AIR DEFENSE

Trends

APRIL-JUNE 1975

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US Army
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MAJOR GENERAL
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Tre

APRIL-JUN

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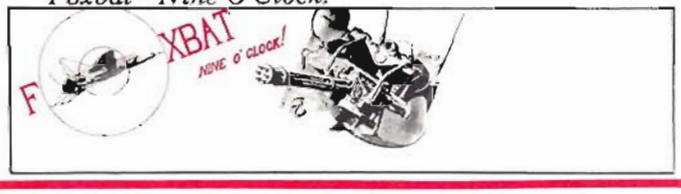

Our bicentennial cover commemorates the 200th Anniversary of the US Army and illustrates the root and present development of Air Defense Artillery. Related cover story appears on page 2. Cover design by ILT Robert C. Pender.

AIR DEFENSE

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AIR DEFENSE TRENDS is published quarterly by the US Army Air Defense School to keep air defense personnel informed of the latest tactical, doctrinal, and technical developments in air defense worldwide, and to maintain a stimulating and mutually productive dialog between the School and units in the field, with a view toward increased efficiency in all aspects of air defense.

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BICENTENNIAL COVE

Our cover commemorates the 200th anniversary of the US Army. When the continental Congress first authorized a regular Army on 14 June 1775, under Article I of the Constitution, George Washington said, "Let us have a respectable Army, and such as will be competent to every contingency." The performance of the Army through two centuries of intermittent peace, civil strife, and bitter war is a record of which our first Commander in Chief would be proud. No other army in modern times has attained such heights of valor and victory on the battlefield.

When the Continental Army was created, a national artillery arm became necessary and was subsequently established. Through the years, guns appeared on the scene in various shapes and sizes. Progress in quality and types eventually resulted in special guns for specific missions. It was thus that coast artillery guns came into being.

The Coast Artillery Corps of the Army was established in 1901 as a counter to the enemy fleets that had threatened, and occasionally attacked, US coastal and harbor areas since the time of the Revolutionary War. The mission of protecting the some 4,000 miles of United States coastline was a formidable one. Nevertheless, within 3 years, one-half of the authorized coast artillery guns had been installed at key ports and harbors.

The emergence of aircraft as a combat weapon during World War I soon led to the development of countermeasures in the form of antiaircraft artillery, and thus air defense artillery had its beginning. Because of its experience in shooting at moving targets, the coast artillery was given the task of developing the new branch. The first antiaircraft artillery consisted of a mobile, heavy artillery formed to engage German combat planes in World War I, thus providing air defense for American Expeditionary Forces in Europe.

After the War, the rapid development of air power caused the coast artillery to become increasingly interested in antiaircraft defense of the US coast. Also, emotions were rising about the need to protect large American cities and vital military installations from aerial attack. Consequently, by the mid-1920's, antiaircraft artillery had become a major Army activity.

As years passed, improvement in aircraft and refinement in antiaircraft guns continued. By 1938 there were long-range bombers, relatively high-speed fighters, and antiaircraft guns that were electrically coordinated with searchlights and range finders that could shoot them down. But it took the disaster at Pearl Harbor to stir public sentiment to the point where a real demand for continental air defense was felt.

