ADA

AIR DEFENSE ARTILLERY JULY-AUGUST 1993

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Intercept Point

A consensus about how Air Defense Artillery should conduct business in today's post-Cold War environment and how it should fight on tomorrow's battlefield has been building for some time. During the ADA Commanders' Conference in June, it became apparent that ADA leaders, despite the drawdown, now share a common vision of a bright future for Air Defense Artillery. It is a vision that has spread beyond the parameters of the "First to Fire" branch.

Applause for Air Defense Artillery echoes from the Pentagon where senior leaders enthusiastically anticipate the near-term fielding of Patriot PAC-3, the Theater High-Altitude Area Defense System and Corps SAM. During his Commanders' Conference keynote address, Army Chief of Staff Gen. Gordon R. Sullivan lauded ADA leadership in national and theater missile defense, conflict deterrence (Patriot in Southwest Asia) and service to the nation in operations other than war (Hurricane Andrew, Somalia and Hawk on the border). These are ways, he said, Air Defense Artillery is "fulfilling the vision" of a "strategic force" geared toward "decisive victory."

Lt. Gen. Donald M. Lionetti, commander of the U.S. Army Space and Strategic Defense Command, strongly seconded General Sullivan's upbeat view of Air Defense Artillery during his own ADA Commanders' Conference speech. "I know of no other branch with more relevance to the future than Air Defense Artillery," he said. "No other branch does a better job of preparing its leaders for the future."

Lieutenant General Lionetti is a former Chief of Air Defense Artillery, and might be expected to say nice things about the branch, but we get comparable feedback from divisional commanders, particularly those who have received Avengers or Bradley Stinger Fighting Vehicles and now eagerly await the Forward Area Air Defense Command, Control, Communications and Intelligence (FAAD C^3I) system.

Air Defense Artillery is out in front and leading the Army through a difficult period of transition. To maintain our position of leadership, we need to keep on doing what we've been doing: continue to build on the branch's spectacular performance in Desert Storm, continue to leverage the branch's unique capability to counter the entire spectrum of the air threat, continue to redefine ADA doctrine, and continue to produce ADA soldiers and leaders who match the excellence of our weapon systems.

I regard the time I have served as chief of branch as my most challenging and rewarding assignment and the highlight of my career. Having been reassigned to the Pentagon as Assistant Chief of Staff for Installation Management, my biggest regret is that my tenure could not have been longer. My chief consolation is that Brigadier General James J. Cravens has been chosen as my replacement. His selection ensures a continuity of effort, for in his current assignment as assistant commandant of the Air Defense Artillery School, he has been intimately involved with every aspect of "ADA in Transition." Blessed with outstanding leadership skills and administrative talent, he is a superb soldier who will see to it that Air Defense Artillery remains . . .

First to Fire!

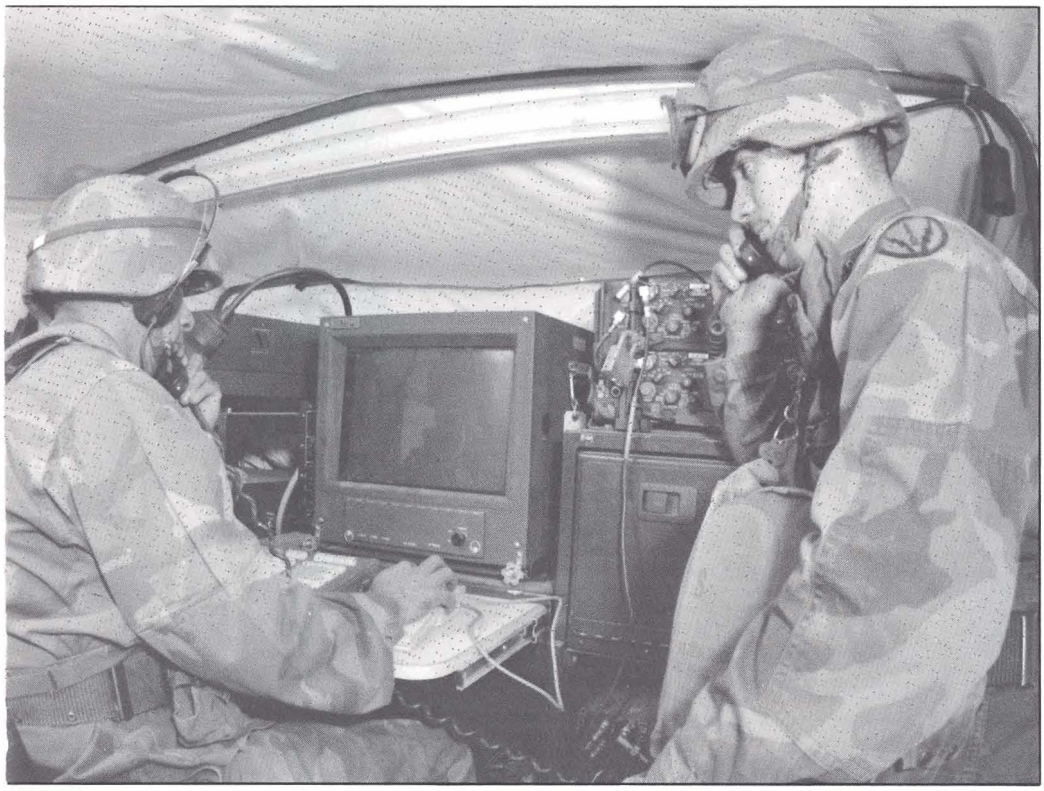
Maj. Gen. John H. Little
Chief, Air Defense Artillery

Brig. Gen. (P) James J. Cravens Jr. replaced Maj. Gen. John H. Little as Chief of Air Defense Artillery, Commandant of the U.S. Army Air Defense Artillery School, and Commander of the U.S. Army Air Defense Artillery Center-Fort Bliss during a July 29 change of command ceremony at Fort Bliss, Texas.

Cravens was commissioned a second lieutenant of Artillery in 1966 upon graduation from North Georgia College where he received a bachelor of science degree in business administration. He also holds a master of science degree from Clemson University. His military education includes the ADA Officer Basic and Advanced Courses, the U.S. Army Command and General Staff College and the National War College.

His most recent assignment was as Assistant Commandant of the U.S. Army Air Defense Artillery School at Fort Bliss. Prior to that, he served as the Director of Requirements, Office of the Deputy Chief of Staff for Operations and Plans, Washington, D.C.

Other key assignments include Chief of Staff, 32d Army Air Defense Command, U.S. Army Europe; Commander, 108th ADA Brigade, 32d Army Air Defense Command, U.S. Army Europe; Chief, Requirements, Programs and Priorities Division, Office of the Deputy Chief of Staff for Operations and Plans, Washington, D.C.; and Commander, 3d Battalion (Chaparral/Vulcan), 61st ADA, 3d Armored Division, U.S. Army Europe.



AIR DEFENSE ARTILLERY

ADA C^2 Systems in the Information Age 4

When ADA commanders have a clear picture of the three-dimensional battlefield, they can make decisions confidently. In the near future, sophisticated command, control, communications, computers and intelligence (C^4I) systems will provide ADA commanders at every echelon the tools they need to make winning decisions on the digitized battlefield.

From Last Defense to Forward Defense 9

The Forward Area Air Defense (FAAD) C^4I system will integrate the new family of FAAD weapon systems, permit the optimum employment of weapons that reduce fratricide and provide divisional air defenders a composite, near-real-time picture of the battlefield.

Full Function TOCs 13

Air Defense Artillery is moving toward a family of standardized and modernized Air Defense Tactical Operations Centers (ADTOCs) to support Patriot, Corps SAM and the Theater High-Altitude Area Defense system.The "full-function" ADTOCs will perform both engagement operations and force operation functions, integrating and synchronizing air defense at all echelons throughout a theater of operations.

COMMAND AND CONTROL

Human Testbed for HIMAD C^2 16

Increasing evidence shows poorly human-engineered automated systems can result in decreased systems effectiveness or even catastrophic systems failure. With computers making most engagement decisions, how will human command and control operaters maintain situational awareness and the skill and proficiency required to react to abnormal situations?

Testing the FAAD C^3I System 18

For forward area air defenders, the "fog of battle" is about to evaporate. The Army has given the Forward Area Air Defense Command, Control, Communications and Intelligence (FAAD C^3I) system the green light for fielding to light and special divisions. The decision followed a series of tests conducted by the Test and Experimentation Command (TEXCOM). TEXCOM is scheduled to begin testing the FAAD C^3I configuration for heavy divisions this fall.

Early Delivery of First GBS 20

The Forward Area Air Defense Ground-Based Sensor will alert or cue Avengers, Bradley Stinger Fighting Vehicles and manportable Stinger teams to the approach of hostile and unidentified aircraft, protect friendly aircraft from fratricide and provide air situation data to command and control centers.

ADA C^2 SYSTEMS IN THE INFORMATION AGE

by Don Harris

This article discusses priorities for the future of Air Defense Artillery command and control (C^2) systems in an environment of changing missions, a focus on new threats and an explosion in information technology. While there are some who advocate that our entire concept of C^2 must be discarded to take advantage of new technology, the conclusion herein is that the fundamental principles developed over time are sound and that technology will be key to executing the "art of command" and the "science of control" according to those principles.

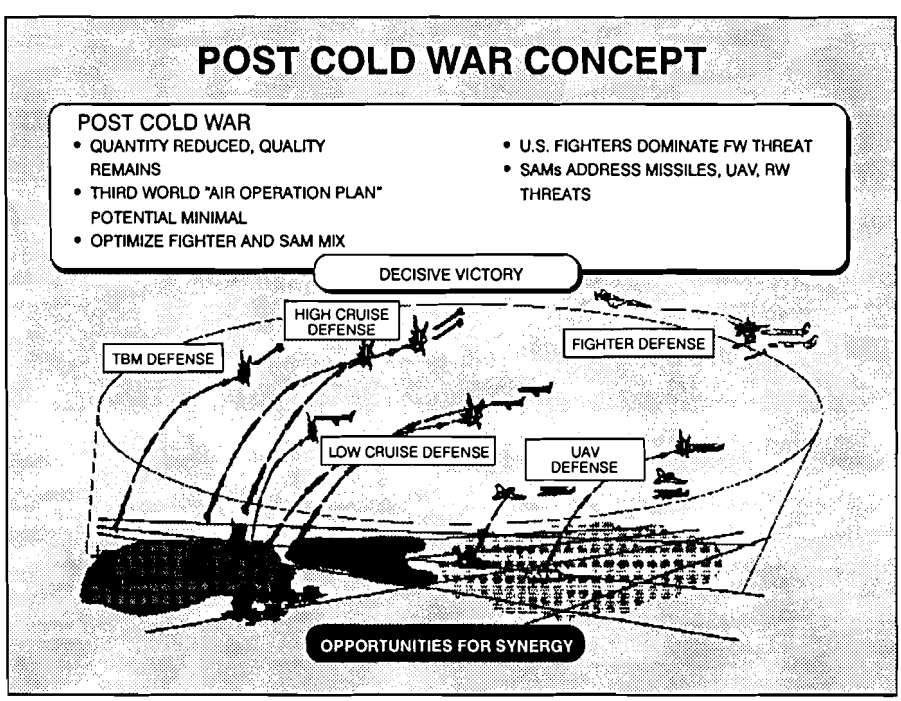
The Army in Change

We had reached a degree of complacency and comfort with our C^2 as we sat hub to hub in Europe facing a known enemy. We were part of a complex, highly structured C^2 system that was being modernized, but not radically so. In the Gulf War, we were thrust into a truly joint C^2 environment with new partners and new structures. We had an opportunity to experiment with new computers, new communications systems, new sources of information, new weapons and a new enemy. We also saw a vivid demonstration of the civilian community's use of information age technology in such areas as real-time news coverage and near-real-time Monday morning quarterbacking by an assortment of armchair tacticians and strategists.

ADA in Change

Air Defense Artillery, a step ahead of most battlefield functional areas in information processing, is also undergoing a revolutionary change in mission priorities and system modernization. The breakup of the former Soviet Union and the Gulf War had a profound effect on air defense. Mission focus has shifted away from killing the hordes of fixed-wing aircraft attacking in the famous "Air Operation Plan" to a new focus on defense of both military and geopolitical assets from a broad array of third dimension threats including tactical ballistic missiles, rotary-wing aircraft, cruise missiles and unmanned aerial vehicles.

In the future we will operate in several environments, sometimes simultaneously, across the continuum of military operations. We must be able to respond to contingencies from operations other than war to sustained land operations. Joint force composition will be tailored and unique for each contingency. As we are doing today in Southwest Asia, Air Defense Artillery may conduct peacetime operations other than war. As the potential for conflict escalates, we may be called on to deploy rapidly and conduct operations anywhere in the world. Further, our force projection Army will operate as part of a joint force, and there is a high probability the Army, in particular Air Defense Artillery, will be operating as part of a multinational, or combined, force. As the focus shifts from a forward deployed to a predominantly stateside-based force projection Army, contingency operations become the norm. As in Operation Desert Storm, Air Defense Artillery will likely employ highly independent, task-organized forces comprised of a mix of ADA weapons and possibly allied weapons as well. Interoperability and standardization, vertically within Air Defense Artillery and horizontally with the joint community, will be essential.



The Essence of C^2

Senior Army warfighters have emphasized that "command and control" is not one word, the point being the distinct difference between command and staff. Command has been characterized as the art of solving complex problems, visualizing a future state, making tough decisions, motivating and guiding — commander's business. Control is the science of implementing the commander's guidance and vision by computing requirements, allocating available resources, measuring performance and recommending adjustments and refinements — staff's business.

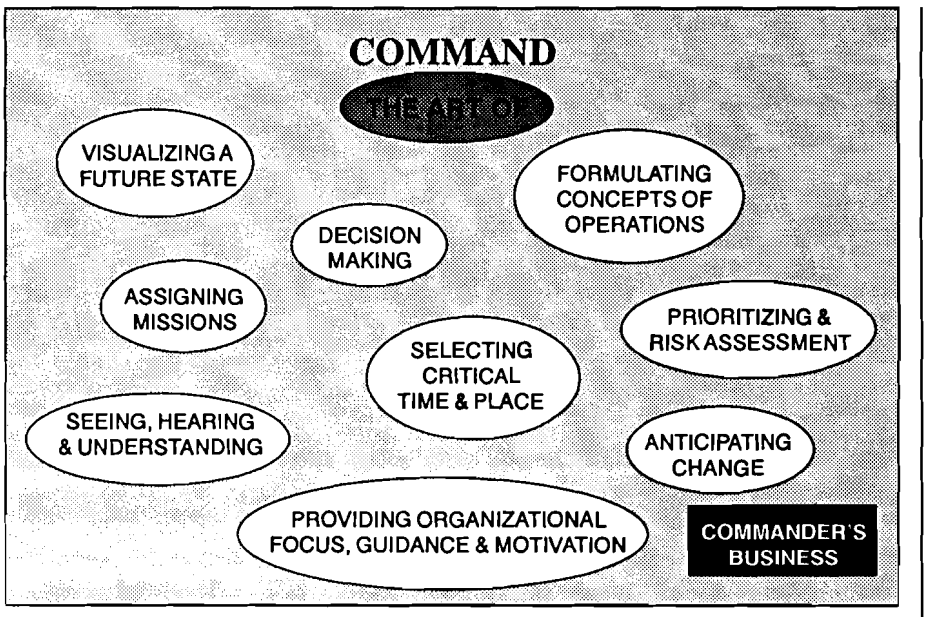
Both commanders and staffs rely on accurate, timely information to do business effectively. Tacticians and strategists through the ages have also known this to be true. Sun Tzu, in the 6th Century B.C., knew the value of information when he advised, "All warfare is based on deception. Therefore, when capable, feign incapacity, when active, inactivity. When near, make it appear that you are far away; when far away, that you are near. Offer the enemy a bait to lure him, feign disorder and strike him. Attack where he is unprepared, sally out when he does not expect you."

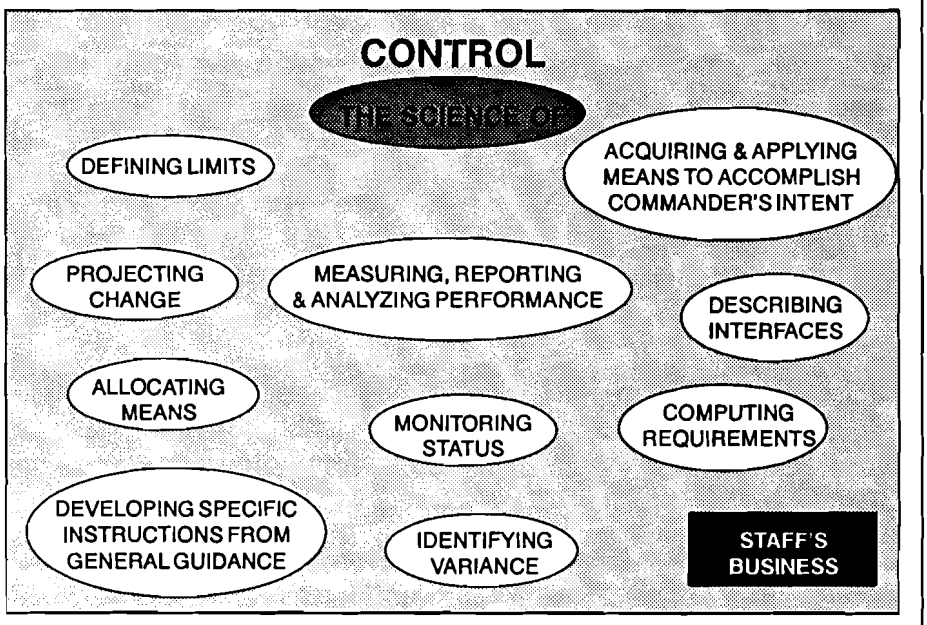
Gen. Carl Maria von Clausewitz, in his great study, *On War*, observed, "War is the province of chance . . . From this uncertainty of all intelligence and suppositions, this continual interposition of chance, the actor in war constantly finds things different from his expectations, and this cannot fail to have an influence on his plans, or at least on the presumptions connected with these plans." On information in war, Clausewitz further observed, "A great part of the information obtained in war is contradictory, a still greater part is false, and by far the greatest part is of doubtful character. What is required of an officer is a certain power of discrimination, which only knowledge of men and things and good judgment can give."

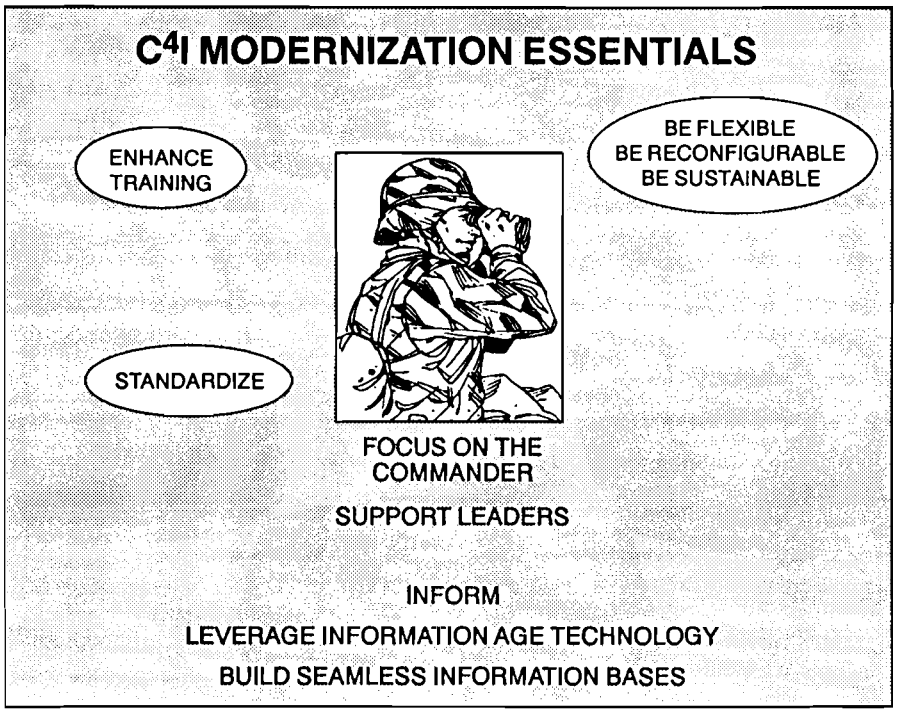
Objectives

The value of battlefield information, the role of the commander's judgment and the importance of his or her ability to visualize future state have not changed from Sun Tzu's time to the post-Cold War era. What then are the attributes of ADA command, control, computers, communication and intelligence (C^4I) systems for the future? The figure on the next page illustrates the fundamental characteristics essential for C^4I modernization.

The commander needs timely, concise and accurate battlefield information to assess the current situation, visualize the future and make and execute good decisions. The C^4I system should bring all applicable information to the commander in a form tailored to his or her preferences and priorities. It should enhance interaction between the commander and staff in conveying the commander's intent, assumptions and constraints. The C^4I system should facilitate an iterative process between the staff and the commander as alternatives are developed and evaluated. Automated intelligence preparation of the battlefield and defense planning will support rapid evaluation and decision making. The C^4I system should also provide a seamless information canvas







vertically between echelons and horizontally between battlefield elements (see figure at the top of the following page). As the tactical situation at a battalion changes, the information canvas at brigade should change. Information gathered by theater sensors that affects the tactical situation must be rapidly sent to the appropriate units. There it must be assimilated with the locally derived information and presented to the commander and his staff. The seamless information exchange implies a high degree of standardization yet a concurrent high degree of flexibility.

C^4I systems must provide several levels of training in the field, including operator task training, integrated system training with live and simulated threats, and joint training. As demonstrated in Desert Storm, C^4I systems must also support review and examination of yesterday's battle to adapt to tomorrow's battle.

C^4I systems are essential to leadership and decision-making. Uncertainty on the battlefield precipitates indecision, delay and error. An informed leader of average capability can make good decisions. A superior leader faced with uncertainty relies on instinct and makes decisions with increased risk.

C^4I systems also contribute to courage and trust. Clausewitz said, "War is the realm of danger; therefore, courage is the soldier's first requirement. Courage is of two kinds: courage in the face of personal danger, and courage to accept responsibility, either before the tribunal of some outside power or before the court of one's own conscience."

When a commander has confidence that he or she has the latest battlefield information and has thoroughly evaluated alternatives in light of that information, he or she can make decisions confidently and accept the consequences without reproach. Robust, seamless C^4I systems also enable trust. When commanders have confidence that their subordinates have the same thorough understanding of the mission and updated, accurate battlefield information, and when they know the seamless canvas will provide them with critical information on the decisions and progress of subordinates, control can be decentralized. Commanders at lower levels can execute their art with vision, decisiveness and innovation.

Initiatives

Our roadmap to future C^4I systems must leverage information age technology in processing, communications and displays. We must stay plugged in to higher level programs such as C^4I for the Warrior and digitation of the battlefield.

C^4I for the Warrior is a Joint Chiefs of Staff-sponsored concept and program. Central to the concept is the establishment of a global C^4I capability that directly links and supports the warriors — the combat troops of all services. This global capability allows the warfighter to plug into the "infosphere" at anytime or place, and brings to the warrior an accurate and complete picture of their battlespace, timely and detailed mission objectives, and the "clearest" view of their target. The Joint Chiefs of Staff's roadmap includes (1) a quick-fix phase that will achieve interoperability between existing C^4I systems through the use of translators, adherence to a common set of joint standards, rigorous testing for conformance and configuration management enforcement; (2) a mid-term phase that achieves total interoperability for new C^4I systems during development, testing, acquisition, and implementation and establishes a joint wide-area network based on digital commonality; and (3) an enduring objective phase during which evolving technologies and techniques are continuously identified and assimilated and a fully developed C^4I network of fused information, updated automatically, is available from which the joint warfighter can pull information to provide the "picture" required on a single display, anyplace, anytime, in the performance of any mission.

