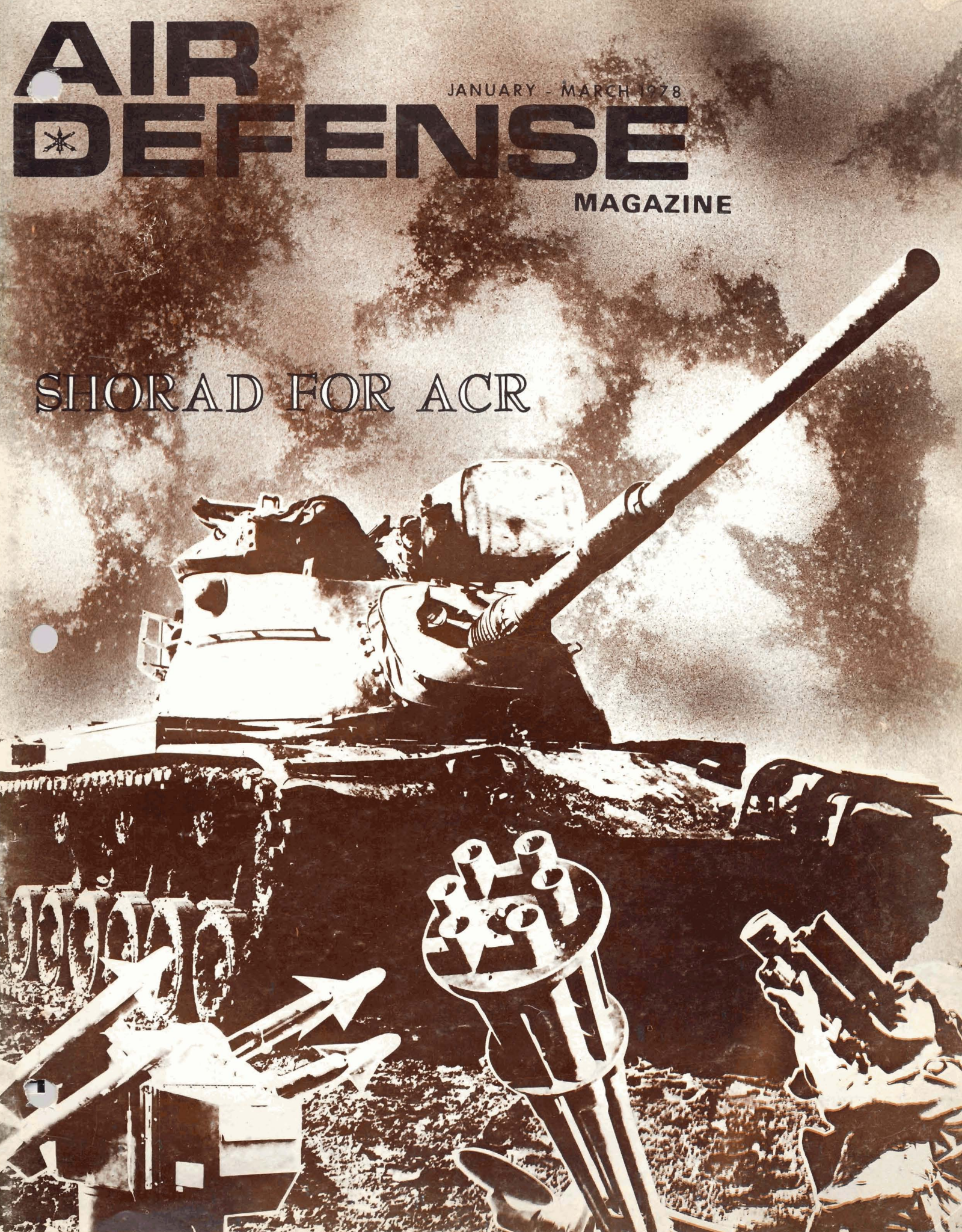
AIR DEFENSE MAGAZINE

JANUARY - MARCH 1978

SHORAD FOR ACR



AIR DEFENSE MAGAZINE

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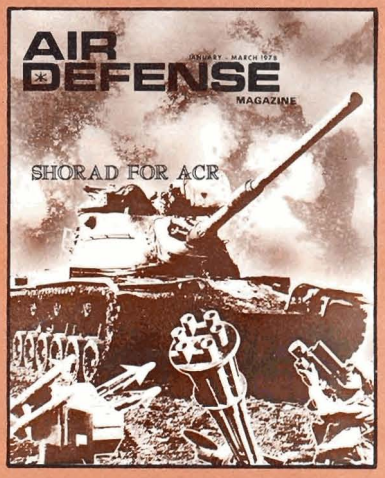
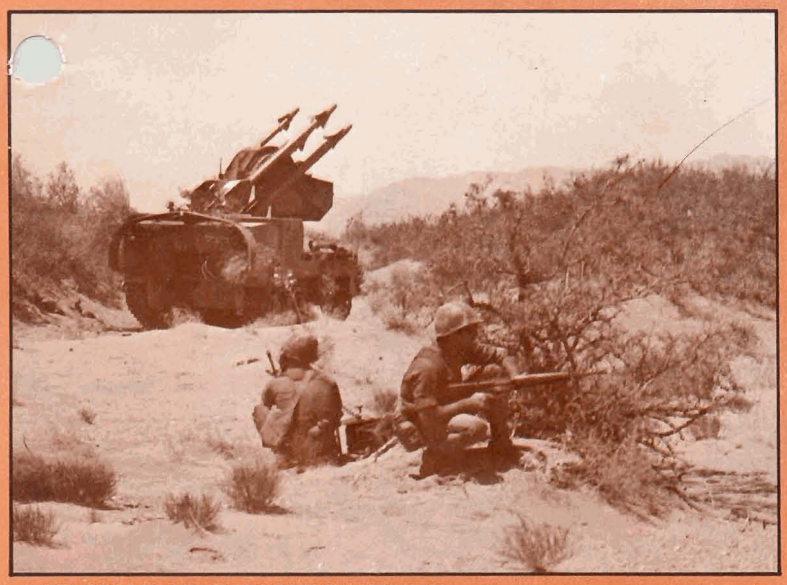
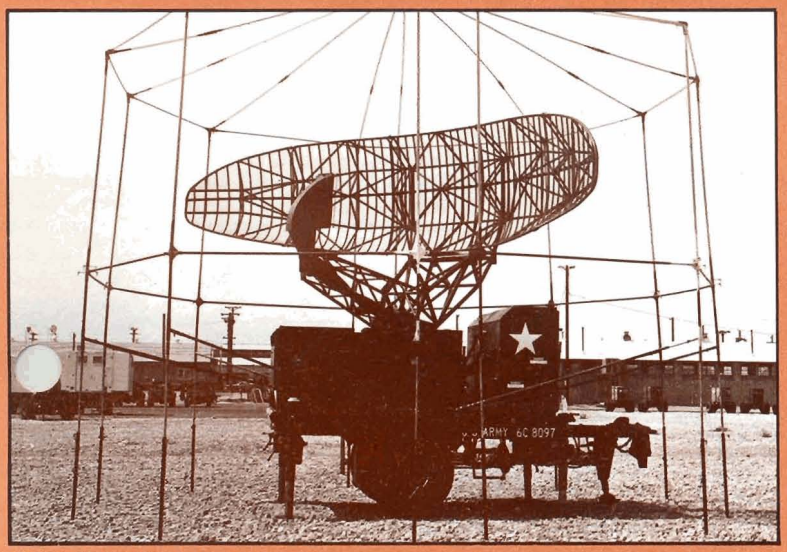


COVER: Among the powerful maneuver forces with which air defense artillery weapons are integrated is the armored cavalry regiment. Our cover for this issue symbolizes the unity between this potent field force and SHORAD air defense weapons.



ACR SHORAD REQUIREMENTS 7



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INTERCEPT P

MAJOR GENERAL JOHN J. KOEHLER, JR.

The Air Defense School is initiating a package training program to improve the level of training of personnel replacements for Hawk units in Europe. The goal is to provide a selected group of personnel [who will have been trained together as a team] to each Hawk battery in the 32d Army Air Defense Command once every 18 months. The training each group receives will be based on the local conditions and operating procedures of the specific battery to which the package will be assigned.

Each package will be composed of the personnel indicated in the chart.

Some grade substitution in the package by MILPERCEN may be necessary, depending on the grade strength available in some of the MOS.

The 4-week training program will include these major areas of interest:

- Daily checks.
- Orientation and alinement.
- Integrated daily checks [operator training].
- Tactical effectiveness training [fire control operations].
- Missile assembly [launcher crewman].
- Weekly check procedures.
- Integrated operator training.
- Weekly and monthly checks and adjustments.

IMPROVED HAWK REPLAC

GRADE	MOS	
LT (TCO)	14D	PLATOON LEADER
WO	223D	AD MISSILE SYSTE
E6/E7	24G20/40	ICWAR MECHANIC
"	24C30/40	IH FIRING SECTION
"	24E30/40	IH FIRE CONTROL
"	16E30	FIRE CONTROL SE
E2/E5	16E10/20	FIRE CONTROL O
E6/E7	16D30/40	FIRING SECTION L
E2/E5	16D10/20	FIRING SECTION L
"	16E10	AN/TPQ-29 ENGA

- Tactical control officer duties.

The training will be oriented to the procedures

MENT PACKAGE TRAINING

TITLE	NUMBER OF PERSONNEL
	1
TECHNICIAN	1
	1
ECHANIC	1
CHANIC	1
ON CHIEF	1
RATOR	2
DER	1
NCHER CREWMAN	3
MENT SIMULATOR OPERATOR	1
TOTAL PACKAGE	13

1 used by 32d AADCOM units on operational readiness evaluations [ORE], annual service practice [ASP], and tactical evaluations [TACEVAL]. The objective is to provide replacements who are ready "to hit the ground running" when they arrive at the battery.

We at Fort Bliss are very optimistic about this program. We believe it will yield very favorable results. It is realized that package training will not relieve the unit commander of his training responsibilities, nor is it a panacea for training problems; however, we feel it is a step in the right direction to assist the field commander. In the future, we may decide to use similar programs for training replacements for other Hawk units and for other types of units, such as Chaparral and Vulcan.

Scheduling calls for the first two packages to be trained in February and to arrive at their units in March. We will be seeking to improve the program as it goes along and we gain experience. This will, of course, require feedback from the field, so I will welcome all comments and suggestions, not only from the commanders concerned, but also from any soldier involved with the program.

John J Koehler Jr

ENGAGEMENT ZONE

letters to the editor

AIRBORNE TRAINING

Dear Sir:

Request clarification of the statement of policy in the July-September 1977 issue of AIR DEFENSE Magazine.

I had orders for Airborne Training as part of my precommissioning packet, but a death in my family precluded my attending. I am now stationed in Germany.

I inquired of the 82d Airborne about schooling and was told, "Your best move would be to go to Airborne School enroute from Germany to the Advance Course. While you are in the Advance Course, your next assignment will be made. ADA Branch probably will not program you for the 82d unless you are already airborne qualified. The reason for this is that all of the ADA slots at Fort Bragg require airborne qualified officers. If something should happen to you in jump school, HQDA would be required to divert you to another post, causing you personal inconvenience and additional DA funds.

"Since you are coming from Europe, your chances would be good for getting into the 82d after the Advance Course. However, you must get to Airborne School first."

As I see the current policy, I will never qualify to attend airborne training. Policy dictates that I must be assigned to an airborne unit before I can attend airborne training. I also cannot be considered for an airborne assignment unless airborne qualified. These statements seem to have no meeting point in my case. If there is one, please inform me. As I see current policy, unless a lieutenant receives airborne training upon commissioning, there will never be another opportunity in his career, regardless of career intentions or personal motivation and desire to achieve and diversify specialties.

Any clarification or further explanation of current policy would be appreciated.

ROBERT L. LOWERY, JR.
1LT, ADA
IFC Platoon Leader
Btry D, 3d Bn, 71st ADA

To clear up your apparent dilemma and provide accurate information to others who might desire clarification of policy,, AIR DEFENSE Magazine sent your letter to LTC Thomas L. Ricketts, Chief, ADA Branch, MILPERCEN, for comment, and following is his reply:

"Effective 1 October 1977, the Army's Airborne training policy was changed. Airborne is now available only to those officers on assignment to airborne units, and as voluntary precommissioning training for USMA and ROTC cadets. Because of this policy change, there can be no requirement that an officer be airborne qualified prior to being considered for an assignment to an airborne unit.

"If you are interested in airborne assignment, you should so state on your Officer Assignment Preference Statement. If assigned to an airborne unit, you will attend Airborne Training enroute to that assignment." *- Ed.*

A WORD FROM PERU

Dear Sir:

I am presently assigned as an exchange officer to the Peruvian Artillery School and have read with interest those issues of AIR DEFENSE Magazine which I have been able to obtain. I recently subscribed and look forward with interest to my receipt of your next issue. The Peruvian

Artillery School has responsibility for Air Defense Doctrine and presently is in the process of updating its doctrine and tactics. As a field artilleryman, I have found several articles in AIR DEFENSE invaluable in keeping my head above water in air defense matters. I would appreciate it very much if you could send me copies of AIR DEFENSE published during the last 2 years.

Please express my appreciation to your staff for the fine product you are putting out.

LTC ROBERT B. CAIRNS
Exchange Officer
Peruvian Arty School
USMAAG—Peru
APO New York 09865

FUNDING FOR METRIC KIT

Dear Sir:

USAADS Air Defense Bulletin, No. 8-77, August 1977, stated that "the NBS Metric Kit, SP 410, complete with references, charts, a conversion card, and the history of the metric system, is available from the Superintendent of Documents, Government Printing Office."

Can you suggest how funding can be provided to procure four copies of the National Bureau of Standards [NBS] Metric Kit, SP 410, from the Superintendent of Documents. Each kit costs $2.00 and funding is not available at this headquarters.

Government publications [e.g., AR 420-90 and Occupational Safety and Health Act Pamphlet 2056], particularly in the fields of fire prevention and safety, continue to list informative-type documents and aids without providing any procedural guidance by which the required nominal publication fees may be obtained. Request that this topic be pursued through command channels, and definitive guidance on such funding be published.

HERBERT J. GALLAGHER
CPT, AD
Commander
51st US Army Arty Det
APO NY 09069

In response to your request for guidance in obtaining funds, we contacted the IG's office and the Comptroller's office here at Fort Bliss with the following results:

IG. The aids listed in the ADB article are for information purposes and there is no requirement to obtain them or have them on hand; therefore, there are no funds provided for their purchase through normal supply channels. However, if the Commander feels that these aids would benefit his entire command, with a certificate of nonavailability he can purchase some through unit funds.

Comptroller. Nonappropriated funds can be used to purchase any item believed by the Commander to be in the best interest of his troops. Each command may have different local procedures to be followed for accomplishing this, but it can be done.

We hope this information is satisfactory. We suggest that you consult your local IG and Comptroller for guidance on the local procedure for obtaining items referred to.

-Ed.

A WELCOME OPINION

Dear Sir:

We just received the charts which we recently requested and we wish to offer our sincere thanks for your prompt response to our request.

We also wish to comment that your magazine articles are highly informative, interesting, and very relevant to today's air defense world.

We will continue to look forward for each issue.

HAROLD MUSNITSKY
Sr. Vice President
EMTECH DIVISION
American Electronic
Laboratories, Inc.

REALISTIC TRAINING

Dear Sir:

I would like to second MAJ Burgett's and CPT Smith's conclusion that joint service air defense training pays dividends [April-June 1977].

During summer training for the 1st Bn, 108th Armor, 48th Bde, Georgia Army National Guard, at Fort Stewart, fighters from the 363d Tactical Air Command [TAC] Reconnaissance Wing and the 347th TAC Wing [USAF] were using the artillery impact zone for antiarmor training using line ordnance. With the assistance of the 21st Tactical Air Support Section, TAC, I was able to make contact with the Air Force units and to duplicate, if only briefly, the type of training experience which MAJ Burgett and CPT Smith describe in their article. In addition, we were able to provide the Air Force pilots with information on the effectiveness of their evasive maneuvers.

Although the aircraft were limited to only 1 hour a day of range time for 4 days, the training

we were able to give our Redeye teams was far more realistic and effective than could have otherwise been achieved.
CHARLES C. OLSON
1Lt, ADA GA ANG
CSC 1st Bn, 108th Armor

The article to which Lieutenant Olson refers is titled, "Joint Services Air Defense Training Pays Dividends," and begins on page 29 of the April-June 1977 issue under "View From the Field." The article describes the cooperation of the Navy at Fallon Naval Air Station, Nevada, in providing live-target training for Redeye sections of the 1st Bn, 51st ADA, assigned to the 7th Infantry Division.

- Ed.

FOREIGN EXCHANGE

Dear Sir:

Thank you so much for your letter of 17 February which I received 9 September. The Postal Service has excelled itself by taking nearly 7 months for the letter to reach me. I note the envelope was stamped June 22, 1977 which is also of interest. However, all that aside, I do want to thank you most sincerely for sending me the issue of AIR DEFENSE containing my letter and in particular for the more than generous amount of posters of Soviet and Warsaw Pact Forward Area Aircraft.

This poster is quite excellent and even surpasses the standard of your previous one on Soviet Air Defense Systems. It will be quite invaluable in teaching aircraft recognition.

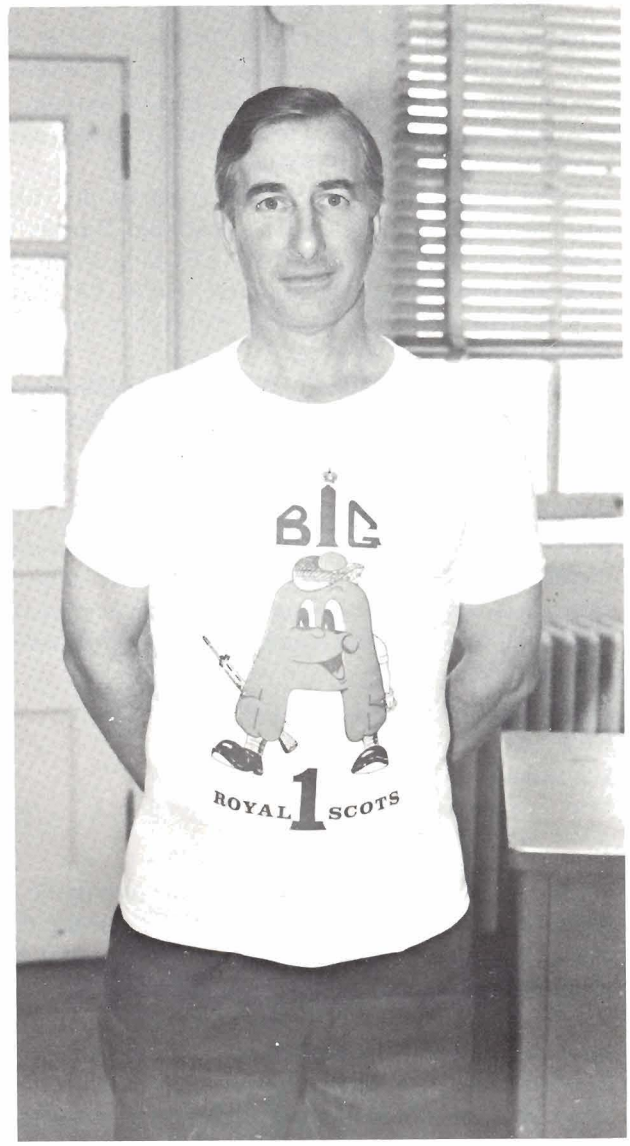
In recognition of all your kindness, I hope you will accept with my compliments one of our Company T-shirts. The unusual I in the middle of the word "BIG" is actually a Crown and the "1" is our Regiment Crest as we are the 1st Royal Regiment of Foot. I hope to see a photograph of you wearing it in the next edition of your excellent magazine!

Thank you again and best wishes to you and all on the staff of AIR DEFENSE.

C D M RITCHIE
Major, The Royal Scots
Oxford Barracks
British Forces Post Office 17

Immediately below is a picture of the Company T-shirt to which Major Ritchie refers in his letter, appropriately modeled by Lieutenant Colonel C.R. Gorddard, United Kingdom Liaison Officer to the US Army Air Defense Center.

- Ed.



SHORAD REQUIREMENTS OF THE ARMORED CAVALRY REGIMENT

MAJOR WILLIAM F. DAUGHERTY

The author has commanded at company and troop level and served as staff officer in tank battalions and in a cavalry squadron. This article was extracted from his Master of Military Arts and Sciences thesis, which was researched and written while he was a student at the Command and General Staff College. It reflects his 2 years of experience as S3 of the 3d Armored Cavalry Regiment at Fort Bliss.

On the modern battlefield the Armored Cavalry Regiment [ACR] must accomplish its tactical missions under a constant threat of low-altitude air attack. Short range air defense [SHORAD] weapons are essential, but how much air defense is enough?

With limited numbers of SHORAD weapons available, how do we solve the air defense equation for the ACR? Let's first consider some basics of air defense employment within the ACR, then examine other factors that are part of the equation—passive air defense measures and organic air defense capabilities of the ACR.

Cavalry commanders must define their air defense priorities in terms meaningful to air defense commanders and air defense commanders must have a thorough understanding of the SHORAD requirements of a deployed ACR.

- **What the low-altitude air threat consists of and its significance to the ACR must be made clear to both air defense and cavalry commanders.**
- **What elements of the ACR must be defended from low-altitude air attack and why has to be understood.**
- **Commanders must evaluate how well organic ACR and air defense unit assets complement and interface with each other and know their combined effect.**

It is, then, those air defense systems that operate within the regiment's zone of action and are directly responsive to the regimental commander that we are concerned with in this discussion. The threat with which we are concerned is low-altitude attack aircraft and helicopters of the types found in the arsenals of the Warsaw Pact Nations.

The critical assets in the ACR requiring SHORAD defense may include a troop, company, or battery; a command post [CP]; logistical element such as combat or field trains; a refueling point; or a key bridge.

The air battle involves the principles of weapon mass, complementary weapon mix, mobility, and integration; and the key element of the weapon mix is the Hawk missile system. Hawk provides all corps units, including the armored cavalry regiment, continuous protection against low- and medium-altitude air attack. Within the corps area defense "umbrella" provided by Hawk, corps C/V units may be assigned to protect a nondivisional unit such as the armored cavalry regiment.

To achieve sufficient mass, a complete C/V battery is preferable to defend a critical asset, and a platoon of four firing systems is the smallest unit that can adequately protect an asset.

An extension of this doctrine applies to Redeye. Overlapping coverage may require the entire Redeye section to protect a single critical asset. Since all Redeye sections in the ACR have at least four firing teams, this roughly equates to the four systems of the Vulcan or Chaparral platoon being required to protect a single critical asset.

The ACR commander's designated critical assets for air defense protection, then, should be no larger than troop/company/battery-size units, command posts, or trains.

With proper contrasting of paint patterns and foliage, the size and outlines of tanks and other equipment can be deceiving.

If the ACR commander considers each troop, tank company, howitzer battery, CP, assembly area, or logistical installation as a critical asset, then his critical assets would total 26, as shown below:

Level	Critical Asset	Total
Regiment	Command Post	1
	Armored Cavalry Troop [ACT] Assembly Area	1
	ACT Forward Area Refuel and Rearm Point [daytime]	1
	HHT Avn Plt Assembly Area	1
	Field Trains [Includes field trains of all subordinate units]	1
Squadrons [3]	Command Posts	3
	Combat Trains	3
	Armored Cavalry Troops	9
	Tank Companies	3
	Howitzer Batteries	3
	TOTAL ACR	26

The SHORAD requirement, then, could be: 26 critical assets—4 Redeye sections = 22 critical assets [or a requirement for 22 C/V platoons].

$$\frac{\text{22 C/V platoons}}{\text{3 platoons per battery}} = \text{7.33 batteries.}$$

$$\frac{\text{7.33 batteries}}{\text{4 batteries per bn}} = \text{1.83 C/V battalions [round out to 2 bns because of size of field trains].}$$

Normally, the corps commander will not have the assets to protect his ACR with two full C/V battalions. Huge quantities of air defense weapon systems are not available under current force structure for the ACR or any other US maneuver force. In arriving at a realistic assessment of the SHORAD requirement for the ACR, we must consider the passive and active air defense measures inherent in the regiment's structure.

PASSIVE AIR DEFENSE

The passive air defense measures of camouflage, night displacements, night resupply, and reduced size of CPs have contributed to the success of the ACR in field exercises. In an electronic warfare [EW] environment, many of these same passive measures will limit detection and possible attack from the air through electronic means in the hands of the enemy. Passive air defense, then, is a vitally important adjunct to air defense.

Camouflage

Effective camouflage, such as concealment, paint patterns, nets, and natural foliage, is essential to survival. With proper contrasting, even the size and outline of tanks can be deceiving. Camouflage discipline must be emphasized even during halts and other temporary situations.

As for helicopters, the Army has developed camouflage pattern-painting techniques. Since helicopter assembly areas are easily detected from the air, they should be located apart from CPs, trains, etc.

Camouflage can be considered the primary passive air defense measure for command posts and small logistical installations.

Dispersion

A troop operating in open terrain in a frontage of 5-7 km, with its three 10-vehicle platoons on line, presents an average density of only one vehicle per 167 to 233 meters. An enemy air attack

Squadron combat trains can be reduced to five vehicles, giving the enemy much less to shoot at if he should spot your position.

would have limited effect on a troop operating over such a large frontage.

Other ACR critical assets lack the inherent dispersion of a deployed troop. The howitzer battery and tank company [poised for a reserve role] are lucrative targets. Proper dispersion of the 200+ vehicles of the regimental field trains compounds the air defense problem. Dispersion is difficult for helicopter assembly areas also, but dispersion is vital because of the helicopter's "softness," difficulty to camouflage, and lack of mobility on the ground.

