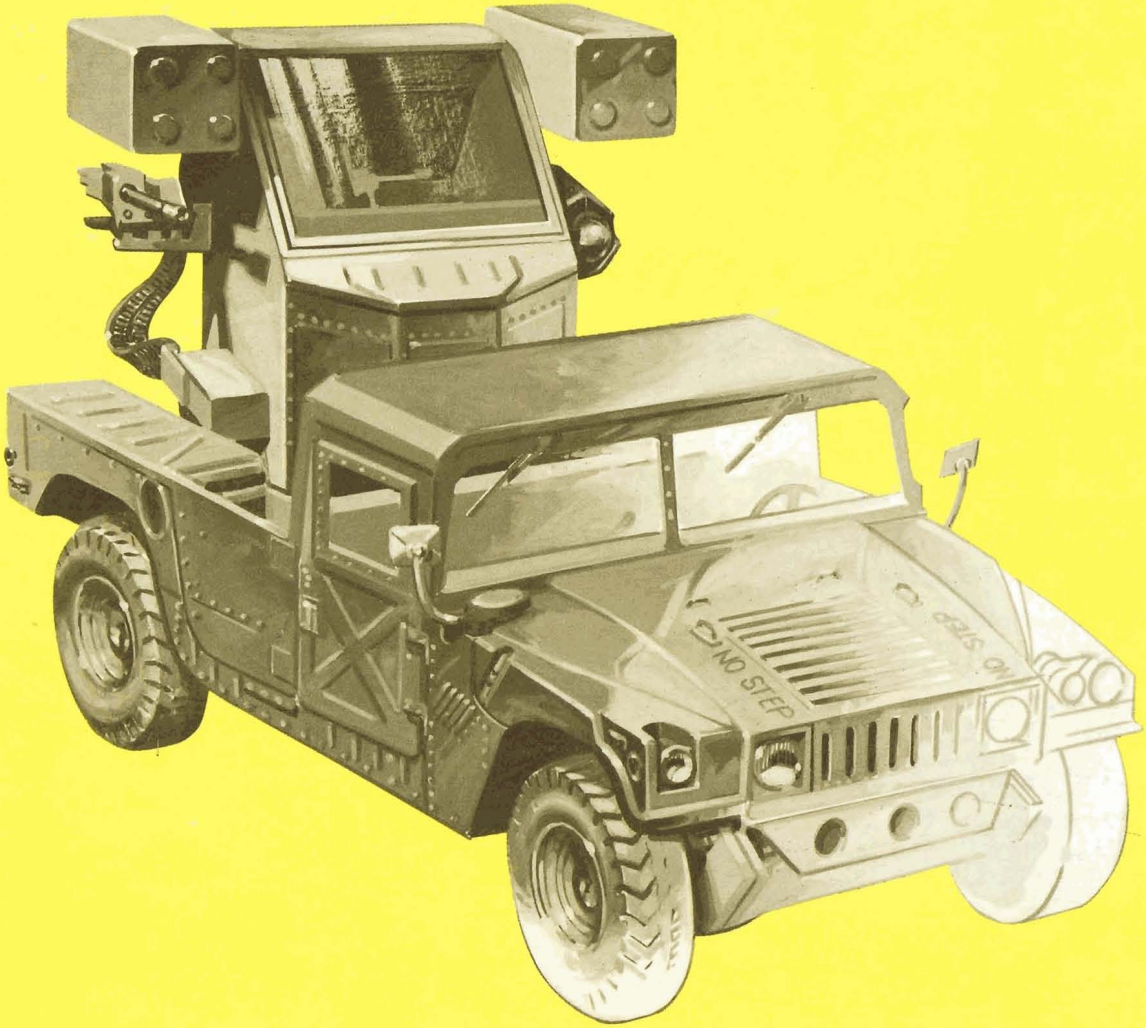
AIR DEFENSE ARTILLERY

PB 44-87-3 (TEST)

NOVEMBER — DECEMBER 1987



Avenger—'Up Close and Technical'

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Professional Bulletin of United States Army Air Defense Branch

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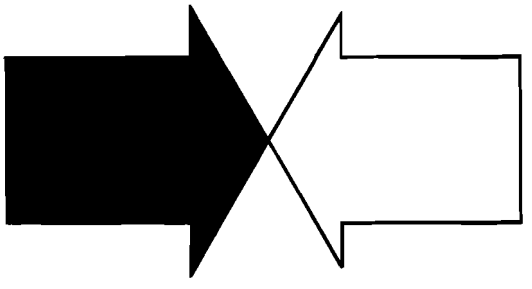
The Threat — The Response



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Air Defense Artillery (ISSN: 0740-803X) is an official professional development bulletin compiled by the U.S. Army Air Defense Artillery School, Fort Bliss, Texas. Articles appearing in this publication do not necessarily reflect the position of the U.S. Army Air Defense Artillery School or the Department of the Army. Material submitted for publication is subject to edit. Footnotes and bibliographies may be deleted due to space limitations. Use of the masculine pronoun is intended to include both genders where appropriate. Copyrighted or syndicated material may not be reprinted. Unless otherwise noted, photographs are U.S. Army photos. If material is reprinted, please credit the author, photographer and the bulletin. Information contained in this publication does not change or supercede any information in other official Army publications. Distribution: Special.

Air Defense Artillery is approved for the official dissemination of material designed to keep ADA Branch members within the Army knowledgeable of current and emerging developments in air defense artillery for the purpose of enhancing their professional development.

By order of the Secretary of the Army:
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Brigadier General, United States Army
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POSTMASTER: Second-class postage paid at Laurel, Md. Department of the Army (ISSN: 0740-803X) **Air Defense Artillery** bulletin (USPS 307-010) and additional mailing offices. Send address changes to Superintendent of Documents, Mail List Branch (SSOM), Washington, D.C. 20402.

CORRESPONDENCE: Address article and letters to: Editor, Air Defense Artillery Bulletin, USAADASCH, ATTN: ATSA-DTP-SP, Fort Bliss, TX 79916-7090. Telephone (915) 568-4133, AV 978-4133.

SUBSCRIPTIONS: May be obtained through the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402. A check or money order payable to *Superintendent of Documents* must accompany all subscription requests. Subscription rates are $8.50 for domestic (including APO and FPO) addresses and $10.65 for foreign addresses for a one-year subscription (six issues). Individual copies are $3 for domestic and $3.75 for foreign addresses.

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Intercept Point

by Maj. Gen. Donald R. Infante
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All Air Defenders Need to Know

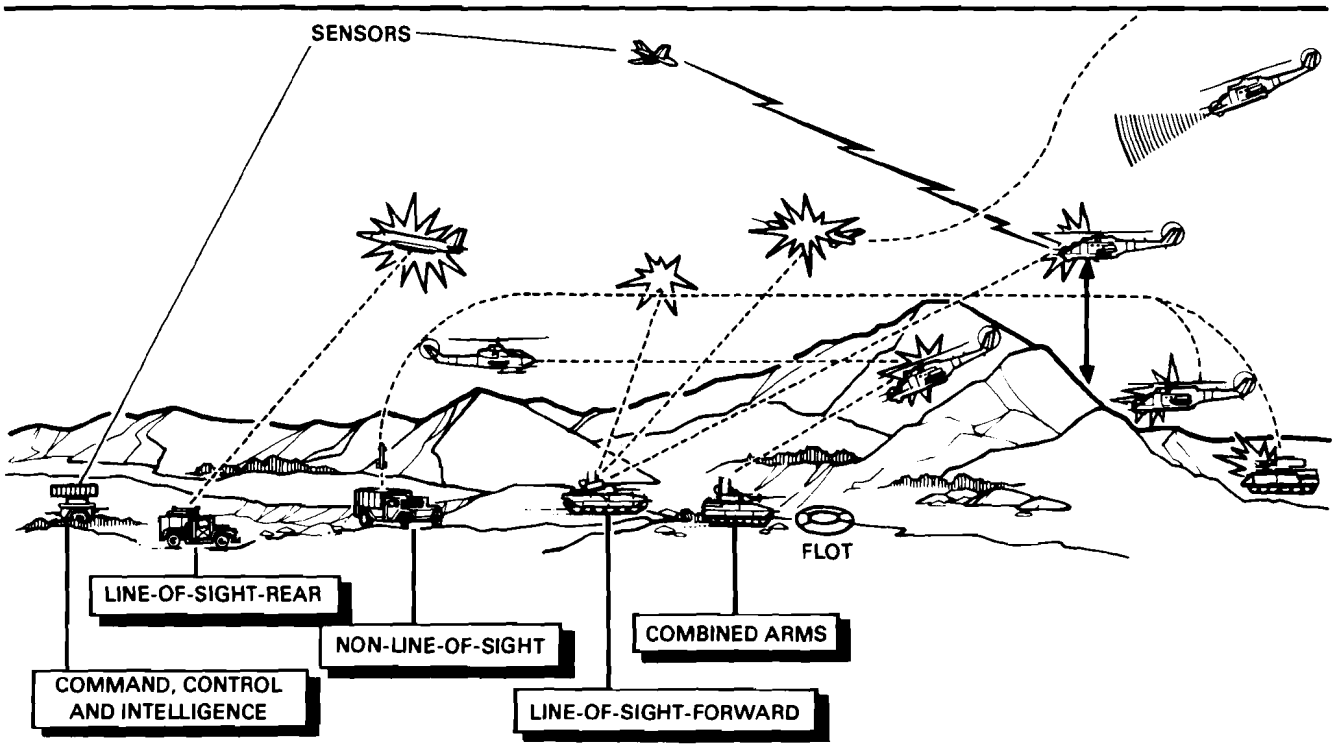
Shortly after this issue of *Air Defense Artillery* goes to print, we hope to know the answer to the hottest question of the year —who is the winner of the line-of-sight forward (heavy) (LOS-F-H) competition? While the focus of this issue is on Avenger, the line-of-sight rear (LOS-R) winner, the focus of this "Intercept Point" is on the LOS-F-H question.

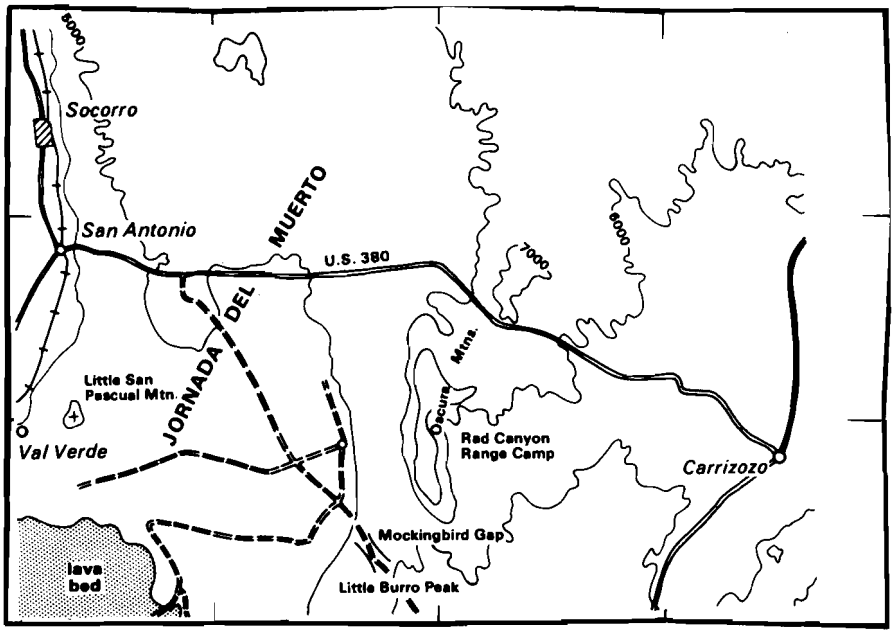
Any follower of air defense history knows that following the demise of the Sergeant York Gun in September 1985, the Army developed the forward area air defense (FAAD) system. This five-component family of systems, shown below, works together in the forward area to accomplish the air defense mission as a member of the combined arms team. The air defense mission is to —

- ensure that our combined arms brethren retain the freedom to maneuver that is crucial to implementing our AirLand Battle Doctrine.
- ensure sustainment of the AirLand Battle by protecting key logistical complexes.
- protect vital C^2I centers that allow us to "see" the battle and employ reserves correctly.
- kill enemy aircraft the first time.

We have a C^2I contract signed and work is underway. We have a LOS-R contract signed and work is underway. We have a source selection and candidate test underway for LOS-F-H. Let's expand on this last area of a source selection and candidate test as all air defenders need to know about this important process.

Forward Area Air Defense (FAAD) System





Candidate Test Team members are putting in 80-hour weeks at Oscura Range in the New Mexican desert.

First, why do we need a LOS-F-H system? The answer to this question is essential in understanding the structure of the test and selection process. We need the LOS-F-H to —

• kill enemy helicopters in clutter at extended ranges. While the LOS-F-H contributes to the killing of helicopters within the range of other combined arms elements (e.g. M-1 tanks, TOWs, etc.), its helicopter focus is beyond the range of the other combined arms.

• kill enemy fixed-wing aircraft in the close combat arena. The LOS-F-H is the only fixed-wing killer deployed with the forward maneuver forces. One sure rule of war — give the enemy a free ride option and he'll exploit it. The LOS-F-H shuts down his fixed-wing option, leaving only undesirable air attack options.

Second, how do we propose to go about finding out if the LOS-F-H is a system that fulfills the above requirements and many others listed in a document termed the LOS-F-H "ROC" (Required Operational Capabilities)? The basic approach is one of competitive non-developmental procurement. We invite industry to submit proposals and come to a "shoot-off" to prove to us that their candidates perform as claimed. Following the guidance of Congress, the candidates test started July 1. Our plan is to complete the test by Oct. 31 and make the selection announcement by Nov. 26. The Army is totally committed to meeting these dates and a miracle is half unfolded as these words are written. Key players are making air defense history and deserve kudos:

• The Candidate Test Team. Headed up by Col. William "Wild Bill" Pedigo. Most spending their 80-hour plus weeks in the desert at Oscura Range, 150 miles northwest of Fort Bliss, Texas, (see insert). When the dust settles, we'll all owe thanks to the entire team of more than 350 dedicated "soldiers" (I include DOD civilians and contractor personnel) for service "far beyond."

• The Source Selection Evaluation Team. Working under the guidance of Brig. Gen. Bill Fiorentino, the FAAD program element manager (PEO), and Col. Mike Gamino, the LOS-F-H program manager. This dedicated team of military and civilians work out of the U.S. Army Missile Command, Redstone Arsenal, Ala. They also are putting in more than 80 hours a week evaluating the test data as it unfolds along with other engineering and cost aspects. One tricky part of their job is evaluating the system growth potential from prototype to "objective system." For example, the initial system will be a missile only while the objective system will be a missile and a gun.

There are four candidates competing in the test. As evidenced by Table 1, this is indeed an international competition.

LOS-F-H Candidates

Name	Evolved From	Contractor Team
ADATS	Canadian ADATS	Martin Marietta (Prime) □ Oerlikon Aerospace
Liberty	Crotale	LTV (Prime) □ Thomson CSF
Paladin	Roland	Western Alliance Air Defense (Prime) □ Hughes Aircraft □ Aero-Spatiale □ MBB
Rapier	Tracked Rapier	United Aerospace Oefense Systems (Prime) □ British Aerospace □ FMC □ Norden

Table 1

While in every case the team leader is U.S., there is also substantial foreign involvement. The key issues that need to be resolved as we pass these candidates through an extremely challenging test and rigorous source selection process are:

- Do they do what the Sergeant York wouldn't do — kill helicopters in clutter at extended ranges?
- Do they meet the spectrum of initial source requirements designed to counter the mid-1990s threat?
- Do they possess the growth potential needed to meet the spectrum of objective system requirements designed to counter the mid-1990s and beyond threat?
- If some fall short in either initial or objective requirements, are we better off to accept this short-fall and proceed, or should we initiate development of a new system?

Crucial Issues. The overall schedule and test break out is shown in Table 2. Each candidate has furnished two fire units. The Army has furnished to each candidate nine of the finest, yet representative, soldiers in our quality Army. The soldiers who are crewing the test prototypes are spotlighted in "All Test, No Talk" on Page 22. Our youngsters have a hand in picking which system is the best!

LOS-F—H Test Schedule

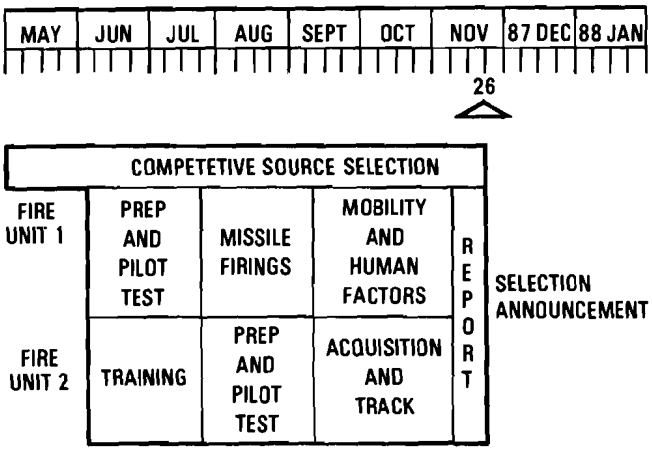


Table 2

Fire unit one will be used to fire 10 missiles at a variety of helicopter and fixed-wing threats. All tough shots which, except for one telemetry shot, employ the range of expected countermeasures. So as not to mislead, the firings will be done by contractor personnel because safety releases could not be obtained without a test delay. The flavor here is technical testing to validate contractor missile flyout claims.

Fire unit two will be used to conduct more than 1,000 target acquisition and tracking missions. Again, the complete spectrum of countermeasures and threats. All conducted by air defenders. The flavor here is operational testing to see our soldiers can use the system in a combat environment.

Exciting times to be an air defender. When the going gets tough, the tough get going. The air defense community continues to excel and meet the challenges of fielding systems essential to our AirLand Battle success. Subsequent issues of *Air Defense Artillery* will continue to cover what is without doubt an action-packed route to a new system selection.

First to Fire!

NCO to NCO

by CSM Harry E. Hicks
U.S. Army Air Defense Artillery School

Living With Guilt

Guilt is a crippling disease. It can hit its victim with devastating impact and then bury itself deep within the victim to slowly start its fatal decay. Guilt may manifest itself through a range of symptoms. The victim may exhibit a natural facade of health and heartiness while guilt works silently to destroy him. Or the guilt may cause irrational eruptions of anger as the victim struggles not to recognize his malady. Guilt may depress its victim or cause him to drink for escape; but however it manifests itself, guilt is an incurable disease once it takes hold.

What does guilt have to do with being a noncommissioned officer? Everything. Because an NCO is at high risk of suffering from guilt at sometime in his career. This is not guilt over some personal wrongdoing or weakness. No, I'm talking about the guilt of knowing you are responsible for the well being of others and that you failed in that responsibility.

"Our soldiers are our mission, and their safety is mission number one"

You and I know that there is no shame in making a mistake. After all, mistakes are a part of trying and learning. But failure is neglecting to do or not do something of which you are aware. And the failure I'm talking about does carry shame and guilt, gut-wrenching guilt. I'm talking about living after one of the soldiers you are responsible for is killed or maimed.

There are horror stories to be told of sergeants and first sergeants and captains and colonels who failed to look out for one of their troops who was then crippled or killed.

One incident that was related to me was a story from Vietnam. A captain was acting as an escort for a visiting advisor. They were observing U.S. forces and, as the captain said, "Things got a little hot. There was a lot of hostile fire and soldiers were dying. I wasn't paying attention to this guy, and the next thing I saw, the back of his head was cut off by the rotor blades of a helicopter. No matter what else I saw in Vietnam, nothing haunts me like that does. I was responsible for him."

During a field training exercise a while back, a soldier was severely shocked because the communications equipment he touched was not grounded. The commo sergeant failed to protect that soldier. That sergeant knew the equipment should have been grounded and so did the soldier. But it was the sergeant's responsibility to ensure that it was. The hardest thing that sergeant had to do was visit his soldier in the hospital, knowing it shouldn't have happened at all.

Another time a first sergeant walked into his mess hall to get a fresh cup of coffee. He noticed one of his soldiers standing on a tall ladder painting a ceiling. At the time, he thought it looked a little precarious, but the soldier seemed relaxed and he was already more than half finished with the ceiling. The first sergeant went on to his office to work on the duty roster. Later that day, the soldier lost his balance and was killed instantly when his head hit the concrete floor.

Anger, lightning-white anger, is how another NCO explains his first reaction after one of his soldiers was run over and killed while sleeping under a vehicle. He said, "We knew we were down for the night. No one was supposed to be moving anything. The guys liked to stay near their vehicles. I just didn't think anything could go wrong. The damnedest thing is, we all know too many of our soldiers die that way. It was the old 'it can't happen to someone I know.' How I regret that night. But I can't rewrite what happened."

No falling back upon "I just didn't see it coming," or "But we checked that equipment out last week," or "Everyone knows that's dangerous," will save these leaders from the guilt they now permanently suffer. There is no rationalization, no compensation, no solace. They failed their soldiers' trust by allowing them to be injured.

Yes, you may bristle at that. After all, soldiers are adults, they should be able to look after themselves. Soldiering is an inherently dangerous profession. We aren't kindergarten teachers now, are we?

No we are not. The more dangerous our profession, the greater is our need for caution and concern. We must be relentless in our soldier care. Circumstances sometimes rob us of that concern, but we must fight to gain it back.

Boredom is a dangerous forerunner of accidents. We repeat the same routine so many times that we forget it is the routine that protects us, not some quirk of fate. After a long spell of safe handling of a situation or equipment, boredom sets in and actions get sloppy. Appropriate checks are left out and wham — boredom's won a victim.

Lack of preparedness may get us when boredom doesn't. If a leader has too many things vying for his or her attention, he or she may just forget that the new soldier isn't aware of the dangers the rest of the squad guards against. There needs to be time in every action to look at the consequences, to mentally rehearse what is about to happen and decide if everyone is out of harm's way.

Lack of training. When you assume the responsibility for soldiers in a unit, no matter its size, you are given their trust — the trust that you know your job and you know their job. When they are hurt on the job, if you have not forewarned them of the dangers, if you have not double-checked procedures to ensure they are correct, then you are responsible for any injury.

I have purposely refrained from using the word safety in this column so far. NCOs hear it so often I don't think it carries the impact that it should. But safety is part of the mission, and the mission is number one. Our soldiers are our mission and their safety is mission number one. No matter how you look at it, the job of NCOs is to take care of their soldiers.

There are many kinds of accidents, but most are preventable. The word accident does not connote lack of prevention. It just means that the injury occurred without planning. To moan that it was an accident after one of your soldiers is killed does not immunize you from the guilt. You must think and act and teach safety at all times. Only if you do this will you not suffer from guilt. Only if you truly, deep in the core of you, know that you did everything humanly possible to protect each and every one of the soldiers under your care, will guilt never gnaw away your center. Think about it.

1/68th Rocks Fort Hood With Joint Live Fire

The 1st Battalion, 68th Air Defense Artillery, attached to the 6th Combat Brigade (Air Cavalry), took part in a week-long joint shoot recently with the 2nd Battalion, 5th Air Defense Artillery, 2nd Armored Division, at Trapnell Range, Fort Hood Texas.

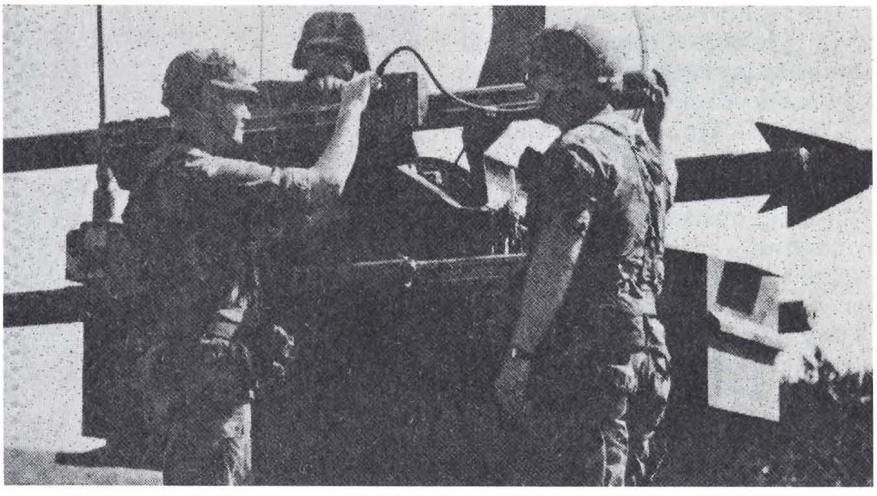
They participated in a six-round Stinger missile system reliability test, after which they fired an additional seven Redeye and seven Chaparral missiles. This was the first time the 1/68th ADA troops fired the Stinger, according to Capt. Richard Hooper, the 1/68th ADA assistant S-3, and the last time they would fire the Chaparral.

The battalion will be reorganized in 1988. Headquarters Battery will be equipped with Stinger missiles, while Alpha and Bravo batteries will have Vulcan and Stinger systems. Charlie and Delta batteries (Chaparral) will go to a new ADA brigade at III Corps.

Recent world events have proven the Stinger to be the premier division forward area air defense weapon, replacing the Redeye. "It is virtually impossible for an aircraft to evade a Stinger," Hooper said. "They also have an IFF [identification, friend or foe] feature which, under combat conditions, will ensure that we won't shoot our own planes."

Intense practice prepared the 1/68th ADA troops for the exercise. "The gunners work on a moving target simulator so that they'll get a feeling for what's in range and how far the missile will travel," Hooper said. "The main points we constantly reinforce are ground recognition of the aircraft, tracking the aircraft and firing at the right time," he stressed.

by L. A. Wolfschlag



Maintenance mechanics and crew of the 1/68th ADA make a Chaparral system ready to shoot down hostile aircraft. (Photo by William A. Speicher)

1/65th ADA Redesignated as 3/1st ADA

The 1st Battalion (Hawk), 65th Air Defense Artillery, 11th Air Defense Artillery Brigade, was officially redesignated as the 3rd Battalion (Hawk), 1st Air Defense Artillery, in a recent ceremony at Fort Bliss, Texas.

Colonel John B. Rogers, commander, 11th ADA Brigade, presided over the ceremony in which Lt. Col. Donald G. Hall, the battalion commander, and CSM Gerald B. Brown cased and retired the colors of the 1/65th ADA and uncased the colors of the 3/1st ADA.

The 3/1st ADA traces its lineage back to 1815, when it was organized in the Regular Army at Plattsburgh, N.Y., as a company of light artillery. Over the years, the unit has been redesignated, reorganized, inactivated, disbanded, activated and consolidated. Prior to its recent reactivation, the battalion was last inactivated on August 30, 1974, at Irwin, Pa.

The 3/1st ADA participated in campaigns in the Indian Wars, the Mexican War, the Civil War and World Wars I and II, earning ten streamers.

1st Air Defense Artillery Latest Regiment Activated

In a recent multiple ceremony at Fort Bliss, Texas, the 1st Air Defense Artillery regimental headquarters was activated. The 1st Battalion (Hawk), 7th Air Defense Artillery, was inactivated; the 2nd Battalion, 1st Air Defense Artillery, was activated; and the new battalion changed command.

Lieutenant Colonel Stephen D. Cork cased the colors of the 1/7th ADA, inactivating the battalion and relinquishing command, and Lt. Col. Eugene G. Hagewood uncased the colors of 2/1st ADA, activating the new battalion and assuming its command.

Retired Maj. Gen. John B. Oblinger, the honorary colonel of the 1st ADA Regiment, and retired CSM Earl D. Ferguson, the honorary sergeant major, uncased the regimental colors with its 43 campaign streamers. This symbolically activated the regimental headquarters with the 2nd Battalion.

The regimental headquarters is the regimental home base and serves as the repository for historical items of the regiment.

The positions of honorary colonel and sergeant major are ceremonial only and in no way affect the operational chain of command.