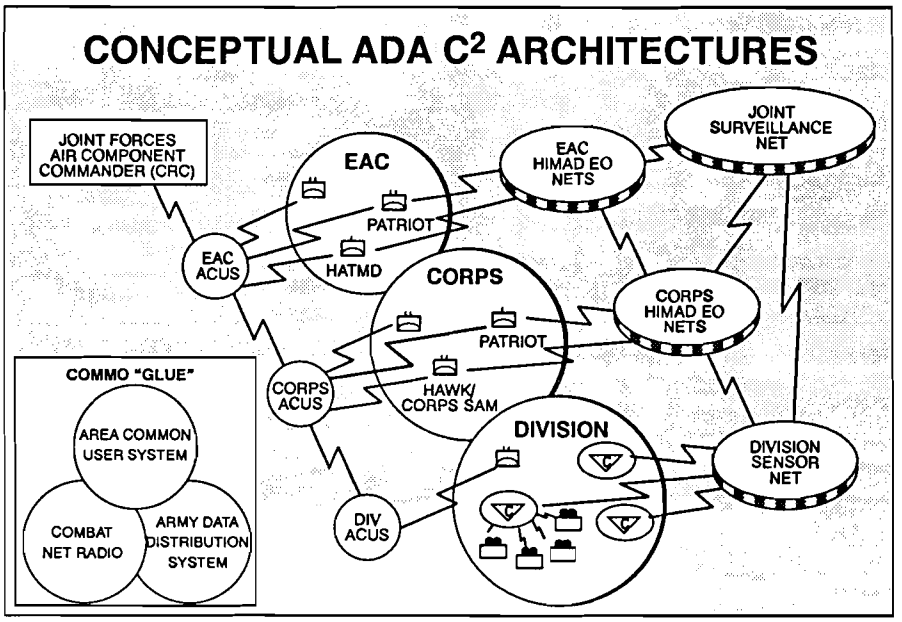
A companion to the C^4I for the Warrior concept is the Army's effort to "digitize the battlefield." The purpose of this effort is to "provide the warfighter an integrated digital information network that supports warfighting systems and assures C^2 decision-cycle superiority. In digitizing the battlefield, the Army's goal is to adapt methods of ad-

vanced information technology and make them as intrinsic to warfighting as any weapon. The effort to digitize the battlefield recognizes that today's combat power comes from the synchronized application of complementary weapons capabilities. Rapid deployment mobility and maneuver to gain positional advantage and achieve surprise, coupled with real-time targeting for standoff engagements, reflect modern warfare doctrine. Execution according to this doctrine requires proper timing and sophisticated and integrated C^2 joining land, sea, air and space.

Air Defense Artillery is also modernizing to meet the challenges of changing missions and threats. Avengers and Bradley Stinger Fighting Vehicles are being fielded now. Forward area air defense (FAAD) C^3I will begin fielding later this year. Patriot Advanced Capability-3 is in development and scheduled for fielding in FY98. The Theater High Altitude Area Defense system is scheduled to achieve a limited deployable capability in FY96 and will be fielded in FY02, followed as soon as fiscally possible by the Corps Surface-to-Air Missile system.

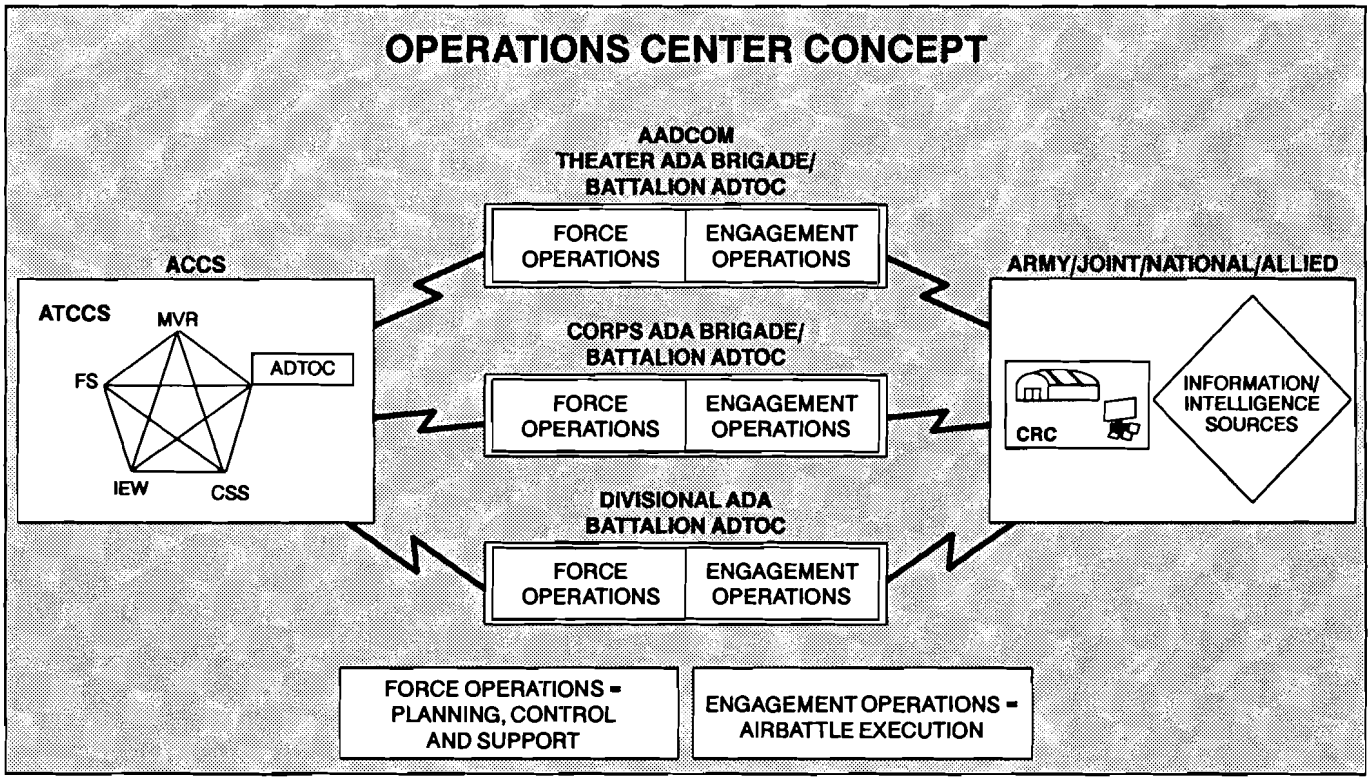
As no surprise, the heart of ADA C^4I is modernization and standardization of tactical operations centers (TOCs). Our vision for the air defense TOC (ADTOC) is a set of modular, reconfigurable TOC functions and supporting facilities that are fielded from battery to brigade in packages tailored in size and capability to each echelon and type of unit, but which are composed of common hardware and software.

It is envisioned that the ADTOC will be available in several configurations that will be applied by tables of organization and equipment according to the functions and missions of the organization to which the ADTOC is assigned. For example, a soft-top standard integrated command post system HMMWV variant may support FAAD battery operations, while two HMMWV standard integrated command post systems, electronically interconnected, may be required for



FAAD battalion operations. Other shelter configurations with additional equipment and software capabilities may support longer range missile defense forces — Patriot, Theater High Altitude Area Defense and the Corps Surface-to-Air Missile system. One or more five-ton configurations, for example, may be required to support these battalions and the air defense brigade operations. While the exact size and shape of an ADTOC is subject to further definition, most important is the precept that all ADTOC variants are based on common software and hardware that implement common functions using a common set of procedures. The standardization, flexibility and common database of the ADTOC, coupled with common communications protocols and equipment, is the basis for the seamless information canvas within ADA. The ADTOC will bring information from a variety of sources to the commander and staff in a tailorable form. Multimedia information will be commonplace, to include near-real-time processing and display of imagery. The ability to reconfigure workstations in the ADTOC will allow the commander to select areas of interest and the depth of information required. To the question asked earlier in this article, "What is the new role of the commander in the real-time fight?", the answer is "Whatever the commander wants." The C^4I system, in particular the ADTOC, must be tailorable to fit the way the commander wants to fight. In the past, separation of fire direction centers and operations centers largely precluded the commander's involvement in the real-time battle. While the advisability of his being deeply involved is open to debate, the TOC design must not be the determining factor.

Our future vision includes standardization of communications equipments and protocols. The Joint Tactical Data Information Link J (TADIL-J) will be used within all ADA units, thereby facilitating the seamless architecture. Because TADIL-J is also the Department of Defense's choice for standardization throughout the services and with NATO (called Link 16), Air Defense Artillery will be able to readily communicate without multiple levels of translation and interpretation. Participation on a joint surveillance net will provide exchange of real-time information between ADA and airborne warning and control systems, JSTARS, Rivet Joint, Navy aircraft and surface vessels and Marine elements. Horizontal integration with the rest of the Army battlefield elements will be achieved through exchange of standard U.S. Message



Text Format data messages to the Army Tactical C^2 System for corps and below and to the Standard Theater Army C^2 System for echelons above corps.

Near-real-time and real-time information from a variety of intelligence sources will be integrated in ADTOCs at battalion and brigade through the use of the Department of Defense standard intelligence radio, the commander's tactical terminal hybrid.

Obstacles to Success

Can we achieve these goals? Technology will not stop us. Local and wide area networks, multimedia information, reconfigurable high resolution displays and very high speed processing are all available in the commercial sector. However —

- *Add* mud, heat, cold and someone trying to kill you, and the problem gets tougher.

- *Add* a stovepiped acquisition system that has a record of building single-purpose C^2 systems with unique hardware and software, and expensive post-deployment software support, and the problem gets tougher. (Our goal of fielding standard TOCs across all ADA systems runs counter to materiel acquisition and funding by weapon system.)

- *Add* the difficulty of defending a C^2 system through the budgetary process and the problem gets tougher. (Couldn't we write a separate requirement for a standard C^2 system? We could, and we have in the past. Unfortunately, when dollars are scarce and weapons program funding competes against C^2 system funding, C^2 loses. Part of the difficulty is in quantifying the value added by C^2 in terms of aircraft kills, assets defended and other standard measures. Our repertoire of simulation models is focused on weapons and, in many cases, does not include C^2, partially because of the difficulty of modeling complex networks with humans in the loop. There is unanimous agreement that C^2 is important. The question is how much is required.)

- *Add* a drastic decrease in the budget of the Department of Defense, and

- *Add* all the problems and the challenge becomes formidable, but knowing what we want to do is the first step.

Summary

Our experience with the Patriot TOC and FAAD C^2 has refined our view of the ADTOC. In addition, several ADA C^2 prototypes currently in development have been used in exercises. Feedback from soldiers who use these prototypes is essential to future success. We are intent on capturing the detailed requirements for ADTOC functions in the ADTOC user functional description. This document, written by the combat developer and comprising some 500 pages, will bridge the gap between concise system-level operational requirements and detailed hardware and software specifications. This living document will continue to be improved with time.

Information age technology is here. Air Defense Artillery must leverage this technology to achieve the C^2 capability for tomorrow's battle.

Don Harris is the chief of the Command and Control, Computers, Communication and Software Division, Directorate of Combat Developments, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

FROM LAST DEFENSE TO FORWARD DEFENSE

FAAD C^3I will change the way we employ FAAD systems

by Maj. James Ivey

Divisional air defense is constantly challenged as the roles and missions of the Army change to meet today's global confrontations. The dynamic world situation can quickly degrade into conflicts that will require rapid projection of our stateside-based contingency forces and will test the mettle of our air defense systems. The challenge, then, is to integrate FAAD weapon systems into a robust air defense network. FAAD C^3I, through automation, provides this integration.

What divisional air defense battlefield missions will the FAAD C^3I system perform? The C^3I system must provide targeting information to alert and cue weapon systems, automatically integrate FAAD elements and other forces, alert the force, reduce fratricide and facilitate execution of the battle by providing force protection from lodgement through decisive operations and redeployment. It is a key ingredient to decisive victory — win quickly with minimum casualties.

Today, divisional air defense still relies on the manual short-range air defense control system. The defense planning process begins with a mission and a thorough understanding of the commander's intent. The aerial intelligence preparation of the battlefield is developed to determine likely air avenues of approach and to define named areas of interest (NAIs) and targeted areas of interest (TAIs). Then priorities for protection are determined and limited air defense assets are task organized using the principles of mission, enemy, terrain, troops and time available (METT-T) to support the concept of operations. Included in this process is the development of a "sensor" plan (scout employment, Figure 1). Scouts must be employed to observe the NAIs and TAIs; they are a limited asset constrained by "eyeball" technology.

Scout teams use binoculars to search for aircraft, then transmit targeting information over voice radios (a slow process!) to the air battle management operations center (ABMOC). It is then plotted and distributed to the fire units over early warning nets (a slower process). There are numerous shortfalls and limitations inherent in this manual process. Information passed across the voice nets is not timely, accurate or adequate. We're using the same method of C^3I we used in 1945 (Figure 2)!

The scout team's "eyeball" acquisition limits what they can see, constrained as it is by range and visibility (obscurants, weather and daylight).

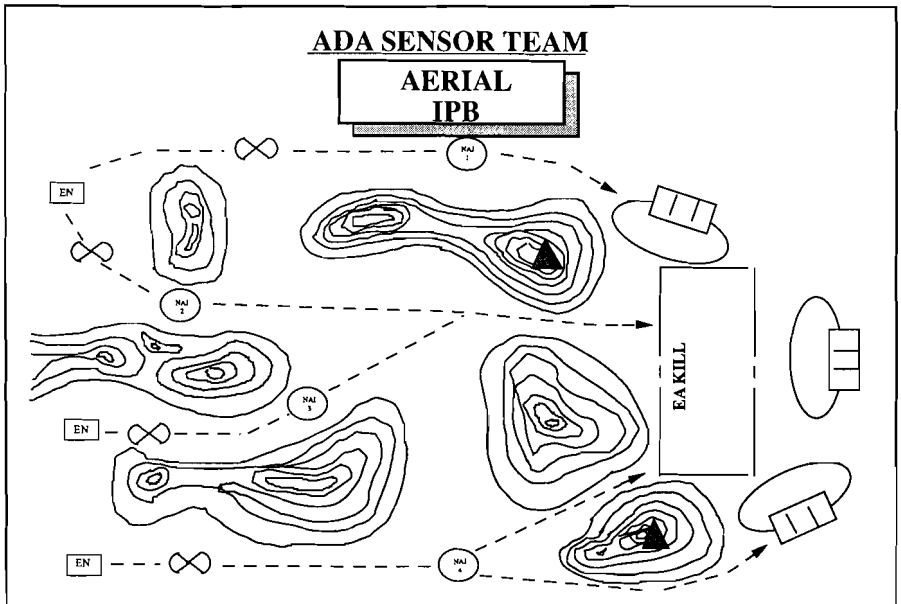


FIGURE 1

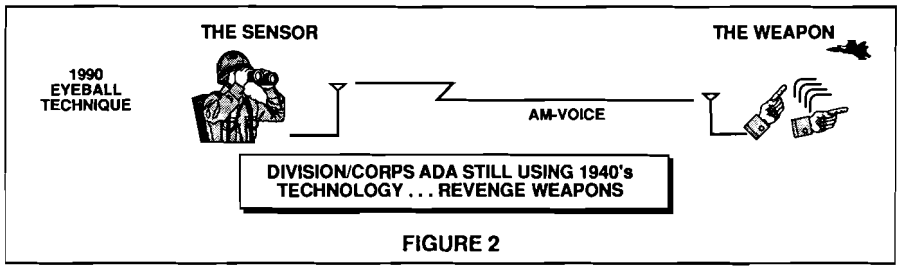


FIGURE 2

As a result, battlefield situational awareness is only available for areas within the ADA scouts' field of view. Further, we can observe only a finite number of aerial NAIs and TAIs on only the most probable air avenues of approach. The small piece of the battlefield that the scouts observe (METT-T dependent) assumes significant risks to the division's rear and exposed flanks on the non-linear battlefield. Coincidentally, the rapidly escalating proliferation of unmanned aerial vehicles and remotely piloted vehicles further exacerbates the air defense unit commander's ability to detect, acquire and destroy these reconnaissance vehicles in critical counter-reconnaissance, intelligence, surveillance and target acquisition (RISTA) operations.

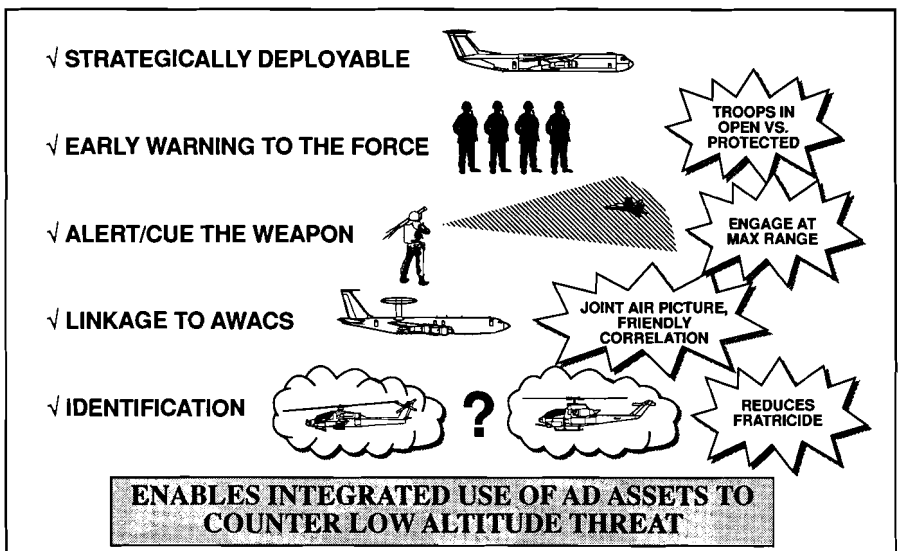


FIGURE 3

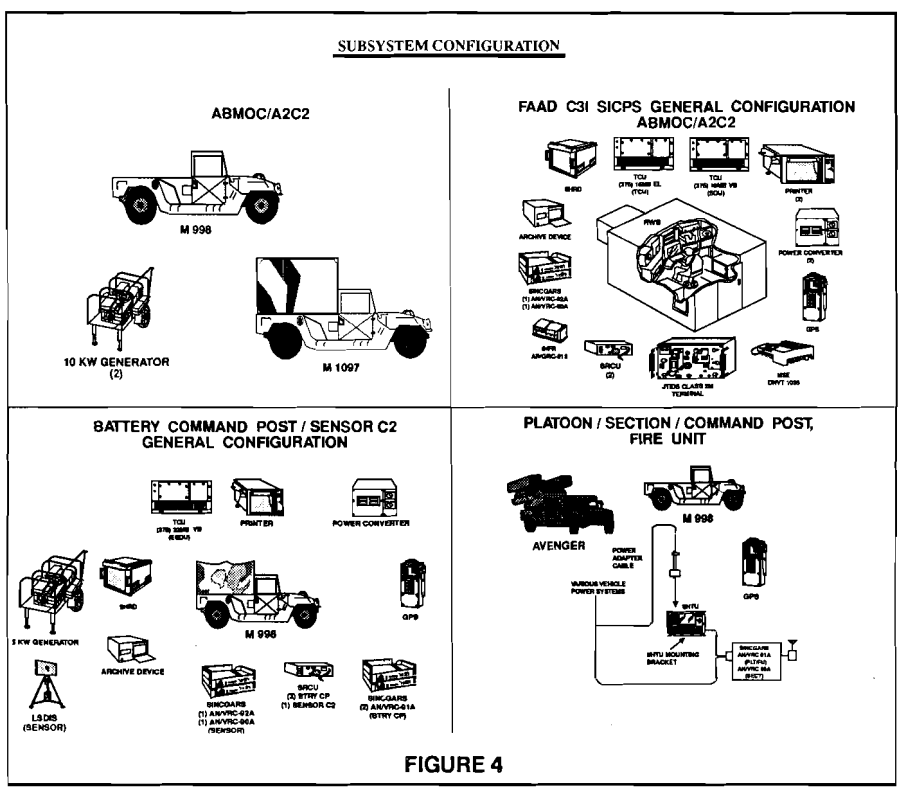


FIGURE 4

Finally, we have a finite number of air defense weapons on the battlefield today. Scouts are unable to provide even near-real-time alerting. Track reports are history by the time the manual process passes early warning to the fire unit. Thus, we are forced into point defenses of the highest priority assets that are most critical to the execution of the commander's intent. We continue to assume unnecessary risks elsewhere in the division's area of operation. On the non-linear battlefield, our exposed flanks remain uncovered. We cannot alert the force in a timely manner and we do not have the real-time situational awareness required to reduce fratricide.

What is the challenge? Design a robust, modular, automated command and control (C^2) system for divisional air defense. It must be strategically deployabl and flexible to counter current and future threats. It must provide real-time situational awareness and identification throughout the division area of operation, pass targeting information to alert and cue the weapons platforms and alert the force, automate force operations and engagement operations, interface with other air defense units and possess growth potential to incorporate future state-of-the-art technologies (Figure 3). To meet this challenge, the U.S. Army initiated an aggressive development of a FAAD C^3I system. The first phase of this system will be fielded to the light and special division air defense battalions beginning this summer.

The FAAD C^3I system consists of the light and special division interim sensor (LSDIS) and the automated C^2 subsystems that provide targeting and C^2 information and orders to Avenger and manportable Stinger weapon systems. Automated C^3I subsystems include remotable common hardware and software processors, displays, specialized FAAD software and communications equipment, all of which aid in the acquisition, identification, processing and real-time distribution of C^2 and air track data. FAAD C^3I consists of the following (see Figure 4): ABMOC,

Army Airspace Command and Control (A^2C^2) node, Sensor Command and Control (Sensor C^2) node, Battery Command Post (CP), Platoon Command Post (computer), Section Command Post (computer) and Fire Unit (computer).

The ABMOC is the centerpiece of the C^3I system. Housed in a Standardized Integrated Command Post System shelter mounted on a heavy HMMWV, it is the primary interface for receipt and processing of external air tracks from airborne warning and control systems (AWACS) (via joint tactical information distribution system [JTIDS] radios). These AWACS tracks are processed, filtered and viewed on a 400- by 400-kilometer high resolution situation display. Additionally, air defense C^2 information and orders are monitored and displayed to the operator. This engagement operation information is broadcast to the Sensor C^2 subsystems via digital data radios, all transparent to the operator. The ABMOC's force operations functions also include an interface with other battlefield functional areas via mobile subscriber equipment and defense planner software that will enable S-3s to plan and analyze the effectiveness of air defense coverage.

The A^2C^2 node, located at the divisional tactical operations center, monitors the same divisional air picture as the ABMOC (via JTIDS radios) 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 the subordinate units. The A^2C^2 shelter is configured like the ABMOC. Its redundancy provides for continuity of operations when the ABMOC is moving or nonoperational.

The Sensor C^2 element receives external tracks and engagement operations information from the ABMOC/ A^2C^2 via digital data radios. 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 CP, platoon CP, section platoon, fire units and combined arms).

The battery, platoon and section CPs receive digital data from their local Sensor C^2 node and battle management messages. These command posts will process, filter and display the air situation to their operators. The battery CP situation display (100 by 100 kilometers) will assist in the deployment of the subordinate platoons and providing situational awareness to supported brigades. The platoon CP situation display (up to 80 by 80 kilometers) will assist the platoon leader in the deployment of the manportable air defense system sections and Avenger fire units and is the source of early warning to the combined arms task force. The section CP display is a simplified handheld terminal unit with a situation display (up to 80 by 80 kilometers) and assists the section leader in the deployment of manportable air defense system teams.

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 simplified handheld terminal unit. Weapons effectiveness is maximized by enabling gunners to engage targets at the full range of the system's capability.