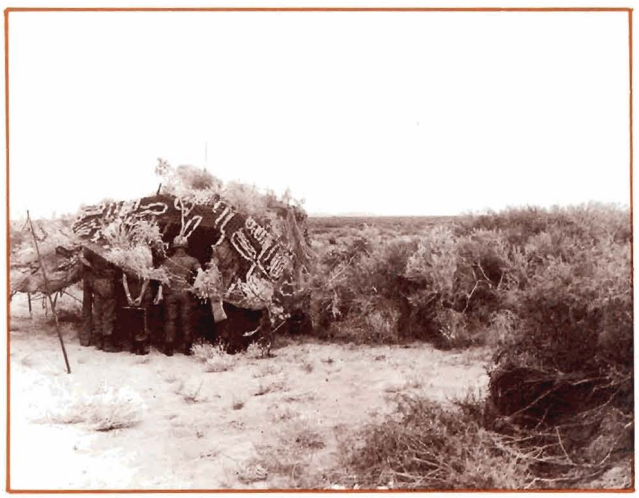
Reduction of Combat Trains

Considering all critical assets, squadron combat trains vary the most in size. Austere combat trains average about five vehicles, carrying emergency POL, ammunition, C-rations, water, and a DS maintenance contact team. The squadron maintenance collection point is collocated either with the combat trains or in the near vicinity.

With the combat trains reduced to only a few vehicles, camouflage and reduced movement can provide the primary means for their protection.

Night Tactical and Resupply Operations

Night tactical operations capitalize on darkness as a passive measure, particularly in the offensive. Night movement to assembly areas, passage of lines, and movement to contact can minimize interference from enemy aviation. A regiment can benefit by "lying low" during daylight hours and fighting as much of the battle as possible under the cover of darkness. Total reliance upon night resupply has been demonstrated as feasible in the ACR. The large, vulnerable field trains and both the regimental aviation platoon and air cavalry troop assembly areas have been positioned 15-20 km behind the line of contact. This distance placed these "soft" installations beyond enemy medium artillery range where resupply would take place.



A key factor in avoiding detection of command posts from the air is to reduce their size to the minimum essential.

The dust signatures of helicopters can be controlled by flying slightly above 15 knots.

Passive Defense for Command Posts

A key factor in avoiding detection of CPs is to reduce the size of regimental and squadron command posts. Field kitchens, tents, and other logistical support were pared by the 3d ACR by more than 50 percent.

The squadron command posts consist almost entirely of four M577 command post [tracked] vehicles. They can easily displace cross-country and be quickly camouflaged. Larger regimental CPs require more dispersion.

When the tactical situation permits, the regimental and squadron CPs displace at night and by dawn are static and fully camouflaged. Day displacements are often required and they should be cross-country and in dispersed formation, particularly in the desert, to reduce dust signature. Track signatures should be erased and vehicles quickly camouflaged to minimize detection from the air.

A significant problem of the command post is the "forest" of antennas. The effect is both a visual and electronic signature that can attract an air attack. The problem can be reduced by remoting radios and antennas from the CP vehicles and using the AN/GRA-39 remote unit, which can enable the remote operation of the radio up to 1

The ACR's huge SAFAD potential can supplement but not replace SHORAD weapons.

mile. A disadvantage is that since the radio must be remoted along with the antenna, a power source and an operator must also be deployed, and channels must be changed to provide security. In addition, the remote unit consumes a large number of BA-30 batteries daily. An obvious requirement exists for a means to remote only the antenna, thus enabling the normal operation of radios from within the CP.

Helicopters can compromise the location of a CP by landing too near and remaining too long. The use of helicopters should be severely curtailed during daylight hours. Consistent with regimental SOP, helicopters need not be used for command and control—tracked command groups can be used exclusively. When helicopters are required to land near a CP, helipads can be located at least 1 km from the CP and moved frequently. Helicopters can approach at low level, discharge occupants, then immediately take off for either a helicopter assembly area or a loiter position within 5 km. This action enhances the passive air defense of the CP.

Reduction of Visual Signatures

The persistent problems of dust, smoke, and personnel-unique signatures must be reduced. A moving vehicle can create a hanging dust plume visible for miles. Because aviators often orient on road features, they can easily acquire vehicle movement on dusty roads and installations located immediately off roadways. The solution to minimize visible dust is to forbid daytime road movement forward of the regimental field trains, except under emergency conditions. Dust can also pose a serious problem for combat vehicles moving across the desert. If tracked vehicles do not follow or "track" each other, the dust signature can be greatly reduced.

The helicopter's dust signature is the most serious, but it may be reduced by maintaining airspeed slightly above transitional life [about 15 knots]. Avoiding extremely dusty areas such as tank trails will further reduce signature. Many rock deserts are comprised of well-compacted soils that reduce the problem of dust. These regions are frequently identified on topographic maps and should be sought as areas of operation when planning NOE flights.

Exhaust smoke from vehicles and smoke from the firing of weapons also give away vehicle and unit positions to aerial observers. All ACR diesel-engine tracked vehicles discharge plumes of black smoke upon quick acceleration. Plumes can be seen from the air as well as the ground and can even reveal how many vehicles are involved. Currently, driver training is the only remedy. Future vehicle exhaust systems should be designed to minimize smoke signature.

Howitzers produce the greatest smoke signature. The voluminous smoke cloud generated upon firing can easily be seen from the air, causing a well-hidden battery to be located. No easy solution to the problem exists. The best passive defense is continual movement to new firing positions—the "shoot and scoot" method.

Without question, only disciplined, highly trained units that are significantly motivated by air attack threat will employ all of the passive air defense measures discussed efficiently.

SMALL ARMS FOR AIR DEFENSE [SAFAD]

Since World War II, the US Army has lost its skill at shooting down attacking aircraft with organic individual and crew-served automatic weapons. Leaders' conclusion that small arms would be ineffective against the postwar, high-performance aircraft resulted in a rush to develop missile air defense, to the detriment of small arms. Passive air defense became the only air defense advocated for deployed units because of the mystique of invulnerability of high-performance aircraft to small arms. Tank platoon leaders in the early 1960s, for example, were taught to disperse and "hide" if attacked from the air. The firing of cupola-mounted caliber .50 machineguns was discouraged because it would "expose positions and would be ineffective against the attacking aircraft." The resulting apathy of the early 1960s still infects the Army in spite of the lessons learned from Korea, Vietnam, and Mideast wars. However, several excellent air defense publications on the subject are available. For example, TC 23-44, How to Train in Small Arms for Air Defense, published by the US Army Air Defense School, incorporates the latest techniques in the "volume fire" method, which can yield rich

dividends on the battlefield.

SAFAD Potential of the ACR

As in the case of passive air defense, before the SHORAD requirement can be determined for the ACR, the SAFAD capabilities of the regiment must be determined and maximized. The armored cavalry regiment's potential for SAFAD is enormous. The small arms density of the regiment is as follows:

Weapon	Auth H-Series TOE	Auth European Modified TOE
20-mm Automatic Gun	153	0
Cal .50 Machinegun	368	446
7.62-mm Machinegun	331	259
Cal .45 Submachinegun	302	263
5.56-mm Automatic Rifle	2,402	1,814
TOTAL	3,556	2,782

The highest percentage [86%] of the crew-served weapons [20-mm gun, cal .50, and 7.62-mm machineguns] is found in the ground combat units. The 9 armored cavalry troops have 69 percent of the regiment's crew-served automatic weapons. With six caliber .50 machineguns [one per SP howitzer] and three M60, 7.62-mm machineguns, the howitzer battery has a relatively limited SAFAD capability compared with the tank company and armored cavalry troop. With only 14 percent of the small arms for air defense available among the four headquarters and headquarters troops and the air cavalry troop, the SAFAD capabilities of the softer CPs, aviation assembly areas, and trains formed from these units, are obviously less. This fact must be considered when the regimental commander determines his air defense priorities.

The ACR's huge potential for SAFAD must be placed in perspective. SAFAD can supplement, but not replace, SHORAD weapon systems. When small arms are employed in air defense, it is a personal confrontation between the attacking aircraft gunner and his intended target. SAFAD really provides the final protective fires once attacking aircraft have penetrated HIMAD/LOMAD/SHORAD defenses.

REDEYE – THE ACR'S ORGANIC SHORAD

In addition to SAFAD, the ACR has the organic SHORAD capability of 22 Redeye teams as follows:

Unit Asgmt	No. Sections	No. Teams	No. Gunners* [2/team]	Total Msls [6/team]
Regt'l HHT	1	4		24
Sqdn HHT	1	6		36
TOTAL, ACR	4	22		132

*Includes team chief.

Although the entire Redeye section can adequately defend a single critical asset, the section leader, based on the commander's priorities, may choose to attach teams to each troop, company, and battery. In this case, Redeye does not have sufficient mass to protect a critical asset but it can supplement SAFAD effectively.

Having considered the threat, discussed available passive and active air defense measures, and viewed the ACR in terms of critical assets, the SHORAD shortfall [examined within the typical regimental role of corps advance covering force] is as rationalized below.

TABLE I
Air Defense Adequacy Without C/V

Critical Asset	No.	Primary Air Defense	Secondary Air Defense	Adequacy of Air Defense
Regiment				
Command Post	1	Passive	Limited SAFAD	Marginal
ACT Assembly Area	1	Passive	None	Inadequate
ACT FARRP [daytime]	1	Passive	None	Inadequate
HHT Aviation Plt	1	Passive	None	Inadequate
Field Trains	1	Regt Redeye	Passive	Marginal
Squadrons [3]				
Command Post	3	Passive	Limited SAFAD	Marginal
Combat Trains	3	Passive	Limited SAFAD	Marginal
Armd Cav Troop	9	Passive	SAFAD	Adequate
Tank Company	3	2 Redeye Teams	Passive SAFAD	Marginal
Howitzer Battery	3	4 Redeye Teams	Passive SAFAD	Marginal

TABLE II
ACR Air Defense Shortfall

Based upon Table I, the adequacy of air defense can be summarized as follows:

Air Defense Protection	No. of Critical Assets
Adequate [high inherent survivability]	9
Marginal [fair inherent survivability]	14
Inadequate [low inherent survivability]	3

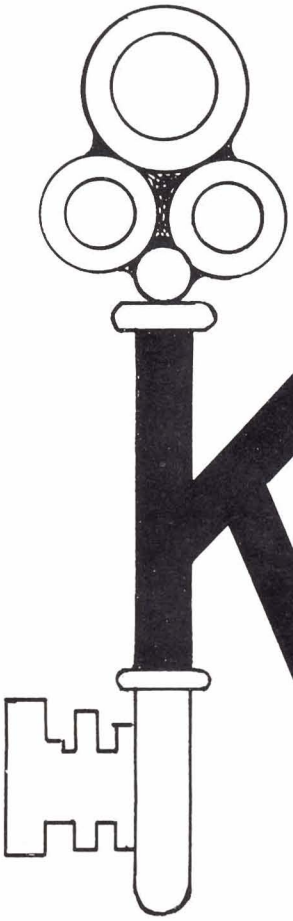
The ACR shortfall requiring SHORAD protection occurs among the 14 marginally and 3 inadequately protected assets. Therefore, for adequate air defense protection, the armored cavalry regiment requires a minimum of one C/V battalion.

CONCLUSION

Even with organic active and passive air defense measures maximized, we have seen that an entire C/V battalion should be dedicated to protect the regiment against a serious air threat. If this seems excessive, the culprit appears to be the system limitations of Chaparral and Vulcan. The possibility of decreasing the requirement for the ACR with modern, more capable systems is coming, but slowly. The follow-on to Vulcan [the DIVAD gun] and Chaparral [Roland] will not be fielded until the mid-1980s.

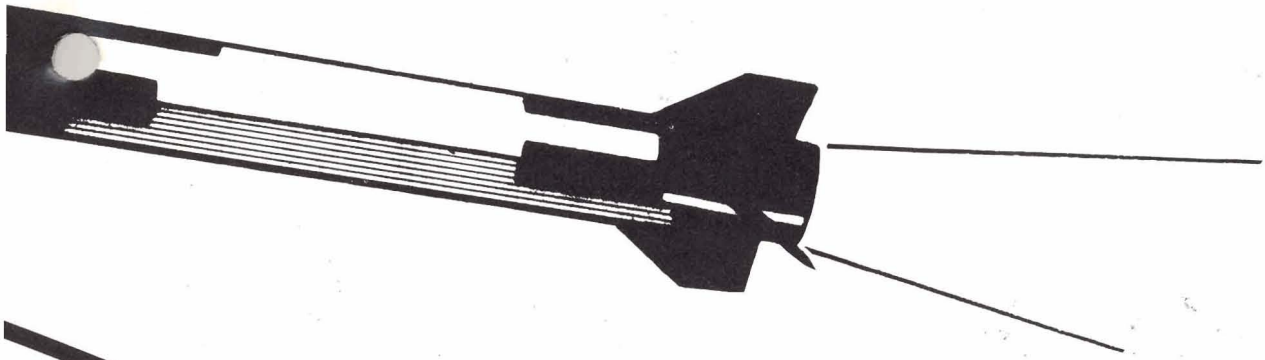
Meanwhile, all maneuver unit commanders, not just cavalrymen, had better learn the fundamentals of the "real world" air defense, which is Chaparral and Vulcan supplemented by the unit's organic active and passive measures.

TRACK VIA MISS



A KEY FEATURE

Lieutenant Colonel Eugene L. Naegele, USA (Ret)



THE PATRIOT GUIDANCE

OF

Track-via-missile [TVM] guidance is one of the key features of the Patriot air defense missile system. This feature combines the efficient, energy-saving trajectory of command guidance [that enables long-range intercepts] with the multiple target resolution and accuracy of homing guidance.

Background

The origin of our present day guided missile program can be traced to German developments initiated during World War II. The names of Locke, Schmetterling, Wasserfall, Enzian, and Rheintochter are not generally familiar names today, but the brilliant radio command guidance systems of early guided missile systems [to which they contributed] were already in the flight test stages in the mid-1940s. At that time, most of the current types of surface-to-air missile guidance had been defined, analyzed, and developed by the Germans. Their achievements remain impressive today.

Surface-to-air missile guidance systems may be classified into three categories: command, beam rider, and homing guidance. The latter is usually subdivided into active, semiactive, and passive homing.

Command guidance is illustrated in Figure 1. In the illustration, the position of the target is continuously resolved by a target tracker while another tracker follows the missile from its launcher. Both trackers feed information to a computer, which solves the target intercept problem and computes missile steering commands [from which this type of guidance is named] that are transmitted via the missile tracker or by a separate communication link. The first US Army operational surface-to-air missile system, the Nike Ajax [deployed in 1954], and its successor, Nike Hercules, both used command guidance.

The second type of guidance system, called beam rider, is illustrated in Figure 2. Only one tracker is used in beam-rider guidance, but it is more complicated than either of the two trackers used in command guidance. It must also generate a broad "capture" beam that can acquire a free-flight missile after launch and provide a means for the missile to sense its relative position in the beam [up, down, right, left]. The missile must also be slightly more complicated in beam rider than in command guidance because it must have the electronic capability to aline itself with the beam and to steer itself so as to fly up the beam axis. If it does that, and the tracker keeps the beam on the target, the missile will be able to intercept the target. This type of guidance was used in the first US Navy surface-to-air missile system, which was named the Terrier.

The three types of homing guidance are depicted in Figure 3. In an active homing system [fig. 3a], the missile has an onboard illuminating energy source [hence, "active"] and locates the target from its own echoes or reflections. The semiactive scheme, shown in Figure 3b, is similar to the active configuration but uses a powerful ground illuminator capable of greater range coverage than that which could be carried onboard the missile. The passive homing [Fig. 3c] uses some characteristic target emanation as a means of locating and guiding the missile. All three of these schemes were tried in the stages of US missile development. One version of the US Navy Sparrow used active homing. The Army Hawk air defense system, which became operational in early 1959, employed semiactive homing. The current Chaparral, Redeye, and Stinger use passive homing, where the infrared radiation from the hot metal of the target aircraft's engine or its exhaust plume attracts the sensor in the missile.

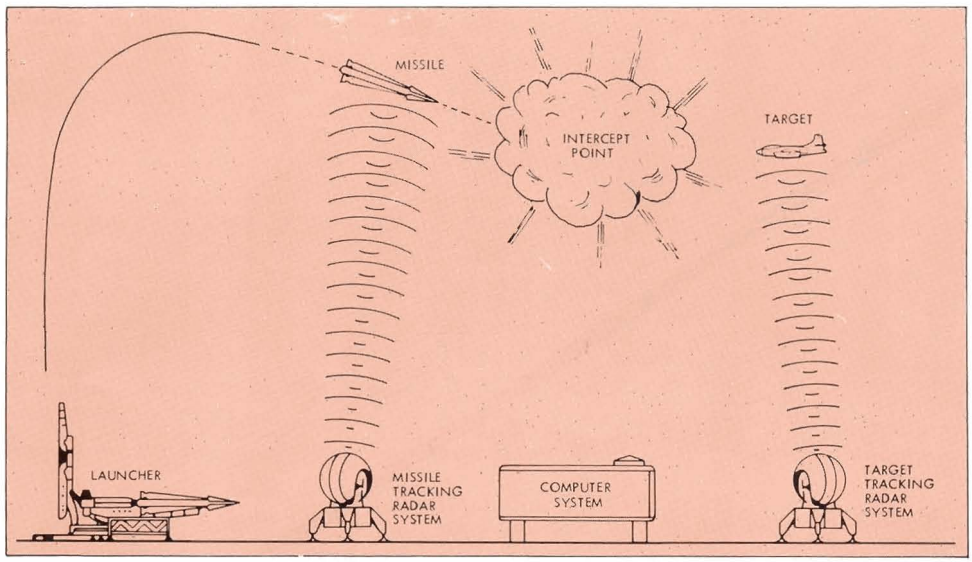


Figure 1

Comparison of Guidance Systems

The major advantage of command guidance, as compared with beam rider, is that the missile can be independently commanded to follow a semiballistic path to intercept. In so doing, the missile wastes less of its

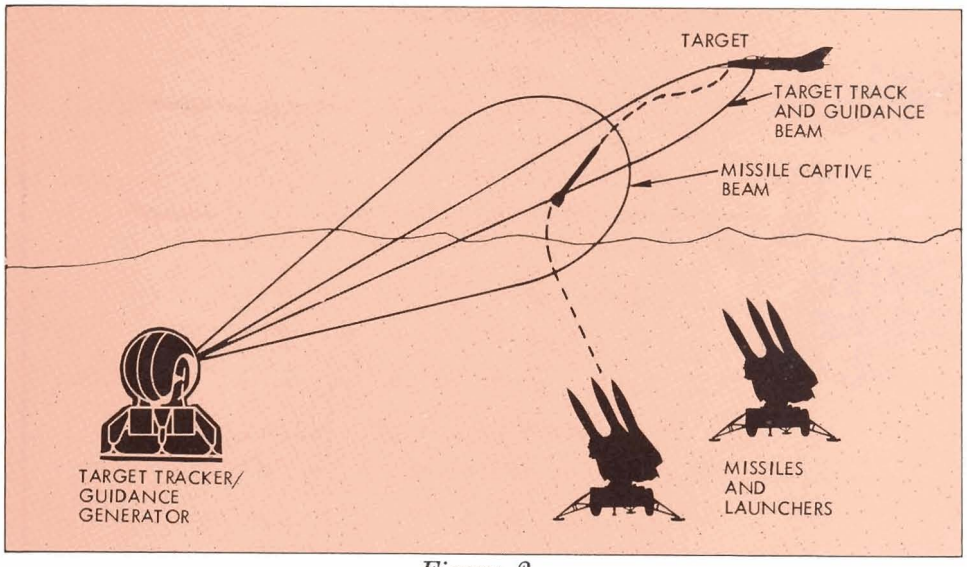


Figure 2

energy in unnecessary early-on maneuvering and conserves it for end-game demands. This results in both a longer range and a higher probability of outmaneuvering the target. The beam rider, on the other hand, is single minded about staying in the beam. Therefore, it must maneuver constantly, usually at low altitudes early in flight, resulting in a shorter effective range for a given missile size than the command guided system. The command guided system, however, requires two full trackers plus a computer and a communication link to the missile, which means a higher investment. Both command and beam rider guidance systems have a common inherent limitation: multiple target resolution and guidance accuracy decrease with increased range. This limitation stems from the fact that all trackers have a diverging beam, which results in a greater uncertainty in target position at long ranges than at short ranges. Furthermore, when there are multiple targets in a formation, the tracker cannot separate their signals at long ranges when the targets are all within one beamwidth. Homing guidance systems overcome this limitation since the target position is determined onboard the missile. As the missile approaches the target formation, it first resolves one of the multiple targets and then accurately locates the target. However, homing guidance also has its limitations. Since the tracker in homing guidance is in the missile, it is limited in size, weight, and power. This results in a relatively short missile-target acquisition range for homing guidance systems in addition to a more complex and costly missile compared to command guidance and beam rider systems.

Because of the tradeoffs involved, hybrid guidance systems can optimize capability, capitalizing on the advantages and compensating for the limitations in the source system designs. The Patriot guidance system does just that.

Patriot TVM Guidance

The Patriot guidance system is actually a combination of three types of guidance: preset, command, and track-via-missile, or TVM. The preset guidance is a simple, self-contained guidance system onboard the missile that permits stabilized flight and a coarse initial turn immediately after launch and prior to missile acquisition by the radar. The command guidance was described earlier. TVM guidance itself can be considered as a combination of command and semiactive homing.

Figure 4 depicts the major items of the Patriot firing platoon; namely, the engagement control station [ECS], radar set [RS], electric power plant [EPP], launching station [LS], and guided missile [GM]. The prinicipal functions that each major item performs are listed under the major item name in the illustration. Let us follow the sequence of events with an emplaced firing platoon that has been energized and put into its operational mode. The electric power plant is

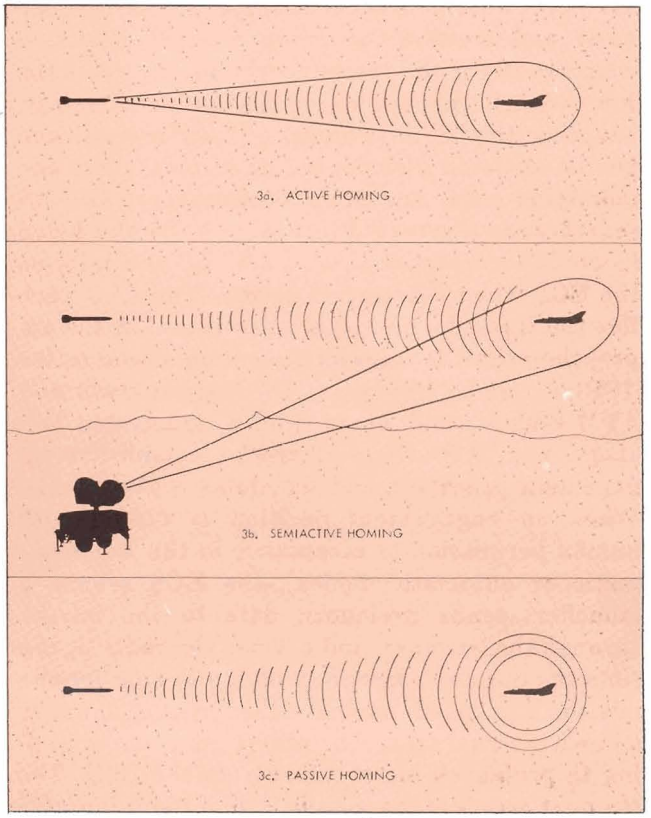


Figure 3

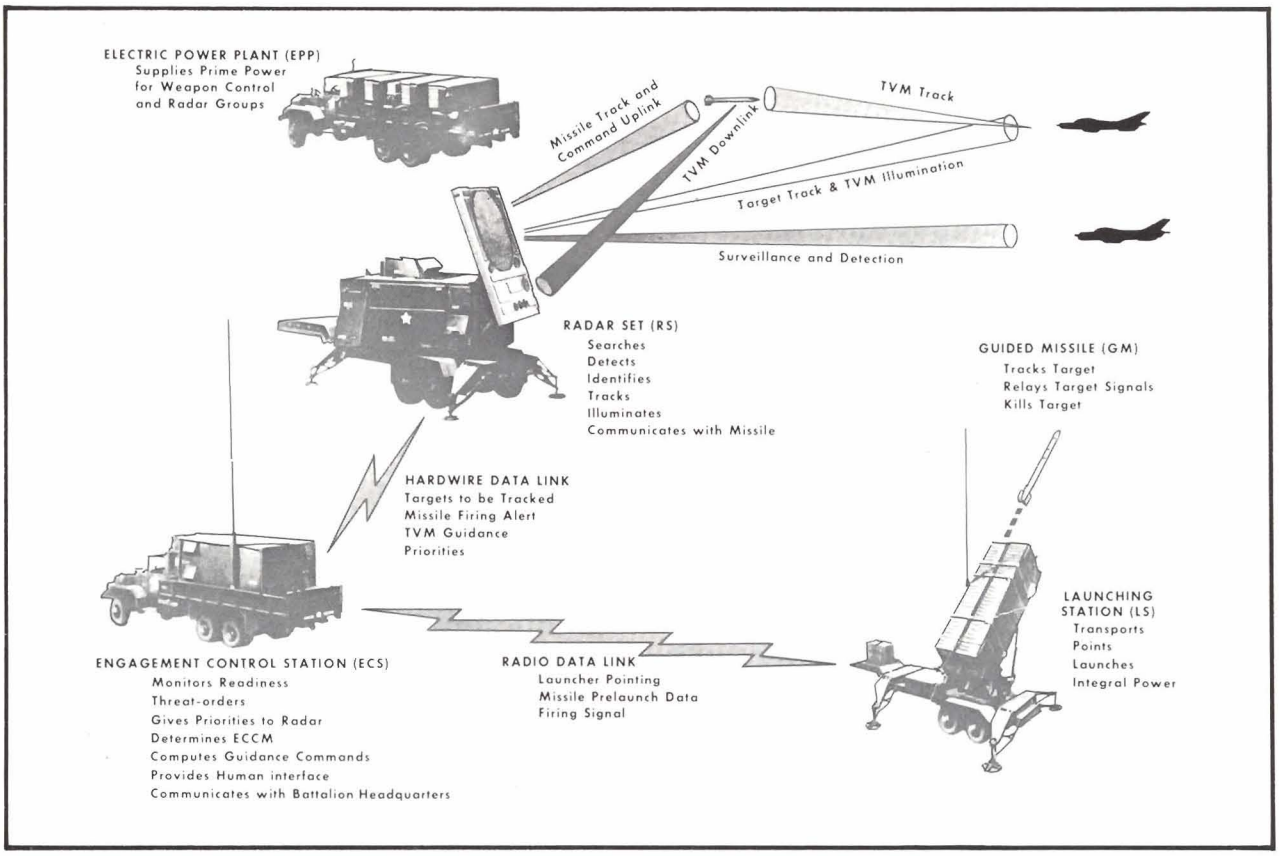
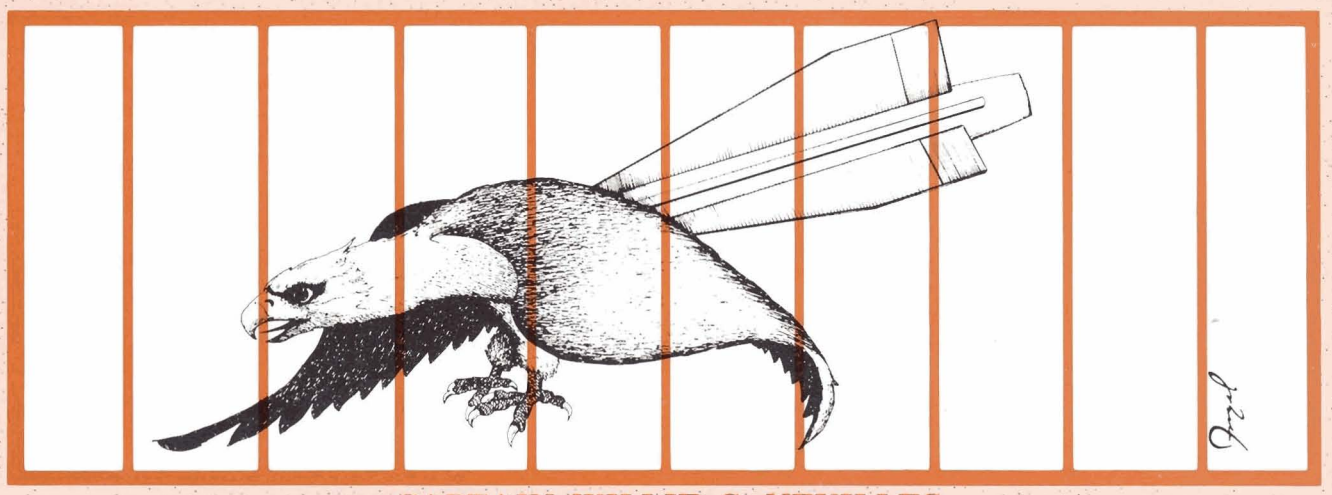