The 2/1st ADA was constituted on Jan. 11, 1812, in the Regular Army as a company in the 3rd Regiment of Artillery. It was organized in July, 1812, as a company in the 3rd Regiment of Artillery. It served in the war of 1812, earning a "Canada" campaign streamer.

Since then, the battalion has been redesignated, reorganized, inactivated, consolidated and activated many times. It participated in five wars. It was last inactivated in Germany in 1983.

Sgt. James Landrum, left, and Spec. Dalton Roy load 20mm rounds into the self-propelled Vulcan gun system. (Photo by Capt. Dean Quaranta)

4/61st ADA Fires Service Practice

Batteries A and B, 4th Battalion, 61st Air Defense Artillery, deployed to Range 119A recently to fire their Vulcan gun systems against the Streaker (Variable Speed Training Target) system at Fort Carson, Colo.

The Streaker is a two-part system for ground-to-air gunnery scoring. A jet-powered drone flying 200 knots at a 1,000-foot altitude, it tows a 24-foot sleeve equipped with a "bullet counter" which emits a 32-foot radar pattern simulating the shape of a Soviet MiG-23. The drone is flown from a ground-based station operated by the system contractor.

Captain Kendall Cunningham, A Battery commander, said, "This provides more realistic training than is normally available to us."

Another Streaker feature that enhances training is the real-time feedback, furnished to the squads as they fire, from the target's radar emission. Rounds passing through the radar pattern are registered by the scorers, and hit or miss information is relayed immediately to the gun crews.

First Lieutenant Keith Flood, a B Battery platoon leader, feels this immediate feedback, "increases squad morale and heightens the competition between squads and batteries."

Dale Becker of Cartwright Electronics, who scores ADA units throughout the United States, did the scoring.

When asked to comment on the firing accuracy of the gunners, Becker said, "They scored two direct hits the first day. Most units don't even come close until day two."

"This training was the most realistic I've had since joining the Army," said Spec. Jordan Swain, a 1st Platoon, B Battery, assistant gunner.

Specialist Nathaniel Fishburne, a 3rd Platoon, A Battery, senior gunner, added, "The whole experience was a blast."

by 1st Lt. Roger Pedretti

4/61st ADA Training Challenges Team Skills

Chaparral soldiers of the 4th Battalion, 61st Air Defense Artillery, fired their annual service practice (ASP) recently at Fort Carson, Colo., to measure systems and crew effectiveness.

The Chaparral is a highly mobile surface-to-air missile system designed to counter the high-speed, low-altitude air threat in the forward battle area.

The ASP gave battalion crews a chance to test their firing proficiency as individuals and as teams. It also provided an opportunity for their families, the local public and the media to watch the troops in live-fire training.

Because of cost constraints, only six of the battalion's 24

Chaparral squads were chosen to fire. Unit soldiers who had never fired before were chosen as gunners for this shoot against ballistic aerial target system (BATS) missiles.

Specialist Chris Nolen, one of the gunners, said, "The experience was different. Just thinking about what would happen if I missed made me nervous. My crewmates would really let me know."

Sergeant Melvin Faris said, "The main benefit of firing during an ASP is that it instills confidence in yourself and in your equipment. Of the gunners who fired, each scored a direct hit or an intercept within the lethal range on a target much like an enemy aircraft."

by Pvt. Samuel Thomas

Sgt. Harrel Baker checks out a BATS missile before a launch. (Photo by Capt. Dean Quaranta).

32nd AADCOM Units Defend England

Europe's largest air force exercise, Operation Hammer, was held recently in England, with the 10th Air Defense Artillery Brigade; the 2nd Battalion (Patriot), 43rd Air Defense Artillery; and the 3rd Battalion, (Hawk) 52nd Air Defense Artillery, participating. The exercise involved U.S., British, Belgian and Dutch forces.

Hammer is a semiannual NATO Air Force exercise to practice multialtitude mass air attack against a hostile nation. The tactics are to saturate the surface to air (SAM) and "Blue" air defense forces and generate a corridor through the defense to facilitate attack of fixed installations.

The raid of approximately 340 aircraft rendezvoused over the North Sea and formed two attack axes toward the eastern coast of England. One raid, directed at Northern England, attacked simulated fixed installations and dropped bombs at the bombing range in that area. The other raid attacked East Anglia. The East Anglia raid was accompanied by an electronic countermeasure (ECM) environment including standoff jammers and chaff.

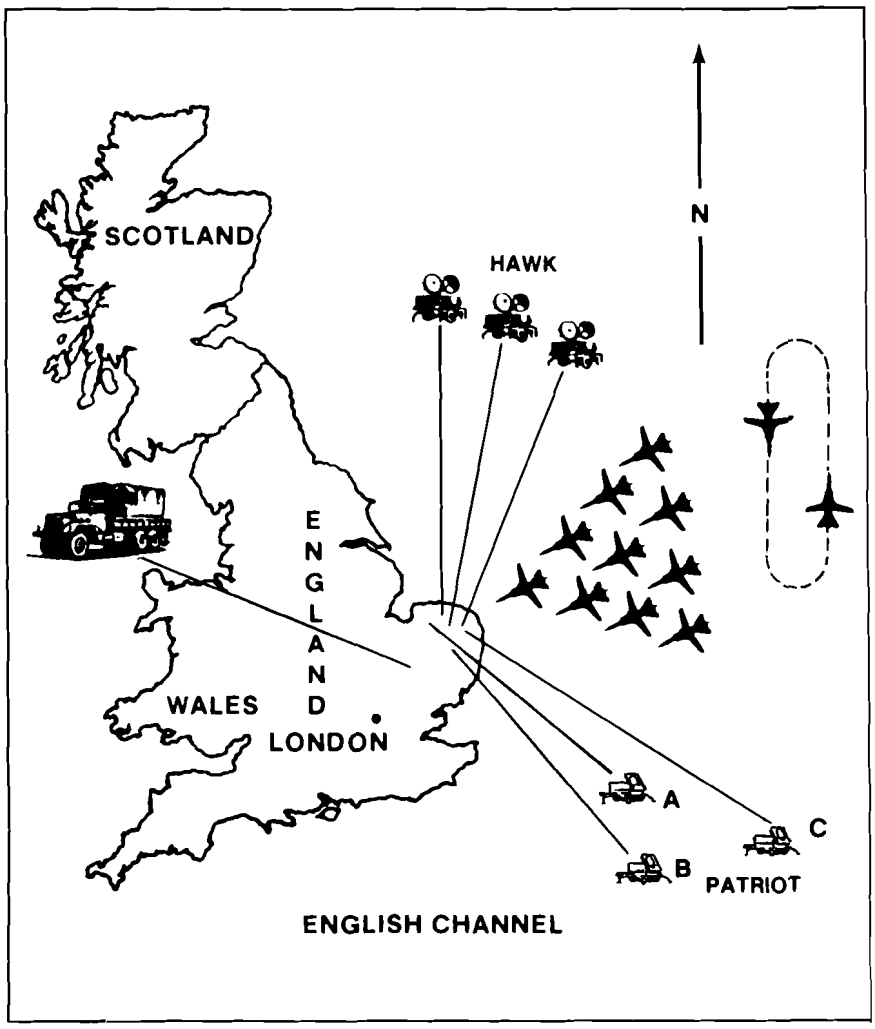
The force structure of the exercise included a Blue force consisting of the Royal Air Force (RAF) (both SAM and air elements) and the U.S. Army air defense element (32nd Army Air Defense Command) which defended the United Kingdom. The U.S. Air Force conducted a simulated attack of a hostile country and was considered the Orange force. The U.S.Air Force aircraft ranged in type from tankers, AWACS, ECM EF-111s, F-15 and F-16 fighters, F-111 fighter bombers, F-4 Wild Weasels, and CAS A-10s, with Tornadoes from the RAF.

The 10th ADA Brigade (minus) was airlifted via C-5A and C-141s from the Federal Republic of Germany to the East Anglia coastal area of Great Britain. This was the first mixed (Patriot/Hawk) brigade to be air transported to a tactical exercise and deployed. The brigade assembled at Feltwell RAF Base, deployed to the tactical sites and was operational within hours.

The brigade equipment was mission capable throughout the exercise. The Patriot and Hawk systems' reliability for the exercise was excellent.

Hammer provided a realistic mass air attack to the air defense forces. The aircraft altitude ranged from less than 100 meters to 10 kilometers. There were two waves in a standoff jamming and chaff environment. The raid provided excellent training benefits to the air defense elements.

The exercise provided the first opportunity for the mixed brigade to operate and formulate tactics and doctrine against a large-scale threat. It provided the brigade with an example of operating con-



A graphic overview of the Operation Hammer exercise location. (Courtesy Raytheon Corp.)

ditions in a mixed air defense environment with no restrictions on fire distribution. From this exercise experience, mixed-brigade operations and fire distribution doctrine on how to best fight Patriot/Hawk can evolve.

Although the exercise took less than an hour, it was billed as the closest thing to an actual air attack. Further, the units involved got many weeks of invaluable realistic pre-exercise and post-exercise training.

For the past two years, Patriot elements of the 10th ADA Brigade have participated, but it was a first for the Hawk battalion. The brigade tested the two ADA systems' compatibility under combat conditions.

"While this is actually an Air Force exercise, the Army ADA units are pleased to play. It is about the most realistic training our troops can get in the European theater," said Lt. Col. Gerald Lemons, deputy commander of the 10th ADA Brigade, adding, "We're both getting more training for our bucks. We're simulating the bad guys for them."

Operation Hammer was used this year to see how well Patriot and Hawk could share information. The Hawk system, like others, is vulnerable to detection because it radiates traceable signals. That requires them to shut down and move frequently to avoid retaliation.

"During this exercise, we used the Patriot to collect data, then passed the air battle picture over to Hawk," said Lemons. "By using a shared air picture, everyone in the brigade sees what Patriot sees. The main goal is to keep [electronically] quiet," he said.

What we try to develop is the most proficient manner in which to fight using these systems. Right now we need more data to tell us if we are doing that in the most effective way. This exercise will help us determine that," said 32nd AADCOM Deputy Commander Brig. Gen. Travis N. Dyer.

"The 2/43rd Patriot units, with their longer range, acquired the targets first. The 3/52nd Hawk units, sited within the Patriot coverage area, picked up the remainder, acting as the supplemental shield to catch the aircraft that may slip through the cracks," said Lemons.

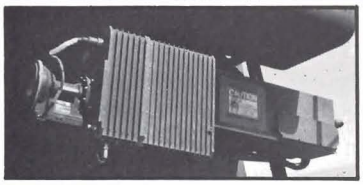
Declaring the exercise a success, Lemons explained that there was an added bonus in taking part in an exercise staged in England.

"The opportunity to practice air mobilization with our weapons systems is a welcome benefit, because many of our troops have never had the chance to perform that mission," he said.

"Overall, this exercise gives an ADA unit optimal training for actually very little cost. There were quite a number of training objectives met in this one exercise, especially for training our tactical control officers in air battle situations," Lemons said.

by SSgt. M. Katherine Burke

Avenger Sensors Page 13

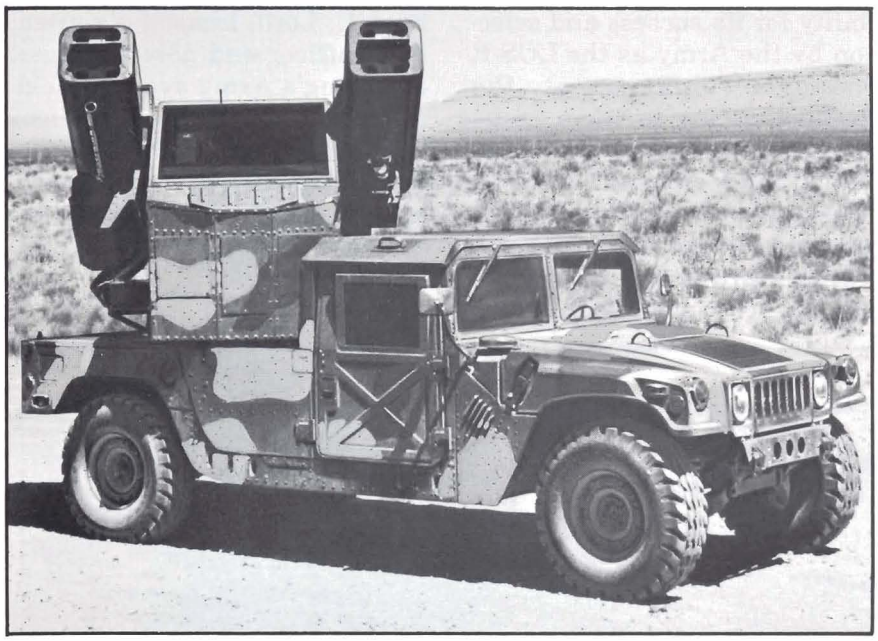


Remote Control Unit Page 14

FAAD News

Vol. 1, No. 101 | Ft Bliss, Texas | Nov. — Dec. 1987

A 'First Big Step'



ADA gets shoot-on-the-move weapon in Avenger

Avenger, the first shoot-on-the-move air defense weapon to enter full-scale production, will begin rolling off Boeing assembly lines in the fall of 1988.

This pedestal-mounted Stinger (PMS) system is destined to become the forward area air defense (FAAD) system's line-of-sight rear (LOS-R) component. ADA officials, meanwhile, praised both the new weapon system and the off-the-shelf acquisition strategy that took the PMS concept from drawing board to reality in just three short years.

"With the selection of Avenger, the Army takes another important step in meeting the requirement for a new forward area air defense system," said Col. Vince J. Tedesco, the U. S. Army Training and Doctrine Command's FAAD system management officer. "The LOS-R program is a true acquisition success story, as it will take only three years from the decision to create such a weapon to the fielding of the LOS-R pedestal-mounted Stinger.

"The PMS program allows the Army to make a super missile — the Stinger — even better," he added. "It also gives the Army its first shoot-on-the-move air defense weapon."

The first of the three FAAD weapon components (non-line-of-sight and line-of-sight forward are yet to be selected), Avenger came out on top during a three-way shoot-off that began in the fall of 1986 and continued through June 1987.

A General Dynamics prototype, disqualified because it failed to meet the weight specification, dropped out of the contest early. Avenger, how-

ever, weathered a stiff challenge from LTV's Crossbow in what test observers described as a "neck-and-neck" competition.

Senior ADA officials expressed confidence in the test results.

"Avenger is pure dynamite. It reacts rapidly and lethally," said Maj. Gen. Donald R. Infante, chief of Air Defense Artillery, after the Army announced its choice. "It can engage high-performance, fixed-wing and rotary-wing aircraft with up to eight Stinger missiles before they can deliver ordnance. The man-machine interface makes Avenger twice as effective as man-portable Stinger."

The U. S. Army Missile Command awarded a firm fixed-price contract to Boeing with a potential value of $189.7 million for production and support of the weapon system. The contract has options for a total of 273 fire units over five years and provides for training devices, operator and maintenance manuals, and depot level maintenance support. The initial award to Boeing is $16.2 million for a first option buy of 20 systems.

Infante called the selection of Avenger a significant increase in air defense firepower and an important milestone in the history of the branch. "After nearly three years of intense planning and testing, we've taken the first big step toward fielding the FAAD system," he said.

Boeing representatives credit Avenger's versatility and adaptability for its success and selection by the Army as the LOS-R component. Like a cat, the Avenger seems to have "nine lives." The Avenger gunner, as the "ultimate sensor," controls the engagement from a fully self-contained turret mounted on a high-mobility, multipurpose, wheeled vehicle (HMMWV). But the driver — or the gunner in the HMMWV passenger seat — can take over fire control from the redundant remote control unit if the gunner's station in the turret is out of action.

Should the HMMWV be immobilized, the Avenger fire unit can simply be removed and put into operation as a stand-alone system or emplaced on another vehicle. If the fire unit is disabled, the Avenger crew reverts to the man-portable mode, firing its allotment of Stinger missiles from the shoulder.

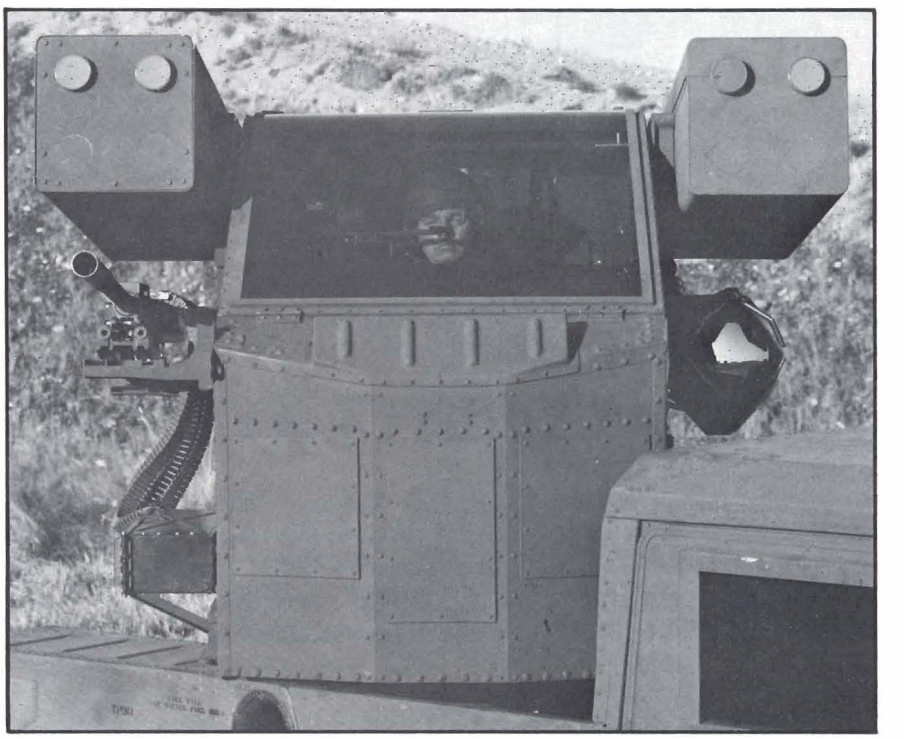
"Soldiers are going to like Avenger," predicted Boeing's Fred E. Lord, himself a retired ADA officer and now manager of Boeing's Army systems field office in El Paso. "It's a 'soldier-friendly' system. During the PMS shoot-off, we were amazed at how quickly the Army's test crew acquired a sense of loyalty to the system."

System Description

Avenger's fire unit includes a 360-degree rotatable turret with a cabin in which a gunner is seated. Two missile pods are mounted on the sides. To change the aiming point, the pods are rotated about a vertical axis and the turret about a horizontal axis.

Each missile pod can hold four missiles, removable for man-portable air defense (MANPAD) Stinger firing if the tactical situation dictates.

Batteries in the base of the fire unit are interconnected in parallel with the HMMWV 24 VDC system to provide turret power.



For Avenger self-protection and for coverage of the Stinger dead zone, an M3P machine gun is attached to the right-hand launch beam as supplementary armament.

Avenger has an unobstructed field of fire of 360 degrees in azimuth and from -10 degrees to 70 degrees in elevation. Its modular design allows future complementary missiles to be installed on one of the launch arms instead of the Stinger pods or the machine gun. These might include laser beam rider missiles or hypervelocity rockets which are being evaluated for preplanned product improvement.

A large transparent canopy cover allows the gunner easy and fast ingress and egress to the turret cabin. It also protects him from the weather as he takes advantage of wide-angle visibility to acquire, track and engage his target.

To aim the missiles, the gunner looks through a transparent sight glass. On the sight glass, he'll see the projection of a driven reticle display. The reticle indicates the aiming point of the missile seeker, confirming to the gunner that the missile seeker is locked on the same target he is tracking and planning to engage.

The sensor package includes a forward looking infrared (FLIR), CO^2 eyesafe laser range finder (LRF) and an automatic video tracker. With these sensors, whatever the battlefield environment — darkness, dust, smoke or adverse weather — the Avenger retains its target acquisition capability.

To provide a fire permit for missile and gun use, the Avenger's fire control system processes data from the LRF and displays an advisory fire permit symbol in the sight and FLIR display. The fire permit function maximizes use of the Stinger's engagement boundaries.

Avenger's modular design is configured for growth to meet evolving threats and to accept advancing technology.

- **Missile system:** Turret launch arms can accommodate laser beam rider missiles
- **Sensors:** Space, weight, and interface identified for P^3I Sensors (RFI, IRST)
- **Fire control:** 100% growth
- **FAAD C^2I:** Space, weight, and power reserved for Enhanced Position Locator Reporting System User Unit and Handheld Computer Unit.
- **Predicted fire weapon:** Hypervelocity rockets or bigger gun can be accommodated

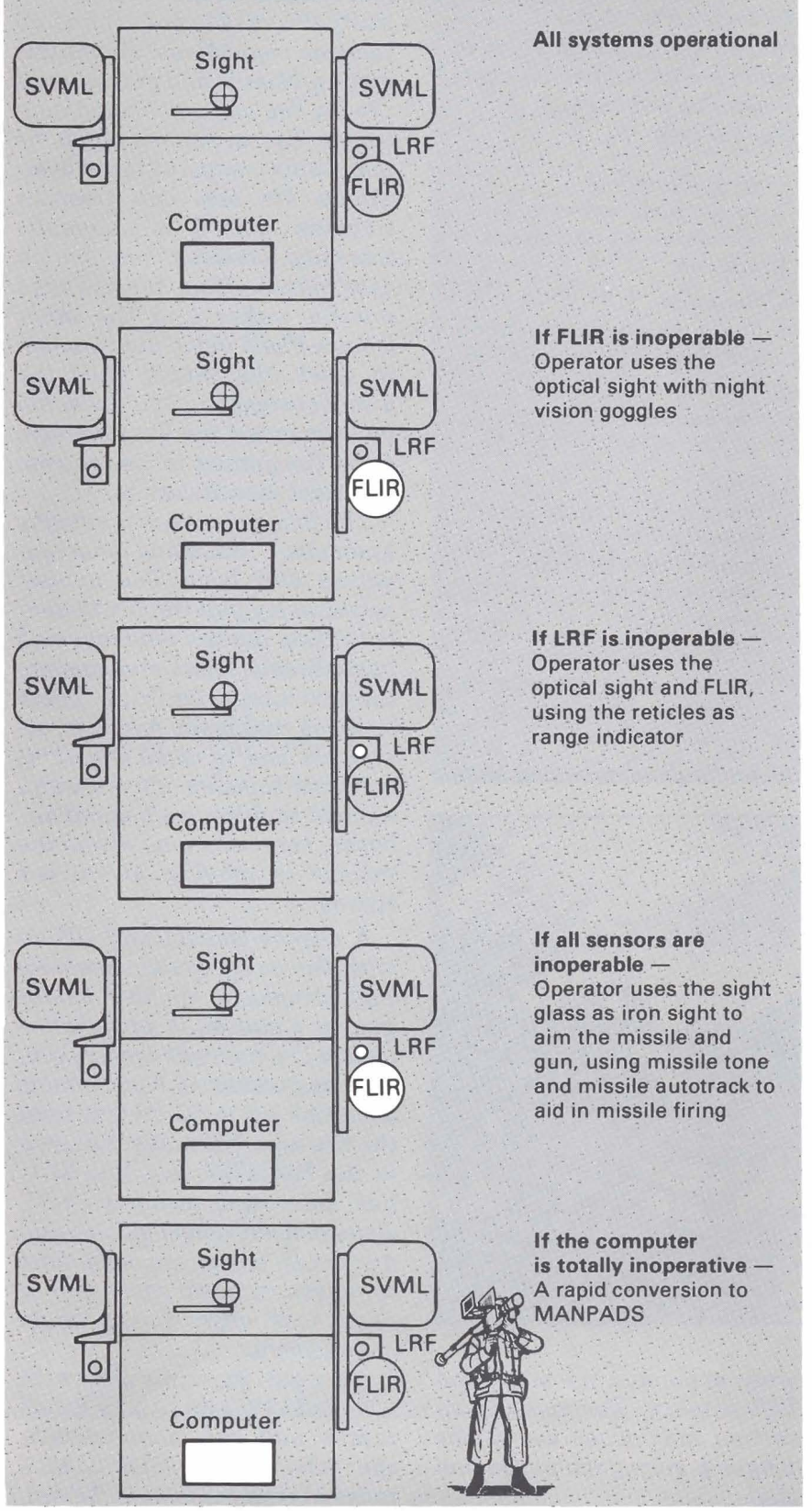
The turret drive is gyro-stabilized to maintain automatically the missile pod aiming direction regardless of vehicle motion. Missile and gun controls are on the gunner's hand controller, by means of which he maintains control of turret operations. He also can transfer tracking control to automatic tracking systems, one which uses signals from the uncaged missile seeker and the other from a FLIR video autotracker, to track the target until the gunner is ready to fire. These automatic target tracking features allow the gunner to concentrate on target identification.

The firing sequence is entirely automated, including superelevation and lead. The gunner need merely pull the fire trigger to initiate the fire sequence and immediately select and prepare the next missile for firing. These systems enable the Avenger, accurately and in rapid sequence, to launch missiles or fire the gun against multiple high-speed airborne targets even while the vehicle is moving at convoy speeds.

A remote control unit (RCU) with the same system controls and displays in the turret gunner's station is provided to enable the Avenger crew to conduct engagements from remote positions up to 50 meters from the fire unit. Normally mounted in the HMMWV cab, this RCU has embedded training provisions so the Avenger gunner and driver can crosstrain each other to maintain proficiency and to assist each other during target engagement.

Avenger is equipped with AN/PRC-77 and AN/VRC-47 radios and can accommodate the AN/VRC-91 SINCGARS radio system when it is fielded.

Avenger turret design assures continuity of operation.



FAAD C²I equipment will be incorporated as it is fielded. The gunner and driver communicate with each other via the AN/VIC-1 intercom subsystem. Identification, friend or foe (IFF), is provided by the Stinger AN/PPX-3B interrogator.

Avenger's capabilities first were demonstrated by a Boeing proof-of-principle fire unit operated by a crew of the Army's lst Battalion, 67th Air Defense Artillery, at Fort Lewis, Wash., in April 1984. This came just 10 months after General Edward S. Meyer, then Army chief of staff, had requested a more effective Stinger air defense system.

Stinger crewmen learned to engage targets in less than an hour. During tracking and simulated launches, they were openly enthusiastic about its ease of operation, accuracy and shoot-on-the-move capability. Within a month, three successful Stinger firings — on the move, at night and in adverse weather — scored three intercepts, confirming the system's effectiveness.

An Army Air Defense Board evaluation in August concluded that Avenger, by successfully engaging aircraft during the training exercise, provided greater asset protection than the Stinger MANPAD team. Under most test conditions, Avenger engaged twice as many aircraft as did MANPAD.

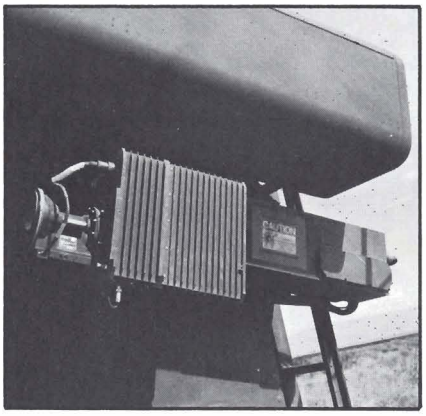
Avenger has demonstrated a high mission reliability and has inherent maintainability characteristics such as built-in test (BIT). Use of proven and production subsystems further reduce cost. The predicted operating and support cost for an Avenger unit over a 20-year service life is estimated to be less than 25 percent of the initial investment.

Sensors

State-of-the-art passive sensors provide Avenger its target acquisition capability. The package consists of a CAI optical sight, a Magnavox FLIR, a DBA automatic video tracker (AVT) and a Texas Instrument's CO^2 eyesafe LRF.

The optical sight is a driven reticle head-up display which allows the gunner to acquire targets through the canopy and to aim the missile manually. Components of the optical sight are mounted inside the turret.