Now, with C^3I, real-time alerting and cueing is provided and integrated into divisional air defense planning. With the initial version (LSDIS and single channel ground and airborne radio system [SINCGARS] data distribution), engagement information is updated every six seconds. The objective FAAD C^3I (Ground-Based Sensor and improved data distribution) will provide two-second engagement information updates, thus making FAAD C^3I a real-time system.

To accomplish this transition, ADA is developing, testing and fielding FAAD C^3I in a structured block design approach. This allows for incremental development and improvement based on lessons learned; user inputs; emerging tactics, techniques and procedures; threat; hardware and software improvements; sensors; communications; weapons platforms (integrated weapon displays and identification technologies); and improved battlefield automation interfaces.

Block I (Figure 5) is the current version we will field to the light and spe-

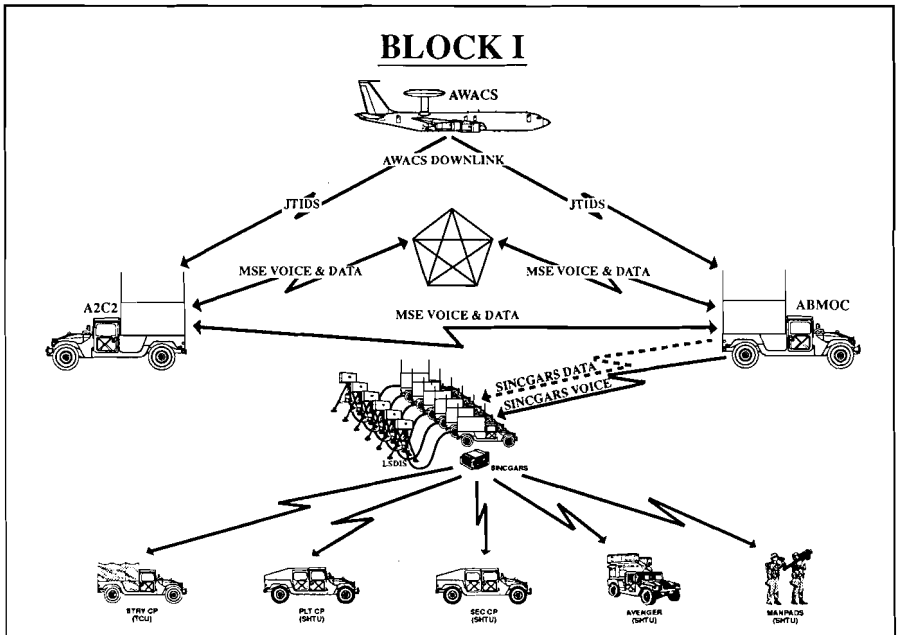


FIGURE 5

cial divisions beginning this summer. The Block I system (Version 3 software) incorporates initial engagement operations, partial air battle management, initial simulation and training, and initial defense planning. The ABMOC subsystem receives AWACS track data via JTIDS radios and broadcasts via SINCGARS radios to the Sensor C^2 subsystems. The Sensor C^2 correlates the external AWACS air picture with its local two dimensional LSDIS radar (20-kilometer range) and broadcasts engagement operations (six-second updates) via simplex SINCGARS digital data nets to subordinates in its area of interest. SINCGARS retransmission teams can extend the range from the ABMOC to the Sensor C^2 elements. Ranges from the Sensor C^2 to the fire units can be extended by configuring the platoon CPs, section CPs or fire units as relays.

Block II (Figure 6), for the heavy division, is projected to be fielded in FY95. The Block II system (Version 4 software) will improve force and engagement operations and add the capability of interfacing with the three dimensional GBS (as well as maintaining an interface capability with the LSDIS). The improved data communications (speed and throughput) and automated interface with the global positioning system will provide duplex data communication and uptell of subordinate system air battle management information. This, along with external tracks from AWACS and high- to medium-altitude air defense, will provide a complete situational air picture of the division's area of interest down to the fire units (two-second updates), thus greatly enhancing the effectiveness of the FAAD weapons systems.

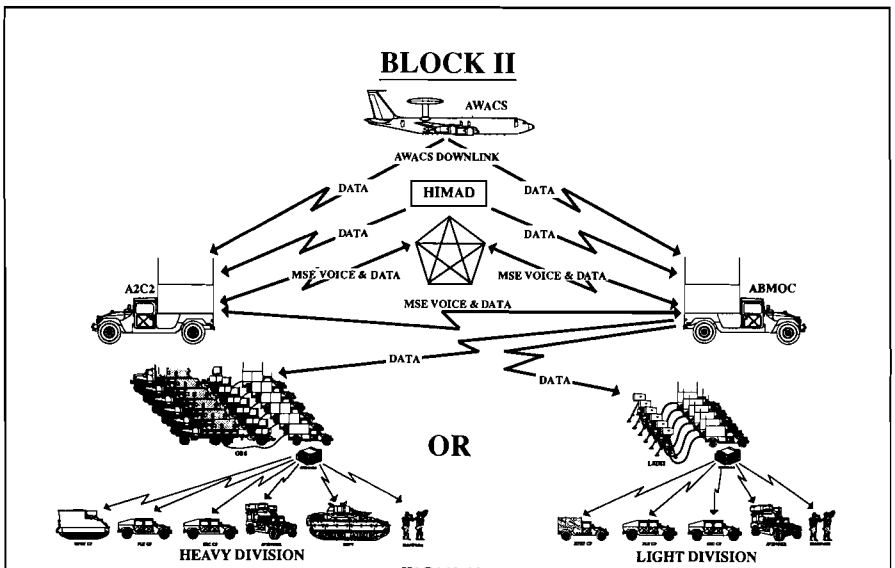


FIGURE 6

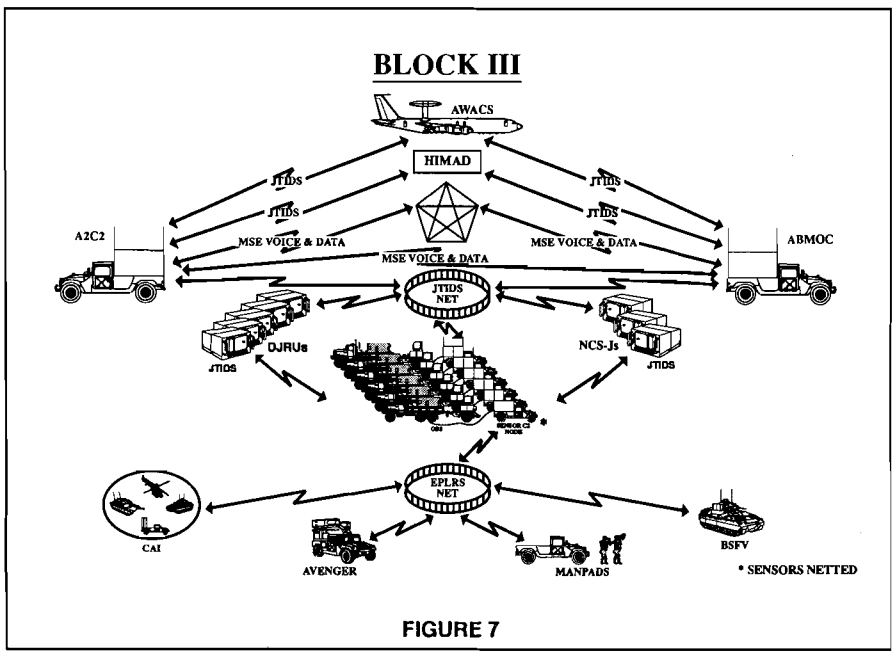


FIGURE 7

Block III (Version 5 software, Figure 7) is the objective system, and is currently planned for fielding in FY97. It will support the networking of the sensors across the battlefield. Block III will finalize full automation of force and engagement operations and provide a fully automated interface with the other battlefield functional areas through the Army Tactical C^2 System.

So, how will you fight with all this state-of-the-art gizmo stuff? Will it change the way we employ FAAD systems? I submit that FAAD C^3I will change the way we plan, employ and fight our limited divisional air defense assets. We will still do our planning processes (mission, commander's intent, METT-T, air intelligence preparation of the battlefield, identification of air avenues of approach, NAIs, TAIs, etc.), but with the defense planner it will be faster and more thorough. It will enable the battalion S-3 to review sensor and weapons coverage on digitized terrain and run scenarios against the defense to test its effectiveness. The S-3 can quickly adjust the plan to maximize coverage and engagement.

External air tracks from AWACS and high- to medium-altitude air defense will be correlated with internal netted sensor data to provide a fully integrated air picture of the division's area of interest. Real-time alerting and cueing will maximize the capabilities of our weapon systems. Situational awareness

will be magnified tenfold and will extend to the limits of the division's area of interest. Today's limitation of our scouts' acquisition and detection capabilities will shift to the limitations of our weapons systems. Unconstrained by detection and acquisition, we can push our systems out to maximum engagement potentials.

Previously exposed flanks on the non-linear battlefield are history. FAAD C^3I will allow air defense to move the weapon systems off of critical assets and push them out to a broader area of coverage to provide more firepower forward and cover the flanks. We will become a productive contributor to the counter-RISTA mission because we will be able to detect remotely piloted vehicles and unmanned aerial vehicles early and deploy fire units farther out for early engagements. The potential for fratricide will lessen as gunners become more aware of the complete air picture throughout the division's area of operation. Just as important, netted sensors will create one air track file with identification data as an aircraft enters the division's area of operation and will maintain the same track file and identification as the aircraft flies from one sensor's coverage to the next.

How will FAAD C^3I change the way we do business? It will permit us to cast off the critical asset, point defense mentality. We will plan and employ our systems forward and to the flanks to go out and get the threat rather than lie back and wait. We will convert from last defense to true forward defense.

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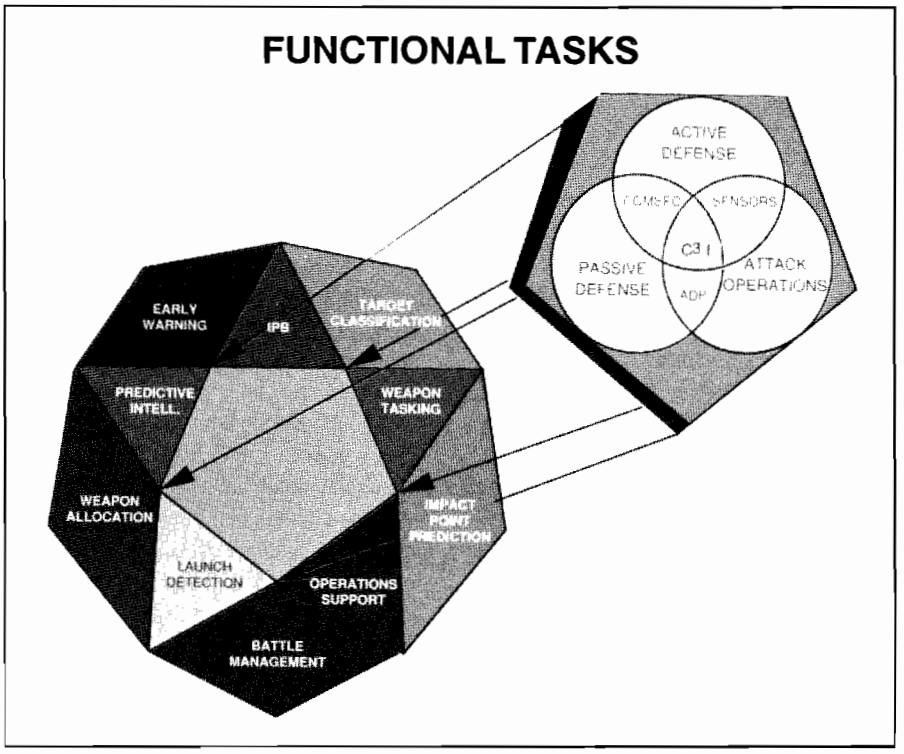
FULL FUNCTION TOCS

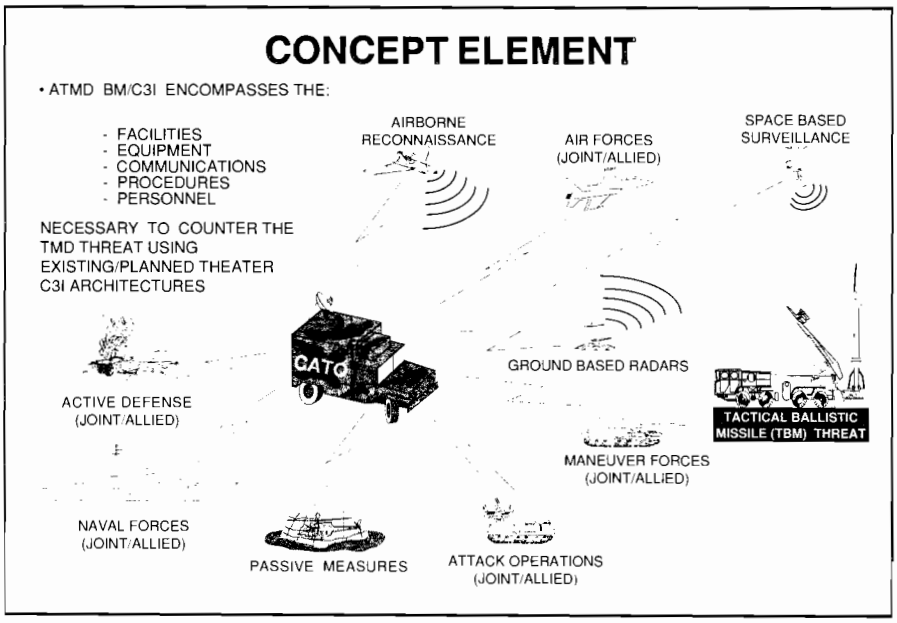
by CWO 2 Thomas Reiser

Air Defense Artillery is modernizing and upgrading its tactical operations centers (TOCs). The need for modern, automated and integrated TOCs has been identified and prototype (developmental) efforts are underway to put modern TOCs in the hands of ADA warfighters. These TOCs and their integration into our "system of systems" concept for theater missile defense constitute the focus of this article.

Today, only Patriot with its Patriot Anti-tactical missile Capability-2 missile has the capability to kill tactical ballistic missiles (TBMs) in flight. In the near term Patriot will embark on a series of upgrades, known collectively as Patriot Advanced Capability-3, to increase its capabilities against TBMs and cruise missiles. Also in the near term, Theater High Altitude Area Defense (THAAD) will be introduced into the inventory in a deployable prototype version. The longer term goal is to field two THAAD battalions shortly after the year 2000. A third piece in the system of systems is the Corps Surface-to-Air Missile (Corps SAM), the Hawk replacement, also planned to be introduced in the following decade. THAAD is being developed specifically to counter TBM threats while Corps SAM is multi-functional to defend corps forces assets against both short-range TBMs and air-breathing threats (ABTs), including the growing cruise missile threat. All of these new weapon systems are to be fielded in battery configurations and will be assigned to battalions, deployable as task organized forces assigned to ADA brigades at corps and echelons above corps.

Commanders at all echelons need automated capabilities to effectively command and control (C^2) their forces





and sophisticated weapons systems. These capabilities must reside in the TOC used at battery through Army air defense command levels. The TOCs of the future, known as air defense TOCs (ADTOCs), are envisioned to be full-function; that is, capable of performing both engagement operations (EO) and force operations (FO) functions at various configurable workstations and for multiple echelons depending on the situation or need. EO, in a simplistic sense, is a term applied to the real-time air battle. FO, in the aggregate, refers to planning, battle support and other non-real-time C^2 functions.

ADTOCs are envisioned as flexible, modular, distributable and reconfigurable C2 systems that will be replicated throughout the Army ADA architecture, and include facilities for ADA liaison elements at locations like a control and reporting center. The ADTOC incorporates the objective TOC capabilities that will be used throughout Air Defense Artillery. ADTOCs could eventually replace all existing C^2 systems (including battle management and fire control systems) in Army air defense. ADTOCs will be found at organizational levels from battery to Army air defense command, with each containing "common" hardware and software and performing many similar functions but with differing physical configurations and functionalities. ADTOCs will enable air defense battlefield integration, execution and control, in a common facility, for a mix of weapons and associated command, control, communications and intelligence (C^3I) systems. ADTOCs will support full integration and synchronization of air defense (including TBM defense) activities; vertically with air defense operations at all echelons from tactical to strategic, including with joint and combined air defense forces; horizontally with similar ADA units at all echelons and with the supported theater or maneuver forces.

ADTOC functionality will be tailored to the mission and echelon of employment through hardware and software modules and also through initializable software parameters. ADTOCs will be the entry point for C^2 information and the normal entry and fusion point for information from non-ADA sources such as theater and national intelligence systems, with fused data shared throughout the air defense and theater missile defense networks. Unfortunately, this full-function capability and integration of EO and FO does not exist today. Much of today's FO in ADA is still grease pencil and acetate overlays.

Today ADA brigades still use the AN/TSQ-73 Missile Minder for ABT-related EO functions, while FO functions are normally accomplished manually. Brigade-level FO functions for the TBM war are in the process of being refined and validated. Future brigade TOC developments must consider the requirements of the echelons above corps ADA brigades as well as those of corps ADA brigades.

A Patriot battalion or battery TOC effectively conducts EO using the weapon system control vans, information and coordination centrals (ICCs), and engagement control stations respectively. At the Patriot battery, FO functions are primarily performed by the battery commander in a tent, van or Humvee using radios, telephones and some unit-level computers for battery administration. Until recently, Patriot battalions had this same primitive FO capability. That situation, however, is changing. At the battalion level, the Patriot Project Office is fielding battalion TOCs (BTOCs) to each of the Patriot battalions (10 total) to help correct today's lack of automated FO planning capability. The 11th ADA Brigade and the 108th ADA Brigade have also received BTOCs. The 69th ADA Brigade, along with three more Patriot battalions, is scheduled to receive the BTOC by the end of 1993.

The current BTOC represents an initial FO capability designed to fill the void until a more complete ADTOC capability is developed and fielded. The BTOC automates tactical planning over Defense Mapping Agency CD ROM maps and features situational awareness displays that show the air picture received over a dedicated cable link from the ICC. Soon, the capability to interface with a brigade AN/TSQ-73 will be implemented. The BTOC also incorporates externally sourced intelligence information, improving situational awareness by allowing the commander and staff to view a much larger geographic area than the ICC's area of interest. The display can also be recorded and played back for training and

for use in after-action critiques. Near-term planned improvements include complete TBM defense planning, communications planning and mission reports capabilities.

The BTOC consists of a standard five-ton expansible van modified with installation kits for two tactical planner workstations, a communications processor, a tactical-information broadcast service receive unit and two color inkjet printers. The BTOC also contains installation harnesses for unit-owned FM radios and workspace for the decision aspects of FO functions performed by the commander and staff.

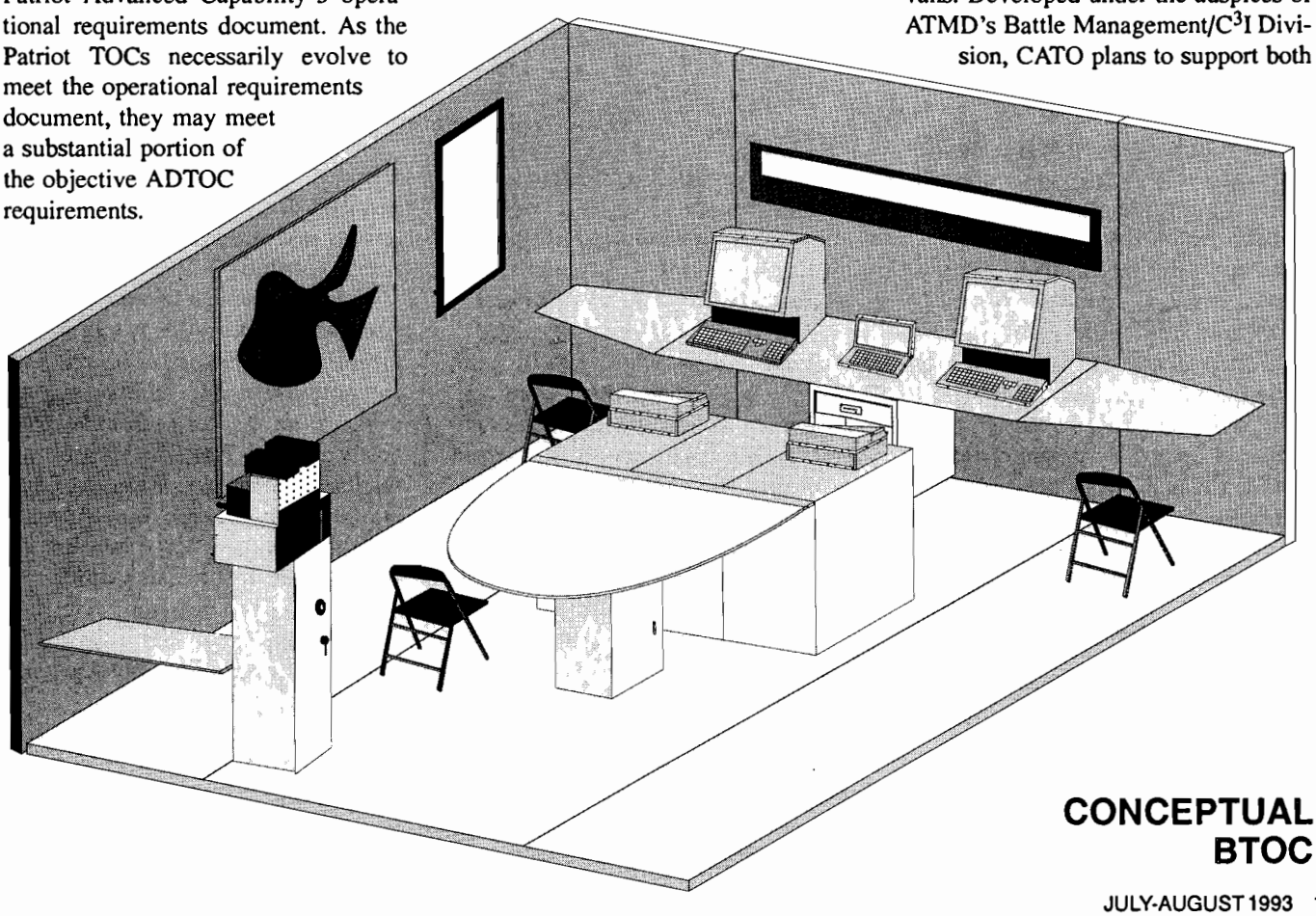
The Patriot BTOC is an important "first step" in providing automated FO for the battalion commander. Twelve BTOCs will be fielded by the end of the year, and a five-year growth program initiated by the Patriot Project Office will result in significant evolution of battalion- and battery-level TOCs to meet the needs outlined in the user's Patriot Advanced Capability-3 operational requirements document. As the Patriot TOCs necessarily evolve to meet the operational requirements document, they may meet a substantial portion of the objective ADTOC requirements.

Additional Army efforts in both the THAAD and Army Theater Missile Defense (ATMD) Project Offices are underway to ensure Air Defense Artillery will eventually field the objective ADTOC capabilities. The THAAD Project Office is on a path to develop a battery-level TOC for THAAD, emphasizing THAAD EO with adequate FO to assist the Patriot BTOC in defense design. THAAD's developmental battery TOC provides one piece of the ADTOC solution: THAAD EO. However, it does not currently contain any capability to deal with the ABT. ABT EO could be the next logical step in the THAAD TOC evolution (i.e., the ability for a THAAD TOC to manage the ABT air battle for the Patriot batteries with EO capabilities similar to the ICC).

The THAAD TOC would also have to expand its FO and other similar data processing capabilities. While it is probably not feasible for Patriot to have all of its TOCs (ICC and BTOC combinations) replaced by a THAAD-based ADTOC, the advantages of an additional ADTOC within the enclave are evident in terms of operational flexibility, redundancy and reconstitution.