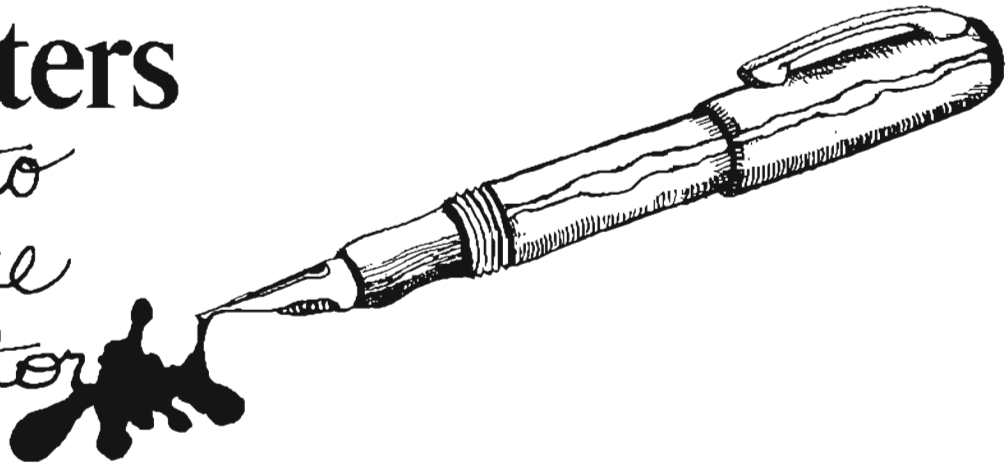
Improvements in antiaircraft weapons continued through World War II to the extent that by War's end we had weapon systems that could locate enemy planes with radar and knock them out of the sky. The introduction of radar opened the door of science to the exciting and deadly effective guided missile systems of air defense.

Today, the ADA's primary objective is to defend the Army in the field from air attack. To accomplish this objective, its Chaparral, Vulcan, and Redeye missile and gun systems are deployed with combat divisions, while the longer range improved Hawk and Hercules missile units are deployed to provide overwatching AD fires to the ground commander.

Improvements on all air defense weapons are in the offing. SAM-D is programed to replace Hawk and Nike Hercules, Vulcan's accuracy is being improved, a new all-weather, short-range air defense missile system is being developed, planning work has started on a new ADA gun system, and a new system is being tested to replace Redeye.

Air defense is indeed a vital part of the Army which has been, and will continue to be, an essential institution for America's greatness. In peace and war, the Army has provided the shield and sword of America's defense, protecting our Nation and allowing each of us to live in freedom.

Letters to the Editor



Dear Sir:

I am writing to comment on/rebut the article, "Realism In Air Defense Artillery Training," written by Colonel J. Hollis V. McCrea, Jr., and also the following article, "Night Firing" that appear in the Jan-Mar 1975 issue.

I truly feel that the time has come to set the record straight. It is really unfair to compare the RCAT with the BAT (the RCAT is not mentioned in Colonel McCrae's article except between the lines) as was done in the "Night Firing" article. The RCAT and BAT are entirely different animals. Incidentally, the picture under the title of Colonel McCrae's article is of a Beechcraft 1025 target drone, which is almost exclusively flown at White Sands Missile Range by civilian contractors.

To start with, a BAT flies a ballistic trajectory of only a few seconds duration--ONCE. This brings the question to mind: Is the enemy going to fly a predetermined course that is ideal for the gunner and before hand send the gunner information on his proposed course, speed, and altitude?

The RCAT, however, is slower but can give one firing presentation per minute for 1 hour plus, and can change course to modify the presentation. The RCAT can also fly just about any course desired. At 800 meters, the RCAT represents a normal sized fighter at 2,500 meters.

Yes, the RCAT costs more, but is also more versatile. The BAT is as versatile as a Roman candle (once it is lighted, control is gone).

As for all-weather capability, during the calendar year of 1974, the RCAT's made 199 flights on the ranges and many flights were made because the weather was too rotten to launch a Firebee. For example, in December two flights were made in a snow storm.

If RCAT's were not reliable, they would not have been in constant use since 1949. The main problem in this area is the same problem that existed between the sheriff and the chain gang in the movie, "Cool Hand Luke." The problem, as the sheriff said, "What we have here is a failure to communicate." If the ADA unit would make its requirements clearly known to the RCAT support prior to launch time, they would undoubtedly find that their support would be "A-1." Most of the "hurry up and wait" is experienced by RCAT personnel when the unit schedules RCAT requirements for 0730 while never intending to fire at RCAT's until 1100. Then saying, "We need an RCAT now!" Then when it takes more than 5 minutes for launch, the Safety Officer gets impatient! (It takes at least 5 minutes for the autopilot system to warm up, and it is unrealistic to expect the RCAT to sit with all systems running from 0730 to 1100 or so.)