Target acquisition at night and in adverse weather is provided by the FLIR, mounted on the left-hand launch arm below the missile pod. The FLIR is a self-contained thermal imaging system operating in the 8-12 micron bandwidth. The target



thermal image is presented to the Avenger crewmen on cathode ray tube displays mounted in the gunner's control console and RCU.

Reticles and symbology (including advisory fire permit) are projected on the FLIR displays by the AVT. The same symbology also is displayed on the optical sight combining glass. The FLIR is a dual field of view system, with the gunner's foot pedal alternating fields of view. The production configuration includes an electrically operated optics cover.

The AVT provides an automatic tracking mode. FLIR video target-to-boresight error signals determine azimuth and elevation repositioning required by the turret drive system for maintaining turret pointing (boresighting) on the target.

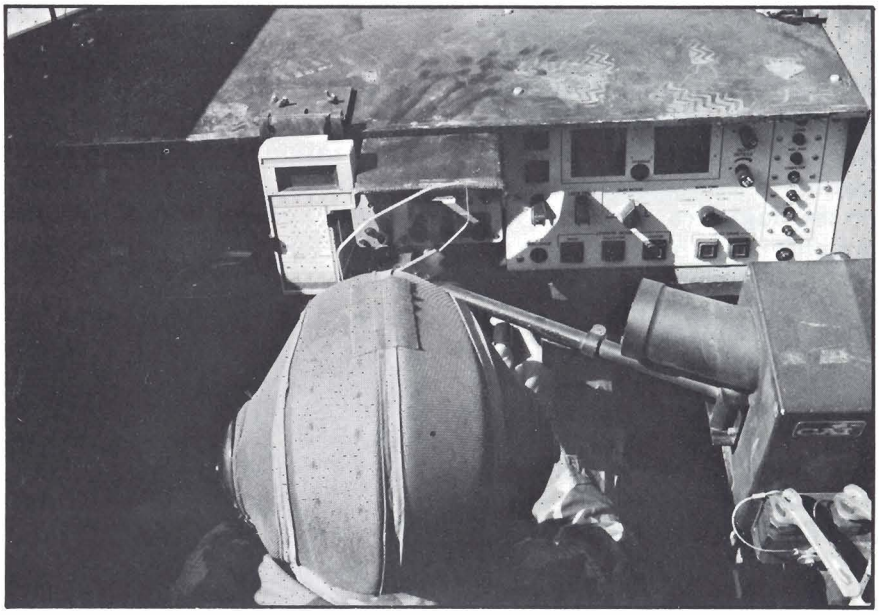
The laser range finder, mounted on the left-hand launch arm behind the FLIR, accurately determines target range. It operates at 10.6 microns, with no danger to the eye. Target range is displayed on a hand-held display terminal inside the turret and is processed by the Avenger control electronics for use in the automated fire permit and fire control algorithms.

Gunner's Station

Designed as a fire unit which stands alone, the Avenger system can be used on the HMMWV, dismounted for static emplacement and operated on other vehicle cargo beds, even commercial trucks.

The gunner is in the turret. He has a wide field of view through the protective canopy, supplementing the FLIR and providing backup in the event of sensor or display system malfunction. The direct view optical sight provides system engagement symbology common with the FLIR.

The BIT terminal is designed for use on the gunner's console



or can be removed and used on the RCU. Space to the left of the BIT terminal has been reserved for the FAAD C^2I interface equipment. The gunner communicates with the driver by intercom. VHF radio links him to the Air Defense command network.

Driver's Station

Avenger's driver station allows the driver full access to all functions necessary to operate the HMMWV. He also has complete intercommunications with the gunner in the turret. All voice (intercom and radio) and system tones (IFF and missile) are provided.

The driver has access to the RCU for redundant control of the turret if necessary. His ability to use the RCU in cooperation with the gunner provides an excellent embedded training capability. The gunner and driver are cross-trained for all HMMWV and Avenger crew functions. The RCU is designed to rotate 180 degrees. This allows a crewman in the passenger seat to operate the RCU.

Remote Control Unit

Target engagement from the RCU is identical to engagement from within the turret because the hand control switches and indicators are the same as the gunner's console. This minimizes logistics impact while simplifying gunner training and maintenance.

Components connecting the RCU to Avenger are the following:

- Control console with FLIR display
- Driver's combat vehicle crewman helmet.
- Cable connecting CVC helmet
- BIT terminal interface
- 50-meter cable
- Pointer-azimuth encoder

When installed in the HMMWV cab, the RCU can operate the turret from inside the HMMWV from either the driver or passenger position. The RCU can be deployed in less than three minutes and is operational up to 50 meters from the fire unit.

RCU-turret line-of-sight synchronization is accomplished by coaligning the RCU pointer-azimuth encoder with the FLIR display on a distant terrain feature.

Another capability of Avenger's remote control unit is automatic slew by the turret to a target designated by the RCU pointer. These automatic slew features eventually will be linked with the FAAD C^2I system.

Avenger .50-caliber Gun

An M3P .50-caliber machine gun complete with an ammunition box soft recoil mount, remote charger, flexible feed chute and case or link collector gives Avenger its extra firepower. The machine gun is an improved Browning AN-M3 lightweight machine gun. Its main characteristics include the following:

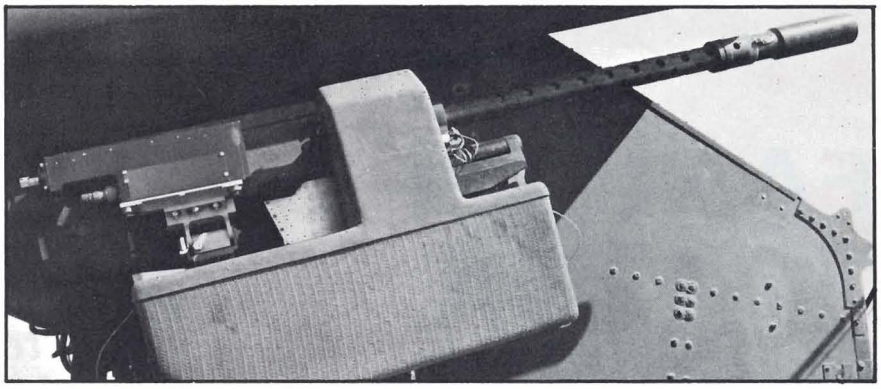
- 1,100 shots per minute
- 5,000 mean rounds between failure
- IR/muzzle blast reducing flash hider
- Five-mil dispersion

The M3P includes a solenoid-sensor for remote operations, the counting of rounds, and automated jam-clearing and cook-off protection.

The Avenger ammunition box is an easily and quickly removable container that can hold up to 300 rounds of ammunition, including a feed chute. The box can be reloaded or replaced in less than four minutes.

The soft-recoil mount reduces recoil by 95 percent, virtually eliminating the high shock and vibration typical of most vehicle-mounted .50-caliber guns. The soft mount ensures accurate placement of bursts whether Avenger is stationary or on the move by reducing stabilized platform pull-off error to less than two mils. The soft mount includes a boresight adjustable mount and a remote electric gun charger for "hands off" operations. All gun functions are automated and remotely controlled.

The Avenger machine gun, ammunition box, soft-recoil mount and remote charger all are combat proven items manufactured by Fabrique Nationale Herstal for installation in aircraft.



The flexible feed chute is a standard Army ordnance item. It guides ammunition from the stationary ammunition box to the machine gun at elevation angles of -10 to 70 degrees. The case or link collector captures all ejected cases and links from a full ammunition complement.

Live rounds collected when the gun is safed between engagements also are collected, a feature that prevents cases and links from entering the weapons platform mechanism and eliminates hazards associated with ejected live rounds. The collector tray can be removed, emptied and replaced in less than 15 seconds.

Avenger Flexibility

The Avenger fire unit is designed for stand-alone operations. The system can be put on the ground, airlifted to critical terrain by helicopter, used on tops of buildings and adapted to erectable platforms concealing air defense assets in forested areas. The stand-alone unit can be easily used on rail cars, barges and ships.

The key to Avenger's versatility is its adaptability to different types of vehicles. Avenger doesn't go out of action just because the vehicle goes out of action. Avenger can be quickly removed from a battle-damaged vehicle and used on available trucks or trailers. It can be removed when the vehicle needs depot overhaul.

Avenger is the pedestal-mounted Stinger, a nondevelopmental item selection.

FAAD C²I Test Bed Fallout

Transitions to automation pose a three-year challenge to FAAD initiative, ADEA partnership

by Maj. Richard A. Brown

One of the salient features of the forward area air defense (FAAD) system is its reliance on "off-the-shelf" technology. Air defense planners, however, aren't ordering FAAD hardware directly from the Sears, Roebuck and Co. catalog. Each FAAD item is subjected to intensive preliminary testing before it becomes a part of the full-scale FAAD development testing.

Carrying out this stringent preliminary testing, in a partnership with Air Defense Artillery, is the Army Development and Employment Agency (ADEA) at Fort Lewis, Wash. Of the initiatives spurred by their partnership, none is more significant than the test bed itself, a conceptual baptism of fire for FAAD Command, Control and Intelligence (C²I).

By examining ideas now, the test bed is providing the U.S. Army Air Defense Artillery School (USAADASCH) and the U.S. Army Missile Command (AMC) with training procedures for soldiers during full-scale development testing.

In the process, the test bed has become a valuable tool in the transition from manual command and control to a fully automated FAAD C²I and its integration into the Army command and control system.

The test bed is an outgrowth of a review in April 1984 of long-range planning by the undersecretary of the Army. Objectives of the test bed, as outlined in a memorandum of agreement, were to examine the following:

- Sensor concepts, sensor locations and their distribution
- Integration in the command and control system and its subordinate subsystem
- Positive hostile identification
- Interface from division ADA battalion to corps ADA brigade, including corps augmentation to division
- Automated interface with airborne warning and control systems (AWACS) and high-to-medium air defense (HIMAD)

First, some background on this crucible of air defense proficiency:

When the undersecretary of the Army decided to establish the test bed, short-range air defense command and control, then known as SHORAD C², had two major thrusts.

The first was a series of shelters, called Mod 1. They would be procured and demonstrated in two geographic areas and used to demonstrate a capability of transmitting data through joint tactical information systems (JTIDS) from a HIMAD source — that is Hawk, Patriot or E3-A — to a division air battle management operations center.

The second, Mod 2, was to be the full-scale development effort, building software to be installed on Army common computer hardware.

But the April 1984 decision revamping SHORAD C² cancelled the Mod 1 program. A SHORAD C² test bed, using equipment to be delivered under a Singer Electronics Division (formerly Singer Kearfott) contract, took its place.

By establishing the test bed at Fort Lewis, the high technology light (9th Infantry) division would have access to equipment capable of interfacing with AWACS and HIMAD. The NATO-type terrain at Fort Lewis and the Southwest Asia-type terrain at Yakima Firing Center, Wash., offered another reason for the site selection. Also, access to Hawk through 1st Battalion, 4th Air Defense Artillery, made Fort Lewis a good choice. The battalion is a sophisticated user of modern equipment.

Other considerations: the high technology

light division's computerized maneuver control system; the 1st Battalion, 67th Air Defense Artillery's experience with an enhanced manual SHORAD command and control system and distributed command and control systems; and the expected activation of an organic corps air defense artillery brigade (the 35th ADA Brigade was activated in December 1984).

The agreement called for tasks to be performed over a three-year period. The Directorate of Combat Developments, USAADASCH, would chair an executive committee governing activities. The school also would provide a lieutenant colonel to be chief of a special team created to handle day-to-day activities of the test bed.

Getting ready for the first test of automated FAAD C²I proved no easy task

Arrival of the team chief in January 1986 signaled the beginning of the FAAD C²I test bed effort.

Central to the task was the Singer equipment. Singer delivered to Fort Lewis three S250 shelters mounted on commercial utility cargo vehicles housing JTIDS Class 2 terminals, a host interface unit, display computer, graphics display and assorted government-furnished radios.

The first two shelters, from the original contract, were delivered in December 1985. The contractor demonstrated initial capabilities. But the equipment was used very little because the Hawk AN/TSQ-73 was supporting JTIDS testing at Eglin Air Force Base and because AWACS aircraft were not readily available in the Pacific Northwest.

Additional shelter and fire unit displays (FUDs), from a contract modification, were delivered in October 1986. The contract modification configured two shelters to accept two local sensors and distribute data to a FUD, a GRiD set compatible with the SHORAD data link specified in the original Singer contract. (Note: The SHORAD data link is a one-way transmission with about one third the capability of the FAAD C²I data link supporting the full-scale development program.)

ADEA procured an additional 13 fire unit displays. Full-scale development called for an enhanced position location reference system for communications within a division. In the test bed, encrypted one-way FM radio links were used.

Efforts to obtain three-dimensional sensors for the test bed were unsuccessful. ADEA then chose to have the two-dimensional radars used in an August 1984 lightweight early-warning radar test modified for use in the test bed.

Lear Siegler, through a supporting contract with Georgia Tech Research Institute, modified the radar for the SHORAD data link interface by adding a GRiD computer. A 1-kilowatt portable Honda generator provided power, working through a power converter. This different power source gave greater flexibility in using the radar. Although the vehicle still was required to power the radio used to transmit data to a shelter for processing and distribution, vehicle batteries no longer were needed.

Getting ready for the first test of automated FAAD C²I, within the limitations of this surrogate equipment, proved no easy task. A cross section of soldiers with 16 series MOSs filled in to support the test, a situation undoubtedly affecting any evaluation. Only after 18 months of coordination and review was the evaluation plan for the test ready to be put to use by monitors. Monitoring went from contractor training in November 1986 to unit training during December 1986 through March 1987 to test completion in June 1987.

During this eight-month period, the equipment was used to support two brigade-level field training exercises, "Recondo Flash" and "Desert Trooper."

Recondo Flash, in February and March 1987 at Yakima Firing Center, was the first opportunity to use the equipment in a tactical environment. It also was the first time for all pieces to be employed as a system.

The radars arrived two weeks prior to deployment. But the level of unit training within the FAAD C²I test bed, at that point, proved unsatisfactory. The shelters had not been reliable or operationally available. Fluctuation of the power source, a 10-kilowatt gasoline generator, created equipment failures. When these generators were replaced by 5-kilowatt diesel generators, reliability and availability increased significantly and the amount of time operators spent on the equipment in training increased. By the end of the training, the operators had become

proficient in march order, emplacement, initialization and inserting graphics. They still were not, however, trained to use the equipment tactically.

As for Desert Trooper II, the 9th Cavalry Brigade geared it for FAAD C²I support. The exercise extended beyond the boundaries of Yakima to Moses Lake, 50 miles northeast of the firing center. Staging of the brigade took place in a secured lodgement at the old Larson Air Force Base, now Moses Lake Municipal Airport.

With the exception of one shelter, the FAAD C²I system represented equipment belonging to the opposing forces. The aviation brigade was conducting a helicopter assault operation from Moses Lake to an unsecured lodgement, the Borden Springs drop zone adjacent to the Columbia River, on Yakima Firing Center occupied by opposing air defense forces.

Because of the nature of the exercise and the desire to obtain as much FAAD C²I information as possible, Stinger teams with FUDs were deployed on the unsecured landing zone and would remain there until insertion of the helicopters.

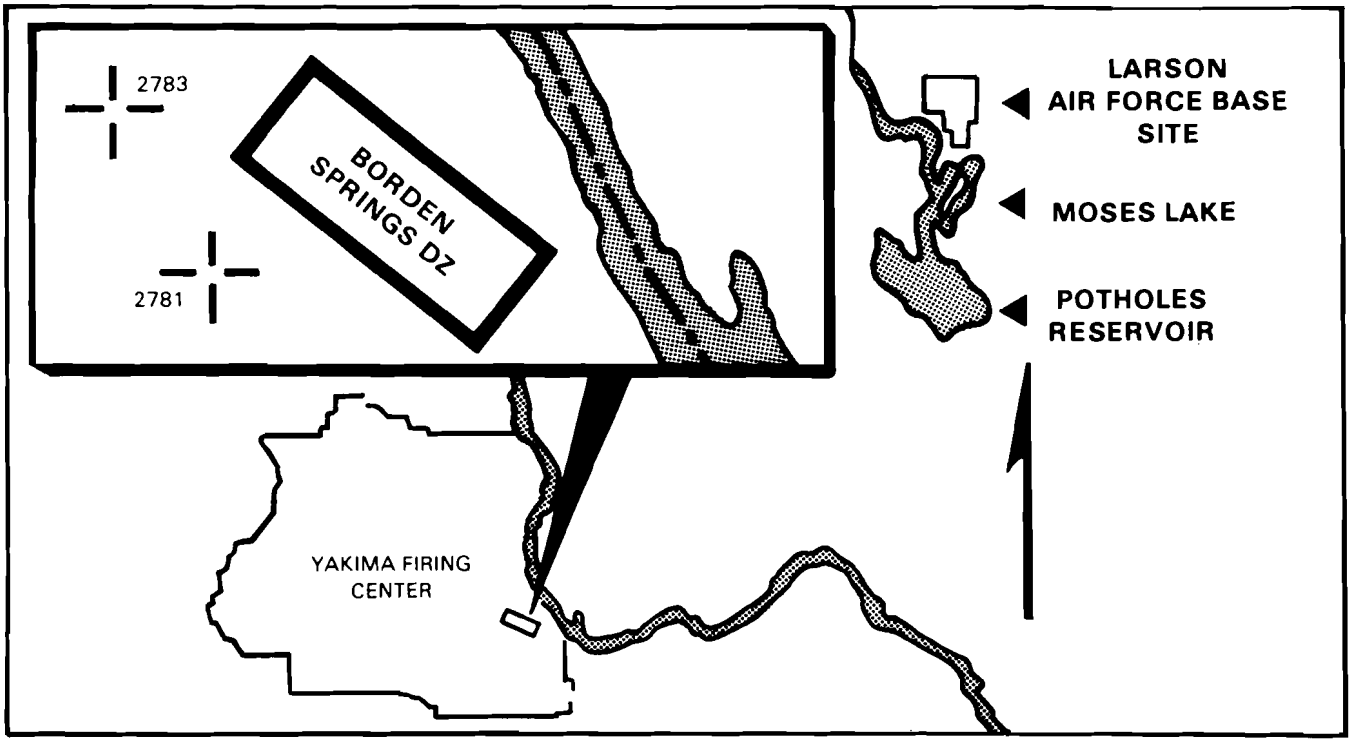
The Human Engineering Lab had instrumented the FUDs for data collection. The two-dimensional radars were employed along the most likely avenues of approach into the area about seven kilometers on either side of the landing zone.

The air battle management operation center shelter was placed some 20 kilometers west of the landing zone. The second shelter went in the C Battery area overlooking the landing zone. The third shelter was integrated into the tactical operations center at Moses Lake.

The JTIDS link from Yakima to Moses Lake came through a relay provided from JTIDS assets loaned to ADEA from a joint project office. Soldiers from 1st Battalion, 4th Air Defense Artillery, operated the relay. The scenario was slightly unrealistic. The cavalry brigade, air attack (CBAA) commander and his staff knew the location of the opposing forces' FAAD C²I equipment on Yakima Firing Center. But from his command post, the brigade commander could observe the air operation into the landing zone while looking at the graphics display.

Unfortunately, a software error existed in the radar. The targets were displayed outside the tactical area. Just the same, knowing the communications systems were functioning correctly, the brigade commander could appreciate the magnitude of what was being displayed.

After the end of the exercise, the software problem was resolved. But the radar had to be



collocated with the shelter to compensate for the problem for the duration of the exercise.

Farther west on the firing center, the CBAA conducted a second assault. Basically, it was the same type of operation completed two days earlier: insertion of a combined arms battalion into an area using CBAA helicopter assets. FAAD soldiers rapidly became aware of helicopter day and night attack procedures, including sight of the barrels of an AH-1 rotating (dryfire) as they flew over their positions. The equipment was deployed tactically, but the desire to get data required it to remain in position during attacks.

For FAAD C²I to be tested effectively, validated procedures are a must

Additional lessons from the exercise will be detailed in a combat development experimentation center board test report. Known problems based on experience to date continue to be lack of validated procedures for tactical application of FAAD C²I, lack of understanding of JTIDS net management and the great amount of training required to establish an acceptable level of tactical proficiency for FAAD C²I operators, including officers and non-commissioned officers.

Validated procedures for FAAD candidate evaluations are critical if the FAAD C²I system is to have an influence on procurement decisions. The Air-to-Air Combat II test is being developed by the Combined Arms Center, with the FAAD C²I test bed team chief participating in the development process.

Based on use of the test bed when the ATAC II test begins, the test bed should have validated procedures applicable to Stinger, Chaparral and Vulcan. The next phase of evaluations at Fort Lewis builds toward this major counterair test.

In September 1986, ADEA conducted an appraisal of the integration of command and control data into the display of Chaparral. Again the number one deficiency was lack of tactical procedures for Chaparral personnel. Another appraisal was scheduled for this past October. Tactical procedures were being developed by the USAADASCH liaison officer (the former Chaparral battery commander who commanded the unit during the first appraisal). Unlike the 1986 effort where no time was given the unit to train tactically, this year the unit had about five weeks to become proficient.

An upgraded forward area alerting radar, called the MOD-B-80 because of its compatibility with the SHORAD data link, provided the early warning to the shelters for distribution to the Chaparral.

The October procedure called for the Chaparral squad leader to be equipped with a FUD, with the senior gunner having information displayed on the forward looking infrared radar. This was to be the forerunner to a cue combined arms evaluation, in which a HMMWV tow squad and platoon headquarters participated to assess application of FAAD C²I to their counterair mission.

This same platoon will now be tested in July 1988.

Participation of the FAAD C²I test bed in development of the Army command and control architecture continues to be debated. An Army experimental site program being developed at Fort Lewis will try to integrate the various command and control nodes and exchange information. The proposed program is being reviewed by U.S. Army Training and Doctrine Command and AMC for implementation.

Since the FAAD C²I test bed is a surrogate system, with limited capabilities, its contribution to FAAD likewise always will be subject to debate. For FAAD C²I to be tested effectively, validated procedures are a must. The test bed is the only means of accomplishing this before FY 91. Another point: Even with its limited capabilities, the test bed can help the tactics and doctrine writers get an understanding of the complexities of command and control.

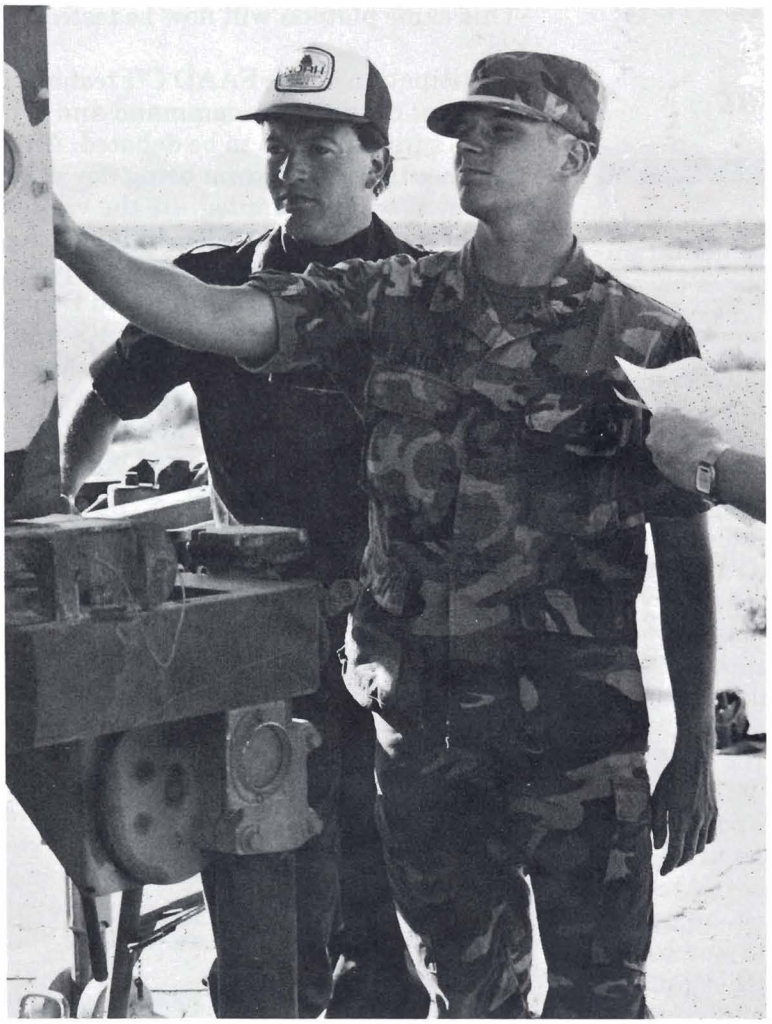
The test bed also has shown that division and brigade level Army airspace command and control is a by-product of FAAD C²I. An observer, seeing the graphic display in operation in a tactical operations center and watching the exchange of information, begins to understand FAAD C²I's capability. The liaison elements exchanging information in turn pass the information back to their appropriate schools and commands.

Access to quarterly maneuver brigade field training exercises at Fort Lewis gives the test bed continual exposure to FAAD soldiers and their comments on making air defense artillery better. Their interests are important contributions to the future of FAAD. □

Maj. Richard A. Brown is the Air Defense Artillery technology manager at ADEA, Fort Lewis, Wash.

FAAD Ground Sensor Candidate

3-D Radar Cuts Hawk Missile Reaction Time During Tests



Spec. James R. Eaton, C Battery, 3/1st ADA (formerly 1/65th ADA), makes final checks on radar equipment with Capt. Krum of Norway before a live firing at McGregor Range. (Photo by 2nd Lt. Elizabeth Linker)

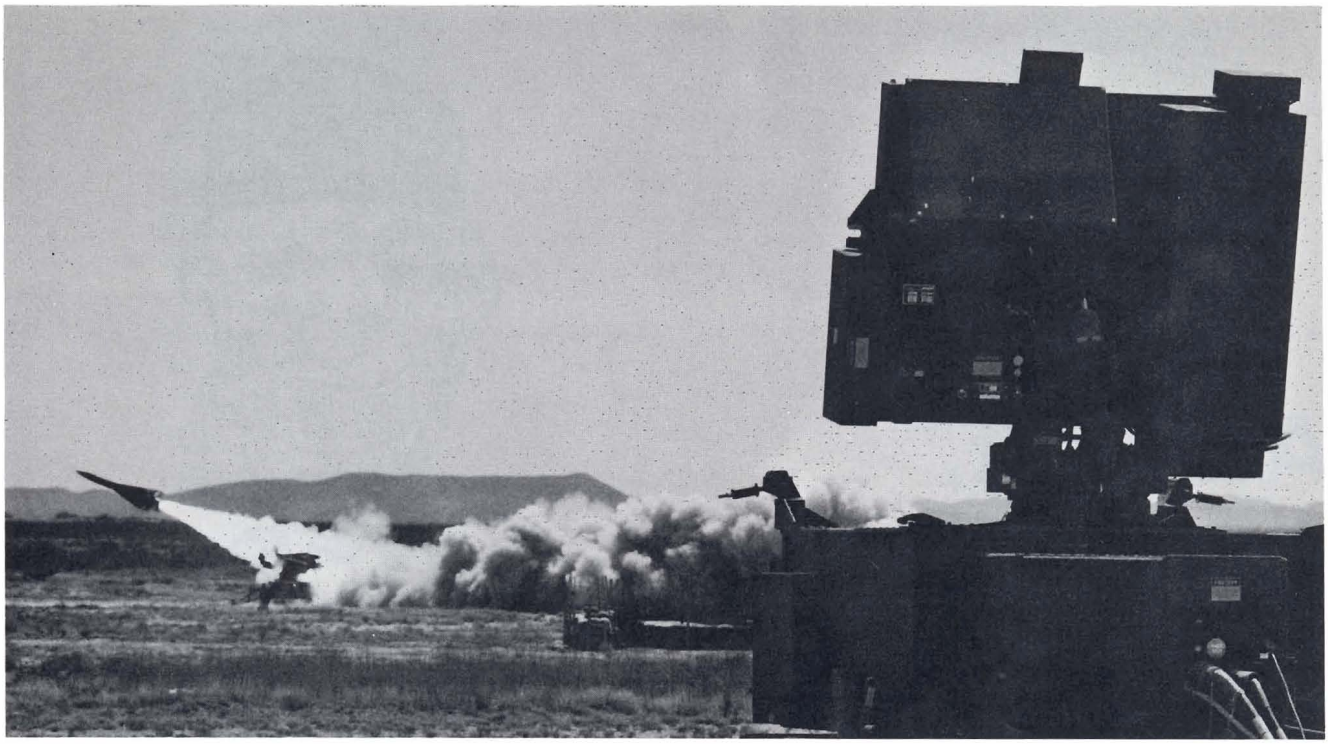
Two Hawk surface-to-air missiles, using data provided for the first time by a three-dimensional battlefield air defense radar, intercepted airborne targets during recent tests at McGregor Range near Fort Bliss, Texas.