The ATMD Project Office is sponsoring a brigade-level automation effort known as the Common Automated Tactical Operation (CATO). In CATO, the ATMD Project Office is developing a prototype, real-time, responsive, intelligence supported, automated data management system that greatly increases ADA brigade TOC EO and FO capabilities, and promotes ATMD operations in the joint arena. This program is weighted toward FO functions that have applicability from battery to echelons above corps levels. Its technical advances will be shared with Patriot BTOC and THAAD TOC programs.

CATO, a newly fabricated system of non-developmental hardware and software, has been integrated and configured in three standard Army expansible vans. Developed under the auspices of ATMD's Battle Management/C^3I Division, CATO plans to support both



CONCEPTUAL BTOC

support both the C^2 of subordinate ADA units and also the non-ADA theater missile defense mission areas of attack operations and passive defense. CATO's software packages will enable the integration of real-time intelligence data with electronic map data and situation overlays; computer simulation, wargaming and analysis of current and potential ABT and TBM battles; receipt of other services' operations plans and status; and enhanced internal and external message processing. CATO's key aspect is the proof of principle prototype capability resulting from a combination of non-developmental item hardware and software (government owned or commercial off the shelf) providing FO and EO capabilities within the commander's TOC.

The CATO system underwent initial field evaluation in support of the 31st ADA Brigade (Fort Hood, Texas) in Joint Exercise Roving Sands '93 at White Sands Missile Range, N.M. Lessons learned and additional requirements determined during the exercise will guide the continued development of CATO capabilities and ADTOC requirements definition.

Three related approaches are now underway to prototype and evolve the objective TOC for all ADA echelons in our concept for theater missile defense. They are the THAAD TOC, Patriot's BTOC and ICC combination, and the ADA brigade-level experiments with CATO. Weapons systems tactical EO software will most likely continue to be built and controlled by our individual weapons systems program managers, but EO software above the batteries and FO software at all levels should be able to be shared by all weapons systems and ADA echelons under a future configuration control organization. In the objective ADTOC system, computer hardware is expected to be Army computer hardware common at all echelons. Shelters to house the ADTOCs will be standardized by echelon using either current shelters or, in the case of new weapons systems, the standard integrated command post variants.

The user has articulated the ADTOC vision in a draft ADA C^3I Master Plan that also provides overall implementation guidance and is to be the vehicle to achieve the objective ADTOC capability. The U.S. Army ADA School has prepared a User Functional Description (UFD) document, a "handshake" between the combat and materiel developers that establishes the software functional requirements for ADTOCs and is a comprehensive bridge from the school-developed system's requirements to the materiel developer's system's specifications. The UFD provides the details needed to ensure that the developed product meets all operational needs of the ADA field users.

The evolution of the ADTOC capability is representative of the success that results when the combat and materiel development communities share a common vision and objective. Working as a team with the field user community, the emerging ADTOC will assure flexible, tailorable, responsive, effective and sustainable warfighting capabilities throughout the ADA force on the battlefields of the future.

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HUMAN TESTBED FOR HIMAD C^2

by Dr. John M. Lockhart and Dr. John K. Hawley

One of the defining properties of the next generation of high- to medium-altitude air defense (HIMAD) command and control (C^2) systems is an increasing reliance on automation. The marked increase in weapons lethality and threat approach speeds requires that the engagement process be augmented by technology. Operators must have automatic data processing support to rapidly and simply provide the information necessary for engagement decision making. The time windows involved in present and future C^2 operations are simply too short to consider any other approach.

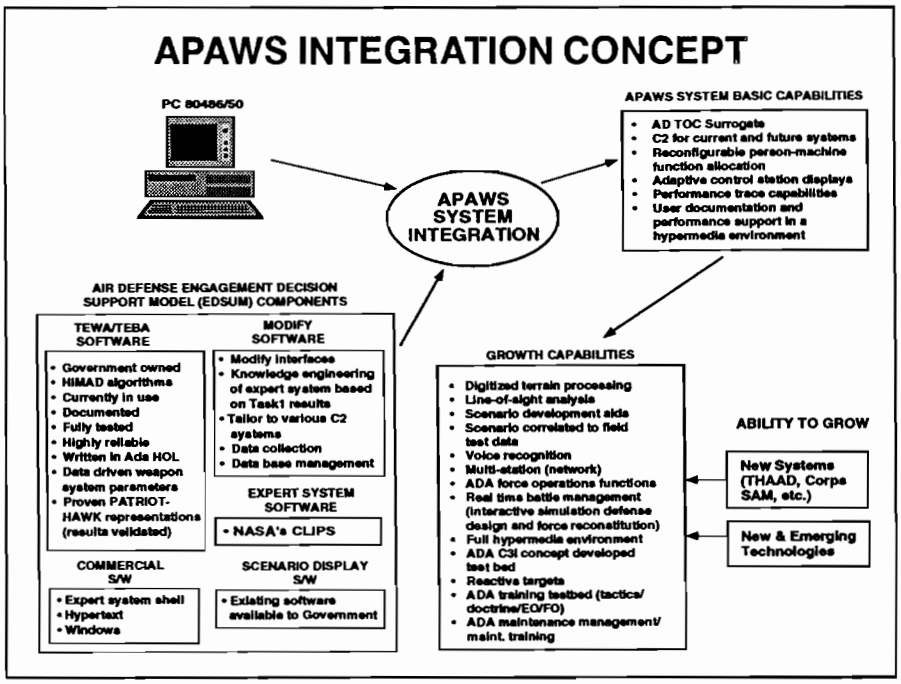
HIMAD C^2 systems include both human and machine components. Recent developments in threat technology have paced a rapid evolution in the technology used to support the machine side of air defense C^2 operations. And as machine technology has evolved, the operator's role in HIMAD C^2 also has changed. Early C^2 systems required operators to perform in a traditional manual control role. That is, within the C^2 complex, human operators had primary responsibility for perception, decision making, response selection and response execution. In contemporary systems, the human operator's role is vastly different. Instead of direct participation in the control process, the operator's role increasingly is one of monitoring a computer and intervening in the case of abnormal situations. Put another way, the operator's role in the face of automation has shifted from traditional operator to supervisory controller.

The impact of automation on human operators is not always positive. There is increasing evidence that poorly human engineered automated systems suffer from a number of problems that

can result in decreased system effectiveness or even catastrophic system failure. The human performance problems associated with improper human-system integration generally fall into one of two categories: loss of situation awareness or skill decay. The essential idea of situational awareness is that operators must keep track of a lot of information from a variety of sources over time and organize and interpret this information to behave appropriately. When an operator is replaced by an automatic controller, his or her level of interaction with the system is reduced. Consequently, when an abnormal situation does occur and requires operator action, the operator may be slow to detect it and may take too long to decide upon the appropriate control actions. The requirement for operators to maintain situational awareness is not eliminated in an automated system, but some automation styles can make it more difficult for them to do so.

There also are longer-term consequences of being removed from the control loop. As they receive less and less hands-on experience, operators may lose proficiency in basic control operations. And when called upon to intervene, their skills may have decayed to the point where they cannot execute the proper control sequence in a timely manner. Research and experience indicate that effective supervisory control requires a skilled operator in somewhat continuous and meaningful interaction with the controlled process.

Recent advances in information technology have resulted in several potential solutions to human performance problems in automated systems. The first of these is dynamic function allocation. In dynamic allocation, both the level and style of automation are variable as a function of operating conditions. Initially, operators can determine their desired automation mode on-line and often can select from several options. Later on, they can change the automation scheme in real-time as the situation requires. Display format adaptivity is the second technological advance having significant potential for improved person-machine integration in automated systems. Adaptive displays are variable in format or logic as a function of mission stage or operating conditions.



Used together, dynamic allocation and adaptive displays create the possibility for a "personalized" soldier-machine interface tailored to mission requirements and to individual operator preferences. These developments represent potential solutions to the problem of situational awareness and skill decay. However, there is at present no general theory and a limited experience base to guide the development of suitable design and operational concepts for human in control of HIMAD systems.

The APAWS Testbed

In response to the problems cited in the previous section, the U.S. Army Research Institute (ARI) has initiated a research program concerned with human performance and training in automated air defense C^2 operations. The focus of this program is the impact of automation on human operators and the consequences of their role change from traditional operator to supervisory controller. To investigate these issues as they relate to present and future air defense systems, the first portion of the effort concerns the development of a human supervisory control performance and training testbed (denoted APAWS) tailored for air defense C^2. The term testbed, in the present usage, refers to a flexible simulation capability that can be used to study a variety of issues involving human performance and training in an automated C^2 environment.

The integration concept for APAWS is illustrated in Figure 1. Key aspects of the concept include (1) software integration vs. software development; (2) use of proven software modules; (3) use of the Ada programming language; (4) hosting the system on a PC-class platform (80486/50); and (5) open, hardware-independent software architecture. When completed, the basic APAWS system will provide decision makers with an air defense tactical operations center (ADTOC) surrogate capable of emulating potential concepts of operation for both current and future systems. The completed platform will support dynamic soldier-machine function allocation, adaptive and reconfigurable control station displays and an

embedded performance assessment capability. Documentation and on-line performance support will be provided in a hypertext format that allows readers instant access to associated graphics and data merely by "clicking" on key words.

The APAWS platform is being developed growth capabilities in mind. From the perspective of supervisory control of air defense C^2 operations, several of the most significant of APAWS' preplanned growth paths include a multimode C^2 configuration, voice technology and simulated participating units (targets, other C^2 nodes, etc.) based on an embedded expert system. The expert system selected for implementation in APAWS is the Ada version of NASA's C-Language Integrated Production System (CLIPS). The embedded expert system will provide the basis for dynamic soldier-machine function allocation and for intelligence performance support features (i.e., job aids) and embedded training. The APAWS platform with CLIPS embedded will provide air defense decision makers with a mechanism for exploring concepts of operation for an explicitly rule-based air defense C^2 system.

The APAWS platform is being developed in three progressive stages referred to as prototypes. Prototype I was completed in January 1993. Stage one consists of the Ada-based Threat Evaluation Weapon Assignment (TEWA) model operating in real time and a preliminary version of an adaptive and reconfigurable control station display.

The second APAWS prototype is scheduled for completion later this summer. In this stage, the TEWA model with be integrated with the control station display to form a generic air defense C^2 tactical operations simulator. Prototype II will also support a run-time-adaptive operator performance assessment capability. A run-time-adaptive performance assessment capability is one in which users can determine operator measures of performance and soldier-machine measures of effectiveness at run time.

Developing the final APAWS prototype will involve integrating the CLIPS expert system into the generic air defense C^2 tactical operations simulator. Rules governing a portion of the engagement operations function set for C^2 of either a Patriot- or Corps Surface-to-Air Missile-like system will also be developed and exercised as a test case. APAWS Prototype III will provide a platform for conducting empirical research on concepts of operation for humans in control of future air defense systems. The platform will also provide a vehicle for examining the impact of various advanced technologies applied to air defense C^2. Some examples of potential technologies that could be evaluated in this respect include artificial intelligence, hypermedia, fuzzy logic and virtual reality. The platform's flexibility will make it possible to explore C^2 options and the impact of supporting technologies rapidly and cost effectively.

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TESTING THE FAAD C^3I SYSTEM

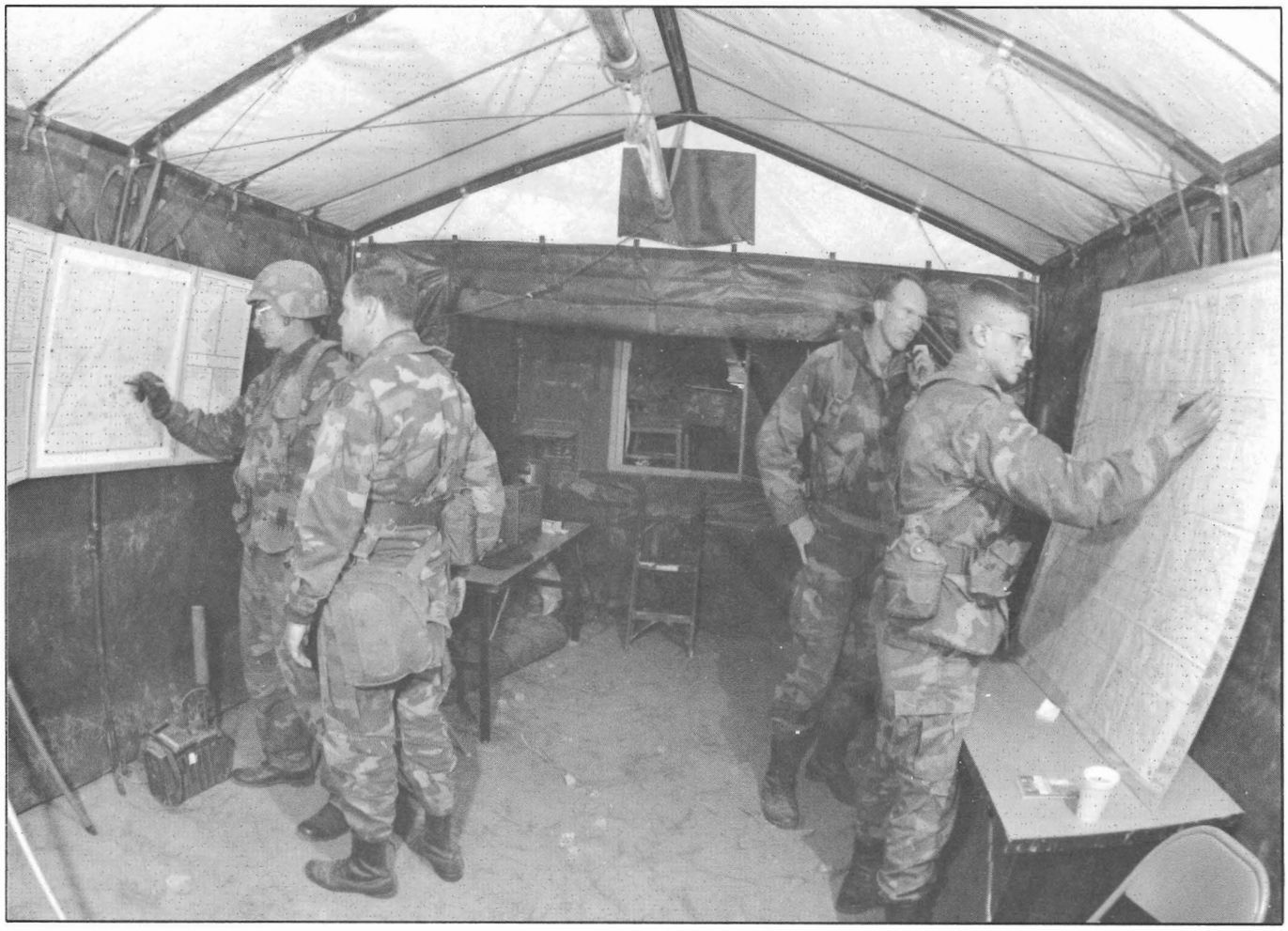
by Maj. Dennis W. Pate

Before a piece of equipment is ever fielded, it must go through a series of developmental and operational tests to ensure it is safe and effective. One of the key tests in this acquisition cycle is the force development test and experimentation.

The Air Defense Artillery Test Directorate (ADATD) conducted the force development test and experimentation and the limited user test for the forward area air defense (FAAD) command, control, communications and intelligence (C^3I) system Jan. 19 to Feb. 26, 1993, to develop tactics, techniques and procedures (TTP) for the FAAD C^3I system and to provide data on its effectiveness. The test data will support an operational assessment and fielding decision for three light divisions in FY94.

The FAAD C^3I system consists of a battalion tactical operations center (TOC), a divisional Army airspace command and control (A^2C^2) and battery- and platoon-level command posts. The system includes the light and special division interim sensor along with collocated sensor command and control nodes. The joint tactical information distribution system radio passes data from the airborne warning and control system to the battalion TOC and A^2C^2, and single channel ground and airborne radio systems provides voice and track data transmission down to fire unit level. Fire units receive early warning information via the simplified hand-held terminal unit.

The five-phase test took place on the Oro Grande Short-Range Air Defense Range Complex, Fort Bliss. Each phase built upon the previous, allowing for improvement in the TTPs throughout the test. Phase I was a three-day pilot test to validate test control measures, instrumentation, data collection plans and procedures, automated data processing procedures and test scenarios. Phases II through IV involved testing the system according to the operational mode summary and mission profile



(i.e., the FAAD C^3I system was operated under conditions that closely replicated those it will operate in when fielded). The test focused on both individual and collective crew tasks, ensuring that the TTP would properly support the FAAD C^3I system in the field. A doctrinal baseline conducted during the final phase provided data for measuring the "value added" of the FAAD C^3I system as compared to what exists in the Army today. During the test, subject-matter experts from the U.S. Army ADA School assessed both individual and crew performance in an operational environment. Soldiers of 2-6 ADA, Fort Bliss, Texas, manned all elements of the FAAD C^3I system.

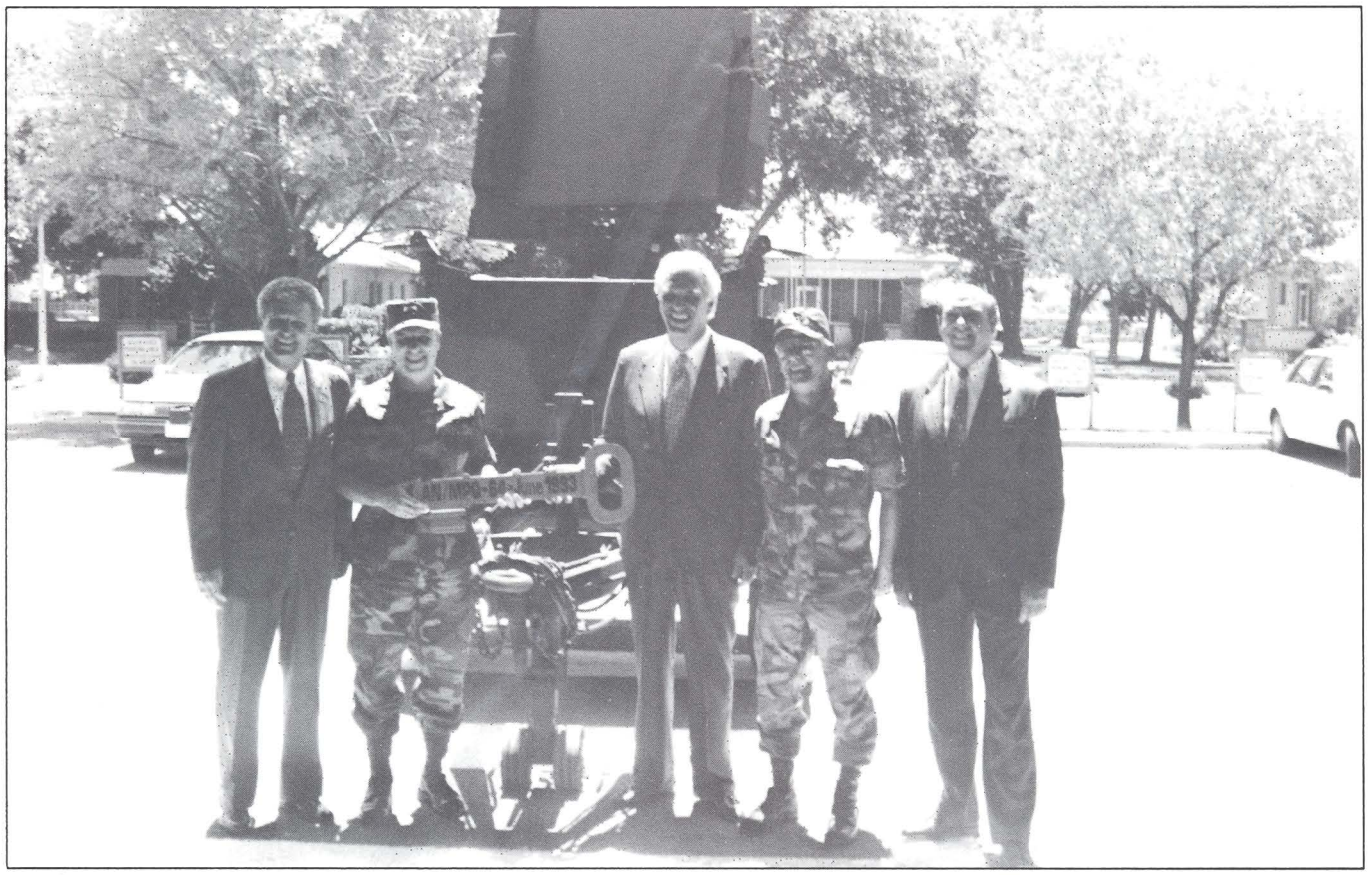
The test report and the operational assessment for this system are just now being released and the project manager, air defense command and control systems (PM ADCCS), has received a "green light" to field the system to three light divisions in FY94.

This series of tests represents the culmination of more than two years of close cooperation between the entire ADA community and Army communications program managers. Since 1991, the ADATD has operated the FAAD integrated test support system (FITSS) testbed for PM ADCCS. This unique approach allowed all agencies to work together to incrementally integrate the hardware, software and TTPs for the system, ensuring that problems identified along the way were properly addressed. Without the advantage of having the FITSS testbed, fielding the FAAD C^3I system in a timely manner would have been much more difficult.

Future testing, scheduled from August to November 1994 for the FAAD C^3I system for the heavy division, will include additional force development testing and an initial operational test and evaluation to support a full-scale production and fielding decision.

Because of the success enjoyed by using the FITSS testbed, the ADATD director is proposing the creation of a similar testbed at Fort Bliss to integrate not only FAAD C^3I but also all of the global protection against limited strikes and battle management C^3I systems. Only through this type of activity can the ADA community ensure successful integration and early fielding of these highly complex systems.

Maj. Dennis W. Pate is chief of the Test Division, U.S. Army Test and Experimentation Command, Fort Bliss, Texas.



Maj. Gen. John H. Little holds the key to the first ground-based sensor. From left to right are Maj. Gen. (Ret.) Donald R. Infante, Little, Dr. Scott Walker, Lt. Col. (P) Mike Howell and Dr. Jim Beck of Hughes Aircraft Company.

EARLY DELIVERY OF FIRST GBS

The U.S. Army took early delivery of the first ground-based sensor (GBS) radar for its forward area air defense (FAAD) system on June 8. The GBS is a key ingredient of the FAAD system's command, control, communications and intelligence (C^3I) subset, which also features an air battle management operations center and a network of automated battery, platoon and section command posts. Other subsets of the five-component FAAD system include the line-of-sight forward (Bradley Stinger Fighting Vehicle), the line-of-sight rear (Avenger) and the developmental non-line-of-sight component. The FAAD combined arms initiative, which consists of product improvements designed to upgrade the inherent air defense capabilities of non-ADA weapon systems, rounds out the FAAD family.

Now known as the AN/MPQ-64, the new generation, three-dimensional radar generates radar track data to inform FAAD weapons of the locations of targets approaching their front-line forces. The first system will be used for training and will allow for an early start of the Army's robust test program at White Sands Missile Range, N.M.

The first radar was delivered to the Army at Fort Bliss, Texas, during the worldwide ADA Commanders' Conference. Dr. Scott Walker, Hughes senior vice president, presented the system key to Maj. Gen. John H. Little, then Chief of ADA.

"This week, as we celebrate Air Defense Artillery's 25th anniversary as an independent combat arms branch, it is hard to imagine a better birthday present than the FAAD ground-based sensor," said Little. "The GBS is the 'objective' FAAD C^3I sensor, an absolutely mission-essential system. It will expand the FAAD engagement envelope and, for the first time, give our forward area air defenders a real-time picture of the battlefield."

Lt. Col. Mike Howell, Program Manager, FAAD Sensors, stated that, "during the Gulf War the AN/TPQ-36 Firefinder caused steel rain to fall on

Iraqi artillery positions. The AN/MPQ-64 will now provide a steel curtain for our troops.

