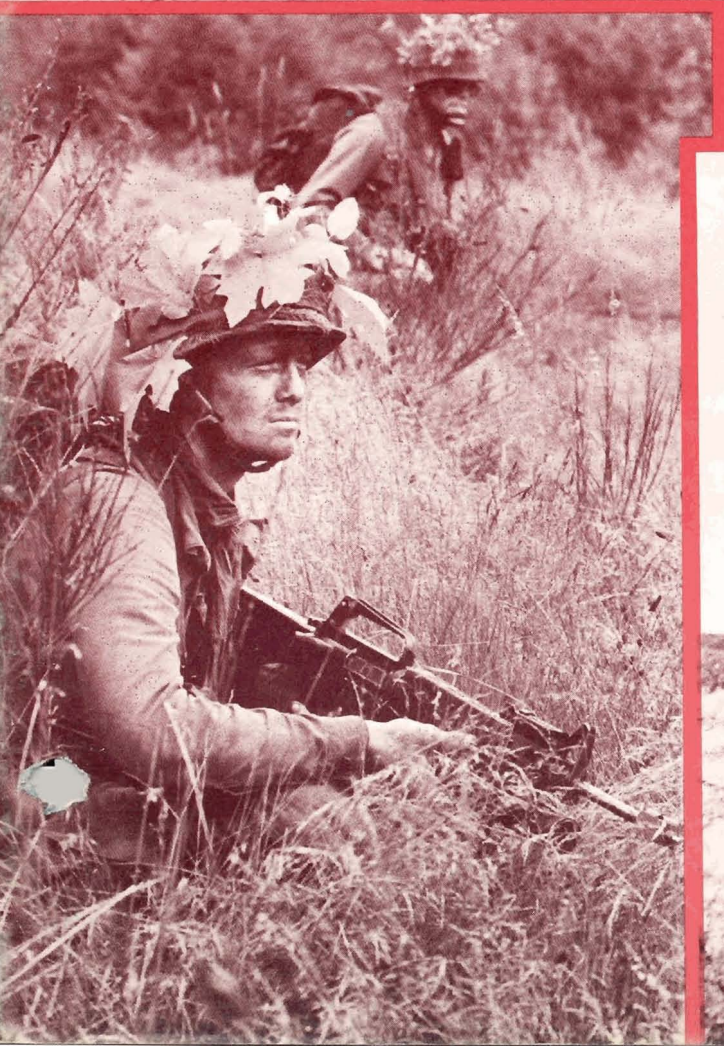
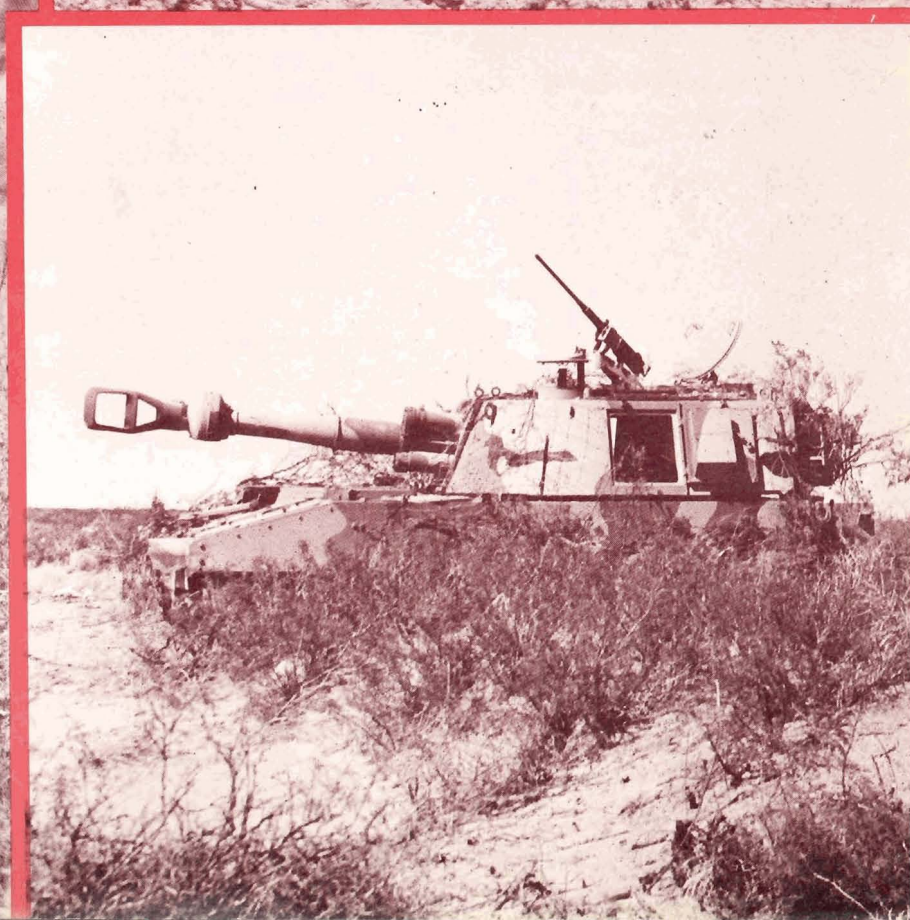
AIR DEFENSE MAGAZINE

JULY-SEPTEMBER 1980





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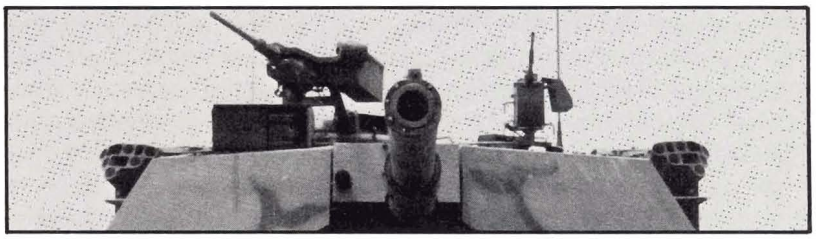

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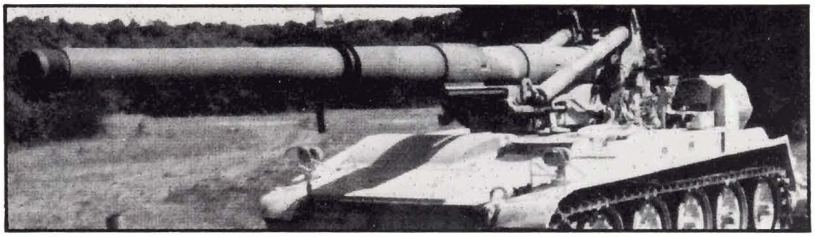

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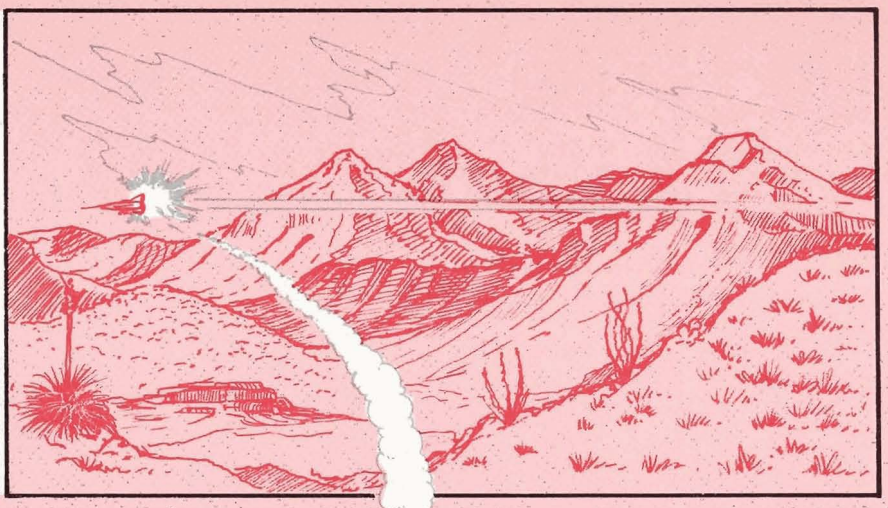
COVER: In this issue we feature the other members of the combined arms team: Infantry, Armor, and Field Artillery. Articles discribing their missions and functions begin on pages 9, 14, and 19 respectively.

AIR DEFENSE

"The Bridge over the Chasm of Defeat."

Editor
W.E. SANFORD

Assistant Editor
JUSTIN R. ORMSBY



INTERCEPT POINT

MAJOR GENERAL JOHN B. OBLINGER, JR.

In a recent issue of AIR DEFENSE Magazine I discussed the progress that has been made in recent years in training techniques at the US Army Air Defense School (USAADS). The article included a list of training simulators now in use or under development. In this issue, I would like to provide a brief description of those simulators and some of the advantages they offer, not only to the training establishment but to the soldier in the field. But first, a word on why we have expanded into training by simulation.

In the past, we have used tactical units in various aspects of training, particularly in firing exercises. Today, the rising prices of fuel, ammunition, and repair parts make the cost of training on tactical weapons prohibitive. For many training objectives, it is far more cost effective to use simulators than to use actual weapon systems.

Simulators permit repetitive operational training under many different simulated conditions. Thus, the soldier or the unit gets the practice that insures the proficiency to perform their combat mission.

The simulators fall into two categories, those for current and new weapon systems and those that simulate the environment and conditions soldiers will experience on the battlefield. Looking at the first category, we have several simulators in use and some others that have been procured.

The Moving Target Simulator (MTS) offers realistic indoor training for Redeye and Stinger gunners. It presents realistic targets and sounds that can be expected in the forward battle area. Students use the tracking-head trainer (THT) that simulates the Redeye system at present and will simulate the Stinger system when fielded. The THT has visual and sound indicators that tell the operator whether he has performed all steps of the firing sequence. The MTS is in operation in the US, Germany, Hawaii, and Korea, and more are planned for posts in Germany and the US.

We have the AN/TSQ-73 Trainer for training Chaparral gunners and enabling them to maintain proficiency. It permits the use of the tactical launch station itself for conduct of the training. The system also allows an instructor to monitor the actuation of controls by the gunner, insert error signals to the gunner, and monitor the gunner's tracking performance against live targets of opportunity. The AN/TSQ-73 permits a competitive situation either in a training mode or in repetitive drill of trained gunners. The primary advantage we gain from this simulator is that it will be used both in the School and the field.

The FAAR Simulator is a computer-controlled, multistation, classroom trainer that displays targets and data. It has 10 independently controlled operator positions. A great advantage is that it records each action the students perform

and retains the results for reference and evaluation. A small, compact, portable FAAR Field Simulator, which basically performs as the FAAR Simulator, has been developed and is at present in the procurement channel. This field simulator will go a long way toward providing trained operators with a means to maintain their skill proficiency.

We have the Hawk AN/TPQ-29 Simulator, which provides on-site, tactical fire control training of Hawk operators. Up to six independently maneuverable targets can be displayed on the various video indicators within the battery control central (BCC). The device simulates target doppler and allows our BCC crews to simulate missile launching and firing procedures. The main advantage is that it can simulate a variety of abnormal situations to train the crews in adverse conditions.

For Nike Hercules we have the AN/TPQ-T1 Simulator to add realism to instruction. As with Hawk, the trainer provides simulated conditions that permit training in fire control operations.

For our new, sophisticated weapon systems coming on line, USAADS is procuring these simulators:

The DIVAD Gun Troop Proficiency Trainer (TPT) will be an onboard, computer-driven, operator trainer. The optical sight and software will permit us to use the fire unit as a tactical operator proficiency trainer in the field. The TPT will also be used to evaluate individual and crew performance/skill qualification tests (SQT).

Somewhat like the DIVAD Gun TPT, the Patriot Troop Proficiency Trainer (TPT) will permit operators to gain proficiency in fighting the air battle and allow individual evaluation. The Patriot TPT will be in cassette form so it can be easily inserted into and removed from the Patriot computer. Its prime advantage is its low cost.

The Roland Operator Proficiency Trainer/Evaluator (OPTE) will provide training for Roland commanders and gunners and will consist of an instructor station and electrical cabling to a Roland tactical fire unit. Through simulated target inputs, instructors will be able to monitor and evaluate the crew's responses to the various simulated air battle situations.

We expect that Stinger gunner training will follow a course similar to Redeye. The MTS, as stated before, will be modified to accommodate Stinger training. In addition, a requirement document has been initiated to develop a Stinger launch simulator that will simulate the noise, vibration, and launch of a Stinger missile.

Modern battlefield simulation (the second category of training devices) involves the Multiple Integrated Laser Engagement Simulation Air Defense (MILES-AD). This tactical training system initiates the air-ground combat environment for short-range air defense weapons and attack helicopters. Our weapon systems that will be able to use this simulator now are Chaparral, Vulcan, and Redeye. Stinger and the DIVAD gun will be incorporated into the MILES when they are fielded. The MILES-AD free-play scenario, weapons-firing simulations, and quasi real-time casualty assessment provide our troops realistic interaction with the "enemy."

As you can see, the thrust is toward simulations for realistic and effective training. The student works in an integrated training environment that presents the complete operation of a weapon system. The learning process is reinforced through visual display techniques, computer-aided instruction, and preprogramed audio response. Students can work in an individualized, performance-paced mode, thus reducing the total training cycle while being afforded more practice opportunity.

I'm sure we all welcome these innovations and the advantages they provide in outstanding training at costs we can afford.

John B. Oblinger

GUEST EDITORIAL

by Colonel Joseph W. House

Much has been written in recent years regarding the way of life of our senior military commanders and of the entitlements of their position. Congressional investigations, charges, counter-charges, and proven abuses of the system have resulted in a drastic reduction in senior officer privileges. Whether the charges are true or whether criticizing general officers and their conduct happens to be the style of a particular member of Congress or columnist, they have caused a lot of internal examination and policing of the system. In most instances, a moderate life-style is accepted and adhered to by senior commanders. However, one of the privileges of a general officer that cannot easily be dispensed with is his personal staff.

The truth is, managing the life of a major commander is an awesome responsibility. Staff members are a select group of individuals, and a great deal of prestige goes with their jobs. But there can be pitfalls.

When an individual is selected as a member of the general's staff, the normal tendency is to overreact. It is always easier to get the job done by implying that "the general wants" or "this is for the general." A classic case occurred a few years ago when an overzealous staff dispatched an additional aircraft to deliver a personal item of a senior Army commander to a distant post. The staff had no intent to deceive, misuse funds, or do anything illegal. The only thought was to "take care of the boss."

A fine ethical line, often difficult to see, governs the rapid day-to-day pace kept by today's general officers. The personal staff must totally support this officer while constantly keeping within the boundaries of ethics and integrity. In their eagerness to please, staff members must be careful not to jeopardize ethical standards.

Taking care of the boss calls for total loyalty and confidentiality. Members of the personal staff are often exposed to information that should, under no circumstances, be discussed with anyone. They are exposed to the general's likes and dislikes, peculiarities, moods, health, family matters, and other personal information. Staff members should know enough to keep these things as private as they would their own personal affairs. After all, the boss is human. He has good days and bad days like everyone else.

Occasionally, staff members act as a sounding board for opinions and ideas. General officers sometimes seek another view or an opinion expressed from a subordinate's perspective. Care should always be taken, however, to insure that judgments by personal staff members are factually correct and free of prejudice. Actions taken or decisions made that may be influenced by their comments could have far-reaching impacts.

It isn't always easy to take care of the boss, but from the driver all the way up to the senior aide, this is the job of each member of the general's staff. The hours are long and, while much of the time spent is rewarding, some of it can be downright frustrating. But if he does his job to the best of his ability and he tells the boss the truth — good or bad, as a staff member, he can take solace in the fact that he has made the boss' job just a little easier.

ENGAGEMENT ZONE

letters to the editor

TO THE ADA LIEUTENANTS

The two letters that follow are addressed to you, and the combination is self-explanatory.

-Ed.

Dear Lieutenants:

As I prepare to depart MILPERCEN and relinquish my duties as your assignments officer, I would like to offer a few observations.

But first, I want to thank all of you for your help and understanding over the past year. Worldwide changes in operational requirements may have caused me to work on a few weekends, but I realize you were the ones who had to be diverted from Yongsan to Frankfurt, or called at home and asked if you could leave 60 days earlier than planned.

Many of you have expressed concern about which jobs are good or bad. Well, as you have heard over and over, they are all good if you do the job well. But I urge you *not* to let your years as a lieutenant slip away without spending time with troops.

Talk with (and listen to) your battery and battalion commanders. Their advice and the ongoing and upcoming missions of their commands will be vital in planning your future assignments.

To the many new women joining the air defense family, welcome. I asked the senior woman air defender, CPT(P) Sue Cheney, if she would address some of the questions and concerns being raised by newly commissioned women. She responded with the following letter. I commend her counsel to all new lieutenants, men and women. Her remarks are right on target.

I look forward to working with you in the field and I am certain that your new assignments officer, CPT Silas Smalls, will enjoy his association with you.

ROBERT F. CHRISTIAN
MAJ, ADA
AD Management Section
Combat Arms Division

Dear Lieutenants:

Welcome to Air Defense Artillery. You are about to start a career in an exciting and challenging field. I am sure you are aware that you are entering a predominantly male branch. Your assignments officer and I know from experience that you have apprehensions and questions that are unique to the women officers. Hopefully, this letter will answer some of your questions. If you have more, you are welcome to write to me and ask.

I have been an air defender for 7 years and have been assigned to units in CONUS, Korea, and Germany. My experience includes the Nike Hercules, Safeguard, and Improved Hawk systems. I had no idea what I was getting into in 1973, but knowing what I do now, I would do it again.

Normally, the first question asked is, "Can I expect the same assignments as a male officer?" Emphatically yes! Most 2LTs, after graduating from the basic course, are assigned as platoon leaders in line batteries. We currently have women assigned in Korea, CONUS, and Germany as platoon leaders, and reports say they are doing well.

"Will I have the same career progression opportunities as the men?" Again, emphatically yes! I am presently commanding an Improved Hawk line battery. I have a tentative assignment in October as a battalion S3 officer. The opportunities are there. Work for them, ask for them, and they are yours.

"What is the atitude of the men?" Because of the small number of women officers, you will probably be the first one assigned to your unit. The first thing to remember: this is a new situation for the men, too. They have apprehensions the same as you do. They are professionals and will attempt to

be fair. They will be watching you to see how you handle yourself. There is a definite difference between the E4s and below and the NCOs and officers. To the E4 you are another officer. To the senior soldiers you are a woman officer. This creates problems only if you allow it to.

"Is there chauvanism? Is there sexual harrassment?" Admittedly, some. I have seldom encountered either, but it is there on occasion. Keep your sense of humor. Normally, the problems arise more from being uninformed than vindictiveness. Frequently the women themselves create the atmosphere that allows these problems to develop. However, be assured that serious incidents of this nature will be dealt with swiftly and fairly by your chain of command. If you conduct yourself as an officer at all times, are knowledgeable in your duties, and aren't afraid of work, you will seldom encounter a serious problem with either.

"I've read and heard about the quality of today's soldier. Is this going to be a problem for me?" Only one comment: this is my fourth command and though the S3 assignment is one that I have wanted, my one regret will be not working with soldiers on a daily basis. Leading is a challenge, but it is what your new career is all about.

Again, welcome to ADA. Good luck in your career. I know you will do well. I am looking forward to meeting you through the years.

S. P. CHENEY
CPT(P), ADA
Commander
Btry C, 2d Bn, 62d ADA

FROM THE JUNIOR SET

Dear Sir:

I'm 13 years old and I'm a patch and crest collector. I have seen the January-March 1980 AIR DEFENSE Magazine. On the front there are sustaining base (ADA FORSCOM) units. Could you please identify them and, if possible, could you give me their mailing addresses? I sent the front cover of the January-March issue. Could you put their identity on it and mailing addresses?

I was reading the "Civilian Cadre National Guard Technicians" by Captain Joe Montoya. I wrote him a letter too, but I don't know his address. The letter is inclosed. Would you please forward it to him for me?

I really enjoyed reading Lineage and Honors of the 1st ADA. Since your magazine comes out four times a year, I'm really looking forward to reading the next Lineage and Honors.

JOHN R. PATTON

We knew AIR DEFENSE Magazine reached a wide audience, but this is the first we knew that it had captured the interest of young men your age. We are pleased to provide the information and services you requested, and we wish you joy and success in your hobby of collecting patches and crests. We also invite our readers to donate insignia to your collection. They can be mailed to the following address: 4212 Halupa Street, Honolulu, HI 96818.

-Ed.

FROM INDONESIA

Dear Sir:

I have just finished reading a copy of the AIR DEFENSE Magazine. I was especially interested in the article titled "History of Air Defense." I am presently a student in the Air Defense Artillery Officer Advanced Course in Malang, Indonesia. I am trying to learn as much about Air Defense Artillery as I can, and I hope you can assist me in furthering my knowledge. I would like to obtain copies of past AIR DEFENSE Magazine issues - if there is no problem in sending them abroad.

In addition, I would be greatly interested in corresponding with other officers in the Air Defense Branch. Thank you for your attention to this matter. I am hoping you can comply with my request.

ART DJOKO MULJATNO
CPT, ADA
Air Defense Artillery Advanced Course
P.O. Box 59
Malang, Indonesia

This is typical of many letters we receive from foreign officers. It is our policy to respond favorably to requests for AIR DEFENSE Magazines. Interested officers may write to Captain Muljatno at the above address.

-Ed.

A WORD OF PRAISE

Dear Sir:

The proliferation of articles by former officers of 32d AADCOM and particularly of the 94th AD Group in your January-March 1980 issue was most gratifying. Of special interest to me was the exemplary article by Captain John Urias, "Preparation for a Nuclear Surety Inspection." Our officers and NCOs of Nike Hercules should use that article as a primer for their surety programs.

While in Europe I had the opportunity to observe Captain Urias' surety program from various perspectives. He arrived there as an eager young lieutenant and was immediately thrust into the surety challenge he describes. His acknowledged success attests to two truths I have always believed: that the key to outstanding inspection results is a high day-to-day readiness and that a major factor in the development of a successful officer is a reliable (first) platoon sergeant. SFC James Clark was Captain Urias' first platoon sergeant, and their successes individually and as a team were recognized throughout 32d AADCOM.

The Nike Hercules officers need to recognize that excellence on their mature system is both necessary and achievable. Captain Urias has provided the thoughts behind his checklist for their use and continued success. Our Nike soldiers can thank him for passing on the wisdom of his experiences.

TERRENCE J. CAMP
LTC, GS (ADA)
DA System Coordinator
Office of the DCS for RD&A
HQ, DA

Thank you for your laudatory comments concerning Captain Urias' and SFC Clark's work. You have provided a valuable footnote to the article.

-Ed.

A BACKWARD LOOK AT HIND

Dear Sir:

The article, "The Hind—Myths and Facts," which was published in the January-March 1980 issue of AIR DEFENSE Magazine caused us some alarm. We didn't know that the Soviet Hind-D was so similar in appearance to our helicopters. On page 14 is the statement, "The illustration comparing the Hind with the AH-1G provides some distortion in that it compares the aircraft in a landed position." The Hind is very distorted. It looks just like an AG-1G. While in flight, the Hind looks just like the UH-1B and UH-1H. Does this mean we need to see the national markings before we can recognize aircraft? Also, we didn't see the scale drawings of the Hind mentioned in the article.

Granted, we are Field Artillery Officers, yet we know what a Hind looks like and its approximate size, and the only picture of a Hind is in the red star on page 12.

MICHAEL T. CHYCHOTA
CPT FA

MARC G. MILLER
2LT FA

RONALD L. BENNETT
CPT FA

Dear Sir:

In reading the Hind article in the January-March 1980 issue of your magazine, I feel that you committed a disservice to your readers by deleting the scaled comparisons of the Hind versus the AH-1G, UH-1B, and UH-1H aircraft, especially when it could be crucial to demonstrate differences between enemy and friendly aircraft to air defense unit crewmen.

DWIGHT E. HICHOLS
US Army Human Engineering Lab.
MICOM Detachment
Redstone Arsenal, AL 35809

See my comment on page 8.

-Ed.

Space limitations prohibit publishing the next installment of Lineage and Honors in this issue. The series will be resumed in the October—December 1980 issue.

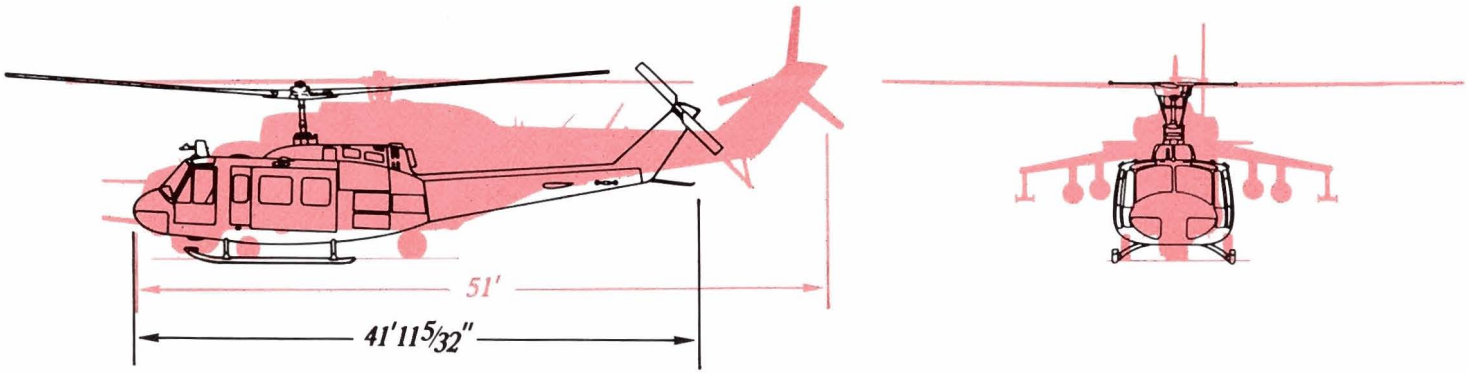
-Ed.

We understand your dismay at finding no comparisons between the Hind and the US helicopters mentioned. The simple answer is that our printer somehow failed to print the color overlays of the Hind that would have shown the comparisons. The complete drawings are printed here to clear up questions in the minds of interested readers.

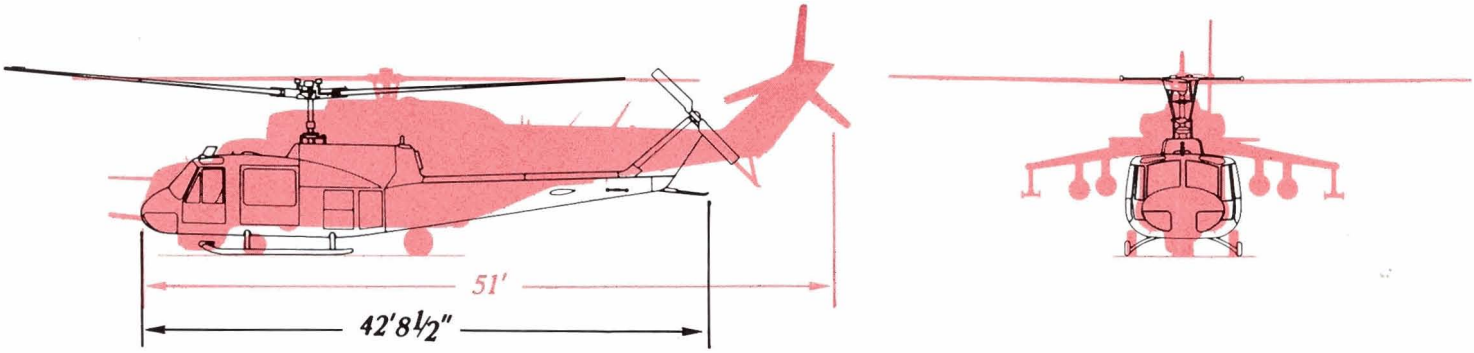
-Ed.

size comparison

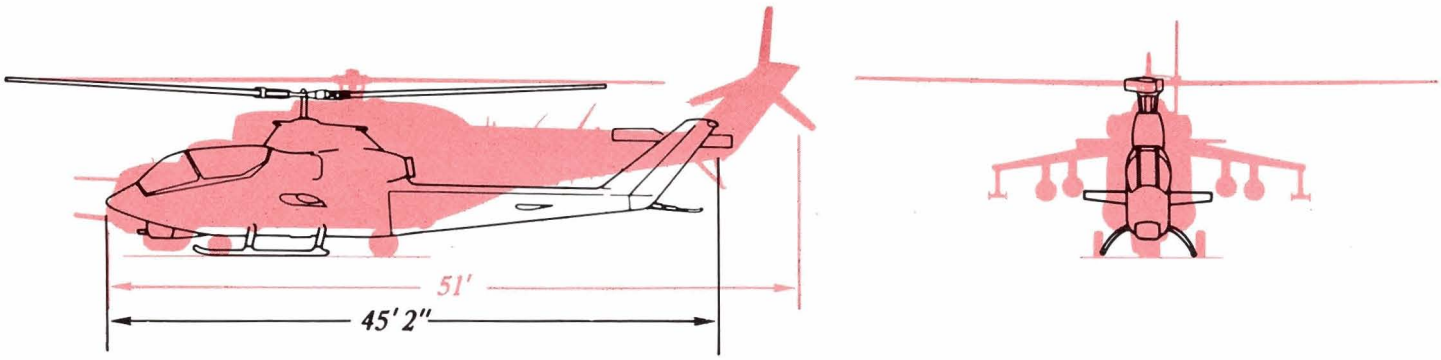
HIND-D
UH-1H



HIND-D
UH-1B



HIND-D
AH-1G



When the INFANTRY magazine staff was asked to write an article on the various roles of the infantry, my first response was, "That's simple. We've got the plain old infantry, and we've got airborne, air assault, Ranger, and mechanized infantry."