Figure 4

self-explanatory. The ECS is the "brain" of the firing platoon and also provides the means for human control of the highly automated Patriot system. The ECS queries the other major items continuously and monitors their operational readiness concurrently with system operation. It directs the RS through the search of the assigned sector, adapting to the environment [both natural and hostile initiated electronic countermeasures] and modifying radar operation as necessary. The RS searches, as illustrated in Figure 4, by the beam labeled "surveillance and detection," and informs the ECS when a detection occurs. The ECS verifies the track from several returns and at the appropriate time, initates identification, friend or foe [IFF], action by the radar. The "target track and TVM illumination" beam [Fig. 4] illustrates this stage. The ECS orders all tracks, establishes engagement priorities, and schedules engagements. When an engagement decision is made [with human permission or acceptance in the semiautomatic or automatic modes], the ECS selects a launcher, sends prelaunch data to the missile through the launcher, and notifies the radar at the time the missile is launched where to look for the missile. The missile executes the initial turn under its own internal control or preset guidance according to prelaunch instructions from the ECS. The RS next acquires the missile in flight and initiates track, monitoring missile inflight operation [see "missile track and command uplink" beam, Fig. 4]. The ECS then commands the missile, via the radar, guiding it on an efficient, energy-saving trajectory to the vicinity of the target. The ECS then instructs the missile over the command link to look in the direction of the target and acquire the reflected target illumination signals [see "target track and TVM illumination" beam, Fig. 4]. When the missile has acquired the target, the ECS orders the missile to enter the TVM phase [see "TVM track" beam, Fig. 4]. The missile relays to the ECS, through the RS, the signals it is receiving from the target [see "TVM down-link" beam of Fig. 4]. The ECS now uses this more accurate information for terminal guidance of the missile to intercept. At the appropriate time, just prior to closest approach, the missile fuze explodes the warhead so as to destroy the hostile target. Worthy of reemphasis is the fact that the engagement control station [ECS] is the "brain" of the system, where all operations, decisions, adaptations to environment, analyses of target signals, and calculations of missile maneuver to intercept and destroy the target are accomplished.

Lieutenant Colonel Naegele is Requirements Research Manager for Raytheon Company's Patriot Program Office, Plans and Requirements. He graduated from Case Institute of Technology with a B.S. in Physics and from the University of Arizona with an M.S. in Electrical Engineering. This is his second article to be published in AIR DEFENSE Magaine. The first, "Multifunction Phased Array Radar... ," appears in the October-December 1977 issue.



CAPTAIN WILLIE C. NEVILLES

"The proper place for a big bird like the Improved Hawk missile is inside a camouflage cage." At least that was the trend of thought reflected by members of the Air Defense Board when they were tasked by HQ, US Army Training and Doctrine Command [TRADOC], to design, fabricate, and test a camouflage support system suitable for the Improved Hawk system.

Air defensemen know that camouflage for air defense missile systems has posed continuing problems for years. Not only are the missile systems bulky and readily identifiable by their visual signature, but they are also identifiable by their radar signature. With the fielding of the Patriot system projected for the 1980s, the major camouflage effort is being directed at Improved Hawk. Most of our standard camouflage systems impose problems in radar transparency [RT], march order time, and emplacement time, while the mission of IHawk requires expeditious installing and removal of camouflage. In an attempt to eliminate structural problems and reduce installation time, the Air Defense Board was tasked by HQ TRADOC in July 1976 to design, fabricate, and evaluate a lightweight camouflage screening support [LCSS] system for all major items of IHawk equipment—a system that would increase the survivability of the IHawk battery in a tactical environment, decrease camouflage deployment time without degrading the air defense mission, and confuse as well as complicate enemy intelligence gathering efforts.

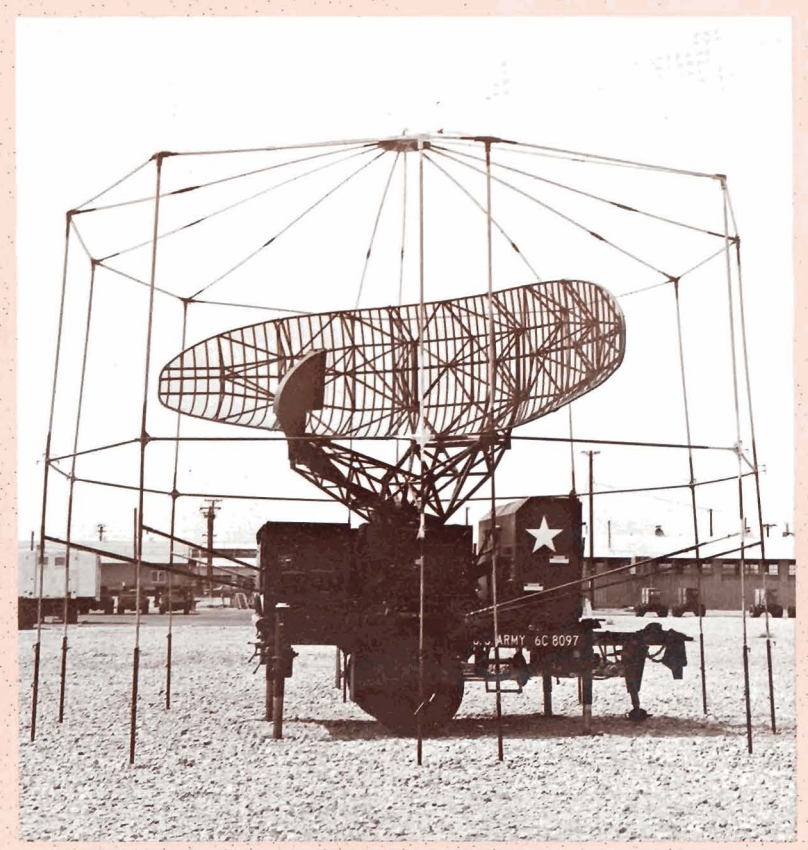


Figure 1. Improved Pulse Acquisition Radar

Pursuing the TRADOC requirement, a prototype camouflage system was designed and fabricated by the Air Defense Board. SFC Charles Bellina, a senior test NCO assigned to the Board's Missile Support Air Defense Branch [Materiel Test Division], designed a fiberglass cage support system for all the major components of the Improved Hawk system. Working with the Board's machinists, SFC Bellina fabricated a support system that has become known around the Board as the "Bellina Cage." This system is unique in that it can be employed with the IHawk equipment without requiring any modifications of IHawk equipment. The support system had to withstand wind and rain under test conditions with all radars fully camouflaged. In addition, the design

Figure 2. Launcher

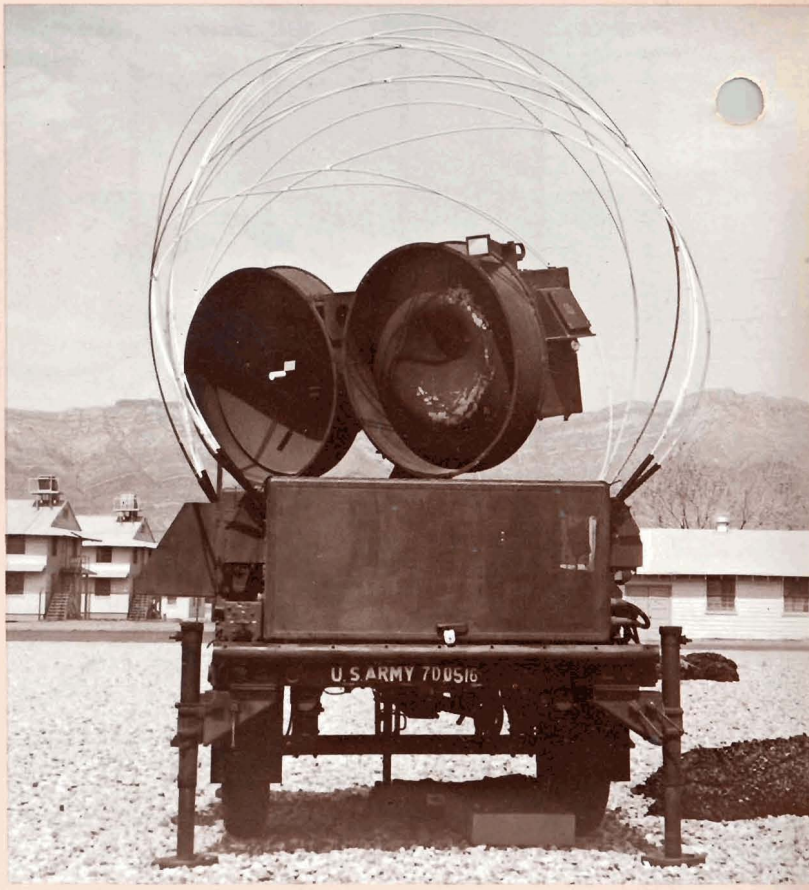


Figure 3. High Power Illuminating Radar

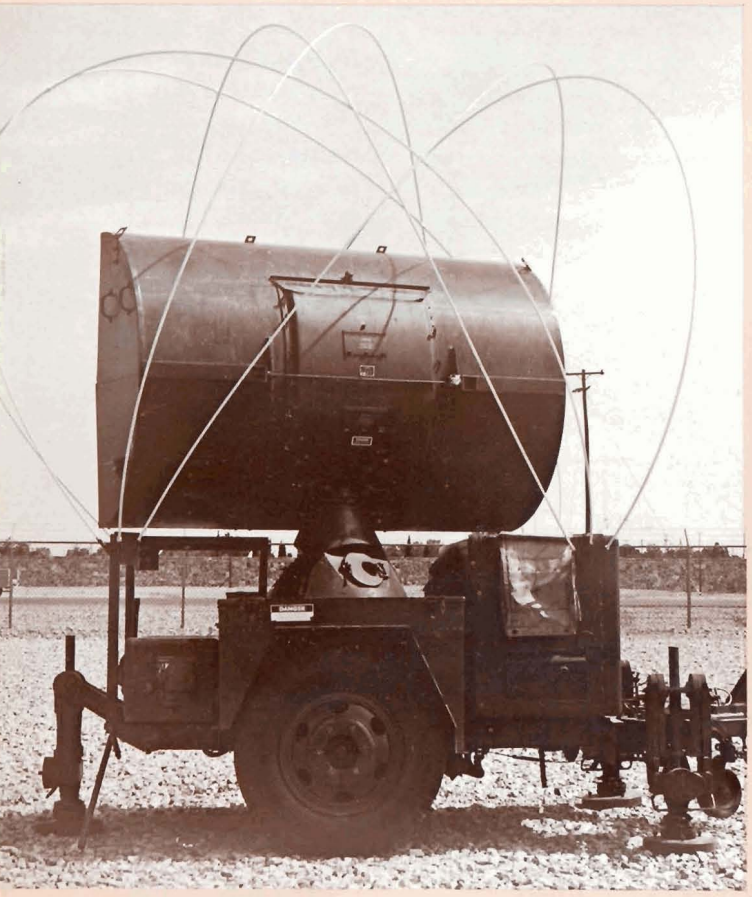


Figure 4. Continuous-Wave Acquisition Radar

Figure 5. Improved Range-Only Radar

structure of the system had to allow full antenna rotation and radiation while in place on the equipment without causing radar degradation. Camouflage systems in the past have interfered with system operation. SFC Bellina was able to complete all designing and fabrication within 60 days at an estimated cost of only $3,500.

The LCS support system for the improved pulse acquisition radar [Fig. 1] consists of rigid poles designed partially of steel and partially of fiberglass. All upper joints are fiberglass. Frames for the improved launcher, Improved Hawk high-power illuminator radar, improved continuous-wave acquisition radar, and improved range only radar [Figs. 2 through 5] are of flexible fiberglass rods that are attached to predesignated lift points. No modifications of the major subassembly was made. Other major items [information coordination central, battery control central, and generator] were camouflaged using conventional camouflage techniques. Tone/shadow painting was used in all cases, since the idea of the LCSS is not to replace normal camouflage painting but to supplement it with other camouflage methods. Shown in Figure 6 are some of the major items of IHawk equipment tactically deployed.

Figure 6. IHawk Equipment Tactically Deployed

Even though the evaluation has not been completed, it appears certain that SFC Bellina's cage system for IHawk will be a success. During the radar performance test, the fiberglass cage system did not degrade the radar's performance in the slightest. Two types of netting configurations were evaluated during this test, with and without metal hog rings.

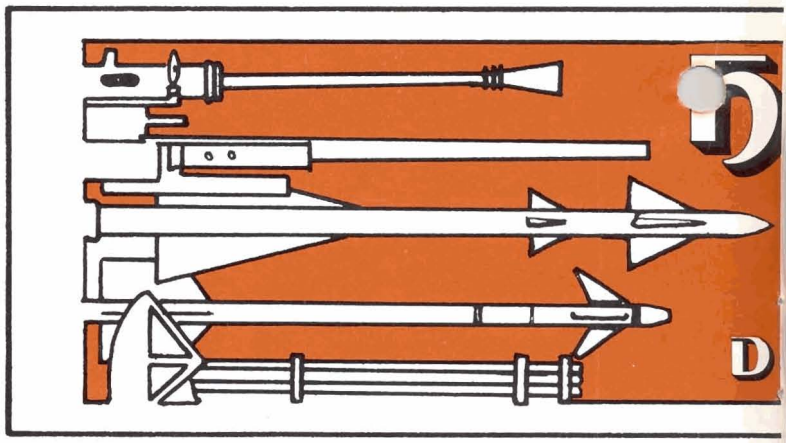
There are some tests remaining. In April 1978, the cage system will undergo a tactical aircraft deception test. High-performance aircraft, using low-level pop-up maneuvers, will fly against a tactically deployed IHawk unit. This portion of the test will be evaluated by personnel from the Army Research Institute. In May 1978, an imagery study will be conducted by professional photographic interpreters throughout the continental United States. The concealment effectiveness of the cage system will be evaluated during this study, which will involve an assortment of aerial photography, including black and white, infrared, color, and color camouflage detection film. It is anticipated that test firings will be conducted sometime in 1978 or early in 1979 to test the improved launcher effectiveness with the cage system installed.

Since there are some aspects of testing still to be performed, it would be premature to make a complete assessment of the fiberglass cage support system at this time. However, preliminary test data indicate that it will be highly effective. If the Army decides to procure the cage support system, a developmental cost savings of thousands of dollars will be realized because of SFC Bellina's ingenuity and efforts. As a point of interest, queries from US forces in South Korea have already been received about his design. Not only can this system save the Government money, it can play a significant role in the future by providing a more efficient camouflage capability and further enhancing the survivability of the Improved Hawk missile battery deployed in a hostile environment.

SFC Charles Bellina arrived at the Air Defense Board in 1975, at which time he was assigned to the Missile Support Air Defense Branch as a Senior Test NCO. Since then, he has been involved in various tests, some of which brought on modifications to the Improved Hawk system.

Captain Nevilles is a Test Project Officer at the Air Defense Board. He is a graduate of Tuskegee Institute where he received a Bachelors Degree in Chemistry [Industrial Research] and is currently enrolled in a Master of Arts Program [Management] with Webster College.

Having discussed US bombers employed in the Pacific theater in the previous installment, we now turn to the situation that confronted Japan in regard to her defense antiaircraft artillery. This narrative traces development of antiaircraft weapons from 1939 to 1944.



The Japanese antiaircraft was inexperienced and suffered from a lack of priority for development prior to its combat engagements in Manchuria and China. Antiaircraft weapons and weapon systems were inferior in quality to those in production in the United States and in European countries. By 1939, steps had been taken to increase the production of antiaircraft weapons and equipment then in existence and to equip the antiaircraft units in the field.

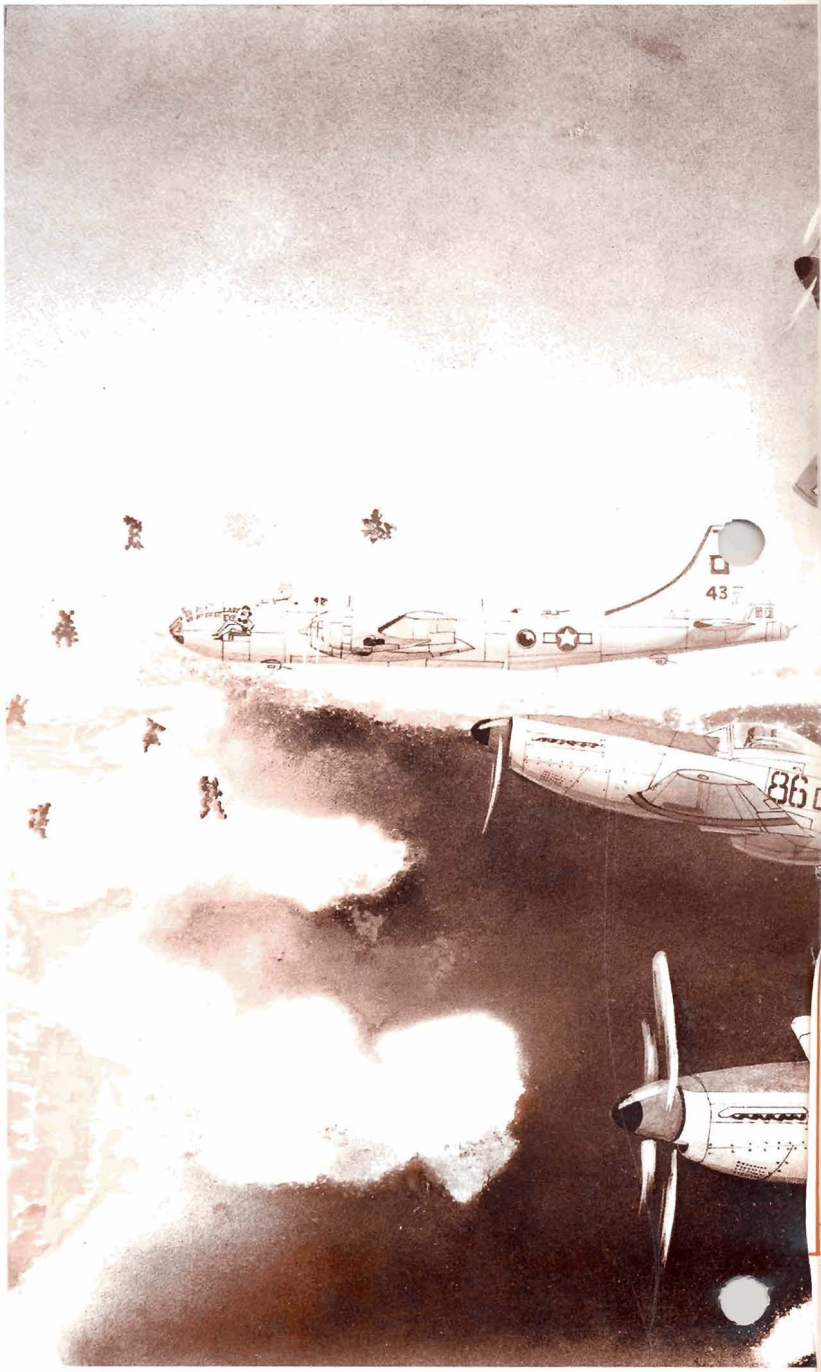
Although deficient in both quality and quantity when compared to operations in Europe, the Japanese antiaircraft weapons and equipment in use in 1941 were adequate for use against the poorly equipped forces opposing them. The limited opposition encountered initially was insufficient to expose deficiencies in Japanese equipment or tactics.

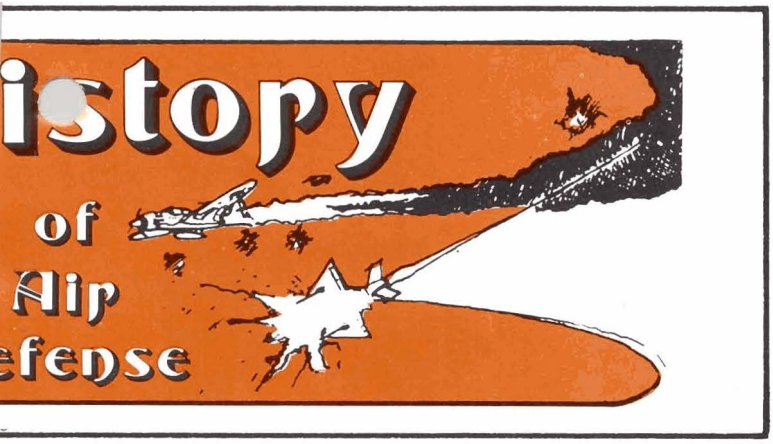
The Japanese failed to recognize the importance of antiaircraft artillery until it was too late. Due to its geographic location as an island country, Japan had a false sense of security regarding safety from air attacks. This resulted in the failure to give proper consideration to national defense.

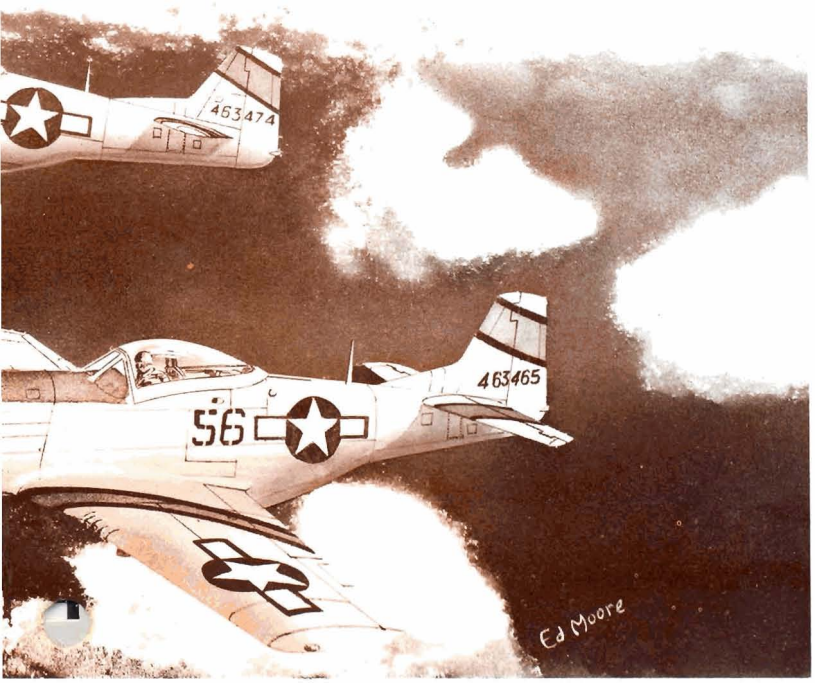
After the start of our large-scale bombing attacks in 1944, Japan decided it should have more antiaircraft but, at this time, it had neither the establishment nor the time to produce the necessary material.

The early days of the war apparently brought home to the Japanese the need for AA fire control equipment. They ordered the Type 97 director [a linear-speed director comparable to the US M4 director] into production, but it soon became apparent that they would be unable to produce this director in the required quantities.

They then standardized on another director that they could mass produce. It was a modified version of their old Type 90 director and was called the Type 2, Model 1. This was quickly subjected to further modifications and was called the Type 2, Model 3. This director was produced in quantity. Although fitted with tracking telescopes, first it was necessary to insert course angle and target speed, as well as altitude. This requirement, in turn, necessitated the continuance of the old Type 90 target speed and course angle calculator. If used for unseen fire, the cotangent plotting board was also required. In this manner, Japan was able to provide the necessary fire con-







trol for the AA guns on hand or being produced. Essentially, the system was equivalent to the old US M1A1 Vickers fire control system, which became obsolete in 1930. Although the firing data produced had low accuracy, it was better then nothing.

