ADA

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FEATURES

ADA DIGEST

ON THE COVER

Prepare to Engage! A Stinger gunner hones his engagement skills on Kollsman's Stinger Troop Proficiency Trainer. (Photo courtesy of Kollsman)

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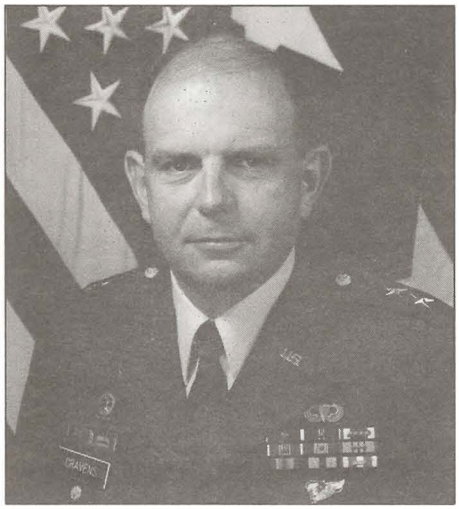
Intercept Point



Readiness — the basic tenet of America's Army. Maintaining the necessary level of readiness in the face of today's declining resources poses a formidable challenge. Air Defense Artillery has achieved a high state of readiness through quality training on devices, simulators and simulations.

Our soldiers require a realistic air threat to train against, yet the cost of supplying helicopters, unmanned aerial vehicles and tactical ballistic missiles is prohibitive. Thus, our branch relies heavily on simulations to provide high quality, near-real training.

Training devices, simulators and simulations have changed the course of training history. Software simulations portray the air threat more realistically than most field exercises. Training devices and simulators fill the void in live-fire training, affording gunners the opportunity to practice fire control procedures, gunnery and teamwork that are critical to battlefield success. Modern supercomputers create a theater of operations that enables air defenders to understand and experience war, to build their self-confidence, to develop their warfighting ability and to envision their ultimate success on a future battlefield.

"Training Devices, Simulators and Simulations," page 2, offers an in-depth look at how Air Defense Artillery has evolved in the computerized training field. From the crude mockups of the 1950s to the most sophisticated simulators of today, Air Defense Artillery has focused its technological expertise on providing the most beneficial, most cost-effective training for its soldiers.

At the forefront of these high-tech advances is the Fort Bliss Warfighting Center (see page 9), which congregates under one management roof the benefits of an ultra-modern computerized battle. The Center's Janus Battle Focused Trainer, an interactive, force-on-force combat simulation, provides exercises and computer-generated wargames air defenders use to demonstrate and hone their tactical skills. Simulators of the not-too-distant future will allow air defense warfighters at Fort Bliss to participate in computer exercises with our combined arms brethren and sister services, sharing the same data base, seeing the same images and actively fighting the same battle.

An old Army saying states that the only "real" training is field training. In large measure this is true . . . nothing can truly replace the experience gained from operating in the fog and uncertainty of the field. But because of budget constraints, simulators and simulations must be used to offset the decline in field training. Air Defense Artillery's computer workstations, training devices and incredibly realistic simulators do just that, and have done so for a long time. Thanks to simulators and simulations, ADA soldiers are combat ready, and if called upon to fight, will again be —

First to Fire!

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

The deterrent value of the Army is directly related to the level of its training. An ill trained force is twice a liability: it is not a credible deterrent, and it invites challenges which it may prove unable to meet.

FM 100-1, *The Army*

The Army increasingly relies on training aids, devices, simulators and simulations to stretch its training dollar and provide realistic training across the force. Simulations form an integral part of the training strategy for all Army forces. They allow the Army to hold the line on training costs, reduce environmental impact and, at the same time, extend a higher level of training to a smaller force. We use training devices to attack the readiness gap caused by constrained funding and increasing operational cost and to provide training environments not achievable in other ways.

Challenges & Opportunities

TRAINING DEVICES, SIMULATORS AND SIMULATIONS

YESTERDAY, TODAY AND TOMORROW

by James Crouch

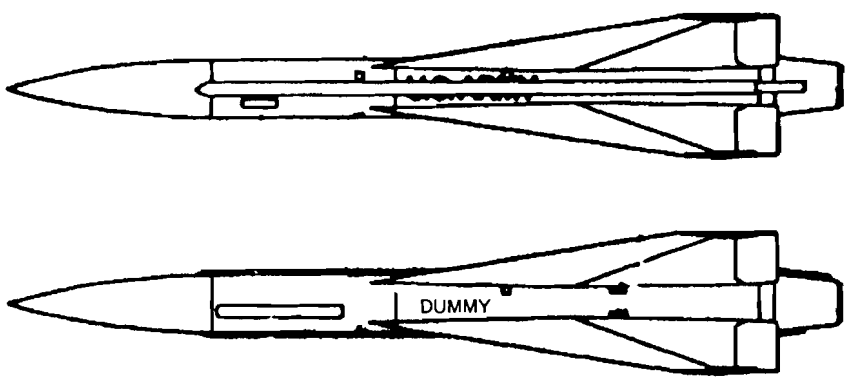
Webster's defines simulators and simulations as "a machine for imitating certain environmental and other conditions for purposes of training." Historically, two elements, expensive systems and skills transfer fidelity, have pushed Air Defense Artillery to the forefront in the development, acquisition and use of training devices. These two truisms will take Air Defense Artillery into the future. If you are an air defender, this article, which revisits yesterday's, examines today's and focuses on tomorrow's ADA training devices, simulators and simulations (TDSS), deserves your attention.

Aware that Patriot had never been fired in anger, reporters who interviewed Patriot crew members on the eve of Operation Desert Storm were disconcerted to discover that the Patriot batteries dispatched to Saudi Arabia had never fired one in practice either. Their engagement training consisted almost exclusively of computer simulations rather than actual engagements. "It works the same way," one crewman assured a dubious network reporter.

In truth, for a Patriot tactical control operator, there is little difference between combat and training except that, in combat, he or she knows that in the real world exterior to the computer matrix, up in the dark sky, a real, live tactical ballistic missile, not just a software-induced blip, is descending. After the first successful Scud intercept, Capt. Jim Sprangler, A Battery, 2nd Battalion, 7th Air Defense Artillery, said the historic intercept went perfectly, "just like in training."

The success of Patriot batteries against Iraqi Scuds during Operation Desert Storm was as much a triumph of training technology as weapons technology. Operation Desert Storm proved ADA simulation-based training strategy works.

Hawk Training Missile



The Hawk M-18E2 training missile is a dummy (inert) missile with the same physical characteristics as a tactical missile. The missile allows realistic training in missile canning, decanning and transfer procedures while eliminating the need for live tactical missiles in training. Each Hawk unit has training missiles.

Yesterday

ADA maintenance courses during the '50s included 90 days of basic electronics before the student advanced to instruction on the tactical system. One training device, the breadboard superheterodyne receiver, tested the student's ability to tune the different stages of the device, thus demonstrating his understanding of Ohm's Law, capacitive and inductive reactance, amplitude and frequency modulated signals and other electronic phenomena. The student also learned the use and importance of test equipment, oscilloscopes and multimeters. Imagine the students' smiles when they tuned in a local radio station — Marconi clones!

As the sophistication of radar electronic countermeasures grew in the '60s, Air Defense Artillery deployed the Nike-Hercules T1 Trainer radar signal simulator to teach operators electronic counter-countermeasures procedures. Mounted in a "white elephant" van, this simulator replaced live aircraft and jammers that had once flown training missions against the Hercules ADA system. Various types of deceptive jamming techniques were simulated and crews continually enhanced their detection, acquisition, tracking, engagement and electronic counter-countermeasures skills using this radar signal simulator.

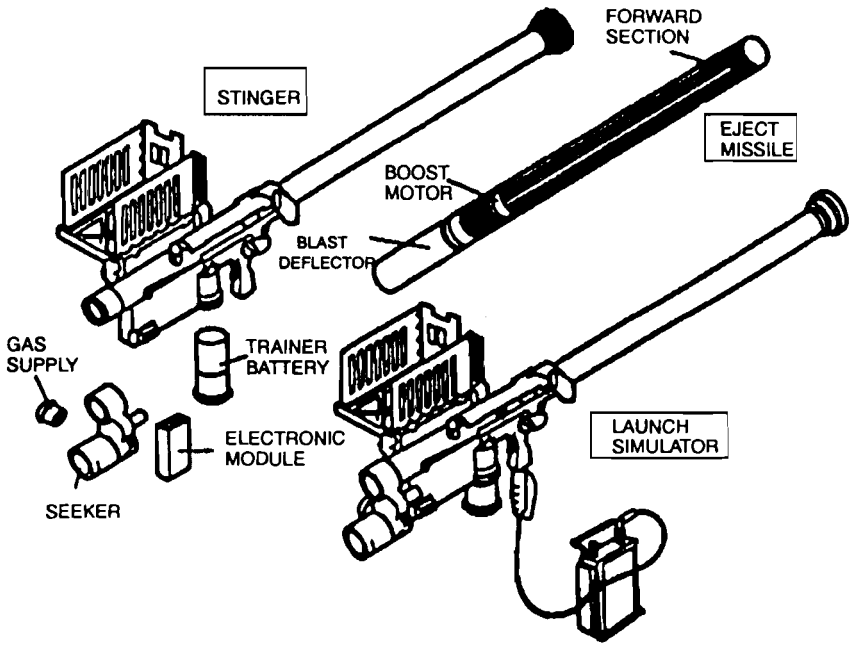
Two radar signal simulators, the Hawk Basic TPQ-21 and the Improved TPQ-29, sheltered in olive drab vans,

provided radar signals and aircraft electronic counter-countermeasures for operator training in the '60s and '70s. With multiple aircraft (six) and jammers (pulse and continuous-wave), these simulators challenged crews via air battle simulations. Crews practiced tracking and engagement procedures, thus maintaining a high state of readiness. A product improvement program fielded in the early '80s and an adaption effort to replicate the Warsaw Pact threat resulted in the 32nd Army Air Defense Command replacing the TPQ-29 with the Operator Training Simulator. Mounted on the wall of the platoon command post, this device signaled the beginning of Silicon Valley's state-of-the-art influence and the end of the analog/synchro concept. Its 40 aircraft and enhanced radar-jamming capabilities challenged crews to a higher performance level.

Redeye, a fire-and-forget missile, required engagement practice worldwide, thus 22 Moving Target Simulators were installed in domes constructed in the '70s. These domes were built in stateside, European and Pacific locations to ensure that personnel maintained proficiency regardless of the theater. Through a combination of 16mm film projections on a 270- degree screen, gunners honed their detection, tracking, identification and engagement skills. The Moving Target Simulator eliminated high aircraft costs while supporting task fidelity.

The electronic world's dinosaurs, analog computers and vacuum tubes, vanished in the late '60s and early '70s. Replacing the cumbersome and slow analog was the digital computer with its small circuit cards and fast execution speed. To meet the demand to train personnel on numbers (binary/octal/hexidecimal) and logic (AND/OR, NAND/NOR gates), Air Defense Artillery developed the Breadboard Digital Logic Circuits Trainer. Both operator and maintenance personnel practiced high- and low-signal tracing through logic gates producing flip-flops, clocks and other transistor circuits.

Stinger Launch Simulator



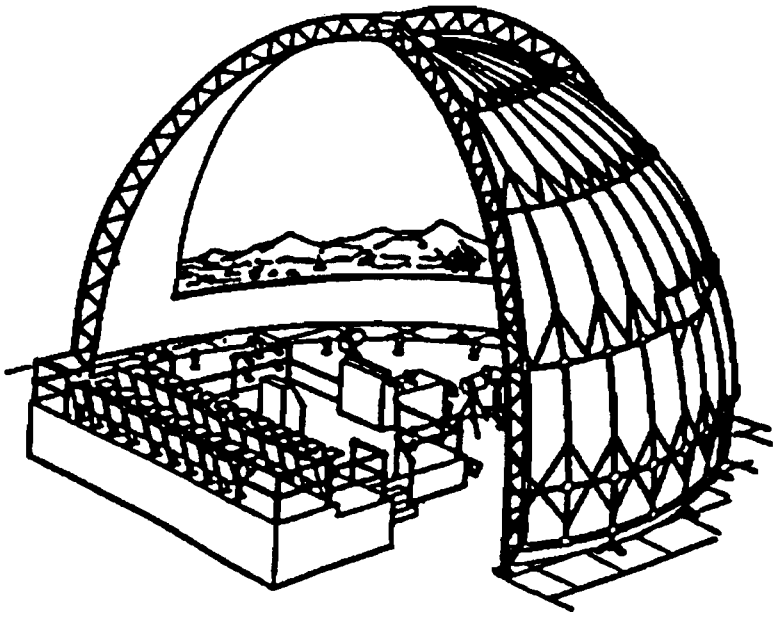
The STLS is a modified tracking head trainer consisting of a launch tube, eject missile, seeker, gripstock and IFF system. When fired, the STLS actually propels the eject missile 50 meters downrange, effectively reducing gunners' fears of firing the actual weapon. USAADASCH is the only Army user.

Air Defense Artillery embraced two new concepts via the Safeguard Central Training Facility: develop training devices parallel with system development and embed the training device as a part of the system software. Acquisition of the Safeguard, our first and only antiballistic missile, started in the late '50s with deployment in the mid '70s. During this time, development of operator and maintenance trainers (with appropriate simulations) progressed to the extent that both system and training device fielding occurred together. Replacing analog computers, digital computers, although housed in large liquid-cooled cabinets, provided a significant advantage: the training software could be "embedded" in the system. Lessons learned later enhanced the acquisition of future trainers.

In the early '80s, two acquisition efforts, one managed by the Roland Program Manager and the other by the Program Manager for Training Devices, simultaneously produced the ADA tactical systems and the conduct-of-fire trainers. The Roland conduct-of-fire trainer, installed in an environmentally controlled building for institutional training and in a van for unit training, provided both the commander and gunner simulated target detection, acquisition, identification and engagement practice with jamming and quiet aircraft. Simulations (scenarios) developed by the U.S. Army ADA School's (USAADASCH) Directorate of Training and Doctrine (DOTD) ensured that realistic and challenging training occurred. The New Mexico Army National Guard proudly operated and maintained the Roland for two years before retiring the system.

The Sergeant York Institutional Conduct-of-Fire Trainer, the third ADA tactical system and training simulator developed in a parallel acquisition ef-

Improved Moving Target Simulator



Inside the IMTS dome, images of flying aircraft are projected against a natural background with realistic sound effects. The hemispherical projection room allows target engagements at 360 degrees horizontally and 90 degrees vertically. Used to train Stinger gunners in target acquisition and engagement skills (at the institution) and to sustain these skills (at the unit), the IMTS reduces the need for real targets by half.

fort following Patriot and Roland, provided crew training in standard skills, detection, acquisition, evaluation and engagement procedures during the early '80s. Although acquired via the "Skunk Works" concept, the trainer's configuration followed the pattern of a general purpose computer driving high fidelity system simulated consoles. Realistic air battle scenarios developed by DOTD enabled crews to hone their skills prior to system testing. Even though the Army rejected the tactical system due to a changing threat requirement, this simulator's performance was exceptional. Unfortunately, some VIPs who attempted to engage aircraft without the initial preparatory practice performed by the Sergeant York crews produced a spate of adverse publicity that helped doom the system.

Today

Originally acquired as the Operator Tactics Trainer, the Patriot Conduct-of-Fire Trainer (PCOFT) was fielded four years prior to the deployment of the tactical system in the early '80s. Designed to meet all system specifications, this trainer set the standard. Initialization and air defense mission tasks trained on the PCOFT reduced the requirements for tactical equipment by 10 percent. Using the Tactical Operator Tactics Trainer (TOS-T), circa late '70s, as a reference, an ad hoc committee made up of DOTD, the Directorate of Combat Developments and Army Research Institute Department of the Army civilians conducted numerous in-process reviews with Sanders Associates, the OTT contractor, to successfully develop and field this simulator.

The versatility to reconfigure to different system combinations (i.e., one battalion with three fire units, four battalions with fire units simulated, eight single-console fire units) by changing console covers and selecting desired software enhanced PCOFT's instructional value. Air battle scenarios developed for any world location by DOTD saved the Army $9,000 per scenario. An initial library of 100 scenarios taught the 14E (Patriot Officer) and 24T (Patriot Operator and System Mechanic) courses. The PCOFT's return on investment is immeasurable. The Operator Tactics Trainer prototype development costs totaled $13 million, while initial production models cost $3.5 million and subsequent production models cost $1.5 million — negligible when compared to the $100 million tactical system cost. If ever the government spent smartly, the purchase and subsequent fielding of the Patriot Operator Tactics Trainer, nine institutional and two unit, stands as an example of the advantages of training devices over tactical equipment.