The data provided by the new radar permitted precise target designation and enabled a corresponding illuminator radar to lock on the targets in about one-third less time than is normally required by the existing Hawk acquisition radar.

The missile launches were part of an exercise involving Norwegian air force crews in the live-firing evaluation of a new Hawk missile battery concept originated by Norway.

The AN/TPQ-36A 3-D radar was built by the Ground Systems Group of Hughes Aircraft Company. Hughes has built a nearly identical model of the AN/TPQ-36A radar for use in a competitive field evaluation later this year by the U.S. Army at White Sands Missile Range, N.M. The winner of the competition will become the ground-based sensor in the Army's forward area air defense command, control and intelligence program. In each of the two launches during the Norwegian test, the AN/TPQ-36A detected the targets and passed the information to the Hawk illuminators, which guided the missiles to intercepts.

"The firing practice validated



A Hawk missile takes off during the first live firing using targeting data supplied by a 3-D radar at McGregor Range near Fort Bliss, Texas. The 3-D radar will compete in a field evaluation later this year for a ground-based sensor role in the forward area air defense command, control and intelligence program. (Photo courtesy Hughes Aircraft Company)

the Norwegian concept of modifying the Hawk batteries," said Lt. Col. S.I. Hansen, the Norwegian air force project manager.

Hughes is building 18 of the new generation radars for Norway's Adapted Hawk program which will provide point defense for that nation's air force bases. Six additional radars will be supplied for improved target designation for other Norwegian short-range air defense systems.

Charlie Battery, 1st Battalion, 65th Air Defense Artillery (since redesignated 3rd Battalion, 1st Air Defense Artillery) provided the Hawk missiles for the evaluation at Fort Bliss. The Hawk missiles were fired against simulated fixed-wing aircraft targets, pulled behind AN/MQM-107C drones.

In the Norwegian program, the AN/TPQ-36A radar and an accompanying fire distribution center, built by Norway's Kingsberg Vaapenfabrikk, not only reduce reaction time but also minimize crew requirements, improve overall reliability and reduce total lifetime costs for the Hawk system, according to Hughes.

The new radar system replaces up to five pieces of equipment (command and control centers and radars) necessary for the Hawk missile system to operate in existing configurations. Hawk illuminators and launchers are retained for use with the AN/TPQ-36A in Norway's Adapted Hawk system.

Reaction time from target detection to missile firing is reduced because the AN/TPQ-36A sends targeting data in three dimensions, pointing the target tracking and illuminating radar directly at the target. Currently, the illuminator must search a large volume in elevation before it can lock on the target for firing.

The modern technology of the AN/TPQ-36A with its narrow pencil beam also provides major operational improvements under jamming conditions.

During the six-day test at McGregor Range, C Battery, 3/1st ADA, also conducted operational readiness evaluations. Since the Norwegians did not bring enlisted soldiers with them, C Battery soldiers performed all missile handling and target tracking functions. When a system check did not give expected results, the Norwegians would ask it to be run several times to ensure the results were accurate.

According to Hansen, "These soldiers are eager. It's a pleasure to work with them. They do not grumble when I ask them to do something. Instead, they jump to help and ask what else needs to be done." □

All test, no talk

Young ADA soldiers split up evenly to match LOS-F (heavy) contenders in a desert contractual shoot-out

Illustration by Dennis Kurtz

by Ed Foster

The hardest thing of all, when you're a young soldier out in the field with a hot new weapon in competitive testing, may be to bite your tongue.

Because it's natural to want to tell your buddies how it's going. And they're your buddies too, those guys with the "other" hot new weapons. They've got their components to test and you've got yours. It sure would be exciting, at the end of a day of simulated battle, to get together and compare notes.

But you can't. It's the rule. And no matter the firepower you've had in your hand, no matter the technological wizardry you've unleashed that day, when you meet up with your old buddy, you just have to say, "Hi, old buddy. How'ze it going? Yeah, I know, same old-same old. . . ." And then you just talk about something else.

This rigorous and demanding slice of life in the Air Defense Artillery began in March for 35 soldiers at Fort Bliss, Texas, when they were plucked fresh from completion of their basic and advanced individual training to train as a special platoon of gunners, drivers, handlers and trackers on not-yet-fielded weapon systems.

The systems: competing prototypes for that most lucrative of forward area air defense (FAAD) contracts, the line-of-sight forward (heavy) component (LOS-F-H).

"Yeah, it's hard not to talk about it, because everybody thinks his system is the best," said a grinning Pvt. 2 David M. Swillinger during a group interview. Swillinger's prototype was the "Liberty," a proud entry in the contractual sweepstakes from Dallas-based LTV, teamed with France's Thompson-CSF.

It was a Sunday afternoon. First Lieutenant James W. Atkinson, leader of the special platoon, had assembled his men at the C Battery, 2nd Battalion, 6th Air Defense Artillery, barracks at Fort

Bliss. All appeared relaxed. They'd had the weekend off. Vans were driving up outside to take them north into New Mexico for another week of weapon testing at isolated Oscura Range.

"We're all good friends," said Swillinger, of Columbus, Ohio. "But we're divided into four sections, each with one of the weapon systems. And we're not allowed to compare with each other what we're doing. We just can't talk about it. So we don't, not even if we're best buddies."

Other platoon members nodded.

Swillinger found himself training as a Liberty crewman by virtue of his assignment to the platoon's C Section. The rest of the breakdown, with sections and names of the weapon prototypes, went like this:

Section A got "Paladin," entered by Western Alliance Air Defense, a joint venture by Messerschmitt-Boelkow-Blohm of West Germany, SNI Aerospatiale of France and Hughes Aircraft.

Section B drew "Rapier," the product of United Aerospace Defense, a consortium of British Aerospace and United Technologies, and FMC.

Section D took to the field with the air defense/anti-tank system known as ADATS, the entry by Martin Marietta and Oerlikon. ADATS already had been selected by Canada as its low-level air defense system.

One of these four weapon systems, based on their performances while manned by these young soldiers on the testing range, would be the Army's choice for its LOS-F-H. In appearance, LOS-F-H is the most dominating of the FAAD quintet of components designed for the forward edge of the Air-Land Battlefield.

Competing line-of-sight rear (LOS-R) components already had been tested at Oscura Range, put through the demands of simulated battle by a special platoon of young soldiers similar to Atkinson's platoon.

"These young men are testing the capability of the forward system for acquisition and tracking," said Atkinson of his platoon. "They're finding how far out their prototypes take them, how they perform behind terrain, behind trees, amid ground clutter, in the face of electronic countermeasures such as jamming and so on."

The Army considers no one FAAD component more important than another. But it was LOS-F-H that had caught the most media attention. The spotlight, quite naturally, had come to fall upon this assemblage of soldiers pushing the LOS-F-H prototypes to their utmost.

Their Army specialty was Vulcan gunner. They'd been drawn, as had the LOS-R platoon, mostly from the ranks just out of basic and advanced individual training, in keeping with the dictum of Maj. Gen. Donald R. Infante, chief of Air Defense Artillery. He stressed that the Army also should determine whether typical ADA soldiers could be trained to operate the candidate systems.

"We're not allowed to compare . . . not even if we're best buddies."

Of the four sections into which the LOS-F-H platoon was divided, two went abroad for part of their familiarization with their respective systems. Section C went to Paris for two weeks in June and Section B went for a month to Larkhill, England, home of the Royal School of Artillery. British air defenders, who already were using the towed version of Rapier, instructed the men of Section B.

"Oh, definitely," said PFC Gilbert Villanueva of D Section, when asked on the Sunday of the interview if he would like to have had some duty abroad while learning to man ADATS. "I wouldn't have minded Paris. And England would have been good."

But he shrugged off his having to stay at Fort Bliss, as did Pvt. 2 Nelson Soo, 19, also of D Section. "What determined the sections they put us in," said Soo, of Alameda, Calif., "was keeping them balanced. They had to distribute us evenly so one prototype wouldn't have an advantage over another in the makeup of the crews."

D Section crewmen underwent familiarization with the ADATS system at the Orogrande Range Camp, a 50-mile drive north every day from their barracks at Fort Bliss.

A Section also stayed home, training initially for Paladin on the Army-owned Roland I Institutional Trainer, a huge on-post "video game" for tracking skills.

All sections came back together, then, for the final stages of the competition, bedding down nights at Holloman Air Force Base, about a forty-five-minute drive from their desert test site at Oscura Range.

How does a soldier in the early stages of his first enlistment feel about landing in the forefront of the testing process for advanced air defense weaponry?

"A fun time," said Michael R. Cotter, 19, of Auburn, Calif. He's in A Section, "happy to be in it." Since joining the Army, he's completed his GED for a high school diploma. Upon completion of basic and advanced individual training, just before selection to the special platoon, he married Dawn, his sweetheart back home. She was on hand that Sunday of the interview to see him off for another week at the Oscura Range desert test site.

"I'm enjoying it," said PFC Bruce R. Lane, 21, of South Padre Island, Texas, also in A Section.

Lane hasn't been too busy to get some college under his belt, completing courses at Park College on the post.

"Glad I got chosen," said B Section's Pvt. 2 Gary J. Rankins, 19, of Los Angeles. As a matter of fact, he said, he's content enough that he's thinking of making the Army his career.

PFC Lenny P. Rudolph, 20, of Hawthorne, Wis., likes the hours. "I like getting up at 5 o'clock, leaving at 6 o'clock and being on the range by 7:30. I'm seriously thinking of this as a career," he said. His was B Section.

Asked if the testing also was a test of their own physical stamina, C Section's PFC Timothy Jordan, 19, of Chicago, said in some ways it was. "Wearing chemical protective clothing during missile reloading in the dark," he said, "that takes some doing."

Jordan said he goes through "stages" in which he thinks of making the Army his career.

Swillinger said another reason he's glad to have been selected for the special platoon is that "it's a good learning experience and will be a benefit on my record."

Atkinson credited the NCOs assigned to the platoon for much of the discipline and cohesiveness shown by the soldiers in carrying out their mission. "While the men chosen from the ranks were relatively inexperienced," he said, "the NCOs chosen to supervise them were quite experienced, averaging more than seven years in the Army."

He named SFC James R. Farris of Tullahoma, Tenn., as platoon sergeant and SSgt. Clayton Flaherty, SSgt. Donald Carmichael, SSgt. Larry Pinkston and SSgt. Tony Orozco as section sergeants. Eight sergeants under them are squad leaders.

In some cases, Atkinson said, remaining with the platoon for the duration of the tests had been a personal sacrifice for the NCOs: they had to forgo leadership schools for which they were eligible and which would have furthered their careers.

Atkinson also credited efforts of the Chaparral Training Section, 1st Instructor Battalion, in the platoon's transition from its Vulcan gun orientation to missile systems.

Tests of the four competing systems were to be completed before the end of October, after which the winner would undergo further testing and evaluation. Atkinson said he would like to see his platoon remain intact and apply its special knowledge and missilery expertise to the continued testing and evaluation of the winner. □

Liberty

Paladin

ADATS

Rapier

The Threat

Tactical Ballistic Missiles

Soviet TBMs offer a new level of surprise for quick success in rupturing NATO's forward defensive positions

by Maj. Peter E. Goodyear

The readiness exercise started like all the rest — an alert notification from the charge of quarters in the middle of the night. By dawn we had moved into our local dispersal area to await the word to return to the *kaserne,* as before.

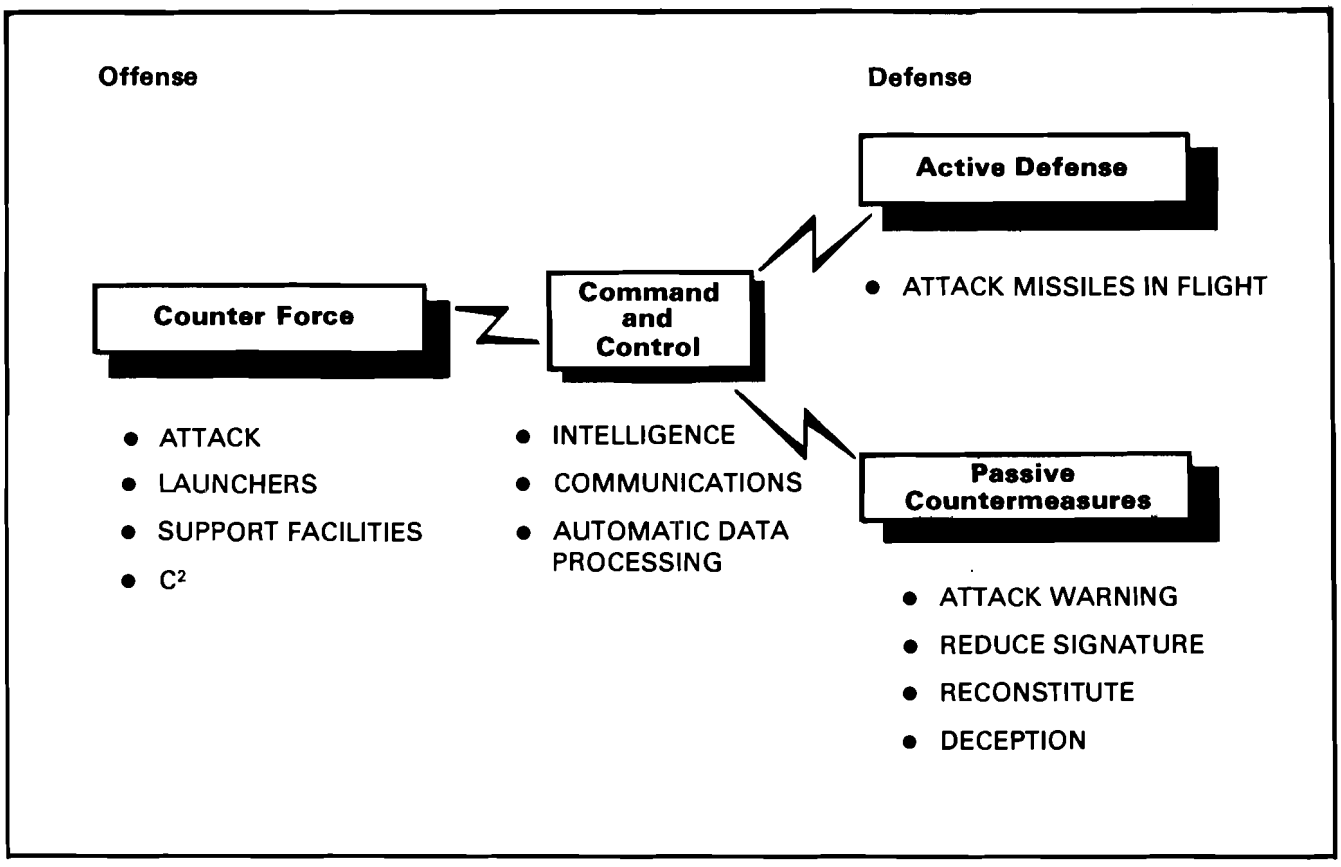
Around noon the battery commander arrived from the battalion tactical operations center carrying his battle book. Later in the day the first sergeant called all the leaders in the Patriot battery together. We would move that night. "Where to?" was the question that day.

After tearing down the camouflage nets just before dusk, we left the dispersal area. The battery executive officer passed strip maps to all the vehicle commanders. Our destination was the high terrain between Schotten and Lauterbach. From that location, the entire Fulda area would be visible on our scopes.

Breakfast was about to be served when the word filtered around to pick up small arms ammunition. On the way to the ammunition trucks, one of our lieutenants walked by talking about picking up Stinger rounds for close-in site defense. No longer was this exercise like all the others.

While we waited for breakfast, the rumor mill went into overtime with everyone's ideas about

Tactical Missile Defense Operational Concept Elements



the who, what, when and why of this field exercise. Some speculated that there was a breakdown in U.S.-Soviet negotiations to reduce the level of intermediate range nuclear weapons. The Soviets offered their best deal and the Allies wanted to "take it under advisement." Frustrated, the Soviets walked out, and the next thing we knew the battery was in the Fulda Gap area.

At dawn, as the sun was breaking the horizon, creating a postcard view of the valley below, the world around our position erupted. Without warning, many small explosions occurred throughout the battery trains. As soldiers found cover under vehicles, the radar disintegrated in a shower of flame and debris.

Fifty meters away, another huge explosion occurred but did no damage, a miss. One of the system techs came running toward the engagement control station screaming, "Why don't you fire? Why don't you shoot back?" A glance at the sky said it all. Nothing was flying. Aircraft had not delivered the ordnance.

As quickly as it began, the attack was over. The battery trains were in shambles from those first explosions. Tactically, we were totally nonoperational. All attempts to reach the battalion via data link or voice commo failed. About the time the severity of the attack began to sink in, a flight of four Soviet Flankers passed overhead. They were weighed down with heavy ordnance heading west. We could only watch. . . .

The attack described here was carried out by tactical ballistic missiles, often referred to as TBMs. Although the scenario is imaginary, it could happen. TBMs pose a dynamic variable in threat options and tactical capabilities. This monograph will briefly examine the total TBM environment illustrating the technical sophistication and scope of work necessary to nullify or reduce this threat. In building block fashion we will look at the Soviet progress with TBMs.

The Soviet Union deployed its first tactical ballistic missiles in the 1960s. Since then, the world has witnessed a methodology producing continuous improvements in fire control, rocket engineering and warhead lethality.

Early systems were true ballistic missiles, lacking onboard inertial or command guidance systems. NATO referred to them as free rockets over ground or FROG. Allied forces observed the Soviets and the Warsaw Pact deploying seven variants of the FROG system. The first inertial guidance system was introduced onboard the SS-1 (Scud) in 1965. As technology evolved, guidance systems, targeting accuracies and warheads likewise improved.

Today we see a new series of TBMs deployed and operational with Soviet units. These new short-range ballistic missiles are the SS-21 (Scarab), SS-12 mod 2 (Scaleboard) and SS-23 (Spider). They are deployed across the spectrum of Soviet ground combat units.

Nuclear capabilities are more threatening

The SS-21 is deployed with tank or motorized rifle divisions. The SS-23 and the SS-12 mod 2 are found at the front and theater, respectively. This provides the Soviet field commander a formidable family of weapons to achieve surprise and give him the initiative during combat operations.

The capabilities of the new and emerging TBMs provide important new attack options in conventional, chemical and nuclear operations. Conventional warheads offer planners an accurate, fast-arriving and high-leverage capability to neutralize a wide variety of key NATO military assets.

Conventional TBMs introduce a very important synergism with other conventional forces increasing their capabilities to rapidly overcome NATO's conventional defensive forces. TBMs armed with chemical warheads are more effective against a wide range of assets, further increasing Soviet capabilities to overwhelm NATO's conventional forces and threaten the survivability of NATO's theater nuclear forces.

Nuclear capabilities are more threatening. Greater accuracy allows these missiles to achieve a higher assurance of target destruction with smaller warheads. This limits unwanted collateral damage to NATO's population and industrial assets. Moreover, these new missiles are more reliable and have longer ranges than the FROG and Scud systems they are replacing. Finally, the agility of the missiles' transporter-erector launcher makes them highly survivable in any phase of combat.

The conventional TBM threat to the U.S.-NATO forces in Central Europe must be viewed in the overall context of the entire Soviet-Warsaw Pact threat. Soviet doctrine currently encompasses a wide range of options in its dealings with the NATO alliance. It reflects uncertainty about Soviet ability to limit or control escalation in the event of the use of nuclear weapons.

The Soviet military objectives regarding NATO can be summarized as follows:

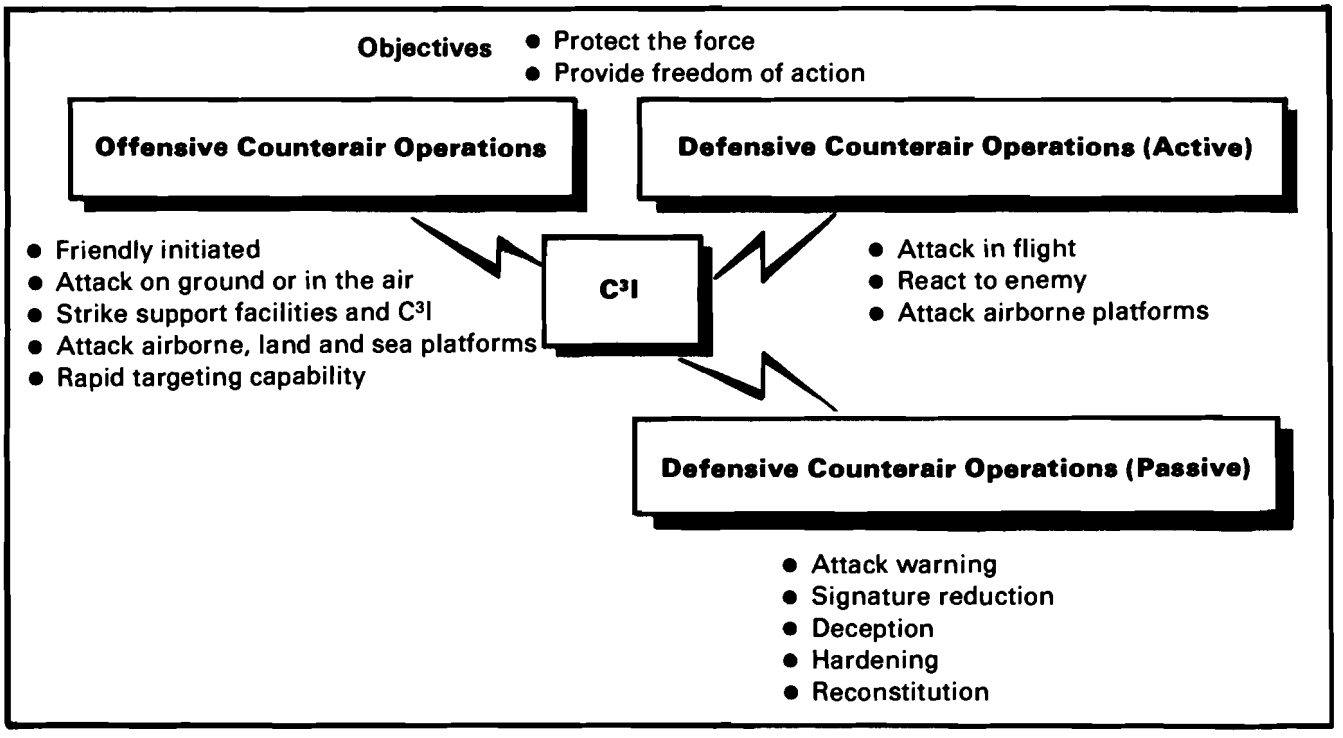
- Eliminate the West's strategic options by improving Soviet weapon systems
- Neutralize NATO's theater nuclear capabilities
- Destroy NATO forces as rapidly as possible before they can be reinforced, and prevent use of NATO theater nuclear options
- Occupy NATO territory in the Central Front

Soviet forces in general are being extensively reorganized and restructured to meet the requirements of that strategy against NATO. Among the most important qualitative changes is the increasing capability to conduct mobile, high-speed combat operations. Soviet forces possess firepower support systems of increased range and volume of fire; enlarged and more sophisticated helicopter forces; improved logistical support for offensive operations; and an increased capability to threaten NATO rear areas. This includes new tactical aircraft of greater range and payload, tactical missiles and a reorganized Warsaw Pact frontal aviation to improve shock capability in independent air operations.

The following scenario illustrates tactical missile defense operations, including counterair actions and offensive air support coordinated, integrated and controlled by an extensive command and control (C^2) system. Successful operations depend on extensive preparation and planning with systems that provide rapid target acquisition, data fusion and communications before and during hostilities.