This makeshift fire control system, together with the on-carriage computing mechanism of the 75-mm and 88-mm guns, the 10-cm binoculars, height-finders, and plottings boards, gave the Japanese battery commander a multiplicity of fire controls so that he could fire, after a fashion, under almost all conditions. Accuracy, however, was of a very low order. By the end of the war, 494 Type 2, Model 3 directors had been produced.

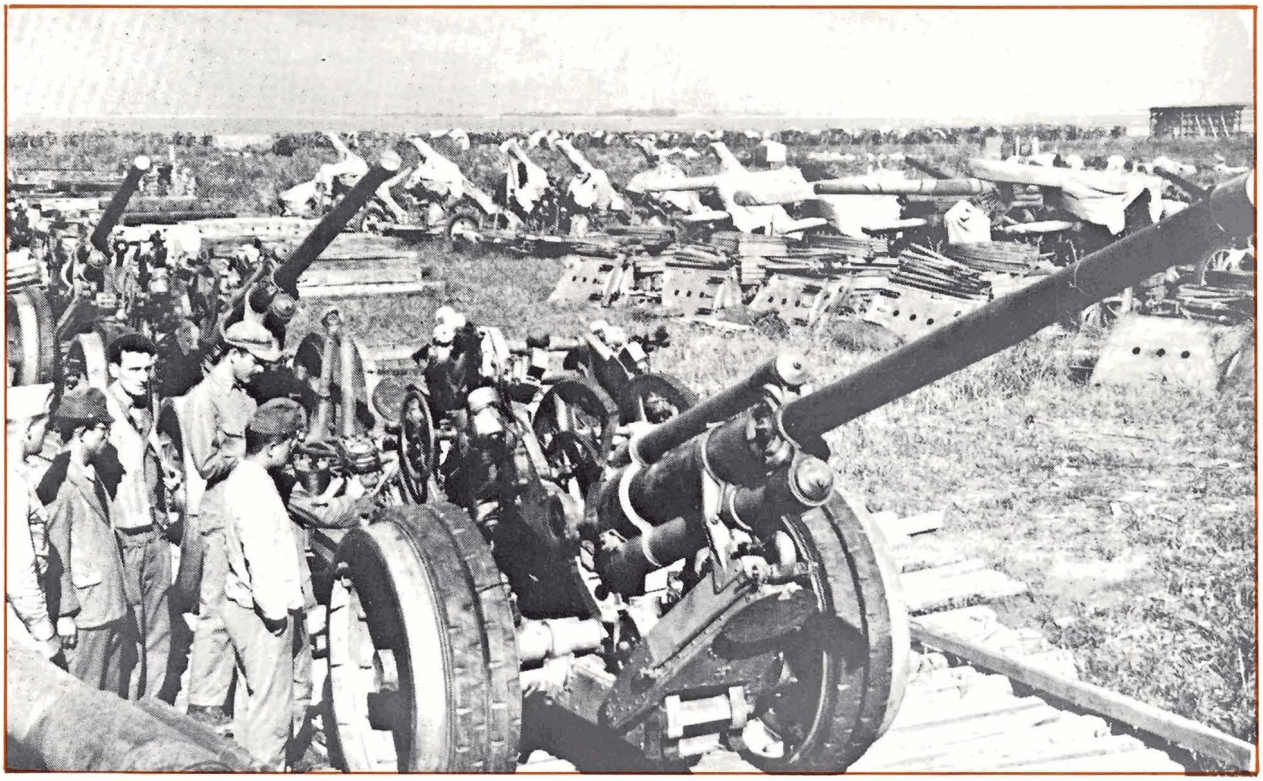
During the period while Japan was endeavoring to get new mass-produced Type 2, Model 3 directors into the hands of troops, she was forced to continue the use of the exterior computing devices —the target speed and course angle calculator for seen fire and the cotangent plotting board for unseen fire. Emergency data computation for seen fire was also provided by another device, the auxiliary antiaircraft firing board used with the sight mechanisms on the guns. This device was a crude system for reading data from curves plotted on cylinders and, after receipt of the Type 2, Model 3 director, was used only as an emergency system.

The Japanese also designed a director [an off-carriage type course and speed computer] for their 20-mm gun mount Type 2, which transmitted data to the six guns of the battery by means of selsyns. Had not production difficulties held up putting this director in the field, it might have been an effective system since one controller would have directed the fire of six 20-mm guns.

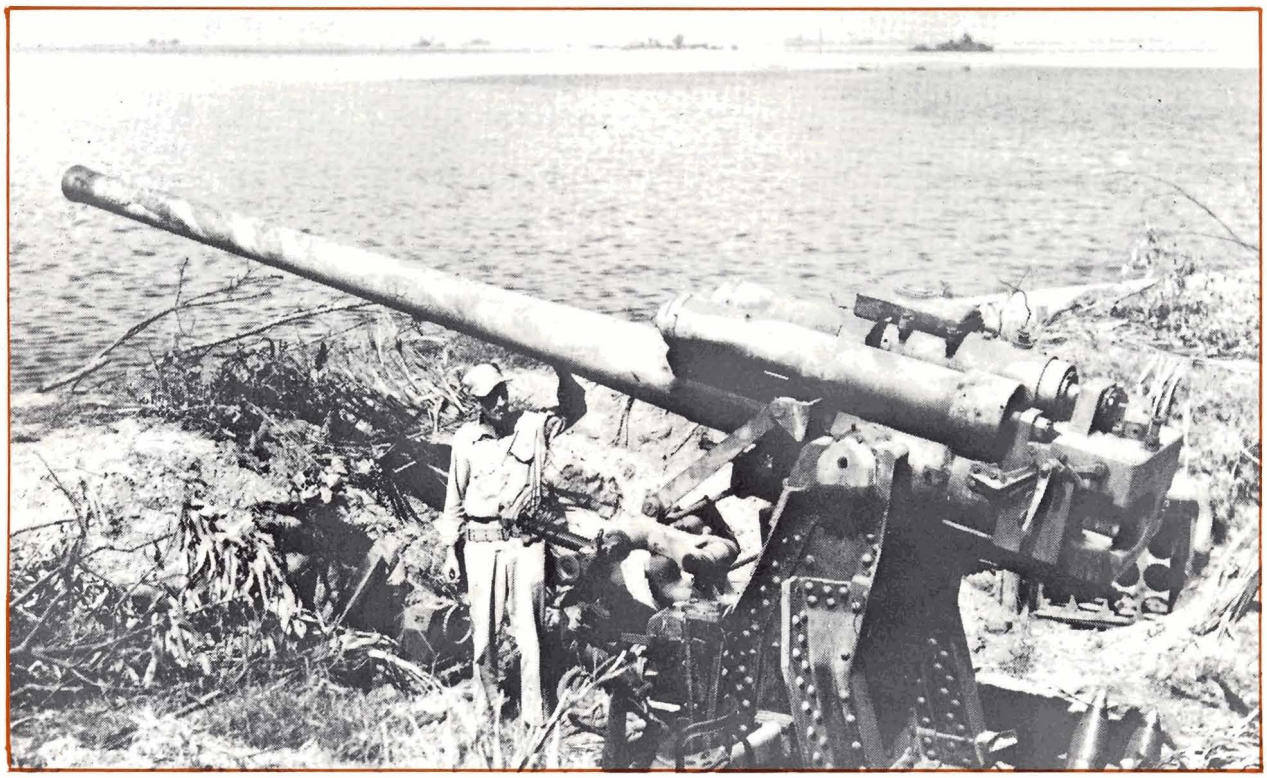
During the war, Japan developed two new searchlights—the Type 1, a 150-cm light, and the Type 3, a 200-cm light. The Type 1 produced a 1,000-million candlepower beam while the Type 3 produced a beam of 2,000-million candlepower. Very few Type 1 lights and only four Type 3 lights were produced.

In their efforts to get a more effective antiaircraft defense, the Japanese also produced an elaborate searchlight control station Type 1. This was a well-designed station, using a pair of 15-power, 10-cm binoculars. It is significant that while they were producing this control the United States was developing a radar control that superseded the searchlight in its entirety.

At the start of World War II, the 75-mm Type 88 AA gun was the mainstay of Japan's antiaircraft gun defense. Early in 1942, they rapidly increased the production of this weapon. It is significant that this weapon was still in production on a



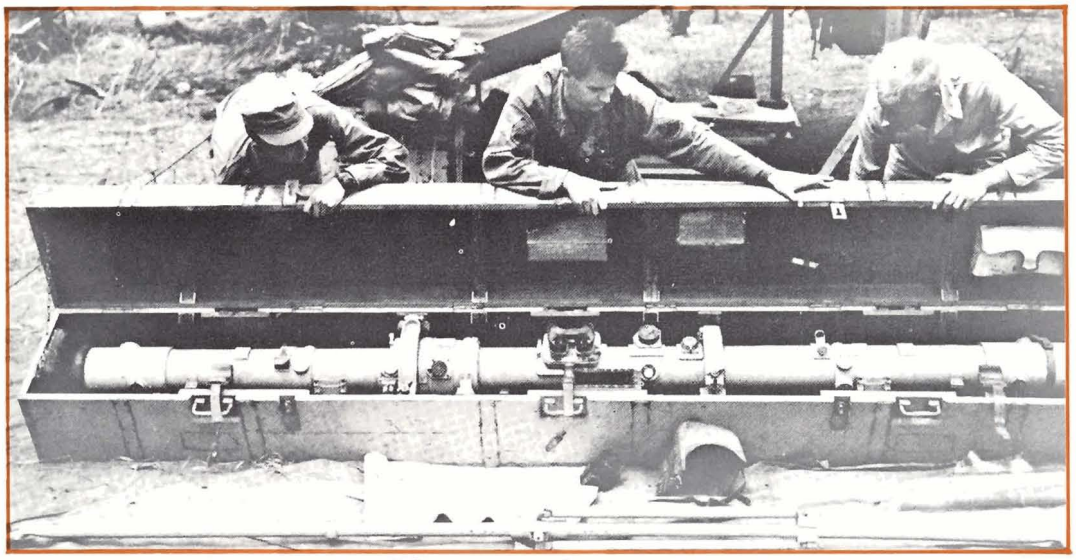
New 75-mm AA gun Type 4 which was produced in 1944.



120-mm AA gun Type 3 which could be used as a dual purpose gun.

limited basis as late as July 1945. This gun, however, had a low muzzle velocity, which limited its effectiveness against US bombers.

Three new AA guns were produced to meet the threat to Japan posed by the B-29 attacks beginning 15 June 1944. These three new guns are described briefly in the following paragraphs.

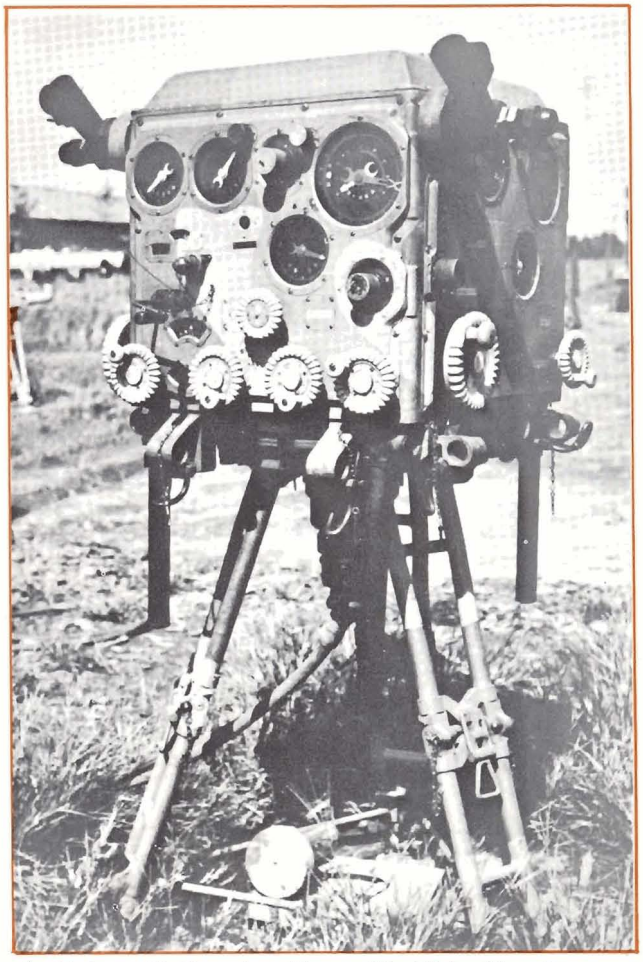


Three-meter base antiaircraft height-finder Type 90.

In 1944, a new 75-mm AA Type 4 gun, which had a muzzle velocity of 2,800 f/s, was put into production. The Allied bombing attacks caused development of this weapon. About 65 of these guns and mounts were produced, but only a few became operational.

Two units of a 120-mm Type 3 AA gun were produced in 1942. This gun was patterned after the Navy 127-mm Type 89 gun and it developed a muzzle velocity of 2,800 f/s. It was put into production during the latter part of 1943 and, by August 1945, a total of 154 guns had been manufactured. This gun could be traversed and elevated either manually or by power. It was equipped with an automatic loader and fuze setter. Its mount was fixed and the gun had a protective shield. It was designed to receive data from a director by means of a zero reader.

A third weapon produced in this period was the experimental type 150-mm AA gun. Only two of these guns were produced, and they were emplaced to defend the Imperial Palace, Tokyo. This gun had a muzzle velocity of 3,050 f/s with a 97.9-pound projectile. Its maximum altitude was said to be 62,500 feet, and it could develop a rate of fire of 8-10 rounds per minute. Loading and fuze-setting were fully automatic. It was said to have essentially no serious faults for antiaircraft fire except at low angles of elevation or at a very high rate of traverse. With a director designed to take advantage of this weapon's capability, it would have been terrifically effective, without doubt. When the B-29s started bombing from medium altitudes, production of this weapon was stopped because it had been designed for the expected high-altitude bombing by the B-29s.

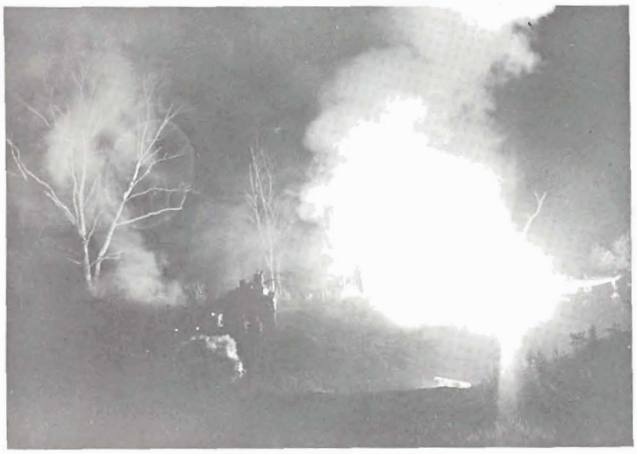


Antiaircraft director Type 97. This director was comparable to the US director M-4.

Japan's production of heavy AA guns showed a progressive increase through 1942 and 1943, undoubtedly their reaction to the damaging effects of the early US bomber operations. It is particularly significant that in March 1944 they cut back production of the 88-mm Type 99 and the 75-mm Type 88 AA guns as well as increased production of the 120-mm Type 3 AA guns. This was probably in preparation for defense against the B-29 bombers, which Japanese intelligence had predicted would be in operation by the fall fo 1943.

Marines of Company M give A Battery and Seabee Detachment personnel a class on patrolling. Each class was followed by a practical exercise.

Communications Sergeant of A Battery gives class on Army communications-electronics operation instructions to Marine and Seabee radio operators.



ATTACK—A red star cluster of smoke signaled the beginning of the attack by the Green Berets [enemy] on the friendly perimeter defenses.

OPERAT
TOTAL

First Lieutenant Th

Soldiers, Marines, Navy Seabees, and Navy Medics from six Reserve units in the Central Ohio area recently pooled their expertise in a unique, first time, joint field problem.

At 0700, Saturday, 20 August 1977, the units formed their personnel from roll call, finished last minute loading, and started their convoy move to the location of A Battery, 2d Battalion, 174th Air Defense Artillery, which is the Armory in Logan, Ohio.

The Marines of Company M, 3d Battalion, 25th Marine Infantry, were the first to join A Battery. The Navy Seabees of Detachment 0520 in Columbus followed, with the Navy Field Hospital, commanded by Cpt James Matson, also of Columbus, arriving at the same time. Officers and men of the Army Reserve of the 2d Battalion, Special Forces [Airborne], and Marine helicopters arrived later in the morning.

The exercise was initiated, written, and coordinated by the author, who is executive officer of A Battery, Logan, Ohio. "To the best of our knowledge, no joint forces exercise of this type has ever been organized on this scale in the state," CPT Victor Smith of A Battery said.

The Operations Order called for A Battery to provide air defense for the ground forces while the Marines established a perimeter around the area where Navy Seabees constructed a service bridge

ON FORCES WELD I

nas A. Grandstaff

for a training project. The problem was conducted in an area in Wayne National Forest, south of Haydenville, Ohio.

Each unit involved gave classes on its specialty to members of the other branches of the service after the formal instruction for the tactical exercises was conducted. WO Toomey of the Marines said, "It is refreshing when units are sharing. The training dollar is very precious these days for Reserve units. There is nothing but constructive results from an exercie like this. We can really stretch our training dollar."

The Aggressors for the problem were the members of the 2d Special Forces Battalion [Green Berets]. Their mission was to penetrate the perimeter, gain information on troop dispositions, then stage an assault to destroy the bridge and capture the Joint Forces Command Post. Using several assumptions about Aggressor air capabilities and direction of advance, our units had to intermix their defense capabilities and coordinate their unit mission to protect the vital areas.

The groups benefited fully from the exercise. This is not a situation you can set up easily. Hopefully, a lot of lessons were learned by everyone on different tactics and from cooperation with different branches of the services. The major problem we had in A Battery was the lack of good radios. We borrowed two portable sets from the Marines just to keep us going. When only three of the eight radios you bring with you work, it makes

Marine Infantry forms up behind an A Battery Duster [M-42 self-propelled weapon] for a tank-infantry assault on objectives held by Army Special Forces.

Marines from Columbus, Ohio, support advance of Infantry during the week-end field problem.

Hostile aircraft being plotted at A Battery command post adds realism to the overall exercise and expands the experience of participants.

Navy Corpsmen separates, tag, and treat wounded for medevac by Marine helicopter.

The "wounded" were actually evacuated by Marine helicopter. Later they were returned to continue the action.

Seabees of Columbus, Ohio, Detachment 0520, manhandle logs for a service bridge. Tested later, the bridge proved serviceable.

it very rough to coordinate with the armor vehicles and the different platoon command posts.

Each unit provided its own transportation, food, and equipment for the exercise. The training site was complete with a Navy battalion aid station staffed by CPT James Matson and 14 corpsmen. The main function of the station was to evaluate and separate casualties for further treatment for any emergency that might arise.

Simulated casualties were tagged and treated, complete with splints and IVs, then prepared for medevac by Marine helicopters. The simulated casualties were flown to the Logan Armory, then picked up by jeep for return to their duties.

After initial positions were secure, the Navy Seabees, under direction of Builder First Class Tom Neviska and Builder Second Class Warren Self, started cutting dead timber and constructing a service bridge across a ravine. Lacking appropriate equipment for more extensive work, they cut and stacked the logs. When the bridge was completed, an air defense self-propelled tank [Duster] was driven successfully across to test the structure. It was sound.

Constant probes continued throughout the afternoon and evening, with the main assault by the Aggressors coming shortly before midnight. Trip flares, booby traps, aerial flares, and muzzle flashes lit the night when weapons fired in a crossfire pattern to repel the Aggressor's attack.

Following the attack, all unit commanders, officers, and senior enlisted members met for a critique of the day's operations and to plan for night patrols and Sunday morning tactical problems. Sunday afternoon the units critiqued the complete field problem. It was agreed that the time was very productive for all concerned and that similar operations would be set up in the near future.

Lieutenant Grandstaff has served as an Air Defense officer since 1973. Prior service includes tours in Vietnam, both military and as a civilian. He is presently executive officer of A Battery 2d Battalion, 174th [AW] [SP] Air Defense Artillery, Logan, Ohio.

the Air force connection

In years past, the friendly air defense community, when seeing an Air Force pilot or crewmember, would jokingly say, "Shoot 'em down and sort 'em out on the ground." This comment was taken good naturedly, as it was intended, and the participants would promptly change the subject. With the advent of modern air defense weapons and the results of the recent Mideast conflict clearly in our minds, the aforementioned salutation has been modified to, "if they fly, they die." This good-natured greeting is no longer taken lightly because it now suggests a most critical consideration- one vital to our success in conflict and our ability to secure the battlefield. Simply stated, the problem is this: until a friendly missile can differentiate between an F-4 and a MiG-21, it is the responsibility of the air defense operator to make the determination.

Positive identification is vital to successful operations in battle. Fratricide, which is the destruction of friendly assets by friendly forces, is a very costly mistake. When a friendly aircraft is lost, the Air Force's ability to support the Army forces is diminished. Not only does fratricide tend to demoralize friendly aircrews, it also increases the cost of battle. The number of our fighting machines is already limited, and if we destroy any of our own systems, we create important advantages for the enemy. We assist him in the attrition of friendly air forces and we expend air defense missiles, which are also limited in number, thus diminishing the threat to his aircraft.

Experience has shown that fratricide is indeed an important problem that we must face. In the past it was generally believed that friendly air forces returning home or operating within range of friendly air defense artillery [ADA] could "pay their money and take their chances" on coming out with an acceptable survival rate. Today, the situation is different. The survival of friendly aircraft is very important because we need them to continue the Air Force's contribution. The effective expenditure of friendly air defense missiles is vital to the ADA mission. Each one we fire against friendly forces is one less the enemy has to worry about.

What all of this leads to is that aircraft identification is the "name of the game." Let's take an example to emphasize the point. Assume that all of our operators can correctly identify at a rate of 95%, a pretty good score. If a friendly aircraft is spotted and identified by eight of these operators, the aircraft's chances of being misidentified by at least one operator is 34%. We are assuming that these operators cannot talk to each other [the IDs are independent events]. If the aircraft is spotted and identified by 16 operators the chances of a misidentification become 56%. In the present deployment concepts of ADA, the chance of friendly aircraft passing over this many friendly operators is quite probable. In a WEAPONS TIGHT environment, this means that 56 of every 100 friendly aircraft are going to be engaged by at least one of these 16 highly competent air defense operators. In this same environment, 56 of every 100 enemy aircraft would not be engaged by at least one of these 16 highly competent operators.

The problem is evident. What must be done? We cannot continue to ignore it because it will not go away. We cannot afford to staff it because that would take too long. What we must do is begin to correct it right now, and this entails a change in training and attitude. Attempts to improve hardware and procedures are underway [TSQ-73, AWACS, etc.] but it will take time for these to become operational. What this article attempts to do is point up the absolute importance of each individual air defense operator and how vital his contribution is to the air battle and to stress the need to learn aircraft recognition and learn it well. We want you to save that missile for a bad guy. We also want that good guy to get through safely so he can continue to support you and your mission.

You can bet that good guy is important. He is just as important as you, the air defense operator, because he is doing or trying to do the same job as you — secure the battlefield so the ground commander can accomplish his mission of defeating the enemy unhampered.

We solicit your comments and desires to help us develop a rationale for future discussions. Please forward your comments to SAFR/USAADS, Box 5188, Fort Bliss, Texas 79916.

PSYCHOLOGICAL WARFARE

Staff Sergeant Richard D. Page

We are at war! At this very instant the United States is fighting for survival. Defeat in this war can be as conclusive as defeat in a shooting war. We stand a good chance of meeting defeat because we are unprepared for warfare as it is being fought this very minute. No bombs are falling, no shells are bursting, no men are inching their way forward through mud and cold. We feel no excitement, no patriotic fervor. But the war is on. We are the targets. We are the victims. We can't necessarily lose our lives in this war, but we can lose much that many of us hold more precious than our lives.

Psychological warfare is being waged against the United States. The United States is not fighting back with any degree of effectiveness because most Americans don't even know the war is on. And if they did, they wouldn't know what to do about it.

Psychological warfare has been in use since the earliest records of man. One of the earliest examples was Gideon's use of lamps and pitchers in the great battle against the Midianites, as told in the seventh chapter of the Book of Judges.

Gideon was outnumbered and on the verge of being badly beaten by the Midianites. The tactics of his time called for one torch bearer for every 100 men. By retaining 300 select men, each bearing a torch and a trumpet, he could create the effect of 30,000.

After positioning his men around the enemy camp at night, he had them show their lighted torches and blow like mad on their trumpets. The Midianites were startled out of their sleep, fought with one another in their own camp, and finally gave up and fled.

The first extensive use of psychological warfare, however, was during and after World War I. During this time, Allied propaganda was directed at the German people through leaflets and pamphlets. It is generally conceded that the Allied Powers' use of propaganda in World War I was more effective than that of the Central Powers. But in World War II, under the direction of Hitler's Minister of Popular Enlightenment and Propaganda, wartime propaganda became a very effective Nazi weapon and its military importance was recognized by both sides.

The definition of psychological warfare has changed many times over the years. Today, it may be defined as:

> ...the planned use of propaganda and other actions designed to influence the opinions, emotions, attitudes, and behavior of enemy, neutral, and friendly foreign groups in such a way as to support the accomplishment of national aims and objectives.

By Strict definition, psychological warfare is neither psychological nor is it necessarily warfare. It is used before war, during war, after war, and at times when there is no war at all. War implies violence, and it is difficult to think of a radio broadcast or a leaflet as violence.

The Commander of US Forces in the Far East and the United Nations Supreme Commander in Korea from 1952 to 1953, General Mark Clark, has written:

> The broad term 'psychological warfare' includes any action that forces the enemy to divert men and equipment from the active front or tie down men and arms in preparation for defense against an attack that never comes. Our amphibious feint off Wonsan [in the Korean conflict] was just such a maneuver. We forced the enemy to expend a great deal of effort in moving a large number of men and much equipment to bolster the defenses of a beach we had no intention of attacking.

The objective of psychological warfare is first to demoralize the enemy, then undermine his beliefs, and lastly, to begin indoctrination of the perpetrator's principles.