The RCAT can fly 22,000 feet altitude, can have radar reflective pods, flares, infrared heat sources, smoke pods, tow targets (banner or dars), night lights, miss-distance indicators (MDI's), or a combination of any of the above mounted.

RCAT's have carried on board telemetry for a variety of scientific data, cameras (TV and still), antisubmarine torpedo (small but potent), and even air sampling equipment. How much more versatility do you want?

The real clincher to the articles is that, unbeknown to most people, the personnel in BATS are RCAT men detailed to BAT's duty. They are but 6 men out of a 41-man RCAT section. So I say, let's give some credit where credit is due.

SFC HAROLD W. ANDERSON
Chief Controller/Shop Chief
RCAT Division, Range Command
Fort Bliss, Texas

Dear Sir:

The library of the State Historical Society of Wisconsin needs histories of United States Army units of any period to further complete what is becoming one of the better collections of this type in the Middle West. Especially useful are those histories which were previously published by units in Germany and Japan in the World War II post-hostilities period.

Similarly, unit histories of the Korean and Vietnam eras, generally printed in Japan, will be most helpful. Donations may be addressed to Colonel O. W. Martin, Jr., US Army, Retired, at the State Historical Society of Wisconsin, 816 State Street, Madison, Wisconsin 53706.

O. W. MARTIN, Jr.
Colonel, Armor
Madison, Wisconsin

Dear Sir:

Over a period of several months this office has received your publication, "Air Defense Trends," as part of the US Army ACSI program to assist the Army Attaches in their representational activities. In the case of the "Air Defense Trends," the magazine is forwarded to the Commander of Colombia's one and only AAA Bn located in an isolated part of the country. I really didn't realize how much they used the magazine in their training program until I received a memo from the Director of the American Embassy's Bi-National Center located in the same area. According to the memo, which explains the situation quite well, the magazine is serving a very useful purpose. I am delighted, as I know you must be also, to know that they think enough of the material in the magazine to go to the trouble to have it translated into Spanish.

WILLIAM H. VAIL
Colonel, USA
Defense Attache
Bogota, Columbia

AIR DEFENSE

OF THE FIELD FORCES

Honorable Herman R. Staudt
Under Secretary of the Army

A speech recently presented at Fort Myer, Virginia, by the Honorable Herman R. Staudt, Under Secretary of the Army, upon the occasion of the sixth annual Air Defense Artillery Officers' Luncheon.

Newspaper readers may have recently come across headlines such as "Nike Site Closures," "ARADCOM to be Disestablished," "Budget Cutbacks." These headlines, to the uninformed, might signal the death knell of Army air defense. Nothing could be further from the truth. The disestablishment of ARADCOM represents only the end of one chapter in the youthful yet dynamic history of Army air defense. The pre-

sent and ever-increasing emphasis on air defense in the field marks the beginning of a new chapter. It is toward this new chapter which is unfolding that I would like to address my remarks to you today.

Many of you have heard the comment, "Air defense is locked in concrete," obviously in reference to the tremendous logistical tail associated with our earlier generation air defense systems as well as the complex, hardened, firing platforms we have more recently used in our CONUS Nike Hercules units. However, when one considers the fantastic changes that have occurred in manned and unmanned flight in the last 70 years, a forward-looking thinker can never see air defense tied to a specific hardware system such as Nike Hercules, but rather sees it as a viable concept that must continually be adjusted to meet the rapidly changing threat: whether it be a strategic threat here in CONUS or a tactical type air threat expected in a highly fluid battlefield situation. It is these perceptions that have allowed air defense to mature and evolve into the critically important capability it must provide as a member of the Army's combined arms team.

The task of reshaping air defense in the field army configuration is a staggering one which represents a major challenge that each of you, I'm sure, will welcome. It is one that requires innovation, imagination, pride, tenacity, and the "can do" attitude that has always permeated the air defense community. But, aside from the people aspect, there is the consideration of the threat and, particularly, the communication of the threat. Many of today's leaders often fail to appreciate the air threat since they have never been under such an attack--the last hostile air attack against our ground forces took place during the Korean war some 20 years ago. In addition, there are the considerations of cost, mobility, and versatility--and I am sure you can think of others.