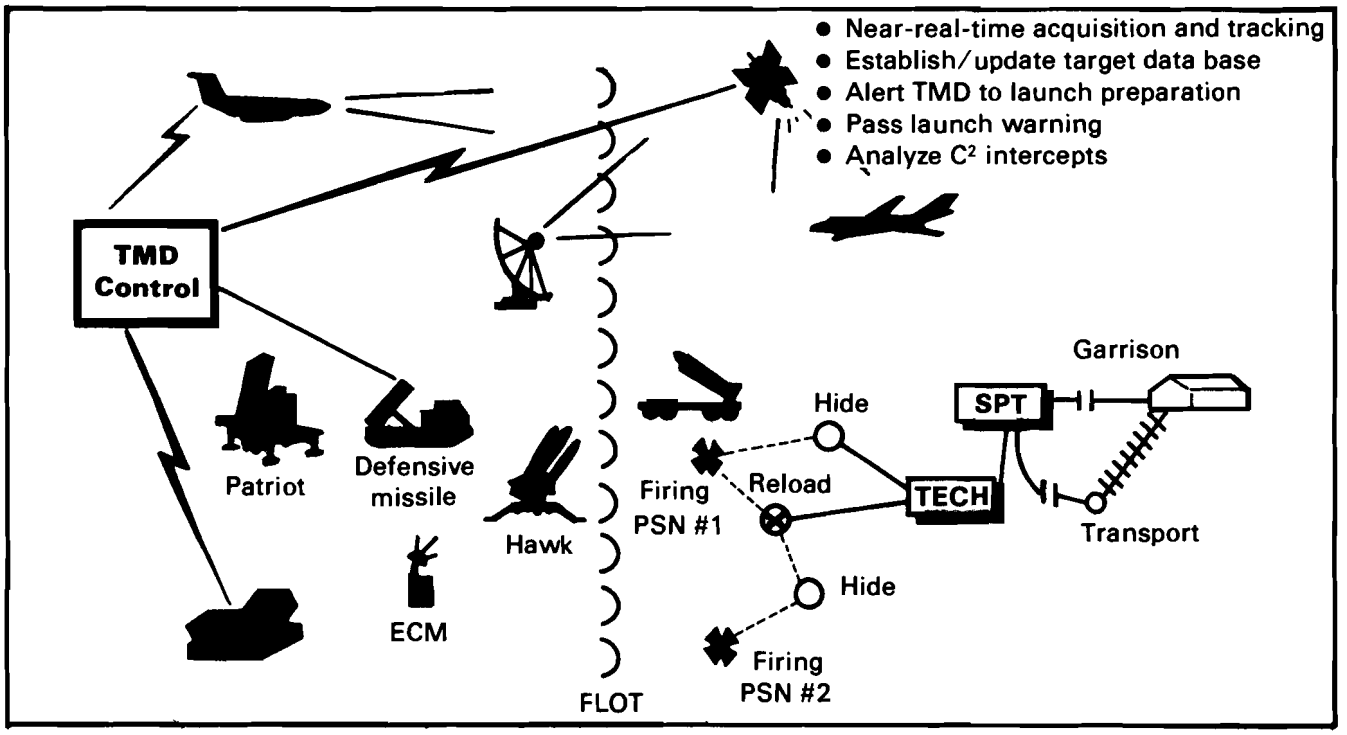
During the transition from peacetime to hostilities, extensive planning is essential to provide critical targeting data. The preparation and

Tactical Missile Defense Concept Elements — Army Counterair Operations

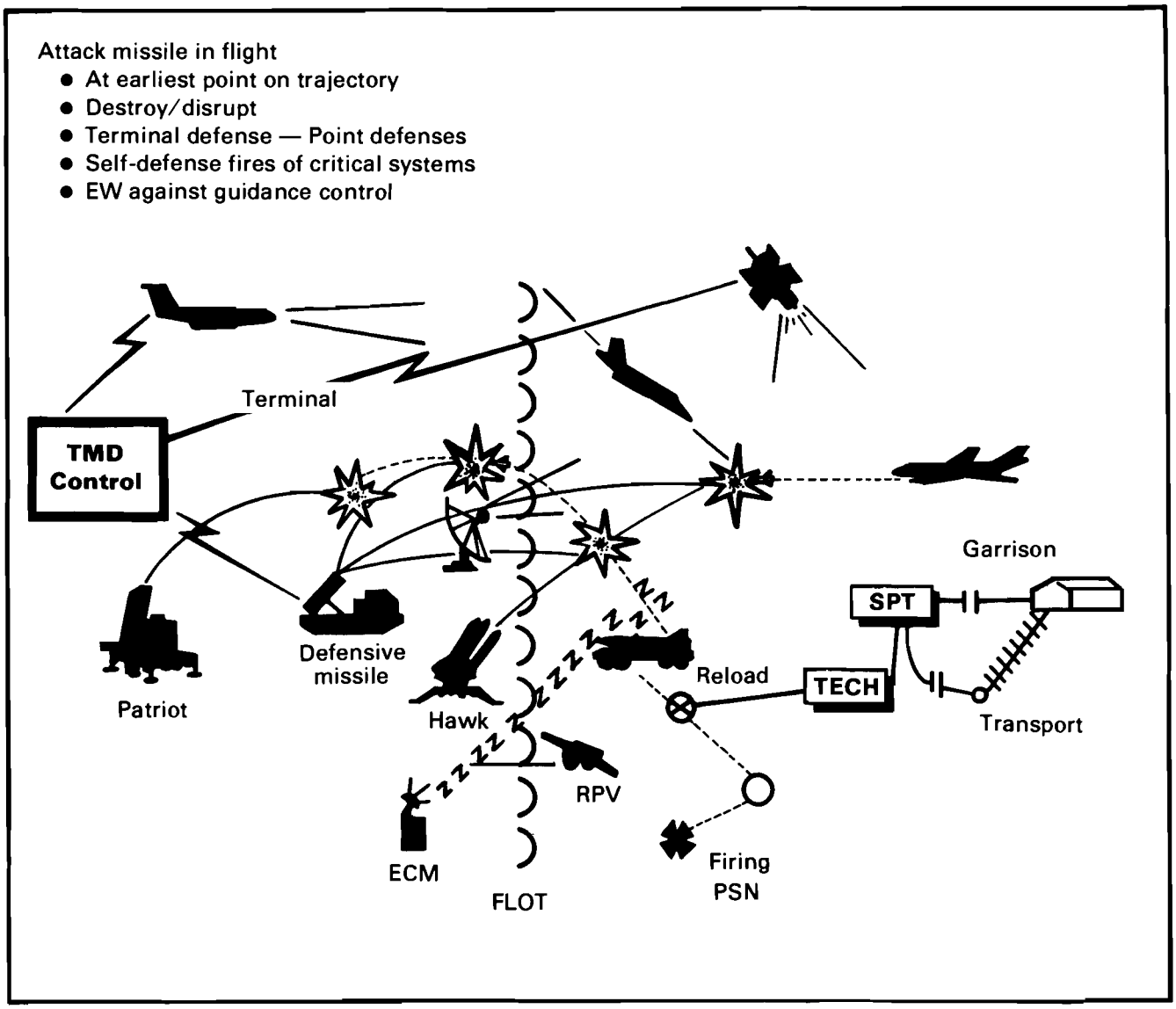


planning process within the C² framework focuses sensor, surveillance and intelligence systems to track deploying enemy tactical missile systems and their supporting operations. During peacetime and immediately prior to war, intelligence preparation must be able to give data on enemy launch, load, hide, technical and support sites.

Tactical Missile Defense Operational Concept — Peace Transition



Tactical Missile Defense Operational Concept — Extended Air Defense



Intelligence templating procedures identify enemy capability and establish target data. The planning phase guides the development of two coordinated yet separate operational plans. These plans include protection of critical NATO assets using active and passive defense measures and planned attack operations. The C^2 intelligence process must also be able to detect prelaunch signatures that indicate enemy missile launch preparations.

Confirmed prelaunch signatures provide the alert for increased readiness of planned attack operations and passive countermeasures. An observed and identified enemy missile launch keys the C^2 process to make defensive and attack responses. In-flight enemy missile trajectory data passes to interceptors, point-defense and self-defense systems using a joint battle management system. Depending on the capabilities of the sensor and surveillance systems, cuing of additional systems may be necessary to provide refined launch site data to ensure counterfire targeting.

At the earliest possible point in the trajectory, surface-to-air missiles intercept the TBMs. Simultaneously, electronic warfare assets disrupt or destroy missile guidance systems, C^2 and support communications, and airborne guidance and surveillance systems.

Concurrently with the defensive actions, NATO will attack confirmed missile launch po-

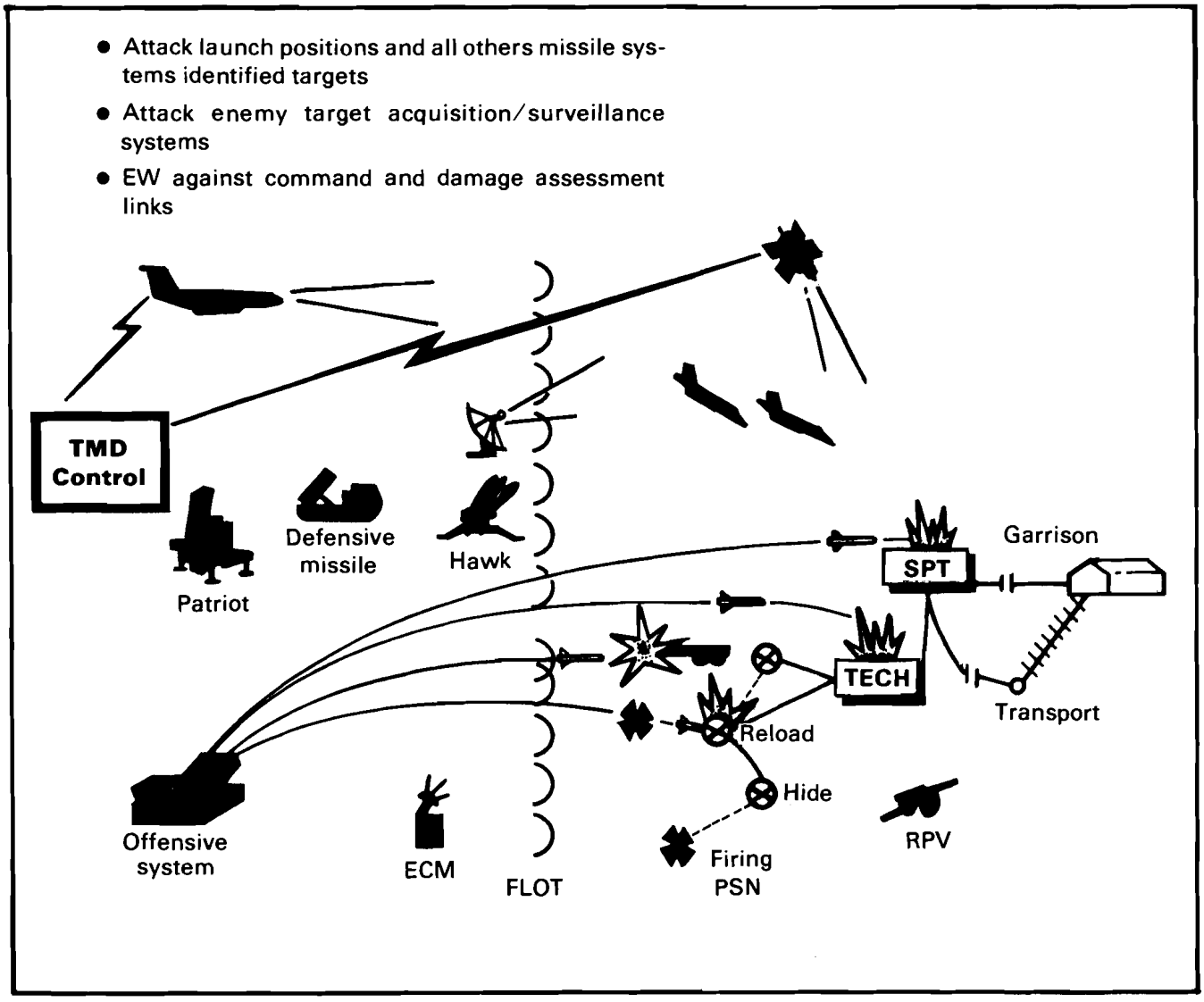
sitions, command nodes, missile transfer points, transportation units and missile technical supporting bases. Ground or air-launched attack systems destroy, disrupt or neutralize enemy target acquisition and surveillance systems. These actions attempt to confuse missile firing units and support activities and fix them in place so a continual targeting and attack process can be conducted.

Aggressive target acquisition is conducted in such a way that enemy missiles and support organizations are systematically targeted, pursued and destroyed.

This descriptive scenario illustrates tactical missile defense actions required against tactical missile, cruise missile and air-to-surface missiles, including their launch platforms and supporting facilities. Defensive reactions and attack of enemy missile systems increase the survivability of combat forces and minimize the impact on friendly combat capabilities.

Attack actions, defensive actions and passive countermeasures define a relationship which must be exploited to achieve protection against tactical missiles. None of the measures alone can provide complete protection, no matter how well implemented. By emphasizing all three measures, friendly forces can create uncertainty in the mind of the threat contemplating the use of missiles in a conventional role. Such uncertainty may be sufficient to deter it from attempting it.

Tactical Missile Defense Operational Concept — Attack Measures



Tactical Missile Defense

The Response

NATO is vulnerable to the lethal firepower of Soviet TBMs until it deploys a TMD system — ADA is driving forward to offer solutions in the TMD arena

by Maj. Peter E. Goodyear

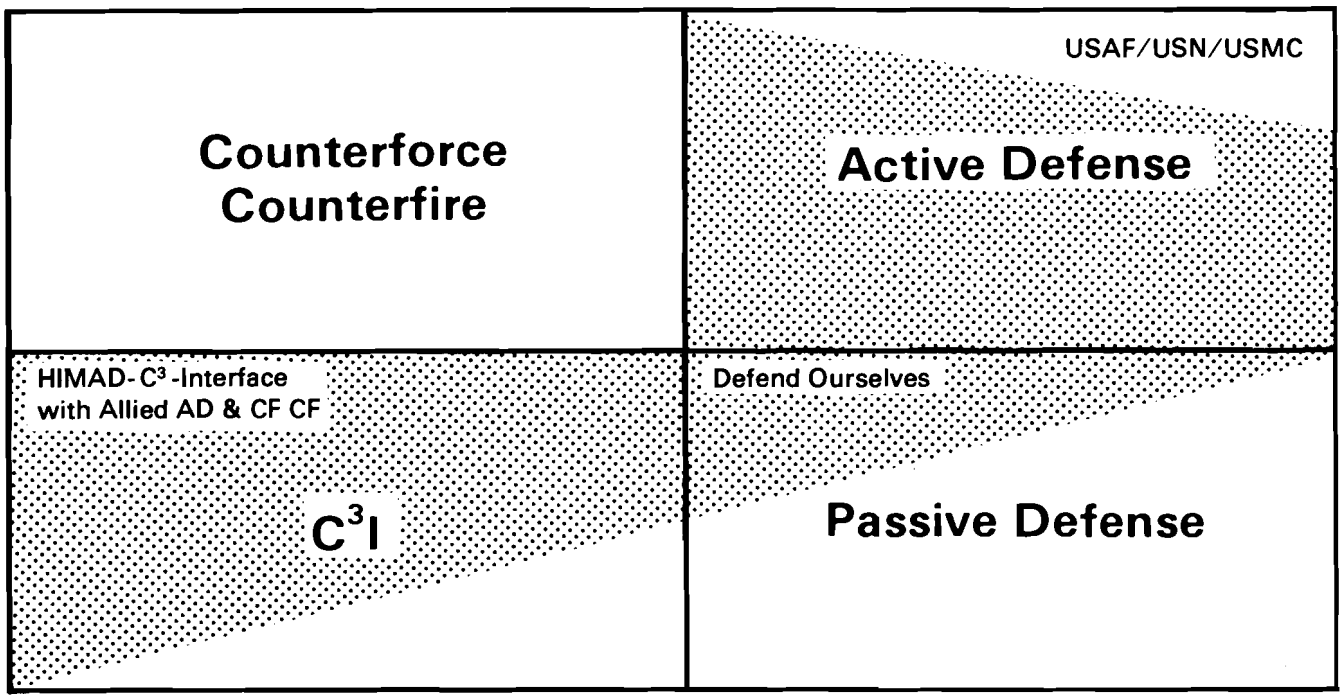
The tactical missile threat offers a new level of surprise and quick success on the battlefield. Missiles will act as the heralds of any large-scale offensive. Soviet doctrine stresses offensive action with their forces in echelon with the immediate tactical objective of rupturing NATO's forward defensive positions. Achieving that objective allows the enemy to race for strategic objectives deeper in the theater.

In light of the deficiencies that exist in tactical missile defense (TMD), General John A. Wickham Jr., former Army chief of staff, formed a special task force to examine TMD issues and accomplish the following specific objectives:

- Evaluate tactical missile defense programs
- Explore concepts and analyze and develop alternative systems solutions
- Recommend a plan to field an active defense capability in the near term

The tactical ballistic missile (TBM) threat illustrates the key role Air Defense Artillery plays in the tactical missile defense arena. Keep in mind the four distinct areas of TMD operations: counterforce/counterfire; command, control, communications and intelligence (C^3I); passive defense; and active defense.

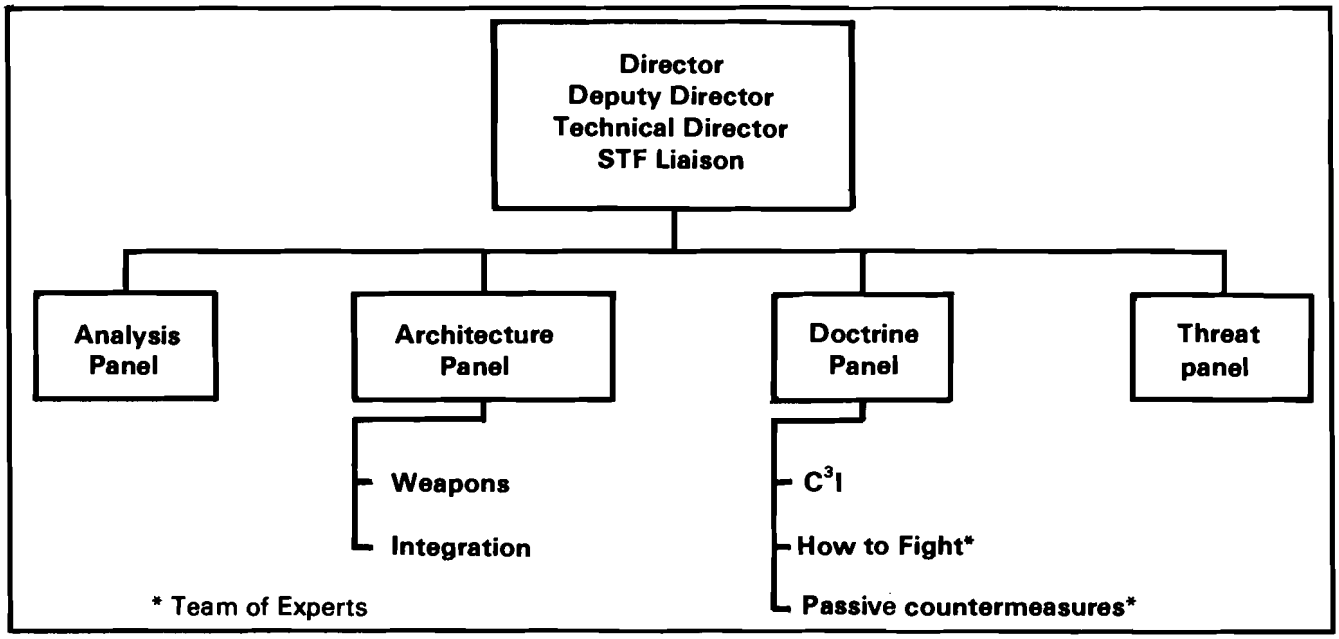
Active Tactical Missile Defense — ADA's Share of TMD



Active tactical missile defense (ATMD) is singularly the most critical for Air Defense Artillery. However, Air Defense Artillery is also an integral part of C^3I and passive defense. Acknowledging the importance of ATMD, Maj. Gen. Donald R. Infante, chief of Air Defense Artillery, established a special working group (SWG) to address ADA's role in TMD. The SWG, organized as shown below, is charged with supporting the TMD special task force, defining ATMD requirements and, perhaps most importantly, laying the groundwork for continued participation of the U.S. Army Air Defense Artillery School in the TMD equation.

In response to requirements of the special task force, the SWG is focusing on performance re-

Active Tactical Missile Defense — Special Working Group Organization



quirements, mix and quantity of dedicated and/or air defense multirole active tactical missile defensive systems needed in the mid-1990s. These systems must include integrated C^3I, passive countermeasures, doctrine and objective system parameters.

Soon after the SWG was formed, the threat panel developed a baseline threat scenario. This provided Soviet TBM capabilities, tactics, doctrine and targeting procedures, and portrayed possible Soviet fire plans for specific Central European targets and avenues of attack. The fire plans reflect that highly accurate conventional TBMs will give the Soviets the necessary firepower to defeat air defenses and successfully conduct massive air attacks against NATO.

Current intelligence estimates predict the use of SS-21 assets initially to suppress Patriot defense within range in the forward areas. SS-23s will attack Patriot units in the forward area that are out of range of the SS-21s. They will also attack Patriot units defending high value targets in the rear and defensive counterair airbases. This limits the number of defensive counterair fighters that could intercept attacking aircraft. SS-12 mod 2 assets, conventionally armed, supplement the SS-23s or attack similar targets at greater ranges. With Patriot and fighter defenses crippled, air attacks on the heels of such a TBM strike could deliver a devastating initial blow to NATO.

Once Soviet and Warsaw Pact capabilities and intentions were stipulated, the architecture panel began an assessment of technologies that could counter the TBM threat. This study concentrated on intercepts that met the active defense requirement.

Patriot anti-tactical missile capability 1 (Patriot PAC 1) is the Army's first step in the active defense arena. Patriot PAC 1 provides a self-defense capability against short-range ballistic missiles without sacrificing defense ability against the air breathing threat. This is possible through system software modifications alone and does not impact on force structure.

PAC 2 brings hardware changes to the missile round. An improved warhead and fuse increase the missile's lethality in the TBM arena. The Patriot system with modifications to improve range, speed and maneuverability is being evaluated and shows promise.

The Hawk missile system may counter the threat presented by air-to-surface missiles and low-altitude cruise missiles. Hawk's ability against low-altitude air threats has been repeatedly proven. Exploiting the system's effectiveness against this aspect of the missile threat rounds out the near-term active defense interceptors.

Air Defense Artillery is pressing onward in the ATMD arena

An Army-funded experiment, the flexible lightweight agile guided experiment (FLAGE), is serving as a test bed at White Sands Missile Range, N.M. The FLAGE program demonstrates the new technologies necessary to counter a tactical missile in the terminal phase of its trajectory. Recently, a FLAGE round intercepted a Lance missile in flight. This proved the guidance system and maneuverability of the FLAGE missile is equal to the ATMD challenge.

The quantitative results of the technology assessment, fire control techniques and interceptor capabilities became the baseline of activity for the doctrine panel. Concepts of doctrine, battle management and tactics are being published with these data. The nature of the TBM threat stresses the need for a near-real-time battle management system.

The NATO airspace command and control system is the framework for any early warning or battle management system. In this manner, duplication of communications links, chains of command and early warning nets will not occur. Fusion of sensor data, battlefield intelligence and target assignments pass over such an architecture.

The linchpin in the entire TMD arena is C^3I. The key to effective C^3I is the deployment and integration of sensors. Sensors give accurate and timely data to decision makers in the battle management environment. Whether active or passive, air or ground-based, sensors fill many roles in TMD. They serve the total force with early warning and impact prediction, and enable active defense with long range, precise cuing Furthermore, sensors provide launch point coordinates for counterstrike forces.

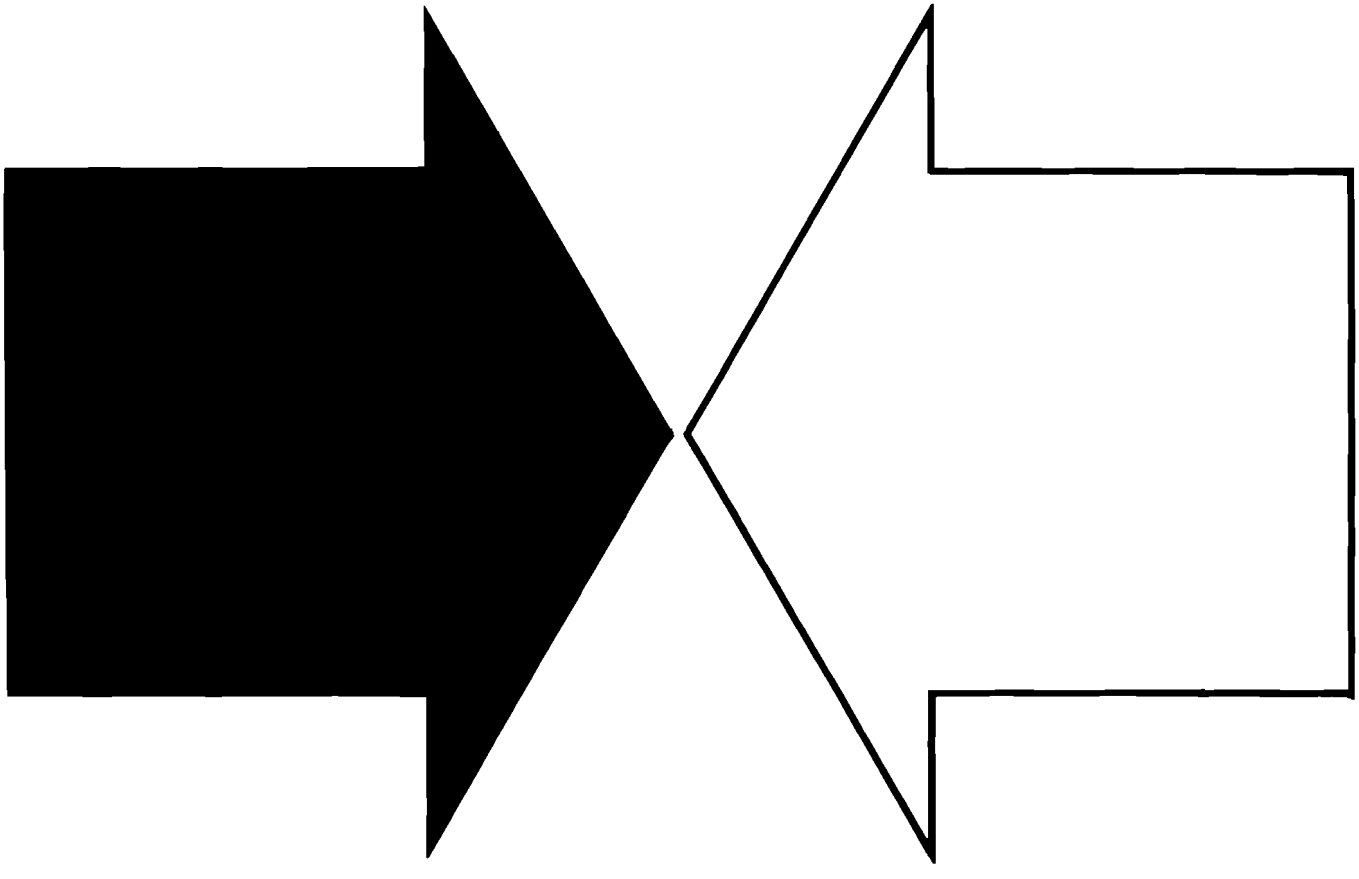
To improve the survivability of the TMD operation, passive countermeasures (PCM) initiatives are being examined. PCM are any operational, organizational or material action short of actively engaging the threat, which degrades the enemy's desired result. Multistatic radars, airborne or spaceborne sensors and told-in data will complicate the targeting of TMD assets by Soviet forces.

Deployment of new weapons systems and capabilities fuels the development of new doctrine and tactics for the field Army. Changing doctrine melds new tactical capabilities with combat systems already deployed and enables them to fight as a team.

Active tactical missile defense is a new mission area for Air Defense Artillery soldiers. Concepts and guidelines to make the most of the tactical value of the ATMD system will be needed. The "how to fight" panel of experts developed a concept paper addressing tactical issues born of an ATMD system. What they wrote provides techniques of fire distribution, command and control and defense design. The goal is to familiarize soldiers with this new capability prior to its fielding and bring a rapid integration of new capabilities into NATO's air defense.

Until NATO deploys an effective TMD system, the alliance is vulnerable to the swift, accurate and lethal firepower of Soviet TBMs. The U.S. Army Air Defense Artillery School is pressing onward in the ATMD arena. Air Defense Artillery initiative and concept exploration are but the first steps in the total integration of elements that meet the challenge of tactical ballistic missiles. □

Maj. Peter E. Goodyear is an operations research/systems analyst with the Active Tactical Missile Defense — Special Working Group, Fort Bliss, Texas. A graduate of the U.S. Military Academy, he has served as a software analyst for the Patriot missile system.



Nike Becomes History

Abandoned Nike sites attract historians and Army clean-up crews

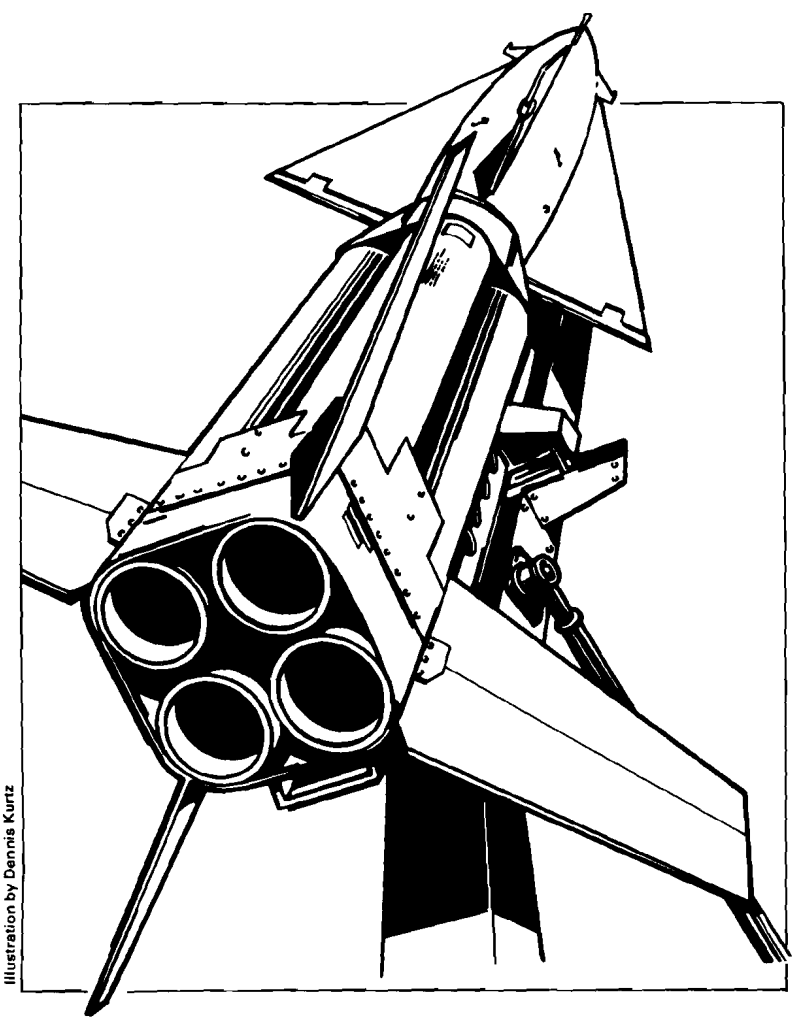


Illustration by Dennis Kurtz

by D. Colt Denfeld

The Nike, Ajax and Hercules air defense systems were the mainstays of continental U.S. air defense in the 1950s. Designed to counter the long-range bomber threat, their mission of defending American cities from air attack became obsolete when the bomber threat was replaced by the intercontinental ballistic missile threat. Today, the missile sites which once stood guard over major U.S. population centers stand abandoned, but the trio of air defense systems hasn't been forgotten.