That was a double mistake. First, the boss said since I thought it was so simple, I could have the job of writing the article. Then he reminded me that these are just the various types of infantry units. "They don't tell anybody what infantrymen can actually do." When I said, "Infantrymen can do *anything*," he responded, "Never mind what we *tell* you we can do," and reminded me that the article was to be for AIR DEFENSE Magazine, not INFANTRY.

So I had to admit that the infantry gets some help from its brother branches and sister services —combined arms team and all that. Then *I* had to get some help from the Directorate of Doctrine and Literature here at the Infantry School to find out what some of the roles of the US infantry really are.

The United States infantry came into being on 14 June 1775 when the Continental Congress authorized the raising of 10 companies of riflemen in Pennsylvania, Maryland, and Virginia as part of the new Continental Army.

Although its weapons and equipment, and consequently its tactics, have become increasingly sophisticated, the infantry still has the same basic mission it had then — to get to the battlefield and close with the enemy by fire and maneuver to destroy or capture him, or to repel his attack by fire, close combat, and counterattack. The various types of infantry units have evolved over the years in response to the need to get to the battlefield quickly and to accomplish this basic mission in various parts of the world and on differing types of terrain. In the process, the infantry has become the most mobile and the most flexible of the Army's combat arms. It can move by land, sea, or air and arrive at its destination ready to fight; it can land by parachute; it can operate effectively under almost all weather conditions; and it can overcome natural and manmade obstacles that would stop other forces.

The infantry of today wields a tremendous amount of combat power. The riflemen, grenadiers, and machinegunners of its rifle platoons provide the basic close-combat capability, and these troops have their own responsive indirect fire support in the form of 81-mm and 107-mm mortars. To defeat their old enemy, the tank, infantrymen are now equipped with a formidable array of TOWs*, Dragons, and LAWs**, which enables them to destroy tanks at long, medium, and short ranges. These weapons contribute significantly to the Army's combat power. With them, the infantry is the one member of the combined arms team that can begin a battle at 3,000 meters or more and finish it at the range of hand-to-hand combat.

Because the US infantry has this mobility and flexibility, it is imperative that every member of the combined arms team understands its roles and abilities.

In discussing the specific roles of infantry units, it is useful to refer to them as nonmechanized (basic infantry, air assault, airborne, and Ranger) and mechanized, with the understanding that dismounted mechanized units have some of the same roles that nonmechanized units have.

*Tube-launched, optically tracked, wire-guided (antitank missiles).
**Light antitank weapons.

THE INFANTRY: ITS ROLES AND MISSIONS

by Marie B. Edgerton

Basic Infantry

The infantry battalions that are sometimes called "light" or "straight leg" battalions constitute the basic infantry arm. These forces are best suited to seizing and holding ground in restrictive terrain (often called "infantry terrain") including areas of steep relief, thick vegetation, or sprawling urbanization.

Not abominable snowmen on skis, but intrepid infantrymen in the arctic.

On terrain that allows more maneuver, the infantry battalions can also play a role, such as occupying strong points, providing rear area security, or conducting raids and ambushes.

But if the concept of an infantry battalion is simple, that simplicity also gives it a remarkable flexibility. As long as US defense interests require forces in far-flung corners of the world — with units now on the ridges of Korea, in the jungles of Panama, on the tundra of Alaska, and in the streets of Berlin — there will always be a need for basic infantry units to protect those interests.

Airborne

In 1940, in response to the need to get infantrymen behind enemy lines to seize and hold ground, 48 men from Fort Benning's 29th Infantry Regiment were formed into the Airborne Test Platoon. From their first jump to the end of World War II, airborne infantrymen established an unsurpassed tradition of spirit and courage.

Soldiers of the 1st Battalion, 509th Infantry parachute onto Vicenza, Italy's Dal Molin airfield upon their return from Wildflecken, Germany.

Today's airborne infantrymen carry on the tradition. Serving as the nation's strategic reserve, they remain ready to go any time, to jump into any part of the world, and to seize key terrain deep in hostile territory. If war should break out in any of a number of remote areas of the world, airborne infantrymen undoubtedly would be among the first US troops on the ground.

This kind of strategic mobility, however, comes at a price. The airborne unit is limited in the amount of combat power it can put on the ground and in the length of time it can defend an isolated airhead. For that reason, successful airborne operations normally depend on a plan for aerial resupply or for link-up with ground forces.

Air Assault

The soundness of the air assault concept was demonstrated in Vietnam, for never before could infantrymen move so rapidly about the battlefield.

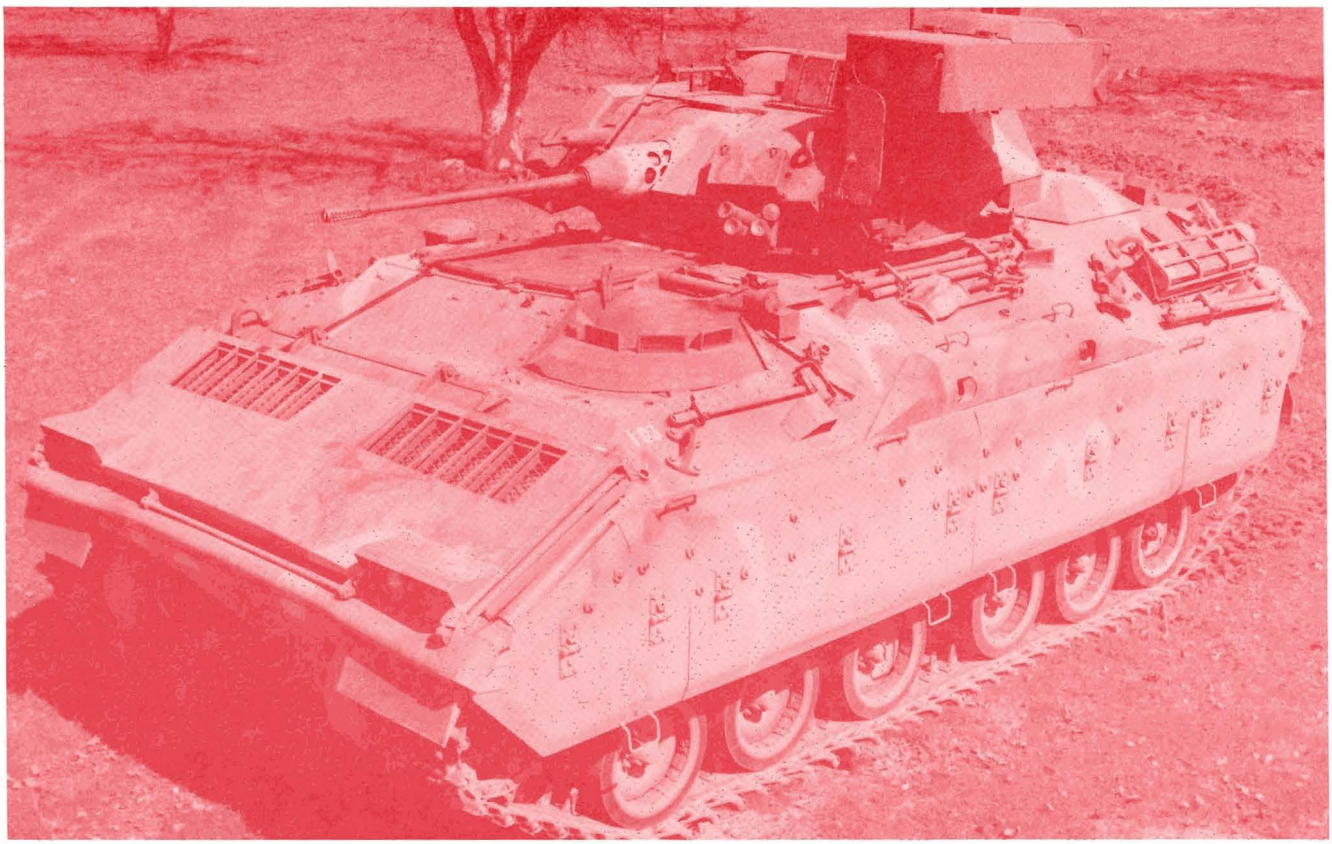
Air assault units can bypass obstacles or hostile defensive positions, attack command posts and other key installations, or form a reserve that can

A door gunner stands ready as a string of Hueys prepare to move infantry troops during an 82nd Airborne Division combined arms Army Training and Evaluation Program.

EDREs = Emergency Deployment Readiness Exercises

rapidly exploit success. In addition to the current air assault division, the 101st Airborne, the Army retains a limited air assault capability in its other infantry divisions. It can even conduct air assaults with dismounted mechanized infantry units, if they are augmented by helicopters.

But there is a price to pay for heliborne mobility, too. Air assault troops are vulnerable to enemy air defenses while they are in the air and, once on the ground, they lack some of the combat power of basic infantry units. In fact, the air assault infantry battalion of today is lighter than its airborne counterpart. The challenge, then, for air assault infantry is to increase its survivability to keep up with the demands of the battlefield of the 1980s. The UH-60 Black Hawk helicopter and the high mobility multipurpose wheeled vehicle should help.



The M2 Infantry Fighting Vehicle, one of the two new Fighting Vehicle Systems currently being tested by the US Army Test and Evaluation Command.

Rangers

Ranger battalions, composed of specially trained soldiers who are both airborne and Ranger qualified, are organized for rapid deployment anywhere in the world. Rangers can operate independently or in conjunction with other US or Allied forces. Properly augmented, Ranger battalions are capable of most infantry missions. But they are best suited — because of their high degree of training and motivation and their lack of heavy combat support and combat service support element — for special, high-priority, combat missions such as conducting raids and ambushes and seizing key installations (such as bridges). Rangers can be inserted into enemy territory either by infiltration, parachute drop, or small boats from naval craft.

In addition to their combat role, the Rangers can be used in other critical situations. As anyone knows if he reads the papers, the world in recent years has been shocked by the actions of political terrorists. If the US is ever required to commit troops in response to this threat, as the West Germans and Israelis have, the Rangers would contribute by capturing key installations or equipment, capturing personnel, recovering US or Allied prisoners, or safeguarding US lives or property abroad.

Mechanized Infantry

Mechanized infantry units have grown out of the need to supplement the mobility and shock action of tanks with the close combat strength of infantry units. In World War II, infantrymen on half-tracks fought with their armored partners from North Africa to the Elbe.

The mechanized infantry battalions of today are far better equipped to accompany tanks and fight with them on the modern battlefield. In fact, we might state the tank-infantry relationship this way: the tank is the mechanized infantry's heavy direct-fire support, and the mechanized infantry is the tank's close-in protection — each has strengths that compensate for the weaknesses of the other.

With the TOW, these soldiers scan the ranges for a glimpse of the ememy.

The specific roles of mechanized infantry in this team effort include clearing obstacles, neutralizing enemy antitank weapons, securing tanks, and defeating enemy infantry. Mechanized infantry units structure the battlefield for the rest of the combined arms team, a role that includes the key tasks of moving under fire, defending against armor and infantry assault, delaying enemy attacks, and quickly disengaging to fight elsewhere.

When the infantry fighting vehicle (IFV) gets to the field, mechanized infantry units will assume more roles. The IFV will enable mechanized infantrymen to fight mounted, to provide overwatch for armored forces, and to contribute more potent firepower under any battlefield conditions. Equipped with the IFV, the infantry will indeed be the ideal and equal partner to armor in the combined arms team.

Whether its units are mechanized, non-mechanized, or highly specialized, the basic mission of the US Army infantry has not changed in 200 years. What has changed is the type of training infantrymen need. With the wide variety of weapon systems they must employ and the range of tactics and techniques they must know, infantrymen have to have a lot of physical stamina, discipline, resourcefulness, and specialized knowledge.

They must be able to see what's happening on the battlefield at distances of 3 or 4 thousand meters, to identify what they see in detail, and to report what they have seen or engage their targets if they can. If they can't, they must be able to direct other weapon systems or other members of the combined arms team to the targets. At the same time, they must remain unobserved and unaffected by hostile fires, smoke, darkness, or contaminants. They must be able to employ all of their target detection and destruction systems against ground forces at long and short ranges along with their combined arms partners — armor, field artillery, air defense artillery, engineers, and the Air Force.

With the training that gives them these abilities — and with the help of members of their brother branches and sister services — infantrymen *can* do just about anything. And the mobility and adaptability of the units in which they serve insure that they will continue to be needed in the future as they always have been in the past.

Marie B. Edgerton is Associate Editor of INFANTRY magazine at Fort Benning, Georgia. She holds a B.A. in English from Wright State University in Dayton, Ohio, and has been a member of the magazine's staff since 1975.

On 15 September 1916, the tank lurched out of the mist and across the scarred earth of World War I. There were many that day who wondered what role, if any, the iron monster would come to play on that battlefield and the battlefields of the future. Among those vitally concerned were the Germans. As one of the new British tanks, affectionately named Creme de Menthe by its crew, rumbled toward the enemy lines, the Germans didn't know quite how to regard it. The Creme de Menthe, still suffering from its technological growing pains, began billowing large white clouds of smoke. The Germans concluded, quite logically although erroneously, that this vehicle was some new kind of poison gas dispenser. They put on their gas masks and were quickly ground beneath the tracks of the new invention.[1]

Following its operational debut, there remained little doubt in German minds what the role of the new vehicle could be. It eventually became the heart of the panzer formations. In the World War II blitzkrieg attacks, the world was astounded as the panzers swept through Poland and the low countries in a matter of days. Later in the war, Field Marshal Rommel (the Desert Fox) and his Afrika Korps used tanks, self-propelled artillery, and mounted infantry in combined arms operations to drive the British in North Africa back on Cairo. Although the British held there, and eventually launched an attack at Alemein that resulted in the smashing defeat of the Afrika Korps, it was not before Rommel had fought some masterful delaying actions using tanks in classic examples of what we now know as mobile and active defense.

However, it was Patton, at the head of his legendary Third Army, who perfected the firepower, mobility, and shock effect of the combined arms force built around tanks and armor-protected infantry, artillery, and air defense elements. Breaking out of the Normandy Beachhead at St. Lo, the Third began a campaign of exploitation and pursuit that was to become the model for modern mounted combat operations.

Historically, the role of armor has been to close with and destroy the enemy by means of firepower, mobility, and shock effect. Like the Creme de Menthe, the role of the tank will continue to be influenced by the changes in technology that will extend or limit its technical capabilities. As for its place in the modern arsenal of warfare, it is clear that the tank "is the single most important weapon for fighting the land battle."[1] In fact, all great armies of the world rely upon the tank for their land combat power.

But even while the tank was proving its worth in a succession of wars in which it faced a variety of antiarmor weapons, there were those advocates of antitank missiles and rockets who predicted its death. An early assessment of the October 1973 War seemed to indicate that the tank no longer ruled the battlefield. That was not to be the case, however, when thorough analyses were made. True, Israel lost 110 of 200 tanks in the initial battles in the Sinai, but on the Golan Heights an entirely different situation prevailed. There, the Israeli armored units fought a series of intense battles against overwhelming odds. Relying on the combat power of their tanks, the Israeli units were able to inflict heavy damage upon the Arab forces. Of the 150 Israeli tanks knocked out of action, almost all were ultimately salvageable.

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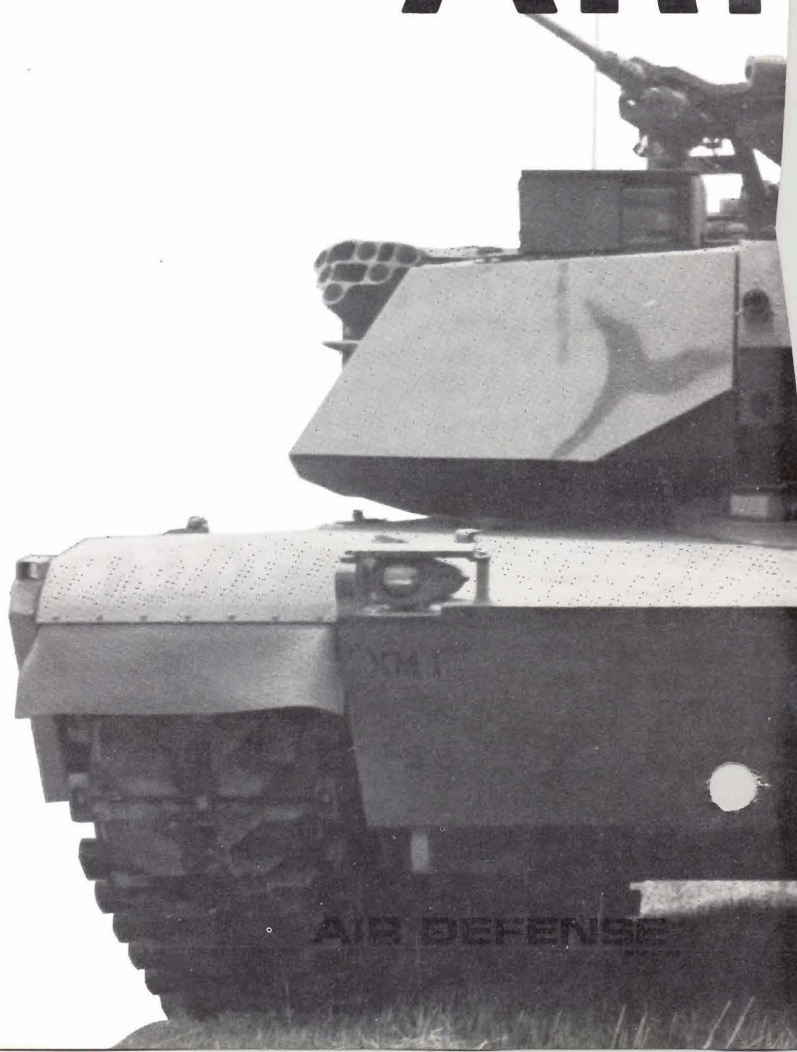

When the Israelis were ready for their counterattack, they crossed the Suez Canal and their combined arms forces were in their environment. Creating a 1,000 square mile salient, they captured the logistical heartland of the Egyptian Army and cut off an Egyptian Army Corp that had once numbered five divisions.

"...the 1973 War was clearly a triumph of armor, even though the Israeli Defense Force Armored Corps had paid dearly for its success in terms of destroyed equipment. Much is made of Israel's loss of 2,600 killed out of a population of three million. However, for this cost, they utterly defeated combined armies equal in strength to those of NATO Europe. This adequately points out the silent fact of armored warfare: people-cheap and material-expensive. Armor is battlefield decisive as long as it is used wisely with proper air, artillery, and infantry support. For even though modern armored warfare will inevitably result in substantial losses during assault operations, tanks can be salvaged and people can't."[2]

What then is the modern role of the tank? How is it envisioned to be employed? What are its strengths and weaknesses?

The answers to these questions began to emerge shortly after the October 1973 War, when General Donn A. Starry, then Commandant of the US Army Armor School, writing in the January-February 1974 issue of *ARMOR* said, "The primary task of the tank, mechanized-infantry, attack-helicopter, artillery-tacair team is the conduct of offensive operations whose purpose is destruction of the enemy — destruction by penetrating into areas of enemy weakness, rolling aside the flanks of the penetrated force, storming into the enemy rear to destroy reserves, trains, lines of communication, and his command-control capabilities. This team is the basic factor in the combat equation: below the level of brigade its role is always offensive; the division may defend — its task forces attack — attack — always attack. Each team member provides capabilities reinforcing weaknesses of other members. Infantry protects tanks against antitank teams and provides antitank capability of its own, protected by long-range tank fires. Antiarmor helicopters attack the enemy when he is moving, on his flanks, and in his rear, adding high mobility antiarmor fires to the fight. Tanks attack enemy armored vehicle formations, penetrate at weak points, and accelerate the destruction exponentially into the enemy's rear."

Later, in the July-August 1975 issue of *ARMOR*, General Starry addressed the matter of the need for tanks and their survivability, strengths, and weaknesses. He wrote:

"Armor soldiers,. . .examining modern battle, view the tank as a multipurpose weapon with a variety of essential combat capabilities.

"Armor soldiers have never viewed tanks as a self-contained battle system. Tanks have always been a part — an essential part — of the combined arms team. We learned this lesson at Cambrai; it has been reinforced by every tank engagement since. No one denies that on today's battlefield, unsupported tank attacks face mass destruction from accurate and lethal antitank guided missiles (ATGMs) as well as from other tanks. . .Therefore, the question is: Are tanks necessary as a part of the mobile weapon combination to seize the battle initiative or can some other systems do the job?. . .

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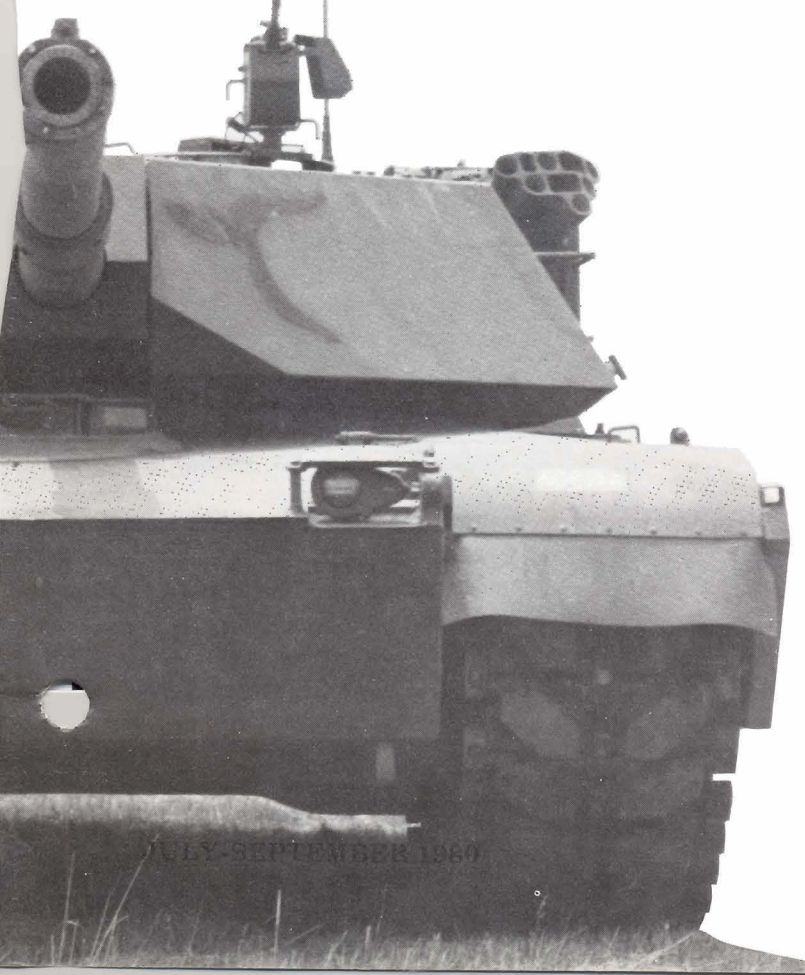
Prepared by US Army Armor Center



While the answer. . .is a function of threat and environment, modern war games show that a force in which tanks are either not present, or present in insufficient numbers, simply cannot fight successfully against an enemy equipped with even a modest number of tanks. . .ATGMs are only marginally effective against armor. It is necessary to balance the combined arms team in order to have sufficient staying power and enough mobile, integrated firepower to wrest the initiative from the enemy. In summary, we don't fare well without tanks in the combined arms team. Tanks are necessary.

"Properly employed, the tank not only can survive on the battlefield, it will dominate the battle. Without tanks, we don't accomplish much against an armor threat. The tank can survive better than an antitank missile system. As a bonus, because of their relative invulnerability to small arms and artillery, there will be fewer personnel casualties among tank soldiers than among antitiank guided missile crews."

Armor's role on the battlefield is based on the tank's inherent firepower, mobility, and shock effect. These advantages make armor the primary offensive weapon in which tanks are used to:

- Fight other tanks.
- Punch through suppressed defenses.
- Create shock and panic.
- Wreak havoc against soft targets.

The tank's firepower and mobility enable the commander to concentrate strength quickly against enemy weaknesses and destroy the enemy's ability as well as his will to resist through the destruction of his rear areas. As impressive as all this might be, "the tank cannot move alone on a battlefield without unacceptable losses. Therefore, all other elements on the combined arms team must be employed to support and assist the forward movement of the tanks."[3]

On the other hand, the tank has weaknesses that could contribute to "unacceptable losses." It is vulnerable in close terrain, woods, cities, or when visibility is reduced by bad weather or smoke. Additionally, most tanks cannot cross rivers or swamps without bridging. From the mud of World War I to the steep hills and mountains of Korea or Central Europe, terrain has always been a limiting factor in armor operations. Despite these constraints, armor has been used most successfully in the past when the enemy believed the terrain to be impassable or unsuitable for armor.

With the role of armor on the modern battlefield clearly identified, the US Army Armor Center and School began work to project the tactics and logistics of that role into the 1980s and beyond.

After analyzing the October 1973 War and other recent conflicts, lessons to be learned were identified and an accelerated program was undertaken to renovate the doctrine for mobile warfare. This new doctrine has now been disseminated in easy-to-read, understandable, how-to-fight manuals that are being continually reviewed, evaluated, and updated.

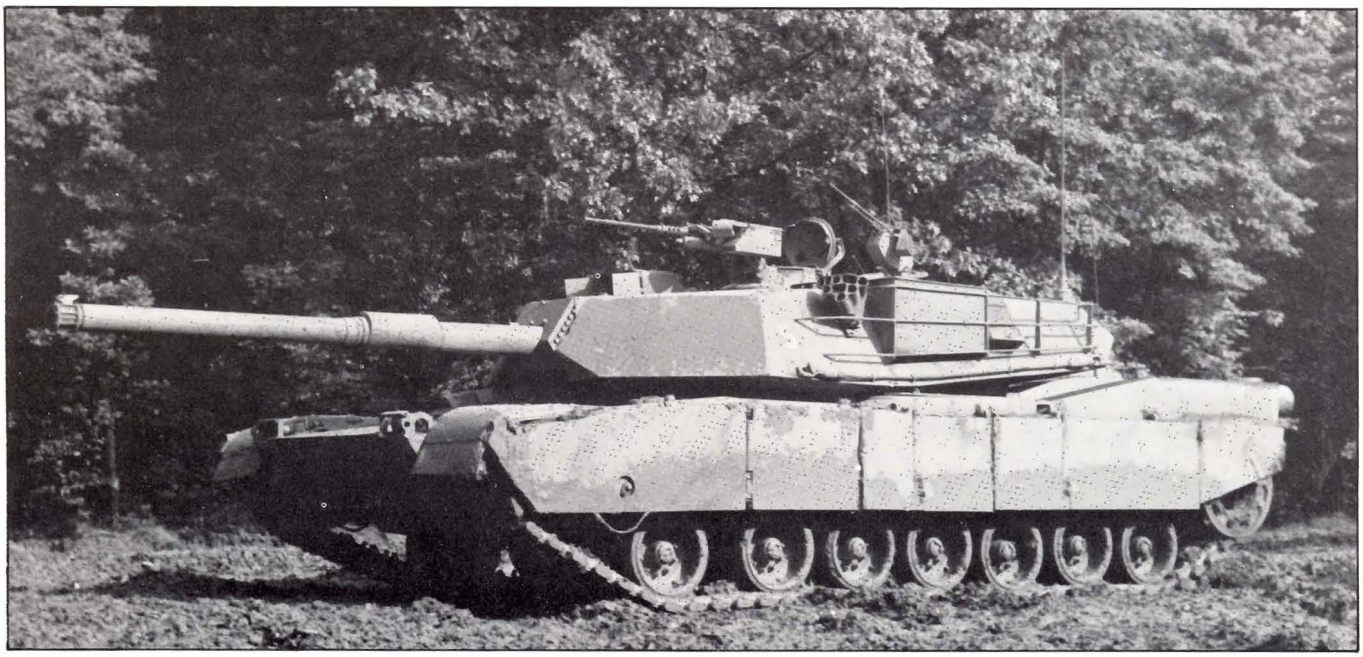


Figure 1. XM1

Figure 2. M2/3

Figure 3. M48A3

Figure 4. M60A1

Reorganization of armor units is also being considered. The revisions, based on the Division Restructuring Study and discussions within the armor community, are designed to enhance the flexibility and response of armor units within the combined arms team. Changes to the table of organization and equipment would include reducing the tank platoon to four tanks and increasing the number of tank companies to four per battalion. The structure of the combat and combat service support units will also undergo restructuring to insure responsiveness to the requirements of the battalion. While the doctrinal and organizational changes were being developed, the Armor Center and School, along with other elements of the armor community and DARCOM, was continuing programs to field the new *XM1* main battle tank (figure 1), the *M2/3* infantry/cavalry fighting vehicle (figure 2), and the *AAH64* advanced attack helicopter. Additionally, programs were established to upgrade the *M48A3* and *M60A1* tanks (figures 3 and 4). The *M48A3* was, among other things, upgunned with a 105-mm main gun, equipped with

Figure 5. M48A5

Figure 6. M60A3

advanced fire control instruments, given a redesigned commander's cupola, and designated the *M48A5* (figure 5). The *M60A1* was improved by adding a thermal shield to the main gun, changing the coincidence range finder to a laser version, changing the ballistic computer to a solid state model, and adding a wind sensor to make it the *M60A3* (figure 6).