Budgets are tight and money is scarce, as we all well know. We simply can't afford to allocate scarce dollars to design and build sophisticated air defense systems that have limited utility as we tended to do in the 50's and 60's. We now have to more closely design highly cost-effective systems to accommodate present and potential future threats — which as we now see it are quite formidable to the Army in the field. To those who may be pondering why this heavy emphasis by the Army on field army air defense as distinguished from CONUS air defense, let me merely ask that you consider the relative status and potential need for one versus the other in recent years as well as the decade ahead. In the Mideast conflict, for example, Egypt did not have the luxury of air superiority — something we have typically always had in the past but may not be quite so likely to have in the future. However the Egyptian forces were able to move readily without air cover by providing strong, balanced air defense coverage of their attacking forces as well as air defense in depth for strategic protection. Israel, after absorbing early armor losses, turned the corner by attacking Egyptian air defenses with ground elements and by fielding a combined arms team which incorporated balanced air, ground, and air defense forces. In both of these cases, air defense protection, or the lack of it, was the decisive factor.

To get the greatest return on our investment in this area, we must design with tactical versatility ever in mind. This point was clearly driven home by the use of our air defense (less Hawk) units in the Vietnam conflict. While our air defense role was not exercised, due to the absence of enemy air activity, our Twin 40, Quad 50, and Vulcan air defense systems were quite effective in the ground support roles of perimeter defense, convoy escort, indirect fire, reconnaissance in force, and as ready reaction forces. Vulcan units give us this capability in the field army, and the lessons learned in Vietnam reinforce the concept of maximizing tactical strength. Future air defense systems must be designed with this versatility in mind.

The Secretary of Defense, Mr. Schlesinger, in his Annual Defense Department Report for FY 75, recently stated, "One conclusion upon which there is general agreement in the Defense Department is that major improvements in our Theater Army air defense capabilities are urgently needed."

Let me take a few moments to review for you only a few of the systems currently in being, under development, or under consideration for future application to this challenge.

For the immediate, short-range program, there are the Improved Hawk and Chaparral/Vulcan

systems which I'm sure many of you are familiar with.

Improved Hawk — An interim system, an earlier version of which has proven itself in combat during the recent Middle East conflict. This system permits greater missile lethality and effectiveness against multiple, maneuvering, and single targets.

Chaparral/Vulcan — These systems are being deployed with division-size forces throughout the world to provide a low-altitude air defense capability. The Vulcan gives us the dual-role capability as a ground support weapon.

Redeye — This shoulder-fired air defense weapon, despite certain limitations, has introduced the capability of small weapon air defense in the forward area, thus greatly complicating the enemy's close air support activities.

Stinger — The follow-on system will provide an improved posture in the forward areas.

We must also consider the impact on our air defense needs of our projected 16-division force structure, requirements for additional field army air defense units, the advantages to be gained in the activation of a newly organized Chaparral/Vulcan group in Europe, all of which clearly provide new opportunities to demonstrate the vitality and importance of Army air defense.

Flak Panzer — We are currently testing a prototype of this system which utilizes twin 35-mm radar-aimed guns mounted on a Leopard tank chassis. The guns fire high-velocity air defense type ammunition at a rate of 550 rounds-per-minute per gun. The manufacturer, a Swissbased firm, claims the radar system is capable of acquiring an aircraft at a range of 15 kilometers. This is one of many possible candidates now being investigated to provide us with a new, modern air defense gun.

For the all-weather, low-altitude air defense mission, we are currently in the process of evaluating several possible system candidates which we believe offer the potential for a significant increase in our Army air defense capabilities in the years ahead. Because of the urgency of the need, and the ever tightening budget, we have included candidate systems developed in Europe as well as in the United States. While the successful system will be fabricated and produced by American industry regardless of which scheme is found to be superior, we wish to take advantage of developmental progress whenever and wherever it can be found in order to cut developmental lead time and costs required to deploy the winning system.