In the past few years, a strong historic interest in Nike air defense has emerged. Articles relating the history of the Nike defenses are beginning to appear in history publications. At least two books devoted to the history of the development and deployment of Nike Ajax and

Alaska air defenses were unique among the Nike systems.

Hercules are in progress and will be in bookstores in the near future.

Why the sudden interest? Many historians emphasize the uniqueness of Nike as a defense system close to our own homes, a security net of which we were all aware.

The U.S. Army Corps of Engineers has over the last two years become very interested in the history and operation of Nike defenses in the United States. The corps' involvement came with the responsibility of cleaning up former Nike sites. In carrying out this environmental restoration, the corps tests for and removes any toxic or hazardous materials. But the corps also considers the historical value of a particular site or defense area.

The Los Angeles district of the corps, as prelude to the cleanup of former Nike sites in their district, has contracted for an architectural and historical study of specific sites and of the Los Angeles Defense Area in general.

Another district in the corps, the Alaska district, has begun the removal of heavily vandalized Nike sites in the vicinity of Fairbanks. The debris at the two batteries will be removed and the sites regraded so they will return to a natural state. The history of Nike in Alaska was reviewed before the environmental restoration was launched. The review indicated that Alaska air defenses were unique among the Nike system for two reasons — innovations were required in the equipment to cope with the cold weather, and Alaskan batteries were among the few operational Nike batteries to conduct live fire exercises.

Recognizing these unique qualities, a historical documentation project was initiated. The completed project, which will include historical photographs, a history of Nike in Alaska and architectural drawings, will be deposited with the Library of Congress in the Historical American Building Survey collection. This will provide a permanent record of the Nike Hercules deployment in Alaska.

Bravo Battery, 2nd Battalion, 562nd Air Defense Artillery, fired the first Hercules missile in Alaska Dec. 16, 1959, near Eielson Air Force Base outside Fairbanks. The missile climbed to 10,000 feet and exploded. A second missile, fired the next day, scored a direct hit and was followed by a series of successful firings.

The live-fire exercises at Fairbanks in 1959 and 1960 preceded live firings at the more heavily populated Anchorage area. The first live-fire missile launched from an Anchorage battery left the launch carriage on a cold Nov. 20, 1960. The missile, nicknamed Celebrity, was fired from Site Summit by B Battery, 4th Battalion, 43rd ADA. The missile lifted off the snow-covered site at 3,900 feet in the Chugach Mountains above Fort Richardson. The missile streaked toward its "enemy" which was intercepted and destroyed at 40,000 feet, 73 miles away from the site. A pleased battery commander, Capt. Erwin F. Tholl Jr., reported the firing to be completely successful.

Watching the missile arc toward the target was a crowd of Anchorage area residents sitting on bleachers at Buckner Field House on Fort Richardson. Included in the crowd were homesteaders from Eagle River Valley who were special guests of the Army. The Eagle River residents had been evacuated from their homes as a safety precaution since the missile would fly over their homes.

Addressing the assembled spectators was Maj. Gen. J. H. "Iron Mike" Michaelis, commander of the U.S. Army Alaska. Michaelis told the crowd that the "live-fire exercises were invaluable training in firing from actual combat sites and at the same time demonstrating to the citizens of Alaska and the nation the power of this modern weapon."

The second significant feature of the Alaska installations were innovations in battery control and launch equipment to cope with the extreme cold. Engineers designing the sites had to make standard Nike equipment functional in a frigid environment. The answer was to modify existing equipment to work in Alaska at minus 60 degrees as well as it would in San Francisco at 60 degrees above.

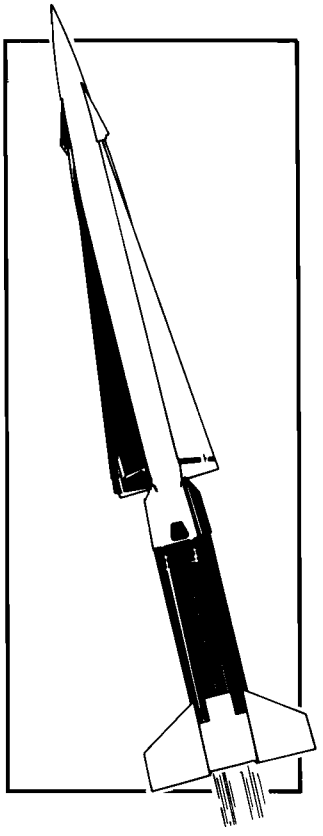
Missilemen returning to the Nike sites found them abandoned and vandalized.

Innovations to Nike Hercules in Alaska included "clam shell" covers over the radars to permit deicing and comfort during maintenance, the housing of all technical control equipment in heated structures and special carriage devices for missile transportation and launching. The clam shell covers in the open position were within a heated room which also generated heat to deice the radars when the cover was in the closed position.

The launch structures were constructed above ground in revetted concrete with launch carriages on heated concrete aprons. A special carriage design was developed that would allow operation in all weather. An automatic cable and winch system moved the missile from the launch structure to the ready and launch carriages. Heating coils in the firing platform deiced the launch area and held down snow accumulations. For example, at the time of the Nov. 20, 1960 firing, the heated platform had reduced the heavy snow cover at Site Summit to a thin coating.

We might ask, why all this interest in Nike many years ahead of the 30- to 40-year mark? Three special characteristics of Nike air defense in the United States seem responsible for this early interest.

Michael Binder alerts us to one factor — the proximity of Nike air defenses to large population areas. Many people became aware of Nike but only as an unknown weapon behind



chain link fences. These folks now have an opportunity to learn about the Nike sites and the program in general.

Another feature of the Nike weapon system that has created additional interest was the siting of some batteries near former coastal fortifications. Individuals visiting the old coastal defense batteries were exposed to the newer Nike missile batteries, and an interest in the newer defense was generated.

A third factor that enhanced interest in Nike is the number of former missilemen returning to the Nike sites who find them abandoned and vandalized or converted into correctional centers, fire training camps or other facilities. The abandoned and vandalized sites are the sites that are targeted for clean-up by the Army Corps of Engineers. Before most of the sites disappear, a relatively complete history and visual documentation may be available. The history of the Nike air defenses will hopefully be in place before all the evidence is gone. □

D. Colt Denfeld is the historian with the Alaska District, U.S. Army Corps of Engineers.

NATO Nike

The Nike is no longer part of the U.S. arsenal, but it is still part of the arsenals of some NATO nations. Therefore, there is a need for soldiers to be trained on the system.

The 59th Ordnance Brigade, headquartered in the Federal Republic of Germany, is responsible for providing training support to NATO Nike Hercules Units spread throughout the European theater. To meet this responsibility, a mobile training team takes to the road, logging more than 15,000 kilometers a year to provide technical assistance and training to personnel manning Nike missile sites in Germany, Italy and Greece.

The job includes maintaining course documents, scheduling courses, presenting course material, updating courses and maintaining liaison with all supported units.

Illustration by Dennis Kurtz

Red Canyon Chapel

by Jim Eckles

The chapel was so distinctly ADA that the bells that chimed from its steeple were made of discarded Nike Ajax missile boosters

The Center Chapel at Fort Bliss is a handsome Spanish stucco that occupies a choice location smack in the middle of the U.S. Army Air Defense Artillery School. Headquarters is just down the street, and the flag is raised each morning at reveille and lowered each evening at retreat at Memorial Circle in an adjacent field. The scene of countless military weddings, the Center Chapel is widely regarded as a spiritual center for Air Defense Artillery.

For some, however, the true spiritual center of Air Defense Artillery will always be a chapel that was built out of scraps and spare parts at a long abandoned site named Red Canyon Range Camp by air defense artillerymen toiling beneath the desert sun. The chapel was a tribute not only to their faith but to the esprit de corps an ADA commander was able to instill in soldiers stationed at an isolated post. It was so distinctly Air Defense Artillery that the bells that chimed in its steeple were made of discarded Nike Ajax missile boosters.

Red Canyon Range Camp, in the northeast corner of White Sands Missile Range, N.M., was once a booming center for air defense artillery training. Today, what's left are concrete slabs, deteriorating roads and a couple of crumbling fire control bunkers. Graffiti marks the remaining foundations where deer and antelope are the most frequent visitors.

However, from 1953 through 1959, more than 10,000 visitors from 45 countries and 40 states passed through the camp to see some of the 3,000 Nike Ajax missiles that were fired by air defenders. About 300 troops from Fort Bliss, Texas, were assigned to the camp. On some days, the mess hall served as many as 1,500 meals.

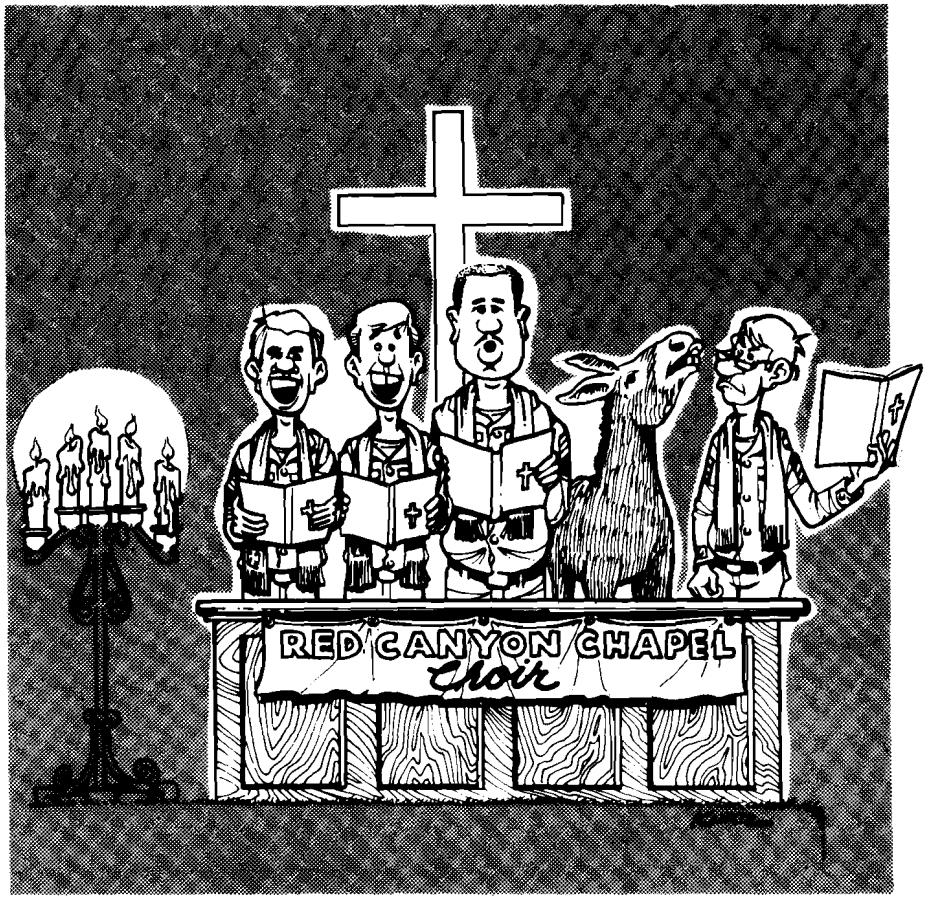
During the 1950s, Fort Bliss, which lacked adequate range facilities, needed a place to conduct Nike Ajax training and annual service firings. White Sands allowed the use of the northeast corner of the range as a temporary facility. Red Canyon Range Camp opened in October 1953, just as the nation, caught up in the Cold War, was about to embark on its decade-long bomb shelter building craze. Ajax batteries received most of their basic training at Fort Bliss, and then moved to Red Canyon Range for further training which was climaxed by the firing of live missiles. Once this was completed, the units were considered ready for around-the-clock operations at a tactical Nike site. Eventually, Fort Bliss established McGregor Range closer to the fort and moved its air defense firings there in August 1959. Red Canyon Range Camp became the military equivalent of a ghost town.

To get there, you follow U.S. Highway 380 west out of Carrizozo, N.M., for 16 miles. The Red Canyon Range Camp turnoff is marked by a gate made of red rock which still stands at what was once the camp's outer entrance. At one time, both sides of the gate were topped with Nike missiles, but the missiles are gone. What's left of the camp is four miles south of the highway, about 165 miles from Fort Bliss headquarters in El Paso.

Red Canyon Range Camp was built from scratch in the eastern foothills of the Oscura Mountains. Dozens of Quonset huts and other temporary buildings were erected on a flat below Chupadera Mesa. Besides the usual barracks, mess hall and motor pool, there were a small post exchange, dispensary, fire department and a recreation and service school. The soldiers also had softball diamonds and volleyball and basketball courts.

Several miles southeast of camp a missile assembly area was built on a low ridge. Nike Ajax missiles were repaired, assembled and fueled at the site and then moved to the launch area further to the southwest. The missiles were fired at drones as visitors watched from the ridges to the east. An area west of the launch points is still littered with Nike boosters stuck in the ground like arrows that fell after being shot straight up in the air.

The men who manned Red Canyon (no women were stationed there) seemed to like the duty. Their tour was supposed to last only five months because of the isolation of the camp, but most stayed on for several tours. The last camp commander, Lt. Col. John McCarthy, liked it enough to stay four and a half years.



McCarthy was the spirit and guiding hand behind Red Canyon for most of its existence. He launched dozens of projects to improve the camp and make it more fit for the soldiers who toiled there. He soon decided that the one thing that Red Canyon Range Camp needed was a decent chapel.

For several years the camp had held church services in the small camp theater. McCarthy wanted something better but could get no funding for a chapel. So he and MSgt. William Sidell, the camp's senior NCO, drew up plans for a building and turned the project over to the troops. More than 100 men volunteered to work on the building. Construction started in December 1957.

The men spent their spare time, weekends and holidays scrounging materials for the chapel. They salvaged steel rails from Southern Pacific for the frame. Bracing was cut from the steel doors of the old Lincoln County jail. The interior walls and roof came from the tops and sides of Nike booster crates. They quarried red rock from a nearby canyon for the walls and used plastered telephone poles as the pillars on the front entry. Using cellophane and shellac, they simulated stained glass windows. For bells they hung three Nike boosters in the steeple. The boosters had been fired and the heat gave them a pleasant resonance.

McCarthy was proud of the chapel and of his men who worked on it. Maj. Gen. Patrick Ryan, then Army chief of chaplains, was so impressed that he made a special trip in 1958 to dedicate the chapel. He told the men, "A building such as this means a great deal more than a large and more expensive chapel built by Congressional appropriation. This has the heart and soul of you men in it."

"This has the heart and soul of you men in it."

The chapel was a cross-shaped building, 87 feet long and 36 feet wide in the main section. Officially, the only cash spent on its construction was $200 the men contributed for the shingles. After he retired, McCarthy admitted to a little creative bookkeeping. He transferred the building number from an unused temporary shed to the chapel. This allowed him to draw funds to maintain it once it was complete.

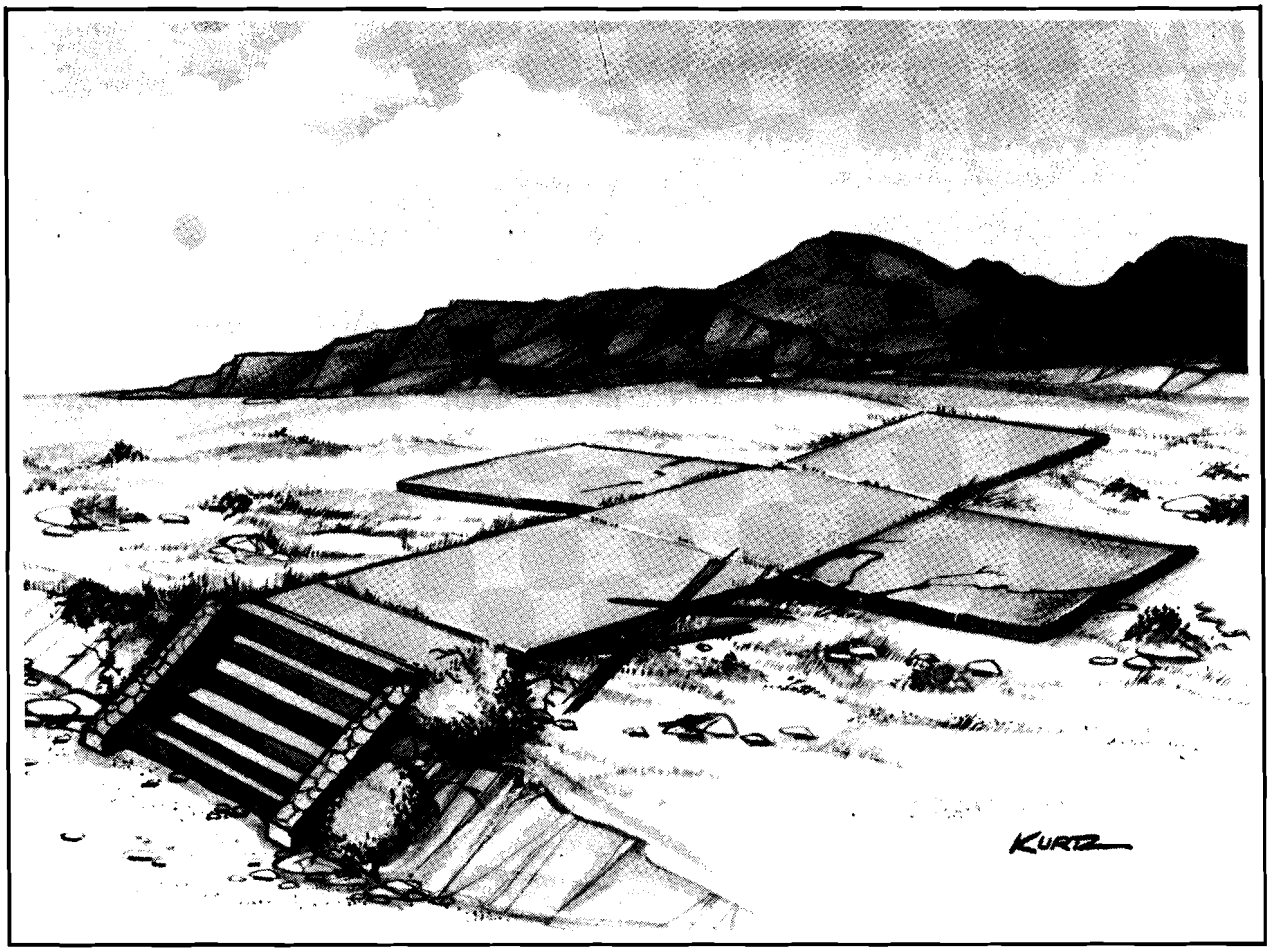
McCarthy included the chapel in tours of Red Canyon Range Camp. Mayors, city councilmen and newspapermen came to Red Canyon Range Camp from cities all over the world which had Nike installations or were potential sites for Nike installations. As the groups went through the chapel, McCarthy always had someone there softly playing hymns on the organ. A delegation from Los Angeles, where a proposed Nike site had drawn protest demonstrations, returned home and quelled the opposition. On one visit, the Norwegian minister of war broke away from the tour group and asked the organist to play a particular hymn. He sang along as the group listened. Eyewitnesses said he had a beautiful voice.

The camp mascot, a burro named Nike whom the men caught and raised, also liked to sing in the chapel. Nike liked to attend the Catholic masses on Sunday. He had, however, an ecumenical spirit. During a Protestant service, Nike managed to get into the chapel through the side door. As the congregation struck up a hymn, Nike stuck his head into the chapel and began braying along with the choir. The service concluded right then and there, but the protestant chaplain later claimed to have made a convert of Nike.

When Air Defense Artillery left Red Canyon Range for McGregor Range, they tore the temporary buildings down. The chapel was left standing since it wasn't an official building. Then in 1961, it was discovered that the chapel had vanished. Only its concrete foundation and the stairs remain.

What happened to the chapel remains something of a mystery. Fort Bliss Real Estate Office records show the building was sold for salvage for $219. Some people didn't believe this, and during the 1960s there were hints that something else had happened to it. What, is unclear. In the June 1972 issue of *Soldiers* magazine there was a one-page story on its disappearance and an appeal for information. Nothing much came of it. The best guess is that the chapel was bulldozed and sold for scrap.

The Nike Ajax, which was



the reason for the camp's existence, is no longer in the service. It was the world's first operational supersonic missile. Originally it was simply called "Nike" but the "Ajax" was added when the follow-on generation Nike, the Nike Hercules, was developed. It was conceived in 1945 with most of the subsequent development testing done at White Sands. Early tests included static firings of motors, live firings of boosters and sustainer motors and tests of the guidance system and warhead.

In October 1951, for the first time, all Nike components were brought together in one missile and fired. A month later, a Nike successfully intercepted a B-17 bomber drone and sent it crashing to the desert floor.

The Nike was almost 20 feet long, 12 inches in diameter and burned nitric acid and aniline. It was equipped with a solid propellant booster which is still used to boost sounding rockets at White Sands. Nike was designed to get close to its target; then a radio signal from the ground would detonate the warhead.

The first Nike unit became operational at Fort Meade, Md., on May 30, 1954. During the mid-1950s, Nike systems were installed along the Eastern seaboard. Later, the system was deployed to allied nations as air defense for industrial and metropolitan areas.

In November 1964, after a decade of service, the last Nike Ajax was withdrawn from active duty. The system was replaced by the Nike Hercules and Hawk.

McCarthy liked to talk about the high morale of the men he assembled at Red Canyon Range and how hard they worked. He said they were dedicated and enjoyed being at Red Canyon. It would be hard to argue with him. Not long ago, I received a call from Ernest Littlejohn, a Red Canyon private first class and missile mechanic who had settled in Michigan. He had helped to build the chapel and wanted to show it to his children. I could sense his disappointment when I told him the chapel was gone and there was no reason to go to Red Canyon Range Camp any more. □

Jim Eckles is the public affairs officer for White Sands Missile Range, N.M.

A Greater Goal

Small Group Instruction helps leaders build cohesive "synergism" — but do you know how?

Illustration by Julie Couture

by Karol McMillan

Good news: the consensus is that small group instruction in the ADA Officer Advanced Course is right on target.

Better news: anyone doubting the effectiveness of small group instruction, also recently introduced in the ADA Advanced Noncommissioned Officer Course (ANCOC), should spend a few minutes talking with SFC Brian Kapusta, an ANCOC team leader. He reports a genuine enthusiasm on the part of students toward this new instructional methodology.

Bad news: not everyone who is part of the training arena (policy makers to course developers) understands why the Army uses small group instruction and how this method of instruction relates to long-term leadership results.

Why does the Army use small group instruction for professional leadership courses? Almost all Training and Doctrine Command (TRADOC) schools will say we use it because small group instruction —

- Involves the students in the learning process
- Teaches how to think, not what to think
- Focuses on application of learning rather than on the rote
- Builds teams and cohesion

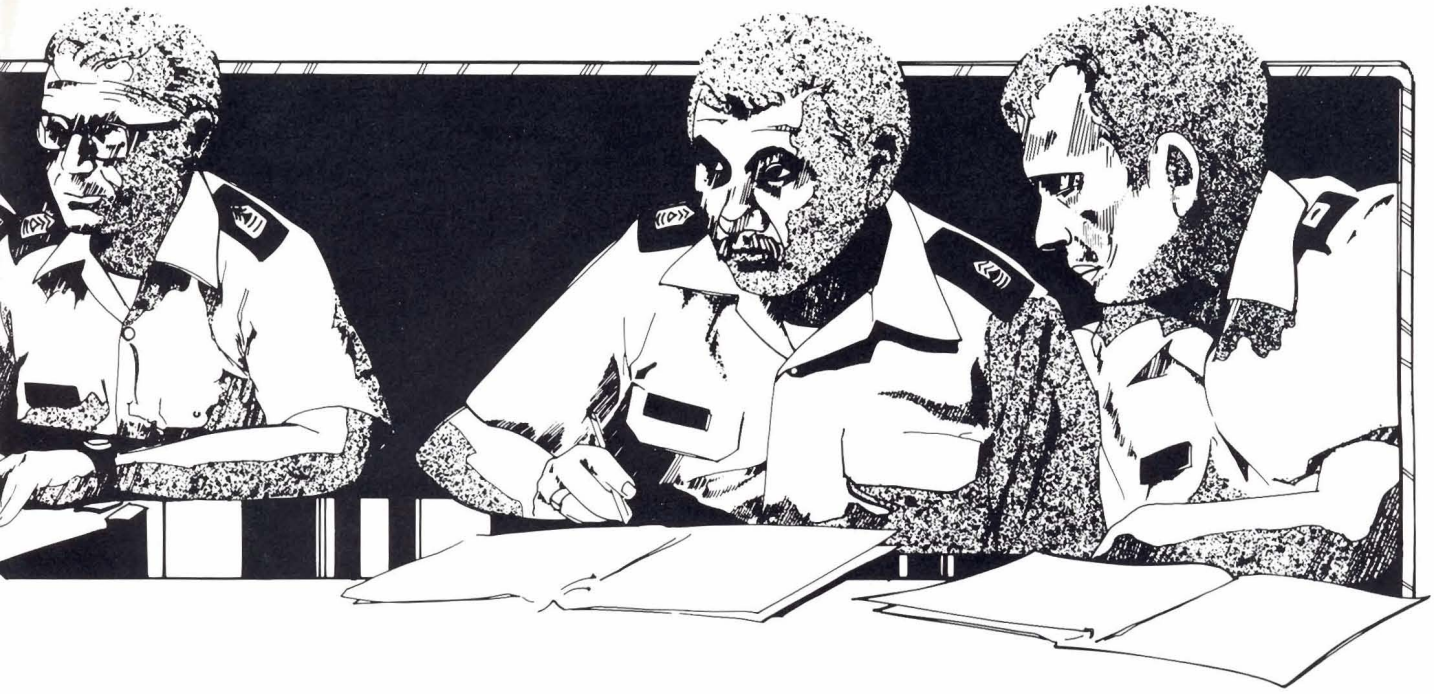
Team leaders can explain, in great detail, how small group instruction facilitates the highest level of adult learning — synthesis. But, more often than not, they focus their explanation on learning content. So, how then do lesson content and the method by which a lesson is taught build teams? As the Center of Army Leadership explains, there is something more than content learning at work in small group instructional settings — "small group process."

This process has to do with individual behaviors and group behaviors exhibited within the small group. Through this process, the interaction of the group members builds teams and cohesion.

Allowed to develop, the process influences and ultimately strengthens leadership behaviors. The result is a leader who speaks candidly, displays competence, is committed, demonstrates courage and maintains unwavering integrity.

The leader cannot build a cohesive team without first possessing those instilled qualities. When group members individually reach those leadership behaviors, the group gels as a cohesive team. This cohesion is called synergism — a cooperative action that results in the total effect being greater than the sum of the actions taken independently.