Rounding out the modernization of the armor force is the training of today's armored crewmen. This training is task and equipment oriented and, as much of it as possible, is of the hands-on variety enabling the newly assigned armor soldier to take his place as an effective armor crewman with a minimum of training in his new unit.

The foregoing adds up to an armor force capable of performing its role as a partner of the infantry, artillery, air defense artillery, engineers, signal and support units, the Air Force, and in some instances, the Navy and Marines on the integrated battlefield. There, armor will fight as a key element of combined arms operations marked by cooperation, coordination, and a lack of branch parochialism. Such an environment is highlighted by LTC Thomas J. Barham in an imaginary description of a future battle, which he wrote while editor of Infantry Magazine.

"There is little confusion and no argument. The men in the company are too young, too tired, and too scared to care about the historic, acrimonious relationship between infantry, cavalry, and tanks. They want to complete their mission. They want to stay alive. In reconciliation of those two desires, they don't much give a damn who gets there first."

Footnotes:

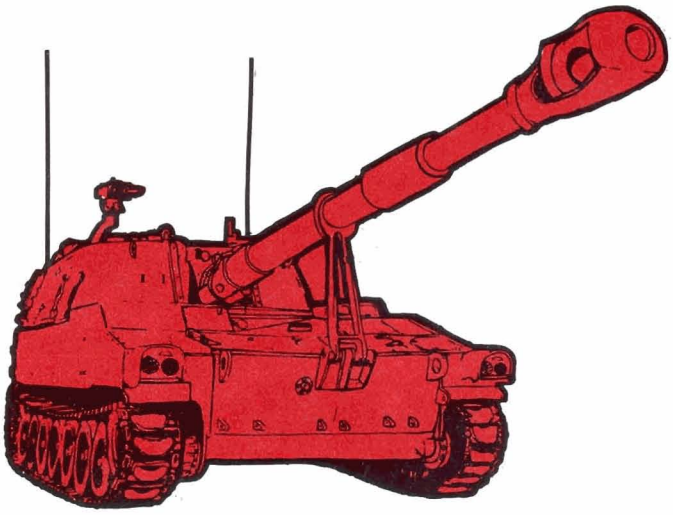
[1]Arch Whitehouse, *Tank* (Garden City, N.Y., Doubleday & Co., Inc. 1960). P. 45.

[2]Kenneth S. Brower, "Armor in the October War," *ARMOR*, May-June 1974.

[3]*Op Cit.* Whitehouse, P. 49.

FIELD ARTILLERY SUPPORT

by Colonel John E. Donohue
US Army Field Artillery School



The field artillery's mission on the combined arms team is to destroy, neutralize, or suppress the enemy by cannon, rocket, and missile fires and to assist in integrating all fire support employed against ground targets. In the past few years the field artillery (FA) has seen a number of changes in doctrine, tactics, equipment, organizations, and in the way we support the maneuver arms. These changes reflect what we think the next war will be like. Right now, the most ominous threat appears to be Warsaw Pact forces on a European battlefield. If our forces can meet the demands of the European battlefield, we have a reasonable assurance of meeting the needs of other battlefields.

Let's look at the major aspects of FA involvement in the battle.

Fire Support

Fire support is the collective use of FA, mortars, close air support (CAS), and naval gunfires (NGF) against ground targets. At all levels, from the company up, the senior field artilleryman in each headquarters is the coordinator of fire support for that command (the FSCOORD).

FA Fires

Delivering accurate fires is a complex job. It requires a system that acquires targets, computes complex gunner solutions, has a variety of weapons and ammunition, and executes the command and control to tie the system together. With this total system, the field artillery supports the combined arms team with fire.

The 155-mm, self-propelled howitzer provides basic close support for our armor and mechanized forces. This weapon fires high-explosive, dual-purpose, improved, conventional munitions; smoke; illumination; scatterable mines; and chemical and nuclear rounds. It can hit targets beyond 18,000 meters and, with the rocket-assisted projectile, can reach 24,000 meters. A product-improved version of this weapon will be fielded this year. It will be safer and more reliable and ammunition handling will be faster. In addition, a feasibility study is under way to increase the range to 30,000 meters.

Future 155-mm close support battalions will have three batteries of eight howitzers each instead of the current six-howitzer battery. This will increase firepower and permit battery employment as two four-gun platoons. This two-platoon employment improves survivability by allowing more frequent moves while maintaining the ability to fire.

A battery computer system will be fielded in the autumn of 1981. Each four-gun platoon will then have its own automatic data processing capability.

The computer can operate with the tactical fire (TACFIRE) direction system or independently. The battery computer system insures precise close support fires.

The 8-inch howitzer can also provide close support fires. It fires a 200-pound, high-explosive projectile to ranges in excess of 20,000 meters. It can also deliver dual-purpose, improved, conventional munitions, and chemical and nuclear rounds. Product improvements are continuing on this howitzer to achieve ranges approaching 30,000 meters.

Point Targets

Although the field artillery has long been employed successfully in destroying area targets, it has not been successful against the destruction of hard, point targets. But now that we have the Copperhead round, the situation is changing. The Copperhead is fired by the 155-mm howitzer and is guided to the target by homing on reflected laser energy. Precision guidance, coupled with a shaped-charge warhead, gives the Copperhead a high probability of killing enemy armor.

Laser designating of targets for the Copperhead round is done by the ground laser locator designator (GLLD). Using the GLLD, the observer creates a high-hit probability on moving and stationary targets (day or night) to ranges exceeding those of the TOW. The GLLD also can designate targets for other precision munitions or can illuminate targets for hand-off to acquisition systems. Linking the GLLD with the TACFIRE system enables the TACFIRE operator to transmit information that provides fire-for-effect accuracy with conventional munitions. The GLLD can be employed from either a ground tripod or can be mounted on the pintle of an armored personnel carrier. Plans call for mounting the GLLD on a retractable hammerhead on the forward observer vehicle.

Another device for locating targets is the hand-held laser rangefinder (GVS-5). The GVS-5 has the same optical characteristics as the binocular and has an accurate rangefinding capability.

Laser devices will also be used in the advanced scout helicopter and the FA's remotely piloted vehicle (RPV). The RPV can then provide optical or infrared surveillance of the battlefield. Controlled from a ground station, the RPV extends the brigade or division commander's vision 20 kilometers beyond the line of contact. Once the target is acquired, the RPV can be used in adjusting conventional munitions or employing precision munitions.

Counterfire

A central European battle could find one US division facing four Warsaw Pact divisions. Our companies may not only be badly outnumbered, but may also face an enemy capable of pounding their positions with massive amounts of high-explosive, indirect fires. Freeing our maneuver forces from such attacks is a job the field artillery will accomplish through counterfire.

Counterfire involves finding and attacking the enemy's indirect fire systems. Counterfire causes damage and casualties to the enemy, thus freeing our direct fire weapons and improving our chances of winning the battle. A target acquisition battery

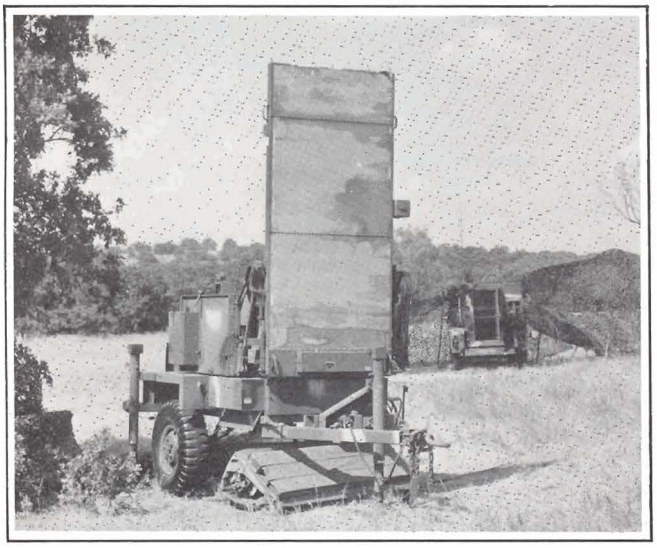


Figure 1. TPQ-36 Implaced

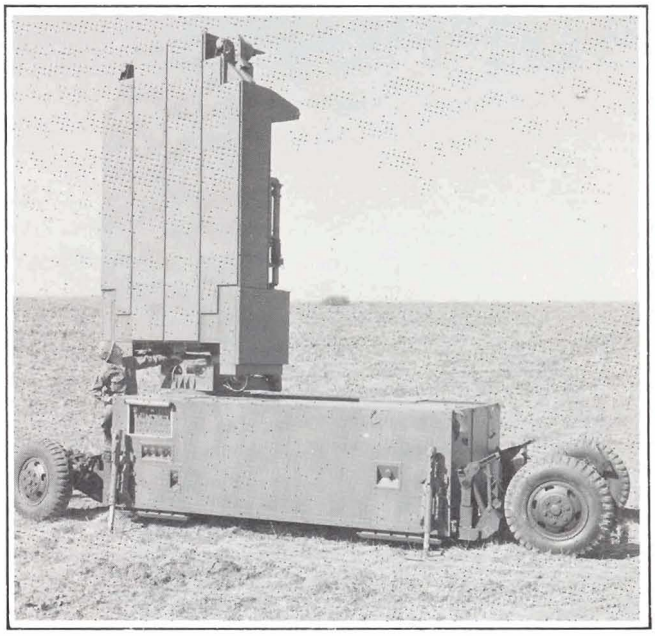


Figure 2. TPQ-37

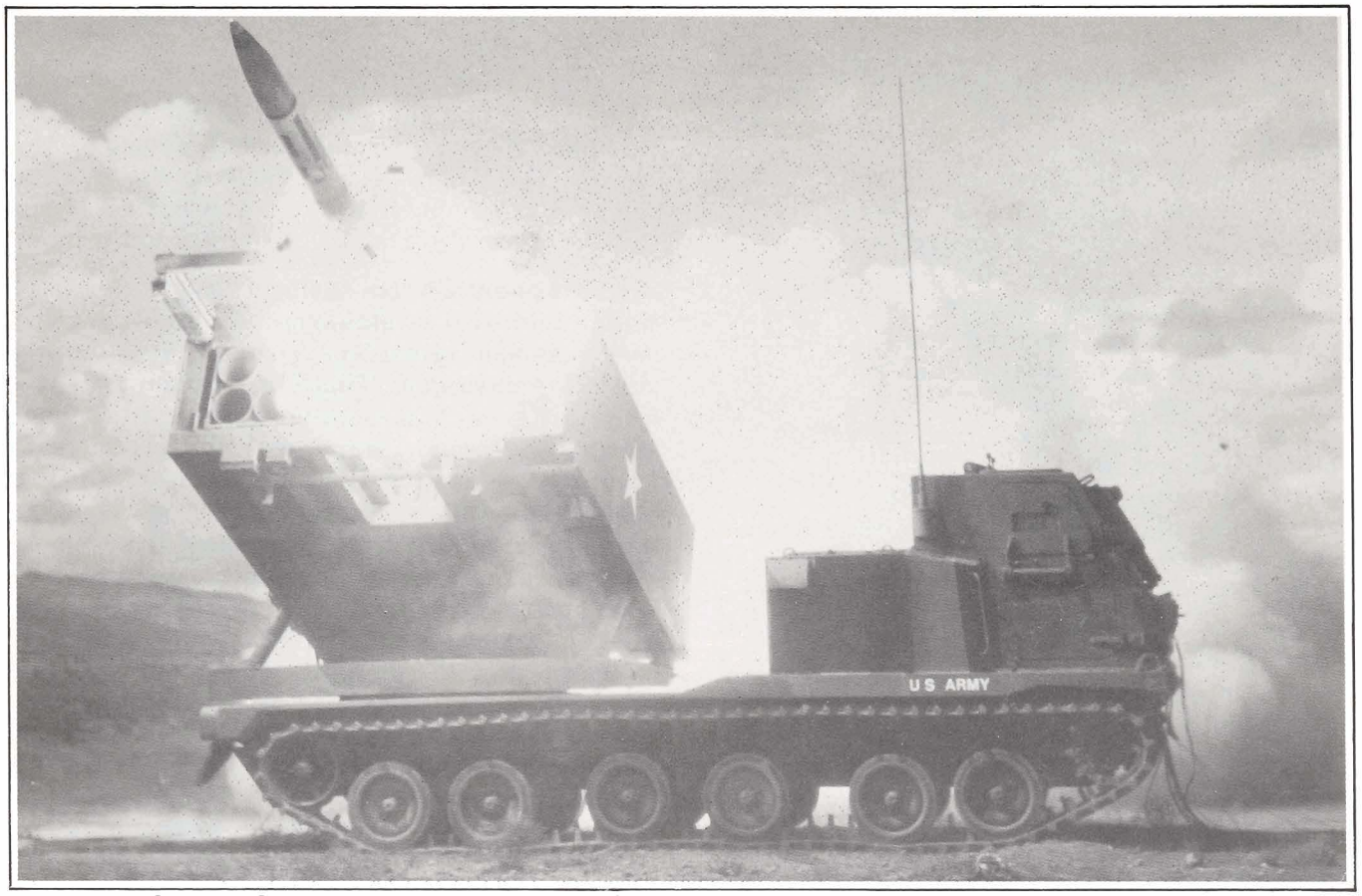


Figure 3. General Support Rocket System (GSRS)

(TAB) has been added to each division artillery to improve our counterfire capability, and the division artillery tactical operations center has been structured to manage the counterfire effort.

Regarding acquisition equipment, we have developed the new Firefinder system. It consists of two radars — the AN/TPQ-36 countermortar radar and the AN/TPQ-37 counterbattery radar. These radars provide a great improvement in capability, with greatly increased area coverage and a range sufficient to locate any threat cannon or mortar. Both radars can track multiple firings and provide direct digital input into the TACFIRE computer. They can locate 15 to 20 targets a minute. Direct digital communications from the radars to the TACFIRE computer give us response that can enable us to have rounds on the way against an enemy target before his initial rounds land. The AN/TPQ-36 has been fielded in USAREUR on a selective basis.

General Support Rockets

The field artillery is developing a general support rocket system (GSRS) under an accelerated program to increase our firepower and counter the advantage of the Warsaw Pact. It is a 35-kilometer range weapon that can deliver large volumes of fire. Each launcher is manned by a crew of three and is loaded with twelve 9-inch rockets. The initial warheads will contain dual-purpose, antiarmor, antipersonnel bomblets with follow-on warheads for antitank mines and terminally guided antitank submunitions.

One load from a GSRS launcher equates to one volley from three battalions of 8-inch howitzers. The allocation, which is nine launchers per battery, provides a massive indirect firepower capability.

Suppressive Fires and Interdiction

Close air support by the Air Force and Army aerial maneuver systems gives FA an added measure of combat power. However, for these aircraft to succeed against a modern enemy force, its air defenses must be suppressed. Warsaw Pact nations are expected to cut loose with an intensive air defense umbrella for their attacking forces. Field artillery weapons are a means of suppressing the enemy's air defenses without any risk to our limited close air support and attack helicopter assets.

The field artillery can attack the enemy at long ranges. However, as we enter the 1980s, we find

interdiction a new mission for the Army. Despite the development of our sophisticated antitank weaponry, the sheer numerical superiority of Warsaw Pact forces permits continued commitment of those forces, even in the face of massive losses. The purpose of interdiction is to prevent second echelon forces from becoming first echelon problems. Interdiction can be accomplished by either slowing the enemy's second echelon forward momentum to reduce his rate of arrival or by degrading or destroying those forces so that our combat elements face a less capable enemy. Our ability to deal with second echelon forces will have a real impact on our ability to win not only the first battle, but also the succeeding battles of any future war.

The field artillery has the Lance missile that can deliver a warhead with some 1,000 pounds of antipersonnel and light, materiel-defeating bomblets to ranges in excess of 70 kilometers. That makes Lance ideal for early attack on enemy forces and for attack on his second echelon formations. Lance can also deliver a nuclear warhead to ranges in excess of 100 kilometers.

The Pershing missile, the field artillery's longest-range weapon, can deliver a nuclear warhead more than 700 kilometers. The Pershing II, currently being developed as a follow-on for the present system, features improved guidance and warhead and greater range.

Fire Direction

TACFIRE gives field artillery an automatic data processing system that vastly increases our capability to plan fires, acquire targets, and attack them quickly with proper amounts and types of ordnance. TACFIRE automates, in varying degrees, virtually every function of the field artillery system.

TACFIRE is a system of computers and remote terminals at every echelon of fire support from the fire support team (FIST) at company level to the field artillery section at corps headquarters. These computers and terminals transmit large volumes of information quickly and efficiently via digital communications. The TACFIRE computer insures efficient technical and tactical fire control. In addition to information by hard-copy printers and cathode-ray tube (CRT) displays, the system provides a fully automated situation map display.

Fire support personnel with the maneuver forces gain access to TACFIRE's capability through one of two message devices. At company and platoon level, observers can input to, and receive messages from, the TACFIRE computer using the digital message device (DMD). This device couples to either wire or radio communications equipment and allows the operator a variety of message formats including free text. The fire support elements at maneuver battalions and higher are equipped with the variable format message entry device (VFMED). It provides input to the TACFIRE computer via a keyboard and can receive messages on a CRT display or line printer.

Fire Support Coordination

The field artillery manages the total fire support system including artillery, mortars, naval gunfire, and close air support. This feat is accomplished by providing each maneuver commander from company through corps with a fire support coordinator (FSCOORD) and a team of fire support specialists who form the base of his fire support coordination facility. These fire support personnel implement the complex planning and coordination required for optimum employment of the total fire support system.

The key individual in the planning and coordination process is the FSCOORD. He advises the maneuver commander on how fire support can best influence the battle and how to accomplish the planning and coordination. The real potential of fire support personnel comes in assisting the commander in the integration of fire support into the total combined arms operation. The maneuver commander, his operations officer, and his fire support coordinator establish the battle plan and implement it to accomplish the integration of fire support with maneuver. This is especially critical when attack helicopters are available. Some target arrays may be ideally suited for engagement by attack helicopters, but others may be more effectively engaged by mortars, artillery, or close air support. Because of the increasing sophistication of weapons, fire support grows more complex, requiring increased emphasis on the role of the commander's fire support coordinator.

This emphasis is reflected at company level in the FIST. The purpose of the FIST is to give each company and troop a team of fire support experts. Each member of the team is trained to request and adjust all types of indirect fires. The fire support team chief is fully trained in fire support planning and coordination, including the direction of close air support in the absence of an Air Force forward air controller.

Although, the field artillery system is undergoing dramatic changes, its primary role remains the same — to provide the ground-gaining arms with timely and accurate fire support that will enable them to succeed in their missions.

SERVICE TO OUR COUNTRY

An interesting story is told about General Washington when he took command of the Continental Army at the beginning of the American Revolution. Although there was an immediate need for an army at that time, what Washington found at Cambridge instead was a rather ragged body of soldiers. Some wore uniforms, others multicolored clothing from a variety of sources. Some carried guns, others sticks. Still others held farm tools. A few gripped ancient swords. In particular, there was a regiment from Connecticut that looked pretty bad.

Peter Marshall, former chaplain to the United States Senate, once wrote about what Washington saw:

> *The men were few . . . badly armed . . . and poorly dressed. They did not even stand at attention. Their ranks were ragged and they had an air of discouragement. Many of them were hungry and had gone without a decent meal for days on end. Some were lame. They were a sorry lot. Yet, when the regiment was drawn up for Washington to inspect it, the great General stood erect and, looking at the men as if they were in the finest regiment in the world, he said: "Gentlemen, I have great confidence in the men of Connecticut."*

One of the soldiers writing home to his family said in his letter, "When I heard Washington say that, I clasped my musket to my breast and said to myself, Let them come on."

This story illustrates a unique quality: given a challenge, proper recognition, and sound leadership, the American soldier will have pride, endure hardship, and undergo great sacrifice in the cause of freedom and service to country.

The early American soldier may not have been distinguished by his sophistication, but no one questioned his patriotism, his willingness to serve, or his courage and devotion in the face of danger.

It is fitting for us to look back over the road the soldier has marched in the service of this country for more than two centuries. Doing so brings into sharp focus the need and value of military service to our country as we meet the challenges facing the nation today and in the future.

The genesis of the Army lies in the American Revolution . . . the fulfillment of a people's quest for a full measure of freedom. There was no real assurance that we could win against the more experienced British Redcoats. But the desire for human rights was stronger than fear of physical danger. The hour had come to make the first real payment on the price of liberty. And we paid the price in blood shed at Lexington and Concord on April 19, 1775. In the "Concord Hymn," Ralph Waldo Emerson wrote:

> *By the rude bridge that arched the flood, their flag to April's breeze unfurled, here once the embattled farmers stood and fired the shot heard round the world.*

Farmers, businessmen, craftsmen, and merchants all joined in the fight for liberty. It was a ragtag and bobtail Army, but it fought well for the rights of all Americans in the new nation.

In analyzing the country's first major war, Thomas Paine declared that the war "contributed more to enlighten the world, and diffuse a spirit of freedom and liberality among mankind, than any human event . . . that ever preceded it."

The visible symbol of this new spirit of freedom—rising out of the American Revolution—was the stars and stripes. The flag is a symbol and a record of our heritage. In times of peace, peril, or crisis, it is a national rallying point. It represents the unity and pride of our people and the courage and sacrifice of our men and women in uniform.

From the Revolutionary War through the War of 1812, the Mexican War, the Civil War, the Spanish-American War, the two World Wars, Korea, and

Vietnam, the flag has been a symbol of the freedom for which generations of Americans have fought, died, borne the scars of wounds, or (perhaps more painfully) endured the limbo of those captured or missing in action.

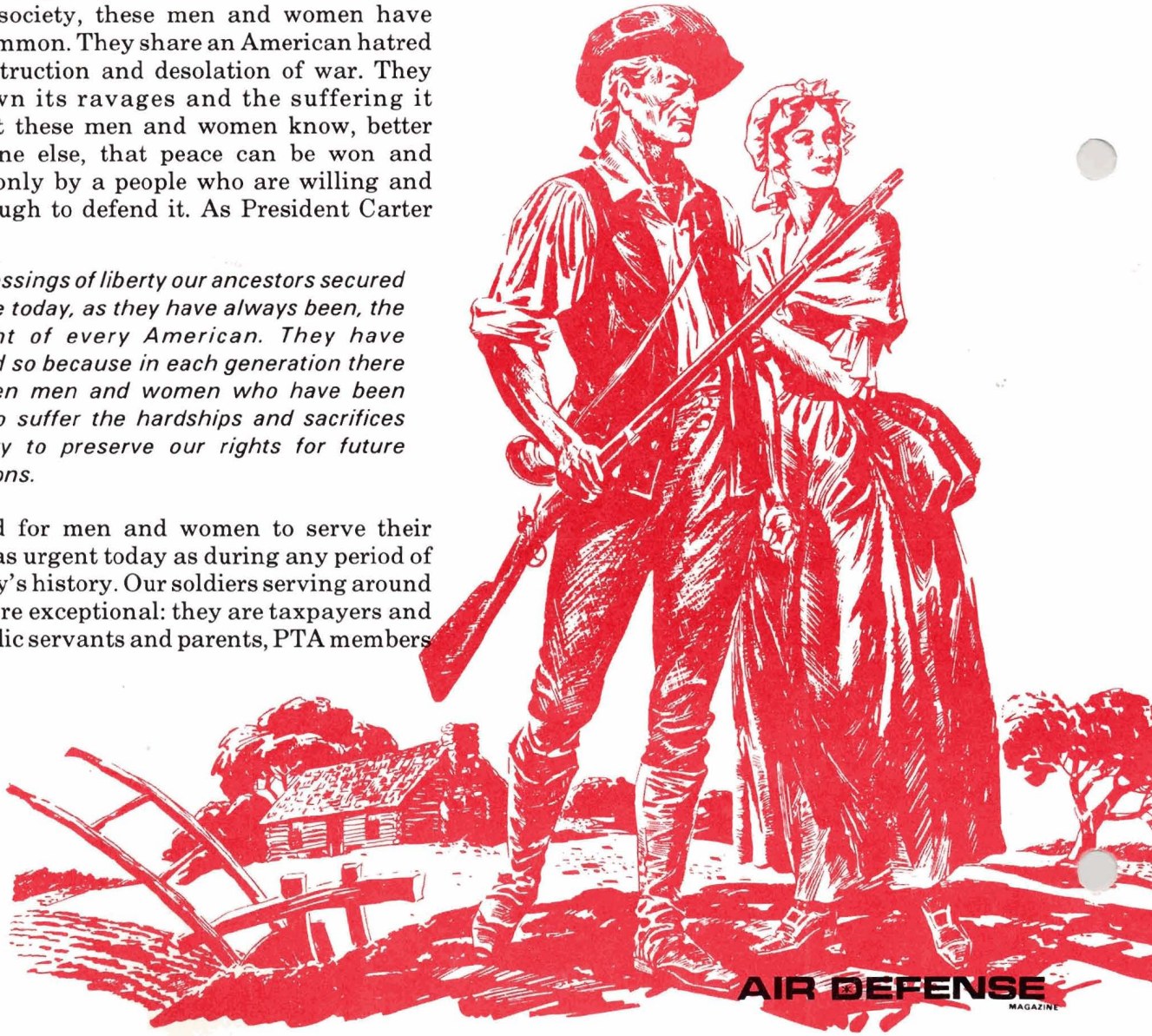
Looking upon the past, it is clear that the Army has been a servant of the people and a defender of freedom. We know, however, that continued peace demands continued effort and renewed sacrifice. Time after time, Americans have responded to their nation's call through service in the Active Army, the Army Reserve, and the National Guard. And so it was that whenever international conflict overtook our nation, it was always a force largely of private citizens who fought our wars. To them the normal way of life was home, family, church, business, and friends, and the freedom to enjoy them. Making war was not to their liking. But when they were called, they left their families, businesses, and homes, took up arms, and fought.