Propaganda is the major tool of psychological warfare. It is a kind of communication that attempts to influence the viewpoint and reactions of others, irrespective of the truth of the message. Propaganda is classified by what appears to be its source. White, or overt, propaganda clearly gives its source. Black or covert, propaganda appears to originate from a source other than its true one. Gray propaganda avoids identifying its source. Militarily, propaganda is of two types, tactical and strategic. Tactical propaganda is directed toward the enemy forces in the forward areas, usually with the objective of encouraging surrender. Strategic propaganda is directed at the enemy in his home country to weaken his morale or at Allied countries to sustain their morale.

By the mid-1900s, propaganda had become an accepted and common factor in the direction of governmental affairs. In 1945, our military psychological warfare persuaded the workers in the Mannheim, Germany, factories to leave their benches, using leaflets telling of impending attack. In 1951, in Korea, we told Communist soldiers to surrender, and they did. Today, Castro's Havana radio tells Venezuelans to blow up refineries and Guatemalans to harass their leaders, and there are those in both countries who follow those instructions.

Propaganda is directed to its audience in many different ways. The most effective is face-to-face communication. This may range from two individuals in an informal conversation to group meetings and rallies. The most widely used form of delivery is printed matter such as leaflets, posters, pamphlets, newspapers, and books. Printed matter is disseminated by air-to-ground, ground-to-ground, and surface delivery. One great advantage of printed matter is that it can be read in private.

Tactical propaganda usually employs loudspeaker broadcasts. Loudspeakers are effective in extending face-to-face communications.

The use of radios to disseminate propaganda to long-range audiences has the desired effect of getting messages to the people in a short period of time.

Selection of the form of delivery system to be used in the dissemination of propaganda depends on the delivery system and the message itself. Today, all these types of delivery systems are used.

It appears that the main difference between psychological warfare by Communist countries and that by the Free World lies in the type of propaganda. While Communist propaganda seeks to undermine ideals, beliefs, and confidence in government, ours is more of a counterpropaganda, with a few exceptions.

Communist propaganda is most effective when it is patterned from the historical experience that even the most successful political system sooner or later decays from within—that it is inevitable we will destroy our own government when the people rise up in revolution. This philosophy prompted the Khurshchev statement a few years ago: "We will bury you."

Our failure to respond vigorously may be rooted in our blind belief that we are invincible. We avoid an effective psychological warfare campaign against Communism in the interest of "detente." Most experts agree that United States propaganda efforts should be directed more forcefully against the Communist system; instead, its differences with our own system are being played down. We make virtually no effort to stir discontent within Communist nations. Their people, who have first-hand knowledge of its fallacies, could be fruitful targets of an offensive psychological warfare campaign.

The main message of our propaganda should be that the majority of Americans live happy, comfortable lives because of our freedom, not because of climate, territorial size, or natural resources.

An effective campaign, aimed at informing the Communist people of concepts on political structure, institutions, and personal and national freedom, would surely bring public pressure upon its leaders and would start the trend of change in the concept of Communism and its place in the world today.

The Communists "war" against us continuously; we do not "war" against them. A psychological offensive offers us a chance to win the cold war without nuclear conflict.

Editor's Note: For those engaged in instructional development, the following article, complete with its accompanying tables, can serve as a helpful guide, particularly when determining the best and most effective media selection at least cost for a particular instructional situation.

MAJOR DELBER

How do we—where do we— when do we—should we— can we—or simply, what is the starting point for selecting a medium of instruction? The prodigious amount of material about self-paced, group-paced, block-scheduled, and individualized instruction available, with each proclaiming its merits, often inundates the instructional developer. The questions then arise as to which method to select and how do we select the media to support the instruction?

These questions are faced daily by persons involved in all levels and forms of educational and training development. The degree of involvement depends on the type of instruction and the complexity and sophistication of the educational and training system. The instructional developer has at his disposal a myriad of proven methods and equipment to choose from. To help the developer, there are computer programs under development that will predict the best medium and media selection combinations. However, an important variable that cannot be weighted to predict effectiveness is creativeness. That element remains with the developer.

The purpose of this article is to provide an overview of four common forms of instruction; to use three media groups as a starting point in selecting a medium of instruction; to aid the instructional/course developer in identifying educational technology media; and to set forth the advantages and disadvantages of various media.

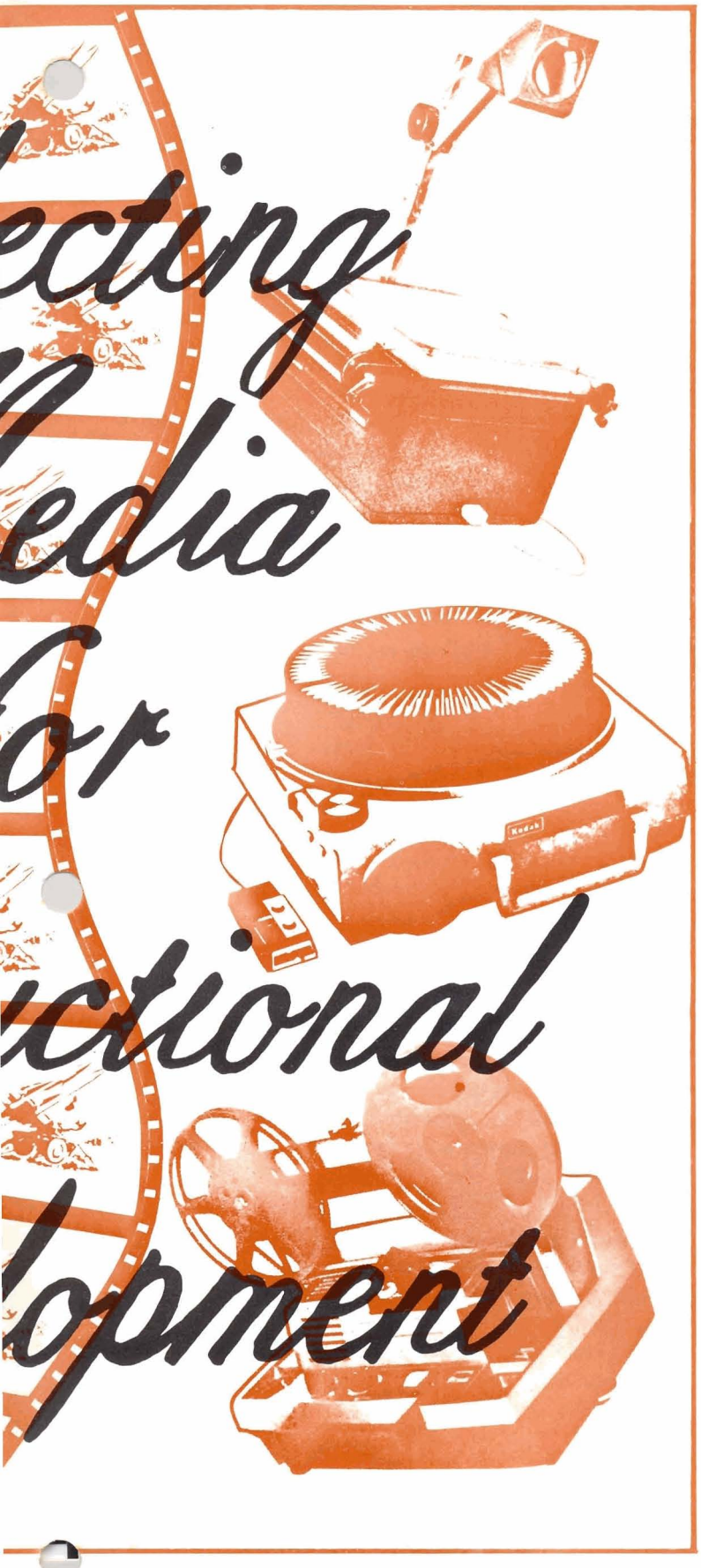
The four forms of instruction addressed in this article are:

Self-paced instruction. Offers all students the same set of learning activities, and all students are expected to accomplish the learning objectives in accordance with established standards, moving at their own pace.

Group-paced instruction. Can be used as a variation of self-paced instruction where more than one student is necessary to carry out tasks that require teamwork or a cooperative effort.

Block-scheduled instruction. Can be used where consideration of economy requires it or where the nature of instruction makes it more practical to schedule it in this fashion—fixed length instruction [also known as lock-step].

Individualized instruction. Is similar to



T W. SHAW III

self-paced instruction in that students move at their own pace through learning activities and take required tests upon demand. The accomplishment of learning objectives in accordance with established standards is the same as in self-paced instruction. Individuals may forego training on subjects or tasks they have mastered or for which they have demonstrated competence.

The forms of instruction should be analyzed to determine which of the following media will be most cost effective, as well as education/training effectiveness for the learning task under development.

The three media groups include:

Verbal presentations. Lecture, lecture with student response, discussion, question/answer periods, problem solving, reports, inquiry method, books, tape, tape with workbook, and workbook/guide.

Sensory presentations. Visual presentations—photographic [stills, slides, and film strips], mosaic, microfilm, and microfiche.

- Motion—16-mm, 8-mm, mosaic, and television.
- Graphic presentations—charts, overhead transparencies, sand tables, chalkboard, magnetic board, felt board, pictures, CAI, cartoons, and picture books.

Combination of visual and graphic.

- Audio presentations—tape, record, radio, and telephone.
- Audiovisual presentations—still-only presentations [slide/tape and filmstrip/tape], motion necessary presentations [16-mm, 8-mm, and television], multipresentations [slide-on-slide, slide/overhead, and slide/motion picture [8-mm]].
- Still-audio presentations—prints-tape, pictures-tape, slides-tape, and filmstrips-tape.
- Simulation presentations—games, role-playing, simulation devices, PCX, video tape, and CAI.

The media selection procedures are:

- Select the form of instruction.
- Select the form of media group that will best support the learning activity.
- Use Table 1 to select the medium that is most effective [training and cost].
- To determine advantages and disadvantages of the media selected, use Table 2.

Table 2

CHARACTERISTICS OF INSTRUCTIONAL MEDIA

MEDIA GROUP A:	MEDIUM:
Audio	Audio Cassette
	[sound only]

Table 1

MEDIA SELECTION MATRIX

CRITERIA \ MEDIUM	Lecture	TM/FM (Book)	Audio (Sound only)	Audio/Print	Programmed Text	Photography Still	Slide (Visual only)	Film Strip	Motion (8mm & 16mm)	Graphic Presentations	Audio-Visual TV	Sync-Slide	TEC	Simulation Device	Actual Item of Equipment				Student-to-equipment ratio	
Currently Available																				
Preparation Costs																				
Reproduction Costs																				
Preparation Time																				
Skills Available (Designers)																				
Display Means Available																				
Maintenance																				
Display means cheaper than real item?																				
Actual Equipment Available (Time)																				
Advantage (State on evaluation sheet)																				
Disadvantage (State on evaluation sheet)																				

TYPE MEDIA SELECTED _____

Advantages

1. Low-cost preparation and duplication.
2. Many creative ideas can be developed.
3. Most suitable for individual use and self-pacing.
4. Most institutions have the capability to produce.

Disadvantages

1. Could be used for lengthy verbal lectures.
2. Not applicable to topics requiring personal verbal interaction.
3. Often requires additional correlated materials for effective learning [see below].

MEDIA GROUP B: Audio/Print — MEDIUM: Workbook and tape

Advantages

1. An adaptable combination that can provide a personalized approach in presenting many kinds of content.
2. Can replace lecture and blackboard diagram-type presentation.
3. Allows the student flexibility in studying [self-pacing].
4. Combination adaptable to study by students at own convenience and location.
5. Can effectively employ programing concept and might replace more complex and costly instructional methods.
6. Other advantages in A above.

Disadvantage

Limited to language and still picture applications.

MEDIA GROUP C: Nonprojected Still — MEDIUM: Photographs and Graphics

Advantages

1. Low-cost preparation and duplication.
2. Can be in forms for individual use of display.
3. Useful for reviewing operating procedures or how-to-do-it steps.

Disadvantages

Often requires accompanying verbal or written directions, explanations, etc.

MEDIA GROUP D: Projected Still — MEDIUM: Slides

Advantages

1. Production and duplication moderate costs.
2. Good medium for reproducing subject in true colors.
3. Relatively easy to revise and update.
4. Adaptable for group or individual use.
5. Projector simple to operate.

Disadvantages

1. Requires moderately expensive equipment for use.
2. Requires projection setup or rear-screen viewing.
3. Rarely used without some accompanying directions, printed or verbal descriptions.

MEDIUM: Filmstrips

Advantages

1. Pictures always in proper sequence.
2. Compact packaging.
3. Duplication in quantity: low cost.
4. Projector simple to operate.
5. Adaptable for group or individual use.
6. Compact viewers inexpensive and suitable for individual use.

Disadvantages

1. Initial production cost: moderate to costly.
2. Production equipment may not be available locally for producing professional quality filmstrip masters.
3. Revision or changes require complete new preparation.
4. Usually used in linear sequence.

MEDIUM: Microfiche

Advantages

1. Most all advantages for filmscripts also apply.
2. Even less costly than filmstrip duplicates.
3. New lightweight viewers provide high degree of versatility.

Disadvantages

1. Requires special viewer.
2. Some people find viewers uncomfortable to use.

MEDIUM: Overhead Transparencies

Advantages

1. For group presentations.
2. Many techniques permit dynamic flexible uses.
3. Projector simple to operate.
4. Number of simple production techniques can be used.
5. Room light at moderate level during use.

Disadvantages

1. Expensive if duplicated in quantity.
2. Bulky for storage in any quantity.

MEDIA GROUP E: Motion Pictures [Silent] — MEDIUM: Super 8

Advantages

1. Can depict reality or animation of subject movement.
2. Strong visual emphasis without verbal interference if proper subjects selected.
3. Adaptable for group or individual use.
4. Projectors semiautomatic in use.

Disadvantages

1. Can have relatively high production costs.
2. Projectors of moderate cost.
3. Transient medium with ideas presented passing quickly.

MEDIA GROUP F: Projected Still Pictures [Sound] — MEDIUM: Slides/Tape; Filmstrips/Tape

Advantage

Narration can cue, direct attention, and reinforce visuals; and test understandings.

Disadvantages

1. If sound not correlated with visuals, effectiveness of program reduced.
2. Loss of synchronization very possible.
3. Does not allow student to replay or review specific parts because of synchronization problems.

MEDIA GROUP G: Projected Motion Pictures [Sound] — MEDIUM: 16-mm/Super 8

Advantages

1. Synchronization is permanent, and student can replay or review.
2. Can be duplicated and converted to video tape.
3. Can often be in exact format for learning reinforcement.

Disadvantages

1. Sound may be used to mask shortcomings in pictures.
2. Equipment for production and use more costly and complex in operation.
3. Film processing required before viewing action.

MEDIA GROUP H: Television — MEDIUM: Video Tape

Advantages

1. Ease of synchronizing picture and sound.
2. Immediate viewing of action.

Disadvantages

1. Equipment costly and extra care must be taken in operating the equipment.
2. Production effects may not meet expectations of administrators.

MEDIA GROUP I: Multimedia — MEDIUM: Overhead/Slide, Slide/Motion Picture, Etc.

Advantage

Employs unique characteristics of appropriate medium as required.

Disadvantage

Careful planning and synchronized use necessary.

The final measurement of effectiveness is: How well does the program meet the teaching objectives; has the program remained within cost constraints; and does it provide the student with information in a manner in which he can learn? If an orchestration of equipment and methods is performed in a totally cost-effective environment without creativeness, it will produce an undesirable end product. The prudent mixture of equipment, methods, and individual creativity should produce the desired product. The task given to the instructional/course developer is no trivial matter—he must use everything he has at his disposal to accomplish his job.

Major Shaw is a graduate of the University of Nebraska at Omaha and holds a Master of Science in Education and Doctorate of Education from East Texas State University. He is presently serving as Chief, Extension Training Branch, Directorate of Training Developments, US Army Air Defense School at Fort Bliss, Texas.

WHAT DO YOU DO NOW,

LIEUTENANT?

Prepared by Tactics Department, USAADS

SITUATION:

Lieutenant Brown, recently assigned to B Battery, 4th Battalion, 7th Air Defense Artillery [Hawk], had reported to the battery commander, who wanted to discuss a training project. Captain Parker greeted him and got right down to business. "John, you have been at the Air Defense School more recently than any of our other lieutenants, so I've chosen you to help with some special training I've been concerned about. It involves the battery's knowledge of countersuppression measures. With so much emphasis on weapons performance, we sometimes neglect the importance of battlefield survival.

"With the enemy having so many ways to locate us [aerial photography, ground and airborne electronic sensors, ground and airborne observers, and ground and airborne infrared sensors], he has a good chance to suppress or destroy our capability to function by using ECM, indirect fire, direct fire, and air-to-surface weapons. I'm confident our people know how to counter ECM and air attacks, but I don't think they know enough about other countersuppression tactics. What I want you to do is prepare an outline of instruction emphasizing practical measures we can take to accomplish three specific things: prevent the enemy from locating us, try to prevent him from delivering his ordnance, and minimize the damage to the battery if he does find us and deliver his ordnance. Tomorrow, let me see what you come up with."

SOLUTION:

Lieutenant Brown decided to break his outline into three areas based on the categories of countersuppression measures taught at the US Army Air Defense School:

- Emission control techniques.
- Deception techniques.
- Deployment/operational techniques.

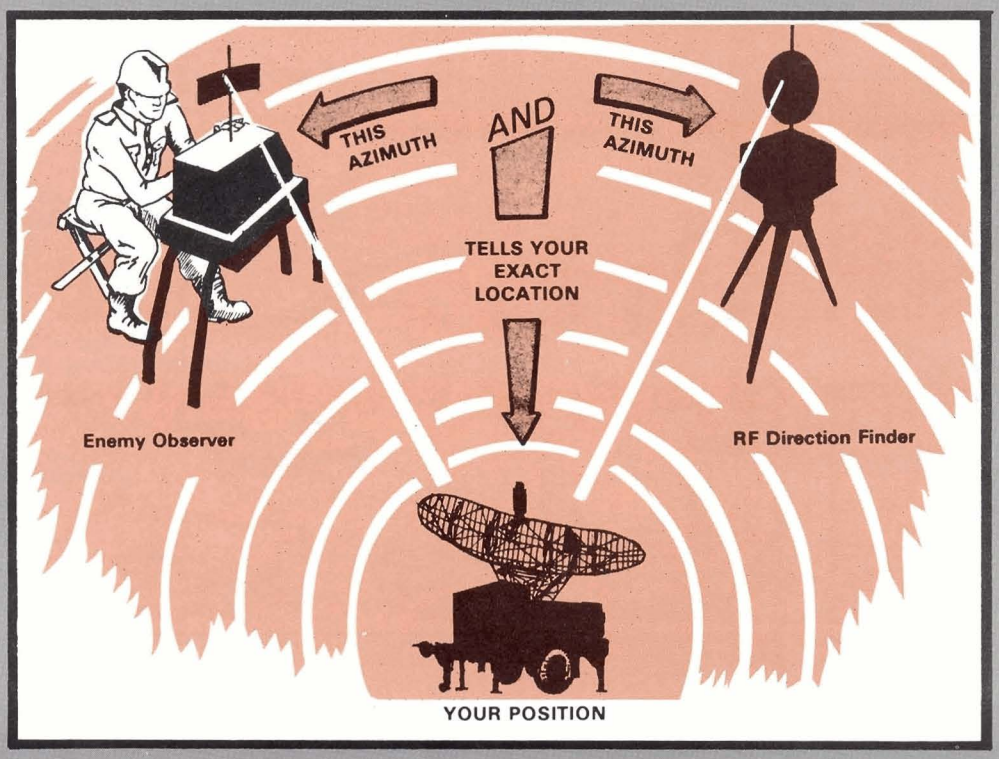
After developing these three areas, Brown listed the major considerations:

- The techniques must be practical and based on current capabilities.
- They must be easily understood.
- The techniques in each area should be listed in the order they should be applied because time on the swift-moving battlefield will be of utmost importance.
- The techniques must counter all of the options available to the enemy and be mutually supporting to protect the battery.

The next day, Lieutenant Brown presented the following outline for his countersuppression measures class to Captain Parker, pointing out that each area would be expanded upon during the presentation:

I. EMISSION CONTROL TECHNIQUES

A. The enemy can locate us with electronic direction finders that tune in our radio and radar transmissions and with infrared sensors that detect heat from generators and vehicle engines, cookstoves, space heaters, etc. Therefore, we must:



Through electronic intelligence [ELINT] electro-magnetic emissions can give away the location of the best camouflaged and concealed position.

1. Minimize transmissions into enemy territory by using dummy loads or other nonradiating modes as much as possible during radar maintenance checks. If the radar must radiate during checks, turn the antenna parallel to the FEBA.

2. Keep the radar off the air as much as possible.

3. Enforce radio silence as much as possible.

4. If possible, site radios so that high ground or buildings are between the transmitter and the enemy.

5. Emplace heat-producing equipment below ground or where its hot parts and exhaust are concealed from direct "view" by enemy infrared sensors.

II. DECEPTION

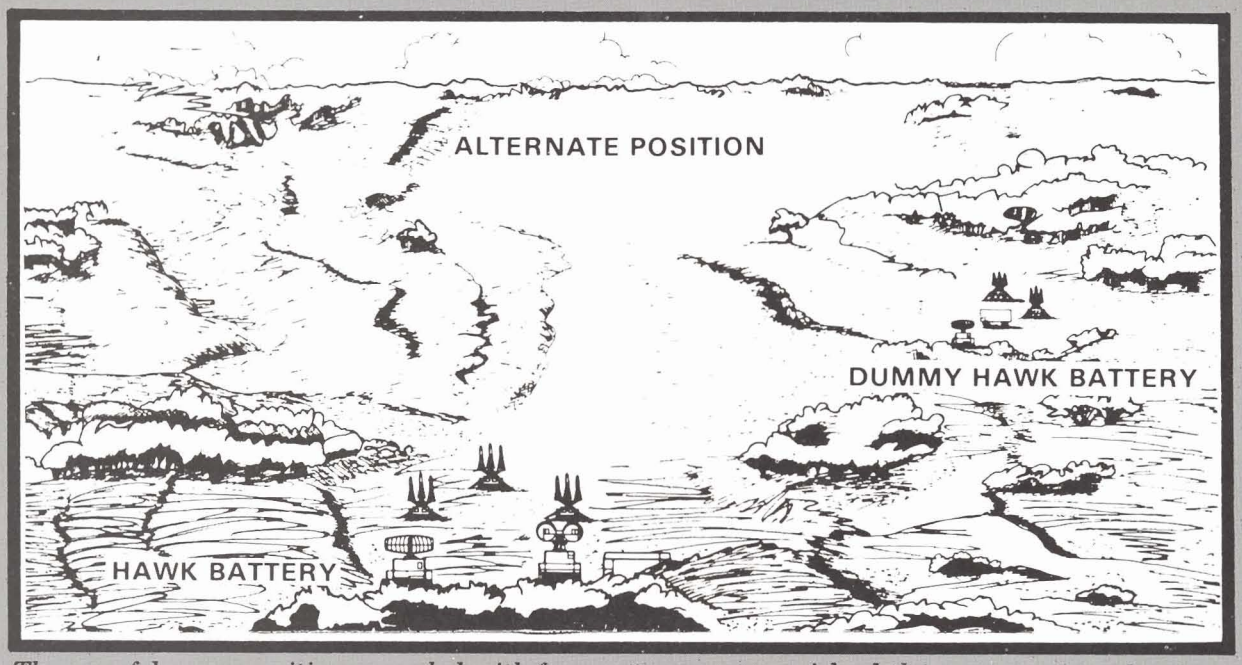
A. Deception, particularly when combined with frequent movement, is an effective way to deny the enemy knowledge of your actual position. The enemy can be deceived by realistic dummy positions. Dummy positions are positions equipped with decoys [facsimiles of real operational equipment] that are emplaced as the real system would be. Decoys can be as simple as boxes; framework and netting; or they can be as sophisticated as battle-damaged/non-repairable real equipment.

III. DEPLOYMENT/OPERATIONAL TECHNIQUES

A. Dispersion: Equipment should be emplaced at maximum cable length consistent with ground security requirements. Linear positioning of major items [radars, launchers, vans, etc.] should be avoided. Platoons should be dispersed up to 10 kilometers away from the battery-minus, consistent with security and control requirements.

B. Camouflage and Concealment: The most important means of avoiding visual detection is through camouflage and concealment. The idea is to take every advantage of the terrain and vegetation to conceal yourself from direct observation by the enemy and to use camouflage to blend into this natural background. The keys to success lie in the reduction of contrast and the disruption of the regular lines of man-made objects. Giveaways are vehicle tracks, reflections from metal and glass surfaces, litter, fresh soil from recently dug positions, and poor light and noise discipline.

C. Revetting: Fortifications are a means of survival if your countersurveillance measures fail and you come under attack. Preparation of field fortifications requires time and manpower. Hasty fortifications for mission-essential equipment and for battery personnel should be constructed immediately upon becoming operational. When emplacing major items of equipment, take advantage of natural revetting offered by the



The use of dummy positions, coupled with frequent moves, can mislead the enemy as to where you are.

terrain. Mounds of dirt, large rocks, sand dunes, reverse slopes, and terrain folds can provide quick protection. Once in place, troops should continue to improve the position by constructing earth or sandbag revetments or by digging equipment in. Again, don't forget the importance of camouflaging the concealed revetments.

D. Movement: One of the most effective means of denying the enemy knowledge of your position is through frequent movement. Movements should be made at night or during inclement weather and should be covered by another battery or platoon. Movement to an alternate position will be considered:

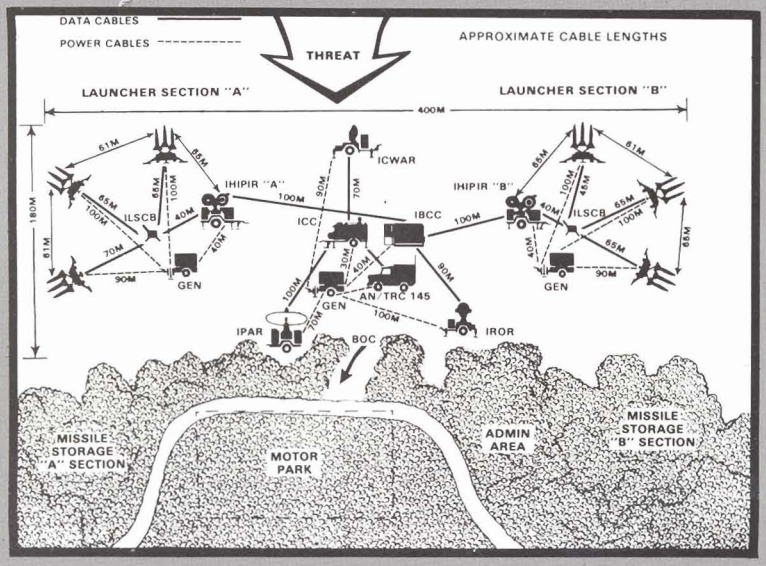
1. If there has been a recent enemy air reconnaissance of the area.