A cohesive team might ask what it can do for the Army rather than what the Army can do for it. A cohesive team accomplishes its mission through candor, competence, courage, commitment and integrity. Every member of the team contributes expertise while sharing the working knowledge of every other team member's task function.



The members also demonstrate that they truly care about the welfare and survival of everyone in the group. With both performance and affection, then, the team achieves cohesion and operates within a synergistic environment.

Back in the classroom, the team leaders recognize that there are two components of small group instruction — content and process. The team leader guides the group through the content and by using facilitation techniques, helps move it through group development, commonly termed dependence (stage one), independence (stage two) and interdependence/cohesion (stage three).

Both the content and process of small group instruction require the team leader to effectively demonstrate the leadership qualities he wants to build and instill in his students. Through facilitation skills, the team leader can bring change in behavior and thereby help move them through the stages of group development. His goal is two fold: graduate a student who knows how to think and search for new answers and who has changed and directed his behavior toward the greater good of the group.

It is not easy to instruct effectively in the ideal small group style. The team leader must, at all times, recognize whether or not the students are learning, and he must constantly watch for behavior change so that he can help the group move to stage three.

It is no wonder that our concerns for the team leader strongly center on his own training to become a small group instructor and on the stress he may undergo as a team leader. The Staff and Faculty Development Division (SFDD), Directorate of Training and Doctrine, USAADASCH, is developing a course to train selected small group instructors for the small-group classroom. The target audience includes small group instructors in the ADA Officer Advanced Course, ADA Officer Basic Course, the ADA ANCOC and the faculty of the U.S. Army Sergeants Major Academy, all at Fort Bliss, Texas. TRADOC selected USAADASCH's Staff and Faculty Development Division to develop a small-group instructor training course for all of TRADOC.

The SFDD small-group instructor training course emphasizes the small group methodology and process. The goal is to produce a team leader who facilitates small group instruction for the purpose of learning and soldier team building.

However finite a course of instruction may appear, the ultimate goal for all these training efforts is to produce soldiers who are effective defenders of the country. Small group instruction intellectually and emotionally moves the student beyond the determinable and toward the greater goal of success for Air Defense Artillery in the AirLand Battle. □

Karol McMillan is an educational specialist with the Staff and Faculty Development Division, Directorate of Training and Doctrine, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

Regimental Colonels

Back in action on the "ceremonial" front

by Ed Foster

Twenty years of retirement haven't taken the starch out of Adam Buynoski's attachment to the firing line. The World War II regimental commander has an honorary colonelcy added to his ranking and is back in action on the ceremonial front.

The 62nd Air Defense Artillery Regiment named him "honorary colonel." Army Regulation 600-82 provided official sanction. His becomes the first honorary colonelcy in the ADA since the Army's return to the regimental system. And thereby hangs an account of an unusual stewardship on behalf of a branch of service, extending well beyond the usual allotment of years to bridge the battlefields of yesteryear to the "high-tech" battlefields of tomorrow.

"I see the idea of an honorary colonel as helping to develop a sense of community within the battalion," said Buynoski, 77, in a telephone interview from his home in San Francisco. "They're a part of something much bigger than just their own unit. I like to think my presence will add that extra dimension.

"Or," he added, with a chuckle at his own expense, "just say I'm the sort of old fud who connects the past to the present."

You get the idea right away that the colonel is the sort who takes the job, not himself, seriously. His is a light touch, deftly applied to scale great events to a nomenclature that every fighting man is comfortable with. "I got a call from Hawaii one afternoon," he begins, when asked how he learned of his new role. "They asked me to come to the activation ceremony of the 1st Battalion, 62nd Air Defense Artillery, at Schoffield Barracks. I said, 'Why me?' It was then they told me I'd been appointed honorary colonel of my old regiment. From out of the blue it came.

"I told them to get in touch with me in a couple of days and I'd give them an answer. I then said yes, I'd be out. I paid my own way — air fare wasn't too big a bump on the pocketbook.

"Well, they sent out invitational orders that permitted reimbursement. And when I got out there they gave me a review. I attended the dining-in at the officers club — a gala occasion. I spoke a few words and that was it."

What words?

The light touch appears in his choice of what to call up before those gathered to hear him, not a momentous battle on the road to glory but a rather weird incident that occurred in the early stages of the World War II invasion of North Africa in 1942. What might be termed a "phantom air raid," as he put it, had "just about everybody in Oran firing into the sky."

Buynoski, of course, was at the center of it all. He commanded the 1st Battalion, 62nd Antiaircraft Artillery Regiment. Entrenched in the port city shortly after the Allied landing on Nov. 8, his gunners knew the aerial attacks for which they'd trained were at hand.

They were ready. They were eager. So were those from other units with hands on a trigger. And somebody jumped the gun.

"Who set off the first shot?" asks Buynoski now, rhetorically. "Nobody ever will know. It could have been anyone in Oran. But the sky lit up like a Fourth of July celebration, triggered by what was taken as an air raid.

"We never picked up anything on our radar. I'm con-

vinced that it was an air raid that never took place," he insists now.

"It came over, I think, as a long-range warning. But however it arrived, all the weapons in the area fired. Everybody reacted automatically. A release of tension is what I think it amounted to, a harmless initiation to wartime action."

The radars in those days were the original radars issued to aircraft "and they were very poor," Buynoski recalls. "It was hard to distinguish the target on the scope . . . too much merging with false echoes."

Anyway, with that fiery initiation to the tensions of war, the 1-62nd AAA under Buynoski's command went on to earn battle streamers for Algeria-French Morocco and Tunisia during the North African Campaign; Sicily and Rome-Arno during the Italian Campaign; Southern France; and Rhineland, Ardennes-Alsace and Central Europe during the European Campaign. He recalls night marches to Strasbourg in the Rhineland operation as perhaps the most strenuous and difficult of challenges.

Buynoski was commissioned in 1936 after graduating from the U.S. Military Academy. He served as a searchlight platoon leader, a regimental adjutant, commander for an automatic weapons battery and as the regimental S-3 for the 62nd before taking command of the 1st Battalion.

In the Army regulations establishing the position of a regimental honorary colonel, the main purpose is set forth as perpetuating the history and traditions and thereby enhancing unit morale and esprit de corps.

The honorary colonel is to be a distinguished retired officer in the rank of colonel or above who previously served in the regiment. His duties are ceremonial and do not conflict with the chain of command.

Buynoski is to serve for three years from the date of his appointment.

Last December, his honorary duties sent Buynoski to Fort Bliss, Texas, where he took part in ceremonies with the 5th Battalion (C/V), 62nd Air Defense Artillery. *Air Defense Artillery* magazine pictured the honorary colonel at a briefing by an A Battery specialist on the Vulcan feeder assembly.

It was for Buynoski a return to familiar ground. After World War II ended, he went to Fort Bliss to spend the next four years as head of a service test section of Army Ground Forces Board No. 4. It was this period from 1945 to 1950 that Buynoski says he looks back upon as "the highlight of my service. There at Fort Bliss I was sitting upon the front edge of the science of air defense."

His board responsibilities were to service test new antiaircraft gun and fire control equipment. He also had responsibility for writing the military characteristics for future antiaircraft equipment.

"I saw no old friends from those days," says the honorary colonel of last December's return to his old stomping grounds. "But I saw familiar faces in the photographs displayed at the [U. S. Army Air Defense Artillery] School."

Just four days after his sojourn to Fort Bliss, Buynoski attended activation ceremonies of the 2nd Battalion, 62nd Air Defense Artillery, at Fort Ord, Calif.

At that rate, it might seem like ceremonial functions alone

would be enough to keep any honorary colonel fully occupied. For Buynoski, however, such is not the case. He periodically writes articles for distribution to 62nd units, "pieces I dredge up from my memory."

He also has initiated the design of a regimental necktie to be sold at post exchanges where 62nd battalions are located. The ties are to have the regimental crest embroidered on a standard scarlet red background, decided upon after conferring with battery commanders. Approval by the Army and Air Force Post Exchange Service in Dallas has been assured, he says.

He also is trying to enlist musicians in the San Francisco and Hollywood area in composing a regimental march. If he brings it off, the composition would come on the heels of an ADA march set to music just this year at Fort Bliss, Texas, by Lt. Col. Douglass R. Hemphill.

Buynoski retired in 1966 at Grand Rapids, Mich., where he was deputy commander of a training corps of reservists and ROTC cadets in Michigan and Indiana.

While at Fort Bliss last December, Buynoski was inducted as a member of the Order of Saint Barbara in recognition of his lifetime contributions to the Air Defense Artillery.

His busy schedule appears to agree with the colonel. Asked if he still can wear his old uniforms, he replied, "Oh, yes, sure."

Undoubtedly more insights into esprit de corps and the like, whether in the ranks of active-duty, retirement or honorary, are to be gleaned from extending an interview with an old hand from the "First-to-Fire" ranks.

However, there's a pause from his end of the line. "Ruth and I have this routine of ours," says the colonel, at last, speaking of his wife. "We go to the Presidio. She's at my shoulder waiting — "

Of course. Army Regulations couldn't have prescribed a fitter ending. □

Spec. Jonathan H. Cummings, A Battery, 5/62nd ADA, explains the Vulcan feeder assembly to retired Col. Adam S. Buynoski. (Photo by Robert A. Lehardy)

Looking for Answers

A specially appointed ADA Warrant Officer Study Group looks at the roles and use of ADA warrant officers

by CWO 3 Jim N. Cupp

Warrant officers are highly specialized experts and trainers who, by gaining progressive levels of expertise and leadership, operate, maintain, administer and manage the Army's equipment, support activities or technical systems throughout their careers.

The above definition of a warrant officer was once precise; however, it provokes dozens of questions on the training, personnel management and professional development of warrant officers as their role in Air Defense Artillery changes. How does the Army acquire, train and retain its technical experts? Must ADA warrant officers be more than technical experts? A recent Total Warrant Officer Study (TWOS) helped to answer generic questions, but, for Air Defense Artillery, there are still many questions left unanswered.

Recognizing that the role of the ADA warrant officer was at question, Maj. Gen. Donald R. Infante, commandant of the U.S. Army Air Defense Artillery School (USAADASCH), directed the Office, Chief of Air Defense Artillery, USAADASCH, Fort Bliss, Texas, to conduct a study of the ADA warrant officer role in the Army today and in the future. Additionally, he has requested recommendations on alternate courses of action to improve the health of the corps.

A board of local warrant officer subject matter experts was formed in July to conduct the ADA Warrant Officer Study. The board will key on the following major subject areas: accession, reductions, orientation, career progression, training and a new definition. Their findings are being staffed within USAADASCH and to ADA commands in the field. The board must compile these findings into recommendations to the ADA Branch chief. (The January-February 1988 issue of *Air Defense Artillery* will publish an article on those recommendations and proposed solutions.)

The board will review all aspects of the role and use of the ADA warrant officer. It will also examine the current role and use of policies, professional development, life-cycle management and training development of future ADA warrant officers. Board members will conduct the study within the guideline of TWOS and its recommendations will apply to the Active, Reserve and National Guard components of the Air Defense Artillery.

The study is focusing on the following potential alternatives:

- The consolidation and enhancement of the existing ADA warrant officer corps. This alternative keys on a "generic" ADA warrant ultimately able to serve across the full ADA spectrum. Development of a system-specific senior enlisted maintainer to offset the decreasing warrant officer technical skills and reduce the size of the warrant officer corps is considered within this alternative.

Due to the elimination of 18 percent of the authorizations for ADA warrant officers and the possible reduction of warrant officer authorizations over the next two years, Air Defense Artillery may be required to create a senior enlisted maintainer for each weapon system.

• A second alternative is to fine tune the existing ADA warrant officer corps, for example, by consolidating existing structure, improving retention, encouraging earlier accession and determining the feasibility of a "generic" ADA warrant, among other things.

Besides answering a list of ADA warrant officer specific questions (see box), the board is also taking up a number of peripheral ADA warrant officer concerns. These include the following:

• It is unclear what ADA Officer Basic Course and ADA Advanced Officer Course students are taught concerning ADA warrant officer use and management.

• There is concern on the ADA or Ordnance branch proponency issue for intermediate maintainers.

• The application phase (Phase 1) of warrant officer procurement should be examined. It may require additional publicity to the soldiers in the field.

• Concern continues over decreasing accession based on the "ego bruising" techniques of the Warrant Officer Entry Course (Phase 2). The possibility of constructive credit for NCO professional development courses will be addressed by the Training and Doctrine Command.

The study's recommendations will become the basis of the approved courses of action; the implementation of the study's courses of action will continue through 1990. Refinement and development of active component issues will occur first and will serve as a model for the Army Reserve and National Guard.

To offer suggestions or to obtain more information on this study, contact CWO 3 Jim N. Cupp, Office, Chief of Air Defense Artillery, USAADASCH, Fort Bliss, Texas. Call Autovon 978-6217 or commercial 915 568-6217.

ADA Warrant Officer Study Group Questions

What is the role of an ADA warrant officer?

How can an ADA warrant officer best be utilized?

How does the currently approved TWOS definition apply to the ADA warrant officer?

What educational programs are available to ADA warrant officers?

Why is ADA having problems retaining warrant officers beyond 20 years of active federal service?

Are the current prerequisites to become a warrant appropriate?

Should ADA access warrant officers earlier and, if so, at what point?

Should ADA create a senior enlisted master mechanic for each weapon system?

Should an ADA warrant officer be a "manager of resources" or a "highly qualified technician?"

Should an ADA warrant officer be a generalist or be specialized in his field?

What is the difference between a 223B and a 24R in Hawk?

Will the creation of an ADA "generic" warrant officer, ultimately able to serve across the full ADA spectrum, benefit the branch?

How will a reduction of 18 percent of authorized strength in the warrant officer corps effect how ADA utilizes warrant officers?

Team Spirit '87

35th ADA Brigade and Korean air defense units maneuver as a team to learn valuable interoperability lessons

by Col. Zigmund J. Roebuck

"Except for being shot at . . . it doesn't get more realistic than this!"

The 35th Air Defense Artillery Brigade, stationed at Fort Lewis, Wash., and a part of I Corps, deployed with the corps to Korea to participate in Exercise Team Spirit '87. The 10-day joint and combined exercise threw out some tough challenges for the brigade, pressing home valuable lessons and raising significant questions.

The unit's month-long air and sea deployment started with equipment loading on ships for the brigade headquarters and 1st Battalion, 4th Air Defense Artillery (Hawk) at the Port of Tacoma, Wash., and 7th Battalion, 7th Air Defense Artillery (Chaparral) loading at Oakland, Calif. In all, 600 soldiers then left the docks for Korea to pick up their equipment and participate in the exercise.

Exercise Team Spirit '87 was a four-phase exercise which pitted Blue and Orange forces against each other. The U.S. I Corps participated as a member of Field Army Orange Center (FAOC). During phase one, I Corp was the FAOC reserve. The field army placed the 35th ADA Brigade in general support of the FAOC but left the unit assigned to its parent, I Corps.

During phase two through phase four, the 35th ADA Brigade reverted to I Corps' control to sustain the AirLand Battle by providing freedom of maneuver for I Corps forces and creating hostile airspace for Blue aircraft in the exercise area.

Long road marches, close integration with Korean air defense forces and successful maneuver of I Corps highlighted the action. Immediately following the maneuver phase of the exercise, the 1/4th ADA became the first CONUS-based Hawk unit to fire outside the continental United States. Its three direct hits at Chul Mae Range made up the first firing for a U.S. Hawk in Korea in seven years.

Lessons Learned

Lessons learned in the maneuver phases proved valuable and have been applied to the ongoing development of the doctrine and operational concept for the corps ADA brigade. Also, significant questions surfaced, including the following:

- What are the command relationships and communications requirements between the corps ADA commander and the division ADA battalion commander?
- How do we get early warning and air raid warning to corps Chaparral and non-ADA units in the corps rear area?
- How does the corps disseminate the airspace control order in a timely manner?
- What are the communications requirements for the objective corps brigade?

Interoperability

During the maneuver phase, both Hawk and Chaparral tested interoperability. Hawk received early warning through a digital link between the Air Force control and reporting center and its AN/TSQ-73. Once the link was functioning, the unit established a second method of receiving early warning though a lateral multichannel link to a Korean Hawk battalion. Both methods allowed the 35th Brigade's Hawk

to receive early warning from the Republic of Korea Army Air Defense Command's early warning system.

Also, a Republic of Korea towed Vulcan battery was attached to the U.S. Chaparral battalion to test interoperability. Further, the Chaparral and Vulcan squads were task-organized under both the Republic of Korea and U.S. battery commanders.

Thus, interoperability and cooperation were tested in the true meaning of the name and purpose of the exercise — team spirit. Both U.S. and Korean air defense units maneuvered as a team to accomplish the 35th ADA Brigade's mission — air defense for I Corps.

Live-fire Exercise

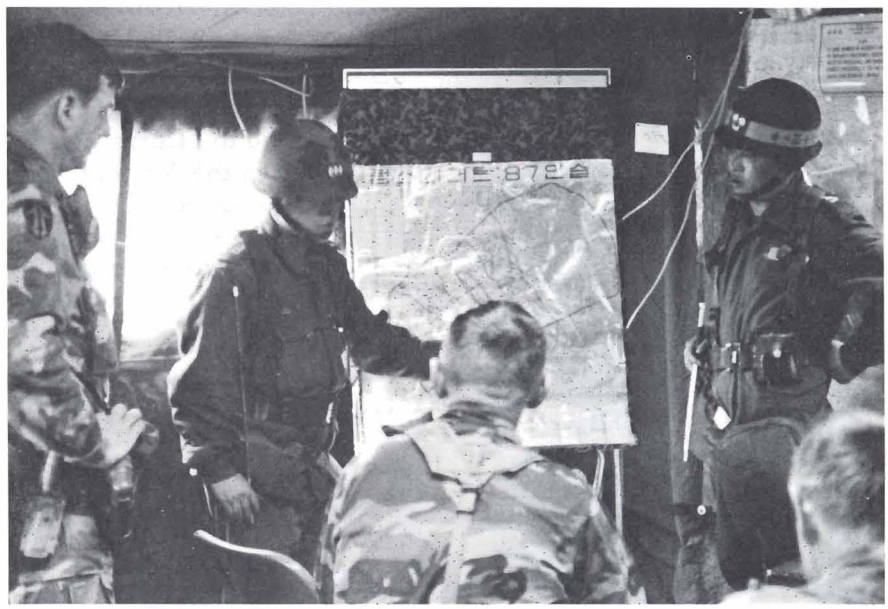
The increased reliability of Hawk Phase II product improvements came loud and clear both during maneuver and live firing. After shipping its equipment half way around the world and bouncing it over the rough Korean terrain for three weeks of field training exercises, 1/4th ADA convoyed to Sea Range and fired three perfect kills. Each platoon fired from its own equipment. The Republic of Korea soldiers were impressed, gaining confidence in their proposal to buy the Hawk Phase II product improvement package.

As the brigade boarded the planes at Osan Air Base to return to the United States, soldiers of the I Corps air defense brigade knew they had done everything that would be required of them had they actually gone to war. In a month they had deployed to a foreign country, interoperated with allies, received early warning from a control and reporting center, maneuvered with a corps with divisions deployed, participated in staff planning for complex exercises and coordinated with the U.S. Air Force.

Successfully firing their missiles at the end of this exercise further verified they are "First to Fire in First Corps." □

Col. Zigmund J. Roebuck is the commander of the 35th Air Defense Artillery Brigade, Fort Lewis, Wash.

The 7th Battalion, 7th Air Defense Artillery, provides coverage of the Nam Han River crossing during Team Spirit '87.



A Republic of Korea Hawk battalion commander conducts a joint briefing of the 35th ADA commander during Team Spirit '87.

ADA Career News

Officers

ADA Assignments, MILPERCEN

by Lt. Col. Frederick C. Beauchamp

Critical Time for ADA

I'm extremely excited about assuming duties as chief of officer assignments, Air Defense Branch, here at MILPERCEN. It's a privilege to serve the officers of this branch during this critical time in its history. The deployment of Patriot, the development and fielding of the forward area air defense system, the ever-shifting force structures, and alignments with the older weapon systems demand an officer corps that is skilled and schooled. Officers must be more tactically and technically proficient than ever before. We've established some goals within the assignments branch that we think will contribute to this end.

First, we'll build on the working relationship that's been established between MILPERCEN's ADA Branch and the ADA proponent office (Office, Chief of Air Defense Artillery) at Fort Bliss, Texas. In so doing, we intend to manage the careers of our officers in a manner that effectively supports and reflects the Army leadership's vision of the branch of today and the future.

Next, we'll remain in close contact with commanders in the field as a means of fostering mentoring. Air defense commanders at all levels have a "quick fire" channel open to me any time. Our team of managers will continue to visit the basic, advanced and leadership-command courses as well as the command and staff and senior service colleges. They will offer personal consultations to officers attending these critical professional development courses. We'll also continue with our trips to installations in the states and overseas.

Finally, with an eye on the future, we'll strive to increase Air Defense Artillery participation in the emerging high tech, hard science fields. Graduate studies, materiel acquisition management schooling, training with industry and meaningful experience in related functional areas are just some of the opportunities that will allow our junior and field grade ADA officers of today to fill the critical product and project manager positions of tomorrow. The result will be a great branch made even greater.

We look forward to communicating with you through this publication and to seeing you during future personal visits.

First to Fire!

From the Lieutenant Colonels Desk

by Maj. Stan Green

'Eye of the Needle' is Smaller

As you receive this issue, many officers will be in the process of putting last minute touches on officer record briefs, official photographs and microfiche in preparation for the lieutenant colonel command board, currently scheduled to convene on Jan. 26, 1988. I'd like to discuss some specifics related to the board.

Approximately 21 commands will be available in FY 89. Two of these commands will be with newly created battalions. One will be a Patriot unit and the other will be a corps Chaparral battalion. Nineteen other battalions will be coming open worldwide at various times of the year. Bottom line is that there are nine fewer command opportunities opening for FY 88. The "eye of the needle" is indeed smaller.

For some, especially those who just came out on the 1987 lieutenant colonel's list, the question of a 10 percent cap on first-time-considered officers is still unanswered. As of this writing, a final decision had not been made. As most of you know, officers being considered the first time for command have a selection cap of not greater than 10 percent imposed. Continuation of that cap is in question this year because there were no new officers added to the selection pool last year since there was no promotion board held.

What then should an officer do to enhance his or her opportunities for selection to command? First and foremost, your chance for selection is determined by your manner of performance as an Air Defense Artillery officer in critical air defense jobs. Your performance as a commander and your time in key staff positions (battalion and brigade), as reflected in your officer evaluation reports, will be scrutinized. Thus, in essence, you have already influenced your opportunities. But, there are things that you can change which are also important factors.

When a board member opens your file, the first item he or she sees is your official photograph. This is your opportunity to be "up close and personal" and provide more than a mental image of yourself to the members of the board. You need to review your photograph — perhaps have one of your peers take a look at it — and decide whether you need to take another or stay with the current one. Should you opt to have another photograph taken, you need to do it quickly and mail two copies directly to the assignments branch.

You should "tune up" your officer record brief. Make sure that the data presented truly represents you and your career. If you have corrections that need to be made, do so soon. Once corrected, you should forward the annotated officer record brief through your military personnel office to DA MILPERCEN.

Last, but not least, when preparing for the board you should review your microfiche. Send a card or short note to the branch requesting a copy of your fiche and we'll get it out to you promptly. You probably won't have time to get your fiche rephotographed, but if you are missing an OER or other critical documents, there may be enough time to place hard copies into your file for the board.

Finally, there are some officers who for one good reason or another would prefer not to be considered for command. A simple letter or note to the branch will stop your file from going before the board. This is non-prejudicial to the officer and can be withdrawn at any time, thus allowing that officer to be considered by a subsequent board. Taking this type of action is preferred over being selected and then making a decision to decline command. Declining a command is irrevocable and you will not be considered again.

I consider this opportunity to serve as your assignment officer just that, an opportunity to serve. I look forward to working with each of you as the occasion arises.

From the Majors Desk

by Maj. Mike Penhallegon

Contributing Factors to Promotions

As everyone probably knows, the promotion list for lieutenant colonel was released in June of 1987. (See the September-October 1987 issue of *Air Defense Artillery* for the combat arms branches promotion statistics.) As a branch, Air Defense Artillery did extremely well. There should be little doubt in anyone's mind that our officers are contributing significantly to the Army, both as air defenders and in their functional areas.

Lieutenant Colonel 1987 Selection Board Results

Branch	Eligible	Selected	Percentage Selected
Air Defense Artillery	123	68	55.2
Armor	222	120	54.0
Aviation	442	195	44.1
Engineers	186	75	40.3
Field Artillery	291	128	43.9
Infantry	471	207	43.9
Army total	3008	1404	46.7

There may be several contributing factors to our doing well. As a branch, our records are in pretty good shape, including photos, OERs, height and weight data, and physicals among others. The OERs I have reviewed were well written, clearly described the rated officer's duties and reflected that commanders are, indeed, doing a great job of mentoring prior to rendering the reports.

However, the following are several other facts from this board worth noting:

Predominate year group	**1971**
Active federal commissioned service average	**16.3 years**
Average age	**38.9 years**
Average time in grade	**4.3 years**
Military education level	**98.1 percent were command and general staff college graduates**

ADA Career News

From the Captains Desk

by Capt. Bob Woods

Combat Arms Immaterial Jobs

This article will address post battery command assignments and current PCS policies.

The U.S. Army has numerous positions that require former battery commanders. These positions are not in an officer's designated functional area. They are generally designated as combat arms immaterial positions and are characterized by duty away from troops. These positions include ROTC, U.S. Army recruiting centers and other critical jobs such as with the National Training Center.

Key point here is that once your battery command is complete, your next assignment will be away from troops. Air Defense Assignments Branch will try to assign you in your functional area, but the requirements of the Army do not always allow this. The officer corps must realize that someone will go to all of these positions. Therefore, if I call you and give you a few combat arms immaterial positions to choose from, it is an opportunity that you should not take lightly.

One of the most frequent questions from officers in the field is "Why can't I be assigned here a little longer and take over the S-3 job next year?" The primary reason not to assign captains to the S-3 positions is that the Army major population always has a long list of command and general staff college graduates who need to fill these positions first. The officers who are currently in, or have recently turned over, their command positions must realize that their time for the S-3 or executive officer slot will come eventually.

The financial restrictions placed on the Department of the Army have drastically limited the freedom of the assignment officer. Therefore, because of the restrictive PCS policies, it is impossible to move you based solely on your personal preference. If the needs of the Army and your own goals coincide, then it could happen. However, the Air Defense Assignments Branch will occasionally have to break stability on an officer to satisfy the hard-to-fill nominative positions.

If you have any concerns, be sure to contact me at Autovon 221-0025/0026, or drop me a line at 200 Stovall Street, DAPC-OPE-A, Alexandria, VA 22332-0400.

From the Lieutenants Desk

by Capt. Bob Wilcox

Maintain Dialogue With Your Boss

As the newest member of the Air Defense Assignments Branch, I'd like to pass on a few initial observations concerning the professional development of lieutenants. Of all the calls I received from the field in my first two weeks on the job, the vast majority concerned non-selection to captain and release from active duty. Although Capt. Bob Woods has covered these items in previous issues, I'll point out what I feel "Lt. Smith" must be concerned with to ensure he will one day be addressed as "Capt. Smith" rather than "Mr. Smith."

The single most important factor has been, and will always be, performance. From the moment you come on active duty, you've got to learn your job and perform it well. That does not mean you can't make mistakes. That's how we all learn. The key is to learn from your mistakes, have a positive attitude, and don't repeat them. Convince yourself that you are performing quality work and convince your boss of the same.

I once had a battalion commander who said, "Don't confuse effort with results." That's excellent advice. That's also the reason you must maintain a constant dialogue with your boss. You may see yourself giving 110 percent, but your boss may only see a 50-percent result rate. If this difference of viewpoint is not cleared before your OER is written, you'll wind up the loser.