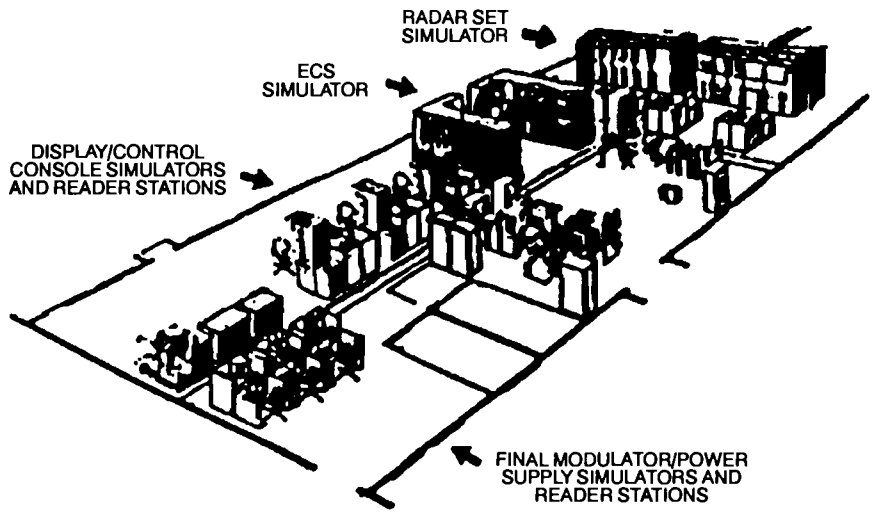
The PCOFT's fidelity is unmatched. Operators experience the same sensations (such as sweaty palms) they would experience while fighting a real air battle. An updated program has replaced the '70s-era conduct-of-fire trainer technology with DEC 11-70 computers and peripherals, FORTRAN software and Patriot system-modified computers and software. A user-friendly scenario generation computer has replaced the former digitizer, VT-100 terminals and software-crunching techniques. This is a step in the right direction; upgrades to tactical Patriot system software are mirrored by upgrades in simulator software, thus keeping the PCOFT current. This has been no easy feat since the tactical system software has experienced three builds after deployment, and at least two more are expected. Air Defense Artillery, however, made one mistake. The Operator Tactics Trainer featured computer-scored pre- and post-test comparisons, but the PCOFT upgrade program omitted this original system specification.

The Patriot Organizational and Maintenance Trainer (POMT) development and fielding occurred concurrently with the Patriot Operator Tactics Trainer in the early '80s. Thinking that the PCOFT was the best that we could do, little did we realize that the POMT

would reduce the tactical equipment requirement by 41 percent (24T course) and provide an Active Maintenance Trainer Simulator as well as a Part Task Trainer. A prototype (cost $15 million) and a production POMT (cost $10 million) enabled students to realistically train display-aided maintenance tasks peculiar to the engagement control station, radar set and information coordination central on the trainer instead of on the actual equipment. Along with the tactical system equipment savings, the student-to-equipment ratio also changed from 2:1 (tactical) to 4:1 (POMT), which equates to a reduction in instructor requirements. Just as the PCOFT's '70s technology needed replacement, so did the POMT; therefore, an upgrade program funded by the Patriot Program Manager replaced hardware and software as appropriate. This upgrade incrementally keeps the POMT current with changes in the tactical system. Without upgrades, the POMT would become obsolete overnight.

Following a Patriot system in-process review, the Patriot Project Office, Redstone Arsenal, Ala., demonstrated an embedded trainer designed to sustain air defense battle skills, the Troop Proficiency Trainer (TPT), circa early '80s. As a fire unit trainer, this training software showed promise; the battalion version, however, limited to only reallocation of fire units, left a lot to be desired. Two years later, modified battalion training software enabled personnel to perform command planning and air defense battle tasks. The TPT satisfied the needs of those who desired to train only with the "real thing." All the complaints about multiple cables connecting the simulator to the tactical system, plus the associated faults, vanished with the appearance of this embedded trainer. DOTD generated air battle simulations (scenarios) for each system configuration (battalion and fire unit stand-alone or battalion netted). Simulations were loaded on mass storage unit cartridges and shipped to deployed units for continued proficiency training. Additional savings! Initially, a limited scoring algorithm evaluated the operator's performance only for asset defense; however, area defense, added later, enhanced scoring. Still, "looking over the shoulder" evaluations continue.

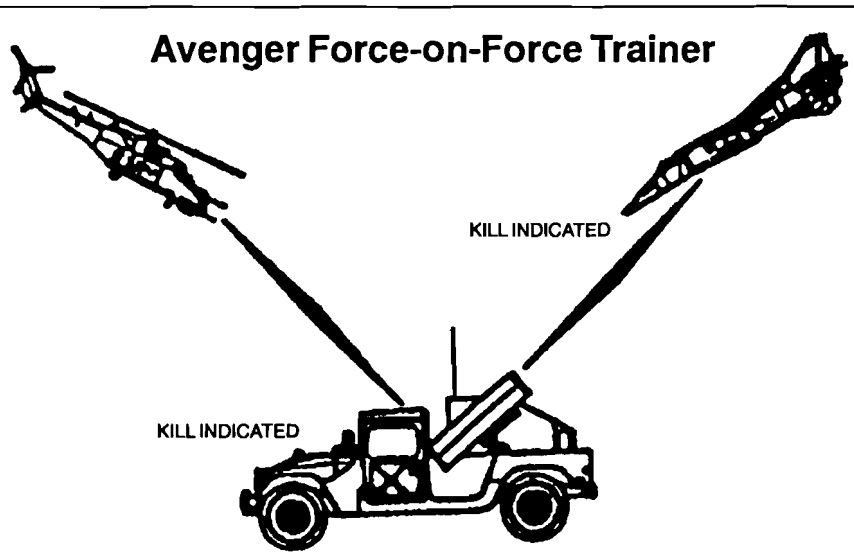
Patriot Organizational and Maintenance Trainer



The POMT provides a realistic part task trainer for Patriot maintenance personnel within USAADASCH. The POMT, which consists of the active maintenance trainer simulator and the part task trainer, trains maintenance personnel in the use of display-aided maintenance, non-display aided maintenance and built-in test equipment indicator procedures to diagnose, fault locate, remove and replace defective components and use software routines for the radar set and the engagement control station. The POMT can train up to 27 students at one time, effectively replacing the equivalent of seven radar sets and five engagement control stations.

For almost 10 years, DOTD pursued acquisition of a Hawk training device or simulator. Improved training techniques and reduction in wear and tear on the tactical equipment supported this action. Finally, with the deployment of Hawk Phase III, the Hawk Advanced Training Simulator (HATS) became a reality in the early '90s. HATS, which is actually a suite of simulators that simulates the continuous-wave acquisition radar, high-power illuminator radar and platoon command post, trains operators in energizing, deenergizing, daily checks, adjustments and air defense operations. HATS also trains maintainers in weekly checks, fault isolation and corrective maintenance. Costly tactical equipment finally became available for fielding to National Guard units and efficiency in training to tasks produced better trained personnel.

Although the Improved Hawk fielded a digital computer in the middle '70s, the radar signal simulator, with its synchros and limited aircraft (six), remained active until Product Improvement Phase II and III in the late '80s. Knowing that the digital computer supported the embedded software concept, the Hawk Integral Operator Trainer/TPT tracked the Patriot TPT training software strategy. A simulations library resided on a PROM, and DOTD developed theater-peculiar simulations for training air defense tasks. Hawk operators honed their skills in an environment with the "real thing," less the costs, of flying air missions with real aircraft. Electronic countermeasures simulations enabled operators to maintain proficiency in this critical task.



The Avenger FOFT, which should be issued to the National Training Center in FY95, will become the only method available to train realistic combined arms exercises without using live ammunition. This integrated laser engagement simulator will be used in MILES force-on-force training exercises and will simulate missile and gun firings, weapons effect signatures and real-time casualty assessments. Units will use the FOFT for realistic training in combined arms and combat training center exercises. Both active and reserve component Avenger gunners will use the Avenger FOFT in a simulated wartime environment.

Three ADA systems, the Vulcan, Stinger and Chaparral, due to their future in the National Guard, forced a relook at their TDSS during the mid-'80s. DOTD competed for funds from the Office of the Secretary of Defense Product Improvement Fund for a Vulcan training device, a video display mounted on the gun and controlled from an instructor station. The ammunition savings realized by reducing live-fires to once a year instead of quarterly were more than sufficient to win $10.8 million for acquisition of the Vulcan Troop Proficiency Trainer. However, two years elapsed before the funds became available. Meanwhile, the National Guard provided $3 million to start the acquisition process through the Program Manager for Training Devices. Vulcan's fielding to the active component and the National Guard was zeroed in the late '80s. Fortunately, the TDSS strategy had requested a common instructor station for all three systems, with a circuit card peculiar for each. Therefore, Vulcan and Chaparral devices' acquisition stopped, and all efforts concentrated on the Stinger TPT. Stinger gunners currently hone their detection, identification and engagement skills with this tube-mounted TV controlled by the instructor station. DOTD develops simulations (scenarios) that challenge the gunners via various flight profiles.

Stinger now replaced Redeye. Still a fire-and-forget system but with greater range, identification features and engagement techniques, Stinger's versatility necessitated improving the 270-degree moving target simulator domes in the early '90s. Thus the "improved" moving target simulator: three projectors (one per target), 360-degree dome display (changeable), three gunner positions, a scenario-generation computer and a scenario library replaced the '70s vintage simulator. Six of the original 22 domes were modified. Presently, selected terrain and a variety of aircraft flying profiles challenge ADA gunners and crews.

Fielded by USAADASCH in the early '90s, the Patriot Radar March Order and Emplacement Trainer trains crew members and drivers in critical march order and emplacement tasks previously taught on the tactical Patriot radar set. Scarce resources, radar sets and repair time dictated the demand for this device. As in the past, replicating system realism resulted in a device that permits Patriot crew members to experience physical sensations associated with the fit, form and function of the tactical Patriot radar set. At four for $3 million, the new trainer was a bargain.

Each ADA system fields dummy and smart missiles capable of training assembly, disassembly, loading and unloading tasks, plus a variety of electronic checks. Additionally, the Stinger Launch Simulator trains gunners to track and actually fire a simulated missile downrange — an inexpensive method to enhance engagement skills, including firing. A similar missile simulator, the Avenger Captive Flight Trainer, trains gunners to detect, acquire, track, identify and engage targets of opportunity without a missile launch. Both devices enable gunners to simulate the engagement of multiple aircraft at a fraction of what it would cost to simulate a similar air battle using real aircraft.

Over the years, various terms — computer-based instruction, computer-aided instruction and computer-based training — identified TDSS used to train ADA system operators and maintainers. The buzz word today is *multimedia*. Past experiences with the Missile Minder, AN/TSQ-73, Simulated Institutional Training System, Electronic Information Delivery System and the Patriot Maintenance Control Simulator Emulator marked Air Defense Artillery's initial multimedia efforts. USAADASCH's visual aircraft recognition PC stations for forward area air defense (FAAD) and short-range air defense students, combined with an active effort to identify and convert Patriot lessons to multimedia, started a second effort; i.e., an introduction to console switches and indicators, missile load, reload and heavy expanded multipurpose mobility truck operations. Scarce resources generated by the current drawdown require relook-

ing multimedia as "the" solution that enhances the quality of future instruction.

Tomorrow

Before focusing on tomorrow's TDSS, a review of Air Defense Artillery's future training strategy is necessary. Throughout this article; indeed, throughout history, we have witnessed that replacement of tactical equipment with TDSS enhanced training effectiveness and cost efficiency. Moving into the 21st century requires adding another element to this strategy: the combined arms function. The digitized battlefield will force Air Defense Artillery to integrate tactically with other combat arms. If we are to satisfy the combined arms requirement and "train as we fight," we must integrate ADA TDSS with combined arms TDSS.

The Air Defense Combined Arms Tactical Trainer will train FAAD soldiers via a computer-driven network simulation that integrates simulated ADA command, control and intelligence, Avenger and Bradley Stinger Fighting Vehicle consoles with Artillery, Armor, Engineer and Infantry tactical operations centers. Simulations (scenarios) realistically challenge student officers and NCOs to perform ADA combined arms collective and maneuver tasks against an array of threats. The Simulation Network developed at Fort Knox pioneered this concept. A follow-on, extended battlefield version of the Air Defense Combined Arms Tactical Trainer is scheduled to add Patriot and Hawk. Unfortunately, funding is questionable.

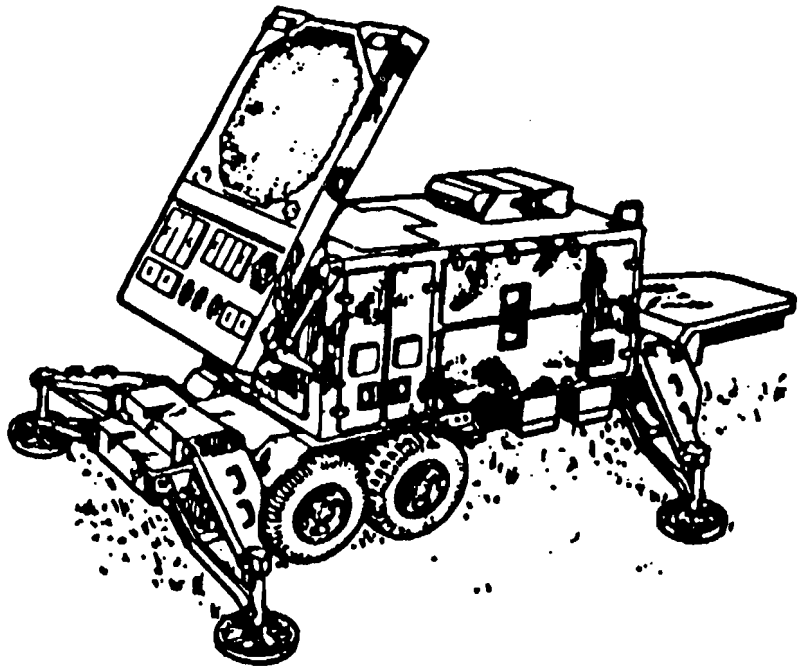
As you read this article, the FAAD command, control, communications and intelligence TPT is scheduled to arrive at Fort Bliss for training FAAD personnel. The new system will train FAAD command and control tasks, combined arms functions and simulated alerts via realistic threat simulations. Institutional training in individual tasks for Advanced Individual Training students and sustainment for unit command, control and intelligence personnel demonstrate the versatility of this embedded TDSS.

TDSS funding took the first hit during recent ADA systems acquisition, and the Avenger missile system was not exempted. Two TDSS requirements, the Avenger Institutional Conduct-of-Fire Trainer and Launcher Sensor Mockup, await fielding funds. USAADASCH is testing an institutional conduct-of-fire trainer prototype that consists of a computer-driven cupola with a video display that replicates the gunner's station. Threat simulations challenge the gunners' ability to perform air battle tasks. The Launcher Sensor Mockup, a similar device to train missile and machine gun loading and unloading, was also a funding casualty. Eventually the need to train more efficiently and reduce wear and tear on the Avenger equipment should revive these two devices, providing the costs don't escalate beyond funding limits.

Simply stated, artificial intelligence, via computer software, places the subject-matter expert at the call of the operator or maintainer. The Patriot system once again served as the means to demonstrate this technology. An Intelligent Conduct-of-Fire Trainer developed for the U.S. Army Research Institute for the Behavioral and Social Sciences demonstrated an application of artificial intelligence in the late '80s. Several functions, target identification and engagement tasks were automated using LISP software. Likewise, audio responses alerted the operator when subject-matter expert actions differed. The audio enabled the operator to continue monitoring the visual display as the air battle raged.

Capturing this artificial intelligence technique and applying it to future tactical and trainer software upgrades should shape Patriot and any other ADA system training and deployment.

Patriot March Order & Emplacement Trainer



The MO&E trainer is a mockup of the Patriot radar set physical characteristics applied to march order and emplacement tasks. The trainer consists of a radar set trailer with outriggers, electrical power, a rotating platform with antenna face and a shelter. USAADASCH uses the MO&E trainer to train Patriot crew members, operators, system mechanics and system maintenance technicians. Using the MO&E trainer reduces the Patriot radar set requirement for MO&E tasks by 223 hours.

The Patriot OTT: A Success Story

Quite often we take things for granted, and the acquisition of trainers is not an exception. However, the Patriot Operator Tactics Trainer (OTT) development and delivery demonstrates a unique effort by a group of dedicated civilian soldiers. Here's the challenge that a request for proposal released by the Patriot Project Office placed on the selected contractor and Air Defense Artillery: build a training device based on the Patriot system's specifications and deliver it prior to the system's scheduled deployment in the late '70s.

Typically, a system's prime contractor is chosen to develop both the tactical system and training device as a parallel effort. But in this case, the prime Patriot contractor, Raytheon, was not selected. Instead the Army selected Sanders Associates, Nashua, N.H., to work on the OTT project. This made delivery of the system's specifications from Raytheon to Sanders a necessary first step. No Patriot technical manuals existed, but a series of Missile Command Continuation Groups (MICGs) (documents used by the military command for system software reference) that had been developed on the functional concept defined operations and maintenance. Raytheon delivered approximately 10 MICGs and Sanders Associates (which became Lockheed-Sanders in the '90s) began a voyage that never ran a true course.

An ad hoc committee representing the U.S. Amry Air Defense Artillery School (USAADASCH) received copies of the Raytheon MICGs. Personnel from the Army Research Institute and USAADASCH's Directorate of Combat Developments, Directorate of Training and Doctrine and Patriot Training Department comprised this ad hoc committee. Their mission was to ensure that the prototype training device tracked these documents, subject to any changes to the tactical system specifications. If there was ever a "Mission Impossible," such was their lot. Armed only with a mission needs (MN) statement and the MICGs as guides, this group also started a voyage that never ran a true course.