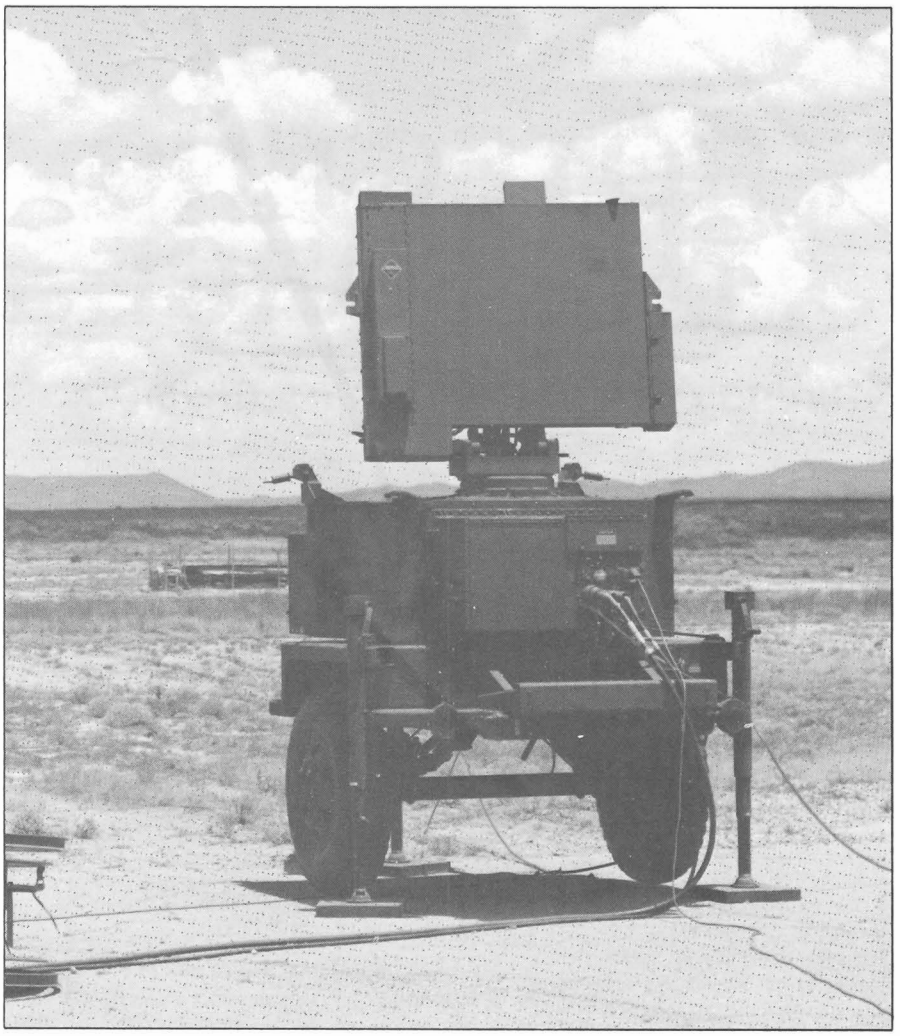
"This radar gives us the capability against moving targets to ranges up to 40 kilometers [25 miles]," Howell continued. "It's very precise in its position reporting, very reliable and it's soldier-friendly."

The U.S. Army awarded Hughes Aircraft Company a contract in early 1992 to produce up to 154 AN/MPQ-64 GBSs, associated spare parts, deployment supplies and services. If all units covered in the contract are ordered, the contract could be worth up to $460 million to Hughes. The AN/MPQ-64 was formerly known as the Hughes TPQ-36A radar.

The premature retirement of the Forward Area Alerting Radar (FAAR), which left the Army with no air surveillance and target tracking/weapon assignment radar for use in the forward area, added urgency to the GBS project. As a stopgap measure, the Army has rushed Lockheed-Sanders' Light and Special Division Interim Sensor (LSDIS) to the field. The LSDIS temporarily replaces the FAAR in ADA units assigned to light and special divisions until the GBS is fielded, but other FAAD ADA units will be deprived of the division area air picture (hostile and friendly) and data required for weapon targeting until the GBS is fielded.

The air threat in the forward area is one of the most pressing problems for modern battlefield commanders and is comprised of heavily armed helicopters, unmanned aerial vehicles and fixed-wing aircraft. The key problem is to acquire, track and hand off these targets in an all weather environment including electronic countermeasures and chaff.

The FAAD GBS mission is to alert or cue Avenger, Bradley Stinger Fighting Vehicle and manportable Stinger teams to the approach of hostile and unidentified aircraft, protect friendly aircraft from fratricide and provide air situation data to command and control centers. The FAAD GBS AN/MPQ-64 performs



this mission by providing the air picture directly to supported units through the FAAD command and control network. The GBS is the key air surveillance and target acquisition and tracking sensor for division and corps air defense weapons.

The GBS radar is an advanced three-dimensional battlefield air defense radar that uses modern phased-array antenna technology. The X-band radar automatically detects, tracks, classifies, identifies and reports targets. GBS targets can be hovering to fast moving, from nap of the earth to the maximum engagement altitude of FAAD weapons.

The AN/MPQ-64 is accurate, quick reacting and acquires targets sufficiently beyond the forward line of troops to significantly reduce FAAD weapons reaction time and allow engagement at optimum ranges. The radar's integrated identification, friend or foe capability prevents fratricide. Highly mobile and reliable, GBS's anti-radiation missile and electronic countermeasures resistant performance supports Army corps and divisional air defense across the full spectrum of conflict.

The FAAD C^3I system currently consists of a battalion tactical operations center (TOC); a divisional Army airspace command and control (A^2C^2) command post; battery- and platoon-level command posts; the LSDIS system that the GBS will eventually replace; and sophisticated joint tactical information distribution system radio equipment. The Army hopes to begin fielding the FAAD C^3I system to light divisions as early as FY94.

PROTECTING THE FORCE

Training ADA in an Infantry division

by Lt. Gen. Richard F. Keller

The BSFV was fielded as an interim capability to fill the significant gap in the Army's Forward Area Air Defense (FAAD) left by the demise of the FAAD Line-of-Sight Forward (Heavy) component. Interim tactics require the BSFV to stop to deploy its Stinger team, with resulting shortfalls in survivability, target acquisition and identification and fire control.

The Army hopes to "grow" the Interim BSFV into a full-fledged air defense system through a series of block modifications, beginning with the mounting of an Avenger missile launch pod and ending with an air defense turret system.

The Senate Appropriations Committee has issued a mandate to "restructure the growth options of the BSFV to immediately review the cost and operational effectiveness of mounting existing air defense turrets on the BSFV." The Army has launched a BSFV Turret Study Program to select up to three existing air defense turret systems and award up to three contracts to develop a BSFV crew station simulator to test each turret.

The soldiers and units of 3d Infantry Division (3ID) strive for excellence and contribute to the division team effort in everything they do. 4-3 ADA is a superb example of this. The battalion has accomplished many firsts over the past year: fielding and testing the Bradley Stinger Fighting Vehicle (BSFV), developing doctrine for its employment and thoroughly integrating it throughout the division. 4-3 ADA outshot Infantry battalions at Bradley Table VIII, developed and fired aerial gunnery tables and provided close support for 3ID's maneuver elements at the Combat Maneuver Training Center (CMTC). Air defenders "put up their dukes" during our recent battalion command training program (BCTP) exercise, decimating enemy attack helicopter regiments in support of the division scheme of maneuver. The effectiveness of a divisional short-range air defense (SHORAD) battalion depends upon the skill and training of its soldiers and leaders, and thorough integration of the ADA battle operating system (BOS) into the overall scheme of maneuver. Through the skill of its soldiers and the quality of its leadership, 4-3 ADA continually achieves high standards for ADA BOS integration and execution at all levels.

Fighting the Divisional ADA Battalion (BCTP)

Our BCTP, Marne Victory, was a huge success. It is the single most important staff training tool available to division and corps commanders, their staffs and green tab leaders down to battalion level. During a recent quarterly training brief, I tasked each brigade and separate battalion to develop and refine their staff planning process in view of our upcoming Warfighter exercise. My intent was to use Reforger '92 and a division command post exercise (CPX) (Marne Campaign III) as the division's springboard to validate our training strategy and the BOS integration at division, brigade and task force levels.

Success on the battlefield is largely attributed to the synchronization of our combined arms team. The air defenders are unique in that they must understand not only the ground picture, but the aerial dimension as well. This includes the entire Army airspace command and control (A^2C^2) arena from theater to battalion. Massed enemy air, unimpeded, can snatch victory from ground maneuver forces. Integrated A^2C^2 is the key to ensuring that does not happen. Prior to our Warfighter, the division conducted several tactical seminars that included an A^2C^2/ADA planning and concept brief. This was vital for the division staff and commanders, the V Corps A^2C^2 element and the 69th ADA Brigade players. Additionally, it provided me with the opportunity to express my philosophy on defeating the enemy fixed- and rotary-wing threat.

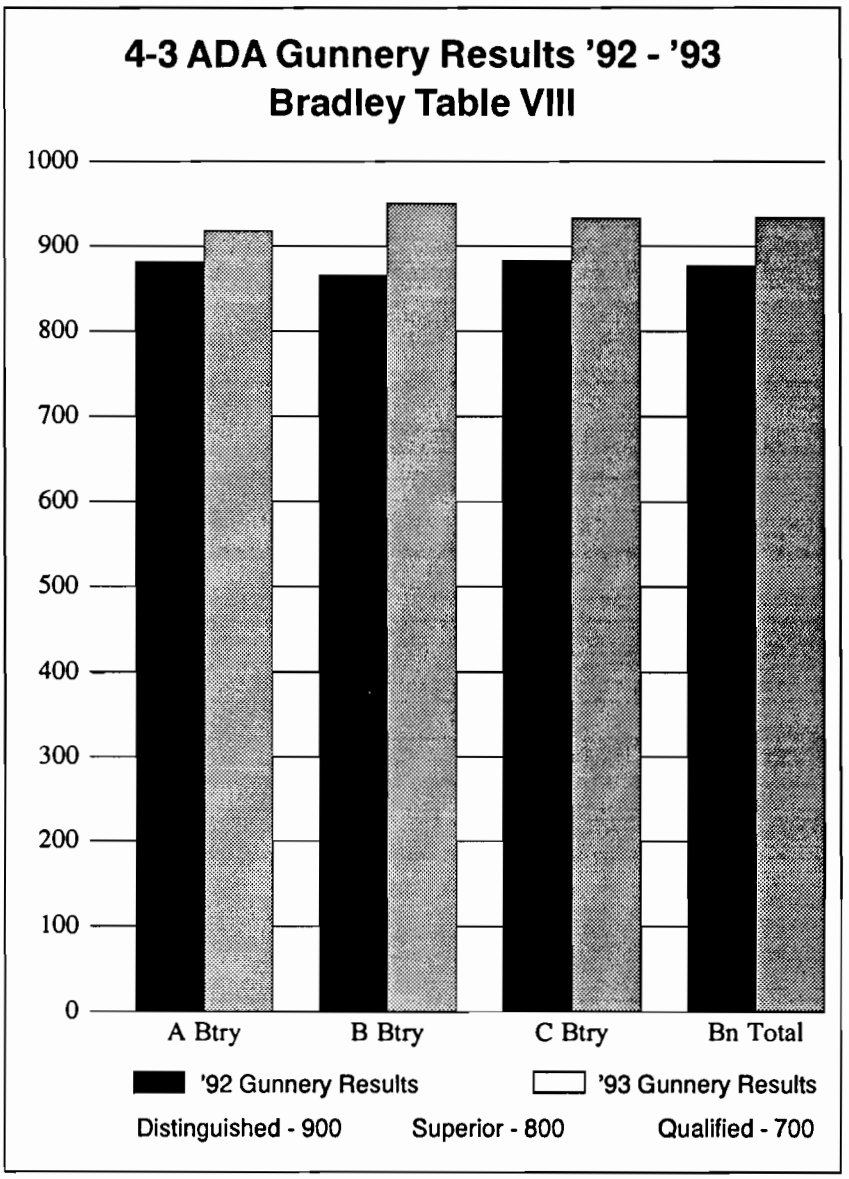
The tactics, techniques and procedures behind our SHORAD "How to Fight" concept are built on six key principles:

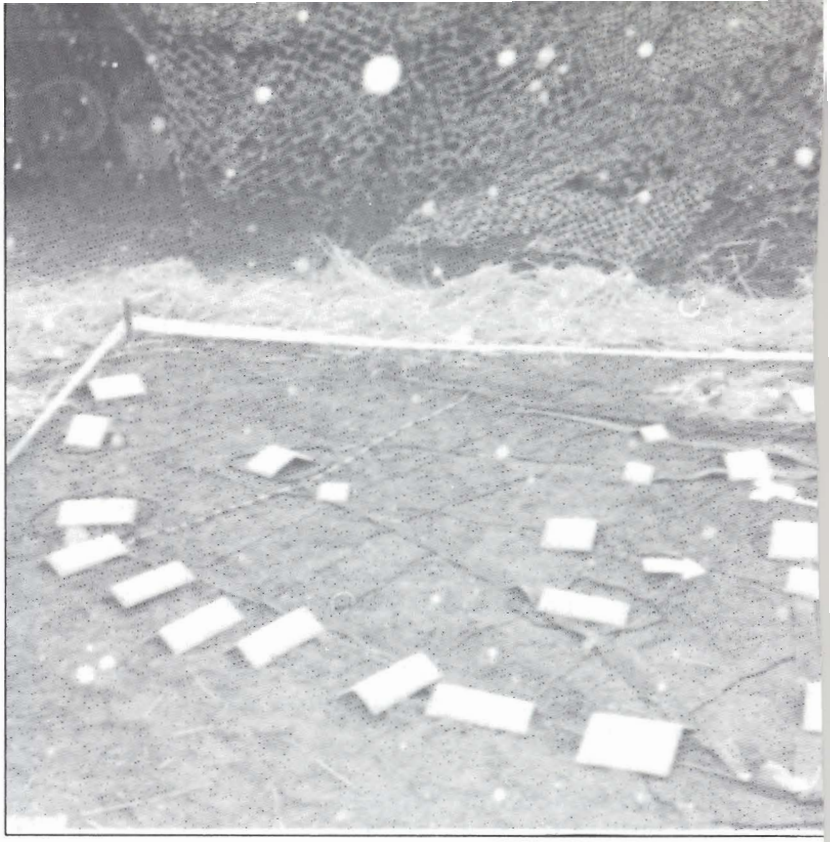
- Develop the air intelligence preparation of the battlefield (IPB) with numbers of aircraft on each air avenue of approach and confirm it with the G-2.
- Predict the commitment of enemy air in consultation with the G-2 or G-3.
- Develop a correlation of forces for air (COFA) using the COFA formula.
- Conduct an in-depth analysis of the division ADA priorities using CVRT based on my guidance.
- Synchronize the ADA plan at all echelons, to include high- to medium-altitude air defense (HIMAD) assets that are available to the division.
- Be aggressive in the use of A^2C^2 measures (HIDACZ) and coordinate them with the G-3 air.

ADA Link to the Brigade Combat Team at CMTC

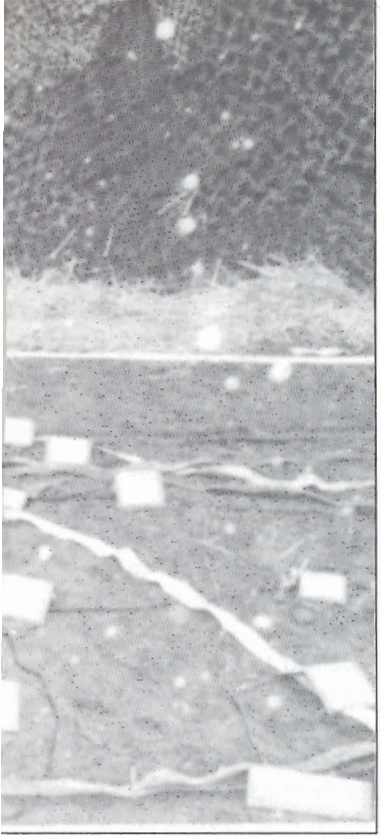
This is where we make our money. Swift execution at the brigade and task force levels enables us to win the decisive battle. 4-3 ADA maintains habitual command relationships with each of the maneuver brigades in the division. Battery commanders serve as air defense officers (ADOs) on BCT staffs, ensuring that air defense is synchronized with other BOSs during planning. ADOs also work with brigade S-2s, refining the aerial portion of the IPB and ensuring ADA scouts and air named areas of interest are included in the brigade reconnaissance and security plan. Finally, ADA batteries maintain liaison with the brigade battle staff, monitoring the battle, updating A^2C^2 information and providing early warning to the brigade.

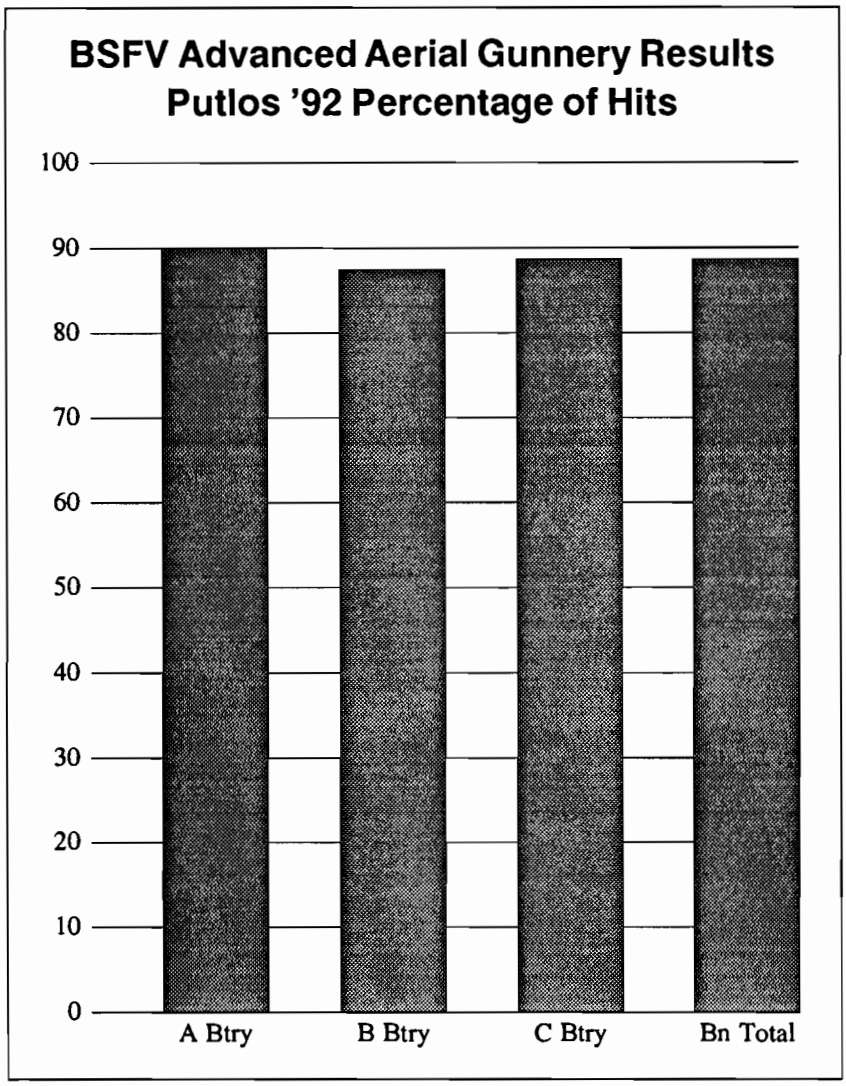
Air defense interaction in the task force is much the same. Air defense platoon leaders serve as task force ADOs, fine-tuning the air defense plan, then ensuring the plan is executed within the commander's intent. To accomplish this, air defenders must ensure they are postured correctly to react to air decision points, which are keyed to the ground fight. Furthermore, ADA elements must "survive to fight." This means maneuvering with the supported force, but not becoming decisively engaged by ground systems. CMTC has taught us that ADA losses were significantly reduced when using the BSFV. The BSFV's firepower, speed and mobility have been used to maximum advantage, allowing air defenders to keep up with Armor and Infantry, survive ground engagements and deliver Stinger teams to locations where they can kill aircraft. Reviewing lessons learned at CMTC enables us to fine-tune our operations. At the brigade and task force levels, participation in CPXs, CFXs, TEWTs and terrain walks ensures ADA leaders are fully integrated into the brigade and task force battle staffs. At the platoon level, SIMNET, task force situational training exercise lanes and CFXs provide the best opportunity for ADA platoons to practice maneuvering with a supported force. In the offense, Stingers need to dis-





Clockwise from top left: Keller awards the V Corps Distinguished Leader Badge to 1st Lt. Paul C. Hester of D/4-3 ADA. A terrain model set up outside the battalion command post. Spec. David Ladurini and SSgt. James McEvers, 4-3 ADA intelligence analysts, at work in the S-2 M-577. 4-3 ADA's BSFVs participate in every CMTC as a fully integrated member of the combined arms team. Sgt. Robert Giammaresi, S-3 operations NCO, updates the situation map in the battalion TOC.





mount in an overwatch position, oriented on air avenues of approach.

In the defense, the Stinger team occupies a fighting position, which is also oriented toward air avenues of approach. Air Defense Artillery must get priority of engineer effort in the defense, and must survive any initial attack since the majority of enemy air assets will be committed with second echelon units. Finally, supported maneuver elements must ensure that ADA assets receive maintenance priority, which is easier now with the BSFV.

Ultimately, success for air defenders requires a synchronized plan that supports the scheme of maneuver and masses Stinger fires along key avenues of approach as determined by the air IPB. The plan must be fully supported logistically, addressing resupply, casualty evacuation, engineer support and weapon system replacement. Such a plan, when executed aggressively by trained platoons, ensures commanders retain freedom to maneuver.

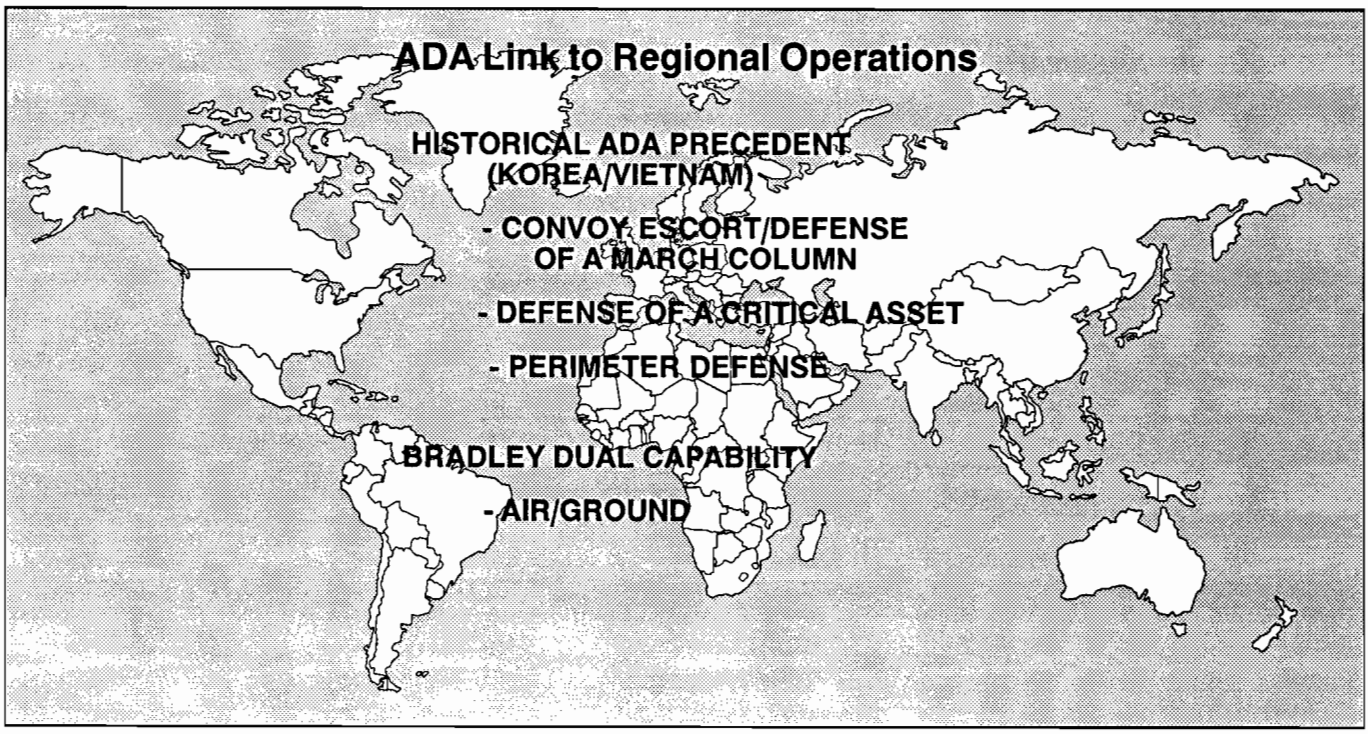
An Innovation in Air Defense

The introduction of BSFVs into 3ID has given air defenders a lethal and survivable weapon system on the battlefield. 4-3 ADA has proven the BSFV's role with the maneuver force throughout the last year, participating in every CMTC rotation for the division as a fully integrated member of the combined arms team.