Surface-to-air missile development (SAM-D) — This system, one of the Army's Big 5 programs, is designed to replace the Nike Hercules and Improved Hawk systems and provide improved air defense for the Army in the field in the 1980's. The advanced features of SAM-D will provide an increased capability against saturation attacks, electronic countermeasures, and maneuvering targets. Additionally, SAM-D will reduce manpower requirements and maintenance efforts required by the present system. This system has the mobility characteristics necessary for utility with the Army in the field and has the range of firepower necessary to be used strategically in providing defense of urban and industrial complexes.

Finally, we are viewing a number of potential systems of the future which could again revolutionize air defense.

While the subject of my comments today has been principally directed at *field army* air defense, I would be greatly remiss if I did not include in my thoughts a salute to the men and women who have so long, so hard, and so admirably labored in the area of CONUS air and ballistic missile defense. I suspect that there are some here today who can vividly remember from their own personal experiences (and within the span of their professional careers) how air defense of the CONUS has shifted so dramatically from coastal defense to cities ringed with guns, to a total missile defense against aircraft first, and now, to systems designed to be effective against ICBM's and reentry bodies traveling at almost an order of magnitude higher speeds, with potentially increased maneuver and deception capabilities. The Army has attempted to keep pace with the changing threat here as it must in the field army area also. We fully expect that much of the experience that has been gained from this area of air defense will be brought to bear in the field army area as well.

You can judge from my remarks that air defense in the Army is not only alive and hearty, but that it will require the keenest interest and participation of each of you. Since air defense projects command a "lion's share" of our R&D

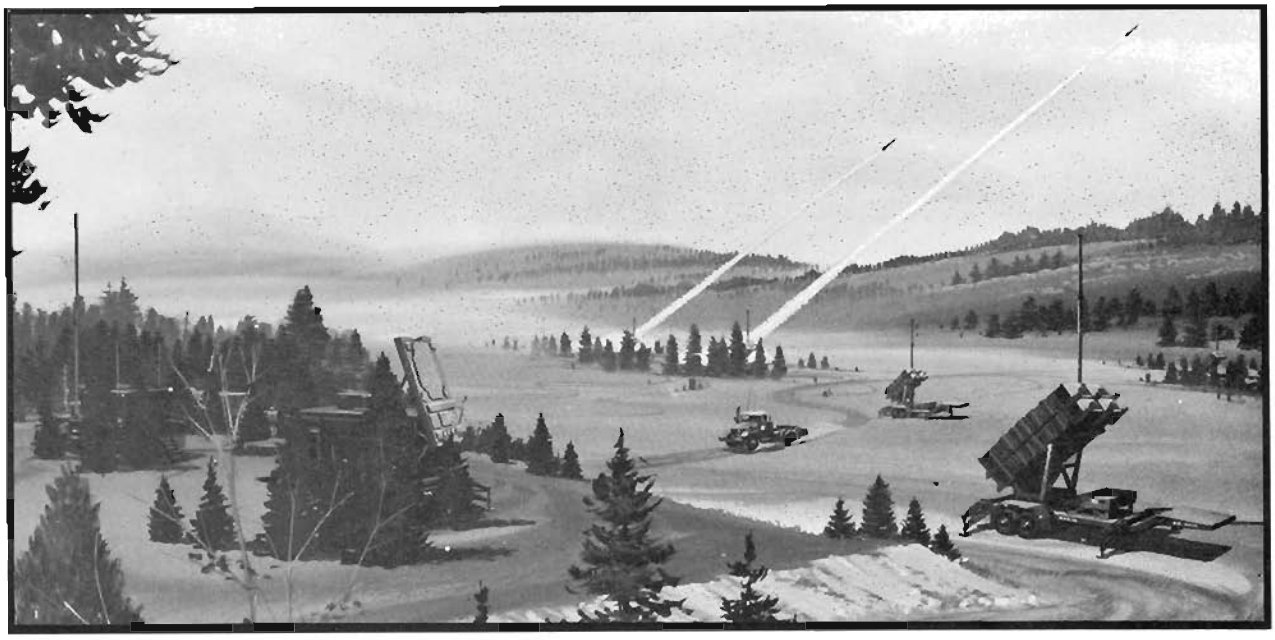
dollar today, you have the challenge to spend those dollars wisely. We believe that we are now at the threshold of a new family of air defense systems.