Since the tactical and training device software need not be identical, both the contractor and the ad hoc had a chance to succeed, slim as it was. Two teams, the contractor and the ad hoc, met and developed a plan using FORTRAN IV software and Digital Equipment Corporation (DEC) hardware to drive eight student consoles and an instructor console. The contractor's challenge was to substitute the cheaper FORTRAN IV software for the Patriot system's Jovial software. Considering that the device must replicate the tactical system with maximum fidelity and system software (24 bits), device software (8 bits) could not be translated. The two-year project passed into three years. In-process reviews (IPRs) continued in a series of day-into-night sessions marked by heated vocal exchanges. Once the OTT software and hardware were demonstrated, numerous reports identifying problems needing fixes were written for future in-process reviews.

Working only from the original MICGs, Raytheon developed the tactical Patriot system, initiating software and hardware changes as necessary to meet the MN. These changes were passed on to the ad hoc committee for its review and eventual forwarding to Sanders Associates. The ad hoc member responsible for software also attended system IPRs to ensure that the device tracked the tactical system. After three years, the prototype device was accepted in August 1981, with exception (fire unit only), and a year later the complete prototype OTT (battalion and fire unit) was used to train the first Patriot unit personnel scheduled for deployment. Interestingly enough, the complete OTT prototype and six additional production models were accepted at Fort Bliss, Texas, 1982-83, and a Germany-deployed Patriot battalion was the first unit equipped in 1985.

The ad hoc committee faded into the woodwork without any recognition except knowing that their efforts produced a training device ahead of the deployment of the tactical system using only a set of documents for a reference. Who were they? Dr. Charles Howard of the Army Research Institute; Rusty Kussero of the Directorate of Combat Developments, USAADASCH; Albert Beginski (deceased) and James Crouch of the Directorate of Training and Doctrine; and Theodore Wright of the Patriot Training Department.

Although initially very costly, the manpower savings should support pursuing artificial intelligence as a scarce resource solution.

Within the realm of automation, an Army Research Institute Performance Assessment Capability Study also identified three scoring functions: mission performance measures, which show the combined results of student actions; function performance measures, which isolate student contributions to final results; and task performance measures, which indicate the student's processing efficiency. The Performance Assessment Capability to future Patriot TDSS software upgrades may finally replace the "over the shoulder" evaluation technique. An objective (computer-based) instead of subjective (human-oriented) evaluation will finally become a reality.

The foregoing description of Air Defense Artillery's journey from primitive to sophisticated devices depicts Air Defense Artillery as the forerunner in TDSS acquisition, past and present. However, to remain first requires a sound, technology-oriented strategy built on automation. The pursuit of funds to achieve this goal requires a "second to none" perseverance.

Janet Crouch is the 6th ADA Brigade's Director for Training Instruction. He has been associated with ADA since 1967.

THE FORT BLISS WARFIGHTING CENTER

by John Armendariz

An ADA officer heads off to war! In the midst of a full-scale, combined arms battle, the officer deploys his Avenger assets forward on the battlefield to ensure that the commander he supports retains freedom of maneuver. But his Avenger units meet deadly enemy fire and soon are crippled or destroyed, unable to protect the force. The officer dejectedly surrenders his weapons — a computer keyboard and a mouse — and turns to his instructor for comment.

What did the ADA officer do wrong? Thanks to modern simulation, instructors can replay the entire scenario and help the future commander learn from his mistakes. For air defenders, the Fort Bliss Warfighting Center is home to this technologically advanced capability.

Chief of Air Defense Artillery Maj. Gen. James J. Cravens Jr. established the Fort Bliss Warfighting Center (FBWC) to consolidate management of the U.S. Army Air Defense Artillery School (USAADASCH) simulations and simulators under "one roof." This Warfighting Center is managed by the Air Defense Combat Modeling and Simulation Division, Directorate of Combat Developments, and is located in Buildings 1043 and 1044 on Fort Bliss. The Warfighting Center provides support to the Air Defense Artillery combat developer as well as to the Fort Bliss training community.

The Warfighting Center is a state-of-the-art simulation facility consisting of a mini-supercomputer, a suite of Silicon Graphics, Hewlett-Packard and Sun graphics workstations, audience rooms with large screen display and recording devices, a mini-stealth device and video teleconference equipment. It also features a high-speed telecommunications link to the Defense Simulation Internet (DSI) through the U.S. Army Training and Doctrine Command (TRADOC) Simulation Internet (TSI) node resident in Building 1043. Several simulations and simulators running on and driven by the facility's hardware, supporting two diverse functions, will be described below.

The Warfighting Center supports the combat developer by providing simulation and modeling expertise in cost and operational effectiveness analyses, tactical software requirements development, advanced warfighting experiments and system prototyping. The combat development tools in Building 1043 provide support through the TSI node, the Extended Air Defense Testbed (EADTB), two large-scale simulations (the Computer Model-Transportable [COMO-T] and the Extended Air Defense Simulation [EADSIM]), a Reconfigurable Tactical Operations Simulator (RTOS) and a Theater High-Altitude Area Defense (THAAD) Operator System Interface (OSI) prototype.

The Battle Simulation Center in Building 1044, which houses the Janus Battle Focused Trainer, supports the training community. Future plans for the Battle Simulation Center include installation of the Brigade/Battalion Battle Simulation (BBS) and a possible upgrade to the Corps Battle Simulation (CBS).

The FBWC provides the nucleus for supporting Army Chief of Staff General Gordon R. Sullivan's Army Enterprise Strategy of exploiting modeling and simulation. USAADASCH's vision for the FBWC is a facility capable of providing the ADA warfighter with cost-effective training, testing and rapid prototyping through state-of-the-art modeling and simulation. The FBWC will also be a key player in Gen. Frederick M. Franks Jr.'s Theater Missile Defense Advanced Warfighting Experiments. In particular, the successful implementation of the TSI is essential to the realization of this vision.

The TRADOC Simulation Internet

Virtual reality. The information highway. These are terms with which the public is becoming more familiar as we approach the 21st century. These new and exciting technologies are quickly becoming a reality.

For many years scientists, military analysts and industry experts have been sharing information — sterile files of text and numbers — through computer networks. However, as networking technology improved, the different types of data that could be passed through these networks increased. The fax machine allowed us to transmit and receive printed material. Then came the ability to transmit video through telephone lines, allowing both parties to see each other as they conversed. These capabilities, now commonplace, are usually taken for granted.

But this is not the end. As technology evolves, more applications for it are envisioned and implemented. The latest is the ability to tie computers across a network and have them process different simulation programs, yet work as one. As if this were not enough, these simulation programs can accept human interaction; thus the term "distributed interactive simulation." "Distributed" because the processing of the simulations is distributed among different machines which can be a few feet or thousands of miles apart; "interactive" because of the human interaction possible.

Theoretically, the simulations that can be joined in this manner are unlimited, constrained only by computer and communications resources and provided they abide by the

distributed interactive simulation protocols that have become an Institute of Electrical and Electronic Engineers standard.

This distribution of simulations and simulators is the main concept behind distributed interactive simulation, but the DSI, developed specifically for the purpose of allowing distributed interactive simulation, is the factor that allows communications between these remotely located simulations. The DSI consists of a net of gateways strategically placed across the nation and in Europe that allows those computers linked to it to talk to each other. Network subscribers can operate in a classified or an unclassified mode and perform either distributed simulations or video teleconferences (or both simultaneously).

Now enters the TSI. The TSI's purpose is exactly the same as the DSI's except that this internet was set up to satisfy the communications requirements of TRADOC Battle Labs and selected simulation laboratories such as the Air Defense Lab at Fort Bliss, Texas. Other sites on the TSI are Fort Sill, Fort Leavenworth, Fort Knox, Fort Rucker, Fort Benning, Fort Gordon, Fort Monroe and Fort Lee. Each of these players will be able to bring their distributed interactive simulation-compatible simulations to the electronic battlefield and participate in large-scale advanced warfighting experiments.

The TSI is linked to the DSI, thus providing the TSI sites connectivity to all the DSI sites. This increases the scope of participation considerably, because the TRADOC sites will be able to participate in joint and NATO experiments. The advantages of distributed interactive simulation and of subscribing to the TSI are many. I've already mentioned that joint experiments can be held. But other benefits are also available: warfighters will be able to stay at home and still participate in experiments, cutting back tremendously on costs. Increased fidelity can be achieved because it is now possible to tie together simulations of various systems that can be extremely detailed but, because they are being run in separate machines, do not contribute inordinately to the execution time. Finally, man-in-the-loop interaction is possible, bringing with it all that this implies: the injection of tactical knowledge and experience without the development of extremely complicated decision systems.

TSI is indeed a gateway to virtual reality and the vehicle on which we will be able to travel along the information highway. A FBWC goal is to make its EADTB distributed interactive simulation-compliant so that it can participate in this electronic battlefield.

Extended Air Defense Testbed

The U.S. Army Testbed Product Office, Huntsville, Ala., delivered the first of five incremental deliveries of the EADTB to USAADASCH on April 15, 1994, as part of an incremental "build a little, test a little" delivery approach. USAADASCH was one of three initial delivery sites, the others being the U.S. Army Space and Strategic Defense Command, Huntsville, Ala., and Supreme Headquarters of Allied Powers in Europe (SHAPE) Technical Centre, The Hague, Netherlands. The EADTB is a Ballistic Missile Defense Organization-sponsored simulation, and Hughes Aircraft Company is the prime contractor.

The EADTB is a multinational and joint theater-level, many-on-many, two-sided model. It consists of a suite of hardware, including a Convex 3840 mini-supercomputer and several networked Silicon Graphics workstations. Each of the four processors on the Convex has 240 megabytes of random access memory and 14.95 gigabytes of formatted removable disk storage. The EADTB contains an extensive modeling environment developed in the Ada computer language. Ultimately, the EADTB will provide a common tool for all services to support analyses of present and evolving air defense systems, and future conceptual defenses involving operational and technological improvements.

The initial delivery of the EADTB, or Capability 1 as it is more commonly called, is an engineering release that includes an integrated system of capabilities to prepare an ex-

Chief of ADA Maj. Gen. James J. Cravens Jr. welcomes visiting dignitaries to the Fort Bliss Warfighting Center during the 1994 ADA Commanders' Conference.

The EADTB Experiment Control Element can prepare and analyze experiments and represent specific systems and environments.

periment and to analyze an experiment and data to represent the behavior of some specific systems and environments.

Capability 1 delivery includes a starter set of data so that a user can see the EADTB in operation immediately. This includes a Southwest Asia scenario with data that includes representations of 30 specific systems and their subsystems. These system representations include the sensors, weapons and command and control of Patriot Advanced Capabilities 2 and 3 (PAC-2 and PAC-3) and THAAD, as well as a Scud tactical ballistic missile, Flogger and Bear fixed-wing aircraft, a cruise missile and ground assets.

Wherever possible, these system representations have been developed in concert with relevant official documentation and cognizant organizations. Future refinement, test, evaluation and potential accreditation of these representations is planned.

EADTB provides a flexible, common tool for analysis of air defense issues. It provides a complete testbed environment in support of the user. Experiment preparation, execution and analysis are entirely supported at an EADTB facility. Successful testing and accreditation of the EADTB will allow this new capability to replace the COMO-T.

Computer Model-Transportable

COMO-T is an event-driven, Monte Carlo simulation system used for tactical air defense weapon systems analysis. COMO-T is the U.S. Army standard model for ground-based air defense effectiveness analysis that was strongly endorsed in 1982 as the model of choice for these analyses by the Hollis Committee report.

The COMO Simulation was originally developed in the early 1960s at the SHAPE Technical Centre. In 1968, the COMO III version of the simulation was introduced into the United States for use by the Concepts Analysis Agency and the U. S. Army Missile Command. In 1982, the COMO-T version was written exclusively in FORTRAN to make the code machine transportable.

At USAADASCH, COMO-T was recently used for the PAC-3 Phase 1 and Phase 2, Corps SAM and joint U.S.-German Medium Surface-to-Air Missile (MSAM) cost and operational effectiveness analyses; the Hawk Phase III and Patriot Deployment Build II and III Product Improvement Phase analyses; and the Contingency Theater, Composite Battalion, Forward Area Air Defense System Update and High- to Medium-Altitude Air Defense force structure analyses. COMO-T is being used for the current Patriot PAC-3 Remote Launch Trade Off Analysis and will be used for the upcoming THAAD cost and operational effectiveness analyses.

The COMO-T simulation features air defense weapon system models that are independently developed by their respective project offices. While COMO-T is not an engineering level simulation, individual weapon systems can be modeled from fairly simple generic representations up to highly detailed and complex systems, which can very accurately depict the actual system performance characteristics.

The Blue systems available with COMO-T include Patriot, THAAD, Corps SAM, Hawk, MSAM, Avenger, Stinger and Blue fighter aircraft. The Red weapon decks include all of the current major threat systems. Simulated tactical ballistic missiles, cruise missiles (high and low), unmanned aerial vehicles, aircraft, jammers, escorts, rotary-wing aircraft, tactical air-to-surface missiles and antiradiation missiles use the latest in Red tactics, techniques and procedures.

COMO-T simulations range from one-on-one through few-on-few to theater-level scenarios and may include any or all possible combinations of Blue and Red systems. COMO-T is provided scenario laydown data produced by the EADSIM.

Extended Air Defense Simulation

EADSIM is an analytic model of air and missile warfare used for scenarios ranging from few-on-few to many-on-many. The U.S. Army Space and Strategic Defense Command has configuration management responsibility for EAD-

SIM, and Teledyne Brown Engineering provides maintenance and model enhancement support. The model is unique in that each actor or platform (such as an aircraft, tactical missile or gun) is individually modeled, as is the interaction between the platforms. EADSIM models the command and control decision processes and the communications among the platforms on a message-by-message basis. Intelligence gathering is modeled to support attack operations.

EADSIM models three of the four tactical missile defense pillars: active defense, attack operations and battle management/command, control, communications and intelligence. A typical scenario includes a large offensive air strike against threat tactical ballistic missiles that are targeted against friendly air defense sites, communication facilities and air bases. Tactical ballistic missiles that escape the preemptive strike would be launched against the friendly assets, only to be engaged by ADA units with SAMs. ADA units will also engage enemy manned aircraft, cruise missiles and unmanned aerial vehicles. The ADA command and control will prioritize and select targets for engagement based on the available air picture, defended areas of responsibility, capability of the SAMs and the threat to assets.

While the definition of scenarios is involved and tedious, EADSIM provides tools for the generation of scenarios and for the post-processing and analysis of the resulting data. These tools center on window-based user interfaces, using the latest technology available for maximum user friendliness. EADSIM has a proven capability to operate in a distributed interactive simulation mode with the U.S. Army Field Artillery Depth and Simultaneous Attack Battle Lab's Target Acquisition Fire Support Model. Additional distributed interactive simulation efforts are being pursued to make EADSIM a major player for ADA's participation on the electronic battlefield.

EADSIM is a powerful analytical tool for evaluating the effectiveness of various command, control, communications and intelligence architectures and weapon systems in the full context of an environment of sensors, command and control centers, communication systems, platform dynamics and weapons performance. It provides a graphical interface enabling all scenario elements and modeled system parameters to be input through dialogue boxes and "pull down" windows. EADSIM's dynamic hands-on simulation environment permits evaluation of system technical and operational performance, command and control and engagement processes. Designed to operate over the middle ranges of the modeling hierarchy, EADSIM models systems to a practical level of fidelity for application of force-on-force modeling, including sub-theater applications, with exceptional speed. An EADSIM version, unique to the FBWC, supports interactive soldier-in-the-loop via connectivity to the RTOS.

Reconfigurable Tactical Operations Simulator

The evolving threat that ADA forces will encounter on tomorrow's battlefield poses a significant challenge. As these revolutionary changes occur, we must make every effort to ensure that our warfighting concepts and weapons systems remain responsive. The USAADASCH RTOS, developed by the Science Applications International Corporation, provides the fidelity and flexibility necessary to evaluate air defense systems within this diverse environment.

RTOS is a modular, high-fidelity, man-in-the-loop, real-time computer simulation with a demonstrated maturity and stability. The RTOS evolved from the Patriot Tactical Operations Simulator (PTOS) to an air defense analytical tool with embedded Patriot, Hawk and command and control models and has proved invaluable for studies related to the development of Patriot software requirements and for conducting operator effectiveness and performance assessments.

The RTOS consists of a hardware configuration based on high-performance Silicon Graphics workstations used to emulate various air defense elements. The latest technology in graphic capabilities is used together with programmable

The RTOS is a multisystem, high-fidelity, real-time air defense simulator used for system effectiveness analyses and training.

The Warfighting Center's THAAD mockup replicates a command and control shelter on a Humvee.

reconfigurable consoles. These consoles consist of separate cabinets containing touch-sensitive screen plasma panels driven by a super-high-resolution color monitor, which also has a touch-sensitive screen attached. Actual switches and controls are represented by software means on the touch-sensitive panels. Both the appearance and the function of any represented system's operator console are generated by software that can easily be edited to implement system modifications. In addition, off-the-shelf, state-of-the-art peripherals are employed in support of the overall system; e.g., high-speed printers, digitizing tablets and small computer systems interface devices.