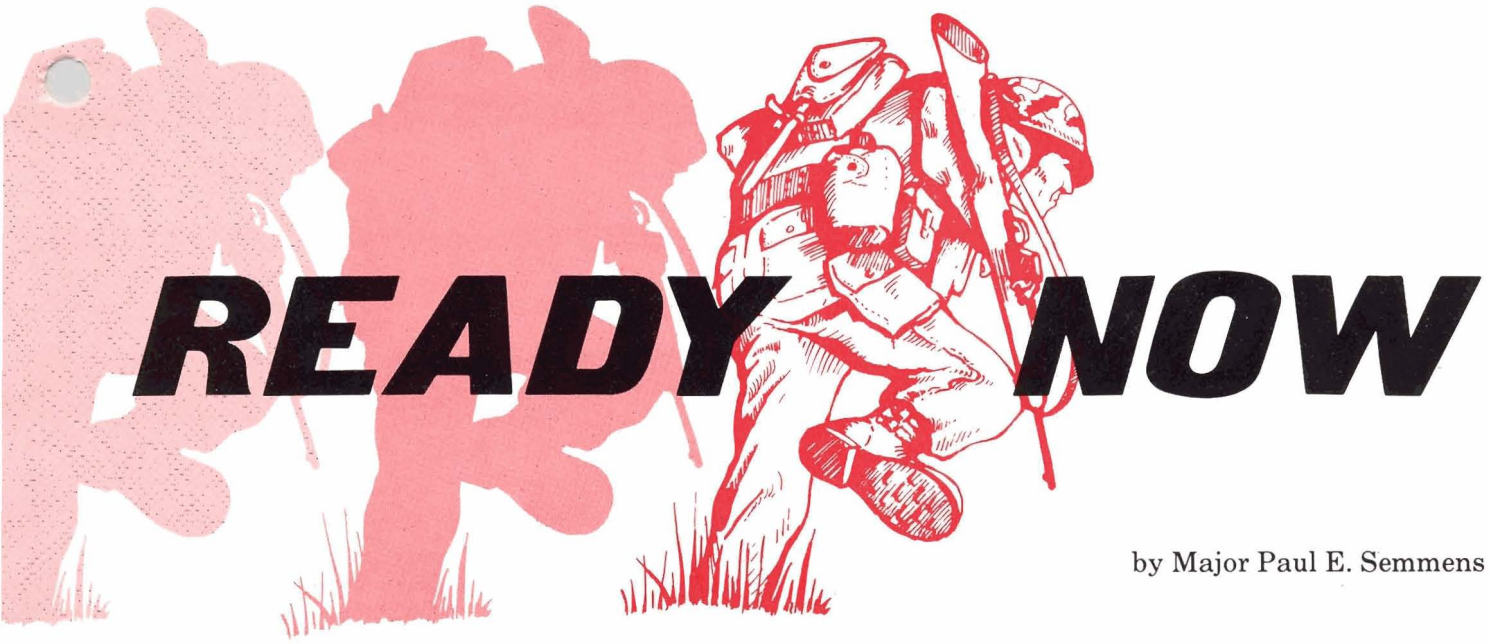
Today, there are more than 29 million living Americans who have served in our armed forces. Although they represent a cross section of American society, these men and women have much in common. They share an American hatred for the destruction and desolation of war. They have known its ravages and the suffering it brings. But these men and women know, better than anyone else, that peace can be won and preserved only by a people who are willing and strong enough to defend it. As President Carter has said:

> *The blessings of liberty our ancestors secured for us are today, as they have always been, the birthright of every American. They have remained so because in each generation there have been men and women who have been willing to suffer the hardships and sacrifices necessary to preserve our rights for future generations.*

The need for men and women to serve their country is as urgent today as during any period of this country's history. Our soldiers serving around the world are exceptional: they are taxpayers and voters, public servants and parents, PTA members and community volunteers. They are also your brothers and sisters, sons and daughters. They are America's sons and daughters, and they have a common bond wherever they are in the world. That bond can be seen from Checkpoint Charlie in West Berlin as you look across a wall that has slowed but not stopped the flight of those desperate for freedom. It can be seen from observation posts overlooking the barren emptiness of the demilitarized zone in Korea. The bond is the difference between freedom and tyranny, between democracy and totalitarianism. It is because of that difference that citizens and soldiers willingly serve today and will willingly serve in all our tomorrows.

That service reaffirms for all of us the need expressed in those final words of the Declaration of Independence: to ". . . mutually pledge to each other our lives, our fortunes, and our sacred honor." The soldiers who have fulfilled and are now fulfilling that need demonstrate to all the value of service in a free society.





READY NOW

by Major Paul E. Semmens

The North Korean Army surged into South Korea like a *tsunami* Sunday morning, 25 June 1950. The undermanned, poorly equipped, Republic of Korea (ROK) forces crumbled before the invader. Ninety-six hours after they crossed the 38th parallel, the Communists were threatening the capitol city of Seoul.

News of these developments ricocheted through the American occupation forces stationed in Japan. Units were placed on alert, leaves were cancelled, and equipment was readied. A week later, as the situation continued to deteriorate, General MacArthur, the Far East commander (FECOM), decided to deter the North Koreans with an "arrogant display of strength."[1] He ordered Major General William Dean, the commanding general of the 24th Infantry Division, one of four divisions in Japan, to commit his forces into Korea as quickly as possible. In compliance with the directive, a reinforced infantry battalion went to Korea on 5 July and encountered the North Koreans just north of the city of Osan.

Occupation duty in Japan had been too soft and the troops were not prepared for the demands of combat. The advanced guard, along with the remainder of the 24th Division, was overwhelmed and pushed steadily southward. During the next 2 months, two more divisions were injected into Korea to no avail. Only a desperate stand around the port city of Pusan prevented the annihilation of the Americans.[2]

But contrary to popular belief, 24th Infantry Division personnel were not the first US combat troops to see action in the Korean War. The American commitment was spearheaded by a small group of antiaircraft artillerymen of the 507th AAA Battalion. Although its mission was essentially security, this element saw action a week prior to the Osan disaster and its performance was one of the few bright spots in an otherwise dark picture.

On 25 June 1950, LTC William S. Fultz, Commander of the 507th, received a warning to ready a detachment for "an air transported mission."[3] He selected 3 officers and 32 enlisted men from a host of volunteers.

The detachment stood by while President Truman presented the American case before the United Nations. As the tactical situation worsened and Seoul appeared ready to fall, American policymakers needed an expert opinion—an assessment of the situation that a reading of statistics could not provide. So General MacArthur decided he would make a cannon's mouth reconnaissance. On Thursday, 29 June, he ordered his C-121 aircraft, the Bataan, readied for a midmorning takeoff.[4]

The air defense detachment was scrambled to precede him. All was ready. Four quadruple .50-caliber machine guns had been loaded on a number of C-47 aircraft. Captain Frank McCabe, a detachment commander, was briefed just prior to takeoff from Japan. The element would defend a still unspecified airfield in Korea. More particulars would be available once the unit arrived in country.

Just past 0900 on the 29th, the air defenders landed at the Suwon air strip 20 miles south of Seoul. The men moved so quickly that many did

not take the time to remove their life jackets; their weapons were emplaced near the runway in 10 minutes and they began improving their positions.

Soon thereafter, an aircraft appeared on the horizon, its distinctive triple tail making it easily recognizable as a C-121. As General MacArthur described it, "The Bataan (descended)...through clouds of oily smoke from some bombed and strafed transports"[5] and landed on the pitted runway. MacArthur stepped out of the aircraft wearing his familiar hat, leather jacket, and sunglasses. He met South Korean President Syngman Rhee and then quickly headed north to reconnoiter the situation around Seoul.

At Suwon, the day passed uneventfully until 1600 when four aircraft approached from the north. The members of the detachment identified them as F-51 Mustangs but, when the fighters opened fire, all realized a mistake had been made. Captain McCabe described the subsequent events:

> *The four planes approached the strip from the northwest at about 1,400 feet. They formed with a pair in front followed by another two in single file and power-glided on our position in an apparent attempt to destroy planes parked near the runway. They made four passes, dropping three medium-light bombs, and strafed the field on each pass. One plane crashed beyond the field and the second, obviously crippled, was losing altitude as it left the area.*[6]

The Americans learned later that the fighter did crash and that its pilot was taken prisoner by South Korean police.

General MacArthur returned to Suwon 2 hours later and immediately departed for Japan. He later summarized his thoughts as a result of the trip:

> *The scene along the Han (River) was enough to convince me that the defensive potential of South Korea had already been exhausted...Even with air and naval support, the South Koreans could not stop the enemy's headlong rush south.*
>
> *Only the immediate commitment of ground troops could possibly do so. The answer I had come to seek was there. I would throw my occupation soldiers into this breach.*[7]

This was his recommendation to President Truman who approved the request. The advance elements of the 24th Infantry went into combat 5 days later.

Captain McCabe and his men remained at Suwon for another 24 hours and then drifted south when the North Koreans resumed their offensive. They returned to Japan on 2 July where 6 of the 32 members of the detachment received the Purple Heart.

There were lessons to be learned. The detachment's aircraft recognition was poor, and despite continual efforts on Captain McCabe's part, they were never resupplied with ammunition. In spite of these difficulties, the mission was a success. The air defenders protected General MacArthur's entrance into and exit from the country. By doing so, they afforded the FECOM the opportunity to make one of the key decisions of the Korean War. McCabe and his men were ready when needed. Their example of preparedness should be an example to today's air defenders.

Major Semmens is an Air Defense Artillery officer, serving as Assistant Professor of History at the United States Air Force Academy, and a frequent contributor to AIR DEFENSE Magazine.

Footnotes:

[1]Robert Leckie, *The Wars of America* (New York: Harper and Row, 1968), p. 859.

[2]T.R. Fehrenbach, *This Kind of War*, (New York: MacMillan, 1963), chapter 7-12.

[3]Captain P. Loomis, "First Army Action in Korea at Suwon," *The Coast Artillery Journal*, September-October, 1950, p. 2. All details of the McCabe detachment are drawn from this source. The author gratefully acknowledges the assistance of Mr. Dick Fritz of the Air Defense Museum in locating this document.

[4]The author cannot document precisely General MacArthur's takeoff or arrival times. McCabe's early departure from Japan and the detachment's mission—to defend Suwon Airfield—would indicate that they preceded the General.

[5]General of the Army Douglas MacArthur, *Reminiscences*, (New York: McGraw-Hill, 1965), p. 377.

[6]Loomis, p. 3.

[7]MacArthur, p. 378.

Stinger Training Devices

by Master Sergeant William A. Chapman

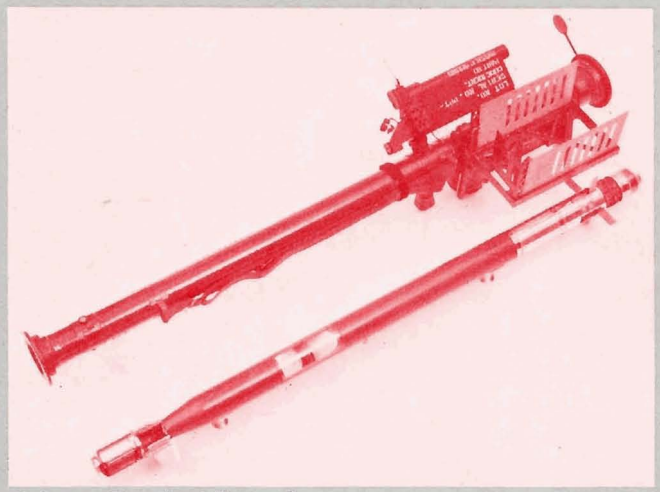
As the fielding of Stinger approaches, it is necessary to look at the full spectrum of the system's training requirements. The reason is to make sure that training support will establish and maintain the gunner's proficiency in the tasks critical to the combat mission — destruction of hostile aircraft.

In this connection, the proposed Stinger training program includes a supporting system of training devices to meet specific training requirements and objectives. Experience with the Redeye, Stinger's predecessor, identified training deficiencies that were never completely corrected. The Redeye Weapon System Training Effectiveness Analysis (WSTEA) and the Redeye Weapon System Army Training Study conducted by the TRADOC Systems Analysis Activity (TRASANA) pointed out that gunners lacked confidence in the weapon and were generally dissatisfied with their jobs. More about that will follow.

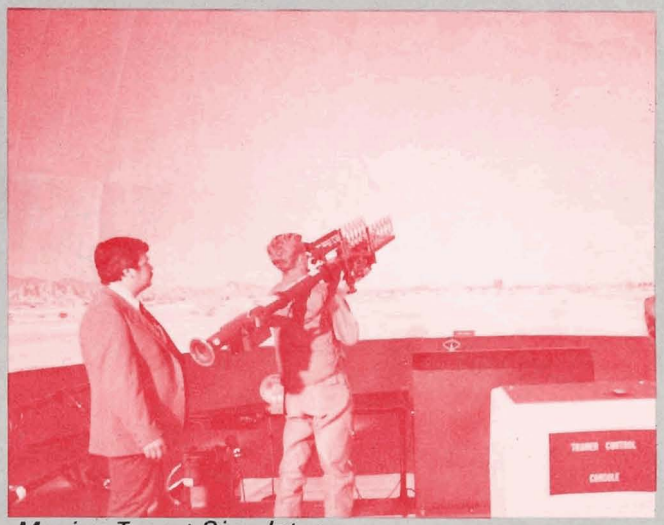
Because the missions and tasks for Stinger are similar to Redeye, training devices that paralleled those for Redeye were developed early in the Stinger program. Four training vehicles will be used to support training.

- FIM-92A Tactical Round. The Stinger live round will be fired to demonstrate the weapon's reliability, safety, and effectiveness. One live round will be fired for each class of 40 to 50 gunners during resident training. Each Stinger section will fire one round annually. This is identical to the Redeye live-firing program.
- M87A1 Moving Target Simulator (MTS). The MTS is a training facility in which target aircraft images on 16-mm film are projected on a spherical screen through a gimbaled mirror. Twelve films, each containing 20 to 25 target runs, are provided. Using the M134 tracking head trainer and instructor cueing allows gunner performance to be evaluated. The MTS provides gunners initial and refresher practice in techniques of fire, engagement sequence, target ranging and identification, and IFF tone discrimination. A cloud simulator provides introductory training in infrared tone discrimination.

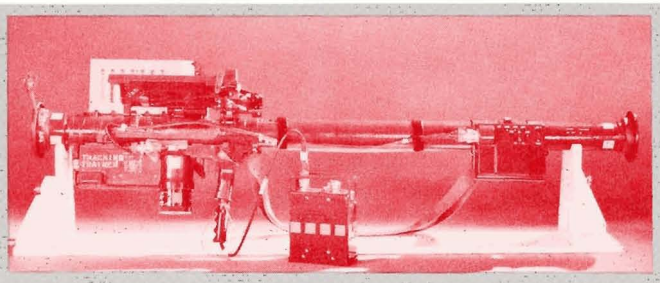
Originally designed to support Redeye, the MTS are being modified for Stinger, which will also enhance Redeye training capability. Thirteen MTS are currently in use. Four are located at Fort Bliss, three in USAREUR, one in Korea, and the remaining five at CONUS divisional posts. Seven new MTS will be fielded by 18 July — two in USAREUR and five at CONUS divisional posts. Two additional MTS may be added at a later date.



Stinger Tactical Round.



Moving Target Simulator.



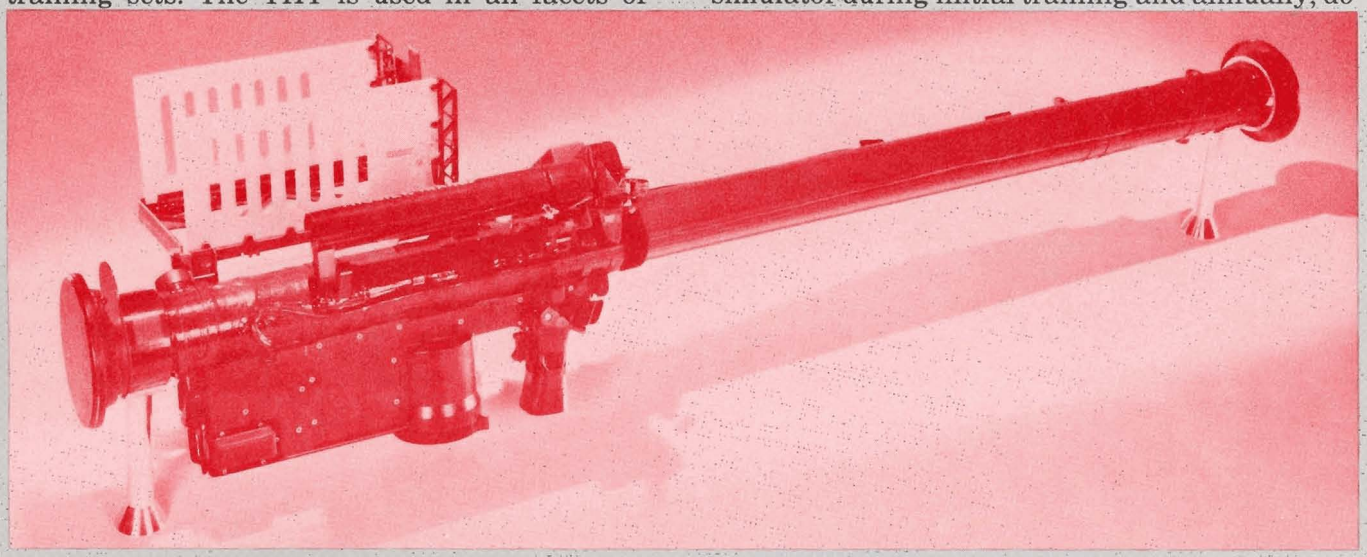
M134 Tracking Head Trainer.

■ M134 Training Set, Guided Missile System. The M134 consists of the tracking head trainer (THT), trainer batteries, an IFF simulator, and a shipping and storage container. Argon gas to operate the trainer is supplied from a gas pumping unit (GPU) located at each MTS and with supporting maintenance organizations. A battery charger is located with each GPU. The THT simulates the appearance, operating characteristics, weight, and balance of a live round. A performance indicator box is included on the launch tube to evaluate gunner performance. A series of indicators identifies successful performance or pinpoints the cause of unsuccessful engagements. The THT uses the same seeker as the live round and has enough argon gas storage and battery charge to support a day's training for a section. Used with the IFF simulator or a tactical IFF interrogator belt pack, the THT supports training in target tracking, ranging, infrared tone discrimination, IFF tone discrimination, and target identification.

The M134 performs training functions similar to those of the Redeye M76 training set. Each Stinger section will have a training set and each MTS four training sets. The THT is used in all facets of training: during initial and unit training, in the MTS, in garrison, at local training areas, during field training exercises, and on firing ranges. The THT is the primary vehicle for conducting and evaluating individual gunner target engagement proficiency.

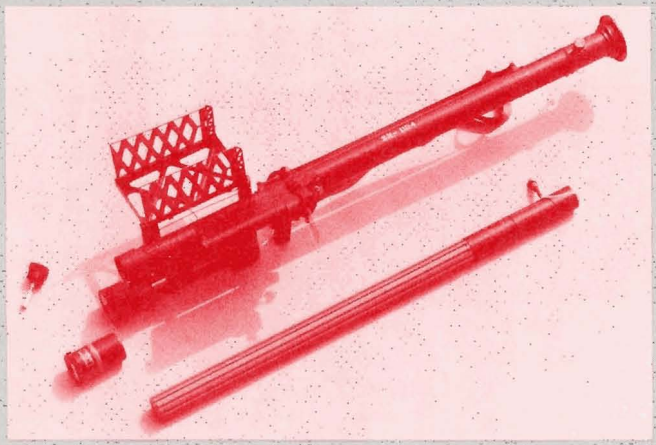
■ M60 Field Handling Trainer. The field handling trainer (FHT) consists of a weighted and balanced dummy launch tube, an inert separable gripstock assembly, and a shipping and storage container. The FHT provides practice in weapon handling to include weapon-round assembly and disassembly, preparation of basic load and ready rounds, reaction drills, sighting, and ranging. Controls and mechanical actions are the same as the tactical round; however, the trainer has no active internal components or electronics. The FHT performs the same training functions as the Redeye M46 field handling trainer. Each Stinger team will have one FHT. The FHT is the primary training vehicle for training weapon handling and preventive maintenance, and for training and evaluating crew reaction drills.

The four training vehicles just described will provide the same training program as we have for Redeye, which brings us back to the training deficiencies mentioned earlier. The TRASANA studies and gunner survey data indicate some gunners lack confidence in their weapons (and experience anxiety and fear for their own safety) because few are allowed to fire the weapon. Initial firing is a traumatic experience. Many gunners have said during surveys that they are not sure they will fire their MANPADS weapon in combat. By comparison, USMC gunners, each of whom fires both a live round and a MANPADS launch simulator during initial training and annually, do



Field Handling Trainer.

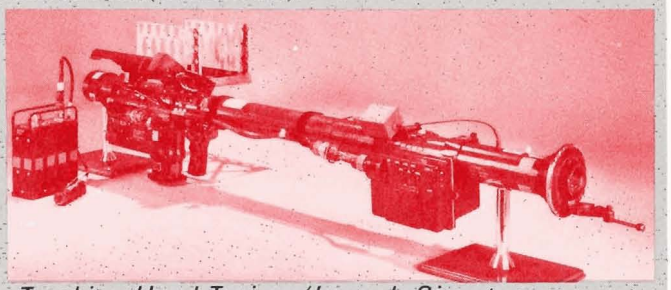
not express doubt about themselves or the weapon. During the TRASANA Redeye WSTEA Study gunners said they felt it is important to fire a live round or a simulator. Test results showed that firing a launch simulator raised individual proficiency while reducing uneasiness almost as much as firing the live round. But, while desirable, it would be cost prohibitive to have every MANPADS gunner fire a live round in training. Based on the USMC experience with the Redeye launch simulator (RELS), a Stinger launch simulator (STLS) is under development for the Marines. A US Army Air Defense School training device letter requirement is under consideration to acquire an Army version of the USMC-developed device.



Stinger Launch Simulator (Proposed).

The STLS has been proposed to provide gunners with a valid simulation of live-round firing in a range environment. Developed by Brunswick Corporation Defense Division, this confidence trainer will duplicate the operating characteristics, noise, backblast signature, launch, and center of gravity change of the live round. The gunner will experience the same physical and psychological effects of firing a live round. The device is intended to be fired by every gunner during initial training and annually thereafter. When combined with observation of a live-round firing, the STLS will improve the gunner's proficiency while reducing his anxiety.

The TRASANA studies also surfaced a lack of realism in field training exercises and a lack of system confidence and sense of participation by MANPADS gunners. With these findings in mind, a modification to the Stinger tracking head trainer has been requested to be incorporated as an engineering production change. It will be called the tracking head trainer/launch signature simulator (THT/LSS).



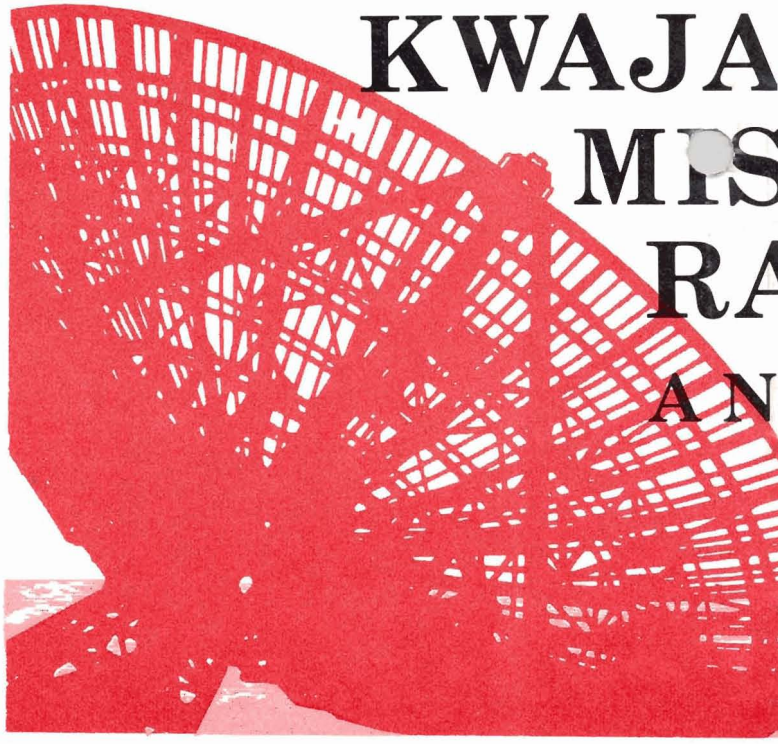
Tracking Head Trainer/Launch Signature Simulator (THT/LSS) (Proposed).

The THT/LSS is a low-cost, confidence-building device that may be used in day-to-day training. Using "off-the-shelf items" such as antitank weapons engagement signature simulator (ATWESS) firing chambers, it will simulate launch noise and backblast signature without the safety restrictions (400 meter impact area) of the STLS. During recent testing of the air-ground engagement simulation (AGES) system, the proposed THT/LSS promoted increased realism, a sense of participation, and interest in the training exercise on the part of both gunners and aggressor aircraft (Army attack helicopter) pilots. In addition, this device will allow Stinger to participate in National Training Center Field Training Exercises.

The combination of programed and proposed Stinger training devices will provide a complete training support system for both resident training at USAADS and collective training in units.

Master Sergeant Chapman is a project NCO for MANPADS in the Roland/DIVAD/Stinger Division of DTD, USAADS. He has served 6 years in ADA fire distribution systems and 14 years in SHORAD/MANPADS duties, primarily in operations and training. He is a distinguished graduate of several technical and professional courses and an honor graduate of the Redeye controller course and the ADA advanced NCOES.

The Kwajalein Missile Range was the subject of an article titled "The US Ballistic Missile Defense Research and Development Program" that appeared in the January-March 1979 issue of Air Defense Magazine. "Kwajalein Missile Range - A National Asset" is a follow-on article that provides review information about the installation and activities and continues with an extension of information on instrumentation and progress in BMD research and development at the Kwajalein Range.



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In nuclear proliferation studies, the Soviets are reported to be deploying fourth generation ICBMs and continuing to deploy multiple independently-targeted reentry vehicle (MIRV) equipped ICBMs. They have retained their ballistic missile defense (BMD) system around Moscow and may be developing a new, rapidly deployable antiballistic missile (ABM) system. At the same time, little has been heard of the US BMD research and development program since deactivation of the Stanley R. Mickelsen Complex, North Dakota, in October 1977. Nevertheless, the United States continues to pursue a comprehensive program funded at more than $200 million a year. The purpose is a hedge against the strategic uncertainties of the ballistic missile threat to the United States and to maintain US leadership in ballistic missile defense technology.

The BMD research and development effort is composed of the Advanced Technology Program (ATP) and the Systems Technology Program (STP). The ATP is a vigorous, broadly based research effort aimed at advancements in the state of the art of conventional BMD technologies. At the same time, new components and techniques for revolutionizing ballistic missile defense are sought and investigated. It is designed to advance BMD-relevant technologies to a level suitable for integration into a system. On the other hand, the STP integrates those technologies that are suitable for transition to systems applications into a systems context. It then validates the integrated technologies through high-fidelity simulations of laboratory and field testing. These efforts are to reduce the risk associated with incorporating these technologies into a systems concept. The US BMD research and development program is directed by Major General Grayson D. Tate, Jr., the Ballistic Missile Defense Program Manager. As program manager, he reports to the Army Chief of Staff. MG Tate commands the Army's BMD Systems Command and its Advanced Technology Center, both of which are located in Huntsville, Alabama. He is also responsible for the operation of Kwajalein Missile Range, a national range and the site of virtually all BMD major field testing.

The Kwajalein Missile Range is located on the Kwajalein Atoll about 4300 nautical miles (nm) from southern California. It is at the same latitude as the southern Philippine Islands and Panama and is at the same longitude as New Zealand. The lagoon enclosed by the atoll is the largest in the world, with a surface area of 1100 square miles and a depth of less than 200 feet. Range activities are located in the southeastern section on 10 of the approximately 100 islands comprising the atoll. The islands of Roi-Namur and Kwajalein, separated by 45 nm, mark the Range's northern and southern extremities.

The Kwajalein Missile Range (KMR) was designated by the Secretary of Defense as a National Range to support major DOD programs and other federal agencies for launching, tracking, and collecting data in guided missile and space vehicle programs. It is the major test range for our strategic offensive missile force and for development of our defensive systems. The presence of this extensive test facility and the visible testing activity provide the world substantial evidence of the United States' intent to preserve strategic equivalence and to maintain a credible BMD deployment option. The installation is unique in two major respects. First, the distinctive quality of data collected by its highly accurate sensors is essential to the successful development of new generations of strategic offensive missiles. Second, it provides the only opportunities for direct field testing interactions between our offensive and defensive technical communities under nearly operational conditions. In fulfilling its mission, the Range has become the most highly instrumented real estate in the free world.