2. After engagement.

3. If the site is fired on.

4. When the position has been occupied for 8-12 hours.

There is no set formula for use of mobility, camouflage, field fortifications, and countersurveillance measures that can be applied to all situations. However, application of these fundamentals of survival during each situation will insure maximum chances of survival and mission accomplishment.



Dispersion reduces the possibility of detection and enhances the probability of survival of personnel and equipment.

After going over the outline with Lieutenant Brown, Captain Parker commented "Good job, John, you have covered all of the points. Hand out copies of TC44-1-1 for study before and after the class, and don't neglect your training aids. I'm scheduling the instruction for 2 weeks from Friday."

In ceremonies on 3 November 1977 at Boeing Aerospace Company, Brigadier General Frank P. Ragano, US Roland Project Manager, accepted the first US Roland fire unit. The first missile was accepted from Hughes Aircraft Company [prime contractor for the entire US Roland system] 2 weeks earlier at their Tucson facility. In this case, the term "accepted" means the US Army is accepting the missiles and fire units from the contractor for extensive testing before introduction into its defense armament arsenal.

The US Roland technology transfer, fabrication, and test [TTF&T] program marks the first attempt by the US to produce a major European-designed weapon system for deployment with the US Army. It is also a milestone in the history of mutual defense among Allies. Moreover, it shortens the research and development program by 3 to 4 years, saving the American taxpayer an estimated $500 million.

At the formal turnover in November, General Ragano said that standardization is a success story — with this system, interchangeability and interoperability with European Roland units are a reality.

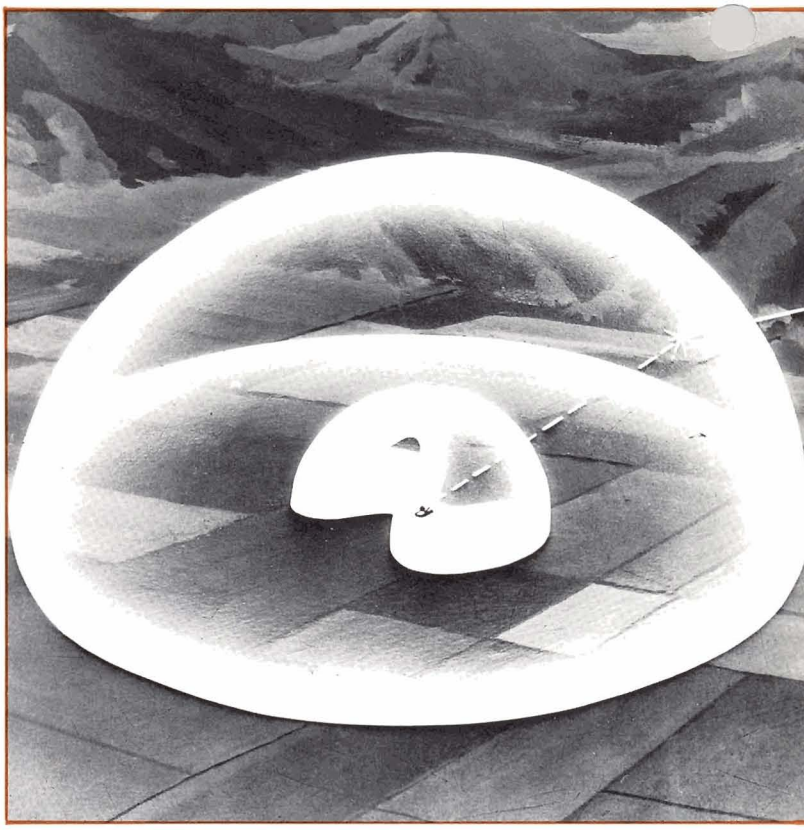
On 14 December 1977, at the French Test Center [Centre D'Essais Des Landes], Biscarosse, France, the first US Roland guided missile was fired successfully from a Europen [German SPZ] Roland fire unit. An hour later a second US-produced Roland missile was launched successfully and all test objectives were met at both firings. This test is an important milestone in the US Roland program, an encouraging indicator that the transfer of European technology has been successful.

Interchangeability will be demonstrated throughout the TTF&T program. Firings of four US-produced missiles from European-built fire units and four European-produced missiles from US-built fire units are scheduled. Approximately 100 [60 US and 40 European] missiles are scheduled to be fired in Europe and the US over the next year. Further, the fire unit is built to metric specifications, using translated engineering documents and blueprints. More than 110,000 such documents were translated, over-coming language barriers through international cooperation unknown since the formation of NATO's 15-nation Air Defense Ground Environment mutual defense organization. This effort has resulted in approximately 550 out of 600 field-replaceable parts being designated as interchangeability candidates. The US Roland weapon system consists of a fire unit module and 10 missiles, 2 rounds on the launch arms and 8 ready rounds [4 in each of 2 rotating magazines on each side of the module]. The fully traversible turret [360°] provides the platform for the launcher arms, surveillance and tracking radars, and the optical sight. This self-contained module is mounted on the M109R tracked vehicle for mobility. However, the module alone can be transported by a C141-class aircraft or heavy lift helicopter and operated from ground emplacements if needed.

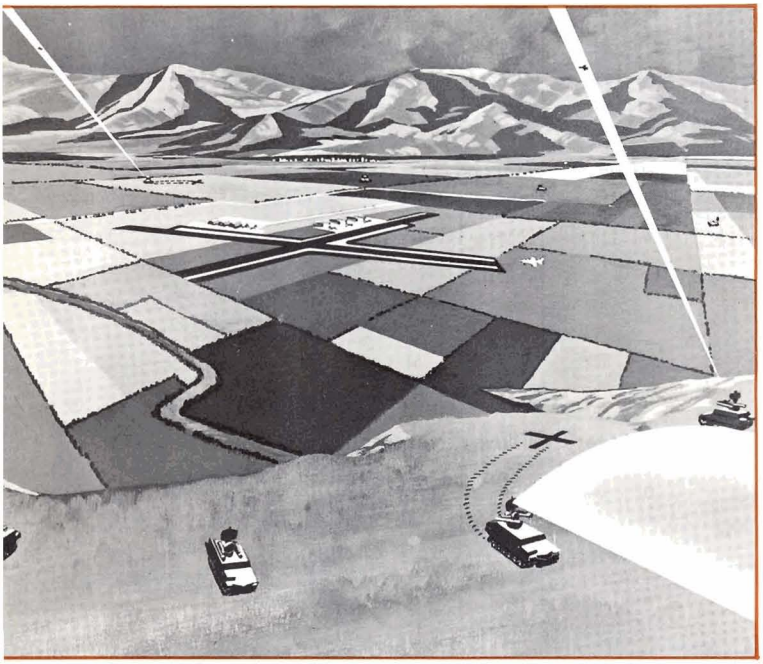
Roland is being procured to protect ground troops, armored columns, air bases, and large logistical complexes from low-altitude attacks. Roland will also give our troops a capability they do not now have—effective, all-weather, short-range air defense.

The entire program is under direction of the Army Missile Research and Development Command at Huntsville, Alabama. A TRADOC System Manager [TSM], COL Joseph L. Hunter, has been appointed for Roland. He is responsible for training, logistics, and personnel support applicable to the user's requirements.

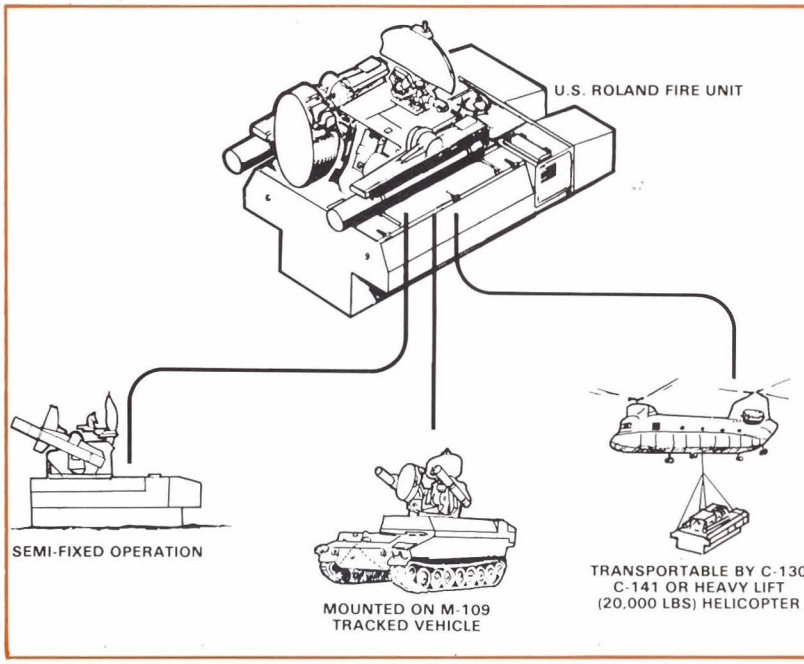
The fire-unit module mounted on the M109R tracked vehicle. A fully traversible [360°] turret provides a platform for the launcher arms, surveillance and tracking radars, and the optical sight.



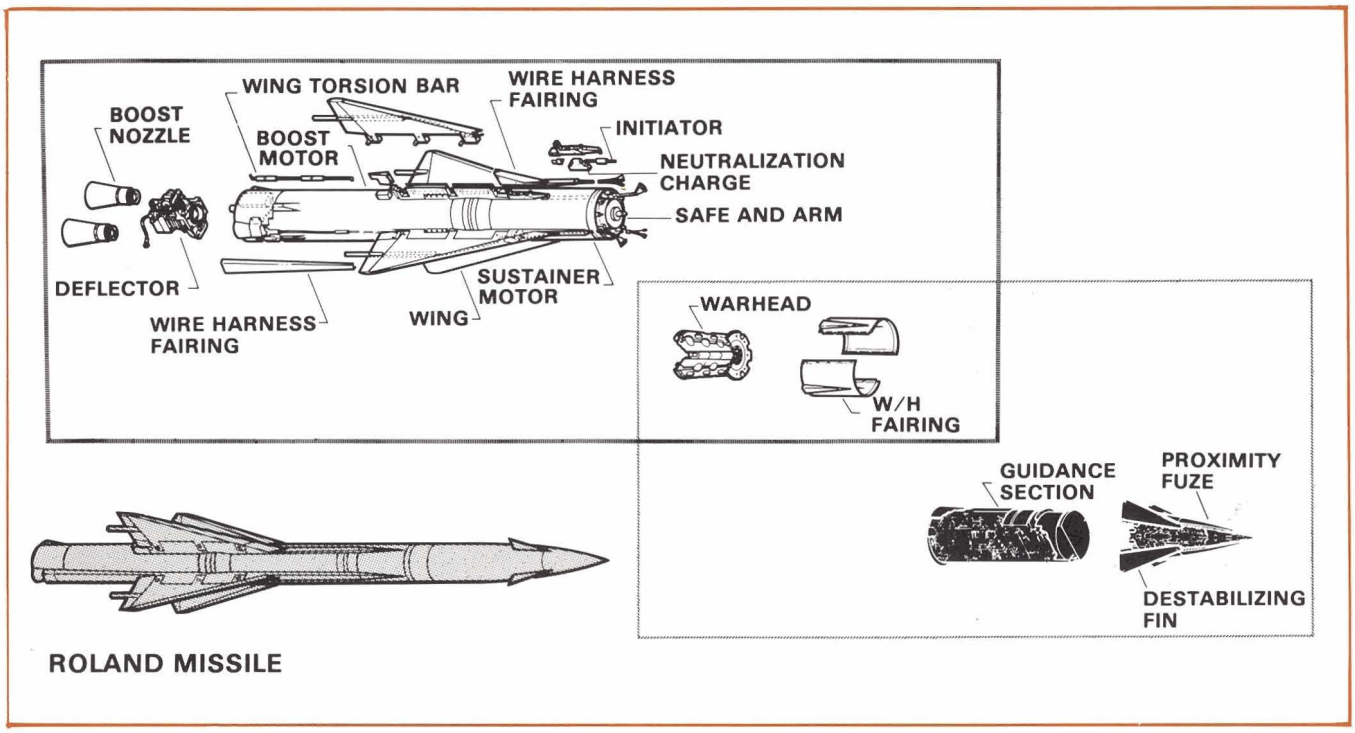
The protective envelope of the US Roland system extends to more than 6 km in range and up to altitudes greater than 3 km.



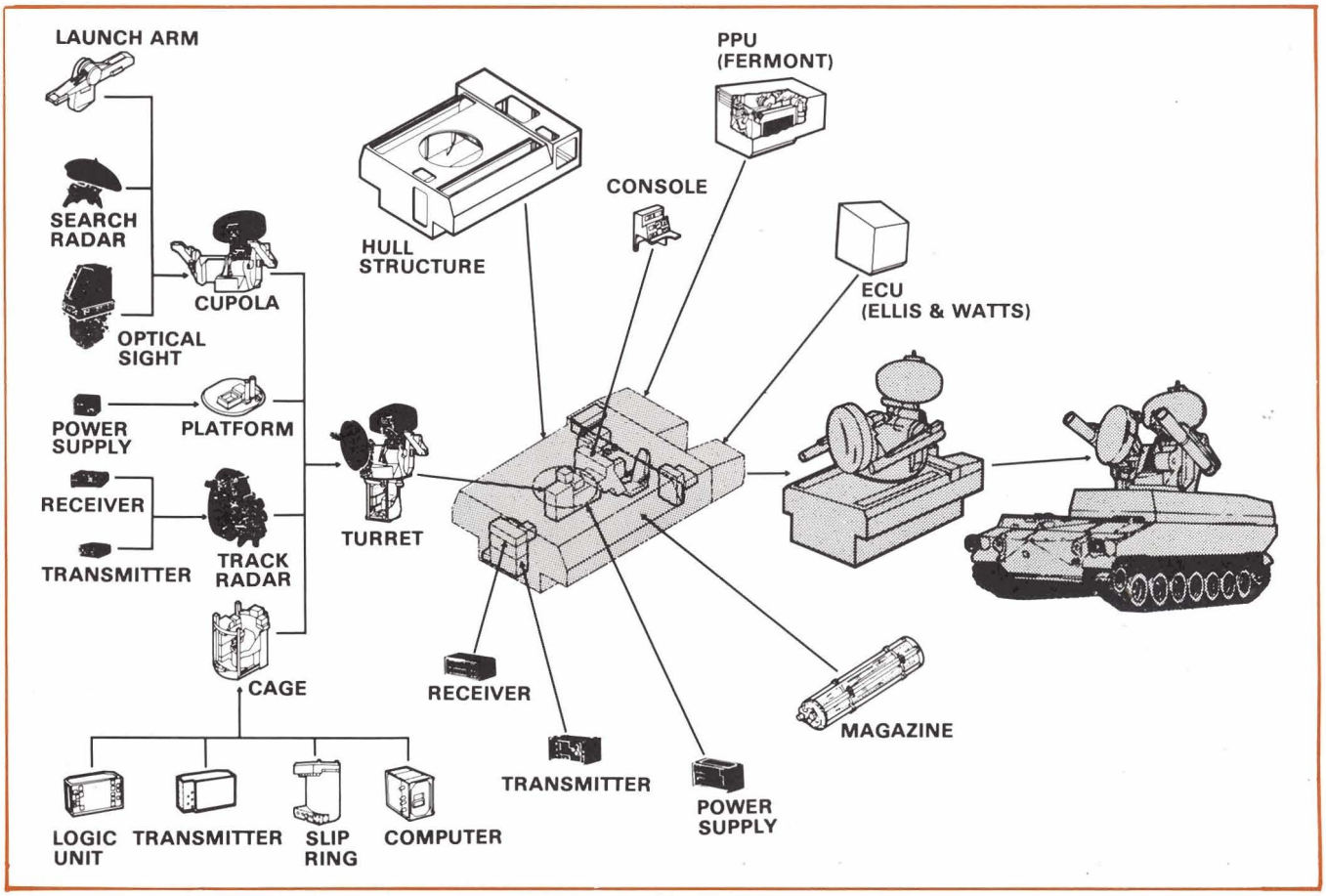
Artist's concept shows the US Roland deployed to protect an airfield.



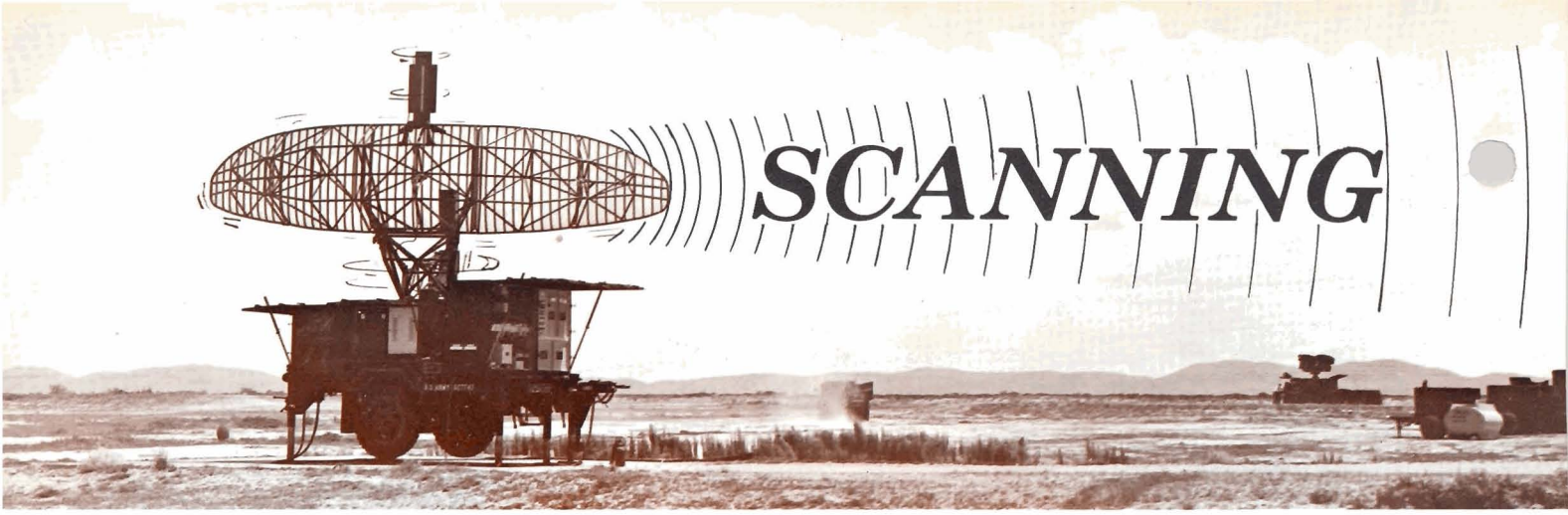
The US Roland fire unit has versatility in application.



A break out of missile components.



A break out of major fire unit components.



VULCAN TRAINING SUPPORT SYSTEMS

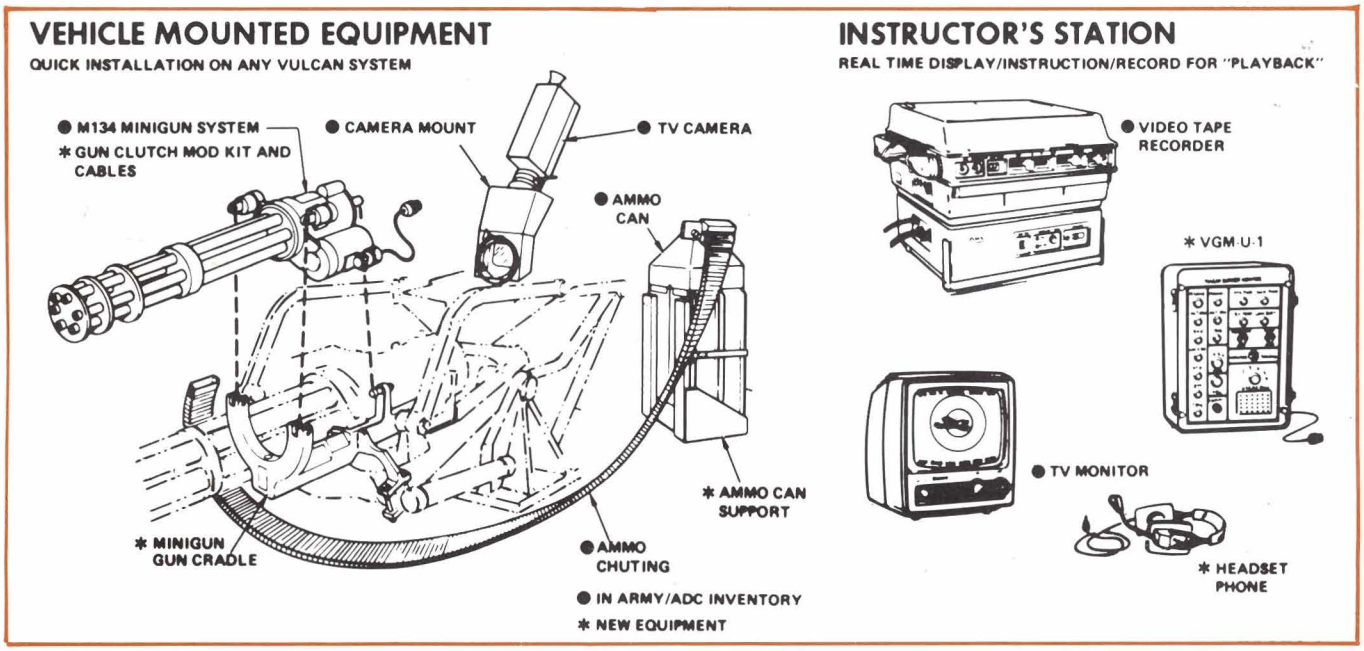
The US Army Air Defense School [USAADS] recently completed a comparison of the effectiveness of two potential Vulcan training support systems, the M10 Vulcan gunner tracking evaluator [VGTE] and Vulcan training system [VTS]. Test results indicated that the VTS significantly increases Vulcan gunner effectiveness when compared with both the VGTE and current Vulcan training practices.

The VTS is composed of four major components, three of which are standard in the Army inventory [see Figure Below]:

- Mini-VADS, the standard 7.62-mm minigun, M134, complete with a 3,000-round ammunition storage and handling system.
- The television trainer [TVT] currently issued to each Vulcan air defense battalion.
- The radio-controlled miniature aerial target [RCMAT], currently being procured under a DA-approved Letter Requirement. An interim distribution of 3,000 RCMATs has been completed Army-wide.
- The Vulcan gunner monitor unit [VGMU] monitors and displays the specific operations performed by the gunner during an aerial engagement. The VTS operates by allowing engagement of the RCMATs with the 7.62-mm minigun in lieu of the 20-mm cannon. All indications to the gunner appear the same as they would in a normal engagement. Testing has shown conclusively that firing the minigun against the RCMAT does correlate with full 20-mm firing against a high-performance aircraft.

The TVT system, in conjunction with the VGMU, allows for constant monitoring of all gunner actions and for constant communications between the gunner and instructor to allow on-the-spot corrections and playback critique of gunner performance.

As a result of the VGTE/VTS evaluation, USAADS has initiated action for procurement of VTS. A Training Device Letter Requirement is currently being staffed for approval by Department of the Army.



FAAR FIELD TRAINER/EVALUATOR

Since deployment of the forward area alerting radar [FAAR] [AN/MPQ-49] in FY 73, a continuous effort by the US Army Air Defense School [USAADS] has been on-going to promote more effective on-site operator training. Opportunities for live-target training in many areas are limited and the lack of ECM environmental training has been a major concern.

USAADS is currently examining a relatively low-cost, portable field trainer/evaluator [PFTE] that is capable of challenging FAAR operators with scenarios that exercise the full range of FAAR capabilities. The PFTE will have 64 1-hour canned scenarios that provide for progressively more difficult training as the skill of the operator increases. Also, the PFTE can be locally programed with a 1-hour scenario that will simulate the threat as it exists on site, including masking and ECM. A test conducted 3-5 May 77 at Fort Bliss demonstrated that the PFTE can be programed and used to standardize FAAR operator SQTs worldwide.

The PFTE itself weighs less than 35 pounds and will be fully contained in a case 16 by 12 by 10 inches. The power requirement is less than 100 watts, using the same power source as the FAAR. The PFTE needs only one cable connection to the FAAR. It can be integrated into the FAAR system while the FAAR remains fully operational. Simulated target video is indistinguishable from live target video. A maximum of 64 targets can be displayed per scenario with a maximum of 8 simultaneous targets. Target velocity can be varied up to Mach 2 with a capability of 0-10 G turns. IFF, masking, and ECM can all be simulated.

The only scheduled maintenance is periodic cleaning of external surfaces. Mean-time-between-failure [MTBF] is estimated at about 10,000 hours, with repairs being accomplished by the unit [using built-in fault isolation] and replacement of one of only seven modules.

The need for a device such as the PFTE is apparent. Funding is currently being sought to purchase a limited number of units to verify the reliability and maintainability predicted by the manufacturer.

ARTS

The Department of the Army has formed a study group, with Brigadier General Rick Brown as director, to evaluate Army training. The evaluation is formally labeled the Army Training Study [ARTS] and has two main goals: first, to determine the relationship between training resources and combat effectiveness and, second, to determine training programs required to optimize the capabilities of major new weapon systems of the 1980's. Specific weapon systems, such as Redeye, TOW, and the M60A1, were selected for analysis. Collective and individual training conducted at service schools and in units will be examined and analyzed.