The RTOS is a highly flexible, realistic simulator. Its design concept was driven by the goal to develop an analysis tool with an open system architecture that can be adapted to growing needs without costly redesign. The extensive software strictly follows actual system specifications and is coded in a high-order language. A modular design structure allows for easy, low-risk modifications, extensions and even the addition of completely new system models. This flexibility supports rapid and inexpensive responses to changes in weapon system software and supports the analyst's need for specific modifications necessary to analyze varying system performance capabilities. A future goal is to make the RTOS distributed interactive simulation-compliant, as well as to link it to the THAAD OSI prototype.

THAAD Operator System Interface Prototype

The THAAD OSI prototype at Fort Bliss is one of four such systems designed to facilitate advance prototyping of the tactical operations center screen displays for the control and monitoring of the THAAD system. The system was placed at the FBWC to provide direct user access, and is unique among the prototypes because it can capitalize on air defense soldiers' existing skills and experience.

The familiar array of hardware switches and indicators in present-day air defense systems are replaced in THAAD by interactive graphics displays, with all system and engagement controls implemented by pull-down menus and mouse-activated on-screen "buttons." The concept for the OSI prototype is to explore screen design concepts and layout well in advance of final design specification. As each screen configuration is implemented in the prototype software, a software version release is provided for hands-on training and subsequent human factors evaluation of soldier proficiency and design acceptability. This software-driven approach to system control design provides maximum flexibility in concept exploration and circumvents the prohibitive costs of hardware re-engineering for design changes.

Many of the OSI on-screen functions may be repositioned by the operator to the best location for his or her functional requirements, thereby customizing the display for optimal performance. These and other operator position functional requirements that will assist in the derivation of how to fight the theater missile defense battle are specific objectives of the OSI prototype approach. The hands-on experience of the soldier test subjects during training and human factors evaluation provides immediate feedback on the positive and negative aspects of each screen design. Comments by air defenders are already finding their way into the next version release. This iterative design process is an application of WYSIWYG ("what you see is what you get").

The prototype screen designs, as influenced by soldier input, drive final design specifications and will be implemented in the THAAD user operational evaluation system. THAAD will hit the field with no surprises and will find air defenders already familiar with this next generation of command and control capability. Plans for the THAAD OSI include making it distributed interactive simulation-compliant and enhancing its software to perform as a tactical operations simulator similar to the RTOS. In fact, the ultimate goal is to link the future THAAD tactical operations simulator to the RTOS and the EADTB.

Battle Simulation Center

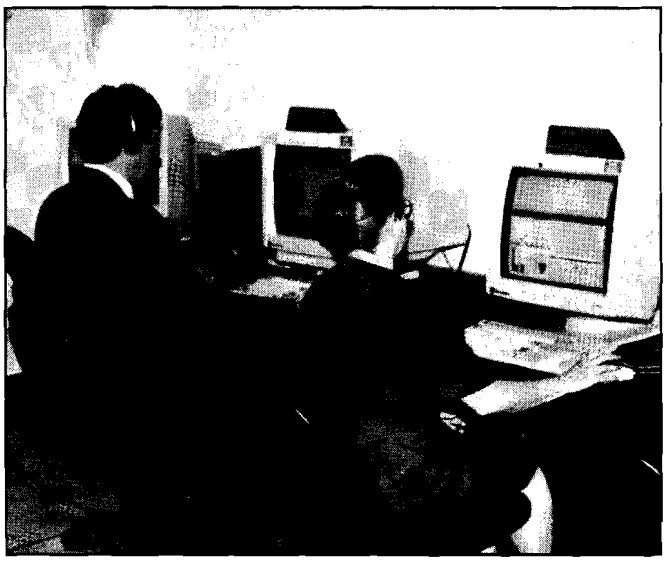
USAADASCH has boldly entered into the new age of realistic unit combat training with the recent creation of the Battle Simulation Center. The installation in the Battle Simulation Center of a double suite of the Janus Battle Focused Trainer (a computer-based, force-on-force, interactive, stochastic combat simulation) accommodates the entire spectrum of battle training within an effective, affordable environment. The Janus battle simulation, named after the Roman god of portals, allows air defense students attending either NCO or officer courses to demonstrate and hone the tactical skills they learned in the classroom. The capability to view the visual record of each battle, as well as to produce after-action reports, allows the students and their instructors to evaluate the effectiveness of tactical training. Recording capabilities also allow participants to revisit a battle at a chosen point, and to revise those tactics that proved non-effective.

Students are placed into simulation positions that correspond to the tactical commanders of the represented forces. Afforded a full spectrum of weapon systems, sensors, munitions and obstacles, each commander (player) must tactically deploy and maneuver his ground combat, aerial (rotary- and fixed-wing aircraft), fire support (air defense, field artillery and close air support), engineer and combat service support forces. Since Janus is a two-sided simulation, students are also able to exercise their knowledge of the chosen opposing force as they employ the same tools in opposing their classmates. The digital terrain base, derived from data provided by the Defense Mapping Agency, depicts a full spectrum of environmental conditions that affect the simulation forces.

The Janus is hosted on a network of 16 powerful graphics workstations, each with 64 megabytes of random access memory, one gigabyte of internal storage and a 76-hertz, 32-bit-plane color monitor. High-resolution overhead video projectors allow entire classes to view selected simulations or training scenarios of their soldiers' efforts.

Fort Bliss is also host to the III Corps' 3rd Cavalry Regiment, as well as Forces Command's 11th ADA Brigade. Commanders of these units are eager to avail themselves of Janus' immense training capabilities to train their subordinate units for rotations at the National Training Center, as well as to develop unit tactics for other specialized missions and deployments. As demand for Janus training continues to grow, plans are being finalized for the installation of two more FBWC major training tools, the BBS and the CBS.

Developed to provide realistic battle inputs to tactical operations center operations at the brigade and battalion level (BBS) and the corps level (CBS), these simulations are hosted on reconfigurable networks of DEC VAX mainframes (minicomputers), controlling graphics workstations and numerous player terminals. The simulations provide the necessary combat information and intelligence that battle staffs must process to effectively control all aspects of the battle. Another major portion of the FBWC's integrated training effort is the developmental Air Defense Combined Arms Tactical Trainer (ADCATT). Envisioned as individual simulators capable of representing current and future air defense weapon systems, the ADCATT will operate within a distributed interactive simulation environment that will allow it to interact with other Army tactical trainers such as the maneuver forces Close Combat Tactical Trainer and the intelligence forces All Source Intelligence System.



Fort Bliss Warfighting Center analysts prepare a wargame scenario.

Conclusion

Most of the simulations and simulators the Warfighting Center uses are, or soon will be, distributed interactive simulation-compatible. Along with the TSI, worldwide distributed simulation interlinks will allow seamless interaction between simulators, simulations and instrumented live forces in the field. Interweaving the effects of such a widespread variety and number of forces will allow commanders to exercise and evaluate their forces' effectiveness or to develop tactics, techniques and procedures for specific operations at a greatly reduced cost. Participation in the Ballistic Missile Defense Organization's Joint Wargames, Space and Strategic Defense Command's Louisiana Maneuvers, Theater Missile Defense Experiments and ARPA-sponsored Warbreaker Exercises is made possible through realization of the FBWC's vision of a fully distributed interactive simulation environment. ADA warfighters may then participate in worldwide exercises from the home of Air Defense Artillery — Fort Bliss, Texas.

Column Write

Are we really taking care of our soldiers?

Air Defense Artillery has a serious problem. The fourth FY94 Advanced NCO Course (ANCOC) class was less than 50 percent full, and we canceled Class 5 because we couldn't find enough qualified soldiers in the entire branch to fill the seats!

For the uninitiated, here's a brief description of how ANCOC works. A DA board selects staff sergeants (SSGs) for promotion to sergeant first class (SFC) every fiscal year. Successful completion of ANCOC is now mandatory for promotion to SFC, so the promotion to SFC is contingent upon successful completion of the course. The number of promotions in a fiscal year helps to determine the overall ANCOC training requirement for that same year.

The U.S. Total Army Personnel Command (PERSCOM) notifies soldiers selected for ANCOC about a year out — plenty of time for them to prepare themselves to pass the course physically (meet the height and weight standards and pass the Army Physical Fitness Test) and academically.

Ideally, the training requirement, the resources allocated and the number of soldiers attending the course in a given fiscal year all balance. This, however, rarely proves to be the case.

ADA's overall FY94 ANCOC attendance rate was a measly 54 percent. The projected FY94 training requirement was 284 soldiers with 208 actual reservations. Of these, 29 were no-shows — soldiers denied the opportunity they have earned to meet the more immediate needs of the branch.

The logical solution is to fill those now-empty seats with soldiers qualified to attend ANCOC. ADA has a standing list of more than 80 SSGs and SFCs who, in the past (in some cases, before ANCOC was mandatory for promotion), were selected to attend ANCOC. Some of these soldiers could not attend due to hardship, temporary profiles or the needs of the branch. Others did attend, but failed the course physically or academically. Air Defense Artillery grants all of its soldiers a second chance to attend, but from this list of more than 80 soldiers, not one has reapplied. Some of them have been on the list since 1987! One soldier, for example, was a no-show for Class 2-90, again a no-show for Class 1-91 and, when scheduled for Class 4-94, became a temporary profile.

I believe there is a two-fold solution to this problem. First, commanders and senior NCOs must put the soldier first. ANCOC is mandatory for promotion! Allowing mission needs (especially in peacetime) to deny soldiers an opportunity for advancement is an injustice.

Allowing an overweight, physically incapable soldier to attend ANCOC does not meet my definition of soldier care. Tell the true story. When you rate an NCO, be honest about his attitude and capabilities. If he's physically unfit, encourage him to get in shape early, and schedule practice PT tests to make sure he's fit and ready.

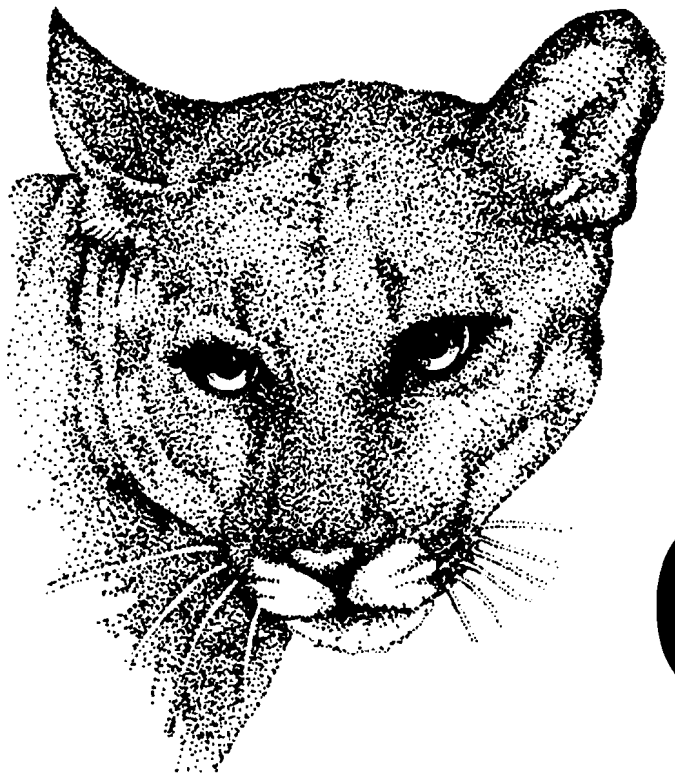
Is one of these 80+ soldiers on the standing list in your unit? I encourage you to get him off the list. Have him submit a DA Form 4187, complete with battery and battalion commander endorsements, to reattend (send it to Commandant; U.S. Army Air Defense Artillery School; ATTN: ATSA-TAC-N; Fort Bliss, TX 79916). Reflect in the endorsements what the soldier has done to improve himself. Has he lost weight? Is he no longer on profile? Has he studied on his own? If this soldier is not ready to reapply, after months or even years on the standing list, he is taking up space.

Make room for NCOs with the desire to succeed. If your encouragement and mentoring do not inspire the soldiers on the standing list, consider a bar to reenlistment.

The second part of the answer lies with the soldiers themselves. Have you been selected for promotion to SFC? If you have, prepare now to attend ANCOC. Make sure you meet the height and weight standards. If you don't, get in shape. Take a PT test to be sure you can pass. Study on your own to decrease the chance of failing academically. If you have questions about the requirements or passing standards of the course, contact Bill Coleman at the USAADASCH Combined Arms and Tactics Department. Bill's a retired 30-year ADA command sergeant major who's been working the NCO Education System (NCOES) for about 10 years. He'll be able to tell you the best way to prepare yourself for success.

Are you on the standing list for ANCOC attendance? Now is the time to get off the list. Submit a DA Form 4187, and make plans now to reattend. Avoiding or delaying attendance will accomplish nothing but damage to your career and your professional reputation. Weigh your options. You can go to school, get promoted, make more money and earn more responsibility. On the other hand, you can subject yourself to possible Quality Management Program (QMP) actions or even a bar to reenlistment. Take action now!

CSM James E. Walthes
Command Sergeant Major



CATS

ADA prepares to implement combined arms training strategy

Necessity is the mother of invention, and some of the most revolutionary battlefield strategies — the German blitzkrieg, for example — were created by soldiers whose military intellects were stimulated by the certain knowledge that they lacked the resources required to do things the old-fashioned way. The same applies to training and training innovations.

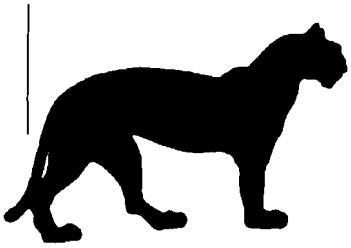
The Army no longer has the resources to conduct training the old-fashioned way. The Army is depending on training devices, simulators and simulations, such as those described in preceding articles, to help lower the cost of training, but these are only a small part of the overall solution to a puzzling paradox: the Army can no longer afford to maintain the training tempo it established during the 1980s; nor, in light of emerging threat scenarios, can it afford to reduce training quality or lower training standards. The Army's solution to its post-Cold War dilemma is the Combined Arms Training Strategy (CATS), a revolutionary training concept that will shortly reach ADA units inside Army training and evaluation program (ARTEP) mission training plans.

ADA units will soon begin receiving the first ARTEP mission training plans to contain CATS appendices. Senior ADA leaders view the Army's new training strategy that CATS espouses as a decisive factor in the battle to maintain training standards.

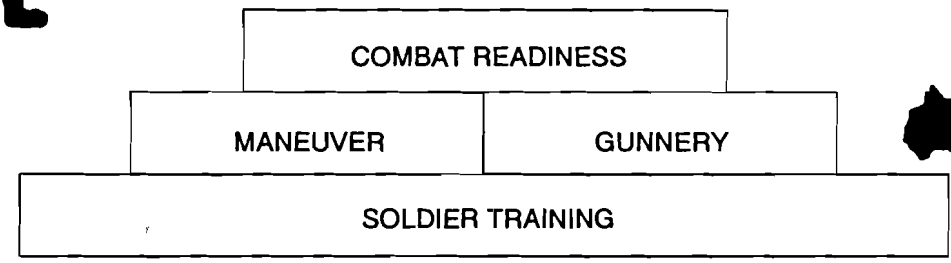
"When the magnitude of the Army drawdown first became apparent, senior Army leaders voiced their firm commitment to maintaining quality training," explained Brig. Gen. Joseph Cosumano, Assistant Commandant, U.S. Army Air Defense Artillery School, Fort Bliss, Texas. "They vowed that there would be no return to the 'hollow force' of the 1970s. Instead, we would offset budget cuts by training 'smarter' and more efficiently.

"The Army developed CATS as a response to the need for more efficient training based on anticipated resource reductions," he continued. "The new training strategy is key to our efforts to prevent the post-Cold War Army from becoming a superbly equipped but 'hollow force.' I am confident that unit commanders will find the CATS appendix an extremely useful tool."

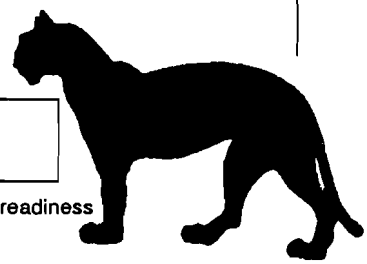
CATS provides a doctrinal base description of how the Army intends to train the force both now and in the future. It describes the Army's concept for current and future training integration and identifies associated training resource requirements. CATS captures training events, frequency of occurrence and supporting resources. The baseline strategies are not prescriptive; they are descriptive. The unit commander applies them as a baseline to his personalized planning and execution of unit training, applying his or her judgment of unit training requirements. The



COMBINED ARMS TRAINING STRATEGY



CATS' three components, soldier training, maneuver and gunnery, are the building blocks of unit readiness



descriptive unit strategies recognize that, while there may be a "best" way to train, it is unlikely that all units across the Army will have the exact mix of resources required to execute the strategy precisely as written. By showing the frequency and required resources for training events, CATS shows the relational values of training resources to training standards. Since the training standard remains constant, CATS shows how changes in resource availability will have an impact and allows commanders to make value judgments on resource tradeoffs.

At the senior leadership level, CATS helps leaders justify resources based on how units train. At the unit level, it provides a recommended method to maintain soldier and unit proficiency. Since CATS evolved from the need for more efficient training based on expected post-Cold War resource reductions, it emphasizes the use of training aids, devices, simulators and simulations.