4-3 ADA quickly adapted to the BSFV, receiving and retraining the battalion during new equipment training throughout May, June and July 1992. 4-3 ADA followed the new equipment training with its first Bradley gunnery in July and August 1992, scoring a battalion average of 877 of 1,000 possible points.

The following months saw 4-3 ADA conduct intense home station gunnery training, focusing on unit conduct of fire trainer, Bradley gunnery skills test and Bradley crew proficiency course training. 4-3 ADA's strategy for success paid big dividends as the battalion scored an average of 934 points on its second gunnery. Twenty-four of 30 crews were designated as "distinguished crews," receiving scores of more than 900 out of a possible 1,000 points, and six crews scored a perfect 1,000 points. 4-3 ADA's performance on gunnery has lent credibility to giving the air defenders BSFVs.

But the real focus of the battalion has been BSFV advanced aerial gunnery. In the absence of established aerial gunnery tables for the BSFV, the battalion developed practice and qualification tables, later approved for use within V Corps and currently being reviewed by Fort Bliss to be established as the Armywide standard. These tables include engagements by each crew member of the BSFV, including the Stinger team, on a variety of targets. The tables emphasize integrated fires of Bradley crews and Stinger teams under fire control of platoon leaders. Every 4-3 ADA crew qualified at the first firing in September 1992 at Putlos. Marne air defenders once again proved their flexibility by adapting to change, and validated



the BSFV concept as a credible air defense system.

Future of SHORAD

With the end of the Cold War and the imminent danger of full-scale warfare in Europe rapidly receding, the threat from massive hostile air attack has been greatly reduced. The U.S. Air Force may crush an enemy's air power, or will to use it, early during the start of future conflicts. Complete air supremacy has become virtually a "given" as far as Americans are concerned. As long as there remains a threat from tactical ballistic missiles, there will be a place for HIMAD, but where does this scenario leave the divisional SHORAD battalion?

Korea and Vietnam provided clear precedents. In both conflicts, the Air Force quickly established air supremacy, leaving little opportunity for air defenders to perform in their traditional role. The nature of these conflicts soon presented a need, however, for ADA assets to be employed in such important functions as convoy escort and perimeter defense. The ground-air dual capabilities of the Quad .50 half-track, 40mm Duster and 20mm Vulcan proved to be excellent for such missions. Today, the BSFV continues this tradition with its dual role combination of Stinger and Bradley. This dual role capability is not only nice to have, but a vital factor. We cannot discount the threat from low-level attack helicopters, which are in the arsenals of dozens of potential adversaries. Countering this threat is the forte of the divisional SHORAD battalion.

With deployment to the Balkans a possibility and regional operations becoming increasingly likely, units will have to change their traditional wartime focus and prepare for different types of missions. We in 3ID understand this, and are preparing ourselves accordingly. Regarding my ADA battalion: **I wouldn't leave home without it!**

Lt. Gen. Richard F. Keller commanded the 3d Infantry Division (Mechanized) from August 1991 to June 1993. His previous assignment was Director of Training, Office of the Deputy Chief of Staff for Operations and Plans, Washington, D.C. He also served as Assistant Division Commander, 3d Armored Division. He's a graduate of the Naval Command and Staff College, Newport, R.I., and the Army War College, Carlisle Barracks, Penn. Keller holds a Master of Science in International Relations from George Washington University, Washington, D.C., and is currently Chief of Staff at Headquarters, United States European Command.

Our air defense is now able to maneuver with the combined arms team. Bradley-mounted Stinger teams are able to keep up, survive and succeed, especially when compared with Vulcan and HMMWV-mounted Stinger teams which are constrained by vehicle or system limitations in the heavy force. As a result of the Bradley Stinger Fighting Vehicle fielding, our air defense commanders talk of an unexpected dividend: morale has taken off. Knowing they are integral to the combat team, soldier motivation, esprit and initiative are highly visible. Our young air defenders perceive they are an asset to the maneuver commander and can contribute in a positive way to his mission.

— Gen. Crosbie Saint, CinCUSAREUR

ADA DIGEST

BRANCH NEWS

1993 ADA COMMANDERS CONFERENCE

Clockwise from left: Little, Sullivan and Cravens visit with a 6th ADA Brigade NCO at the ADA Commanders' Conference weapons displays.

Approximately 450 ADA officers, senior ADA NCOs and defense contractor representatives helped the "First to Fire" branch celebrate its 25th anniversary by attending the 1993 ADA Commanders' Conference, June 7-10, at the U.S. Army Air Defense Artillery School, Fort Bliss, Texas. Maj. Gen. John H. Little, Chief of Air Defense Artillery, opened the conference on a note of optimism. "There is good news and bad news," Little said, referencing the Army drawdown, "but there is a lot more good news than bad." He said a consensus now exists among ADA leaders on the direction the branch should take in the post-Cold War era and expressed his confidence that Air Defense Artillery has a bright future.

A great deal of the branch's future was exhibited on the parade field adjacent to the U.S. Army Air Defense Center and Fort Bliss headquarters building, site of the four-day conference. Components of the new Forward Area Air Defense Command, Control, Communications and Intelligence (FAAD C^3I) system and automated tactical operations center prototypes were arrayed alongside newly fielded Avenger air defense systems and Bradley Stinger Fighting Vehicles. Inside, conferees crowded around futuristic displays featuring Patriot Advanced Capability (PAC)-3, the Theater High-Altitude Area Defense (THAAD) system, Corps Surface-to-Air Missile (SAM), national ballistic missile interceptor prototypes and sophisticated training simulators. Hughes Aircraft Co. rolled out its FAAD C^3I ground-based sensor on the second day of the conference.

Gen. Gordon R. Sullivan, Army Chief of Staff, and Lt. Gen. Donald M. Lionetti, commander of the U.S. Army Space and Strategic Defense Command, headed the conference's list of distinguished speakers.

Sullivan drew cheers at the beginning of his keynote address when he asked: "Who would have predicted three or four years ago that the leading element in the United States Army would be the air defenders?" The chief of staff listed "change, continuity and growth" as the keys to the Army's future. He said the Army must undergo an "intellectual change" as it makes the transition from a forward-deployed Cold War deterrent force to a mostly U.S.-based, power projection force focused on contingency missions and rapid response to regional crises. Sullivan also warned that, during the transition, the Army must continue to maintain its traditions and high training standards. Despite the Army drawdown, he said, the Army must "grow" its operational and technical capabilities. "We must have Patriot PAC-3! We must have the THAAD! We must have Corps SAM!" he said.

During an interview with *ADA* magazine following his

address, Sullivan fielded questions about the Army in general and Air Defense Artillery in particular.

"I think the thing that impresses me most is that Air Defense Artillery has been able to build upon its record of service during World War II; in fact, there were some limited aspects of air defense as far back as the Civil War," he said. "Air Defense Artillery has built on that record of service, become an independent branch, accommodated a multitude of technological changes, and yet remains a viable and credible branch. Now we see Air Defense Artillery out in front in a deterrence role in Southwest Asia, moving to Korea on relatively short notice, and performing many missions other than war. I'm very pleased with what I've seen, and I think the future of Air Defense Artillery is bright."

Sullivan also said the Army and Air Defense Artillery are rapidly adjusting to the post-Cold War environment.

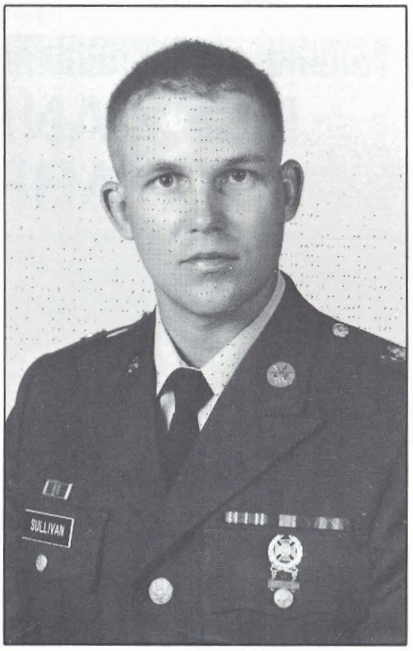
"I think the force has already accommodated most of the changes. Perhaps the principal one — one that really impacts on ADA probably more than any other branch — is the shift away from a focus in Central Europe against the Warsaw Pact," he said. "The Berlin Wall coming down probably had as dramatic an effect on ADA as on any branch. Your primary mission during NATO's existence has been to protect Central Europe, so the shift away from the focus on the Soviet Union, and then the shift to regional crises, I think are a clear manifestation of the changes that have taken place. I think that's the wave of the future and that's what our Army reflects. Power projection, crisis response, regional crises and reconstitution — the Guard and the Reserve related to air defense. There's where you see reconstitution."

Asked if ADA units deployed to fight forest fires, provide hurricane relief and fight famine and banditry in Somalia demonstrated the type of flexibility required in operations other than war, Sullivan answered: "Absolutely. But there are more missions to count. Peacekeeping and peacemaking are on the horizon. I think more ADA soldiers will be involved in those missions in some form or another. The U.S. Army has served the nation in countless ways since 1775, and ADA soldiers are a part of that tradition."

Sullivan said he thinks the Army is handling the Army drawdown and the transition to a contingency force remarkably well. "Only a world-class institution could do what this Army is doing," Sullivan said. "And it is a story that I'm trying to get out to the American people. We have lost 40 cents on the dollar, for every dollar, and we have taken 260,000 people out of the Army in about two years; that is, 200,000 soldiers and 60,000 civilians. And we've come back from Germany. Today the strength in Germany is 104,000; two years ago it was about 215,000. We've taken the nuclear weapons out of the Army. All of this has happened in two years, and the requirements are going up. We are in 65 countries today with 20,000 soldiers. I will tell you only a world-class organization could do what we're doing, and the members of the U.S. Army — those in uniform, the civilians who are with us and the family members — need to feel a sense of justifiable pride. The American people owe all of you a great debt of gratitude."

In closing, Sullivan predicted that the Army would be able to maintain training quality despite budget cuts. "We have an affordability problem; you can't lose 40 cents on the dollar and not have an affordability problem," he said. "What I'm trying to do is strike a balance between modernization, training, leader development and quality people and training of the total Army (Active, Guard and Reserve) and keep all of those in some form of equilibrium. One challenge is to ensure we keep the troops trained, another is base operations. We must keep the posts viable and credible so that we have good places to live and work.

SOLDIER OF THE YEAR



Spec. James Sullivan has been selected as the 24th Infantry Division's and Fort Stewart's soldier of the year for 1992. Sullivan, an Avenger crew member, is assigned to 1st Battalion, 2nd Air Defense Artillery, 108th ADA Brigade. Battalion commander Lt. Col. James Green attributes Sullivan's success in the tough competition to his "military bearing, knowledge and motivation." ■

"One reason we stress simulators and simulation so much is to save dollars," he added. "I've got a lot of leverage with simulators and simulations. I can say put 'X' troops in the field and they represent 'Y,' a much larger number. I can take 4,000 soldiers of all grades and they represent maybe 100 guys. Then, I can use the dollars I save through that to let the troops go out and train and conduct gunneries. Its a balancing act, and a big challenge, because this change is coming on in just a couple of years. Although we began a downward financial slope in the mid '80s, given that the war was over just two years ago, most of the dollars have gone away since 1991. We're doing remarkably well, but it's a jungle out there."

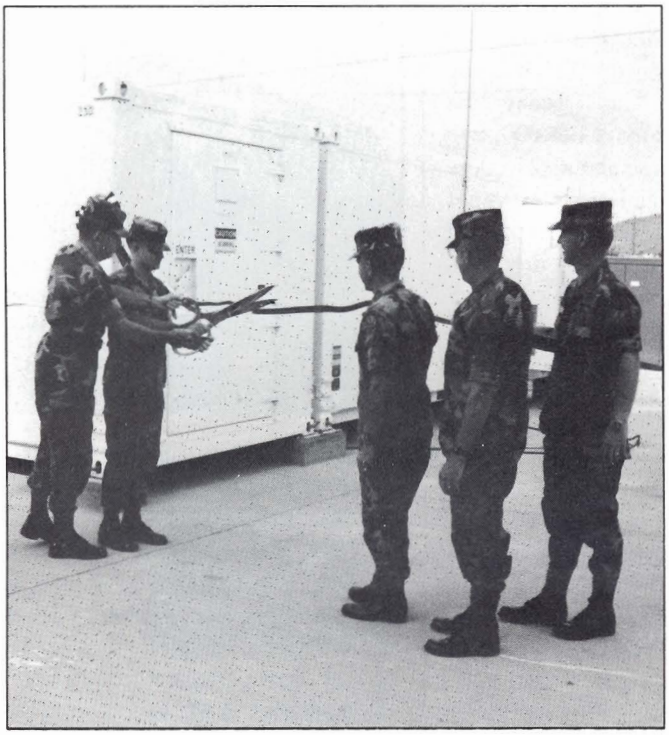
In his address, Lt. Gen. Donald M. Lionetti, a former chief of Air Defense Artillery, said, "I don't think there is another branch more relevant to the future than Air Defense Artillery. No other branch does a better job of preparing its officers for the future." Lionetti also pledged to continue to aggressively fight for rapid fielding of air defense systems designed to counter a growing ballistic missile threat despite budget constraints.

Little, who characterized his tenure as chief of branch as "the highlight of my life, my most fulfilling and challenging assignment," concluded the conference by announcing his reassignment to Headquarters, Department of the Army, as assistant chief of staff for installation management. He said ADA soldiers "basically need to keep on doing what we've been doing," and that his successor, USAADASCH Assistant Commandant Brig. Gen. James J. Cravens, would ensure continuity.

Both the departing and future chiefs of Air Defense Artillery received standing ovations. ■

TRAINING

BSFV AND AVENGER SIMULATORS ARRIVE AT FORT BLISS



Assistant Commandant Brig. Gen. James J. Cravens dedicates the two COFTs during a June 30, 1993, ceremony.

Bradley Stinger Fighting Vehicle (BSFV) institutional conduct of fire training is no longer relegated to the "swing" and "graveyard" shifts. 2-6 ADA (the "FAAD Training Battalion") celebrated a red-letter day June 30 as the first two of six BSFV conduct of fire trainers (COFTs) were emplaced and became operational. The COFTs' arrival marked the culmination of a long, hard struggle for 2-6 ADA and the U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

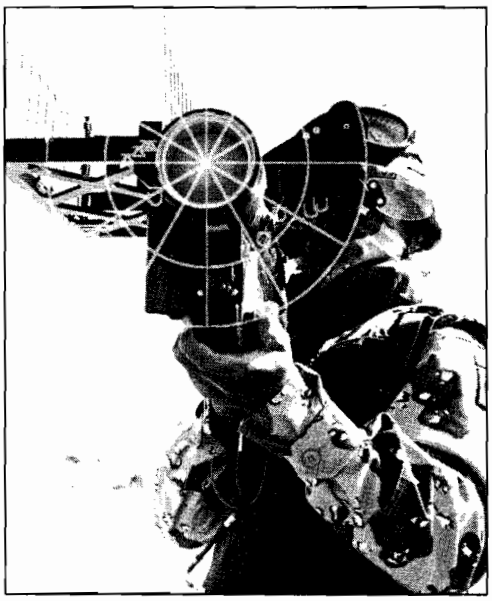
In the past, the BSFV Branch scheduled training in a COFT that belonged to another major command, a compromise that forced most ADA training to occur between 6 p.m. and 6 a.m. "Owning" the two COFTs allows 2-6 ADA to schedule training during normal duty hours, which has a positive effect on instruction and students.

2-6 ADA also received a prototype Avenger institutional COFT (ICOFT) that was displayed during the 1993 ADA Commanders' Conference. The trainer is set up adjacent to classroom facilities so trainers can conduct demonstration and practical simulation training simultaneously. The Avenger COFT was developed as an "in-house" engineering effort by the Project Management Office in Huntsville, Ala. ■

Tom Cooper

WEAPON SYSTEMS

STINGER PRODUCT IMPROVEMENTS



In Afghanistan, *Muhajideen* rebels firing Stinger missiles downed more than 270 Soviet aircraft, attaining a 79 percent combat success rate and effectively stopping Red Army air assault operations. Some analysts credited Stinger for forcing a Soviet withdrawal, a prelude to the collapse of the Communist empire.

The good news (or bad news, depending on which side of the air battle you find yourself) is that today's Stinger reprogrammable microprocessor (RMP) missile is much deadlier than the basic Stinger employed in Afghanistan. Stinger-RMP has maintained a greater than 90 percent success rate in reliability and training tests against advanced threat targets, and it's destined to become even more lethal.

The Stinger pre-planned product improvement (P^3I) program addresses both ADA and Army Aviation (air-to-air) issues. Stinger Block I, under contract, includes hardware and software changes to the missile that will eliminate the need to superelevate and increase the missile's performance at low-target aspects and during night engagements. Block 2, or Advanced Stinger, improvements will more than double Stinger's detection range against the most advanced helicopter threats in clutter at stand-off ranges. This will provide fire-and-forget Stinger an acquisition range equivalent to or exceeding its kinematic (target dependent) range. Advanced Stinger is scheduled to enter operation near the end of the decade. These improvements will be incorporated via low-cost retrofits to the Stinger-RMP inventory.

"There is currently a gap in our missile defenses that will be filled by Stinger-RMP and Stinger P^3I," said Steven J. Ignat, Stinger Weapon Systems, Hughes Missile Systems Co. "Over 100 countries are currently working on cruise missile technologies designed to fly under U.S. and friendly air and missile defenses. Stinger-RMP has demonstrated performance against these threats; however, Advanced Stinger will be capable of defeating this evolving threat well into the next century. Stinger-RMP continues to address the future and expanding threat, providing superior air defense to the forward maneuver forces." ■

COMBAT TRAINING CENTERS

NTC TRENDS

The National Training Center (NTC) performs one of the Army's most important training missions: it prepares brigade combat teams for combat. Executing this mission is the primary responsibility of the NTC's Operations Group. Currently, 20 ADA soldiers are assigned to Operations Group as observer-controllers (OCs). ADA OCs ensure that training and expertise is available at every level, and that Air Defense Artillery is correctly represented as a member of the combined arms team at the NTC.

As the senior ADA OC, one of my tasks is to compile a quarterly list of trends displayed by ADA units that visit the NTC. The following is a rundown of second quarter FY93 trends.

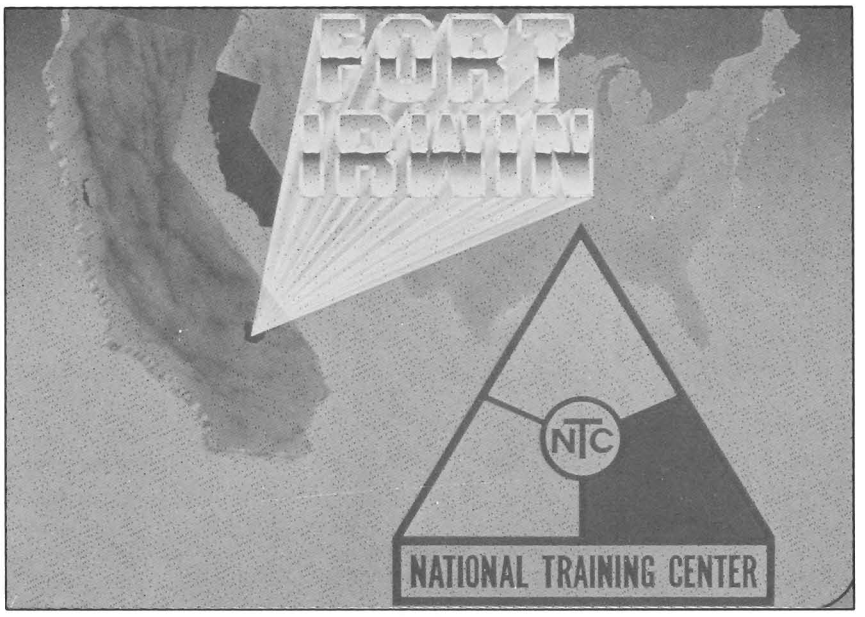
Positive Trends. One of the most positive recent trends displayed by ADA units at the NTC has been the flexible use of Stinger. Based on mission analysis and intelligence preparation of the battlefield, ADA units are using Stingers more frequently in a GS role rather than in a direct support (DS) relationship. In the defense, ADA battery commanders are retaining more Stingers under their direct control. This allows the commander to develop counter-air assault plans or a scheme of maneuver designed to meet the threat on identified air avenues of

approach. In the offense, the priority is still to maintain flexibility yet weight ADA coverage over main-effort task forces. One technique is to push GS Stinger teams out in front of the task force but behind the scouts or screen line where they can provide early engagement and overwatching fires. Another technique is to assign some Stingers reinforcing or general support- reinforcing (GS-R) missions, which reinforces the task force DS ADA unit but provides a greater degree of flexibility to shift fires if required.

Class V Management. ADA DS platoon and task force support platoon leaders do not understand procedures for ADA-specific ammunition resupply and fail to consider the ammunition requirements of slice units. At least once during each rotation an ADA platoon has not had its full basic load prior to a mission because the platoon leader failed to coordinate with the supported unit.

Support Relationships. ADA leaders and task force leaders do not understand the responsibilities and limitations associated with the standard tactical mission (support relationships) as defined in FM 44-1. Most problems occur when units receive a reinforcing or GS-R mission. Task force commanders and DS ADA platoon leaders tend to treat reinforcing and GS-R units as DS units under their direct control. When the ADA battery commander attempts to move the reinforcing or GS-R unit, he finds that he cannot because the unit has been fully integrated into the task force scheme of maneuver. This limits the ADA battery commander's ability to shift his assets on the battlefield to counter the air threat.

Early Warning Reaction. Most units have tactical standing operating procedures that generally describe how the air attack early warning system works. But units lack a specific combined arms drill or list of actions to take in response to changes in the air defense warning status. Apparently a perception exists that early warning is for ADA only, and that other units can continue business as usual. For example, one task force had 10 minutes early warning of an inbound enemy air assault, and the air defense warning status was RED. Yet not one of eight .50-caliber machine guns at the task force tactical operations center was manned. The air assault force landed 800 meters away and destroyed the tactical operations center.