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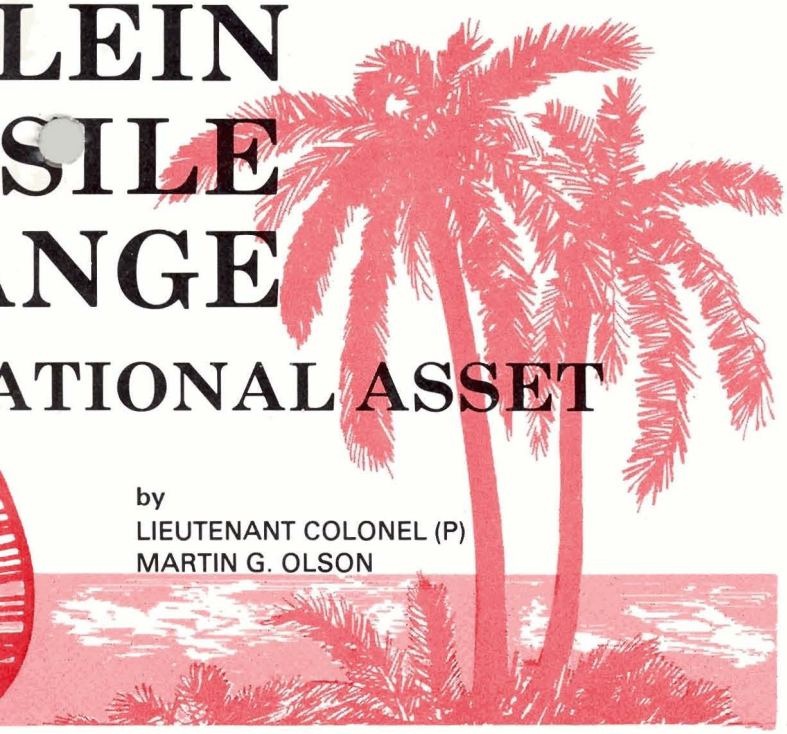


by
LIEUTENANT COLONEL (P)
MARTIN G. OLSON

Current range instrumentation employs a wide variety of data acquisition techniques such as radar, optics, telemetry, and hydro-acoustics. The following are some of those operating at KMR:

■ Super RADOT (Recording Automatic Digital Optical Tracker) (fig 1) is a large aperture (24 inch), long focal length (240 inch) tracking telescope used with a low-light-level video camera. It enables closed loop tracking of reentry vehicles at ranges in excess of 1600 nm.

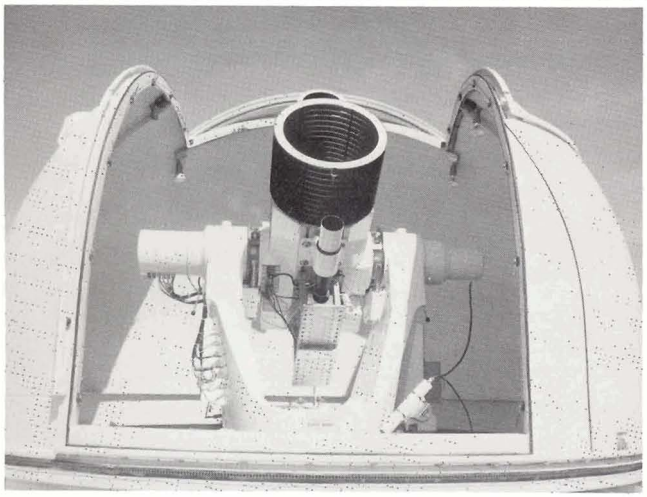


Figure 1. Super RADOT.

■ HITS (Hydro-Acoustic Impact Timing System) consists of four underwater hydrophones and three velocimeters located on the lagoon floor. It detects and measures the geographic point of the impact of a reentry vehicle on the water's surface. Average point of impact accuracy for this system is ± 16 feet.

■ ALTAIR (ARPA* Long Range Tracking and Instrumentation Radar) is the largest (150-foot, mechanically steered dish), most sensitive radar at Kwajalein.

It tracks a central object in a multitarget complex. It also acquires, tracks, and records digital data on as many as 14 targets simultaneously. ALTAIR's acquisition range for data on a slender reentry vehicle is 1500 nm.

■ TRADEX (Target Resolution and Discrimination Experiment) (fig 2) has an extensive repertoire of coherent, high pulse repetition frequency (PRF) waveforms for unambiguous doppler measurements and high resolution doppler discrimination. It provides D- and F-band reentry vehicle and wake signature data.

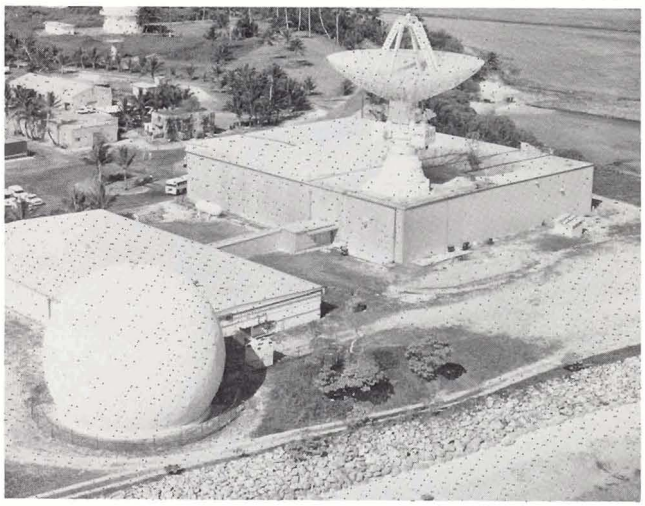


Figure 2. TRADEX (roof mounted). ALCOR in radome, left foreground.

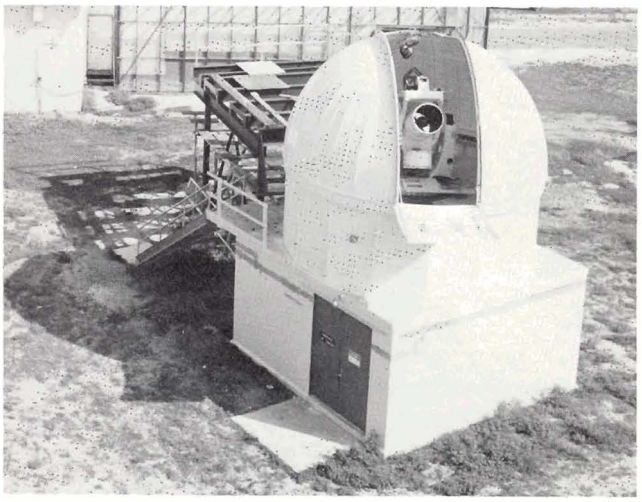


Figure 3. The LITE laser radar is one of three sensors that comprise the Army Optical Station.

■ LITE (Laser Infrared Tracking Experiment) (fig 3) is an active infrared laser used to develop a data base of laser cross-sections of the various reentry bodies and the particulate wake. The

*Advanced Research Projects Agency.

transmitter is a neodynium YAG laser operating at 1.06 microns and employing a peak power of 50 megawatts. The receiver is a 24-inch Cassegrainian telescope using a silicon avalanche photo diode as a detector at the focal plane. Since the system's initial operation in 1978, handover of reentry targets between LITE, passive optical sensors, and radar sensors has been demonstrated repeatedly.

■ Telemetry ground stations are located on three islands -- Ennylabegan, Gagan, and Roi-Namur. These locations give near optimum tracking geometry for both impact and launch operations. The main telemetry installation (fig 4) is located on Ennylabegan. Here six F-band, state of the art, auto-tracking antennas receive data transmitted by reentry vehicle and missile on-board telemetry systems. Four antennas are 10 feet in diameter, one is 28 feet, and another is 24 feet.

■ ALCOR (ARPA-Lincoln C-band Observables Radar) is a high-power, narrow beam, tracking radar with range resolution of less than 2 feet. Its 40-foot, solid antenna dish is enclosed in a 68-foot space frame radome to protect it from windloading effects. ALCOR's exceptional tracking accuracies include a range accuracy of 2 meters, an angle accuracy of 50 microradians, and a doppler velocity accuracy of 2 centimeters/sec.

Every test range must have instrumentation as dynamic as the technology it supports if it is to remain effective. Kwajalein Missile Range aggressively pursues modernization and improvement of range sensor and support capabilities. The super RADOTs are representative of this modernization effort. They were developed by KMR Army and contractor personnel who took the original RADOT's high speed camera/motorized mount concept and introduced a low-light-level video system and improved optics. The resulting combination provides increased tracking and recording capabilities. It also allows for improved, lower cost use of video tape versus movie film for data recording. The Super RADOT is a marked improvement in Range instrumentation. Three Super RADOTs are now operational. Two more are being procured and a sixth Super RADOT is planned for the future. The modification of older systems is frequently inadequate for accurate tracking data needed to support modern weapon systems. Kwajalein Missile Range's conventionally designed radars and optical systems have been refined mechanically and electrically, and their data processing systems and programs have been improved. However, DOD missile testing and development programs are demanding still greater accuracies, and a new tracking concept is required to meet this need.

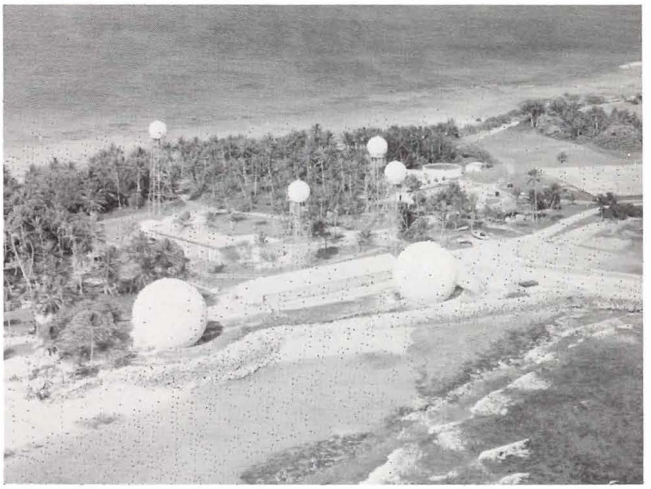


Figure 4. Primary telemetry ground station on Ennylabegan.

The Multistatic Measurement System (MMS) is scheduled to be operational this summer. MMS will use two receivers at remote locations in conjunction with existing monostatic radars. The geometric relations of the target and three ground stations will provide greater crossrange measurement accuracies. The MMS will use the TRADEX and the ALTAIR as monostatic radars. The TRADEX will be used with two new remote receivers to form a D-band multistatic system providing precision tracking of the target and D-band bistatic signature data as well. Each of the new receivers (one on Illeginni Island and the other on Gellinam Island) employs a 20-foot diameter dish with a dual-frequency, D-band/UHF feed. The antenna at Gellinam will, besides supporting the TRADEX D-band multistatic system, support the ALTAIR simultaneously in a UHF bistatic operation to obtain UHF bistatic signature data. The MMS will provide bistatic signature data vital to discrimination research and realtime metric tracking accuracy of 13 feet for a reentry vehicle (RV) 60 miles away. This tracking accuracy improves generally with decreasing range due to the effect of the geographic separation of the receivers. Important features of the system are its all-weather, all time-of-day capability and the capability for using radio star positions for absolute references.

Activation of this precision system will represent the first availability of exact real-time tracking accuracy to support feasibility and developmental testing of nonnuclear kill (NNK) warheads for BMD applications. The development of the NNK technology offers the following advantages in ballistic missile defense system development: warheads are less expensive, self-induced nuclear effects in an engagement are eliminated, and testing is not as restrictive as for nuclear devices. Furthermore, the improved

tracking accuracies are vital to the Air Force for precise testing of strategic reentry and delivery systems.

About 20 times a year, the Air Force launches ICBMs from Vandenberg Air Force Base, California, targeted for the Kwajalein lagoon and surrounding area. The FY 80, test programs supported by these launches include:

- Advanced Ballistic Reentry System (ABRES) tests of RV material characteristics, penetration aids, arming and fuzing technology, and maneuvering RV design conducted by the USAF Ballistic Missile Officer (BMO).

Minuteman development tests, also conducted by BMO, of special test missiles and production verification missiles to evaluate modifications and improvements to the Air Force reentry systems.

- Strategic Air Command (SAC) tests of Minutemen II and III missiles to provide training for SAC crews and evaluation of weapon system performance. Selected test vehicles have additional data requirements in support of offensive system development objectives.
- Detection, designation, and discrimination program conducted by the BMD Advanced Technology Center using TRADEX, ALTAIR, and ALCOR radars to obtain the primary field data for identification of new discrimination techniques and to validate proposed techniques.
- Systems Technology Test Facility operation by BMD Systems Command to support evaluation of BMD components for potential application to future BMD Systems.

Virtually all ICBMs targeted at KMR serve the data collection needs for both the offensive and defensive technical communities. Most ICBM's from Vandenberg are single launches. Depending on the type of missile and test purpose, they may be equipped with one or more RVs as well as a wide variety of penetration aids including chaff and various types of decoys. A different launch situation occurred on 10 July 1979 when SAC operational crews from the 90th Strategic Missile Wing at F.E. Warren AFB, Wyoming, launched two Minuteman III missiles 12 seconds apart from Vandenberg. The launch (fig 5) was part of the Strategic Air Command's readiness exercise, Global Shield 79. SAC forces were responding to a hypothetical enemy attack on the US.

Although the dual launch was conducted primarily for the sponsoring offensive community, data taken during midcourse and reentry on the RVs, tanks, and debris will be used in a variety of defensive community developments. Some ICBM launches from Vandenberg AFB have had related launches from Kwajalein in support of defense system developments. The most recent was in December 1978, when the Designating Optical Tracker (DOT) vehicle was launched from Roi-Namur in conjunction with the arrival of a Minuteman III ICBM launched from Vandenberg.

A brief concept description is needed to reveal the full significance of the DOT mission. An advanced BMD system concept being developed by the System Technology Program is that of a layered defense system (LDS). The system could be used to provide protection to ICBMs in silos as well as most of the MX basing options against the large number of Soviet reentry vehicles estimated for the mid-80s. It would provide that protection at a cost far below that of conventional terminal defense systems. It can also defend other high-value military targets such as command and control facilities, SAC aircraft bases, and flight corridors. The system consists of an exoatmospheric overlay and an endoatmospheric underlay. Early warning would come from satellite information and initial data would be provided the defense system by optical probes lofted above the atmosphere. These probes survey the threat complex obtaining information on numbers, composition and direction of the incoming threat. When the threat has been confirmed and initial data are sufficient, interceptors would be launched. These interceptors, also equipped with sensitive optical sensors, would acquire, discriminate, and intercept, employing multiple kill vehicles to achieve nonnuclear kill of the RVs. The multiple kill vehicles would be carried on the upper stage of the interceptors and be bus-deployed in the same manner as multiple RVs on a multiple independently targeted reentry vehicle equipped ICBM. This filter enables (for the first time) the employment of defensive missiles well out into the earth's atmosphere. Those RVs that penetrate the filter would be dealt with by an underlay in the form of a terminal defense system. This system is comprised of small, potent phased-array radars (with about one-fifth the power-aperture product of the MSR), commercial computers, and high-velocity interceptors.

Figure 5. USAF dual ICBM launch from Vandenberg AFB, 10 July 1979.

The layered defense system concept is especially effective in achieving low leakage. It has a much greater ability to withstand large numbers of attackers than the previous site defense system concepts because of the effective thinning out of the attackers by the multiple NNK, exoatmospheric intercepts by the overlay. This concept is particularly insensitive to penetration aids because of the radar and optical sensors. Penetration aids effective against radars are not effective against optics, and vice versa. Finally, the layered defense system concept affords great economic advantages over previous terminal defense concepts. For example, the underlay system would require only about one-half of the radars and one-tenth the number of interceptors of a stand-alone system.

Together, the two portions composing the layered defense concept produce a strong defensive capability. However, it should not be overlooked that, for given tactical situations, acceptable area coverage and resilience to a variety of threats may be provided by the overlay system alone. For example, the overlay is ideal for defense of SAC bases where the target is soft and high-altitude intercepts are required to provide adequate protection. In August 1978, Lockheed Missile and Space Company was awarded a 5-year Homing Overlay Experiment (HOE) contract for $118.4 million as a result of competitive procurement. This contract calls for Lockheed to develop a ground-launched interceptor missile to optically locate and then "kill" attacking ICBMs above the atmosphere. Experimental demonstration of this technology is scheduled this year at Kwajalein Missile Range.

Crucial to this overlay concept is the feasibility of detecting and tracking ICBM RVs by means of a long-wavelength infrared (LWIR) telescope carried aloft by a ground-launched missile (fig 6).

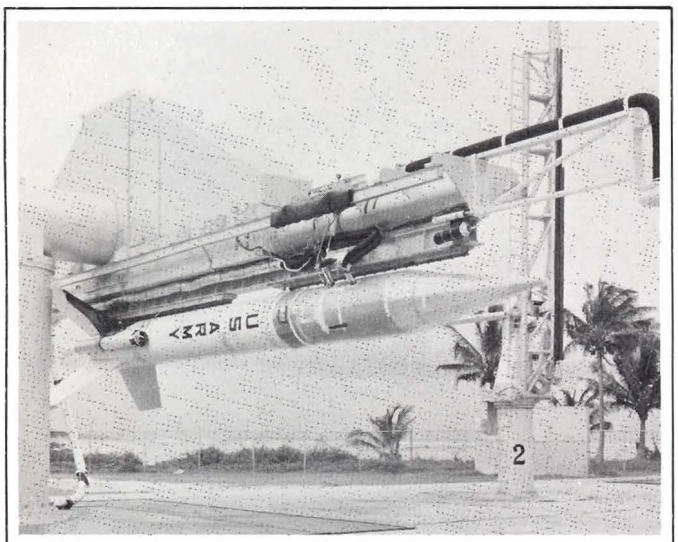


Figure 6. Designating Optical Tracker (DOT) on its launcher at Roi-Namur.

The DOT launch demonstrated this feasibility. The experiment began with the launch of a 78,000 lb Minuteman III ICBM from its 90-foot deep, 12-foot diameter silo at Vandenberg AFB targeted for impact in the Kwajalein lagoon. A few minutes after the ICBM's launch, the DOT vehicle was launched from Roi-Namur carrying aloft an LWIR telescope, stabilizing system, and telemetry system. Upon receiving a preprogramed command from the flight computer, the viewing door was opened, the telescope pointed toward the incoming complex and commanded into a viewing sequence for about 5 minutes. After successfully gathering the data, the telescope was stowed, the door shut, and the vehicle prepared for reentry and parachute descent to the ocean where it was recovered. The vehicle and its optical system were refurbished and prepared for future tests. The second DOT flight was conducted successfully in February 80.

The support of the BMD Systems Technology Program sponsored radar technology development program is another important function. The vehicle for this development and testing effort is the Systems Technology Radar (STR) on Meck Island. This phased-array radar system (fig 7) is smaller and more advanced than its predecessor, the Missile Site Radar (MSR). The STR performs the functions of search, acquisition, track initiation, discrimination, and interceptor guidance simultaneously against a target complex of hundreds of objects. These functions are achieved by computer selected commands to the radar subsystem. Specific radar pulses with appropriate waveforms and frequencies are requested to perform the foregoing tasks in a totally interleaved manner. The real-time software maintains constant control of resources expended, making sure that radar commands and the radar return signal processing by the data processor do not saturate the capabilities of the radar or the data processor. The STR features 22 different waveforms, and the system is designed for unmanned operation. The electronics design provides a dormant-to-quick start capability, and the system is rapidly deployable. The transmitting

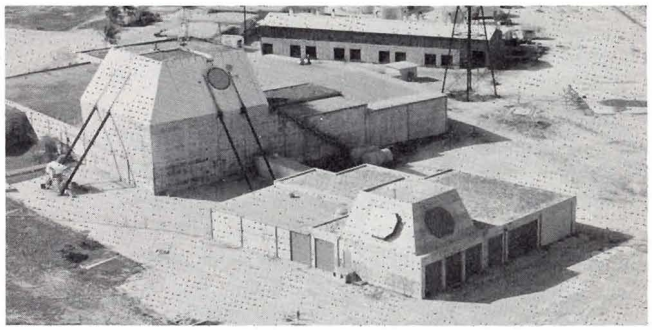


Figure 7. Systems Technology Radar (STR) in foreground. From installation to first radiation took only 3 months.

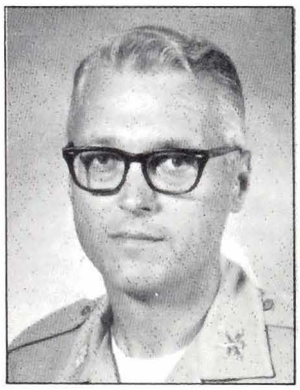
system has dozens of computer selected frequencies from which to choose with the transmitted frequencies being changeable from pulse to pulse. The system has real-time coherent waveform processing which enables it to discriminate in the dense clutter environments surrounding waking RVs. Although missions coming into Kwajalein are used by the STR as targets of opportunity, dedicated missions specifically designed are sometimes required to test the extensive system capabilities completely. On these occasions, ICBMs dedicated to the STR's mission are launched from Vandenberg. In January and August 1979, Minuteman ICBMs carrying target packages prepared especially for the BMD Systems Technology Program were launched into Kwajalein. These tests produced stressing environments in which the STR was to discriminate and track the RVs in the incoming target complex. To a less sophisticated radar, all reentering objects appear as credible targets and their number would quickly saturate its tracking capability. In these tests, the STR demonstrated its ability to automatically and correctly identify the RVs from the many objects in view. The STR then tracked them while they reentered the atomosphere surrounded by thousands of pieces of debris from the disintegrating booster.

This effort is scheduled for completion during FY 80. It has been extremely successful in validating critical technology for a baseline terminal defense system that represents the state of the art in BMD. As the lowest risk technology, baseline terminal defense would have to be considered seriously if it were necessary in the immediate future for the United States to deploy either a stand-alone terminal defense of hardened targets or the underlay portion of a layered defense system.

Looking to the future, the Systems Technology Program will begin to focus on a low-altitude defense (LoAD) system. LoAD is a simplified, downsized adaptation of baseline terminal defense technology employing a small, single-stage, inertially guided interceptor, a small phased-array radar, and a distributed data processing system. Operating at less than 50 kilofeet altitude (less than 200 kilofeet for baseline terminal defense), it would defend hardened targets, such as land-based ICBMs. A signature measurements radar will begin collecting data on low-altitude reentry activity at KMR during FY 81. Integration testing of the LoAD pre-prototype system, including interceptor firings, is expected to begin at Kwajalein in mid-1980. Successful completion of the program would reduce the leadtime required to deploy a low-altitude defense, which would provide insurance against unbounded growth in the Soviet threat to US forces.

These examples provide a glimpse of the varied activities accomplished at KMR. Whether it is support of a nominal Air Force SAC mission (the most frequent type of range support mission), support of the Defense Nuclear Agency's atmospheric probes launched from Roi-Namur, support of specialized, highly demanding missions, tracking support of orbital launches from Cape Kennedy, or tracking a dying skylab on its final orbits, KMR provides a service nowhere else available. The US possesses no comparable capability to collect exoatmospheric radar and optical signature data, record missile reentry phenomena, obtain terminal trajectory and impact data, recover reentry vehicles, and provide precise metric tracking data. The quality of the equipment and the technical team assembled at KMR is superb. Sensors are continually being upgraded. Range capabilities continue to be improved by significant technical improvements and modernization and by adding new equipment to keep pace with demands for increasing accuracy and range capabilities. The collocation of the offensive support and defensive test activities allows opportunities to test new BMD technologies against the most sophisticated targets available. Fewer missile firings are required and it provides a continuous interchange of data and ideas between our offensive and defensive development programs.

Kwajalein Missile Range is a unique national asset. It is vital to the development and testing of strategic offensive and defensive systems.



Lieutenant Colonel Olson graduated from the University of South Dakota with a Bachelor's Degree in Electrical Engineering. He also holds a Master's Degree in Systems Management from the University of Southern California. A graduate of the Armed Forces Staff College, he is now a student in Army War College Corresponding Studies, Class of 1981. At the time this article was written, he was Deputy Commander of the Kwajalein Missile Range.

NEW LOOK FOR FRENCH TACTICAL LAND FORCES

by Captain Jean-Pierre Pailler

At the onset of the 1950s, France ended her colonial involvement. At that time she became preoccupied with safeguarding her *own* independence. She began by building a nuclear arms capability. Once that goal was achieved, her attention turned to conventional forces, particularly those entrusted with guarding the country against the mechanized threat in Eastern Europe.

The French Army of the 1960s

During this period the French Army consisted of three types of units, each suited to a particular type of environment and assigned a particular piece of geography. Force d'intervention units, both airborne and amphibious, were prepared for oversea deployment to protect far-flung French territories and meet other treaty obligations.

Forces de manoeuvre, consisting of two corps (five divisions), were stationed in northeastern France and West Germany. Their mission was to ascertain the strength of the threat and provide the commander in chief with time (in case of attack) to make the appropriate strategic response.

The Pluton — A tactical nuclear missile.

Defense operationelle du territoire troops, spread across the French countryside under territorial commanders, were responsible for internal security.

Plans called for the mobilization of the Reserve in an emergency, but most military planners discounted the Reserve's effectiveness because of an outdated callup procedure that simply took too much time.

The 1975-1977 Program

In 1975, the President of France, at the urging of then new Army Chief of Staff, Jean Legarde, approved a comprehensive plan of reorganization for the French Army tactical land forces. Six features marked the plan:

■ Cost Reduction. To get maximum combat efficiency out of funds available, combat units were increased at the expense of staff positions. Brigade level was eliminated. Smaller, tougher, more cohesive divisions resulted.

■ Despecialization. Elimination of the specialty missions for the various forces greatly broadened flexibility of command. The new style divisions were capable of deployment anywhere with any mission.

The AMX30 Battle Tank.

■ Increased Mobility. New combat vehicles (the AMX10 infantry combat vehicle and SAVIEM VAB armored personnel carrier) were added to the inventory and the AMX13 tank was replaced with the AMX30.

■ Unity of Command. Wherever possible, territorial responsibility was integrated into operational command. This made organization for combat simpler and more effective.

■ Geographical Harmony. The lessons of history dictated a strong military defense position in the northeastern quarter of France. This uneven presence, however, has always caused uneasiness about the total defense picture. The situation improved greatly with deployment of a corps around Paris and with the "beefing up" of new divisions of the old territorial force. To accomplish this required a minor reduction in force in West Germany.

■ A More Credible Reserve. New mobilization plans were developed and implemented based on Active Army supervision of the call-up. The program was tested successfully in 1978 with the rapid mobilization of an entire infantry division. More exercises have been planned.

The French Army of the 1980s

As a result of the reorganization, now well underway, France will have an Active Army composed of 16 divisions — 8 armor, 6 infantry and 1 each alpine and airborne. The Reserve will comprise 14 divisions and the response time will be a fast 48 hours.

Tasks formerly assigned to the five forces de manoeuvre divisions now fall on eight armor divisions, two armor battalions, and two mechanized infantry regiments.

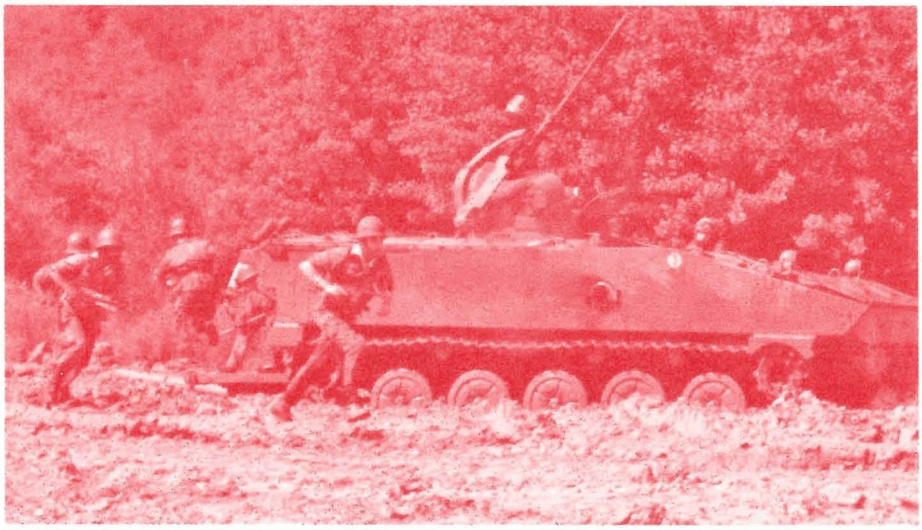
The keystone of this organization is the Pluton tactical nuclear weapon system, employed by either two or three battalions at the corps level.