As a training management tool, CATS incorporates training principles from FMs 25-100 and 25-101 to emphasize training standards, provides baseline strategies that offer unit commanders a training menu to help in developing an annual training plan, and offers projected strategies that incorporate changes in doctrine, training, leadership, organization and material. It also provides critical gates to validate soldier proficiency in critical tasks before they move on to more difficult tasks. As a resource management tool, CATS displays the optimum mix of resources needed to support training and helps decision makers identify, acquire and manage training resources.

CATS has three major components: soldier training, maneuver and gunnery. The soldier training component provides an annual plan for training and maintaining skills at the individual level and lists the resources needed to train the soldier. The maneuver component provides a set of recommended training frequencies for key collective training events in a unit. It shows the resources needed to support the training events. A gunnery component is built around the unit's weapon system and provides an annual training plan that includes the resources needed to support weapons training. The CATS appendix also drives gunnery allocations found in Standards in Training Commission (STRAC) Department of the Army Pamphlet 350-38. Together, these three components serve as the building blocks of combat readiness.

Mission training plans for Bradley Stinger Fighting Vehicle batteries and ADA sensor platoons (light) are scheduled for publication in September. Mission training plans for Bradley Stinger Fighting Vehicle platoons and Avenger battalions are scheduled for publication in early FY95. The U.S. Army Air Defense Artillery School points of contact are Joe Garcia (DSN 978-1236/1830) for the Bradley Stinger Fighting Vehicle mission training plans and Terry Fuentez (DSN 978-3688/3233) for the Avenger battery and sensor platoon mission training plans. Other ADA units will receive CATS as new mission training plans are written or old mission training plans are revised. Units will be able to download the new mission training plans, along with their CATS appendices, into unit computers.

"CATS, when fully developed and implemented, will shape ADA training now and in the future," said Cosumano. "It is each field commander's duty to participate in the continuing development of CATS and support its implementation. User feedback is an important link in the process of improving training publications. Each mission training plan contains a standard user feedback questionnaire designed to make it easier for ADA unit trainers to communicate their recommendations to the schoolhouse.

"Training is the cornerstone of unit readiness," he added. "During Operation Desert Storm, we saw what miracles highly trained soldiers and highly trained units can produce. Working together, we can continue to provide ADA soldiers the quality of training they deserve."

ON THE ROAD TO SUCCESS:
PREPARING FOR JRTC

by 1st Lt. Sean Sapone

"Success" at the Joint Readiness Training Center is a relative word. For some of us it simply means survival. But for those ambitious many, success is defined by how much airborne derriere air defenders kick. Those who fall into the second category of success also know that those two weeks "in the box" are only half of the story; the other half lies in the weeks prior to ever setting foot on Fort Polk: the preparation. Though no great revelation, particularly to those who had to abdicate to the "survival" definition, making it happen can be more of a fight than the Atlanticans. Time, more than will, is the culprit, and the time allowed to prepare for any event is inversely proportionate to its significance. So what to do?

A Battery, 3rd Battalion (Airborne), 4th Air Defense Artillery, 82nd Airborne Division, was recently caught in this quagmire and achieved success (the derriere version) at JRTC. As its commander, Capt. Charles Heatherly, said, "It's not impossible, only difficult." Not everything they did will help everyone, but perhaps their experience can serve as a starting point for other batteries with JRTC on the horizon.

The key to preparing for JRTC is not quantity of training time but quality of training. Granted, A Battery began preparing four months out, but time is deceptive. First of all, subtract the various taskings of a battery, then deduct a change of command, next allow for Mr. Murphy, and voila, about eight weeks of real training time remain. The success mindset must be cemented months prior to ensure these eight weeks exist. But again, time is relative, and this battery devised a rigorous regimen of instruction for both troops and leadership. The end goal was confidence in self and battery.

Troop Training

Troop training involved confidence-building in two areas: equipment and people. The former is a lot easier than the latter, particularly with former Vulcaneers turned Stinger team members. Detailed pre-combat checks, two full layouts and exacting maintenance in the weeks prior to deployment proves and reproves one's faith in equipment — first, to make sure it's all there; second, to make sure it all works.

Instilling confidence in soldiers is another quandary altogether. Putting the question of leadership aside for the moment, the building block of confidence originates in one's own ability to perform. This is exactly what the battery focused on, using Stinger training as the medium.

Four months out, the battery senior leaders drafted an in-depth and intensive Stinger training program. The key leaders and instructors reviewed, revised and rehearsed the program constantly for more than a month before putting it into action. The reason is clear: quality training requires quality planning.

Besides building the soldiers' confidence, the program's goal was to reacquaint everyone with the weapon system above and beyond schoolhouse standards. It also standardized the battery's understanding of the weapon system, allowing the rapid and smooth interchange of gunners and team chiefs when necessary.

Lastly, the leadership decided that, whatever shape the final program took, it needed to be command driven. All leaders got personally involved in the classes as students, including the battery commander. Key leader attendance ensured troop participation, and droning was never an option.

Platoon leaders and platoon sergeants alike were held accountable for their platoon's achievement and carefully tracked soldier progress. The first sergeant maintained a huge butcher board in his office showing every soldier's progress, event by event, with retests. This process detected soldiers having problems, and these soldiers received additional tutoring. Buddies were also assigned — an experienced gunner with a former 16R team chief or vice versa — and kept throughout the JRTC rotation.

By the time the training aids, handouts, instructors and their assistants passed the commander's rehearsal, the Stinger program was set into motion. The first four weeks operated as a round-robin, each platoon taking a different class and rotating. The program's rudimentary outline is shown below.

Overall, the program went exceptionally well. SSgt. James Hunter, a primary instructor, believes it takes more than a well-orchestrated training plan to prepare for JRTC. "It takes soldier participation," Hunter says. He believes that the success of the program lies in its students. Whether or not it was the imminent pressure of JRTC, soldier professionalism, command emphasis or novelty that drove the training is secondary. The point remains, the program was a success primarily because the soldiers made it so.

"I've never seen anyone so interested in becoming Stinger," said Hunter. "They [the soldiers] wanted the training and asked a lot of questions. It helped tremendously."

Team chief Sgt. Michael Leach and his former MOS 16R gunner, PFC Brian Sell, exemplify the buddy system at its best. As with many NCOs, Leach's training often went beyond the classroom: "If you want to go out and do a good job, take time out, personal time, and teach him [the gunner]," said Leach. This applied not just to specific Stinger skills but to all facets of soldier development, be they land navigation, reporting or contingency plans. Leach's goal was to have Sell ready to assume team chief responsibilities should he go down in battle.

Leach's impact upon Sell was not lost. As Sell explained, "He made the transition possible. I expected it to be a lot harder than it was. Overall it was fairly easy . . . I'm confident in what the Stinger can do." With over 20 hours in the improved moving target simulator and the tracking head trainer, Sell was a competent and confident gunner stepping into the box. Despite his relative inexperience, he shot down the very first hostile aircraft to fly this side of Cortina, an An-2 Colt. He survived through the next to the last day, killing 15 of 18 aircraft engaged. That is success.

Air Defense Officer Training

Simultaneously with the Stinger program, the commander and his lieutenants enrolled in aggressive training of their own. Similar to the Stinger plan, the gears for air defense officer (ADO) training were oiled long before they were set into motion. The simple blueprint involved a four-stage progression culminating in the real thing. Again, the bottom line was confidence.

The first stage was research. Aside from the plethora of articles, JRTC "veterans" and after action review slides and videotapes available, there are an equal number of more creative and active ways to learn about JRTC. A Battery sent a platoon leader, section sergeant and a few NCOs through the first rotation at Fort Polk with another brigade as part of the command post exercise (CPX). There is no substitution for being there. Sgt. Philip Frazier, a team chief, says, "It gave a

Stinger Program

Week 1:	Detailed Pre-Combat Checks; Reconnaissance, Occupation and Selection of Position (RSOP), Stinger Fighting Position (concentrating on survivability) Battle Drills
Week 2:	Proper Operation of the Stinger (e.g., Firing Sequence, Range Ring Profiles, etc.)
Week 3:	Programming the IFF and Battery Maintenance
Week 4:	Introduction to the Reprogrammable Microprocessor (RMP), Operation of IFF, Maintenance of M-134 THT, Maintenance of ANGSX/1A Programmer/Charger
Week 5:	IMTS Training (at least one hour per soldier) and THT training (up to 20 hours per soldier)
Week 6:	Review and Catch-up. Pre-Combat Checks
Week 7:	FTX: Battalion Evaluation Team (to schoolhouse standards), Soldier Skills, Survivability, Communications
Week 8:	Pre-Combat Checks, Deployment

good heads-up for what lies ahead, particularly those small things you never think about while in garrison." The chance to walk the terrain, witness common problems and track actual threat flight patterns proved a real payoff. Other ways to reconnoiter JRTC are volunteering a platoon for the opposing forces and sending some key personnel with another battery.

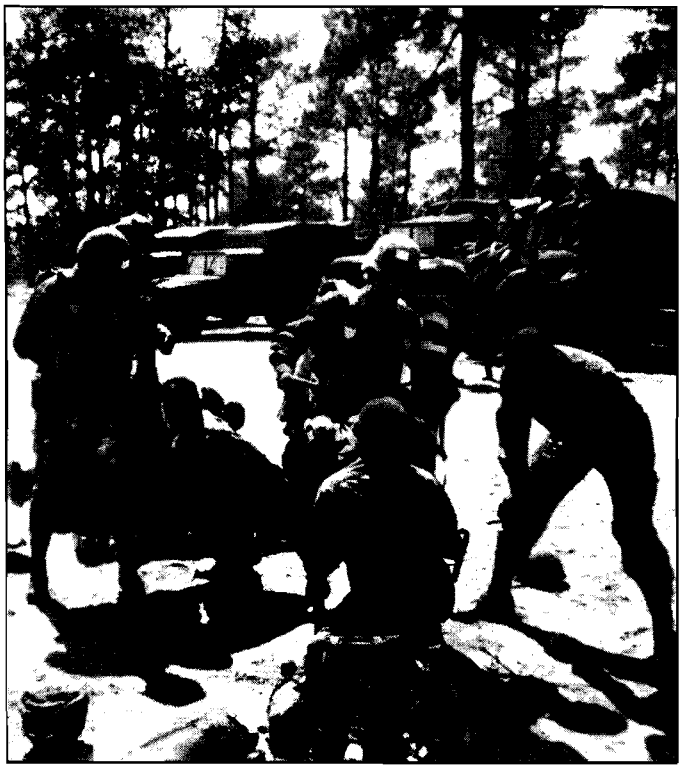
The second and perhaps most critical step was the Air Defense Tactics Seminar held at Fort Polk. Maj. Thomas Williams, the battalion S-3, describes the seminar as a "total lessons learned for air defense at JRTC" that aligned A Battery to the reality of JRTC. Some attendees were the 108th ADA Brigade commander, U.S. Army Infantry School representatives, senior members from most every ADA battalion and the ADA observer-controllers (OCs). Its purpose was "to exchange information among the JRTC ADA OC team, ADA School and ADA client units on brigade and battalion task force use of ADA assets at JRTC."

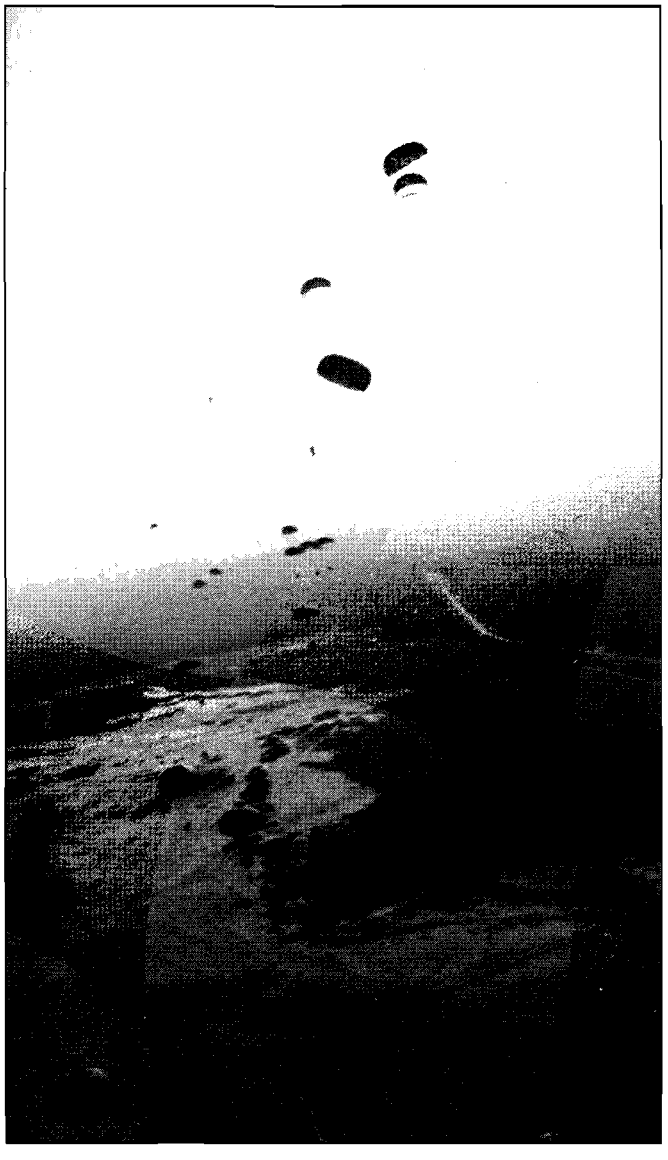
Both Williams and Heatherly agree that this experience gave a lucid account of ADA's role in the brigade and task force arenas, and structured the cornerstone of all JRTC training. "It served," states Heatherly, "as the culminating point of all I researched on JRTC. It gave guidance to specific problems and made doctrine immediately clear." The seminar also allowed the attendees a terrain walk of the box.

Next, Heatherly imported the value of the seminar into the battery. For example, he had all liaison officers (LNOs) review his notes, had many lieutenant meetings and refocused the overall training program. In fact, Heatherly strongly recommends that commanders schedule blocks of time for the *entire* battery to review the videotapes of the seminar. Points of particular concern for LNOs were ADO responsibilities, aerial intelligence preparation of the battlefield (IPB), staff integration, operations orders and synchronization of the battery air defense design.

The laboratory for honing these expertise was the third step, the Leadership Training Program (LTP) also conducted at Fort Polk. Ninety days prior to the rotation, JRTC hosts a week-long program to integrate all the brigade staff, and phenomenally, it succeeds. It does this by putting all company-level and above leaders under one roof (dangerous, yes) and conducting advanced classes on staff integration and common mistakes. The LTP culminates in two planning exercises, one of which is executed via Janus computer.

3-4 ADA soldiers rig their Stinger missile jump packs to parachute into the JRTC "box."





Lessons Learned at the LTP

— Make a good and strong impression upon your task force or brigade the first time.

— Establish a relationship with the S-2. Be a part of his IPB process and, during the battle, be an intelligence asset for him.

— Educate your S-3 on air defense tactics and the need for security.

— Educate the S-4 on Stinger resupply problems.

— Pay attention to what the OCs say.

— Conduct a detailed aerial IPB with labeled air avenues of approach, potential navigation turning points and potential Stinger positions. Standardize it by making exact copies for all key leaders.

— Use the operations orders and air defense annexes created for LTP as the basis of those you will use in JRTC.

— Create "fill-in-the-blanks" operations orders and air defense annexes and distribute them to all key leaders, standardizing everyone.

— Practice writing and presenting operations orders. Review and coach platoon leaders.

— Automate as much as possible, and bring a field computer and printer to JRTC if necessary.

— Ensure the lieutenants understand how and why an ADA battery is employed to support the brigade commander's air defense priorities, not just the task force area of operations.

— Ensure that every lieutenant knows how to do the battery commander's job.

— Realize the absolute importance of communications, timely and accurate reporting, clear and concise orders, and contingencies for the failure of radio communications. You must always communicate!

The idea was simple: let the staff of the entire brigade meld together now instead of later in the box, and it worked. Everyone had the chance to meet and work face-to-face with their counterparts at all levels. This reaps tremendous benefits later in the box, when all you receive is an order over the fax machine or a voice over the radio. The LTP allowed everyone a view of the big picture without losing sight of the execution.

The implications were equally great for an ADA battery. "Bring as many lieutenants as you can. Bring a platoon leader for the CPX task force. Bring an extra LNO, if possible," advises Heatherly. The reason is clear: the LTP is where you take what you've learned from the Air Defense Tactics Seminar and work it over. Like task force and brigade staff, this is the opportunity for the battery commander and the platoon leaders to synchronize their understanding of air defense and each other. Some of the things they took away from the LTP are shown above.

The Last Step

The last step is simple: fuse troop and ADO training together in an intense, JRTC-speed field exercise. A Battery used the brigade's own dress rehearsal two weeks prior to deployment in a unique brigade and battery field training exercise (FTX). It truly was a joint exercise. Although the battery was a full and successful participant in the brigade's week-long FTX, the battery implemented its own training plan above and beyond the challenges of a brigade FTX.

Williams assembled a Stinger evaluation team (modeled after a Fort Bliss evaluation team) that visited each and every Stinger team going to JRTC. The evaluators tested each team to Fort Bliss schoolhouse standards for MOS qualification. All passed. They also tweaked other areas, such as timely and accurate reporting, communication contingencies, soldier skills and, above all else, survivability.