Redeye was selected for the study because valuable data had already been gathered during the Redeye Weapon System Training Effectiveness Analysis [WSTEA] conducted between April and August 1977. The Redeye WSTEA assessed the effectiveness of institutional and unit training programs as they relate to gunner proficiency. The major conclusions of the WSTEA were that Redeye firing doctrine should be simplified and for units to maintain Redeye proficiency at an acceptable level, training must be standardized, increased, and scheduled at regular intervals. The TRADOC System Analysis Activity [TRASANA] conducted the WSTEA at the request of USAADS.

Continuing where the Redeye WSTEA concluded is the USAADS System Work Team [SWT], composed of personnel from the Directorate of Evaluation and TRASANA. The SWT will collect and analyze data in the following areas: Redeye gunner proficiency in AIT and in the unit, status of unit training, Redeye integrated in war models, status of reserve training, and relation between war models and combat effectiveness.

The Redeye System Work Team is currently preparing the study plan for gathering information that will include visits to Redeye units worldwide. In addition, personnel from four AIT Redeye classes are currently being evaluated, and their progress as Redeye gunners will be checked after they have received training in their units of assignment.

The end result of the Army Training Study will be the development of an efficient, achievable, and justifiable training system for the Army of the mid-1980's. To achieve this result, system work teams Army-wide require the assistance and cooperation of all units designated to support data gathering activities.

AIR DEFENSE PRIORITIES

The US Army Air Defense School [USAADS] recently submitted to Training and Doctrine Command the air defense priorities for the program years 1980-83. The priorities established were based on adherence to the family deployment concept, production and fielding schedules, present system capabilities, and air defense requirements to counter the mid-1980's threat.

7TH ADA IN JTX

Members of the 1st Bn, 7th ADA, from Fort Bliss, Texas departing a C131 aircraft at Fort Irwin, California in preparation for DEVIL STRIKE JTX.

The 1st Bn, 7th ADA, 11th ADA Group, Fort Bliss, Texas, is providing air defense combat support for Exercise DEVIL STRIKE, a joint training exercise at Fort Irwin, California. DEVIL STRIKE is designed to provide realistic training for soldiers, airmen, and marines.

According to Exercise officials, the entire joint exercise will be conducted under the most realistic war conditions that can be applied during a peacetime operation.

Field activity includes day and night operations, landing logistics, and close air support with live firing from Air Force and Marine aircraft. Live artillery fire will also be delivered. The Air Force will employ A-10 aircraft specifically designed for close air support missions. The Marines will use Harriers. The Harrier is a short-takeoff, landing [STOL] jet that can make veritical takeoffs and landings, yet operates at jet speeds when airborne.

Participating in the JTX are units of the 1st Infantry Division from Fort Riley, Kansas, including the 1st Bn, 5th Field Artillery, and units of the 1st Battalion, 504th Artillery [Airborne], from Fort Bragg, North Carolina.

AIR DEFENSE Magazine will report on the results of the exercise in the April-June 1978 issue.

BOLD EAGLE '78

The 1st Bn, 55th ADA, Fort Bliss, Texas, participated with its parent unit, the 5th Inf Div [Mech] from Fort Polk, Louisiana, in Exercise Bold Eagle 1978 in the vicinity of Eglin Air Force Base, Florida.

Bold Eagle '78 was a major Joint Training Exercise involving elements from the Army, Navy, and Air Force and was directed by the Joint Chiefs of Staff.

The purpose of the exercise was to improve joint operations, exercise abilities to deploy major units, and to reaffirm capabilities to command and control combined arms teams. The Fort Bliss-based Chaparral/Vulcan unit provided effective low-altitude air defense coverage for the 5th Inf Div during the readiness exercise.

ENLISTED CAREER NEWS

MICROFICHE PERSONNEL FILES

Microfiche copies of official military personnel files [OMPF] are being mailed to soldiers whose records have been converted to the miniature sheets and copies will be mailed to other soldiers as theirs are converted.

The OMPF microfiche copies, measuring only 4 by 6 inches, have been converted for E-8s and E-9s with officer and E-7 files scheduled to be completed by the end of this year. E-6 records are also scheduled to be converted by the end of this year with E-1 through E-5 records completed by late 1979.

Each soldier will receive a free copy of the microfiche file and will have 1 year to correct errors and an opportunity to purchase additional copies of microfiche and original files.

The conversion from paper documents to microfiche files is designed to cut time and money costs from the present system. In addition, it allows duplicate copies to be stored at an alternate site to safeguard against loss or damage.

The microfiche system, which will eventually be used for reserve files as well, can miniaturize up to 98 documents on the small sheet of plastic, including photographs. The average enlisted file contains 51 pages of standard size paper documents, and the average officer file contains 166 pages.

Each soldier will have two sheets of microfiche on file, one labeled "P" fiche for performance and disciplinary data and one labeled "S" fiche for service and administrative data. Some soldiers will also have an "R" fiche containing restricted documents, such as Army Board, for the Correction of Military Records cases. Personnel centers worldwide will maintain viewers that magnify the sheets to 24 by 48 inches.

WEST POINT PREP SCHOOL

The US Military Academy Preparatory School [USMAPS] at Fort Monmouth, NJ, is now accepting applications for the class of 1978-79. The basic eligibility requirements are simple. An applicant must be:

- A citizen of the US or become a citizen prior to entering the Military Academy at West Point.
- At least 17 and not over 21 years of age on 1 July of the year he enters the preparatory school.
- Unmarried and have no legal obligation to support a child or children.
- In good health, have no disqualifying physical defects, and have vision correctable to 20/20.
- A high school graduate, or the equivalent with a solid academic background. Ideally, applicants should have 4 years of English and 3 years of college preparatory mathematics. An individual with obvious leadership potential and a weaker academic background should not be discouraged from applying since many other factors are considered.
- Applicants should be highly recommended by their commanders, counselors, and teachers.

Applications must be received by the preparatory school not later then 1 June 1978.

Anyone seeking further information should call the USMAPS Admission Officer at AUTOVON 992-1807 or commercial [201] 532-1807, or write to the Commandant, US Military Academy Preparatory School, ATTN: MAPS-AD-A, Fort Monmouth, NJ 07703.

Career enlisted personnel who meet the foregoing qualifications are encouraged to take advantage of this excellent opportunity.

HANDICAPPED DEPENDENTS

Soldiers with handicapped dependents will receive special consideration for assignments and transfers under a new regulation effective in January 1978. Soldiers in grades E-4 with more than 2 years service and E-5s and above are eligible for special consideration of their dependents who are handicapped, according to AR 614-203. Among the handicapped needs that will be considered are treatment, education, therapy, training, and any counseling that dependents may require. The purpose of the special assignment consideration is to avoid emotional or financial hardships that may exist for handicapped dependents in some areas. The regulation requires that the nature of handicaps revealed in applications be kept strictly confidential.

Although dependent needs will be given every consideration during the assignment process, the needs of the Army will ultimately prevail. Soldiers assigned to short tour areas and other locations where dependents are restricted will not be considered under the new regulation, although they do qualify for special consideration on return assignments.

The policy does not allow requests for deferment or deletion of assignments, only special attention before orders are actually issued. Compassionate and other requests for reassignment or deferment are allowed under AR 314-30, along with AR 614-101 [for officers] and AR 614-200 [enlisted].

ARMY HUSBAND/WIFE TEAM

Surprise orders can be a real surprise, if not upsetting, for Army married couples if the husband is ordered to one oversea location and the wife is ordered to another. But such a situation can be prevented by checking block 34 on the Enlisted Personnel Record [DA Form 2]. If it shows code "L," then that first step hasn't been taken—the step of reminding DA that one service member is married to another service member. Block 34 should read "H" to let HQ DA know about the marriage situation.

Chapter 3, Section III, AR 614-200 tells Army couples how to apply for reassignment if orders have already arrived. If only one has assignment instructions, the application is fairly simple and stands a good chance of being approved, provided there is a vacancy in the spouse's grade, MOS, and sex in the area of assignment.

If both have oversea assignment orders, the importance of correct records is vital because one assignment order will have to be changed to coincide with the assignment of the other.

Having compatible MOS [such as MOS that normally have several authorized in a company or battalion] improves the chance of staying together. Low density MOS don't help, since they normally have only one or two authorized at company or battalion-size units.

IMBALANCED ASSIGNMENT CHANGES

Units with too many or not enough soldiers qualified to fill certain positions will receive priority consideration for adjustment and some soldiers will receive retraining under a program that began last December.

Soldiers with MOS in the Improved Hawk weapon system will be assigned under a test program to increase readiness and reduce a common problem among first-termers serving most of their enlistment overseas. An Army-wide program will be developed from the initial test program and is expected to begin late this year.

The Space Imbalanced MOS [SIMOS] Program will assign soldiers overseas in their primary MOS at all times. Soldiers returning from overseas and without available stateside primary MOS positions will be assigned in secondary MOS positions.

The program also includes granting Guardsmen and Reservists an opportunity to serve on active duty in the imbalanced MOS. Another goal of the program is to allow soldiers to serve 2 years in a stateside assignment before returning overseas.

RETIREMENT POLICY CHANGE

Soldiers who have an already scheduled retirement date, and E-9s serving overseas, are affected by recent changes in personnel policy. Those who received assignment instructions for an unaccompanied oversea tour on or after 1 January 1978 will be required to serve at least five-sixths of the tour, or for a period of 12 months, whichever is longer, before retiring. Soldiers currently serving overseas or who received orders before 1 January are not affected by the change.

Also effective 1 January is a requirement for E-9s serving overseas to have retirements cleared by DA prior to field approval. Applications may be submitted 8 months in advance of requested retirement date. Military Personnel Center has also established a system of providing written acknowledgement of alerts for assignments involving soldiers with 19½ years' service. The system provides for application for retirement in lieu of reassignment.

BARS to STARS

OPMD UPDATE

WHITE HOUSE FELLOWS PROGRAM

The White House Fellows Program offers a unique opportunity for a young person who is a citizen of the United States. Each year the President's Commission on White House Fellows selects approximately 15-20 individuals from all sectors of our national life—the professions, business, government, the arts, and the academic world—to serve for a 1 year period as special assistants on the White House staff or with cabinet officers. These gifted and highly motivated young Americans gain firsthand experience in the process of governing the nation and a sense of personal involvement in the leadership of the society. Since the program began in 1965, 17 Army officers have been chosen as White House Fellows.

In the most recent competition period, two Army officers were selected from approximately 3,000 civilian and military applicants to be 1977-1978 Fellows.

Army personnel desiring to compete in this program must first request permission to compete, in accordance with AR 621-7, "Acceptance of Fellowships, Scholarships, or Grants." Interested Army personnel should submit their "Request to Compete" through channels to their career division at MILPERCEN so as to arrive not later than the first week in September 1978. Selection will be limited to individuals who have demonstrated unusual ability, high moral character, outstanding motivation, and a broad capacity for leadership; show exceptional promise for future development; and are dedicated to the institutions of the United States. Additional recommended qualifications for individuals are those who possess a strong academic background, normally including a graduate degree; are qualified in their primary specialty; and possess a record of overall outstanding manner of performance.

Upon receiving approval to compete from Headquarters, Department of the Army, individuals should then submit their White House Fellows application directly to the Commission on White House Fellows, The White House, Washington, D.C. 20500. Application forms and full particulars will be mailed to those personnel granted permission to compete. The deadline for the submission of applications to the Commission for the 1979-1980 program has not been established but should be in the October-November 1978 time frame. Final selection of program participants will be made in May 1979, and the fellowships will begin in September 1979.

WO MOS MANUAL

Department of the Army has approved the revised AR 611-112, Manual of Warrant Officer Occupation Specialties. The new regulation should have reached the field sometime during late fall, 1977 with an implementation date of 1 April 1978.

The new regulation gives a clearer identification of warrant officers in most specialties as middle managers responsible for technical functions in their areas of specialization. A feature of the new regulation is the consolidation of several current military occupation specialties, reducing the number from the current 86 to 59. Care has been exercised to retain identification of all valid and previously documented skills. This was accomplished through the revision of current, and creation of new, special qualification identifiers [SQIs] and additional skill identifiers [ASIs].

The revised AR 611-112 will also apply to the Army Reserves and the Army National Guard. AR 611-113 and AR 140-135 are being superseded. Some of the new warrant officers' MOS of interest to the air defense community are:

- 211A Target Acquisition Radar Technician.
- 221B Missile Assembly Technician, Nike.
- 222B Missile Fire Control Technician, Nike.
- 223B Missile System Technician, Improved Hawk.
- 224B Short-Range Air Defense Systems Technician.

DA Circular 611-58 will be published in the near future to provide commanders and personnel officers guidance for the implementation of the revised warrant officer MOS structure.

ACADEMIC EVALUATION REPORTS

Policies and procedures for preparing Academic Evaluation Reports [AR 623-1] were revised effective November 1977. The revision provides guidance for submission of Academic Evaluation Reports [AER] on soldiers in formal resident and nonresident professional development, career progression, and specialty training at service schools, NCO academies, and civilian schools.

The major features are the introduction of revised service school [DA Form 1059], civilian educational [DA Form 1059-1], and senior service school [DA Form 1059-2] academic reports; establishment of the requirement for submission of an academic report for those granted constructive or equivalent school credit; provision for the submission of a DA Form 1059-1 for active duty soldiers participating in after duty degree programs; and the requirement for referral of an adverse AER to the student.

The revision also permits the installation education services officer to initiate, review, and forward AERs through the local MILPO to HQDA for officers who complete a degree during off-duty time. It also applies to officers who obtained a degree on off-duty time prior to 1 November 1977. Duplicate grade transcripts must be attached to the AER.

ACCREDITATION OF MILITARY EDUCATION

Equal credit for military courses is a reality for warrant officers since June 1977. HQDA has approved a revision in the procedures for accrediting military education levels [MEL] that will eliminate descrimination between resident and nonresident course graduates. This revision will go into effect when the mid-77 SIDPERS change packet is distributed. This new system is discussed below.

On the back of each Officer Record Brief, there are two sets of MEL codes: one representing resident course completion and one representing nonresident or equivalent credit. An Army goal has been to give equal weight to all graduates regardless of their method of course completion. Although this was a desirable goal, it was not achieved under this system because of the following factors:

- Noneresident graduates remained eligible for resident attendance, thus negating equal weight eligibility.
- By including nonresident graduates in the zone of consideration, the school selection process inferred that nonresident training was not equal to its resident counterpart.
- The dual coding method of accreditation created a dichotomy that stigmatized all graduates by attaching a "method of completion" label to their achievement.
- Past practice created an environment in which the fact of an individual's selection to attend school was considered by some to be more important than the value of the training received.

The most important changes that will occur under the revised accreditation procedures are:

- Warrant officer MEL codes A through E will remain in effect, but their meanings will be expanded to represent all course graduates, not just resident graduates.
- MEL codes T through W will be eliminated. The single set of codes A through D will be used in their place. For example, individuals who have completed the Warrant Officer Senior Course by nonresident instruction will have their MEL codes changed from T to A. Similarly, the MEL code for Warrant Officer Advanced Course nonresident graduates will be changed from U to B.
- All nonresident course graduates will be exempted from the zone of consideration for selection to attend the same course in residence, just as resident course graduates are removed from consideration to attend the same course.

In summary, the following benefits are anticipated from the new accreditation system:

- Duplicate training will be avoided. The Army can thereby obtain a greater number of course graduates. Individuals who complete training via nonresident instruction will not be confronted by a need to pack up for a move to attend the same course in residence.
- Equal treatment will be rendered. Both resident and nonresident course graduates will have the same entries in their official files.
- Emphasis will be restored to the training itself. There no longer will be discriminating codes to designate the method of course completion.

OFFICERS GUIDE

The new Army Officers Guide is just off the press. This 39th edition includes, for the first time, information on warrant officer programs and policies and is now truly a guide for all Army officers. Reference to warrant officer information appears on the cover and a special acknowledgment to the US Army Warrant Officers Association is printed in the forward. The cost of the Officers Guide is $8.95 and should be a valuable addition to every officer's reference library.

NO OER's BEFORE BASIC COURSE

Each year a number of newly commissioned Regular Army officers are ordered to their first unit of assignment prior to attending the basic course. This occurs because of the statutory provisions the Regular Army officers are on active duty as of the time they are sworn in as a commissioned officer. There is no provision for these officers to be commissioned "not on active duty" as with the Reserve officer, who can be held in "inactive reserve" status prior to his active duty date. Those Regular Army officers who cannot be scheduled for reasonably immediate basic courses or other schooling are therefore ordered to their first duty assignment with a proviso that basic officer course attendance will be on a "TDY and return" basis as soon as a class quota is available.

In past years, these officers received officer evaluation reports [OERs] for that period of time prior to the basic course if they were at their initial assignment long enough to meet the criteria of AR 623-105, Officer Evaluation Reporting System. This was not a good situation for these Regular Army officers because they were expected to perform duties as platoon leaders, as well as other jobs, without benefit of the valuable training presented in the basic course. Some of these officers received OERs that were not on par with those being received by their basic course trained peers.

This inequity was recently corrected. DA implemented an interim change to AR 623-105. The change states in part that "a newly commissioned officer programed for attendance at an officer basic course will not be rated . . . prior to attendance at the Officer Basic Course . . . the period of time prior to attending the Officer Basic Course will be nonrated time accounted for in the initial academic report."

SPECIALTY PREFERENCE STATEMENTS

Many commisssioned officers in year group [YG] 1970 have not told MILPERCEN their preference for OPMS alternate specialty.

About 25 percent of the 4,200 commissioned officers involved have returned the specialty preference statements sent out last year. MILPERCEN must have on file statements from those who came on active duty between 1 July 1969 and 30 September 1970. Officers in this year group who have not filled out a preference form should contact their local MILPO or MILPERCEN. AUTOVON numbers for company grade career divisions at MILPERCEN are: combat arms [221-7820], combat support arms [221-0617], and combat service support [221-7444]. Officers also may write Commander, MILPERCEN, DAPC-OPP-S [YG 70], 200 Stovall St., Alexandria, VA 22332.

MILPERCEN emphasizes that what appears on the officer's preference statements can, and in most instances does, influence the OPMS specialty assignment of that officer. DA officials have expressed concern that many commissioned officers in that year group have not indicated to MILPERCEN their preference for an OPMS alternate specialty.

RA SELECTIONS

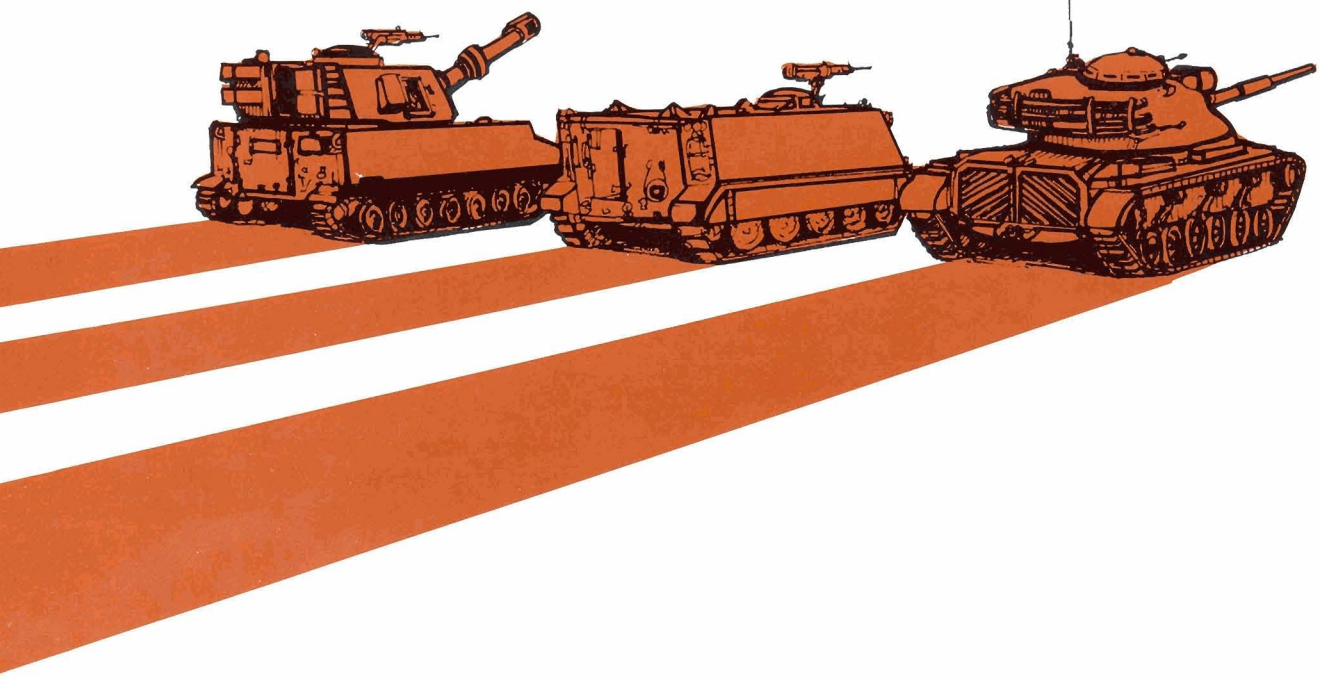
The results of the October 1977 Regular Army Integration Board have been released and 16 Air Defenders were among those tentatively selected. Names of the applicants recommended for appointment were transmitted to the Secretary of the Army for action to effect appointment [to include nomination by the President and conformation by the US Senate]. Officers selected for appointment will receive an appointment package after nomination and approval by the President and the US Senate. Each officer should familiarize himself with the requirements of para 5-6, AR 601-100, before being sworn into the Regular Army. The next Regular Army Integration Board is scheduled tentatively for April 1978. Applications [in accordance with AR 601-100] must be received not later than 31 January 1978.

ROTC ACCESSIONS

Air Defense Artillery Branch congratulates those ROTC cadets recently selected for active duty in the Air Defense Artillery. Of prime concern to you is your initial assignment. Your assignment relies heavily on the preferences stated on your DA Form 4255-R, Request for Initial Assignment Instructions for Active Duty. This is the only document the Air Defense Artillery Branch has that reflects your preference for geographical location, type of duty, and the other important data to be considered when making your assignment. AR 614-185 [CONUS Installations] and AR 614-30 [Oversea Locations] identify the various geographic location and tour lengths. Other important data are information on marriage plans, dependents, additional military schooling, and willingness to extend active duty obligation for oversea assignments.

If you have any questions concerning Air Defense Artillery assignments, call or write ADA Branch, Combat Arms Division, ATTN: DAPC-OPE-A, 200 Stovall Street, Alexandria, VA 22332, AUTOVON 221-0115/0112.

COMBINED ARMS CORNER



COMBINED ARMS EXERCISE

Members of the 4th Bn, 1st ADA, 11th ADA Group, and troops of the 3d Sqdn, 3d ACR, joined forces and participated in a combined arms live-fire exercise recently at Dona Ana Range, New Mexico.

The combined arms, live-fire exercise had three objectives. The first was to train the tank platoon leader to control the maneuvering and firing of tanks within the tank platoon. The second was to develop the proficiency of the individuals in the tank crew into a tank platoon fighting force. The final objective was to integrate the weapon systems of armor, field artillery, and air defense artillery into a lethal combined arms team.

One tank platoon, one Vulcan platoon, and a howitzer battery participated in the exercise. The tank platoon split into two sections of two and three tanks, respectively. Each tank section had one Vulcan with it. The second Vulcan section provided suppressive fires using indirect fire. The howitzer battery provided suppressive fires and a smoke screen to hide a bridge crossing. The two tank sections used the bounding overwatch method, a leapfrog-type action, to move towards the objective and capture it.

The versatility of the Vulcan air defense system was demonstrated by its three roles in providing fire support. The first and primary role is low-altitude air defense. The secondary role is ground support. By providing ground fires, the Vulcans were able to suppress enemy activity. The third role is indirect fire.

The live-fire exercise provided experience for all personnel concerned, as they were confronted with and readily solved the problems of the integration of weapons and the coordination of fires.

NEW ARMY ROCKET

The Army has selected two industry teams to compete for the production program of the general support rocket system [GSRS]. The Boeing Aerospace Company and the Vought Corporation will competitively design, build, test, and evaluate the GSR system.

The GSRS, a highly mobile, surface-to-surface, free-flight rocket system, is intended to complement cannon artillery during "no warning" and intense combat conditions. The system is designed to rapidly deliver fire in a concentrated area. Principal targets would be troops and light equipment, air defense sites, and command centers.

The Missile Research and Development Command has established a 29-month validation program to obtain the most effective weapon for the lowest cost. The program will include a competitive "shoot off" at an Army missile test range between the two contractors prior to a production decision.

Six rockets will be contained in tubes within a disposable, rectangular launching pod. Loaded launching pods will be sealed at the factory and stored in supply depots until needed. They require no maintenance.

The pods will be clipped to a launching device that will swivel and tilt to aid the pod and its rockets. The launcher is designed to be installed on a modification of the mechanized infantry combat vehicle [MICV] but should be adaptable to a variety of American and foreign vehicles. The modular design of the GSRS will also facilitate interchange of the rocket, pods, and launchers with similar systems of foreign nations.

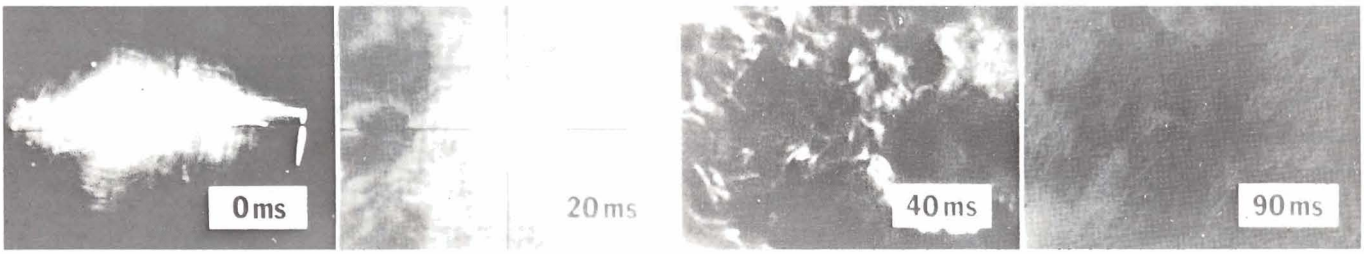
The modified MICV will carry a 3-man crew, and 12 rockets in 2 pods. After firing, two new loaded pods can be installed in minutes. Quick reload and the ability to fire-and-move should make the GSRS an elusive target. The range of the rocket is more than 18 miles [30 km]. The rockets will be able to carry a variety of warheads.