Air Defense in the New Organization

Under the old organization, air defense of the corps area was provided by a Basic Hawk battalion and in the division area by a light ADA

battalion equipped with 40-mm L60 towed guns and 30-mm twin-barrel, self-propelled guns with acquisition and range radars.

In the new organization, ADA at the division level has been eliminated, but the corps received an Improved Hawk battalion and two light ADA battalions (one pure Roland and the other mixed Roland and 30-mm, self-propelled gun). Frontline troops will protect their aerial flank with a 20-mm gun.



The AMX10P infantry combat vehicle.

An Improved French Army

The reorganization of the French Army has gone beyond simple rejuvenation. This fighting force is more mobile, more powerful, and is in a much greater state of readiness.

France is a charter member of the Atlantic Alliance and is still bound by Article Five of the Treaty of Washington, which states that an armed attack against one of the signatory nations shall be considered an attack against all. Therefore, the importance of major improvements to the French Army extends well beyond the borders of France.

Roland — A SHORAD weapon system.

The 20-mm antiaircraft gun.

This article was written when Captain Pailler was a student in the Air Defense Artillery Officer Advanced Course, US Army Air Defense School, Fort Bliss, Texas.

VIEW from the FIELD

OPFOR TRY I

Beneath a giant Russian flag, the men stand at rigid attention. Patriotic music of mother Russia plays in the background. As you stand in formation, there are two things you do not have to move your eyes to see — a bigger-than-life poster of Comrade Lenin silently inspecting your platoon and (above Lenin) a 40-foot red banner that reads, *"THE MORE WE SWEAT IN TRAINING, THE LESS WE BLEED IN BATTLE."*

You definitely will sweat much today. At 0500 you were in line to draw your weapon and protective mask. The platoon leader started his inspection at 0610, not a second later. Next comes physical training, commander's inspection, daily news, orders of the day and, finally, breakfast at 0755.

A Russian army base somewhere in Eastern Europe?

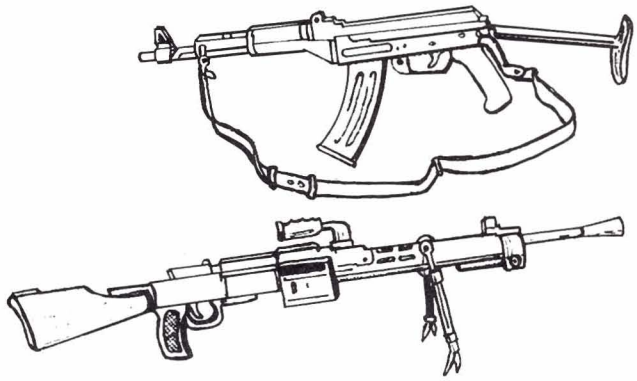
No.

This is a National Guard Armory in the southeastern Ohio town of Logan, home of Battery A, 2d Battalion (AW) (SP), 174th Air Defense Artillery. This will be the first Opposing Force (OPFOR) training day experience for the men of Battery A and possibly for the National Guard of Ohio.

Months of research and planning went into this first day of playing the role of our Russian counterparts. Requests for support went out to many Army posts and some civilian agencies. In all instances, those contacted were eager to help. People donated personal equipment, 35mm slides, and other items to be used by the unit.

Battery A is also fortunate to have its own Russian expert in the person of 2LT Joseph Eberly, a senior at Ohio University majoring in Russian studies. His knowledge added significantly to the realism of the training.

The Russian training schedule was adopted from FM 30-102 and was followed as closely as possible. Russian identification books and paybooks were issued to all personnel (GTA 30-3-17) and, as time permitted, these were typed in Russian for the individuals. Static displays were set up for all to view. Included were Russian company-type weapons, current magazines, books, newspapers, pictures of equipment, and an economic profile.



Russian battalion-size maneuver forces in the offense were simulated using the map in GTA 30-3-17, terrain boards, scale models of OPFOR, and US vehicles displayed in battle positions. Threat

movies and video tapes were scheduled throughout the day's training. Although some were in the Russian language only, the pictures provided a dramatic view of Russian soldiers in training. With all the Russian atmosphere that could be mustered, squads still trained on American tasks throughout the day; tasks were taken from the Soldier's Manual of Common Tasks.

Meals were served on the OPFOR time schedule: 0755 breakfast, 1530 lunch, and 1930 supper. The meals served were American, but a typical Russian meal was prepared and displayed. As meager as the OPFOR meal looked by our standards, the display was gone by 1330. Apparently the feeling of hunger was just too much for someone.

A morning news period was allotted in the daily schedule. At this time, LT Eberly gave the news in the Russian language, translated by LT Elick (from a prepared script). The headlines in our newspapers sound very different when twisted to suit political needs rather than to inform honestly.

Designed to inform as well as train, the following subjects were taught: enemy aircraft and vehicle identification, defense against the Sagger missile, and defense against the Hind helicopter. These were integrated throughout the day with movies, slides, and TV films.

Platoon integrity was stressed so that individual questions, when asked, could be answered to the largest group possible. Question and answer periods brought some interesting thoughts to the surface. The questions covered not only military subjects but economics and religion in Russia, conscription into the service, and freedoms allowed the population. The most stirring question was why do the Russian people tolerate that type of political system?

Is OPFOR training worth the extra time and effort put into organizing it? Yes, if it is done with one purpose in mind: to stimulate interest in training. Yes, if everyone gets involved and is aware of these questions: Am I equal to the task of fighting the OPFOR soldier? Do I know my job as well as he knows his? Training planned to stir the imagination and interest of the best-educated soldiers in the world will always pay off for the unit.

What comments did Battery A people have about OPFOR training? "From 0500 to 2200 was a long day." "Meals were too far apart." "I got up at 0300 so I could get to my station by 0500."

Good comments? There were a few. Questions? There were hundreds.

Credit: "Armies & Weapons"

Are you, as an American soldier, serious enough in your personal training efforts to make you a match for these Russian troops?

WHAT DO YOU DO NOW,

LIEUTENANT?

A Special Challenge!

by Captain Warren J. P. Brey

SITUATION:

You are a Second Lieutenant who has received assignment orders to a Hawk battery in the 32d AADCOM. You will be required to meet the unusual requirement of an assignment in a 32d AADCOM Hawk battery, a truly challenging and demanding job. Following are some facts about what you will experience while stationed opposite the Warsaw Pact nations.

In a Hawk battery, you can expect to serve as a platoon leader who functions in a variety of additional duties and periodically performs the demanding 24-hour duty of Tactical Control Officer (TCO). As a newly commissioned officer, you learned in the Officer Basic Course that you will be counselor and personnel manager for members of your platoon. Because time becomes a precious resource to the busy Hawk platoon leader, be sure to set aside time to attend to your personnel. For example, reserve time to counsel your men, make recommendations for awards, or write letters of reprimand as appropriate.

In your role of training manager, you must supervise individual training and help plan, organize, and execute collective training. Frequent evaluations by higher headquarters will monitor the progress of individual and unit proficiency.

Organizing and supervising the maintenance of platoon and individual equipment are also part of your job as a platoon leader. TRIAD Hawk battery personnel must service 9 launchers, 12 radars/radar vans, approximately 13 60-kw generators, 22 small generators, 50 trailers, and 60 vehicles plus a variety of communications and nuclear, biological, and chemical equipment. To perform this maintenance, sufficient repair parts must be on hand and a well-organized, well-supervised, systematic program must be in effect.

There are other duties distributed among the lieutenants in a battery that require varying degrees of effort: duties such as classified documents custodian, physical security officer, motor officer, and training officer. This is but a brief account of the responsibilities Hawk platoon leaders share with many of their contemporaries in other branches.

"Why is the 32d AADCOM job special?" you ask. Here are some reasons. First, the 32d AADCOM Hawk battery has a year round, 24 hour a day, NATO air defense mission. Every day of the year, each Hawk battery maintains one of four readiness postures as directed by higher headquarters.

The responsibilities a lieutenant incurs as a TCO constitute the second reason that his job is especially challenging. To ensure that a Hawk battery can respond to an alert message within the time specified, a TCO and his crew must maintain the highly sensitive Hawk equipment around the clock. During a 3-year tour in 32d AADCOM, you as TCO can expect to spend 1 out of every 3 days on 24-hour TCO duty.

The third reason, which is the demanding evaluation system, will be discussed after a more complete account of TCO requirements.

Several aspects of TCO qualification must be mastered for you to become a good TCO. To employ the Hawk system fully, the TCO must be familiar with the basic concepts of each major item of equipment as well as the system as a whole. Knowing the daily checks, most importantly integrated daily checks, is essential to building this foundation. Besides knowing the daily checks, the criteria for passing Operational Readiness Evaluations (OREs) must be learned and you must be able to prepare the Hawk system to meet, and preferably exceed, ORE standards.

Another TCO requirement is a knowledge of air defense tactics. The tactical SOPs of Hawk units in 32d AADCOM are complex. To certify that a TCO retains this critical information, every 6 months he must demonstrate his proficiency by written examination. Once you have passed the examination (and demonstrated your technical proficiency during an ORE), you are qualified to serve as a TCO during increased states of alert.

As indicated above, the third reason that a 32d AADCOM, Hawk lieutenant's job is more challenging than that of his contemporaries is the demanding tactical evaluation system. In addition to Army Inspector General and command inspections, the Hawk battery is subjected to frequent OREs and a thorough Allied Air Forces Central Europe (AAFCE) Tactical Evaluation (Tac Eval).

A battery in 32d AADCOM is almost always preparing for evaluations because of the frequency and high standards of the evaluations. Experience shows that the average Hawk battery can expect to pass only 25 to 50 percent of the 25 plus OREs it will undergo each year.

Tac Evals are the most thorough mission evaluations a unit undergoes. An entire battalion is tested at one time to determine its ability to react and to perform operations in a simulated hostile environment. The Evals are conducted annually at each battalion by the 32d AADCOM. The multinational AAFCE Tac Eval team evaluates most units every year, also. Since AAFCE is a NATO command, the results of this evaluation and all preparatory evaluations, good or bad, have high visibility and bring credit or discredit to the Hawk battalion, the group, the 32d AADCOM, and the US ARMY Europe. Thus, there is a great deal of pressure on the TCO and his crew to perform their mission-related duties to perfection.

RECOMMENDATIONS

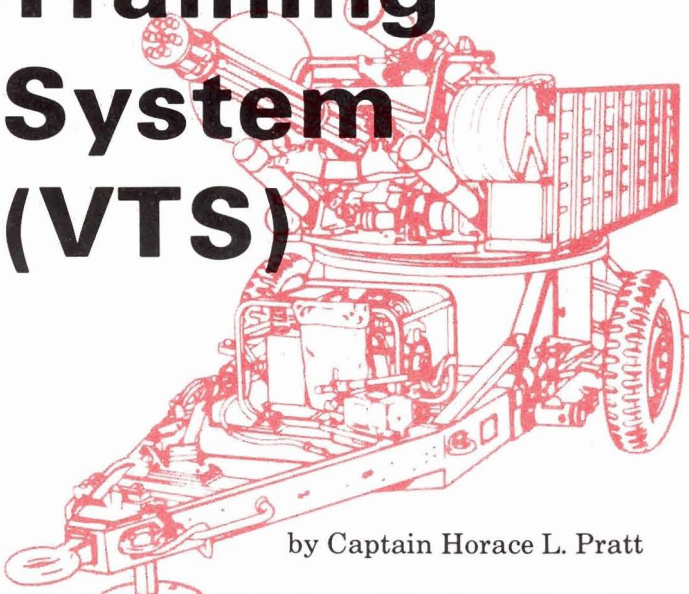
Although there is no easy way to prepare for the road ahead, several suggestions may be helpful in getting you started in the right direction.

- As soon as possible after arrival at your battery, develop and execute a plan that will lead to rapid TCO qualification.
- As you gain expertise in the role of a new TCO, you may have the chance to participate as a member (under training) of the Tac Eval teams. Seize this excellent opportunity to learn the intricacies and subtleties of the evaluation system. You can also observe techniques used in other units and bring good ideas back to your own unit.
- Despite the low success rate of some units during evaluations, you can help create a positive attitude in your unit that will keep the unit going when the rigors of Hawk duty begin to show on personnel.

In summary, the lieutenant assigned to a 32d AADCOM Hawk battery has all of the normal responsibilities of a platoon leader. But he also has the burden of supporting a 24-hour-per-day, NATO air defense mission, tough TCO duty every third day, and a strict evaluation system. To accomplish all of these tasks, he can expect at times to work long, hard hours. The complexities of the job keep it interesting, successes can be rewarding, and failures can be frustrating. This overview may seem overwhelming, but it is intended to inform the lieutenant who has received orders for a 32d AADCOM Hawk battery about the demands of the job ahead. It is a special challenge.

Captain Brey graduated from West Point in 1976. He has served as Platoon Leader and Battery Executive Officer in the 32d AADCOM, ECCM Training Officer in a TRIAD Hawk battalion, and Evaluator of Mission Effectiveness on the 32d AADCOM and AAFCE Tac Evals. He is currently assigned to the 4th Battalion, 61st ADA (C/V), Fort Carson, Colorado.

Vulcan Training System (VTS)



by Captain Horace L. Pratt

The US Army Air Defense School, working with the TRADOC Systems Analysis Activity (TRASANA), often reviews and studies soldier proficiency levels in all areas of air defense. The purpose of such reviews is to look for problem areas or shortfalls in training. A TRASANA team recently ended a study on the effectiveness of the Vulcan air defense system. The study involved 15 battalions worldwide to determine significant performance gaps and to find a potential solution.

The TRASANA study group looked closely at the relationships among the soldier, trainer, environment, and equipment. Proficiency levels of 891 soldiers were evaluated in the areas of visual aircraft recognition (VACR), hardware knowledge, and hands-on capability. Of this number, 242 were gunners and were graded on live-fire gunnery. All evaluated tasks and standards were taken directly from the 16R soldier's manual (Sept 76).

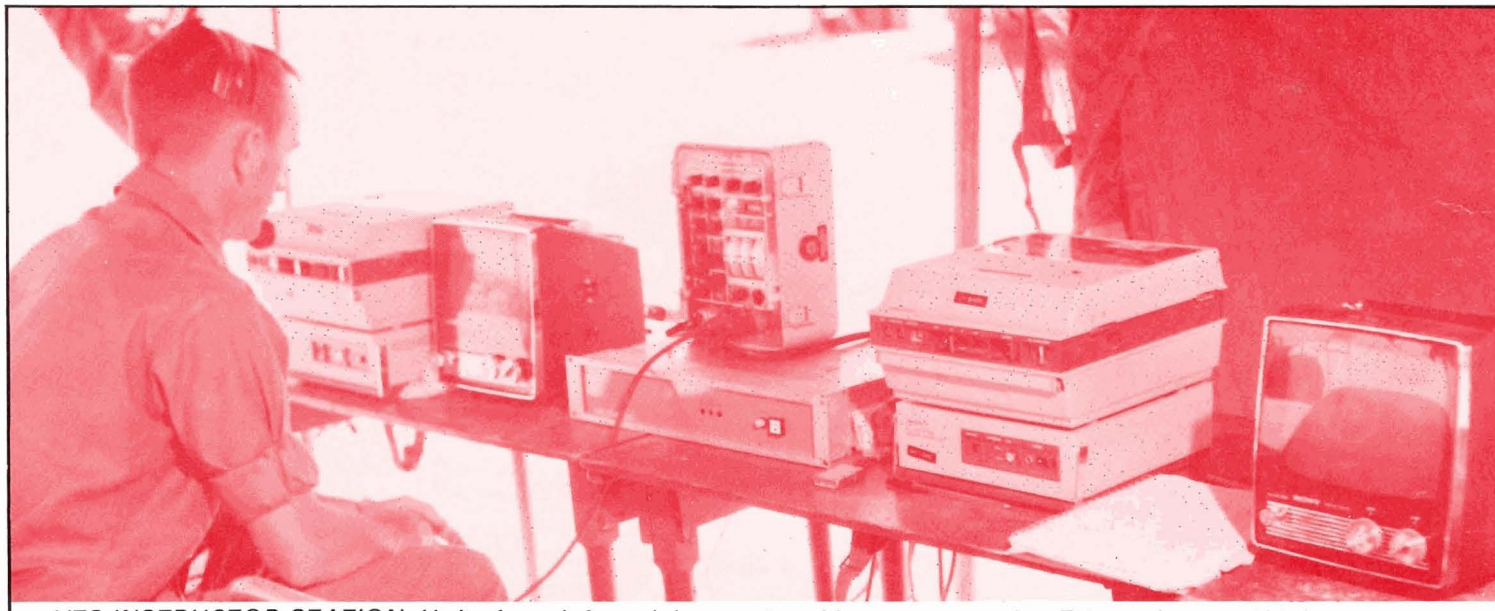
Solutions to problems came as a result of the study itself. Mr. John D. Tubbs of TRASANA used General Electric's Vulcan training system to do the worldwide study. It was so well received in the field and produced such excellent training results that more study on the VTS was justified.

The Vulcan training system is made up of four major parts:

- Television trainer (TVT).
- Vulcan gunner monitor unit (VGMU).
- M134 7.62-mm minigun.
- Radio-controlled miniature aerial target (RCMAT).

The TVT is the same closed circuit TV now on hand in the Chaparral/Vulcan air defense battalions.

The Vulcan gunner monitor unit is connected by cable to the VADS and provides the trainer with information on the gunner and the system. With the VGMU, the trainer can look at all the steps the gunner is performing in the firing sequence. From the VTS display he knows: the range to the target, when the gunner radiates the target, when ATD is inserted, when ready-to-fire illuminates, and when the gunner engages the target. The VGMU



VTS INSTRUCTOR STATION. Units from left to right are the video tape recorder, TV monitor, and Vulcan gunner monitor unit.

displays these data on the screen and records them for playback. The gunner and trainer can also talk to each other, with other gunners observing the TV display.

The M134 7.62-mm minigun with ammunition storage and handling system can be mounted on the left side of the Vulcan cannon in approximately 30 minutes. It requires no modification to the VADS.

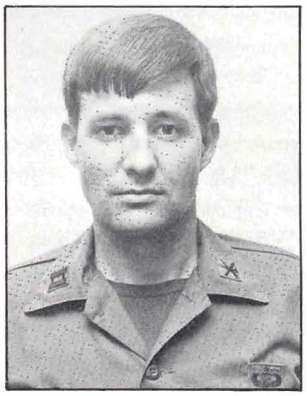
The target used for the VTS is the radio-controlled miniature aerial target (RCMAT). The RCMAT's size and speed present lifelike engagement situations to the gunner. It also stands up to 7.62-mm fire so it can be reused after minor repairs.

A special TRASANA test was performed to determine the training value of the VTS. Gunners trained in this manner show significant improvement and improved ability to hit targets with the Vulcan. Two line batteries (A and B) were selected to conduct the test. Gunners from both batteries were pretested using Vulcans and a bullet counter to see how many hits they scored. Battery A used its regular training methods, while Battery B used the VTS. Each Battery B gunner received 30 minutes of individual training in tracking and shooting at the RCMAT. During this time the gunner was able to talk with the trainer at the VGMU, who determined his mistakes and made necessary corrections. While they were not being trained individually, all other VTS gunners received group training by watching the TV monitor. Each gunner was able to play back his portion of the engagement procedures for additional critique. The Battery B gunners received 9 hours of training.

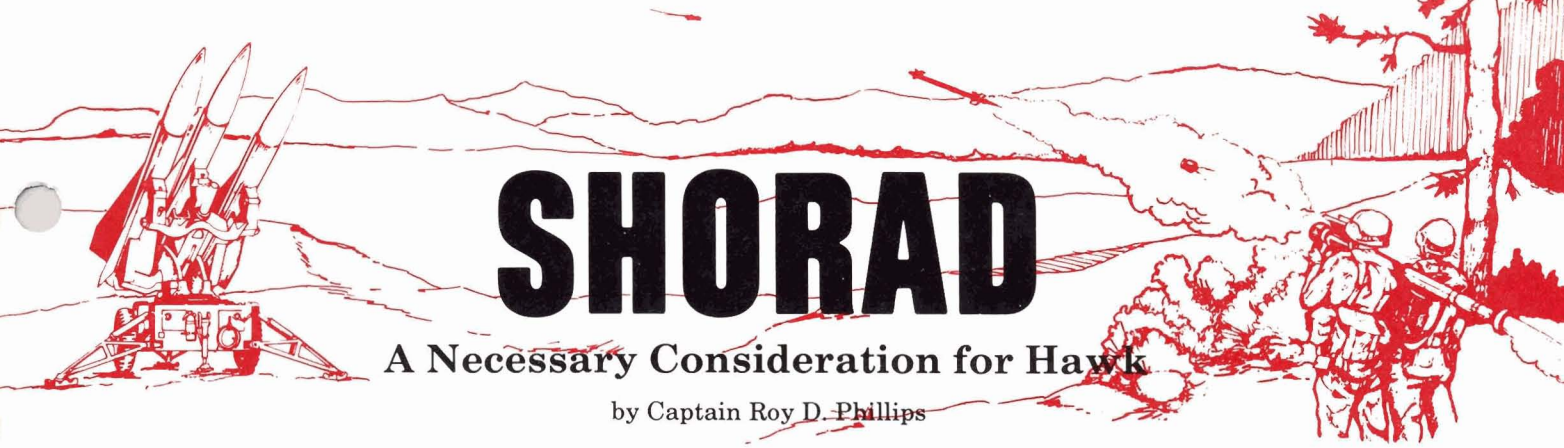
At the end of the VTS training, both groups were tested again. They used the Vulcan, a towed banner, and a bullet counter. Proper acquisition, tracking, radar procedures, and the number of hits were used to grade the two groups. Although Battery B personnel achieved lower scores on the first test (used primarily as a baseline or diagnostic), they were able to achieve much higher scores on the post VTS training test and the final test. The results supported TRASANA's idea that the VTS was an excellent way of training Vulcan gunners. This is especially true considering the learning rate experienced. Comparing the first two tests, Battery A improvements were marginal while Battery B gunners learned at a much faster rate. A score of seven on the vertical scale represents the Army minimum standards for this test. The two batteries tested were about average by worldwide comparison. In the final shoot-off, VTS-trained gunners increased their number of target hits by 64.3 percent, while Battery A hits actually decreased in number. This proved that gunners receiving training with the VTS are much better in firing procedures. More important is that VTS gunners showed a significant improvement in their ability to hit targets with the 20-mm Vulcan. Soldiers trained with the VTS said that for the first time they knew what they were supposed to do.

As a result of these tests, TRASANA strongly advocates the purchase and fielding of the VTS because it provides the most effective training vehicle available to Vulcan gunners. More reinforcement is gained at the trainer station where gunners can play back their engagements. Soldiers benefit from reviewing their own mistakes and by watching the actions of others. When operated as designed, this is the most realistic simulation short of firing on actual aircraft. There is an increased probability that VTS-trained gunners will carry this skill to combat where the initial stages may be the most critical.

The findings of the study will be the basis to request the purchase of the VTS for the field. Mr. Tubbs, Study Director, will travel Army-wide to brief major commanders in greater detail on the TRASANA study results.



Captain Pratt graduated from North Georgia College where he studied Management and Economics. His first 3 years in the Army were spent in the 82d Airborne Division in assignments with Redeye and Vulcan and as Battery Executive Officer. He later served 1 year in Korea assigned to the 38th ADA Brigade. He is presently attending the ADA Officers Advanced Course at Fort Bliss, Texas.



SHORAD

A Necessary Consideration for Hawk

by Captain Roy D. Phillips

The author has recognized a critical issue; however, the recommendations implied should not be construed as existing or projected doctrine.

In any future major war, NATO's success will be measured largely by the ability to secure and maintain air parity with the enemy. Because our Air Force no longer controls the airspace above the battlefield, surface-to-air missile (SAM) systems hold a particularly significant role: neutralizing enemy air power, insuring freedom of maneuver for ground forces, and surviving to achieve air parity and maintain air defense integrity.

In response to changes in enemy doctrine and improvements in low-altitude attack capabilities, short-range air defense (SHORAD) weapons were added to Hawk battalions to provide low-altitude self defense. Because of the flexibility of a TRIAD Hawk battalion, it is suited for defending maneuver areas, integrating air defense coverage, and providing defense in depth. For these reasons, TRIAD battalions will most likely be in support of division operations in areas susceptible to low-altitude attacks by helicopters and ground support fighters. SHORAD missiles were added to the Hawk battalion for self-defense but only in the firing batteries. Augmenting Hawk units with SHORAD weapons was a realistic and necessary action. Unfortunately, to augment the battalion only within the firing batteries and only with three two-man teams (as was the case) does not provide enough defense.

Air defense systems will be most effective when their focus remains on suppression of attack. When the battle situation reaches the point where AD systems, specifically Hawk, have to defend themselves, a crisis is at hand. Attacks aimed directly at Hawk positions may involve a mixture of enemy aircraft, weapons, and electronic warfare. The Hawk battalion will quickly reach a saturation point between self-defense and overall defense. The enemy, using electronic warfare and terrain analysis, will quickly pinpoint each firing element and the battalion headquarters. The entire battalion must then depend upon three Redeye (or Stinger) teams for self-defense, allowing the enemy to easily suppress the Hawk units and effect an air penetration.

Some think Stinger will be the cure-all for SHORAD. In adequate numbers, it may be. SHORAD is intended for protecting critical assets and point targets, executing mutual support, and providing balance in the early engagement. As in all units, a priority system of criticality must be established to organize the defense. All factors must be examined, including weapon capability and quantity versus the mission and threat. The defense should be designed accordingly.

In planning the SHORAD defenses for a Hawk battalion, the number of SHORAD assets is inadequate to achieve the mission expected. Three Stinger teams are allocated to protect a TRIAD Hawk battery with its three platoons spread across an area more than four times the engagement range of the weapon.

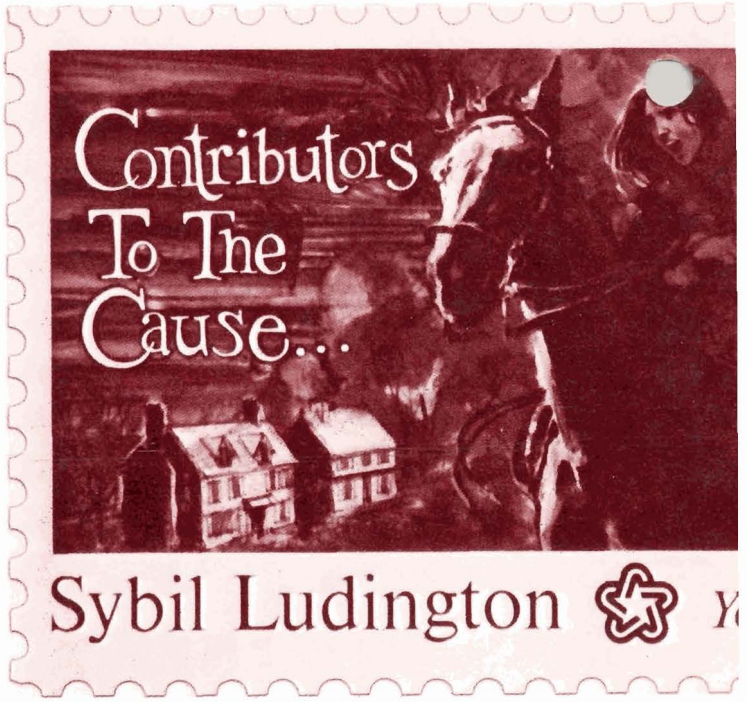
The Hawk battalion must also be mobile to minimize AD suppression. However, major moves of Hawk units provide lengthy exposure to hostile air attack. In march column defense, planning principles require less than 3 kilometers between Stinger teams in the column. Allowing for normal daylight dispersion, two teams are required for a 30-vehicle march column. Consequently, when the platoons move they become more vulnerable to air attack because they lack the minimum SHORAD protection. What of the battalion headquarters? No real SHORAD defense has been allocated. When emplaced properly, a battalion operations center (BOC) can be concealed, but not the acquisition radar signature. In a unit 1½ times larger than the firing battery, with a significant command and control function, the air defense capability is limited to four .50-caliber machineguns. If the BOC is pinpointed and suppressed, air defense integrity over the entire division area will be damaged.