For the LNOs, the brigade FTX was the acid test of staff integration, and it was successful. The FTX is the natural conclusion of the crawl-walk-run cycle — the seminar, the LTP and then the real thing. It is also the time to exercise and fine-tune the LNO system. For example, Heatherly assigned Lt. Teyve Yoblick as the LNO to brigade, allowing himself a deciding asset in the tactical operations center. As a result, Yoblick gained a "sneak preview of battery operations that bridged the gap between task force operations and brigade," and assisted the commander in anticipating problems at the platoon level before they became predicaments at the battery level.

Training is a process, not a product. Some of the lessons learned and techniques applied by A Battery, 3-4 ADA, are not compatible with all light batteries, but their experience may assist ADA units soon to deploy to JRTC. The key to unlocking the door is confidence, for it not only alleviates self-doubt but also asserts one's worth and contribution to the battery. Only a battery, not high-speed individuals, will defeat the enemy on the JRTC battlefield or any battlefield.

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THE END OF AN ERA

Story and photos by Spec. Jeff Adams

Under the watchful eye of 1st Regiment honorary colonel, Maj. Gen. (Ret.) John Oblinger, the 2-1 ADA battalion commander and command sergeant major case the battalion colors during the June 1994 inactivation ceremony.

An era in Air Defense Artillery will end Sept. 15, 1994, when the last active Army Hawk battalion — the 2nd Battalion, 1st Air Defense Artillery, 11th ADA Brigade, commanded by Lt. Col. John S. Westwood — inactivates at Fort Bliss, Texas. Although Hawk, which was first fielded in 1959, has been officially phased out of the active Army component after 35 years of service, the Army National Guard, U.S. Marine Corps and 22 foreign countries will continue to deploy the system.

The Hawk weapon system, designed and manufactured by Raytheon, was the Army's answer for a low- to medium-altitude air defense weapon system. It has been modified, upgraded and reconfigured several times during the past 35 years to meet changing requirements and threats. In the history of the U.S. Army, there have been 45 active Hawk battalions stationed throughout the United States, Germany, Korea, Vietnam and Panama.

Four National Guard battalions, 7-200 ADA, Rio Rancho, N.M.; 2-265 ADA, Titusville, Fla.; 1-263 ADA, Anderson, S.C.; and 2-174 ADA, McConnelsville, Ohio; are currently equipped with the latest Hawk Phase III systems. Hawk Phase III features increased firepower, improved electronic countermeasures, reduced manpower and logistics support costs, improved reliability and maintainability, and the ability to exchange air-battle information with airborne warning and control systems and Patriot. Phase III Hawk is also fielded by the Marine Corps and one foreign country. It is in production for several other international customers.

ADA soldiers never lost their enthusiasm or affection for Hawk, nor their

keen appreciation of its capabilities. Many, therefore, viewed the elaborate 2-1 ADA inactivation ceremony, conducted in June at Fort Bliss during the 1994 ADA Commanders' Conference, through a veil of nostalgia. The ceremony also marked the inactivation of the 1st Air Defense Artillery Regiment.

2-1 ADA traces its lineage back to the War of 1812. Until its official release from mission on April 1, 1994, the battalion provided the Army's contingency force with protection from low- to medium-altitude aircraft. Its most recent accomplishments reflected the Army's post-Cold War emphasis on regional conflict, contingency missions and operations other than war.

In August of 1990, when the United States launched Operation Desert Shield in response to Iraq's invasion of Kuwait, the battalion was alerted for deployment to Southwest Asia. Faced with the threat of Iraqi Scud missiles, the battalion added a Patriot fire direction section, three Patriot firing batteries and supporting maintenance elements to form the first Hawk/Patriot task force in U.S. Army history. After designing and testing the task force structure and developing new tactics, techniques and procedures, Task Force Scorpion deployed to Southwest Asia with a final strength of more than 1,500 soldiers on Sept. 16, 1990.

Tasked to provide protection to the XVIII Airborne Corps from attack by aircraft or tactical ballistic missiles, the task force deployed its units from west of Dhahran north to Hafar al Batin near the Saudi-Iraqi border. The greatest challenge for the task force came when the XVIII Airborne Corps and VII Corps made the now-famous "Hail Mary" move in Operation Desert Storm. With Task Force 8-43 ADA filling the gaps, Task Force Scorpion extended its coverage the length of the flanking maneuver. In the move to Rafha on the western flank of the XVIII Airborne Corps, the southernmost task force units moved more than 650 miles in single convoy, which lasted more than 24 hours.

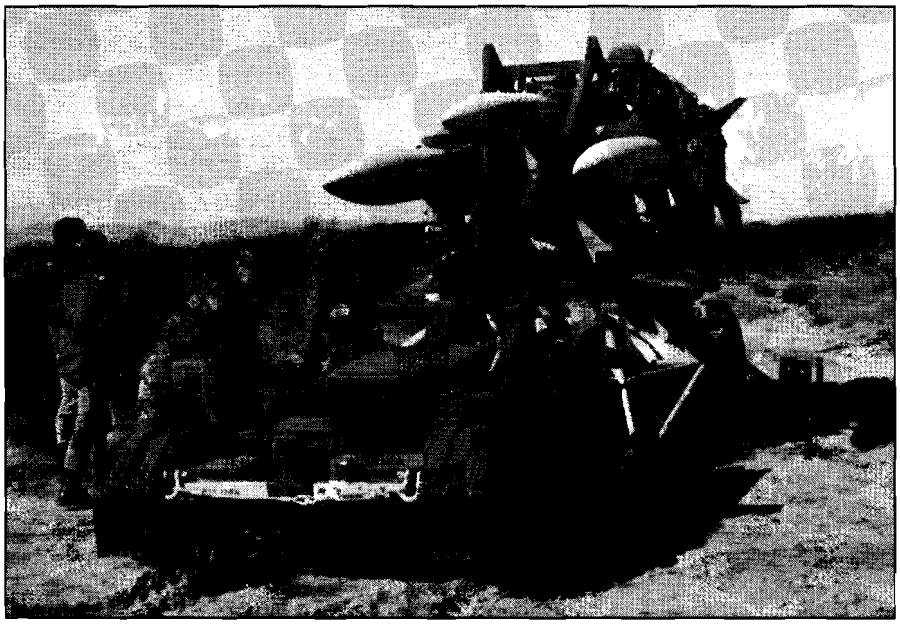
At dawn on Feb. 26, 1991, the lead element of Task Force Scorpion, B Battery, 2-1 ADA, crossed the border into Iraq. Moving along Main Supply Route Texas through defensive positions that, a few hours earlier, had been manned by Iraq's 45th Infantry Division, B Battery occupied positions near Al Salman in Iraq, halfway to the Euphrates River.

While the other elements of Task Force Scorpion were prepared to follow, the war ended and the units remained in place. 2-1 ADA was awarded the Army Valorous Unit Award for its service during Operation Desert Storm.

After the battalion's redeployment to the United States, it once again resumed training to provide support for

2-1 ADA soldiers deployed on a remote Caribbean island provide food, water and shelter to refugees who washed ashore.

2-1 ADA soldiers demonstrate Hawk missile reload operations for visiting German soldiers during an exercise at McGregor Range, N.M.



the Army's contingency force. In November 1991, the battalion was again called upon to help fight a war. This time the war was on the U.S. border against illegal drug traffickers.

In the fall of 1991, under the leadership of Lt. Col. Peter W. Thomson (commander, 2-1 ADA, June 1991 to 1993), the battalion had assumed a vital role in military support to drug law enforcement agencies. Thomson recognized the Hawk weapon system's potential for tracking airborne drug smugglers.

He took this idea to Raytheon, and several modifications later, the radar system was adapted for a new mission: counternarcotics surveillance. Thomson then actively sought out counterdrug missions for his battalion.

In conjunction with the U.S. Customs Service, the Southwest Air Defense Sector, North American Air Defense Command and many other agencies, 2-1 ADA took on this new and vital mission. It provided these agencies low-altitude, mobile radar coverage of suspected aerial drug trafficking corridors along the border between the United States and Mexico.

In October 1991, the battalion rolled out to Yuma, Ariz., in support of the U.S. Customs Service. Operation Angle Sagebrush was the unit's first counterdrug mission. All battalion elements participated in the mission, which saw 2-1 ADA soldiers deploy to remote areas along the border from Yuma to El Centro, Calif., and back to Lordsburg, N.M. Operation Angle Sagebrush was considered an unqualified training and deployment success. It validated the Hawk missile system's rapid deployment concept.

A year later, in November 1992, 2-1 ADA was once again deployed in support of the U.S. Customs Service during Operation Angle Roundup. Task Force 2-1 ADA (Hawk/Patriot), led by Thomson and comprised of elements from 2-1 ADA, 2-7 ADA (Patriot), 11th ADA Brigade, and signal companies from Fort Monmouth and Fort Huachuca, railed to Davis Monthan Air Force Base in Tucson, Ariz. The task force tracked suspect aircraft and passed the information to the U.S. Customs Air Operations Center West, which scrambled planes to intercept the suspected aircraft. This operation was again a huge success, and the unit redeployed to Fort Bliss in early December.

Operation Reliant Enterprise was conducted in April 1993. The unit deployed to Davis Monthan Air Force Base, where it successfully assisted the U.S. Customs Service in the assimilation of information on drug traffickers and filled gaps in the radar coverage along the border.

In September 1993, under the leadership of Westwood, a Patriot/Hawk task force deployed to Ottawa, Canada, for Operation Sky Wide. This was an emer-

With the inactivation of 2-1 ADA and the 1st Regiment, the Hawk missile system transfers to the National Guard. 7-200 ADA prepares for its new mission during an annual live-fire at Fort Bliss, Texas.

gency deployment readiness exercise that tested the task force's readiness capability. A total of 12 C-5As, KC-10s and C-130s transported the Patriot and Hawk equipment for a joint operation with the Canadian military. Soldiers from the task force convoyed approximately 125 miles through the rugged Canadian terrain. The soldiers then set their equipment up in a real-world, tactical configuration. The task force, along with the Canadian army and air force, then fought a mock air battle. The task force transmitted a picture of the mock air battle to the Fort Bliss command post for evaluation and intelligence feedback.

In November 1993, the battalion assumed its first overseas counterdrug mission with units deployed to Key West, Fla., the Bahamas and several remote islands. This unprecedented, joint "corps size" operation had 2-1 ADA coordinating directly with Forces Command, U.S. Atlantic Command, Transportation Command and Communications and Electronics Command. Elements of 2-1 ADA deployed by air, land and sea. While performing this classified mission, 2-1 ADA soldiers, located on a remote Caribbean island just north of Cuba, unexpectedly participated in a humanitarian mission by providing food, water and medical supplies to refugees who washed ashore.

Operation Last Hooah in March 1994 would be the battalion's final counterdrug mission. The task force, comprise of 2-1 ADA elements, 11th ADA Brigade elements and elements from Fort Huachuca and Fort Gordon, once again convoyed to Davis Monthan Air Force Base. Units dispersed over 1,000 square miles, with the headquarters element collocated with U.S. Customs Service and C^3IW on March Air Force Base, Riverside, Calif. This mission's success will be felt for years to come as the intelligence gathered is assimilated and processed.

Providing radar coverage in various locations inside and outside the borders of the United States, the battalion continued to provide detection and monitoring of airborne drug smugglers crossing into U.S. airspace until it was officially released from mission and began preparations for inactivation.

The soldiers of 2-1 ADA established a long and proud tradition of being "First Among Equals" (*Primes Inter Pares*). Most will be reassigned to different units within the 11th ADA Brigade and on Fort Bliss. Many will be reclassified and trained on the Patriot missile system. They will continue to carry on the proud tradition of Air Defense Artillery.

Spec. Jeff Adams. *a frequent contributor to ADA magazine, is the Public Affairs Officer for 11th Air Defense Artillery Brigade, Fort Bliss, Texas.*

ADA DIGEST

ESPRIT DE CORPS

AIR DEFENSE "ON THE RIGHT TRACK"

Editor's Note: Maj. Gen. Paul E. Blackwell, while assigned as Commanding General, 24th Infantry Division (Mechanized), sent this message concerning results from the National Training Center Advanced Warfighting Experiment to Chief of ADA Maj. Gen. James J. Cravens Jr.

The Advanced Warfighting Experiment during NTC 94-07 gave my 3rd Brigade practical experience with a wide variety of new digital equipment. Believe we gained a better appreciation for the equipment capabilities our Army needs for the future through the exercise.

Have told the senior leadership of the Army in separate messages that several systems were very successful at the NTC and need to be provided to units quickly to improve "go to war" capabilities.

One of those successful stories is the FAAD C^3I [command, control, communications and intelligence] system along with its ground-based sensor (GBS) radar. The GBS radar proved tough and reliable. It made 25 moves and operated 150 hours without a single malfunction. Do not need to tell you how pleased Col. Mike Deegan [Commander, 3rd Brigade, 24th Infantry Division] was to receive 40km+ of actual, real-time early warning instead of relying on bino teams. The C^3I equipment proved equally reliable and useful. It provided the BCT [brigade command tactical operations center] both a friendly and enemy air picture, and added a new level of importance to the brigade ADA cell. It even allowed for limited A^2C^2 [Army airspace command and control].

C/1-5 ADA received numerous accolades for this exercise as the "most successful" rotation yet against opposing forces air power. Firmly believe this system has the capability to significantly reduce divisional fratricide.

Perhaps most important, "Victory Division" soldiers like and believe in the system. They are bigger proponents than I am. They began training for NTC 94-07 in January, and these same soldiers will conduct the system FDTE/IOTE [force development test and evaluation/initial operational test and evaluation] this fall. They are trained and ready and will deploy to Fort Bliss, Texas, in early June.

Conducting the FDTE/IOTE will allow the Armored component of the XVIII Airborne Corps to see ADA systems of the future almost 18 months earlier than scheduled.

More selfishly, our soldiers are already trained and have hands-on experience at the NTC. Would fight to deploy this capability if the 24th were called into action. I never again want to rely on bino teams for early warning.

Am convinced you have ADA on the right track for warfighting. Urge the ADA community to continue this recent trend of development. The last three prototype systems, Bradley Stinger Fighting Vehicle-Enhanced (BSFV-E), dubbed the armored Avenger, GBS and C^3I, are all winners —

First to Fight!

1-62 ADA SOLDIERS "PUSH" FOR GUINESS RECORD

Ten soldiers stationed at Schofield Barracks, Hawaii, pumped out 50,727 pushups in 24 hours in their bid to get into the Guinness Book of World Records.

From noon to noon, June 2 to 3, 1994, the all-volunteer team of officers, NCOs and enlisted personnel rotated, knocking out pushups at the post gym in an effort to establish a first-time team record.

Although the event has been sanctioned by Guinness Book as an official record attempt, the team's efforts will not necessarily be accepted as a record. A package that includes witness logbooks, personal certifications and videotapes of every pushup will be sent to Guiness Book for evaluation.

25TH ID PUBLIC AFFAIRS

DID IRAQ USE SS-12s?

During the Gulf War the coalition checkmated one of Iraq's most potentially destructive weapons, the Al-Hussein Scud variant, by employing the Patriot missile system in the anti-tactical ballistic missile mode. This was one of Air Defense Artillery's finest hours, as Americans at home watched video of spectacular night-time intercepts. But there may have been more to the Iraqi missile campaign than is commonly known.

The secret threat to American Patriot units actually originated during the Iran-Iraq War. Iraq found itself in a missile war with Iran, a war in which Iraq came out second best. While all of Iraq's cities were in the east, relatively close to the fighting front, Iran's cities were spread across the Persian interior. Few could be reached by standard Scud missiles, then the mainstay of Iraq's rocket forces. At 600 kilometers, Tehran was well out of Saddam Hussein's reach.

Iraq's first effort to improve the situation was an attempt to acquire new and improved missiles. Hussein requested at least one advanced model from the Soviets, a type code-named the SS-12 Scaleboard[1] and known to the Soviets as the OTR-22 Temp. A two-stage, TEL-equipped, solid-fueled missile roughly the same size as the Scud, the Temp had a range of at least 800 kilometers, which would have made it possible to reach roughly a third of Iran (including Tehran) from Iraqi territory. The Scaleboard missile was also capable of terminal guidance and of homing in on a radio target[2], a fact not known in the West at that time.

References

[1]Ashley Brown and Dr. John Pimlott, editors-in-chief, *War in Peace*, vol. 11, 1974-1984 (New York: Marshall Cavendish, 1987), 2119.

[2]Duncan Lennox, editor, *Jane's Strategic Weapon Systems* Issue 12 (Coulsdon, Surrey, UK: Jane's Information Group LTD, 1992), SS-12 Scaleboard (OTR-22/9M76 Temp) Datasheet.

[3]Simon Henderson, *Instant Empire: Saddam Hussein's Ambition for Iraq* (San Francisco: Mercury House Incorporated, 1991), (Caption on Scud missile photo).

[4]Ibid, 128.

[5]Brown and Pimlott, *War in Peace*, 2119.

[6]"Experts Believe Iraqi Missiles Aimed At Radar." *The Stars and Stripes*, Jan. 26, 1991, 8.