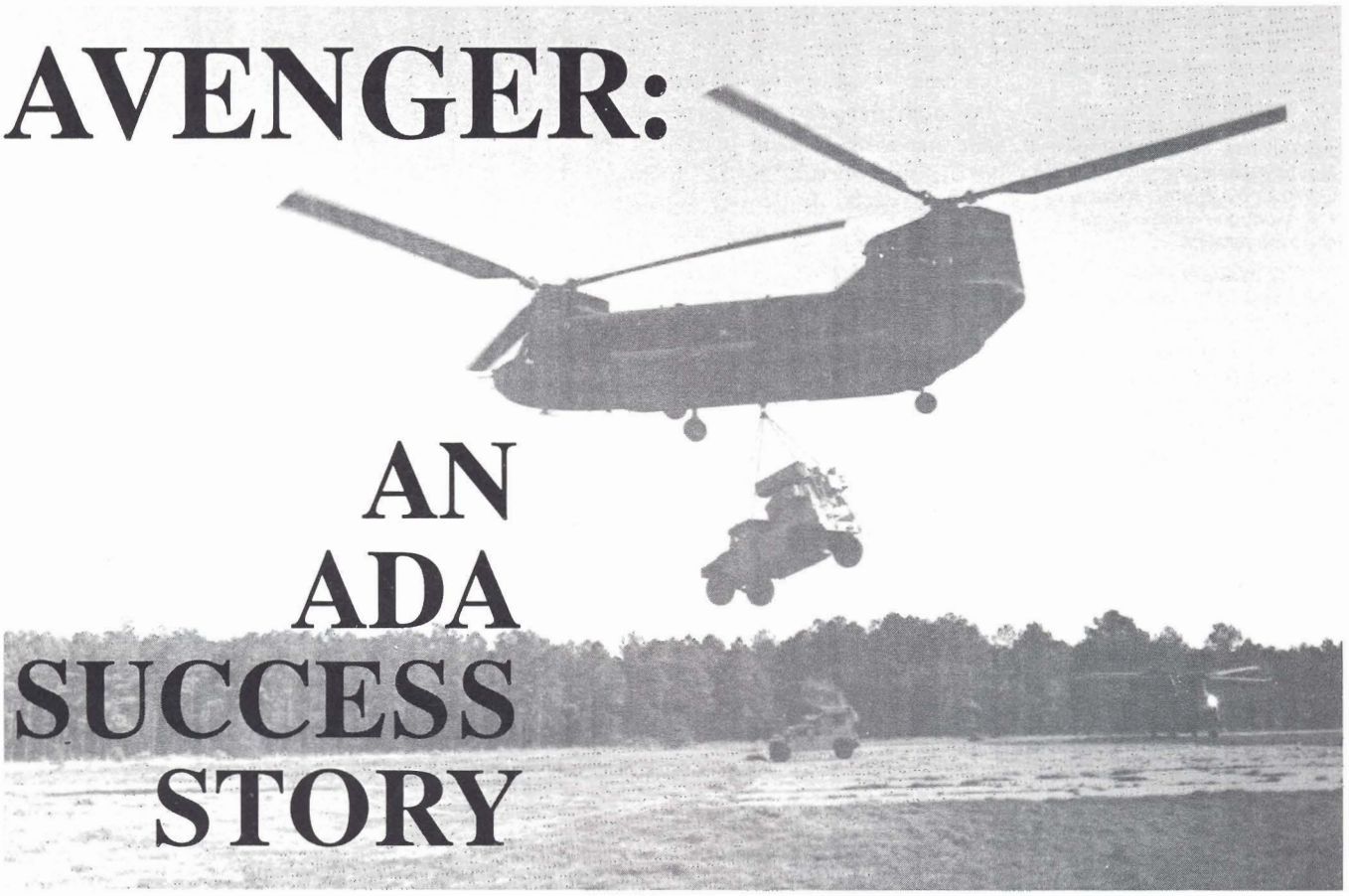
The early warning broadcast system generally works well at the brigade or ADA battery to task force level. The system tends to break down and become ineffective at the company or team level.

Counter-Air Assault Planning. Units do not take enemy air assaults seriously and, therefore, make no plans to counter them. When they do plan for them, it is an unsynchronized, token effort that lacks a combined arms approach. There is a misconception that counter-air assault planning is entirely an ADA responsibility. The contributions of other members of the combined arms team are often overlooked. There is too much emphasis on identifying landing zones and not enough stress on identifying objectives and air avenues of approach.

Good Ideas. Some ADA units prepositioned GS Stinger teams forward with good results. They massed ADA assets at critical points on the battlefield by pushing GS Stingers forward to cover choke points or air avenues of approach. This allowed DS ADA units to move with and protect the task force while the GS Stingers provided overwatch. The most successful units moved the Stingers out behind some sort of security element, such as scouts or screening forces, that provided them an element of security. The Stinger teams were told to select positions that allowed them to cover a specific air avenue of approach or sector. The exact position was left up to the Stinger team based on the tactical situation. ■

MAJ. DAVE EIKMEIER

AVENGER: AN ADA SUCCESS STORY



by Lt. Col. James W. Green

The forming of the Army's first Avenger missile battalion began in 1990. Considerable efforts from the entire ADA community resulted in the 1st Battalion, 2d Air Defense Artillery, Avenger fielding being accelerated ahead of previously published schedules. Once the decision to field 1-2 ADA was official (October 1991), the planning process and execution of converting an entire Chaparral missile battalion into America's first Avenger battalion began. A detailed plan for retrograding all tracked vehicles in the battalion was established. This plan included the turn-in of all Chaparrals, M-578 recovery vehicles, M-577 command and control vehicles and M-113 personnel carriers. All equipment had to meet -10/-20 standards before turn-in. The entire turn-in was accomplished from May 14 to 28, 1992. All the vehicles were accepted for turn-in and shipped from Fort Stewart, Ga., four weeks ahead of schedule.

A complete ADA personnel MOS transition training program had to be established and executed. This process included converting all 16Ps (Chaparral Crew Member) initially into 16Ss (MANPADS Crew Member) prior to training as 14Ss (Avenger Crew Member). Since all 14Ss are expected to be able to perform as Stinger gunners, this was a critical gate to achieve before beginning Avenger 14S training. An overview of the battalion transition timelines is shown in the diagram on the following page.

A super team of trainers from Fort Bliss, Texas, and the Boeing Corporation provided the necessary expertise to accomplish our personnel transition training mission.

The Program Manager-Avenger shop was a first-class operation throughout the personnel transition and Avenger new equipment training. The establishment of a solid in-progress review schedule, training support and actual delivery of Avenger equipment made the battalion transition an extremely smooth, professional process.

AVENGER CHRONOLOGY

January 1983
Army challenges industry to develop more efficient use of Stinger missile.

June 1983
Boeing Aerospace begins design and fabrication of Avenger on Army's Humvee.

March-May 1984
Avenger field tests by 9th Infantry Divsion at Fort Lewis and Yakima Firing Center, Wash.

August 1984
ADA Board evaluates Avenger at Yakima Firing Center.

October 1984
Boeing submits unsolicited proposal to Army to build Avenger system.

January 1985
Talks between Boeing and U.S. Army Missile Command fail due to lack of funding.

August 1985
Secretary of Defense cancels Sergeant York Gun.

Avenger Chronology (cont)

October 1985
FAAD study group receives inputs on new air defense system to replace Sergeant York Gun. Boeing and suppliers start work on Avenger production configuration.

January 1986
Secretary of Defense approves FAAD plan.

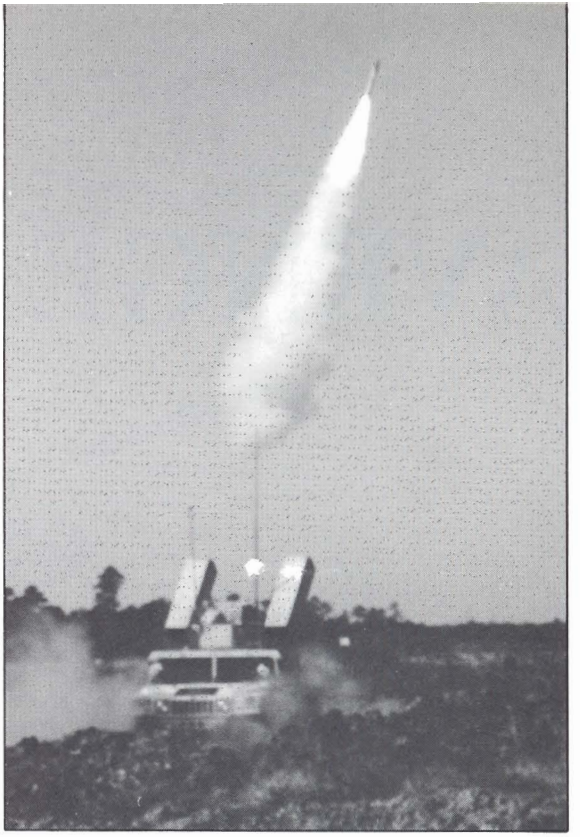
July 1986
U.S. Army MICOM releases request for proposal for Pedestal-Mounted Stinger.

August 1986
Avenger initial production unit ready for testing.

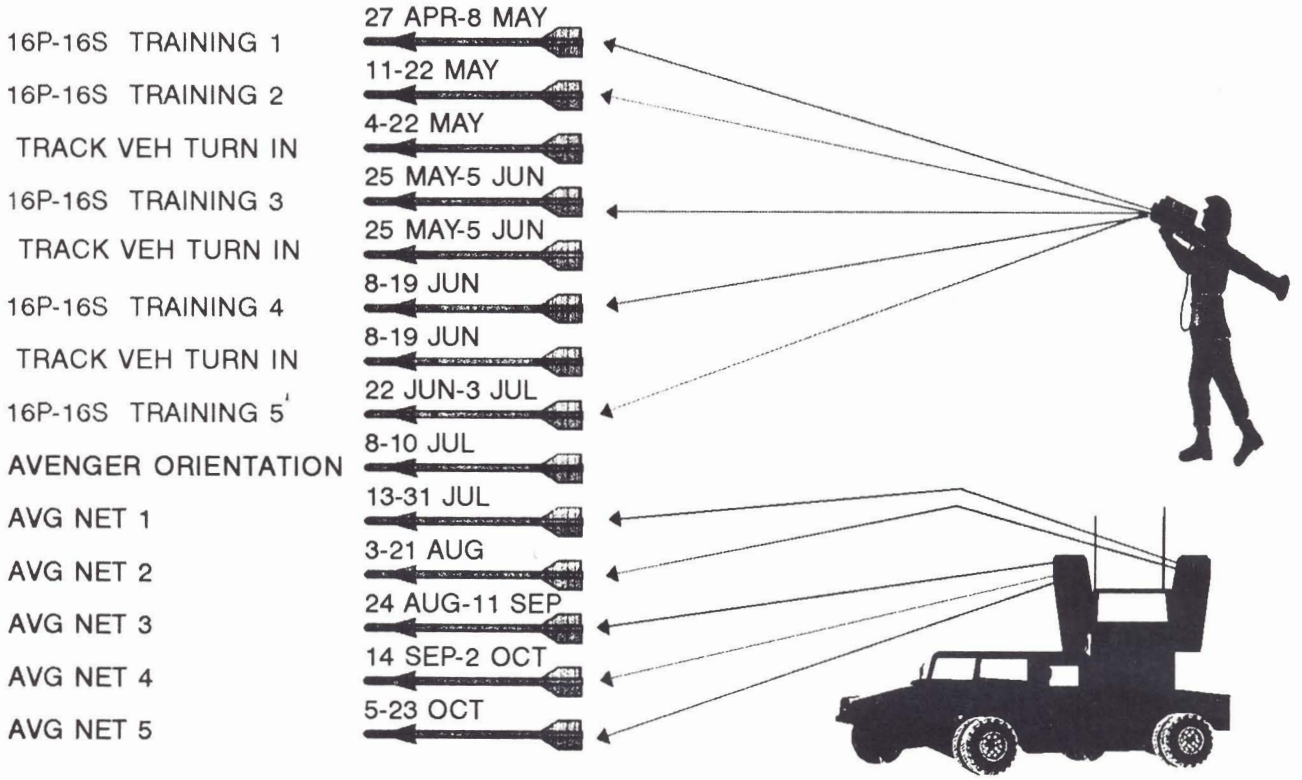
September 1986
Contractors submit proposals for Pedestal-Mounted Stinger.

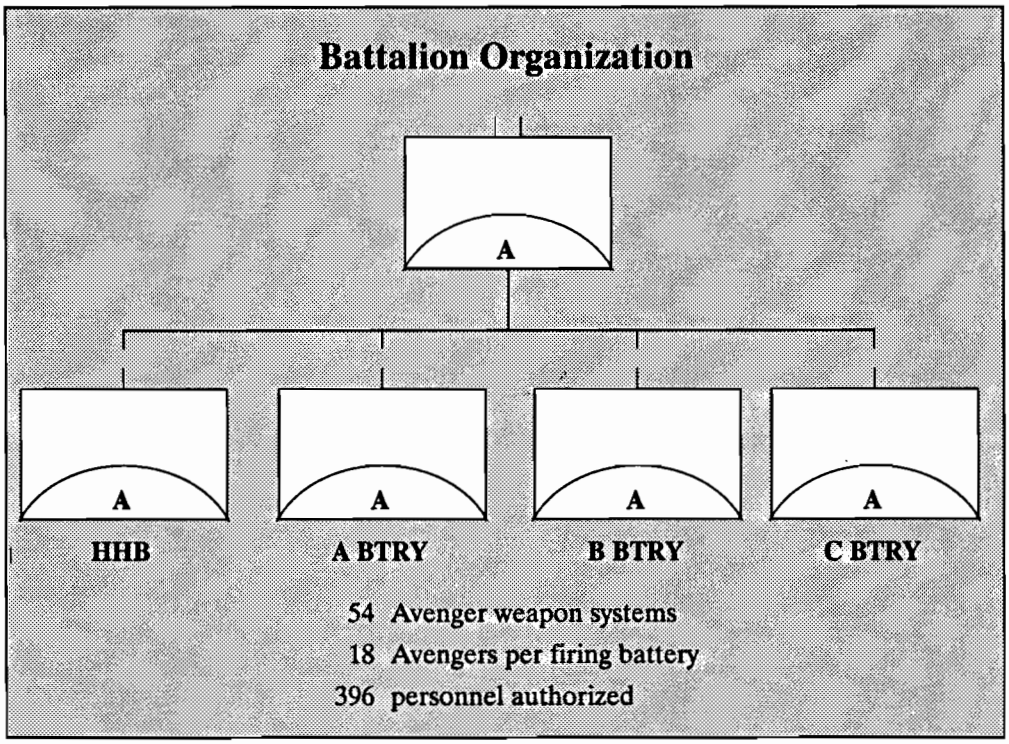
1-2 ADA soldiers did a great job during the entire Avenger training process — with many soldiers maxing both the academic (classroom) and hands-on training portion. The hands-on portion of the 14S training included crew drills, day and night tracking exercises and preventive maintenance checks and services. Tracking exercises used both live aircraft (coordinated through 24th ID (M) G-3) and remotely controlled miniature aerial targets (RCMATs). An integrated part of the NET training included first training and then certifying our soldiers into operating the RCMATs.

The entire NET process trained more than 180 soldiers in 14S, of which 54 Avenger crews (two sol-



BATTALION TRANSITION SCHEDULE





diers per crew) were established forming the nucleus of the Avenger battalion.

After Avenger NET training and equipment issue, the battalion moved to the Fort Stewart field training area for a battalion command post exercise using newly received and fitted five-ton command and control expansible vans, followed by a three-week battalion field training exercise (FTX). The focus of the FTX was learning "how to fight Avenger," with emphasis at the crew and platoon levels. Many lessons were learned as after-action reports produced the teaching tools for Avenger skills improvement. The FTX culminated in our first Avenger live fire exercise (LFX). All the training paid off as the soldiers fired day and night and on the move, destroying 12 of 14 targets engaged (two non-kills were attributed to missile malfunctions).

Using the ADA Avenger gunnery table model, the battalion continued Avenger training, certifying and qualifying Avenger crews. After the LFX, the battalion continued Avenger operations training, which included Avenger tactical air mobility exercises using Army helicopters and U.S. Air Force C-130s. The battalion also demonstrated Avenger strategic mobility during airlift exercises using C-141 transport airplanes. Further training exercises allowed the battalion to deploy Avengers to the Camp Lejune, N.C., U.S. Marine Corps base, and participate in our second LFX, a joint LFX with 2-52 ADA (Hawk). The LFX was conducted under extremely poor weather conditions; however, all ADA systems performed magnificently. During our formation as an Avenger battalion the soldiers successfully underwent some significant force modernization fielding and training that included mobile subscriber equipment, 9mm pistols, five-ton expansible vans, M-40/-42 protective masks, squad automatic weapons, M-249s and an entire fleet of M-998s (70).

The battalion, formerly assigned to 11th ADA Brigade, is assigned to 108th ADA Brigade, XVIII Airborne Corps. Our mission is to provide low-altitude air defense in support of XVIII Airborne Corps operations.

With Avenger, we believe the Army got its money's worth. The "Silent Stalkers," 1-2 ADA soldiers, are proud to be part of the continuing modernization and advancement of Air Defense Artillery and stand ready if called on to be "First to Fire."

Lt. Col. James W. Green is the commander of 1st Battalion, 2d ADA, Fort Stewart, Ga.

Avenger Chronology (cont)

October 1986

Army awards test contracts to Boeing and two other defense contractors.

October 1986-June 1987

The Army tests Pedestal-Mounted Stinger candidates at Orogrande Range, N.M.

August 1987

Boeing wins contract to build 273 Pedestal-Mounted Stinger/Avenger systems.

November 1988

Boeing delivers first two Avenger production units.

April 1990

Army approves full-scale production.

May 1990

Army buys 52 additional Avengers, exercising a purchase option that also authorizes production to increase from five to 12 units per month.

August 1990

Boeing provides condensed Avenger training to 4-5 ADA, 1st Cavalry Division, in support of Operation Desert Shield.

August 1990

Avenger's first deployment comes when two 6th ADA Avenger fire units are airlifted to Saudi Arabia for Desert Shield.

September 1990

4-5 ADA deploys the Army's first Army's Avenger battery, minus platoons, to Saudi Arabia. The remaining three platoons are to arrive in January, just in time for Operation Desert Storm.

July 1981

Successful firing of a Starstreak missile from a fully integrated Avenger fire unit demonstrates Avenger's ability to accommodate a variety of missiles.

September 1991

Army begins Avenger new equipment training for 2d Infantry Division in South Korea, the first foreign country to host a U.S. Avenger unit.

February 1992

Army awards Boeing a $436 million contract for the production of 679 Avengers (600 for the Army and 79 for the U.S. Marine Corps), bringing the total number purchased to 1,004.

The U.S. First Army, of which the 49th AAA was a part, broke the Hindenburg line during World War II. It carried on tradition during World War II when it was FIRST ashore in Normandy, FIRST to break out of the Normandy beachhead at St. Lo., FIRST into Paris, FIRST into Germany, FIRST across the Rhine, FIRST to meet the Russians and the FIRST combat unit to be redeployed to the Pacific.

— *Antiaircraft Journal*, January-February 1949

We will write our history in the skies.

— Brig. Gen. E. W. Timberlake, 49th AAA Brigade Commander

50TH WWII COMMEMORATION

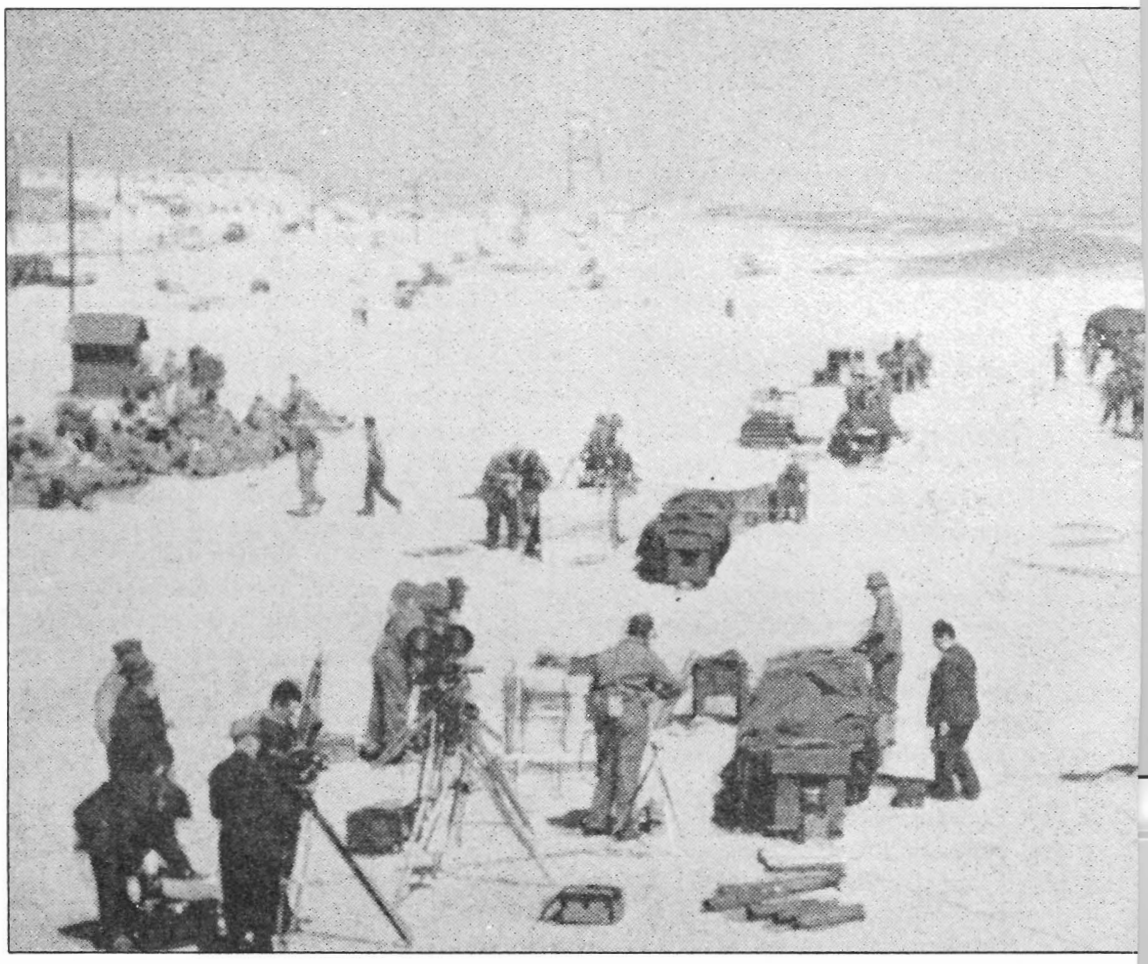
THE TRAINED LIVE!

The 49th AAA Brigade in Normany

by 1st. Lt. (P) Kerry J. Trahan

A little over a year ago the world watched as war came to an end with the signing of the cease-fire agreement between Iraq and the coalition forces led by the United States. During the buildup of forces and the increase in tensions between Iraq and the United States, few believed that victory could be so quickly realized. The quick and hard-won success of the coalition forces was due to several factors. A crushing U.S. air campaign is one. The technological superiority of U.S. weapons is another. And the enthusiasm and motivation repeatedly demonstrated by U.S. service members is a third. But underlying all of these, and a key to the success, was the rigorous training all U.S. service members received both before and during Desert Storm. Training teaches air crews how to conduct devastating bombing sorties. High-tech weaponry is useless without competent operators. And only repetitive training can instill the type of confi-

Members of the 49th AAA Brigade train at Camp Davis, N.C.



dence demonstrated by soldiers, sailors, airmen and marines during those tense days.

But if the Gulf War was the latest example of the value of training, perhaps one of the best examples is the story of the 49th Anti-Aircraft Artillery (AAA) Brigade. The history of the 49th AAA Brigade is the history of a unit that emphasized training. They never missed an opportunity to train, and eventually demonstrated their proficiency in direct conflict with the enemy during the Normandy invasion, June 6, 1944.

The history of the brigade divides easily into two distinguishable periods: the first from the unit's activation until its deployment to England in December 1943, and the second from the unit's arrival in England until the invasion in June 1944. Each of these time periods reflects a difference in the type of training conducted by the brigade.