How well we manage our assets, analyze the threat, train our personnel, and field systems that will provide us greater flexibility, mobility, and varied capabilities are all closely entwined in the proper execution of the air defense mission, and we don't believe that we have firmly in hand the final route to take to optimize these often conflicting pressures. In a similar vein, I would urge that you optimize and manage the personal intellectual assets of yourselves and of those with whom you work to provide the greater flexibility, versatility, and expertise, which we greatly need to cope with the variety of duty assignments reflected in our Army force structure today and projected for the future.

Before I close, I would like to pose to you experts a few challenges for which we don't believe we have the final answers today and could use some help.

- What additional or complementary ways of improving air defense effectiveness are available to us in other than materiel areas such as through training and/or tactics?
- How can we field air defense systems in the future that have other than a single purpose mission?
- Reflect for a moment on our air losses over North Vietnam, considering the relative sophistication of the hardware and the men available to our adversary in contrast to our own. Can we — or rather dare we — rely in the future on a philosophy that suggests that we will necessarily have air superiority in any future conflict?
- Finally, I would ask — Have all of us really been innovative in this area? Have we adequately pondered in depth the direction that the Army should go in the field of air defense in the years ahead? How can you help us with our thinking and planning during this period of transition? For example, are there major opportunities in combining Air Force aerial platforms for surveillance with Army ground-launched missiles?

My message to you, then, is this — Army air defense has an increasingly important mission and purpose. It is an essential part of the Army's combined arms team. Systems may change but air defense must continue to keep pace with the developing threat. Our job is to insure that the *field army* can fight and win in a sophisticated air threat environment and to think far enough ahead to plan for future contingencies. We must produce the kind of air defense weapon systems, tactics, and personnel needed that are realistically consistent with our resource constraints. These thoughts, then, I leave with you as our mutual challenge.



LEARNING FROM THE MIDDLE EAS

Lieutenant Colonel William O. Staudenmaier

T WAR

The views expressed in this article are those of the author and do not necessarily reflect the views of the US Army Air Defense School or Department of the Army. Material used is certified by the author to come from unclassified sources.

Their swiftness shocked the military world. In less than 3 weeks the armies of Egypt and Syria, using Russian weapons and tactics, upset the military and political balance of the Middle East, perhaps forever. For the first time since the 1967 Arab debacle, Israeli Skyhawks and Phantoms lost control of the skies over the Sinai and the Golan. The Arabs had learned their lesson well. In October 1973, Syria and Egypt assembled a formidable air defense force of missiles and guns, of which Moshe Dayan, the Israeli Defense Minister, said, "I doubt whether there is another place in the entire world that is protected by such a dense array of modern missiles." He was right.

This Arab air defense system consisted of over 10,000 surface-to-air missiles (SAM) and antiaircraft guns (AAA). Most reporters and magazine writers are frustratingly vague about the exact number and organization of this force, with the notable exception of General Andre Beaufre. According to his account, each of the 16 Arab divisions fighting Israel was assigned an air defense regiment, presumably comprised of AAA and the SA-7. Additionally, one AD battalion was assigned to each of the six separate Egyptian brigades; this was all backed up by 75 more nondivisional battalions of SA-2, SA-3, and SA-6 SAM's. Israel suffered heavier aircraft losses than in the 1967 war from the massive concentration of Arab air defense on fronts of about 70 kilometers in Syria and 180 kilometers in the Sinai, with most of the weapons sited within 50 kilometers of the FEBA.