Neither Iraq nor the Soviets admitted that Scaleboard missiles were transferred to Iraq, but there is evidence to support this idea. Reports circulated within the diplomatic community in Tehran that Iraq was using secret agents to plant transmitters in the Iranian capital for missiles to home in on. Some of these missiles were detonated in midair over the capital, a sophisticated capability needed to deliver chemical weapons, but one that should have been beyond the ability of Iraq.[3] There was a sudden improvement in Iraqi missile accuracy at this time and some missiles tracked by American satellites seem to have flown trajectories consistent with terminal guidance.[4] All of this pointed to an Iraqi missile capability inconsistent with the Scud, but definitely consistent with the SS-12.

Iraq was unable to convince the Soviets to provide Scaleboards in large numbers, but some reports indicate that 15 were delivered.[5] The need for the Scaleboard lessened as Iraq's domestically-produced Al-Hussein program began to bear fruit and other missile designs became available. Apparently, however, a few SS-12s were still in the Iraqi arsenal.

Following the Iraqi invasion of Kuwait in August 1990, Patriots were rushed in to defend airfields and ports in Saudi Arabia and Turkey. When coalition forces initiated the air war on Jan. 17, 1991, a defensive anti-tactical ballistic missile network was in place. Patriots prevented large numbers of coalition casualties, and deprived Hussein of the propaganda value of having his missiles hit Saudi Arabia and Israel unopposed.

Survey teams checked out intercepted missiles after impact in the hope of discovering any unusual characteristics or signs that the Iraqis were equipping them for biological or chemical weapon delivery. One particular impact site, that of an Iraqi missile launched on Jan. 23 against Saudi Arabia, was found ⇨

to have traces of a fragmentation sleeve, solid rocket fuel and thermal batteries of a type found in anti-radiation missiles.[6] These items were not consistent with the debris left by Al-Husseins or other Scud variants, but could have resulted from the impact of a more advanced missile: the SS-12 Temp.

One scenario goes like this. Iraq, embarrassed by the apparent impotence of their missile force in the face of superior American technology, decides to destroy a Patriot unit to score a propaganda victory, perhaps with the additional belief that such an attack would limit the effectiveness of the Patriot missile crews if they were under the impression that they, rather than the targets they were protecting, were under direct attack. The Iraqis would have to use some sort of homing missile to attack the Patriot batteries directly, but a successful terminal guidance system for the Scud would have been beyond the ability of Iraq's technical bureaus.

The only option left would have been to deploy the few Temp missiles remaining from the Iran-Iraq War as ballistic anti-radiation missiles. The Temp missiles would have been modified, withdrawn from their hiding places, and then driven in their transporter-erector-launchers to firing points. Once aimed at their target (one the Iraqis knew with certainty would be defended by a Patriot battery) the missiles would be launched, their warheads now set to home in on the Patriot's radar station.

Had the Iraqis kept one or two Temps from the war with Iran, it would have only made sense to alter the radio homing mechanism to seek out the Patriot's radar station. The destruction of a Patriot battery would have been a tremendous propaganda victory for Saddam Hussein, but in all likelihood, the Temp (if indeed it was an SS-12) was intercepted before it could hit the defending unit, thus nullifying his secret "ace in the hole."

This is, of course, only one possible explanation. Another is that the Iraqis indeed did try to modify one of their Al-Husseins with an anti-radiation warhead, but this is very unlikely. Yet another explanation is that the Iraqis filled an empty warhead casing with debris that would suggest an anti-radiation missile, mistakenly believing that Patriot crews would shut down their radar rather than risk destruction from a non-existent "homing Scud." But the simplest and most logical explanation would seem to be that the Iraqis not only possessed SS-12 missiles during the Iran-Iraq War, but kept some, perhaps without Soviet knowledge, and employed their special capabilities to attack Patriots during the Gulf War.

1ST LT. JAMES CRABTREE

1-263 ADA ROCKETS TO HISTORICAL FIRST

The siren screamed and the men and women of C Battery, 1-263 ADA, jogged to their firing posts or sought cover behind concrete bunkers.

Then it was quiet again. The large green Hawk missile perched on its launcher suddenly dipped downward, then quickly raised its head, like a well-trained pointer spotting a flock of ducks. Seconds later, a sharp roar and flame heralded the departure of the missile, now traveling at more than 750 miles per hour toward an aerial target miles distant.

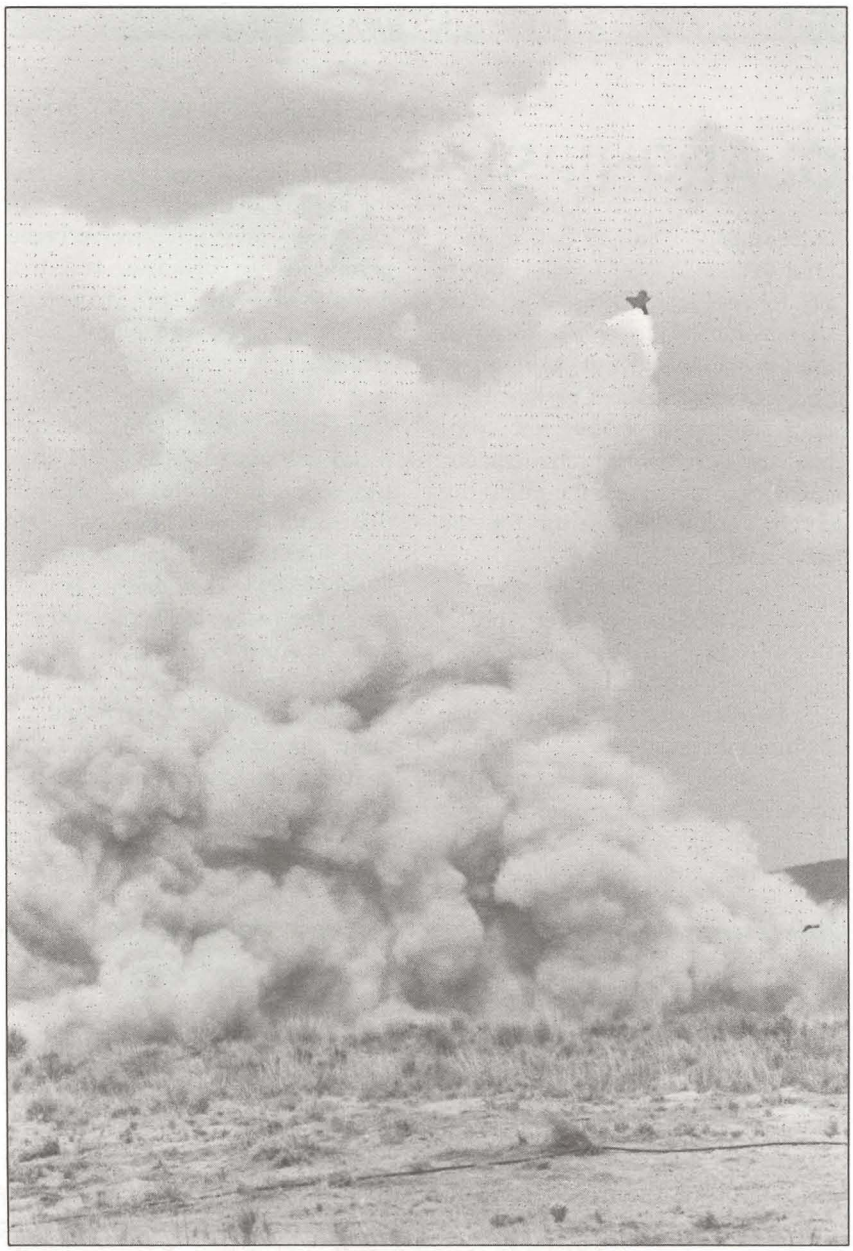
For McGregor Range at Fort Bliss, Texas, this was a routine Hawk launch. But for the South Carolina Army National Guard, this was history: the first time the Seneca-based ADA battalion launched the weapon for which they exist.

For many years, the unit was home to the antiquated, but beloved, 40mm antiaircraft gun. In 1989, 1-263 ADA converted to the Army's sophisticated Hawk surface-to-air missile.

It was just two short years ago that this battalion received the equipment to begin training on the Hawk missile, a $230,000 piece of equipment designed to bring down a more expensive and deadly enemy warplane. And now, for the first time in its history, the battalion's 400 soldiers trained as a unit in the Desert Southwest.

"We're getting the big picture as far as using the missile," said Sgt. Kevin A. Lewis, a member of A Battery. "But I think what we've really learned out here is how much we need to learn."

1-263 ADA's prize during their two weeks of annual training at Fort Bliss was to experience the actual launching of the Hawk, but the overall goal was something else. The unit went completely tactical during their participation in Roving Sands '94, the world's largest air defense training exercise for soldiers. They planned, loaded and headed for Fort Bliss as if they had mobilized for combat. All of their equipment was railheaded to the desert, and they executed each desert maneuver as if they were in imminent danger of attack from the enemy. ➪



1-263 ADA fires their first Hawk at Fort Bliss, Texas, during Roving Sands '94.

In fact, they were. 1-263 ADA was part of the "blue" force sent to the aid of a friendly country overrun by the "red" forces.

"I think the Army wanted to see what we are made of," said SSgt. James H. Grant, a Vietnam veteran and a member of A Battery.

"But this is the kind of training we'd be subjected to if we were called to a desert environment.

"This is not training you can get back home," Grant added. "It just wouldn't have the same effect [in South Carolina]. You have to experience it. We are learning basic survival out here. And one thing we have learned out here is that, when you're in the desert, you have more enemies than just the enemy."

1-263 ADA's C Battery can add credence to Grant's statement. Three of their members were bitten by rattlesnakes during night exercises. Other than a moment when the men's hearts probably felt as if they were taking a lap around the Darlington Speedway, there were no serious injuries.

"It scared the hell out of me," said Spec. Dennis Reynolds, one of the soldiers who was bitten. "I thought I was a dead man. But I stayed pretty calm, and they told me at the hospital that the snake had not injected the venom." Reynolds escaped serious injury because rattlesnakes often use the first strike as a warning; in most cases, the snake's second strike carries the venom.

The snakebites added to the training's realism. The soldiers of 1-263 ADA now know much better what they would face if mobilized for war.

"The average person doesn't understand how eight people [the team responsible for preparing the Hawk for launching] have to come together and do everything correct for this launch to occur," said CWO Larry Lainey, battalion electronics missile maintenance officer. "It doesn't take much for something to go wrong and cause a 'no-fire' to happen."

C Battery, which had won the right to fire first, did not score a clean hit. A Battery's missile, however, hit the flying target clearly.

"They did an outstanding job," said Lt. Col. John Pendergrass. "Our higher headquarters was most complimentary. Their performance was something we, as Guardsmen, should be proud of."

SSGT. DANNY BRAZELL

1995 OLMSTED SCHOLARSHIPS

Act now, and be one of just three soldiers afforded a unique, valuable opportunity: the chance to become an Olmsted Scholar.

Scholarship awardees and their families become part of a foreign culture while the officer attends one of the host nation's universities. The officer and his or her family reside in the local community, speaking only the native language.

Officers selected for the George and Carol Olmsted Scholarship Program attend the Defense Language Institute (DLI), Monterey, Calif., for six to 12 months, depending on the language of their host nation. Following DLI, the officer will attend in-country language training for approximately three to four months prior to attending the foreign university for two years. Olmsted Scholars are not obligated to serve a utilization tour; this allows officers to return to troops or to attend the Command and Staff College, depending upon professional development requirements.

Officers must meet the eligibility criteria below to qualify for the scholarship:

- Captain with three to 11 years of commissioned service as of April 1, 1995.
- Branch qualified.
- Defense Language Aptitude Battery minimum score of 89.
- Graduate Record Examination score of 1150.
- Minimum grade point average of 3.50.
- Eligible to start language training in the Fall of 1995.

Officers must also receive branch permission to compete, and must comply with AR 621-7, *Acceptance of Fellowships, Scholarships or Grants.*

A U.S. Total Army Personnel Command (PERSCOM) selection board will meet Jan. 23, 1995, to select seven candidates for presentation to the Olmsted Foundation for final selection as Olmsted Scholars, Class of 1995. The Olmsted Foundation's final selection board will convene on April 15, 1995.

If you are interested in becoming an Olmsted Scholar, or would like more information on the program, contact Capt. Curtis Jackson at PERSCOM, DSN 221-0025.

TUITION ASSISTANCE TASK FORCE

College credits and college degrees are stepping stones to promotion in today's highly competitive Army. College degrees also provide soldiers leaving the Army an advantage in civilian job markets. Tuition assistance is one of the Army's primary recruiting and retention tools. The Army's recently formed Tuition Assistance Task Force (TATF) is responding to the growing concern throughout the Army about increased demand for tuition assistance and the adquacy of tuition assistance programs for soldiers.

"Soldiers are worried about the tuition assistance program. TATF is our way of saying we hear you and we're responding," says TATF co-chair Todd Weiler, Deputy Assistant Secretary of the Army for Training, Education and Community Support. TATF's policies will provide soldiers a statement of what tuition assistance they can expect to receive, regardless of when or where they use it.

Soldiers use college courses to remain competitive in a smaller Army and to prepare for civilian employment after separation or retirement. But increased demand, coupled with a strain on funds available for education, leaves soldiers unsure of the tuition assistance money available.

Over the past five years the demand for tuition assistance, as well as the cost of an average college education, have risen substantially. TATF co-chair, Sergeant Major of the Army Richard Kidd, emphasizes that while a college degree isn't required in the enlisted ranks, "the competitive nature of our enlisted soldiers virtually necessitates that they pursue a degree to remain competitive among their peers."

The TATF's recommendations should be in place by the end of this fiscal year.

ARMY PUBLIC AFFAIRS

JRTC TRENDS

Recurring problem areas still include early warning; command, control and communications; air defense survivability; and passive air defense. Two new areas, combined arms for air defense and fratricide, also need attention.

Observer-controllers at the Joint Readiness Training Center have noted that, while aerial intelligence preparation of the battlefield development and historical plotting of aircraft tracks continues to be done well, units need more emphasis on analyzing enemy track information, disseminating this data and then moving fire units into positions to engage and destroy these aircraft. We've seen some improvement at the platoon leader level, but units need to refine the aerial intelligence preparation of the battlefield product for their supported unit's area of operation. Platoon leaders routinely attempt to use the battery product, thus overlooking likely landing zones and air avenues of approach.

Class V resupply of ADA munitions continues to be a success story. Using the first sergeant at the forward support battalion or ammunition transfer point to request, overwatch distribution and monitor the ammunition resupply effort pays big dividends. ADA units, however, still suffer small arms ammunition shortages during deployment. This situation usually begins at the intermediate staging base, when the unit does not receive the full basic load of small arms ammo, then grows worse during the course of the deployment. Accurate forecasting, establishment of the required supply rate and aggressive follow-up by the first sergeant should eliminate this problem.

Early Warning

Untimely early warning or no early warning at the fire unit level results in reactive versus proactive engagements. Reactive engagements greatly reduce the probability of a successful engagement, and when combined with a tendency to emplace on or near the defended asset (within the ordnance release line), the results are routinely a destroyed or damaged defended asset. ADA leaders must conduct a thorough reconnaissance, selection and occupation of position, consider the ordnance release line and select the position that offers the greatest likelihood for mission success. Successful receipt of early warning information is dependent upon reliable communications, but all too often, fire units arrive into position only to discover they have no communications. A thorough precombat inspection at the intermediate staging base, followed by subsequent checks as lulls occur, offers a good start in solving this problem. Key leaders must conduct inspections to ensure that proper frequencies are on hand, sufficient quantities of batteries are available and all authorized equipment is present and working. Manual Short-Range Air Defense Control System maps annotated properly with grease pencils, a valuable yet often-forgotten item, aid in successful engagements. FM 44-16, *Platoon Combat Operations - Chaparral, Vulcan and Stinger*, provides extremely thorough precombat checklists which, if followed, will improve the chances of mission success. ADA fire units often rely upon directed early warning as their sole source of early warning. While redundancy is good ⇨

Distracted by enemy ground activity and having received no early warning, this Avenger team is about to have a close encounter with an Mi-24. (Photo by SFC Eugene O'Neill)

and should be practiced to further increase the possibility that everyone is alerted and cued, it is inherently slow. Again, units relying solely upon directed early warning often see their defended asset sustain avoidable damage. Observer-controllers have noted slippage in directed early warning from the air defenders to their supported units at all levels. This failure to notify the non-ADA units has resulted in numerous missed opportunities for combined arms for air defense fires. Successful directed early warning, resulting in a combined arms for air defense engagement, can devastate enemy aircraft — at a minimum, it can cause the pilot to seek out a less-well-defended target.

Poor passive air defense leads to a high-casualty encounter with an Mi-8. (Photo by SFC Eugene O'Neill)

Command, Control and Communications

Communications problems degrade the air defense officer's (ADO's) ability to effectively command and control the unit at the battery and platoon levels. These problems generally arise due to malfunctioning or incomplete equipment and a lack of operator knowledge. Thorough pre-combat inspections at home station followed by communications exercises should reduce equipment failures. Now that the single-channel ground and airborne radio system (SINCGARS) is in place in virtually all JRTC client units, it's very apparent that a training shortfall exists across the force. Oftentimes one or two personnel within a section or platoon are truly proficient in SINCGARS operations, but the majority of the personnel possess only the very rudimentary skills necessary to power up the system. Consequently, most unit personnel rely upon the "experts" to get them into operation. But if these "experts" become casualties, communications problems rapidly multiply, and units quickly become command and control ineffective. Frequent home station training will prevent skill or proficiency decay.