To fully appreciate the history of this brigade, it is necessary to abandon our current notions of what a brigade is. The 49th AAA Brigade was, from its very activation, much larger than the size of a brigade today. During its time in the continental United States, the 49th AAA Brigade consisted of up to five subordinate AAA groups. Each of these groups was made up of four or five battalions of air defense soldiers. So, to comprehend the large role the brigade would later play in the Normandy invasion, it is necessary to realize that the 49th AAA Brigade more resembled an air defense division (like the 32d Army Air Defense Command in Europe) than a modern brigade.

The 49th AAA Brigade activated Dec. 1, 1942, at Camp Davis, N.C. The brigade's initial assignment was to report to Fort Fisher, N.C., and supervise the training of American AAA units being prepared for overseas movement. This duty was important to the brigade for two reasons. First, the experience gained served the unit well when it was

Men learned how to live in the field, learned the importance of maintaining constant alert, how to recognize aircraft, and last but not least, how to operate with the other members of the air defense team — the Aircraft Warning Service and the fighters. The lessons learned and the procedures established proved to be an extremely valuable guide for the participation of AAA units in European operations.

— Col. C. G. Patterson,
U.S. First Army AAA officer

First Army AAA Assault Units — Normandy

Omaha Beach (V Corps)
Force "O"
16th AAA Gp, Hq & Hq Btry
397th AAA MG Bn (Prov)
413th AAA Gun Bn (M)
197th AAA AW Bn (SP)
467th AAA AW Bn (SP)
320th BB Bn (VLA) (-C Btry)

Force "B"
49th AAA Brig, Hq & Hq Btry
149th AAA Opn Det
18th AAA Gp Hq & Hq Btry
457th AAA AW Bn (M)
110th AAA Gun Bn (M)

***Utah Beach** (VII Corps)*
Force "U"
11th AAA Gp, Hq & Hq Btry
81st AAA/AT Bn (-3 Plts)
116th AAA Gun Bn (M)
535th AAA AW Bn (M)
474th AAA AW Bn (SP)
Btry C, 320th BB Bn (VLA)

A few days after arriving in England, Lt. Col. Bill Mahoney, General Timberlake's executive officer, met with British officers from the 11th Antiaircraft Artillery Brigade to review their movement procedures. The British had developed a system of simultaneous movement and reconnaissance. Battery officers would depart to selected positions upon receipt of a new mission. The unit executive officer moved the fire units forward almost immediately, their route identified in general terms before the second part left, and specifically by markers the recon party would leave behind. Arriving at the objective, the unit occupied their positions immediately, guided into the final locations by the members of the recon party. . . .

The First Army provided the on-board fire control, [Gen. Sanderford] Jarman's disciples provided the imagination, and the British provided the methodology that made First Army antiaircraft artillery units mobile on the battlefield.

— Col. E. Paul Semmens, *The Hammer of Hell*

Over paid, over sexed and over here.

— Opinion of U.S. soldiers, sailors and airmen frequently expressed by British servicemen

Confirmed Claims

AAA Units Attached to:	Cat I	Cat II	Total
VII Corps	266	126	392
V Corps	199	77	276
III Corps	67	59	126
XIX Corps	26.5	24	50.5
VIII Corps	19.5	8	27.5
XVIII Abn Corps	17	7	24
XV Corps	1	0	1
Subtotals	596.5 (74.7%)	301 (67%)	897 (72%)
49th AAA Brigade	153	118	271
52d AAA Brigade	39.5	25	64.5
47th AAA Brigade	3	1	4
Others	6	4	10
Subtotals	201.5 (25.3%)	148 (33%)	349.5 (28%)
Total Army	797.5	449	1,246.5

given the responsibility of supervising the training of the invasion AAA forces a year later. And second, the brigade would often send its own batteries and soldiers out on maneuvers with the training units, thereby gaining valuable field time it would not have otherwise had. This is one of the first examples of the brigade's dedication to training. Not yet scheduled to ship overseas, and with an important stateside mission to accomplish, the 49ers still pushed themselves to fit in training whenever and wherever they possibly could.

In June 1943 the brigade was transferred to Fort McPherson, Ga., and assigned to III Corps which was, at that time, participating in the Tennessee Maneuvers, a major exercise in the preparation of units shipping overseas. For the exercise, the brigade had three groups and 12 battalions attached and was charged with providing anti-air coverage for the corps' mobile elements. The Tennessee Maneuvers was of particular importance to the 49th AAA Brigade because it offered the brigade its first chance to provide AAA coverage to a mobile force under simulated combat conditions. It also provided the brigade staff elements their first experience in trying to control a large, dispersed force.

In December 1943 the brigade deployed to the United Kingdom where they again trained other AAA units. It is important to note that even though the brigade was still a very large unit, with six groups attached, they were not, at this time, guaranteed a spot on the invasion force. It was not until March 25, 1944, when the brigade was assigned to the First Army, that they were assured a role in the invasion of Europe.

Of the schools the brigade conducted during their assignment in the United Kingdom, by far the most important was the mobility school. While this concept of mobility is essentially our modern concept of reconnaissance, selection and occupation of position, at the time the idea of reconnoitering one site while occupying another was completely new. In fact, the U.S. Army had no doctrine on this topic at all, so the 92d Group, tasked by the brigade to run the school, adopted the British manual on mobility operations and adapted it to suit American needs. The 92d Group conducted its first school on mobility by training three different battalions for three weeks and hosting a demonstration of the new tactics at the end of the course. This demonstration was attended by representatives of the British and American AAA commanders and representatives from First

Army. The new tactics proved so successful that American units were encouraged to attend this training prior to the invasion. The success of this mobility training went a long way toward convincing non-AAA officers of the AAA's ability to keep up with the other more mobile branches during the invasion. This training was so revolutionary that comparing a unit before this training to a unit after this training would be like comparing a Nike hardstand unit with a Patriot mobile unit. It changed the way everyone, including air defenders, thought about the branch's capabilities.

The second most important school the brigade operated during this period was the radar school. The SCR 584 gun-laying radar was new to Europe at this time, and very few of the 90mm units to which it was assigned had ever received any training. The success of the radar school can be attributed to the combat setting used to conduct the training. A Battery, 184th AAA Gun Battalion, emplaced in positions around London and conducted training. Representatives from other gun units visited the battery and received training on the operation and maintenance of the radar set. Often this training took place during Luftwaffe attacks on the city and A Battery achieved the distinction of being the first U.S. AAA unit to fire against the German Air Force in the London area. Unit records, especially the unit history, attribute later successes by gun battalions to experience gained at this school. Both the mobility and radar schools dramatically improved the brigade's combat readiness and were examples of the training philosophy expressed by the brigade commander, Brig. Gen. E. W. Timberlake: "The trained live, the untrained die."

The result of the brigade's dedication to training is clear. When the time came and the brigade was called upon to provide anti-air cover for one of the most important and ambitious operations in history, the Normandy invasion, they were ready. And the results of their combat experience prove that. An important statistic from their operation is the percentage of enemy aircraft destroyed by the 49th AAA Brigade units during June 1944. That month, when every American anti-aircraft unit in the European Theater fell under the control of the 49th AAA Brigade, the percentage of enemy aircraft killed or probably killed by AAA fire was 22.1 percent. While that percentage may seem low by today's standards, it was, at the time, high enough to ensure several benefits to the allied invasion force. The First Army *Report of Operations* for this time period lists four main benefits directly attributed to the performance of the AAA forces. First, no ships were lost to enemy air activity if the ships were located under the AAA umbrella provided by the 49th AAA Brigade. Second, no vital targets were damaged badly enough to hamper the invasion operation in any way. Third, no allied airfields were attacked and put out of commission. And last, no allied aircraft were destroyed on the ground during Luftwaffe raids. The report went on to attribute the success of AAA operations to the "effectiveness of the equipment, the state of training, and the conduct of antiaircraft [sic] personnel."

From the instant of the initial landings in Normandy, the guiding principle was to allocate AAA resources where they were needed the most. With the preponderance of Allied air strength striking deeper into Germany, more of the Luftwaffe was retained for air defense operations. As a result, German air operations were usually concentrated in forward areas, and AAA units were pushed well forward to meet this threat. As indicated in the tabulation on the preceding page, 72 percent of the aircraft accounted for by First Army AAA units were destroyed by units operating with corps and divisions.

The 49th AAA Brigade serves as an example of what a unit dedicated to training is capable of achieving. Even though their nation was at war, the brigade had no knowledge of what their role in the conflict would be. Despite this, the unit conducted training at every opportunity and was responsible for the training that ultimately changed the face of AAA. Their dedication to Timberlake's philosophy, "The trained live, the untrained die," inspired this unit's readiness. That same dedication to training is exactly what makes American units ready today.

1st Lt. (P) Kerry J. Trahan, a 1988 USMA graduate, is currently assigned to a 32d AADCOM G-3 detachment in Boerfink, Germany.

In order to provide the scale of AAA effort considered essential, and to provide continuity of operations on the far shore, it was planned to utilize Army, rather than Corps or Division, AAA units in the assault and buildup. By the time forward echelons had moved beyond the range of the beachhead coverage of shipping, artificial ports, unloading facilities, beach exits, dumps and airfields, Corps and Division AAA units were to be phased in to move forward, thus now weakening or disrupting the defense of the most vital and most vulnerable targets. Regardless of claims and publicity to the contrary, the Air Force estimate placed the Luftwaffe capabilities at 1, 750 sorties per day, falling off to a maximum of 1,000 sorties per day as allied flight fields became operations on the continent. Based on this estimate, AAA requirements were predicted on the task ahead, rather than on a fixed scale of attachments.

— Col. C. G. Patterson,
U.S. First Army AAA officer

At 1500 hours on D-Day, Timberlake ordered the captain of the small boat he was on to land at Omaha Beach. He sauntered off the ramp, wearing a helmet with an oversized white star which he had been told to cover. The infantrymen pleaded with the general to take cover, but he walked up and down the beach, encouraging units to move out and "go get the bastards." Several times the general drew his pistol to provide the necessary motivation. Timberlake set the example: his combativeness made him one of the heroes of D-Day. More importantly, he taught a number of antiaircraft artillerymen to think the same way.

— Col. E. Paul Semmens,
The Hammer of Hell

AIR DEFENDERS KEPT HOPE ALIVE IN AFRICA

For nation shall rise against nation, and kingdom against kingdom: and there shall be famines and pestilences and earthquakes, in divers places.
— Matthew 24:7

All I can add in my solitude, is, may heaven's rich blessing come down on every one, American, English or Turk, who will help to heal this open sore of the world.
— African explorer David Livingstone's last words that also serve as the epitaph on his tomb in Westminster Abbey

After Russia extended the Cold War to Africa, it became the classic theatre of Realpolitik, of abrupt formations and reversals of alliances, and the principle "my enemy's enemy is my friend."
— Paul Johnson, *Modern Times*

by 1st. Lt. Eric Martenson

Excitement ran high at Fort Drum, N.Y., as thousands of 10th Mountain Division soldiers prepared to deploy to the war-ravaged, lawless East African country of Somalia. The division, which performed a starring role last September in the relief mission following Hurricane Andrew in Florida, felt it was the unit of choice for the Army in "Operation Restore Hope."

Among the nearly 4,000 10th Mountain Division soldiers who deployed to Somalia, 124 were air defenders of the 3d Battalion, 62d Air Defense Artillery. 3-62 ADA soldiers are well trained air defenders who support the light infantry division with a short-notice, worldwide deployment mission. In the frigid and hostile environment, soldiers train on ADA mission essential task list (METL) tasks daily to prepare them for high stress field training exercises at the Joint Readiness Training Center and the National Training Center. The soldiers are tough, aggressive and competent, ready to deploy at any time to provide air defense coverage to their maneuver counterparts and the commander's counterair priorities within the division.

For the second time in four months, 3-62 ADA deployed with the 10th Mountain Division on a real-world contingency mission. However, in both cases, it was in a non-air defense role. The mission in Florida taught air defenders many lessons in humanitarian assistance and the challenges of working with relief organizations.

In Florida, 3-62 ADA soldiers operated tent cities, distributed food, cleared debris and performed many other varied emergency response missions. On a daily basis, our soldiers interfaced with the local population, civilian contractors, Federal Emergency Management Association personnel, Red Cross personnel and many other relief organizations. Although soldiers seldom train for such a mission, they were highly successful and contributed immeasurably to the overall success of the 10th Mountain Division's humanitarian mission.

With lessons learned in Florida, 3-62 ADA deployed with 2d Brigade, 10th Mountain Division (L) on a 17-hour flight to Mogadishu, Somalia. The battle-ready troops arrived in Somalia, along with a firing battery's worth of Humvees and support equipment, and found a land of guns, violence and anarchy. They faced an unfamiliar mission that was neither a combat operation nor a traditional humanitarian relief effort. In Somalia, unique challenges continually faced air defenders. Each soldier had to carefully guard his own personal health and safety. Soldiers deployed from freezing conditions to an extremely hot climate where disease, heavily armed bandits and warlords threatened their very existence.

Deployment operations proceeded cautiously and slowly as units flew into Mogadishu. The first few days were spent downloading equipment from ships and getting soldiers acclimated. Upon completion of the initial preparation, 3-62 ADA soldiers moved with the 2d Brigade to establish a base camp at Baledogla, an old Soviet fighter base about 50 miles northwest of Mogadishu.

Many buildings were still in place, but as in most of southern Somalia, all plumbing fixtures and pipes, electrical wiring, glass and furnishings had been taken by local Somalis during the anarchy that has prevailed over the past few years. Intense work was required the first few weeks of occupation to make buildings usable. Many buildings had been used by migrant herdsmen as temporary stables for their livestock. Other buildings were filled with trash and rubble. In addition to security and patrolling missions, 3-62 ADA soldiers worked hard to

make the area livable. With the arrival of more equipment and aviation assets, the mission to restore order and provide food convoy security was now in full swing and weeks ahead of schedule.

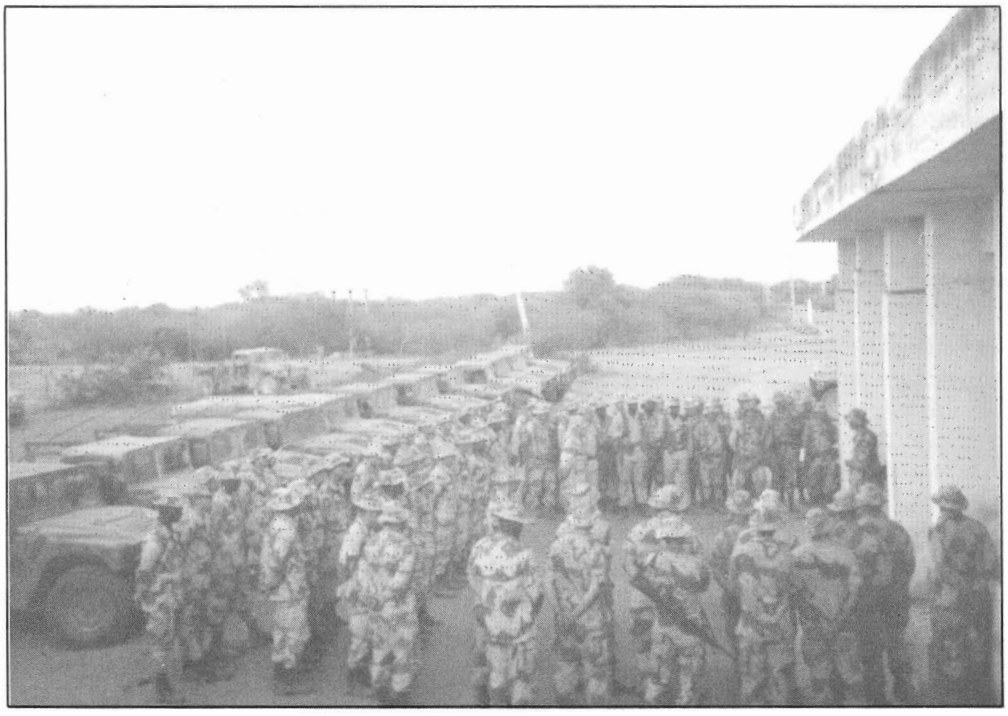
3-62 ADA soldiers performed infantry missions every day, providing convoy security, occupying check points, confiscating weapons, supporting long-range AM and FM communications and operating two critical food distribution centers in Afgooye and Buurhakaba. Their collective efforts at both distribution centers provided much needed food to thousands of starving Somalis. Additionally, an antitank platoon from E-87 Infantry was attached to B/3-62 ADA to assist in convoy security missions.

2nd Lt. Cameron Mitchell and SSgt. Dominique V. Steingel, both of 3-62 ADA, served as liaisons (LNOs) between the Moroccan and U.S. forces. The LNOs assisted in obtaining supplies that Moroccans needed that American units based in Baledogle had. Since their arrival in Somalia, LNOs conducted night security missions with Moroccan forces (searching for bandits that set up roadblocks to rob vehicles) and many other difficult and far-ranging missions, such as coordinating Army engineers and Navy Seabees to construct roofs and flooring in abandoned buildings required by Moroccan forces conducting a relief-in-place of various 10th Mountain Division units.

The LNOs' knowledge of the language and interpersonal skills greatly eased arrangements with logistics units to make daily deliveries of supplies like water and Class IV materiel. They also interpreted, for local commanders, concerns and questions the Moroccans had. Steingel, a French native, served as an interpreter between the French-speaking Moroccans and the U.S. Army. These LNOs did more than simply complete another deployment, they promoted cooperation and friendship among nations.

In addition to these missions, some A/3-62 ADA soldiers were attached to the 3d Battalion, 25th Aviation, as helicopter door gunners. The 3-25 Assault Helicopter Battalion faced crew shortages due to manpower constraints. The Aviation battalion commander wanted an additional crew member to round out the crew of two pilots and a crew chief per helicopter, particularly in light of the estimated threat from armed Somali factions. He requested assistance from the ADA battalion commander, who immediately complied. As a result, 18 air

3-62 ADA commander Lt. Col. Jerry D. Hatley addresses the ADA battalion task force in Somalia.

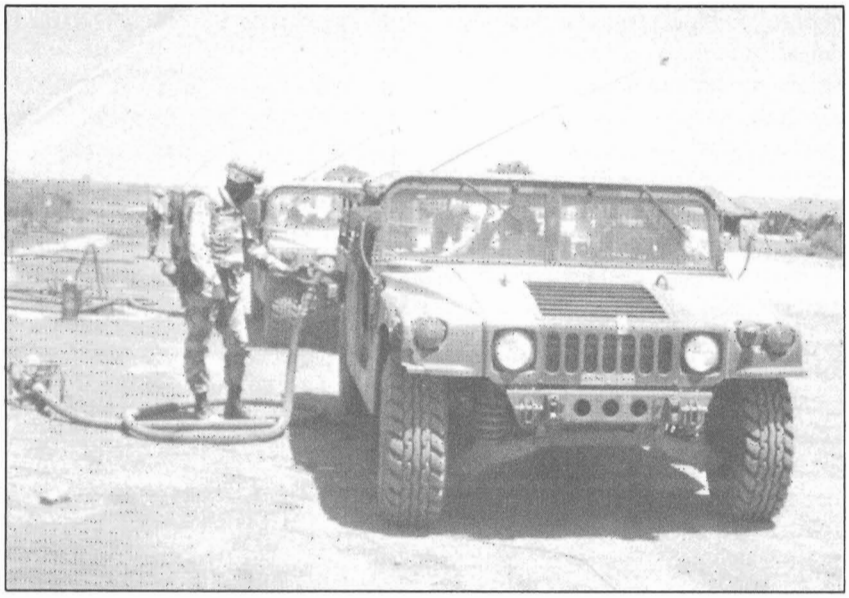


The remarkable changes in eastern Europe have signaled the beginning of a dynamic period for the Armed Forces and especially for the U.S. Army. With the ever-increasing problems in the Third World, contingency operations will gain emphasis. These changes will impact upon every member of the Total Force and require a review of doctrine to ensure our preparedness for future operations, especially humanitarian assistance operations.

— Brig. Gen. William L. Nash, U.S. Army Deputy Commanding General for Training, Combined Arms Command, December 1992

The African continent is the setting for what is potentially the greatest tragedy facing the world community. Daily we are engulfed by media images of emaciated populations living in unimaginable misery. Such conditions prompt calls for multinational — or failing that, unilateral — military action to ensure safe havens for populations and relief workers, and to create an environment in which the restoration of moral political intercourse can occur. Somalia is a graphic example.

— Army Chief of Staff Gen. Gordon R. Sullivan



An ADA soldier prepares for another convoy mission through war-torn Baledogle.

The United States must provide strong moral and political support for the UN's humanitarian efforts. This will mean taking a leadership role on these issues and engaging in creative and active diplomacy with other countries, both inside and outside the UN, to let the world know that the United States considers humanitarian access a fundamental human right — as important as any other. We know too well from experience that the United States is the only country capable of playing this vital catalytic role, and that the support of other countries is essential to the success of these efforts. We also know that it will take hard work and commitment to the true essence of American values. The new world order won't happen just because we say it will.

— Tony P. Hall,
Chairman of the Select
Committee on Hunger, U.S.
House of Representatives

For I was hungry, and ye gave me meat: I was thirsty, and ye gave me drink: I was a stranger, and ye took me in.

— Matthew 25:35

defenders made the transition from shooting at aircraft to defending them. Soldiers received training and orientation on aircraft characteristics and the M-60D machine guns prior to deployment from Fort Drum, N.Y., and performed this new job daily in Somalia. They flew a diverse and continuous mission schedule.

They participated in air assaults into Jilib and Afghoi, flew logistics resupply missions into Marka and supported general aviation operations throughout the theater. These air defenders flew a combined total of more than 300 mission hours. For their commitment and selfless contributions, the 10th Aviation Brigade commander initiated exception to policy actions to get the air defenders flight pay for the duration of their stay in the theater, and to award them air crewmen's badges.

3-62 ADA soldiers led the way in Somalia, doing a magnificent job as they brought life back to the people. Infantry units were continually impressed with the flexibility of our soldiers to perform difficult missions they were not accustomed to executing. ADA soldiers and leaders proved once again that they can adapt to any situation and successfully complete any assigned mission.

In a recent *Parameters* article, Army Chief of Staff Gen. Gordon R. Sullivan predicts operations such as Restore Hope may become routine. "Even though such operations are undertaken for benign reasons and without warlike intent," he warns, "they may expose our forces to hostilities. Our soldiers, therefore, must be trained to operate in an environment that looks like war but in which we do not want to become a belligerent. The situation that has prevailed in Bosnia-Herzegovina poignantly illustrates this point: it is difficult to imagine a scenario involving the introduction of U.S. combat forces in that beleaguered land where they would not likely become combat-engaged. We must recognize that whenever and wherever we commit ground forces we have crossed a unique threshold signaling a high level of commitment and national will. Inherent to the use of military formations — even in seemingly noncombat situations — is a coercive message that we are prepared to employ combat power. As we consider the variety of 'noncombat' missions regional conflicts and crises will present, we must think in terms of streamlined formations that can respond quickly, perform peacekeeping or humanitarian assistance, and still be credible warfighters."

As our global defense strategy changes and becomes more complex and gravitates from traditional missions toward the resolution of regional crises and relief efforts like Somalia, ADA soldiers can expect to perform missions like this more often. Of course, our primary mission is and will always be air defense. As Sullivan points out: "An important point to be underscored in this regard: a disciplined warfighting organization is inherently capable because of its administrative and logistical expertise to accomplish many peripheral missions, but the reverse is not true. We cannot organize primarily to accomplish humanitarian relief and disaster assistance and then be capable of winning decisively on the battlefield." As the soldiers of 3-62 ADA have learned, you never know what you will be called upon to do in the line of duty. As a consequence, preparedness is the key and flexibility is never an option. *Aim High!*

1st Lt. Eric Martenson is currently assigned to A/3-62 ADA as a brigade liaison officer to 1st Brigade, 10th Mountain Division (L).

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