What's the answer? Simply, to provide adequate SHORAD defenses to the Hawk battalions to make them viable assets. The concept of integrated air defense is to make enemy air attackers fly where they least desire. Integrated SHORAD forces enemy pilots to fly higher into Hawk coverage. Breaking the Hawk integrating link reduces SHORAD effectiveness. The same principle applies to integration of SHORAD into Hawk for self-defense. Each Hawk battalion needs Stinger teams in all batteries and in sufficient quantity to provide a realistic defense for each critical asset. What is needed is not three teams per battery but three or four teams per platoon or firing section and BOC.

Commanders who effectively employ SHORAD will have a better chance for survival than those who don't. Realistically, a battalion commander will have only the SHORAD assets deemed necessary to meet the threat. If those assets should number only three, it might prove to be extremely difficult to prevent neutralization by enemy air power.

Captain Phillips, a 1973 graduate of the United States Military Academy, has served as platoon leader of Vulcan, Redeye, and Hawk weapon systems. His last assignment included positions as Battalion Redeye Operations Officer, and Headquarters Battery Commander in an Improved TRIAD Hawk Battalion in Germany. He is currently attending the ADA Officer Advanced Course enroute to an assignment with the 101st Airmobile Division at Fort Campbell.

Editor's Note. This article is published in recognition of the growing number of women entering Air Defense Artillery and the superb job they are doing. AIR DEFENSE Magazine will publish additional articles on this subject as often as material is generated. Comments concerning each article, and reliable items of information suitable for publication, are welcomed in the form of letters to the Editor.



THE FEMALE AIRDEFE

A Historical Sketch

What do you say about a 20-year-old woman who pins her long tresses into a tiny knot on top of her head, dons a green baseball cap and a green suit with black boots, and heads out to her job as a Hawk missile crewman? You say that she is part of our modern Army. Only a few years ago she probably would have been typing the requisition for repair parts instead of helping operate the weapon. But times have changed, and women are finally being allowed to realize their full potential. Today, after a long upward struggle, women entering Air Defense Artillery (ADA) are giving the organization a new look. Let's take a brief glance at a few of the milestones they passed along the way.

This isn't the first time in our military history that women have been involved in nontraditional roles. When the United States was emerging as a nation, a determined and courageous girl named Deborah Sampson actually disguised herself as a man and served for 3 years with the Fourth Massachusetts Regiment in the Continental Army. And there was Mary Hays (known as Molly Pitcher) who served alongside her husband in the Revolutionary War. When her husband was wounded in battle, Mary promptly assumed his duties at the cannon.

These, and similar accounts, tell us that women have long had a capacity for other things than what we call traditional. But most Americans don't think of women playing nontraditional roles in the military. Instead, they envision the woman doing all those "feminine" things for which she is "so well-suited." This was especially true before World War II. For the most part, women assumed their patriotic duties as nurses, cooks, laundresses, and seamstresses while the military forces were composed of men.

A faint glimmer of change appeared during the frenzy of mass mobilization for the Second World War. Thousands of women began volunteering for military service. So many, in fact, that women's services in the Army were officially recognized in 1942 with the formation of the Women's Army Auxiliary Corps (WAAC). By 1945, almost 100,000 were serving in the Army, and the WAAC had become simply the Women's Army Corps. Although most of them were delegated to nursing, typing, and clerical chores, many were involved in communications. Some even found themselves employed as airplane mechanics, bombsight maintenance specialists, gunnery instructors, and in other jobs normally held by men. History shows that the women performed their jobs admirably. That could have been the start of an expanded role for women in the Army. But after the war, the number of women on active duty dropped sharply and, in the tranquility of peacetime America, women were returned to those "womanly" duties of nursing and typing.

It wasn't until the early seventies that the role of women in the Army took a giant step forward. Two events paved the way. First, the draft was about to end and, second, the Equal Rights Amendment was expected to be ratified, guaranteeing equal rights for women. Almost immediately, the Army initiated changes. The Women's Army Corps was filed under "History," and for the first time women became part of the Army's "body" instead of one of its "limbs." Women were no longer limited to only one-third of the MOSs available. They could serve

by Linda Pirino Ross

in any assignment except those directly involving combat.

In 1973, servicewomen began entering the Air Defense Artillery Branch. However, the transition was not without obstacles. As studies were being conducted, ADA MOSs were opened to women, then closed, and then opened again. It wasn't until the end of 1977 that a final decision was near. At that time, the Department of the Army announced that female soldiers could hold most ADA MOSs as long as no women would be involved in actual combat. Then in December 1979, the Combat Exclusion Policy was announced. It provided a basis for current Army policy regarding women in nontraditional jobs.

Presently, only four ADA MOSs and one ADA officer specialty are closed to women. Female commissioned officers may not hold the 14B specialty (Short Range Air Defense (SHORAD) Officer) and women warrant officers may not hold a 224B MOS (SHORAD System Technician). Enlisted women may not be assigned to 16P (ADA Short Range Missile Crewman), 16R (ADA Short Range Gunnery Crewman), or 16F (Light ADA Crewman (Reserve)) positions.

Even though the integration of women into Air Defense Artillery is barely past the infancy stage, real progress is being made. More than 260 enlisted women hold ADA MOSs. These women are Hercules Missile Crewman (16B), Hercules Fire Control Crewman (16C), Hawk Missile Crewmen (16D), Hawk Fire Control Crewmen (16E), ADA Operations and Intelligence Assistants (16H), and Defense Acquisition Radar Crewmen (16J).

Forty-nine female officers have chosen the Air Defense Artillery as a specialty. This number includes 1 captain (promotable) and 48 lieutenants. Eleven of the lieutenants are West Point graduates — members of the US Military Academy's first coed graduating class. No women warrant officers are serving in an ADA MOS at the present time. That field is wide open.

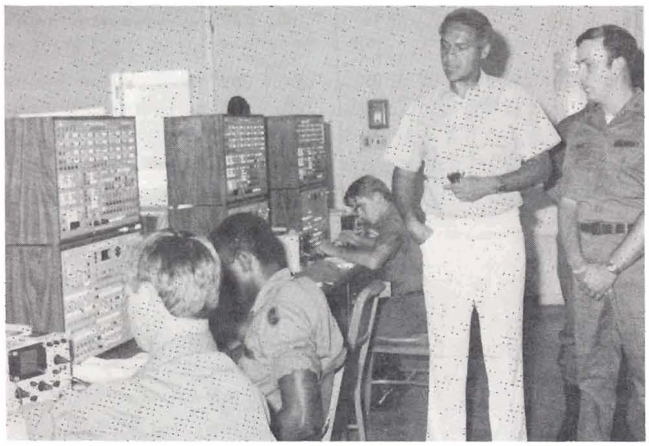
Even though the relative density of women in ADA is low, the number continues to rise from day to day as more women take advantage of the choices that their mothers and grandmothers didn't have. Women have a bright future in Air Defense Artillery.

Linda Pirino Ross received her BA Degree, summa cum laude, from Marywood College, Scranton, Pennsylvania. After being commissioned a second lieutenant in the US Army, she completed the Quartermaster Officer Basic Course. She subsequently served in various staff positions. She returned to civilian life in 1978 and is presently a member of the AIR DEFENSE Magazine staff in the position of technical publications writer intern.

DIGITECH

Digital technology training at the Air Defense School has made rapid advances in the past 2 years in the areas of instructional equipment and methodology. As our air defense systems rely heavily on digital computers, it is important that our soldiers fully understand them. The conversion from "lock-step" instruction to full criterion-referenced instruction (CRI), using a new digital electronics trainer, has resulted in a better-trained technician for air defense field units.

The Digital Technology (DIGITECH) Branch of the Roland/DIVAD Gun/Chaparral/Vulcan Department uses 68 digital trainers to provide instruction in digital logic and computer fundamentals to officers, warrant officers, and enlisted students, both US and Allied. In addition to the basic technology, air defense maintenance personnel are taught troubleshooting techniques so they can isolate and identify problems with digital equipment in the field. Students receive a block of instruction in basic electronics prior to starting the digital instruction. The time a student spends in digital technology is dependent upon his MOS. Courses range from 46 to 106 hours. Current enlisted courses undergoing this training are: 24G, 24M, 26H, 24E, 25L, and 25J.

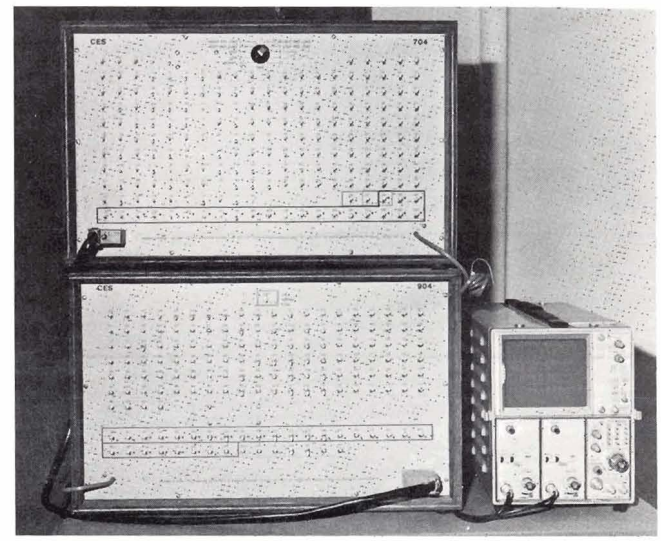


Secretary of the Army Clifford Alexander, during a recent visit to Fort Bliss, observes students studying the CES 700/900 digital trainer at the US Army Air Defense School. CPT Randolph Rice explains the learning process.

The primary hardware used is a CES Company 700/900 digital trainer. The trainer is a complete general purpose digital computer with 32 words or 256 bits of random access memory. The trainer is programable using its own internal machine language consisting of eight numerical instructions. The student inputs these instructions through a calculator-like matrix (similar to a hand-held calculator) on the front of the trainer. The trainer will execute the student's program and provide a three-digit light-emitting diode output display. There is no computer hard-copy output.

The primary test equipment used in the instruction is a standard oscilloscope. It shows a signal actually emanating from the computer. The student uses the oscilloscope to "troubleshoot" the digital system to isolate the fault or system error. Revision is currently under way to incorporate new oscilloscopes into the training. The AN/USM-281C scope will provide instruction in more up-to-date electronic technology and will better equate instruction with the actual field environment.

Each student is provided his own book of 28 modules of instruction, all of which are in a fully criterion-referenced, performance-paced format. The modules are directly related to the specific

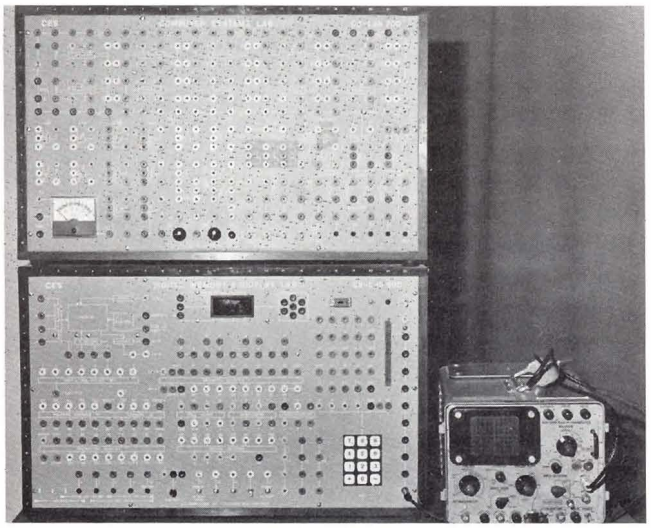


Rear view of CES 700/900 digital trainer with AN/USM 281 oscilloscope.

MOS of the student. The student will take only those modules relevant to that particular weapon system. The instruction is performance oriented to the digital trainer. The tasks the students perform in the classroom are directly related to the tasks of the maintenance man in the field unit. Unlike standard self-paced instruction, where the student can choose his starting point and course path, CRI in DIGITECH is a straight-line concept. Each module is a building block upon the previous module of instruction and each module must be learned in a specific sequence.

The student's performance is measured through a criterion test for each module. This test is directly related to the objective for that particular module and is performance oriented. The student must perform a specific task on the digital trainer to complete the module successfully and progress to the next module. He has the option of taking this test at any time he feels confident he understands the subject matter. Therefore, a student with prior electronics or computer experience can choose to take the criterion test immediately and progress more rapidly through the course.

The first module taught is use of the oscilloscope. It enables the instructor to identify the problem student or slow learner quickly. The student who has difficulty in learning the operation of the oscilloscope can be expected to experience difficulty with the digital trainer as training progresses.



CES 700/900 digital trainer with AN/USM 117 oscilloscope, used to teach digital computer fundamentals.

Modules of instruction are included on all the logic gates of a general purpose digital computer. Following the understanding of basic logic, the student is given a module on combined logic encompassing everything the student has learned to that point. This module shows the important interfacing qualities of logic and serves as a reinforcement and enhancement of student learning to that point in the course.

The trainer can teach three numbering systems—binary, octal, and hexadecimal. The student is taught the one related to the missile system to which he is to be assigned.

Other modules include: computer programing (involving actual student programing), flowcharting to assist in understanding the flow of logic through a system, and computer operation and maintenance. In addition, many students will take a module on the fundamentals of Boolean algebra, an important computer concept.

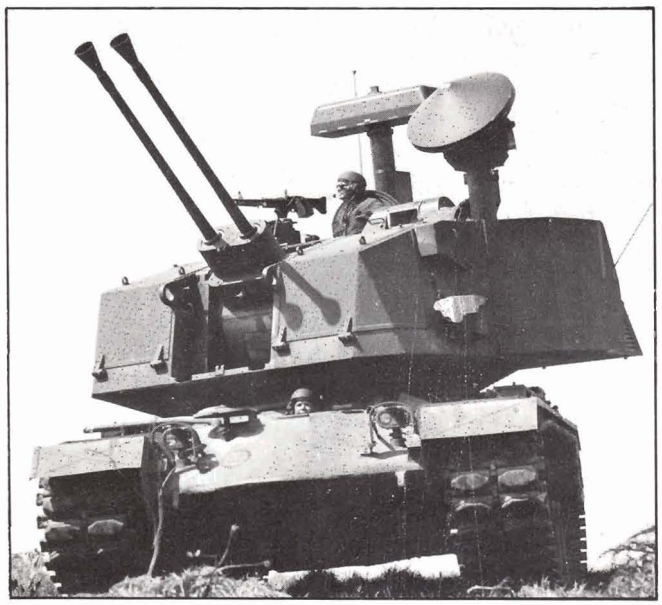
This training methodology has provided several significant advantages. First, studies have shown that students are retaining more of the subject matter over a longer time. Retention of subject matter over a 6-week period is in excess of 85 percent. Second, there has been a significant drop in the attrition level for digital training. Attrition, which in the past has been around 15 percent, is now less than one-third of 1 percent. More than 1500 maintenance personnel have taken the course with only 3 failures. Instructors find that students are more highly motivated than ever before because the challenge of the computer makes training fun. The student no longer takes written examinations or has to wait for exam results. He receives immediate feedback from the trainer, letting him know whether or not the response is correct. Students having problems can be identified rapidly and given additional instruction in the problem area. Students who progress rapidly through the course are used as peer instructors to assist slower students.

The new instruction in DIGITECH is being continually updated, incorporating the latest in electronics and computer technology available. The student completing this instruction is 100 percent competent in the subject matter. More students are more highly motivated in this training phase than ever before and more are graduating.

ANOTHER DIVAD GUN DELIVERED

The prototype of the 40-mm Division Air Defense (DIVAD) Gun system developed by Ford Aerospace and Communications Corporation was delivered recently to Fort Bliss, Texas, for contractor testing. Two prototype weapons were built under the contract.

Ford's entry features twin 40-mm guns, a search and track radar derived from the F-16 fighter aircraft, and an advanced digital fire control system integrated into the fire unit providing rapid detection and effective engagement of a variety of enemy targets under all weather conditions. The system also has fire-on-the-move capability. The turret design provides protection from small arms and artillery attack, and a modified M48A5 tank chassis provides mobility. The DIVAD Gun system is designed to furnish the Army's forward combat forces with a highly lethal, mobile, rapid response air defense gun system for defense against heavily armored attack helicopters, fixed-wing aircraft, and ground targets.

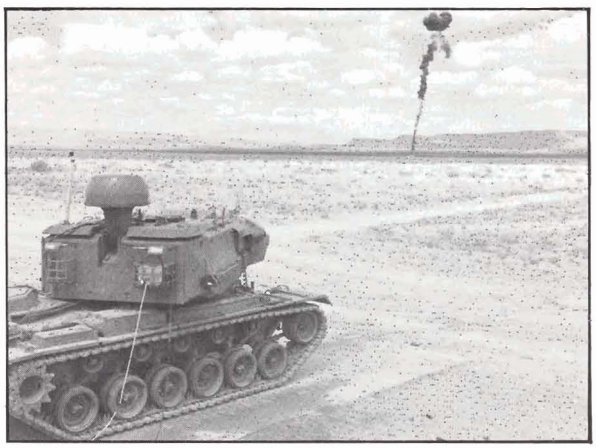


Extensive tracking and test firings of the 40-mm DIVAD Gun system were carried out at test facilites in San Juan Capistrano, California, prior to shipment of the units to Fort Bliss. Three months of Army testing and evaluation of the prototype weapon will follow contractor testing.

DIVAD GUN DESTROYS TARGET DRONE

In May 1980, the General Dynamics version of the Division Air Defense (DIVAD) Gun system prototype underwent its inital target engagement test at North McGregor Range, Fort Bliss, Texas. With the first burst of fire from the gun, the drone helicopter target fell to the ground spewing a trail of flames and smoke.

For about 2 months prior to the target engagement phase, the General Dynamics-developed DIVAD Gun had been undergoing initial field testing at McGregor Range. More than 1,300 rounds were fired during various tests, and Army crews who operated the system received more than 60 hours of intensive operational and mechanical training.



The initial successful target engagement was followed by 30 days of additional contractor demonstration tests. In early June, two prototype systems were turned over to the Army for a 90-day development test/operational test evaluation.

ENLISTED CAREER NEWS

"WHY WASN'T I PROMOTED"

When the latest E7 promotion list was published, E6s everywhere began asking the question, "Why wasn't I promoted?" Even commanders and supervisors were puzzled. "Sergeant Jones is the best E6 we have. Why didn't he get promoted?" Because there isn't one simple answer, this question was the subject of an essay by BG Richard A. Scholtes, President of the 1980 E7 Promotion Selection Board. The following paragraphs are excerpts from General Scholtes' work. Some of his observations and findings might provide the NCOs whose names were not on the promotion list with sought after answers. It could also prove valuable to others who will become eligible for promotions in the future.

Undoubtedly, the toughest part of a promotion board's job is to determine who within each career management field (CMF) is *best qualified.* If every NCO who is highly qualified could be promoted, there would be no problem. But there are limits imposed on the number of NCOs the Army can have in each CMF. Because of this, only a portion of the highly qualified NCOs can be selected, and the board had the difficult task of determining which of these were, in fact, the best qualified. It was not an easy job, but I can assure everyone that our board approached it in a most responsible way.

One thing the board noticed during its review was that many of our NCOs are doing some careless things that could have an adverse impact on selection. Similarly, some of those commanders and supervisors who are wondering why their NCOs were not selected also did some careless things that impacted negatively on the selection process.

Foremost among the things that cause nonselection for promotion is poor performance of duty. The majority of those not selected for promotion by our board had failed to perform their assigned duties to the proper standards. I am talking about mediocre performances; NCOs who failed to appreciate responsibilities, and NCOs who have shown a lack of personal discipline. These things automatically denied selection. We must be concerned about these NCOs because they impact on the quality of our Army through their direct contact with young enlisted soldiers who look to them for training, guidance, discipline, and standards of performance.

More than 41,000 records were reviewed, and from this number only about 9,900 NCOs could be selected for promotion. Every record was carefully reviewed by a group of highly qualified senior officers and NCOs to determine promotion potential within a particular CMF. It is impossible to have every NCO personally stand before a centralized Department of the Army Promotion Board, so we rely on the only feasible means available — the NCO's record of performance. This is precisely where some of those careless things that were mentioned earlier became evident.

An NCO's Official Military Personnel File (OMPF) represents him. It is his personal record, and it is his responsibility to make certain that it is correct and current. One of the first things a board member sees upon starting a records review is the NCO's official photograph. This helps emphasize to the board member that the file on the viewing screen represents a real soldier. However, a

considerable number of records contained no photograph at all, or had one that was 4 to 5 years old. This communicates one of several things to the board member: the NCO had a photograph taken and it never reached his DA records, the NCO did not care enough to have a photo taken, or the NCO elected not to have a photo taken because of his appearance (poor physical condition, length of hair, overweight, etc.). None of these is an adequate explanation. Even the fact that an NCO had a photo taken but it failed to reach his DA file is inadequate, because if the NCO had made a timely records review, the omission could have been corrected.

How many NCOs would appear personally before a promotion board without wearing authorized badges and decorations? Not many. However, the board repeatedly saw records that did not contain orders awarding badges and decorations. It also found indications that career NCOs had obviously received some form of recognition for military or civilian course completions, unit citations, certificates of appreciation, etc., over the years, but in many cases there was not a single document in the OMPF to reflect such recognition.

NCOs who were at one time overweight based on AR 600-9, and had subsequently lost weight and were within the standards, still had their old weight posted on their Form 2-1 (Personnel Qualification Record). Frequently, these same NCOs had signed the form acknowledging that they had reviewed their records, but failed to insure that corrections were made.

There are other examples of careless things that detract from promotion chances. There are also things that commanders and supervisors do which impact negatively on their soldiers' chances for selection. Commanders should insist that every NCO review his Form 2-1 when the local MILPO publicizes the zone of consideration and establishes review dates and times. There were instances in which the board found statements on the current Form 2-1 indicating that the servicemember failed to complete the scheduled review.

Commanders must also insure that their unit personnel procedures are designed to facilitate forwarding significant forms of recognition on an NCO to the individual's DA file.

In addition, the importance of having every NCO request a copy of his microfiche record from MILPERCEN should be stressed. All an NCO has to do is send a letter requesting his record to the Commander, Enlisted Records and Evaluation Center, ATTN: PCRE-RF-I, Fort Benjamin Harrison, Indiana 46249. Commanders should insure that microfiche readers are available in the unit area. All of this must be done in a timely manner so that missing or new documents can be obtained and forwarded through the local MILPO to reach the soldier's file prior to the board's convening date.

The significance of the things I have classified as careless plays a crucial role in establishing the cutoff criteria for selection of the last person within a particular CMF. During their initial records review, board members use a numerical scoring system to rate the record based on their evaluation of each NCO's qualifications. A total of four such numerical votes are placed on each NCO's record by the four board members evaluating a particular CMF. The four numerical votes on each record are totaled to determine where each NCO should be positioned in a general order of merit listing.

MILPERCEN determines the specific number of NCOs that can be promoted within each CMF, and the general order of merit list is compared to that number. A considerable number of NCOs will have vote totals that place them at or very near the cutoff point. The board then conducts a second review of the records of all NCOs that are near the cutoff point, to include some NCOs above as well as some below that point. It is during this second screening that those careless things I have mentioned could become even more significant. Remember, the board is looking for the best qualified NCO and will lean toward selecting the NCO who made the extra effort over the one who didn't.

Undoubtedly, it is the SEER, coupled with the MOS Test and SQT results, that carries the real weight in deciding which NCOs are best qualified for promotion. But it is also important that all of our NCOs appreciate that they owe it to themselves and the Army to have as many positive factors as possible going for them when their records are submitted to a promotion board. The items mentioned and classified as careless will not in themselves stop an NCO's promotion, but they can exert a negative influence.

I do not want it to appear that the majority of the records reviewed by the board were incomplete and inaccurate. Just the opposite was true. It is apparent that most of our NCOs appreciate the importance of their records and have reviewed them conscientiously. Now we must concentrate on improving the accuracy and completeness of the records of every NCO to enhance the chances for promotion and, more importantly, the quality of our entire NCO Corps.

BARS to STARS

OPMD UPDATE

SENIOR RATER RESPONSIBILITIES

One of the major objectives of the new OER system is to increase the role of senior officers in the evaluation process. The new system focuses special attention on senior raters and charges them with the very difficult, but necessary, responsibility of balancing their obligations to the rated officer with their obligations to the Army. On the one hand, they must prepare honest and fair evaluations which give each rated officer credit for his achievements and potential. On the other hand, senior raters must provide realistic and discriminating evaluations to allow Department of the Army selection boards and career managers to make intelligent personnel management decisions.

To date, senior raters by and large appear to be accepting this added responsibility. The majority of senior raters are spreading their successful, effective soldiers over at least the top four boxes of Part VII, DA Form 67-8. Additionally, many of these senior raters are using their narratives effectively by explaining the evaluation and commenting specifically on the potential of the rated officer. There are, however, a few senior raters who are concentrating all of their ratings in the top one or two boxes only, thereby claiming that all of their officers are in the top 1, 2, or 3 percent of the Army. A senior rater with this type of inflated profile runs the risk of losing credibility with selection boards. Such a profile provides no discriminatory information and merely implies that the rated officer is "running with the pack" and has not failed. At the very least, this situation does a disservice to the truly outstanding officer whose senior rater has lost the ability to distinguish him from the rest.

a. POTENTIAL EVALUATION (See para 4-7, AR 623-105)

	(20)	RO: MAJ
X	*(2)	HILL, THO
	(1)	321482293
	(1)	SR: COL
	( )	BOLTE
		698421833
	(1)	DATE 790410
	( )	
	( )	TOTAL OFF
	( )	RATED 25

A COMPLETED DA FORM 67-8-1 WAS RECEIVED WITH THIS REPORT AND CONSIDERED IN MY EVALUATION AND REVIEW.

☒ YES ☐ NO (Explain in b)

Figure 1.

a. POTENTIAL EVALUATION (See para 4-7, AR 623-105)

	(1)	RO: MAJ
	(1)	ANDREWS, M K
X	*(2)	182443342
	(10)	SR: COL
	(10)	PRICE
		444338893
	( )	DATE 790410
	( )	
	(1)	TOTAL OFF
	( )	RATED 25

A COMPLETED DA FORM 67-8-1 WAS RECEIVED WITH THIS REPORT AND CONSIDERED IN MY EVALUATION AND REVIEW.

☒ YES ☐ NO (Explain in b)

Figure 2.

The senior rater's evaluation of the rated officer's potential has little meaning until it is compared to the senior rater's rating history or normal rating tendency. For example, you cannot automatically assume that a top or second box evaluation is better than one in the third box. Instead, both ratings must be viewed in relation to the senior rater's normal rating tendencies (displayed to the right of the evaluation). In figure 1 it is obvious that the second box evaluation is one of the lowest evaluations the senior rater has given. In figure 2, it is equally obvious that the third box evaluation is one of the highest evaluations the senior rater has given. Therefore, the officer who was given the third box check clearly received a better potential evaluation than the officer who was given a second box check.

The profile increases in value over time. With succeeding evaluations by different senior raters, the potential of the rated officer becomes clearer. Therefore, extreme care must be taken when considering a potential evaluation by a senior rater who has not yet evaluated enough officers to reveal a tendency. On reports with small or limited profiles, it is important to place the senior rater's potential evaluation in perspective by closely reviewing the senior rater's comments and the rest of the report.

Another method being used by the Army to emphasize the importance of the senior rater's evaluation responsibilities is the publication of the Senior Rater Profile Report (DA Form 67-8-2). Beginning in September, this report will be published annually and will display the rating history of each Army officer who has senior rated at least five different officers. One copy of this report will be forwarded to the senior rater and another will be placed in the performance section of his Official Military Personnel File (OMPF) along with the senior rater's other performance documents. This is being done to highlight the fact that the evaluation of subordinates is a most important responsibility. It impacts on the selection of future Army leaders; therefore, the extent to which a senior rater fulfills this responsibility is in itself an indication of his or her performance.

Overall, the quality of OERs arriving during the first 5 months of the new system has been very impressive. The officer corps is to be congratulated on the professionalism it has displayed in its approach to the new OER.

SELECTION FOR STAFF SCHOOLS

The Chief of Staff of the Army has recently approved a new selection system for Command Staff College (CSC) to be implemented for the academic year 82-83 selection. Some of the major aspects of the new selection plan are:

- A 4-year selection window. An officer will be selected for CSC during the 8th to 11th year of service (YOS) category.
- A year-group methodology. An officer will compete against others in his year group for selection.
- A percentage of the annual CSC seats will go to each of the year groups in the 4-year selection window. The percentages are 15 percent for YOS 8, 15 percent for YOS 9, 35 percent for YOS 10, and 35 percent for YOS 11.