Air Defense Survivability

Why do ADA fire units sustain significant, avoidable losses? Failure to establish a deliberate position or to move to an alternate position after firing, poor noise and light discipline and poor situational awareness have all contributed to the greater-than-100-percent attrition rate currently being experienced. Fratricide has also been a contributing factor in ADA unit losses. Following existing field manuals and battalion standing operating procedures (SOPs) will reverse this trend.

Passive Air Defense

Maneuver units continue to ignore passive air defense; consequently, they continue to sustain punishing air attacks. ADOs at all levels must brief passive air defense measures at every opportunity. ADA units must set the example by adhering to passive air defense measures, and must take corrective action by pointing out shortcomings within their supported units. For example, it doesn't increase a Stinger team's life expectancy to have an outstanding position when, just 100 yards distant, the team's Infantry security element's HMMWV is completely exposed. Leaders at all levels must aggressively identify and correct deficiencies. Your survivability may well depend upon it.

Combined Arms for Air Defense

Combined arms for air defense effectiveness decreased greatly since the past quarter due to the ineffectiveness of directed early warning. Fires are attempted in a reactive versus proactive manner, after the unit has been surprised by ⇨

ADA Tactics Seminar

The JRTC air defense team will host the annual ADA Tactics Seminar at Fort Polk, La., on Dec. 7 and 8, 1994. The seminar's focus is to exchange information among the observer-controller team, the ADA School and the JRTC client units. ADA School personnel will provide the latest information on the evolving threat, doctrinal updates and other pertinent issues. The observer-controller team will provide feedback on the trends that have emerged during the past 10 JRTC rotations.

The seminar will provide many valuable insights and should improve everyone's warfighting skills. Hope to see you there!

exploding aerial-delivered ordnance and the aircraft is on the egress. Successful engagement begins with the ADOs! ADOs must ensure that air defense warning upgrades and "dynamite messages" are transmitted on the command nets to all levels. ADOs must emphasize proper techniques at every opportunity. Combined arms for air defense remains a proven combat multiplier that, when properly practiced, can greatly reduce the enemy's aerial effectiveness.

Fratricide

Fratricide is a constant concern. Failure to receive timely air defense warnings and early warning, combined with the failure to follow established procedural weapon control status engagement criteria, has played a major role in every fratricide. Failure to adhere to established target engagement battle drills also contributes. Before directing an engagement, the team chief must positively identify the aircraft. If his visual aircraft recognition skills are below the expected standard, he may cause a fratricide. Rules of engagement criteria that would further assist the team chief are rarely addressed.

Incidents of ground combat fratricide involving air defenders is of equal concern. Air defenders have either initiated, causing casualties, or received and taken casualties on every deployment. In each instance, a lack of positive target identification and the inability to maintain situational awareness in a combat environment play a large part. Often, poor situational awareness results because the soldier has not received, or has received a substandard, operations order. Operations orders often neglect or omit valuable information, such as locations and planned actions of units (to include engineer obstacles) on the left, right, front and rear. Deploying an ADA fire unit into another element's sector without adequate information and subsequent coordination greatly increases the likelihood of fratricide. Fratricide avoidance is a two-way street. The ADA leader must ensure his subordinates are armed with the necessary information for mission success, and must also ensure that other elements within the supported unit know the precise air defense plan. The fire support officer must know the location of fire elements so that pre-planned targets do not include a Stinger team. Deconfliction must occur with the Aviation liaison officer for the same reason; many times Stinger teams have been mistakenly engaged as SA-14 teams. Tactical operations center integration and effective communications will reduce fratricide.

A final point. One problem consistently hampers the order development process and has resulted in soldiers receiving poor operations orders: the use of platoon leaders as unit movement officers. At the intermediate staging base, the unit movement officer is faced with developing aircraft load plans, monitoring the joint inspection process, adjusting load plans to fit the ground tactical plan and monitoring the entire outload process. This is an extremely demanding, full-time function. If the movement officer is a platoon leader, he rapidly finds that he will spend the majority of his time outloading the battery. Consequently, his integration with the supported unit is practically nonexistent. This leads to air defenders with little or no information on the pending mission.

One possible solution, which has worked well on several occasions, is to use the systems technician as the movement officer. If the unit is overstrength and has a headquarters platoon leader, this is the ideal candidate. If the unit must use a platoon leader as the movement officer, then the platoon sergeant or section sergeant must step up to fill in as the ADO with the supported unit. This is critical to ensure integration with the supported unit, and will help keep air defenders abreast of the evolving plan. However, the tradeoff with this technique will most probably be a reduction in the quality and effectiveness of the pre-combat inspection.

Well-trained, disciplined soldiers, combined with aggressive leaders, have repeatedly overcome all obstacles to ensure mission success. In many cases, with minor adjustments, units can greatly enhance their proficiency, ensure mission success and bring all of the soldiers back.

MAJ. JAMES OMAN

NTC

NATIONAL TRAINING CENTER

TRENDS

Most units use smoke to obscure target areas from aircraft or air controllers — an unsuccessful endeavor, because pilots have little difficulty seeing down through smoke. More often than not the ADA gunner, not the enemy aircraft, suffers a degraded field of vision when he tries to find approaching aircraft through a horizontal layer of smoke.

NTC observer-controllers recently witnessed the first successful use of smoke in an air defense mission. One unit used smoke in an economy-of-force role to close an air avenue of approach, thus allowing ADA to mass elsewhere. Terrain and weather allowed the use of smoke in the John Wayne Pass, a narrow pass about four kilometers long, between Tiefort Mountain and the South Wall, Hill 024. This air avenue entered from the flank into the rear of the task force's battle positions. By closing it with smoke, ADA assets were able to mass on more likely air avenues.

When pilots attempted to use the John Wayne air avenue, the smoke forced them into the central corridor at a higher altitude. They lost the terrain masking advantage of John Wayne Pass and flew completely exposed through ADA coverage in the brigade rear.

Some ADA units are now considering the use of smoke to force aircraft off of walls and ridges and into more open and exposed areas.

Rehearsals

Quality rehearsals reinforce sound ADA plans. Although they use both sand table and frequency modulated (FM) or radio rehearsals, most units have found that the FM rehearsal is the more productive of the two. While key leaders cannot always attend sand table rehearsals due to the different planning cycles of the supported units, the more-flexible FM rehearsal does not require key players to travel long distances to a rehearsal site, does not take leaders away from their units and is not dependent upon daylight.

Rehearsals normally last about one hour and cover intelligence, maneuver, command and control, ADA positioning and logistical issues. The most successful units have rehearsal SOPs for and train on the conduct of FM and sand table rehearsals. These SOPs normally cover the format, information required and participant's responsibilities. Units that try to rehearse without a plan or an SOP often "wing it" with poor results.

One unit discovered an added benefit of the FM rehearsal. When fire unit crews started monitoring the battery-level rehearsal, small unit leaders were able to look beyond their particular mission and see how they fit into an integrated air defense plan. This understanding of the overall plan was a significant factor in small unit initiative.

Early Warning

ADA sensor teams, both radar and optical, have improved their analysis of aircraft track data provided by the division early warning (DEW) net. Some teams have gone beyond broadcasting track location to predicting where a lost track ⇨

The FAAD ground-based sensor makes its first appearance at the NTC.

(terrain masked) should reappear. Some sensor teams now match track locations with the terrain and thus determine where the track should or should not be masked by terrain. Based on this analysis, ADA units have been cued to masked aircraft approaching from unexpected directions. On one occasion, Stinger gunners were cued and waiting for aircraft that unmasked and popped up in the rear of the task force sector.

Non-ADA Aircraft Fratricide

Brigades are experiencing a high level of non-ADA engagements against friendly aircraft. Several factors are contributing to this situation. Army airspace command and control is ineffective at brigade level. Information on friendly air missions is generally passed to ADA units; however, it is not being passed to the trigger-puller level in maneuver units where it is needed most. Non-air defenders tend to think the weapons control status (WCS) is for ADA units only, and brigades do not understand or train using WCS for control of all arms air defense fires. The result is that most air fratricides at the NTC are caused by M-1s and M-2s. Visual aircraft recognition is also very weak in maneuver units. Most maneuver TSOPs lack a realistic criteria about when to engage aircraft.

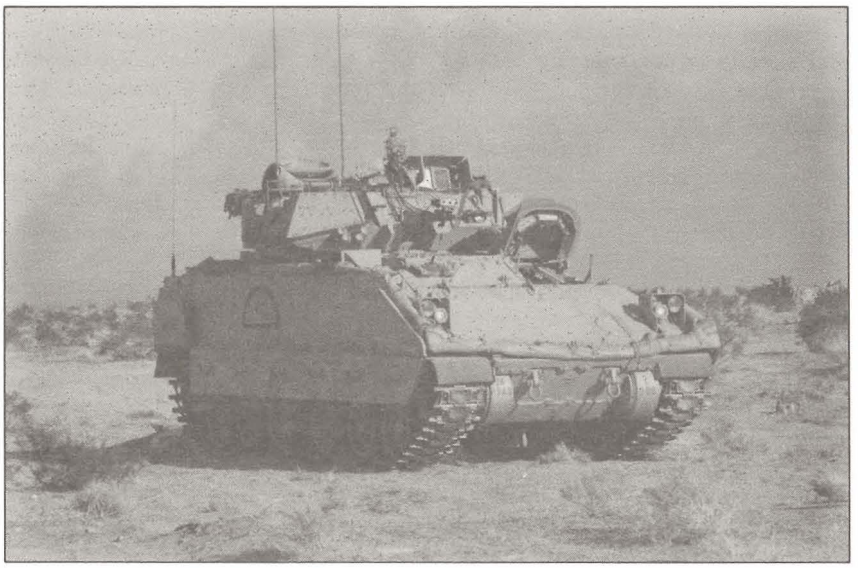
Poor planning also contributes to fratricides. In one instance, friendly helicopter missions were planned in a task force sector during what the S-2 had identified as a high probability enemy air assault window. The ground units, believing the friendly mission was in fact the enemy air assault, engaged several of the helicopters.

ADO Advice

When maneuver commanders ignore the advice of their ADOs, they employ ADA assets poorly, at high risk and with little payoff. Infantry task forces have used Stinger teams in questionable roles on more than one occasion. One task force placed a dismounted Stinger team ahead of the forward line of own troops, under cover of darkness, with an Infantry force. Both the ADA platoon leader and battery commander pointed out to the task force commander that —

- there was no air threat to the dismounted force since it was moving at night;
- the enemy commander would not waste air assets against dismounts when faced with an armored or mechanized attack;
- with only two missiles, the dismounted Stinger team's contribution to the air battle was very limited.

The air defenders recommended that the team be mounted and used to reinforce ADA coverage over the task force's main body, which was the more likely close air support target. But the maneuver commander ignored their advice and the dismounts never came under air attack.



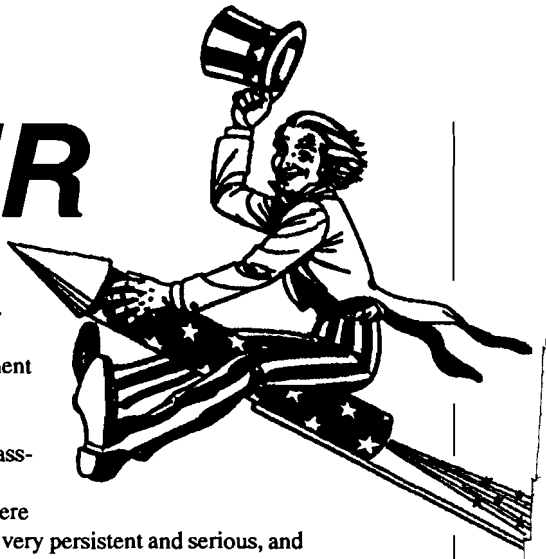
This Bradley Stinger Fighting Vehicle, from C Battery, 1-5 ADA, deploys on a smoke-covered NTC battlefield.

Task and Purpose

With team and squad leaders, poor understanding equates to a lack of initiative. Mission briefs often emphasize which positions to occupy, but do not explain why, causing ADA teams to misunderstand that their task and purpose is to kill aircraft, and instead focus on "moving with C team" or "going to Grid NK 123456." These teams are reluctant to adjust their positions to accomplish their ADA mission. A Stinger team will typically follow behind a specific vehicle in a formation and not move to a good air defense position from fear of being left behind. One Stinger team halted when its supported unit stopped behind a hill mass that afforded good concealment. The Stinger team, however, could see no more than 200 meters on the most likely air avenue of approach. They could have and should have (but did not) repositioned forward of the hill, where their field of view would have improved to 10 kilometers.

LT. COL. DALE EIKMEIER

ADA BANTER



Compliments of the Honorable Joe Reeder, Undersecretary of the Army:

* * * In General * * *

Seeing so many generals [at Fort Bliss] reminds me of a story about generals. It's a true story. It's a story about the occasion of General George Cabot Marshall's retirement, the honoring of his retirement. It's also about General Joseph Brewer, who went on to become an ambassador. General Brewer was called upon and honored with making remarks on General Marshall's retirement. He was very taken by this. He believed that General Marshall was the greatest then-living American.

So when the evening came and the time came for him to go to the podium, he did. He walked up to the podium and he began, "This greatest of all Americans, George Cabot Marshall, from the time he graduated from VMI as a first cadet to the time he was Chief of Staff of the Army, took the Army from 139,000 to eight million soldiers, won World War II, served as Secretary of State and masterminded the Marshall Plan, saving from the ravages of war both our Allies and our former foes alike. This greatest of all Americans, who could have anything that he wanted, who could be elected to any office that he wanted. . ."

About this time, as he was making this remark, he looked out into the audience and his eyes affixed on General and Mrs. Eisenhower, and he proceeded,

"This great American, who could have anything he wanted, could be elected to any office, all he wants to do is to move out on his small farm and pretend that he can spend the rest of his days with Mrs. Eisenhower."

The room just erupted. General Brewer looked over at General Marshall and General Marshall thought it was terrific, but he looked over at Mrs. Eisenhower, and she didn't think it was one darn bit funny. So he was very mortified and he scribbled out a note: "Dear Mrs. Eisenhower, I'm absolutely mortified. I don't know what possessed me. I'm so sorry. Would you please accept my apology on behalf of yourself and the general?" He folded the note and handed it to a waiter. The waiter walked it over.

She was still bristling, sort of, when he handed it to her. She pulled out a pen and wrote something back and the waiter brought the note back. General Brewer opened it up and down at the bottom she had written, "Which general?"

* * * Pass the Word * * *

This is a true story taken from the heartland of America's Army.

About six months ago, the Commanding General at Fort Jackson, Major General Steve Ziegfried, was down at Fort Jackson in the middle of the night with his command sergeant major inspecting the training. They came upon a young basic trainee who was on guard duty. The general walked up to the sentry, a very serious young man, who barked out "Halt! Who goes there?"

General Ziegfried replied, "This is General Ziegfried, Commanding General, Fort Jackson, accompanied by the command sergeant major."

The guard was relentless.

"Give me the password," he ordered.

General Ziegfried responded, after a moment of thinking about it, "Potato."

Unfortunately, the password was "peanut."

The general stood there and the soldier became very persistent and serious, and ordered, "Advance five steps, put your ID cards on the ground, retreat five steps, and come to attention."

Ziegfried thought about this, decided he would go ahead and comply. The sergeant major accompanied; they walked forward and put their ID cards down. The young soldier advanced, having these two individuals at rigid attention, looked at their ID cards and realized — for the first time — that he may be crossing the line. So he ran over to his TA-312, cranked up the telephone and called the sergeant of the guard for further instructions.

At this point, General Ziegfried said, "Private, the sergeant major and I are standing here at rigid attention, but we're not going to stand here at attention all night."

The soldier, a man of action, and a man who's becoming scared, ran up to the general, got up right in his face, and said, "Sir! Parade Rest!"

* * * Prayerful Thoughts * * *

This is a story about a Patriot unit that just returned from an outstanding rotation in Saudi Arabia. This was a gung-ho unit, a hooah unit, with a hooah commander, a commander very proud of his unit. And he decided that, as a reward, he was going to have a weekend bivouac in the Black Forest. So he invited his company out to the Black Forest — steak, beer, music — it was a wonderful bivouac, if you like that kind of thing.

One of his soldiers, a young man from Mobile, Alabama, named Timmy, who was in his cups, began to float away from the campfires, from all the singing and laughing. Before he knew it, he couldn't see the campfires and he couldn't hear any noise. It became very quiet. He started to shout out for his friends.

While he was shouting he heard a huge noise to his immediate right, and when he looked over there was a gigantic black bear standing there. Timmy fell to his knees in a prayerful position, with his eyes shut, praying for his life. After about 30 seconds of praying — and nothing happening — he finally manages the courage to screw up his eyes and look out, and lo and behold, right beside him, also in a prayerful position, was this huge black bear. He was just shocked. He began in a very nervous fashion to communicate with this bear.

"Oh bear, Mr. Bear, this is unbelievable. I don't know you. You're not even a human being. But here we are gathered nonetheless in the Black Forest in Germany praying together. Isn't this absolutely wondrous?"

The bear, who was in a thoughtful mood, turned around and looked at Timmy and said, "Son, I don't know about you, but I was saying grace."