This brings up the next point — OERs. No longer can commanders use second lieutenants to round out their profiles. Every OER counts. As a rule, the average person appearing before the captain promotion board has only two OERs in his official military personnel file. As you know, we currently send out letters to individuals who, in our opinion, have received an OER that is below the average. This is primarily determined by Parts IV, V and VII of the DA Form 67-8. Your goals should be for all "1s" in Part IV and a checked block in "always exceeded requirements" and "promote ahead of contemporaries" in Part V.

If you are talking with your boss regularly, there shouldn't be any surprises. Part VII, the senior rater's portion, is an area that should be discussed with your senior rater before the rating period

ends or, once it is written, before it is forwarded to the MILPO. You cannot determine how you have been rated simply by looking at the check mark in the potential block. To understand what it means, you must know what the senior rater's rating profile is. Ask! Be sure you don't fall below "center of mass." If you do, find out what is expected of you to improve by the next report. There should be a huge improvement.

For all other-than-regular Army officers who are not sure if they want to stay in the Army past their initial obligation, the decision will be made for you during the captain/conditional voluntary indefinite (CVI) board if you have not submitted your request for CVI. These requests are now acted on only once. If they are not submitted prior to this board, you will not be permitted to stay on active duty past your initial obligation.

Schools are important, but the most important position a lieutenant can have is one with soldiers. In my opinion, you should work toward your first troop assignment as soon as possible and remain a platoon leader as long as possible. This is the time that you are nearest to soldiers. You learn their needs and wants as well as what motivates them. You will never again be that close to them. There could never be a better leadership course.

The days of all lieutenants making captain are past. Everything counts from the first day of active duty. It is the responsibility of the individual, chain of command and career managers to ensure that records are up to date and show a true reflection of the officer under consideration.

I'm here to help answer any questions you may have concerning your career. Every board evaluates records differently since every board is made up of different individuals. There are trends, however, and they may help give valuable insights to you and your commanders. In the future, I will communicate as many of these trends as I can identify. For any specific questions, call me at AV 221-0025/0026.

Warrant Officers

New WO MOS Designations

Air Defense Artillery warrant officers are receiving new military occupational specialty codes. The new numbers are based on five character designations.

The first and second characters in the code represent the branch or functional area. The third character designates the warrant officer's area of concentration (AOC). The fourth character, a letter, designates separate definable qualification within an AOC because of major systems or skill differences.

The fifth character is indicated as 0 when identification of a special qualification is not required. An example of a fifth-character special qualification for ADA warrant officer would be a "V" for intermediate maintainer.

Following are the changes in ADA MOS codes:

Old	Name	New
221B	Nike Msl Sys Tech*	140C
222C	Patriot Msl Sys Tech	140E
223B	Hawk Msl Sys Tech	140D
224B	Chap/Vulcan Sys Tech	140B
225B	ADA C^2 Maint Tech**	140A

* Name changed to Custodial System Technician
** Name changed to C^2 Systems Technician

Future of ADA Warrant Officers

The role of warrant officers in the ADA Branch is changing. A specially assigned Warrant Officer Study Group at Fort Bliss, Texas, is looking at this changing role to retain quality warrant officers and improve their professional development (see Page 47).

The following are what the branch expects of ADA warrant officers today:

- Technically proficient in one or more of 11 highly specialized weapon systems both current and proposed
- Able to lead and train soldiers
- Employ air defense artillery weapons in support of military combat operations
- Train for their wartime mission
- Assigned to varied positions which include: combat development, joint staff, research and development, training, test and evaluation, and other activities
- Advise commanders at all echelons on the technical and tactical aspects of ADA weapon systems
- Manage supply and logistics functions

The question facing this study group, in light of tomorrow's technologies, is: What will the branch expect from ADA warrant officers in the future?

ADA Career News

Enlisted

16H Being Eliminated

Soldiers with the military occupational specialty (MOS) 16H are encouraged to consult their chains of command for reclassification or reenlistment in another MOS.

The U.S. Army Air Defense Artillery School has proposed the phasing out of the 16H (operations intelligence specialist) by weapon system, beginning with Patriot. Basically, the 16H positions are to be changed to 16T positions.

Elimination of the MOS will have no direct impact on forward area air defense. All 16H soldiers will have the opportunity to reclassify or re-enlist into another MOS. Soldiers with 18 and more years of service and first-term soldiers will not be reclassified.

The Air Defense Enlisted Branch, Military Personnel Center, is accepting DA Form 4187s requesting reclassification.

Special Forces Pitch

Air Defense Artillery soldiers with an interest in Special Forces as a career are eligible, as are qualified soldiers in other branches, to seek entrance to career management field (CMF) 18, Special Operations.

Application packets from the CMF 18 recruiting team at the U.S. Army John F. Kennedy Special Warfare Center will be mailed on request. Write Commander, USAJFK-SWC, ATTN: ATSU-SP-R, Fort Bragg, N.C. 28307-5000, or call AV 239-1818/5083.

MOS 24C Restructuring Due

Continued modernization of Hawk units and the need for enhanced promotion opportunities has caused a restructuring and elimination of paygrade E-7 for MOS 24C (Hawk fire control mechanic).

Effective April 1, 1988, when 24C staff sergeants are considered for promotion to sergeant first class, it will be in MOS 24R. Staff sergeant promotables or sergeants first class who currently hold MOS 24C and want to remain in the Hawk maintenance field must attend the 24R (Hawk master mechanic course) as soon as possible.

Those not wanting to remain in Air Defense Artillery should submit a DA form 4187 requesting retraining or reclassification. For more information, contact MSgt. Foy, AV 221-8052.

MANPAD Beckons

Soldiers in grades E-4 and below are needed as Stinger gunners, MOS 16S.

Conversion of divisional Chaparral/Vulcan battalions to the Army of Excellence structure requires 16S soldiers to man the Avenger. The pedestal-mounted Stinger, chosen as the Army's newest weapon in its forward area air defense system.

Chaparral crew members with MOS 16P who are interested in reclassifying or re-enlisting into MOS 16S are invited to contact a mobile training team when it comes to their unit. These teams are training applicants to make them eligible for the Stinger MOS. For more information, contact SFC Mead, AV 221-8052.

Enlisted Force Accession Quality

The quality of ADA enlisted soldiers in career management field (CMF) 16 and CMF 23 has increased substantially since 1980.

The Training and Doctrine Command tasked the branch schools to test skill level 3 soldiers by military occupational specialty on a hands-on component. The test provided information on performance versus mental category. Results support and help develop the enlisted quality requirements. In the U.S. Army Air Defense Artillery School, the Directorate of Evaluation and Standardization tested 16Rs in FY 85 and 16Ps in FY 86.

Additionally, the Office of the Deputy Chief of Staff for Personnel has obtained some current data from the field and used it to justify to Congress the need to maintain high accession quality standards. Following are data obtained from the field that show:

- During high-aptitude soldiers' (CAT I-IIIA) first term, they perform 10 to 20 percent better than lower-aptitude soldiers.
- Soldiers with a high school diploma have a markedly lower attrition rate than non-graduates (25 to 50 percent).

TRAINING TIPS

Early Warning Scheme

A more effective early warning technique has been proposed by the Directorate of Evaluation and Standardization, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

Without a doubt, the most common air defense observation at the National Training Center, Fort Irwin, Calif., is ineffective early warning — getting early warning to maneuver units so that weapons of the combined arms team may be incorporated into the counterair operation.

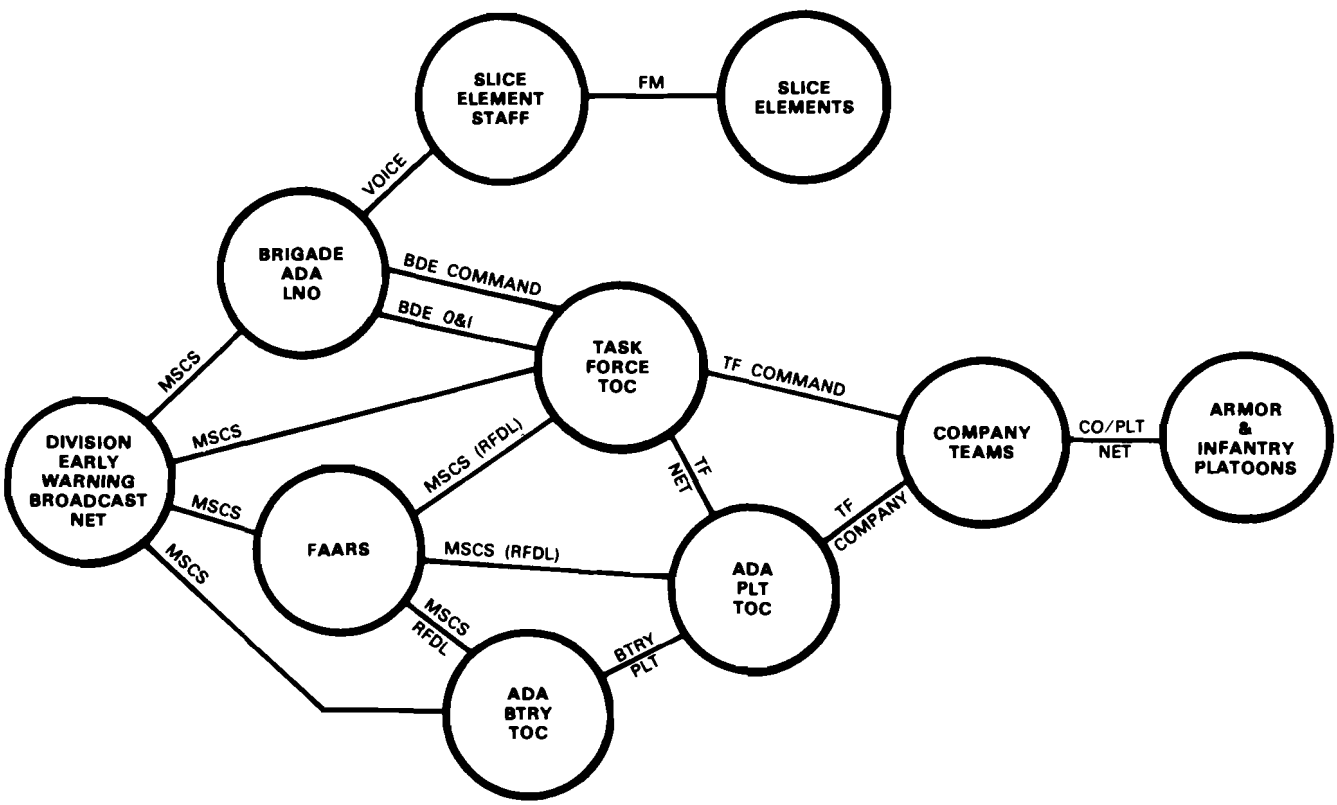
It's important to note the direct relationship between use of small arms for air defense (SAFAD) from the maneuver units and effective early warning. Maneuver units that receive advance warning of inbound hostile aircraft engage and destroy more aircraft with SAFAD. They also lose fewer of their own assets.

Every effective technique for early warning has two key elements in common. First, the manual SHORAD control system (MSCS) must be converted into something that the maneuver units can understand. Usually, the converted MSCS contains an alert (Dynamite, Bandit, Red Air or the like) and a direction (from the east, the west and so on). Some units even put in a four-digit grid. The second key element is that dissemination of this converted MSCS must be redundant at virtually every level.

The proposed technique for assuring that all units get the early warning involves radar tracks. It does not address visual early warning from scouts or observation posts. Visual tracks can be inserted at any point in the system.

The technique calls for monitoring by four cells: the tactical operations centers (TOCs) of the brigade, the task force, forward area alerting radars (FAARs) and the ADA battery. Conversion of the MSCS should be at the ADA, brigade and task force TOCs.

Early Warning Scheme



The technique is to work like this:

When the brigade liaison officer inside a brigade TOC receives a track and analyzes it as a threat, he converts it and passes the conversion by voice to all the slice element staff and liaison personnel inside the TOC. They rebroadcast it via frequency modulation to their respective elements in the brigade area. The liaison officer further passes, or ensures it be passed, with priority onto the brigade command and brigade operations and intelligence (O&I) networks.

The task force TOC monitors both the brigade command and O&I nets. To create redundancy, the air defense cell also should join the monitoring. This cell usually consists of the Stinger section sergeant and vehicle. Depending on the number and type of radios he has, he should monitor as a priority the dedicated ADA early warning net and if possible the division early warning net. He converts the MSCS and rebroadcasts it or ensures it is rebroadcast over the task force command net.

This technique allows for early warning (EW) to enter the task force TOC on three or four nets.

The FAAR monitors the division EW net and correlates that information with targets he sees on his scope. He passes the division EW tracks plus additional local pop-up tracks using MSCS format over a dedicated net used only for early warning.

The ADA battery TOC monitors both the division EW net and dedicated EW net. The Battery TOC converts MSCS and sends it out over as many nets as possible. Once air defense elements receive early warning, they must rebroadcast it, whether or not it is a task force or company team net. Company teams must rebroadcast EW on their company net to ensure their platoons and attached Stinger gunners receive it.

To emphasize the importance of rebroadcasting EW on the company team net, several persons should be designated to perform the function, not just the commander.

TC 44-20 Field Exported

Distribution of Training Circular 44-20, SHORAD Identification, Friend or Foe (IFF), begins this quarter. Feedback form evaluations by the Directorate of Evaluation and Standardization, U.S. Army Air Defense Artillery School, Fort Bliss, Texas, and from commanders in the field revealed that additional IFF training support is needed.

The training circular, a joint project by the SHORAD Department and the Directorate of Training and Doctrine, is designed to support and standardize training in the following areas:

- Preventive maintenance checks and services on IFF and programmer/battery charger
- Charging the IFF batteries
- Programming the IFF
- Instructions on how to use the code book
- Instructions on determining Zulu time

Along with the training circular, lesson plans and a video tape on programming the IFF are available. For more information, contact the SHORAD Department at AV 978-1994.

Take notes

So asserted Pvt. 2 Douglas Sparrow on completion recently of the Patriot crew member training course at Fort Bliss, Texas, when asked what advice he would give other soldiers in advanced training programs.

"Until you get used to studying," he said, "I think the most common mistake you can make is just not taking enough notes. Take notes and notes and notes. Then when the test comes, you've got what you need. You KNOW you've got what you need. And that's very comforting, just to know you've got them.

"You can't take too many notes," he said.

Sparrow, 30, enlisted last March in Atlanta for Air Defense Artillery. On completion of training as a Patriot crew member, he was assigned to 3rd Battalion, 43rd Air Defense Artillery, a new unit at Fort Bliss.

Chaparral Training Devices Peak

The Army, according to the Directorate of Training and Doctrine (DOTD), U.S. Army Air Defense Artillery School (USAADASCH), has not programmed any additional training devices for the Chaparral. However, Chaparral has a healthy variety of training devices and programs to keep them at the forward edge of combat readiness.

From initial entry training to annual service practices, from field training exercises to identification, friend or foe (IFF) subsystem training, Air Defense Artillery offers comprehensive training devices for Chaparral.

The USAADASCH conducts initial entry operator and organizational maintainer training using tactical systems, dummy missile rounds, the AN/TSA-T3 Simulator/Trainer, and the IFF simulator set. One important addition to school training for Chaparral, however, is the student interactive training system which will enhance institutional training by using interactive video disc and computer-assisted instruction. USAADASCH is developing 265 hours of instruction.

Short-range air defense units conduct follow-on individual and collective training using targets of opportunity, radio-controlled miniature aerial targets, live fire during annual service practices and the training devices mentioned above.

The AN/TSA-T3 trains 16P crew member gunners in the basic skills of target engagement. The trainer was fielded in the 1960s, and one device was issued to each firing platoon. The device consists of two major components: the Chaparral missile simulator and the simulator/evaluator.

The IFF subsystem training set allows evaluation of the Chaparral gunner's reaction to simulated IFF tones. The set is similar in size, weight and appearance to an IFF interrogator. The trainer was fielded in the 1970s.

FEEDBACK

'Johnnies on the Spot'

When Bill Sunde, SFC Steve Laflin and Spec. Baron Brown arrived at the Fort Carson, Colo., battalion that had asked their help with inoperable Vulcan gun systems, they came upon the cause of the problem just as they walked in the door: defective and incorrect repair parts.

Before them were maintenance shop personnel unpacking and testing three declutching feeders and six internal drum assemblies just arrived. Wrote Sunde in his report:

"During the test, all three declutching feeders failed gage 4 on the aft rim guide. Four of the internal drum assemblies were totally unacceptable and two were marginal because of cracks, dents, broken welds and the like."

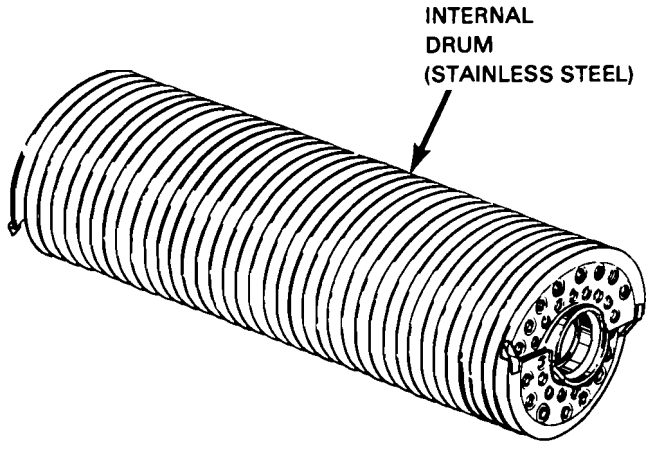
The damages had occurred before or during shipment, said Sunde, civilian instructor in the Short Range Air Defense (SHORAD) Department of the U.S. Army Air Defense Artillery School at Fort Bliss, Texas.

Laflin, noncommissioned officer in charge of the Vulcan/FAAR branch of SHORAD Department, and Brown, Vulcan specialist with the 118th Ordnance, shared with Sunde the trouble-shooting mission to Fort Carson.

The trouble-shooting trio also discovered that, although a variety of partitions received at Fort Carson had the same stock numbers, their parts numbers were different and could not be used interchangeably.

To correct and avoid problems with the M1631A1 self-propelled Vulcans' controlled feed systems, Sunde issued these firm recommendations:

- Use only the double partition, Part Number 8436996, 15 each per storage drum.
- Use only the separator partition, Part Number 8436938, one per storage drum.
- Use only partition retainer, Part Number 12007586, NSN 1005-01-086-6922.
- Most important, if you receive defective or incorrect repair parts, prepare an SF-368 (Quality Deficiency Report) and send them back to the supply depot from where they came, and if this seems to happen too often, request command assistance to get the problem solved. (POC: Commandant, USAADASCH, ATTN: ATSA-SHC-V, Fort Bliss, Texas 79916-7155, AV 978-3094/5015/6680.)



Internal drum assemblies as shown in drawing were unpacked and found to be damaged.

FAAR Training

The Directorate of Evaluation and Standardization (DOES), U. S. Army Air Defense Artillery School, Fort Bliss, Texas, has determined that many units have difficulty with planning, coordinating and executing of forward area alerting radar (FAAR) coverage for a brigade area.

Some FAAR operations have been substandard at the National Training Center because unit leaders lack the time and expertise to effectively plan, coordinate and execute FAAR operations supporting a brigade sector.

FAAR integration into the maneuver plan is extremely important. With the addition of Hawk to each rotation, FAAR operations will become even more important to the counterair operation. Air defense units that involve their FAAR platoon leader experience greater success than those that rely on someone else to control FAAR operations.

This success comes through his being their dedicated leader and the FAAR sections not having to share time with someone else. Therefore, DOES recommends that rotational units take along their FAAR platoon leaders. Many never get to train in a combined arms environment. Although each platoon leader will have only two or three FAARs, these still will be excellent training opportunities.

SCANNING

Stingers, Blowpipes

Introduction over a year ago of British Blowpipes and United States Stingers changed the Afghan battlefield by making air defenses even more dangerous than operational attrition.

Published figures from Western sources typically have put Kabul government and Soviet aircraft losses at 1.2 to 1.5 aircraft per day (438 to 547 annually) since late 1986. Such numbers are optimistic. They could be true only if *mujahideen* missile crews are achieving kill probabilities close to U.S. test results of 77 percent.

A more realistic estimate assumes a kill probability of 33 percent. With an effective inventory of about 800 missiles last year, this translates into the destruction of about 270 aircraft per year, or almost .8 per day. Combined with operational attrition, the figure reaches a total of 390 to 510 aircraft lost annually from all causes. These numbers coincide nicely with published figures which seem to exaggerate the missile's effectiveness by erroneously assuming that all aircraft losses are due to the missiles.

The huge increase in losses due to the new missiles is straining even the enormous Soviet air fleet. The losses come at the same time that Soviet military aircraft production is declining from 1,500 fighters and helicopters in 1983 to 1,150 in 1986, according to Department of Defense estimates.

The economic loss is already consequential. Destruction of 270 additional aircraft a year represents a loss of about $2.2 billion.

Having confronted the Stinger and Blowpipe in combat, Soviet aviation is learning valuable lessons. To reduce the vulnerability of their aircraft, the Soviets have already implemented an initial modification program. For example, they've added louvers to helicopter engine exhaust ducts to reduce their infrared signature and screens to keep missiles out. All close air support aircraft in Afghanistan employ suppressive countermeasures, as do transports.

The Stinger quickly has become the most celebrated rebel weapon of the West. Soviet Mi-24 Hind gunships, once the scourge of the battlefield, have now become the quarry. The rebels can move and fight with greater confidence. They have gained much of the advantage of surprise and initiative that characterizes successful insurgencies. The impact of the missiles extends beyond the fighting. By providing the *mujahideen* with a potent symbol of martial prowess, they have strengthened the morale and resolve of the four million Afghan refugees. (*Armed Forces Journal, September 1987*).

Cercy Takes Command

Maj. Gen. James C. Cercy assumed command of the 32nd Army Air Defense Command at Darmstadt, Federal Republic of Germany, in Aug. 5 ceremonies at Griesheim Army Airfield.

Cercy formerly had commanded the 108th Air Defense Artillery Brigade and the 2nd Battalion, 60th Air Defense Artillery. He returned to the 32nd after a six-year absence. He had been commanding general of the U.S. Army Laboratory Command, Adelphi, Md.

Israeli Pushes

Almost immediately after dropping its Lavi fighter project, Israel's defense ministry sent notice to the U.S. Defense Department that it regards its anti-tactical ballistic missile (ATBM) program as one of its top priorities.

U.S. observers see the move as calculated to encourage the United States to test and evaluate Israeli ATBM systems for the Strategic Defense Initiative.

Two Israeli companies, Israel Aircraft Industries and the armament firm Rafael, have produced anti-ballistic missiles, but neither firm has any commitment from the Pentagon on them. (*Defense News, Sept. 7, 1987).*

Soviet System Advances

The new Soviet SA-12 mobile air defense system is entering service, reports the Aug. 31 issue of the newsletter *For Your Eyes Only*, raising problems for military planners and arms control negotiators.

One version, the SA-12a, code-named Gladiator, has entered service in the southern and western USSR, says the newsletter. It has been tested against short-range ballistic missiles.

The other version, the SA-12b, code-named Giant, reportedly still is being tested. It apparently is being configured as a mobile anti-ballistic missile system. Vehicles of the SA-12b are to be carried on the same trains as the SS-24 rail-mobile intercontinental ballistic missile, says the newsletter. When the train moves out of its tunnel and into a firing position, the Giant vehicles will unload themselves and disperse to provide an ABM defense system.

The SA-12b also may be deployed as part of the new regional ABM network. Its ability to redeploy periodically would complicate attack planning.

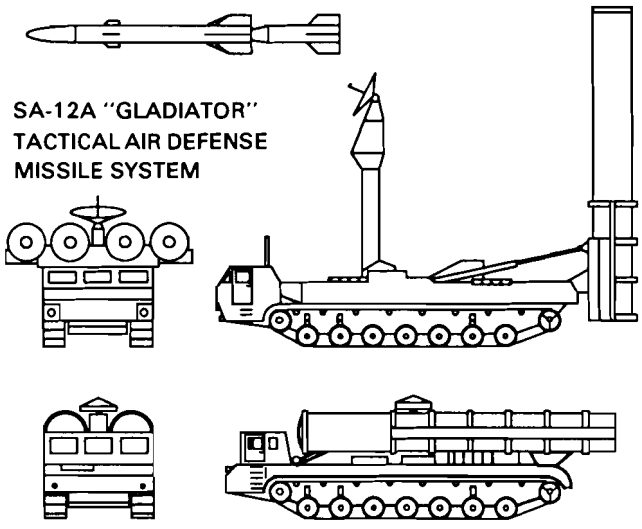
Both vehicles use a modified MT-T armored tractor, which is based on the hull of the T-64 tank. The vehicle itself is 9.3m long and weighs about 18 tons. With missiles, the weight increases to 20 tons (24 for the SA-12a). Several similar vehicles exist, including two transporter-erector-launcher (TEL) vehicles (shown in drawings), a command vehicle, a transloader and two early-warning vehicles with different large radars.

The missile itself is 7.5m long and has a maximum range of 80 kilometers (100 kilometers for Giant).

Unit organization is unclear, but there apparently are three or four batteries per battalion with up to four battalions per brigade. Each battery includes two or more TELs, one or two transloaders, a command vehicle and possibly a radar vehicle. Battalion headquarters includes more radar, command and transloader vehicles.

Development of the SA-12 systems, says the newsletter, indicates a continuing Soviet reach for a combat capability that will function even in a strategic nuclear environment.

For Your Eyes Only publishes biweekly in Amarillo, Texas. The editors cite various sources for its information about the SA-12 versions.



SA-12B "GIANT" MOBILE ANTI-BALLISTIC MISSILE

Drone Builder Chosen

Honeywell's Sperry Defense Systems Division of Albuquerque, N. M., has been awarded a U.S. Army Missile Command contract to design and develop the control system for an unmanned drone version of the Sikorsky S-55 helicopter.

The firm also has received a contract from Mitsubishi Heavy Industries of Tokyo to develop a full-scale aerial target system for the Japanese Defense Agency. The development effort will provide drone avionics equipment and operational engineering capability for conversion of F-104J prototype aircraft into aerial target drones. (*Defense News, Sept. 7, 1987*)

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- Foreign forces

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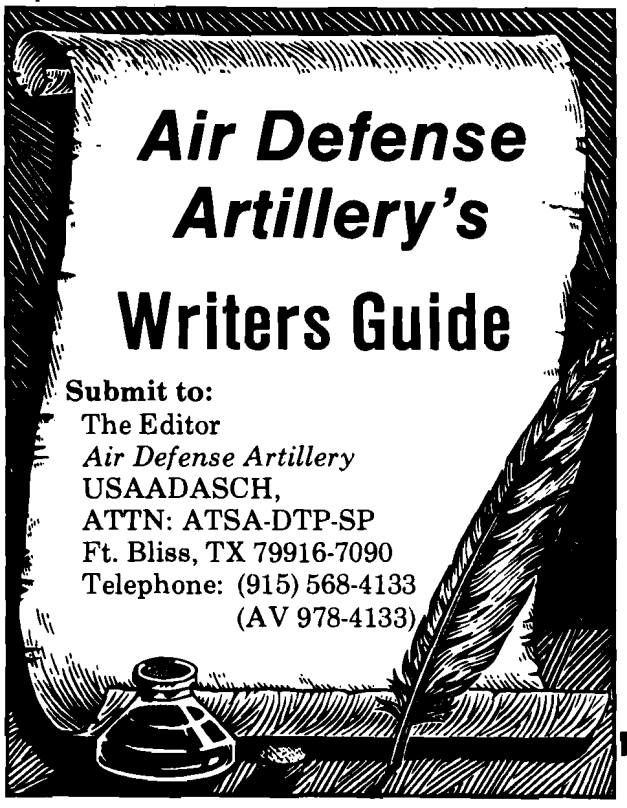

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Coming in the next issue . . . **FAAD's line-of-sight forward (heavy) component — "up close and technical."**