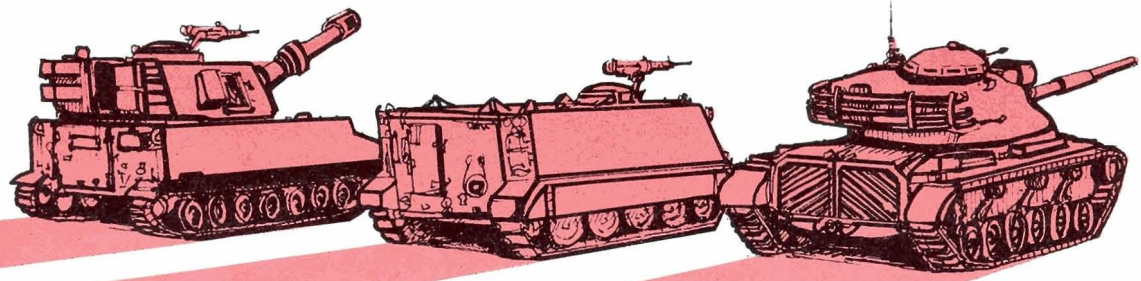
CSC attendance will be programed in accordance with the stability criteria established in DOD Directive 1315.7. It requires an officer to be on station 3 years prior to PCS. Actual attendance at CSC will occur during an officer's 9th to 14th year of service.

The new selection plan will require a 2- to 3-year transition period upon implementation.

In addition to the announcement of the CSC selection plan, the Chief of Staff of the Army has also made several decisions concerning attendance for the Combined Arms and Services Staff School (CAS^3) Program. One hundred percent of the officer corps will attend, thus making it an assignment rather than a selection action. All officers will attend the resident CAS^3 Course in their 7th to 10th year of service after completing the CAS^3 nonresident instruction package and exam.

The CAS^3 Course will continue to be developed at Fort Leavenworth, Kansas, in fiscal year 81; however, CAS^3 options are being considered for Fort Benning, Georgia, and Fort Sill, Oklahoma.

COMBINED ARMS CORNER



MLRS CONTRACTOR SELECTED

The Vought Corporation was recently selected by the US Army to be the prime contractor for the Multiple Launch Rocket System (MLRS).

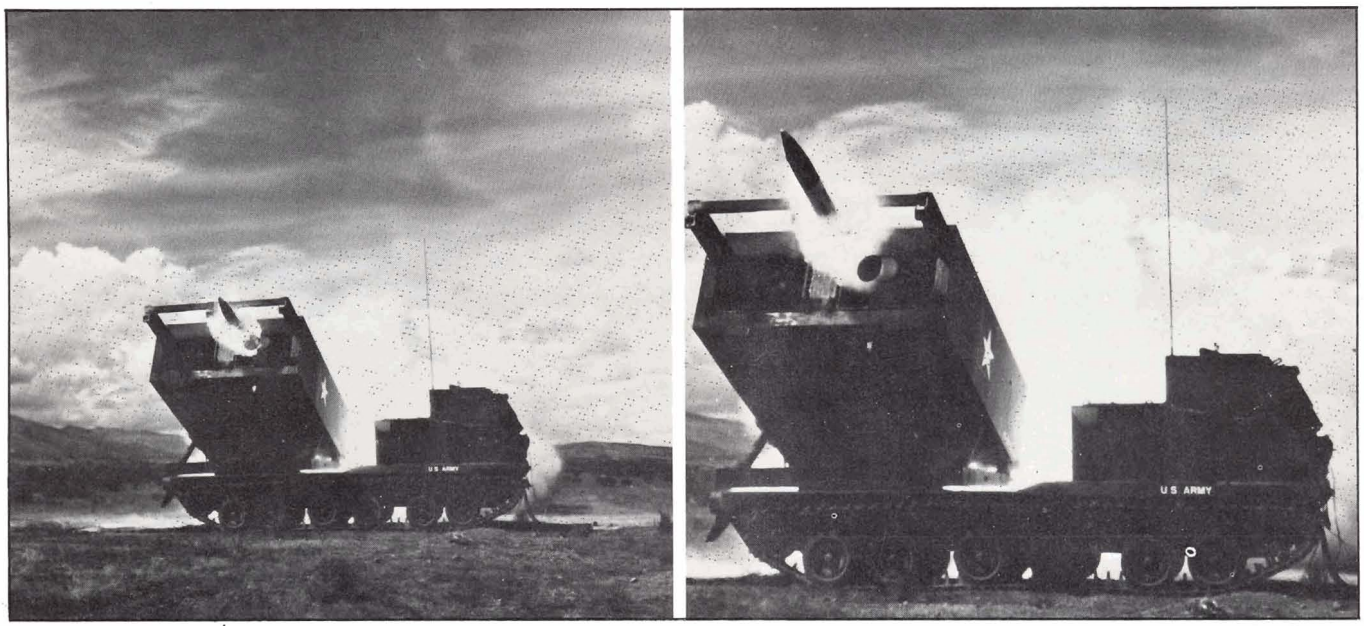
MLRS is a highly mobile, automatic rocket system that permits a firing crew (with minimum training) to shoot a complete 12-rocket load quickly and accurately, reload, and fire again. When fielded, MLRS will be more accurate than any known artillery indirect-fire, free rocket system.

Competitive development and testing of the MLRS have spanned a period of more than 2 years. During that time, test launches and firings were ongoing continuously. In December 1979, the first US Army firing of the MLRS took place at White Sands Missile Range, New Mexico. After completion of competitive contractor firing tests, the Vought system was selected.

COMBAT TRAINER ENTERS INVENTORY

A versatile, highly mobile aviator combat training system has entered the Army's inventory. Known as the Tactical Radar Threat Generator (TRTG), the system will help the Army train its aircrews to survive in combat while under heavy enemy antiaircraft fire.

The TRTG is a self-contained electronic system. Its emissions represent the electronic impulses of antiaircraft weapons that are now in the inventory of many Soviet-affiliated countries. The system contains a modified military aircraft radar, turret, radome, TV display, camera, turret drive, gimbals, electronic system monitoring device, controls, and an integration of electronic equipment. All of the subsystems are inclosed within a shelter that can be carried on a variety of military and civilian vehicles.



An MLRS is fired from the self-propelled launcher/loader during contractor firing tests at White Sands Missile Range, New Mexico. The MLRS is designed to complement cannon artillery during combat, especially against surging forces.

UH-60A BLACK HAWK

The Army is being equipped with the most advanced utility helicopter ever built to move and sustain soldiers in combat. The UH-60 Black Hawk will serve as the Army's primary air carrier through the year 2000.

The new utility helicopter is already in service with the 101st Airborne Division (Airmobile) at Fort Campbell, Kentucky. The first Black Hawk was delivered to Company D, 158th Assault Helicopter Battalion, in June 1979. Plans call for more than 1,000 Black Hawks to be produced for the Army by 1990.

"Super impressed" has been the verdict rendered so far by the most finicky judges there are — the users. The soldier was uppermost in the minds of those connected with the engineering and development of the Black Hawk. General John R. Guthrie, Commander of the US Army Materiel Development and Readiness Command, describes why the Black Hawk is considered an outstanding achievement:

" . . . Black Hawk is the first Army aircraft designed, developed, and produced specifically with the soldier in mind, from the combat squad members to the mechanics who will appreciate the modular maintenance concept used for the T-700 engine and other aircraft parts."

Because of its payload and troop-carrying capability, 15 Black Hawks can replace 23 UH-1 Huey aircraft. With the Black Hawk, a combat support aviation company can transport up to 210 troops at a time. Three of these aviation companies can lift a rifle battalion, including its 81-mm mortars, Redeye, and TOW teams.

The Black Hawk is a tactical helicopter; it must operate and survive on the high-threat battlefield. To do that, the Black Hawk was designed with advanced aircraft survivability features and systems. Critical components are armored to enable the Black Hawk to withstand multiple small arms hits. It is the most survivable helicopter ever built for the Army.

The Black Hawk will give the ground commander increased tactical mobility and flexibility. It will provide the backbone of air mobility for Army units in the most demanding combat environment.

ROCKET LAUNCHERS DELIVERED

The first production model of the helicopter-mounted lightweight rocket launchers being built for the US Army was delivered in July—6 months ahead of schedule.

The aluminum launchers for the 2.75-inch rocket are manufactured at the Tucson manufacturing division of the Hughes Missile Systems Group. The production contract required delivery of the first launcher on 31 December of this year.

Under the $6.5 million contract, initial quantities of a 7-tube and a 19-tube version of the system are being manufactured. The lightweight, reusable structures are intended for the Army's AH-1 Cobra and its new advanced attack helicopter. The 19-tube model represents a weight savings of about 50 percent compared with current launchers.

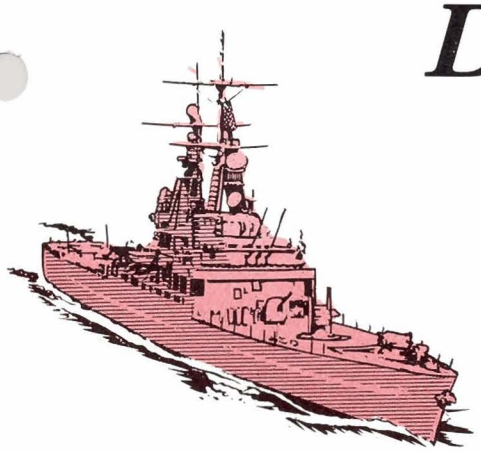
The early deliveries are expected to continue during the life of the current contract with the final launcher delivery anticipated some 4 months ahead of the contractual date of 30 November 1981.

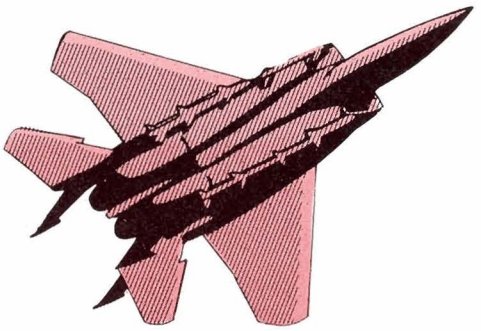
IFV/CFV TYPE CLASSIFIED "STANDARD"

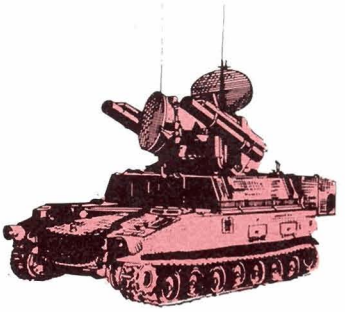
The Department of the Army recently type classified "standard" the M2 Infantry Fighting Vehicle (IFV), M3 Cavalry Fighting Vehicle (CFV), M242 25-mm automatic cannon, and M231 firing port weapon for the IFV. In separate actions, the 25-mm ammunition and the M240C coaxial machinegun were also type classified "standard." The Department of Defense approved the Army action and authorized full-scale production. The first year's production will be 75 IFVs and 25 CFVs with the first vehicles coming off the production line in May 1981. The production rate will increase annually and reach 90 vehicles per month in 1985.

The US Army Armor Center and Fort Knox recently completed the planning and training phase for conducting a Force Development Test and Evaluation (FDT&E) of the CFV. The purpose of the FDT&E is to test the cavalry training and organizational maintenance packages, tactics, and doctrine for the CFV. During the test phase, which will be conducted by the US Army Armor and Engineer Board, five CFVs will be evaluated in an armored cavalry platoon organization that will also have four XM-1 tanks. In addition to the training issues, several hardware changes designed to correct minor deficiencies found in earlier testing will also be evaluated. Lessons learned from this test will be incorporated into the institutional and exportable training package for the CFV.

DEVELOPMENTS







MAVERICK SCORES DIRECT HIT

The first Maverick missile to be fired by a US Marine Corps (USMC) pilot scored a direct hit during a test at Eglin Air Force Base, Florida, recently.

The test shot, also the first Maverick launched from the Marine Corps A-4 aircraft, was the third launch of the AGM-65E Laser Maverick. All have been direct hits.

The missile is the laser-guided version of the US Air Force's air-to-ground Maverick with a heavier warhead. It is being developed initially for use by the Marine Corps in close air support of combat troops.

USMC Major John P. Bland piloted the A-4M attack aircraft on a combat flight profile for the low-altitude, long-range launch in which the missile was guided to a laser-designated spot on an armored personnel carrier. The firing was from more than 5 miles distance (well beyond visual range of the target), and the missile struck within 3 feet of the planned impact point.

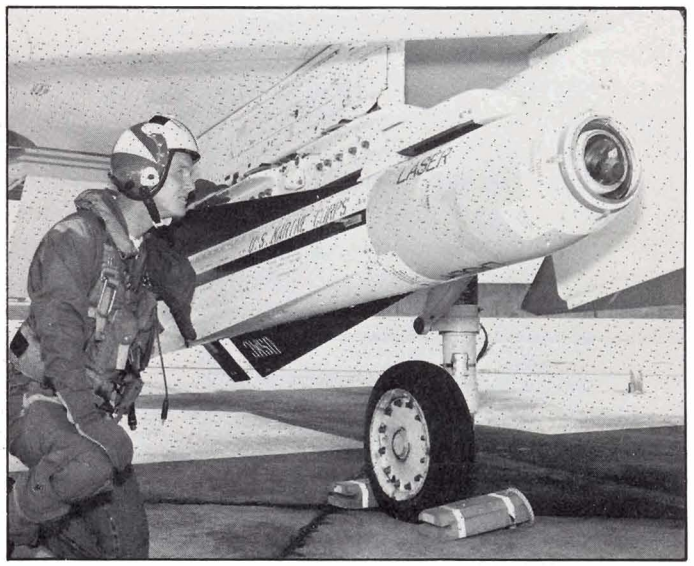
The test firing demonstrated the successful integration of the missile system into the attack aircraft. In addition, it was the first time that the Maverick single-rail launcher was used in the Navy configuration.

Major John D. Restivo, USMC Laser Maverick Program Manager, said the test launch "spectacularly demonstrated the suitability of the A-4 aircraft for Maverick deployment as well as the pinpoint accuracy of the Laser Maverick." He added that the successful firing was an important step towards providing the Marine Corps with the ability to destroy targets in the close air support environment with the Maverick missile.

The nose of the AGM-65E has a tri-service laser seeker but shares the common Maverick missile family airframe and propulsion system.

The AGM-65E will carry an approximately 300-pound warhead, more than twice the weight carried in the earlier TV-guided Mavericks (the AGM-65A and B). In the AGM-65E test launches to date, the warhead has been replaced by telemetry equipment, but the missiles duplicated the weight and balance of a live warhead.

An infrared-guided AGM-65D version of the Maverick is also being developed for the US Air Force.



US Marine Corps Major John P. Bland checks out an AGM-65E Laser Maverick mounted on an A-4M attack aircraft, prior to the test flight.

ELECTRO-OPTICAL SENSOR

A new device that scans the sky with electro-optical sensors is in development at Hughes Aircraft Company. It will detect, track, and identify attacking aircraft and incoming missiles, classify them by order of priority, and pass the data almost instantly to a fire control computer.

The device, called an electro-optical threat sensor, could be used with ground, ship, or airborne fire control systems.

Under a US Air Force Wright Aeronautical Laboratories contract, the contractor conducted a design study and a component validation. A ground-based demonstrator model of the threat sensor is currently being fabricated for field testing.

The threat sensor consists of an acquisition unit, an interrogation unit, and a computer. In operation, the acquisition unit scans the sky, acquiring aircraft and incoming missiles by sensing the infrared energy they radiate. (The system will have the capability to continue searching for more threats as it tracks those already acquired.) A signal processor extracts the target signal from the background radiation and feeds this datum to the computer, along with the target's relative bearing, to cue the interrogation unit.

The interrogation unit uses additional sensors to further classify the target. The computer processes this information and classifies each target as to the type of threat (such as aircraft or missile) and then lists the targets in order of priority, based on which pose the most immediate threat.

The system can detect, track, identify, and classify multiple targets almost instantly and relay these data to the aircraft, ground, or ship-based fire control system. The sensor "sees" with an advanced hybrid focal plane array consisting of many detectors and a corresponding number of minute signal processing elements known as charge coupled devices (CCDs).

The CCDs combine memory and multiplexing functions, store and process signals from the detector elements, and pass them on to a signal processor. Since they are mounted on the same small base (or chip) with the detectors, the CCDs drastically reduce the complexity associated with discrete component focal plane designs.

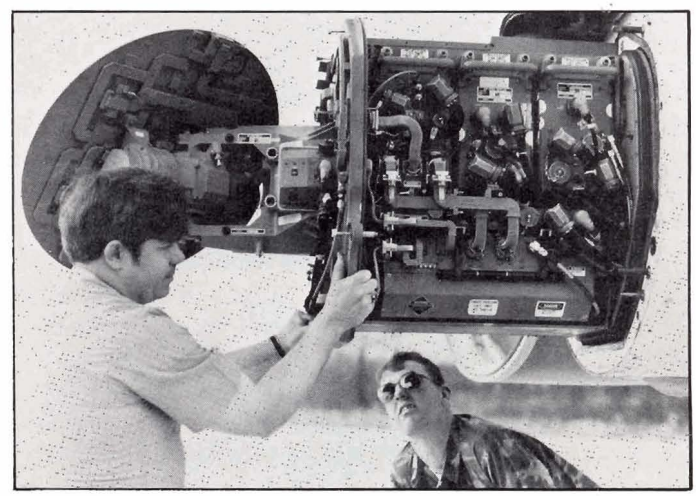
The electro-optical threat sensor will have several advantages over conventional radar. The acquisition unit is a "passive" sensor which radiates no signals of its own, and therefore cannot be detected while searching for and tracking targets. The system is relatively small and can rapidly search a large surveillance volume, accurately pinpointing threat locations.

12-MINUTE TURNAROUND

The AN/APG-65 radar for the US Navy/Marine Corps' F/A-18 Hornet is designed for quick maintenance. Required maintenance can be accomplished easily and rapidly aboard ship or in the field. The radome swings aside to allow technicians to slide the radar out on its built-in rack for easy, eye-level access to the entire system, including five modular replaceable assemblies. They are the antenna, the programable signal processor, the radar data processor, the transmitter, and the receiver/exciter.

A built-in test (BIT) system provides automatic preflight radar checkout as well as continuous operational monitoring. In case of malfunction, the BIT locates and identifies the problem area. This allows technicians to replace the unit, test the entire system with on-board power, and return it to operational status within 12 minutes.

The AN/APG-65 is an all-digital system requiring no special support tools or equipment and no adjustments or alinements at the flight line.



An AN/APG-65 radar is examined by Navy/Marine technicians at the Naval Air Test Center, Patuxent River, Maryland.

BATTLE OF BRITAIN: THE HARDEST DAY—18 AUGUST 1940, *by Alfred Price. Charles Scribner's Sons, New York, 1980. 246 pages, $14.95.*

Reviewed by Lieutenant Colonel Brian W. Moore, Royal Artillery, United Kingdom Liaison Officer to the US Army Air Defense Center.

This is a unique, easily read book written by an author who has studied the Battle of Britain in detail but has chosen in this volume to analyze one single day, which he considers the hardest for the antagonists. He has portrayed very thoroughly the hopes, fears, and attitudes of not only the airmen of the Luftwaffe and the Royal Air Force, but also of the civilians who were so much a part of the battle and who contributed in no small way to the final outcome by their spirit and fortitude.

Large parts of the book are biographical, and numerous personal accounts of those who fought the battle and who (as a result of the book) have met and become good friends make absorbing reading.

Technically, the book is a fascinating study of this period in military history and should be read by students of aerial warfare in particular and air defense in general. The author takes the reader through all the phases of the battle. The planning, based on the intelligence available, is graphically depicted with many easily understood diagrams showing the format of the attack and the tactics employed by both sides to defeat their opponent. Their measure of success is analyzed accurately, and a comparison is made with the official claims of the day by London and Berlin.

Aircraft types and their performances are examined in some detail. This aspect will be especially interesting to aircraft advocates.

Some of the uniqueness of the book lies in the fact that it records the propaganda of both sides and then tells the truth. The book's strength lies in its authenticity and human interest. Every student of military history should read it.

EGGNOG RIOT-The Christmas Mutiny at West Point, *by James B. Agnew. Presidio Press, California, 1979. 211 pages, $12.95.*

The sounds of shattering glass, wild shouting, and chaotic music pierced the stillness of the night. It hardly seemed like Christmas Eve, but the date was December 24, 1826. The place was the United States Military Academy at West Point, New York.

When Superintendent Sylvanus Thayer decreed that there would be no "spiritous liquors" allowed on the Academy grounds in celebration of Christmas, some of the cadets decided to take matters into their own hands. "I have always kept the Yule in my fashion," proclaimed one of the cadets. "This year I will do no less."

For days the men had stockpiled necessary ingredients for the eggnog that was made behind closed barracks doors on Christmas Eve. But what was intended as a simple drinking party soon turned into a mutinous riot that involved over a third of the cadet corps. From broken windows to assaults on superior officers, it was an incident that tested the very foundation and the code of conduct on which West Point was established.

The *Eggnog Riot* is an intriguing novel based on fact. Court-martial proceedings against the 19 cadets brought to trial were taken directly from official records of the US Government. History buffs will find some familiar names among the cast of characters.

James Agnew has successfully woven documented facts into a setting that captures the mood of the times. The result is a most enjoyable reading adventure.

BRINGING UP THE REAR, *by S.L.A Marshall, edited by Cate Marshall. Presidio Press, San Rafael, California, 1979. 310 pages, $12.95.*

Any discerning person who came face to face with S.L.A. (SLAM) Marshall must surely have been impressed with the intelligence, self-confidence, and candid nature that seemed to radiate from the man. Couple these characteristics with a classic sense of humor and you have the tone in which he wrote *Bringing Up the Rear,* the story of his unique, colorful life.

This book is an intimate account of what Marshall was and what he did from his early life through the days of Pancho Villa, World War I, the Spanish Civil War, World War II, Korea, the Mideast, and the disheartening war in Vietnam. But it is not a report on wars. Rather, it is the story of a great war historian who reflects upon his life and his more interesting wartime experiences.

The famous men, military and civilian, with whom Marshall was associated throughout much of his life (and whom he discusses in his book) must fill many pages of Who's Who. Presidents, statesmen, generals, famous authors, and newsmen — he encountered them all, along with numerous others from all ranks of military and civilian life.

When we realize that the author travelled the world over and wrote more than 30 books, we expect to read a lot of interesting facts concerning himself and others he is bound to talk about. And in *Bringing Up the Rear*, we get the full treatment. The book is loaded with interesting details about these people, and the "tell it like it was" style carries the reader along in solid entertainment from the first page to the last.

The prose is so vivid that the reader will find himself "living" many of the adventures described — going through childhood fantasies, experiencing early life in wild El Paso, Texas, facing death in several wars, and playing the roles of soldier, newspaper man, and military historian. All of these adventures and many more are skillfully woven into the life story of this great man in his last book — a book he dedicated to his "Shipmate, Cate, who taught him to sing about Mrs. Murphy's chowder."

HOW WARS BEGIN, *by A.J.P. Taylor. Atheneum, New York, 1979. 180 pages, $10.95.*

The author examines eight wars in detail to determine what caused them. Six of them were major wars fought in Europe, and the seventh was World War II. The remaining one was the Cold War, which Taylor equates to actual war minus the shooting. His insights differ from anything you will have read before about these conflicts. The profuse illustrations (almost half the book) help to make *How Wars Begin* one of the most interesting books you could pull off the shelf.

As expressed by Publishers Weekly, "Taylor presents some surprising opinions: World War II did not become a 'world war' until 1942. In fact, Europe was 'at peace' for a year after Hitler overran the continent in 1940. The US actually forced the Japanese to bomb Pearl Harbor when it imposed an impossible embargo. And in 1948 it was 'the Russians who really conducted the Berlin airlift,' since they were running the control towers. The book is a lucid presentation that upsets many long-accepted bits of conventional war wisdom."

What started these wars? Some, as Mr. Taylor explains, had a long background; others were brought about by the overweening ambitions of a single man: Napoleon at the beginning of the period, Hitler towards the end. Public opinion, secret diplomacy, jingoism, armament manufacturers, even historians have not escaped censure.

This book is highly recommended for military reading, both for its shrewd insight into the making of past wars and its applicability to the making of future wars.

NUMBERS, PREDICTIONS, and WAR, *by Colonel T.N. Dupuy (US Army, Ret.). The Bobbs-Merrill Company, Inc. 1979. 244 pages, $13.95.*

Numbers, Predictions, and War is the result of a series of studies undertaken for the US Department of Defense and the British Defence Operational Analysis Establishment.

After making several exhaustive analyses, Colonel Dupuy and his associates identified the variable factors involved in combat and determined the effects of each on the outcome of the battle. Using this information, they derived theoretical criteria by which all these factors could be entered into mathematical equations to determine the probable result of any given conflict between two forces.

Wargamers, political and military analysts, and anyone else interested in military history — or in future history — will find this a truly remarkable book.

AIR WAR — VIETNAM, *(various authors). The Bobbs-Merrill Company, Inc., Indianapolis/New York. 361 pages, $15.00.*

Combining tactics, weapons, aircraft, and personalities, *Air War — Vietnam* discusses the use of air power in Southeast Asia. It is broken down into four parts: The Tale of Two Bridges, Airpower and the 1972 Spring Invasion, The Battle for the Skies Over North Vietnam, and The Mayaguez Incident.

The text touches on all aspects of the air war in Vietnam. In particular, it tells about the difficulty and frustration of knocking out important bridges and about the aircraft and tactics used. The book explains the development of "smart" bombs that used laser or electro-optical guidance systems. It was "smart" bombs that finally dropped the Thanh Hoa bridge. The courage of US airmen in their fight for survival is highlighted by accounts of air-to-air combat with MiGs and ground-to-air combat with surface-to-air missiles and antiaircraft artillery.

The planes they flew were the F-100, F-105, F-4, A-4, B-52, the O-2 and OV-10 observation aircraft, and the C-130 gunship.

Perhaps the one shortcoming of the book is that the part played by US Navy and Marine aircraft is given only token mention. They are not covered in proportion to their importance or contribution to the air war.

Illustrated with maps and photographs, *Air War — Vietnam* blends the personal drama, weapon systems, aircraft, changing threat, tactics, and political considerations into an interesting and informative narrative. It gives the reader a good background in the use of air power in Southeast Asia and leaves him with the desire to read more.

ADDITIONAL SELECTIONS:

MAN O' WAR (THE FIGHTING SHIP IN HISTORY), *by Richard Hough. Charles Scribner's Sons, New York, 1979. 239 pages, $14.95.*

In this fascinating, profusely illustrated book, Richard Hough provides an examination of 15 of the most significant and interesting Men O' War. He begins with Lord Howard of Effingham's *Ark Royal*, which held the Spanish Armada at bay, and progresses to the American battleship *New Jersey*, which took part in three wars and whose guns still remain ready for action. Although armaments, structural developments, and the tactics of war all play their part in the history of the Man O' War, Richard Hough's story is a human one: a record of men and ships, of courage and endurance — a true taste of the sea.

WORLD MILITARY AIRCRAFT SINCE 1945, *by Robert Jackson. Charles Scribner's Sons, New York, 1979. 160 pages, $10.95.*

This reference volume provides photographs, specifications, armament details, and operational history on more than 400 aircraft. The author has divided the book into three parts: combat aircraft, transports, and trainers. Robert Jackson details the evolution of World War II's fighter and bomber planes into the sophisticated aircraft of today. Aircraft range from such diverse types as the B-26 Invader and F-80 Shooting Star through the F-15 Eagle, F-16, and MiG-23/27 FLOGGER.

POLICE OF THE WORLD, *by Roy D. Ingleton, Charles Scribner's Sons, New York, 1979. 192 pages, $12.95.*

Another in the popular "of the World" series, this book gives the fascinating facts and figures about police forces all over the globe. It also includes as much as possible about the forces in Communist countries. With more than 190 photographs and details about the origins, organizations, uniforms, ranks, badges, weapons, and establishment of each country's police force, *Police of the World* is a valuable reference for anyone interested in the police and how they work.

MILITARY AIRCRAFT OF THE WORLD (Revised Edition), *by John W.R. Taylor and Gordon Swanborough. Charles Scribner's Sons, New York, 1979. 224 pages, $12.95.*

Literally every aspect of modern air power is reflected in this unique book. It is unparalleled as a single-volume, compact guide to all combat and support aircraft now flying throughout the world. Filled with more than 300 photographs and descriptions, *Military Aircraft of the World* is the perfect reference book for aircraft enthusiasts everywhere.

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U.S. ARMY