NEW XMI CREW SAFETY FEATURE

The fire-suppression system being installed in the Army's new XMI main battle tank, using fire sensors and logic that will be common to other vehicles, operates so quickly it can detect and suppress a fuel explosion inside the tank literally within the blink of an eye. It's a good thing, too, because a projectile entering the fuel tank of a combat vehicle can spark a fireball that expands into a devastating high-pressure explosion.

The key elements in the fire-suppression system are two infrared sensors and their related electronics. One detector senses in the near-infrared region [0.6 to 0.9 micrometers] while the second sees in the far-infrared band [7 to 30 micrometers]. This combination prevents the system from accidentally detonating when pointed directly at the sun or other light sources like gunfire, rockets, lightning, electronic flashes, matches, headlights, or even bright-colored shirts.

At the start of an explosion the sensors respond within 0.5 to 2 milliseconds and trigger the release of a fire-suppression agent called halon. When this gaseous-liquid substance spews forth from its pressurized steel bottle, it suffocates the explosion before the heat or energy can do any damage, even to a passenger. The only evidence of an explosion is a flash of light. The length of time from the initial flash to when the explosion is snuffed out is less than 100 milliseconds [a tenth of a second]. By comparison, it takes 250 milliseconds to bat an eye.



NEW PROTECTIVE MASK

The Air Cavalry Troop of the 3d ACR, Fort Bliss, Texas is currently field testing a new protective mask, modeled here by a member of the 3d ACR. The mask is designed for use by aviators, infantrymen, and armor personnel. If adopted, the new mask would replace three masks now in inventory — the M17, M24, and M25.

The mask, referred to as the XM29, has many improved features. In place of the small eye holes, as in the M17, the new mask features a large plastic face plate that improves the field of vision. The XM29 is lighter and less bulky, and has less air resistance than any mask currently in use. Masks destined for use by armor and aviation personnel contain a built-in communications system.

Two versions of the mask are being tested by the Air Cavalry Troop. One has a filter canister attached directly to the face plate and the other has a harness with canister to be worn at waist level. The harness version includes a new pliable rubber hose, an improvement over the fabric-wrapped duct now in use.

The new mask retains its original shape even when kept in the carrying case for long periods of time. Also, the XM29 will fit 90 percent of all personnel, unlike current models that do not fit female personnel at all.

Final results of the field testing have not been completed. The new mask has gone into the engineering testing phase at Aberdeen Proving Ground, MD.

COPPERHEAD TEST

Howitzer Battery, 2d Squadron, 3d Armored Cavalry Regiment, Fort Bliss, Texas, is the first tactical unit in the Army to test and fire the "Copperhead," the cannon-launched guided projectile [CLGP]. The unit participated in evaluations at White Sands Missile Range, New Mexico.

The CLGP is a laser-guided, 155-mm round weighing approximately 140 pounds. The projectile is more than 50 inches in length. The round is being developed for use against heavy armor. The CLGP was tested at temperatures ranging from 78° F. [25.6°C.] down to minus 25° F. [-31.6°C.] in climatic labs at the missile range. The cold temperature evaluation of the CLGP's performance also served as a good test of the Army's arctic weather gear. The battery used standard Army cold-weather gear, including arctic mittens.

The projectile is a revolutionary development in field artillery. A forward observer sights the target and determines the range and speed [if the target is moving] through the use of a special laser device. The round is guided to the target by an energy-sensitive fuze and is steered by "pop-out" fins that deploy after firing.

Final test results will be studied and published.

COMBAT EXPERIENCED FIELD ARTILLERYMEN

Researchers at the Field Artillery School are trying to define how the fire support officer should be trained to succeed in combat. If you were a Field Artillery liaison/fire support officer or noncommissioned officer for a direct support battalion in combat anywhere in the world since 1940, you can help. A questionnaire is being prepared to find out how you were trained, what you did, what you learned, and what you would change. Persons who contribute data [and who so indicate] will be named in the research report.

If you are willing to participate, please send your name and address to: Commandant, US Army Field Artillery School, ATTN: ATSF-TD-TS, Fort Sill, OK 73503. If you know someone else who might be helpful, pass this information on to him.

CBR CLOTHES

Seventy members of A Battery, 1st Battalion, 73d Field Artillery, recently performed normal training tasks while wearing full chemical, biological, and radiological [CBR] protective clothing and masks. The exercise was to familiarize troops with the specially treated jacket, socks, trousers, and gloves and to evaluate their performance while wearing the clothing.

Troops loaded and fired the howitzers, issued ammunition, and communicated while wearing the protective clothing and masks, with the only apparent difficulty being handling a pencil while wearing the gloves.

The clothing was comfortable on cool mornings, but some troops thought it might be otherwise on hot days. All agreed that it would be most welcome in the event of an actual chemical attack.

- FA Journal

ARMOR'S M-88 UPDATED

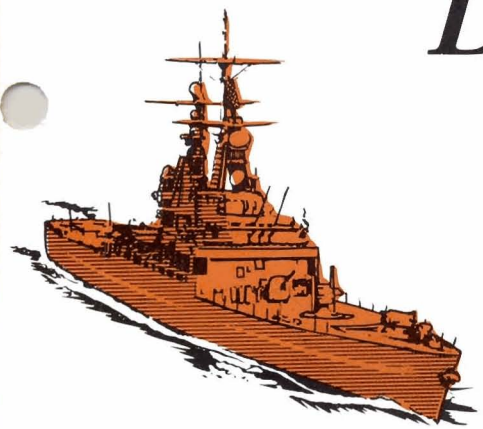
The Armor's M-88 medium recovery vehicle, known as the "big loud monster," has been updated [M-88A1] with a new engine, transmission system, and a modified suspension system.

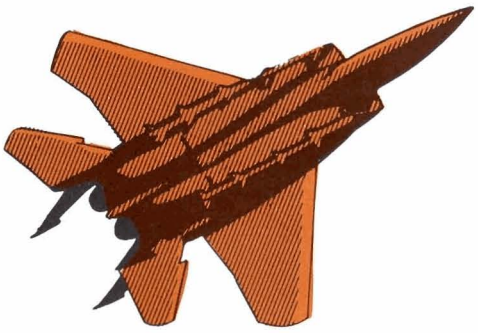
The vehicle has been dieselized with the conversion of the engine to the AVDS 1790-2DR RISE engine. The vehicle's "Little Joe" engine has been replaced with a diesel auxiliary power unit. It is a two-cylinder, four-cycle engine that produces 10.8 hp. In addition, there is a pair of lockout blocks for the suspension that allows the operator to lift a 20-ton load without using the ground space, and the vehicle can move with a 20-ton load. The old maximum lift of 25 tons still applies.

Changes to the hull are few. A new door and cover for the auxiliary power unit have been added; also the exhaust and vise have been relocated. Not only will the M-88A1 be more quiet, but the overall changes from the M-88 are considered welcome improvements by Armor commanders and maintenance tasks are more simplified.

- Armor

DEVELOPMENTS





ELECTRIC VEHICLES

The Army Mobility Equipment Research and Development Command [MERADCOM] is currently testing four energy-saving, pollution-free, and cost-saving electric vehicles for future use by the US Army. An additional eight electric vehicles are programed for testing at Aberdeen Proving Ground [APG] in Maryland. The tests are being conducted jointly by MERADCOM and the Federal Energy Research and Development Administration.

As a result of a survey, a MERADCOM official reported that 50 percent of the 3/4-ton engineering utility trucks and 57 percent of the 1/2-ton pick-up vehicles could be replaced by electrics.

As part of the overall testing program the Army is studying the potential advantages of lower operating costs, improved logistics [since the vehicles do not need petroleum fuels], and reduced air polution. Aberdeen Proving Ground was selected for the testing program because the facilities meet the requirements for testing electric vehicles at speeds up to 50 miles per hour.

GLASS FIBER TRANSMISSION

The employment of glass fiber as thin as a human hair is being considered by engineers as the most important advance in electronics since the advent of the transistor in the early 1950's. In New York City, the Teleprompter Manhattan Cable television is currently using an 800-foot length of optical fiber at its transmission facility to carry signals from receiving equipment on the roof to the central processing center 34 floors below. According to company officials the picture is razor sharp.

Some of the advantages of the glass fiber coaxial cable is that the fiber carries a picture a much longer distance without the need to regenerate the signal and in its television use the fiber has the ability to sub-divide existing channels on TV to provide an almost unlimited number of audio and video channels. With the use of a laser beam, glass fiber can carry over 165 channels, thus, a bundle of 6 fibers makes possible more than 1,000 channels.

METRRA MINE DETECTOR

METRRA [metal reradiation radar], an airborne system designed to detect surface mines, booby traps, munitions, armed troops and vehicles, is being developed at the US Army Mobility Equipment Research and Development Command [MERADCOM], Fort Belvoir, Virginia.

In operation, VHF radio waves are transmitted outward, reflect off the surface, and return at the same frequency to give a terrain picture that is displayed and stored by monitoring equipment inside the aircraft. Small amounts of energy change to a harmonic frequency as they reflect off the junctions of metal parts of semiconductors of targets. For example, electronic parts in air-scatterable mines are detected and displayed on the METRRA monitor.

In addition to the airborne METRRA, a portable backpack unit is being developed for use by ground troops to detect surface mines and booby traps at safe distances.

JUMPING FROM THE SKYCRANE

The CH-54 helicopter is a stable platform for parachute jumping, according to the Army's Airborne and Communications-Electronics Board [ACEBD]. The board conducted a series of tests at Fort Bragg, North Carolina, using the Skycrane equipped with a pod carrying Army parachutists.

Prior to making test jumps, weighted dummies were dropped from the front doors and the rear exit of the pod. Parachuting from the front doors of the pod did not prove practical. The tests involving the dummies showed that deploying parachutes often struck the wheel of the helicopter.

Jumping from the rear exit proved to be satisfactory, despite some initial concern that static lines and parachute deployment bags might become fouled on the tail boom of the aircraft. Deployment bags were trailed at varying lengths from the rear exit until it was found that a proper trailing position was obtained by securing the static lines to the floor at the right side of the pod.

The counterclockwise motion of the helicopter's main rotor in conjunction with a forward speed of 60 to 80 knots served to create an airflow that holds the deployment bags level approximately 12 feet to the rear and bottom of the pod.

The board wanted the answers to three questions prior to trying actual parachute jumps from the rear exit of the craft; they were:

First, would the jumper hit the tail of the CH-52? A test drop of the dummies was made. Speed was maintained at a constant 70 knots, and the dummies dropped straight down, with the parachutes deploying well away from the tail of the helicopter.

Second, with a floor anchor cable, would the last jumpers in a "stick" strike the deployment bags of the first jumper? Again, tests with the dummies indicated this would not occur.

The third question was how the opening parachute would behave in the airflow under the tail of the CH-54. The answer: the absence of significant wind behind the helicopter allowed jumpers to fall away during deployment rather than being buffeted in violent airflow. As a result, most of the jumpers experienced a soft, delayed opening shock, without twists in the parachute risers. Earlier tests with the dummies showed the possibility of parachutes being inverted during deployment, and all the jumpers used parachutes equipped with anti-inversion nets to prevent this type of malfunction.

During the ACEBD tests, more than 300 static line jumps were made by troopers from units of XVIII Airborne Corps. Military free-fall jumps were also made during the tests, along with bundle drops. Night jumps were made with the pod illuminated by four overhead red lights.

While the Skycrane is not being considered for tactical applications, the ACEBD considers the aircraft to be an exceptionally stable platform for paradrop training purposes.

UH-60A BLACKHAWKS

The US Army has contracted for the production of 56 additional UH-60A Black Hawk helicopters. Fifteen of the aircraft were authorized under a previous contract and are expected to be delivered August 1978. Delivery of the first of the additional 56 helicopters is expected in early 1979.

The UH-60A is a modern helicopter designed to serve as the Army's primary utility transport helicopter in the decades ahead. Designed to carry 11 fully-equipped combat troops plus a crew of 3, the UH-60A has a large cabin that can also be used for secondary missions such as medical evacuation or troop resupply. For external lift missions, the UH-60A has a cargo hook capacity of up to 8,000 pounds.

AH-1S FIRE CONTROL SYSTEM

The US Army has awarded a $12-million contract to Texas-Bell Helicopter Textron for the development of a new fire control system for the Army's AH-1S helicopter.

The AH-1S is the Army's most modern antiarmor helicopter. It is equipped with the TOW missile system, an advanced deterent to an enemy armored vehicle attack. It is powered by an improved Lycoming T53-L-703 engine, has an uprated drive train with 1,308-hp intermediate power transmission and 260 hp tail rotor drive.

The US Army plans a total purchase of 305 production model AH-1S helicopters. In addition, 290 Army AH-1G Huey Cobra helicopters have been modified to AH-1S configuration.

The AH-1S modernization project is being administered by the US Army Aviation Research and Development Command, St. Louis, Missouri.

JAWS

A tactics development and evaluation called JAWS [Joint Attack Weapon Systems], Phase II, currently underway at the US Army Combat Developments Experimentation Command [CDEC] field laboratory at Fort Hunter Liggett, is developing the most effective ways of combining Army attack helicopter teams and Air Force A-10 jets to counter enemy armor in a high-threat environment.

Field trials are evaluating tactics developed earlier this year at Fort Benning, Georgia to determine the optimum number of each type of aircraft, the methods of coordination to be used, and the tactics best suited to this type of operation.

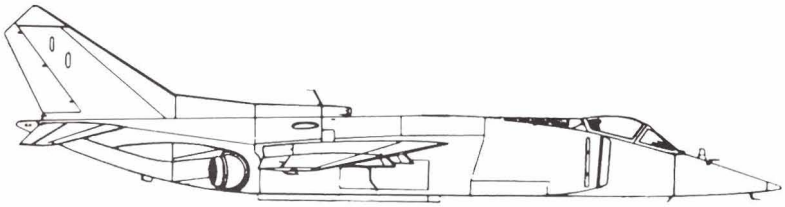
During trials the joint team locates and identifies simulated threat forces. The aircraft engage the force with a variety of tactics to collect data to be used in determining which are the most effective. Related information is also collected regarding vulnerability of the aircraft to the threat weapon systems.

CDEC's electronic field laboratory enables the mock battles to be conducted under near real conditions with the smoke and sound of an actual engagement but using blank ammunition. Not only is firing between aircraft and tanks simulated but additional realism is provided on the mock battlefield with simulated firing of artillery rounds and other weapons. Aircraft and threat locations are recorded through a unique range measuring system [RMS] that transmits data through a series of radio relays for instant reading and recording by a central computer.

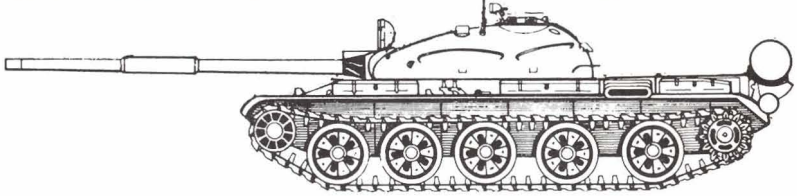
Five A-10 jets from Nellis Air Force Base, Nevada, and nine AH-1 Cobra helicopters from Fort Hood, Texas, have been equipped with special electronic equipment enabling them to be tracked by the CDEC RMS system. The tanks and armored personnel carriers of the simulated threat force have also been so equipped.

AN/TPB-1C

The AN/TPB-1C ground-directed bombing system is an automatic tracking radar system designed to follow beacon-equipped aircraft. The system also has skin track capability. The radar tracking information is fed to a digital computer and combined with manual inputs such as weapon type, wind data, etc. The computer provides vector guidance to the pilot by way of the 2 special bearing pointer and aural tones over the headset to a calculated weapon release point. Old heads will remember the "sky spot," where you had a straight and level run-in of 30+ miles, and a calculated error probable [CEP] almost that big. This system gives you the capability to choose your own attack heading, altitude, and airspeed. Since it updates itself continually, your straight and level time is cut down tremendously. You can even jink to your heart's desire before you start the final delivery leg. So far, the test CEP has been about three times better than one would expect.



INTELLIGENCEWATCH



Recently Spain unveiled its new computerized air defense system called, "Combat Grande," at Spain's Torrejon Air Base on the outskirts of Madrid. The system has already been described as one of the best in the world.

Using a ring of remotely located, long-range radar sites and a computer that makes millions of calculations each second, the sytem will automatically detect, track, and identify intruding aircraft; evaluate and compile the information; and guide fighter-interceptor planes to their assigned targets. Although Combat Grande is primarily an air defense system, information gathered by the system is already being provided to Spanish air traffic control centers, where it is being used in the control of civil air flights.

Nerve center for Combat Grande's electronic networks is hardened multiconsoled combat operations and sector operations centers, called COC and SOC at Torrejon Air Base. Data from the improved radar sites is transmitted constantly and automatically to the COC and SOC where it is analyzed by computers and deployed on large cathode-ray-tube consoles. Within seconds, operators can determine whether a radar sighting is friendly or a potential threat. A designated individual remains in control of the complex system and is the final judge in originating necessary action as a result of the sighting.

On a mountain peak somewhere in Spain, a long-range radar installation stands as a sentinel to protect the nation's airspace against air attack day and night. The radar is part of a new computerized air defense system called Combat Grande. Below the peak are antennas of the microwave communications system that links radar sites with operations centers at Torrejon Air Base near Madrid.

Soldiers, Statesmen, and Cold War Crises. *Richard K. Betts [Harvard University Press, Cambridge, Massachusetts, 1977. 222 pages, $15.00]*

Reviewed by Major Grady A. Marshall

Soldiers, . . . transcends a typical military or political innuendo. Both civil and military leaders at all levels would be remiss in not gaining the valuable experience that exudes from Betts' book.

"Influence, . . . causing decision makers to do something they probably would not have done otherwise . . . " is an elusive and intangible force that structures decision. As crises arise, how influential is the US military in the decision to use or refrain from using military force? In answer, the author analyzes key crises in which force was used since World War II through the Vietnam era. He runs the civilian and military gamut of policy, strategy, capabilities, precedents, personalities, careerist attitudes, and uses of influence on decision making to draw his conclusions.

His conclusions may in fact be inconclusive because of the myriad of variables that must exert a quantitative or qualitative pressure on the Presidential decision to use force, or the limits of escalation if force is used. The results might not be entirely correct unless all factors discussed by the author — and possibly other factors — are inserted into the decision process at the appropriate time.

The author strikes off toward his objective by comparing the civil and military pressures and personalities at the key decision points. The almost universally accepted premise that military and civilian pressures are constantly in contravention is exploited. He shows the fallacy of this theory. In reality, each side has autonomous goals that blend with the degrees of pressure. The author supports the opinion that, though this blending takes place, the players must not condescend to a level of biased integrity and compromised loyalties.

Betts, who is a research associate at Brookings Institution and previous lecturer in the Government Department at Harvard University, substantiates his thesis with an enormous amount of research from documents as well as personal interviews with many of the high-level decision makers. Insight into interplay and personalities is excellent. Issues examined include the Berlin Blockade, Cuban Missile Crisis, Vietnam War, and American Intervention in Lebanon. He exposes doctrinal, psychological, and philosophical perspectives that ultimately conclude military advice and affect decision making. Of special interest is the indirect influence caused by intraservice differences in joint military advice; likewise tradition versus innovation in the military. Tradition keys another critical point, that of precedence type influence or "grooved thinking" as the author quotes. Through precedence, many times undue contradiction to innovative, individualistic, and otherwise acceptable thinking is exerted.

The author does in fact draw stoic conclusions which are themselves interrelated throughout his work. He carefully charts data in tabloid form to give a terse overview to support his conclusions. To enumerate, some of the generalizations that emerge are: on decisions to commit forces, military advice at the executive level has not been more pugilistic than that of civilian counterparts; intermediate members of the military community favor use of force more than Joint Chiefs of Staff; and all military are more prone to escalate forces once the decision is made to use force.

If we heed the experience that can be gained from the interactions of past leaders as Betts portrays them, when the next cold war crisis arises, our preparedness will have certainly increased. In the author's words, "In decisions on use of force, it is impossible to detect objectively whose influence is greatest; it can only be inferred because only the President—and maybe not even he—really knows what convinces him or changes his mind."

Major Marshall has served two tours in the US Army Europe, and one in Vietnam. He has attended the Air Defense Officers Advanced Course and holds a B.S. Degree from Presbyterian College. Presently, he heads the reliability, Availability, and Maintainability Analysis Section at the Directorate of Combat Developments, Fort Bliss, Texas.

Combat Aircraft of World War Two. Elke C. Weal, *John A. Weal, and Richard F. Barker* [*Macmillan Publishing Company, 1977. 238 pages. $17.95*].

This may be the most important aviation reference work published in years—containing information never before available in one volume.

- **Concise yet comprehensive details of every combat aircraft of World War Two [several thousand entries].**
- **Technical data listings for each aircraft plus a brief resume of its wartime career.**
- **Meticulously illustrated with 176 full-color, specially commissioned paintings and 250 outline scale drawings.**

Combat Aircraft of World War Two encompasses even more than its title suggests. In addition to fighter and bomber aircraft, it includes many transport, reconnaissance, liaison, and other support aircraft that played such an integral—but relatively little-recorded—part in air warfare.

The book is arranged by the twenty-five countries of manufacture. Within each country, information is organized by manufacturer and model. For each aircraft there is a data listing covering details of—

- **Power plant.**
- **Performance [including maximum speed, climb, and ceiling].**
- **Weights and dimensions.**
- **Armament and crew.**
- **Air force division in which it served.**
- **Variants [including modifications, rearmaments, licensed builders, etc.].**
- **Production figures.**
- **General remarks.**
- **Design and service career.**

Combat Aircraft of World War Two also includes carefully selected Orders of Battle, enabling readers to compare the strengths of opposing airforces at specific times during the course of the war, plus a Glossary, which includes comparative unit organizations for the major air powers.

Compiled from official sources and private archives, information in this book has been checked and authenticated by a team of aviation experts under the direction of J.M. Bruce, Keeper of Aircraft and Aviation Records at the Royal Air Force Museum, Hendon.

Elke C. Weal, compiler of basic data.

John A. Weal, artist, renowned for his illustrations in Aviation International.

Richard Barker, line drawing illustrator and Librarian of the RAF Museum.

Armoured Fighting Vehicles of the World. [*Revised 3rd Edition*] *Christopher F. Foss* [*Charles Scribner's Sons, 1978. 192 pages. $7.95*].

Since the second edition of Armoured Fighting Vehicles of the World was published in 1975, there have been a number of significant advances in the production of armoured vehicles.

The new generation of Main Battle Tanks [MBTs] has started to make its appearance. There is also a possibility that the United States and West Germany may try to standardize some components of the Leopard 2 and the XM1. In Britain development of the new Chieftain for the Iranian Army is well under way, and this should enter service in 1980. The Russians already have their new MBT in service.

The Russians were also the first to introduce a Mechanized Infantry Combat Vehicle [MICV], the BMP-1, in 1967. Since then both the Germans [with the Marder] and the French [wtih the AMX-10P] have introduced MICVs into their armies. The American MICV, the XM723, should enter service in 1980.

For many years NATO forces have had an important edge over those of the Warsaw Pact in that the latter has had no self-propelled artillery. The introduction of the Russian 122-mm and 152-mm self-propelled weapons redresses the balance. The introduction of the American Cannon Launched Guided Projectile will, however, give new strength to Allied self-propelled artillery.

This book contains data, development history, variants and a list of countries that use all tanks, reconnaissance vehicles, armoured personnel carriers [and MICVs], self-propelled guns [including antiaircraft missile systems], and armoured load carriers at present in service or under development. There are many new entries and the text has been fully revised. Almost all the photographs have been replaced and most of them have not been published previously.

We also Recommend these

Politics of Defeat: America's Decline in the Middle East. By Joseph Churba. Cyrco Press, 1977. 224 pages. $10.00. Distributed by the Bobbs-Merrill Company, Inc. Introduction by Admiral Elmo R. Zumwalt, Jr., Chief of Naval Operations, USN, Ret.

Abstracts of Military Bibliography. By Ruben A. Ramiriz, Captain, Argentine Marine Corps, Ret. Written in Spanish, the book is a collection of important military writings from leading military magazines throughout most of the world.

The Editor Comments

As AIR DEFENSE Magazine [formerly Air Defense Trends] enters its 10th year of publication, it seems appropriate to comment upon its beginnings and give our readers some idea of how we reached the point where the magazine has been officially referred to as one of the Army's most prestigious periodicals.

When the Air Defense Artillery was designated a separate Branch in 1968, action was initiated to establish a branch publication, and the January 1969 issue of Air Defense Trends was the product of the first faltering steps in that direction. Four thousand copies were circulated to a readership numbering some 40,000. Printing was done at the local field printing plant, which lacked the modern equipment of most large commercial plants. So the inaugural issue was something of an ugly duckling.

But, as in Hans Christian Andersen's story, it began to mature into a dignified product. Established originally as merely a random publication to be published "only when sufficient material. . . can be accumulated," it nevertheless caught on immediately. As interest spread throughout the Air Defense Artillery and on to other branches of the Army, as well as the Air Force, Marine Corps, foreign armed forces, commodity commands, scientific organizations, universities, and industry, authors supplied material sufficient to justify a quarterly periodical rather than a random publication.

Along with this expanded interest came authorization from Department of the Army to contract for commercial printing, which enabled us to go to the glossy publication with color that you see today. Of course, with time, a number of other improvements logically followed. Names synonymous with this development appear in the back issues. We were able to add several new features due to the attention that increased prestige attracted. An example, and a compliment, is the fact that many of the nation's leading publishers send us new books for review.

This is of necessity a very condensed historical sketch, but it does bring out the contrast that 10 years has engendered. Today, AIR DEFENSE Magazine serves an enthusiastic readership exceeding 100,000 individuals in military and civilian agencies throughout the Free World.

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