In contrast to the vagueness of open literature regarding the Arab air defense order of battle, experts are in virtual agreement that Israel lost about 105 aircraft during the war. The accompanying table gives a breakout of these losses. The Israeli Air Force (IAF) lost most of its aircraft during the first week of the war, primarily on the Golon Heights Front, where the Arab armored columns, heavily supported by air defense, threatened to overrun the Israeli ground forces. Because of the danger that this thrust posed to Israel, the IAF did not have the time to launch a flack suppression campaign before attacking the Syrian tanks. This unavoidable tactical inversion cost the IAF dearly, both in terms of aircraft and pilots. Arab air losses are not as easily arrived at, but a fair estimate is approximately 410 jets and 41 helicopters. Israeli interceptors accounted for most

of the losses, of which about half occurred in the final week of the war during the Egyptians' vain attempt to stem "Arik" Sharon's daring counteroffensive, on the West Bank of the Suez Canal.

These statistics, considered in relation to other factors of the war, point to some important lessons learned and indicate, however imprecisely, the magnitude of the Arab air defense effort.

Perhaps the most basic lesson that was validated was the importance of the family of weapons concept to air defense. This concept envisions complementary air defense systems that engage enemy aircraft at all altitudes, and air defense fires that begin at maximum range and intensify as the enemy approaches the defended area. Paradoxically, the Arabs' neglect of this doctrine served as its best illustration. As the table indicates, the Arabs deployed most of the Soviet family of AD weapons, except the high-to-medium altitude air defense-oriented SA-4, Ganef. The SA-6 Gainful depends upon the SA-4's long track radar for altitude discrimination and early warning information. By not fielding the Ganef in the October War, the SA-6 was "blinded" at high altitudes, a disadvantage that was quickly exploited by the IAF, which used high and steep attack profiles to destroy it.

The IAF was not as successful in countering antiaircraft guns, which were again extremely lethal weapons, repeating the experience of the North Vietnamese, and accounting for nearly one-third of the Israeli aircraft that were shot down. The ineffectiveness of the SA-7, the "Russian Redeye," however, was surprising. In testimony before Congress, Assistant Secretary of the Army for Research and Development, Norman R. Augustine, stated that over 5,000 SA-7's were fired during the war, but that only a handful of jets were destroyed. Contrast this to the accomplishment of the Viet Cong in the Spring of 1972, when one out of every three Strella firings, against unprotected helicopters, resulted in a kill. Many Israeli aircraft were able to return to their base, even after being hit by the SA-7, because of the missile's small explosive charge. Rest assured that the Soviets will quickly correct this deficiency. Still more Israeli planes were saved by the evasive tactics and electronic gear that was developed by the USAF.

Israeli fighters, carrying ECM pods, prevailed over the older SA-2 and SA-3's, but were virtually powerless against the newer SA-6 which was seeing action for the first time. This missile system is very effective in an ECM environment because of its multiple frequency bands, terminal infrared guidance, and optical backup feature. At first, chaff was tried to confuse the Gainful's *Straight Flush* Radar, but it wasn't effective until the SA-6's frequency range became known late in the war. Helicopters were also used to spot missile launches — the two Israeli helicopters that were shot down were doing just this. After being warned of a missile firing, aircraft would execute a series of violent maneuvers to "shake off" the missile; if this failed, flares or "heat balloons" would be dispensed to decoy the infrared missile from the jet's vulnerable exhaust. The value of these countermeausures were mitigated by the evasive maneuverings often bringing the aircraft into the effective range of the Arabs' accurate AAA fire, or by the use of filters in the missile's infrared seeker that enabled it to distinguish the lower temperature decoy from the higher temperature engine exhaust.

Many of the electronic warfare measures that were developed during the war must necessarily remain a secret. But the lesson is clear — although it is important to train air defensemen to operate in a heavy ECM environment and to pursue a vigorous electronic warfare R&D effort before war erupts, it is probably more important to have the capability to gather electronic intelligence after hostilities have begun and to rapidly develop and field electronic countermeasures.

Associated with the extensive use of electronic warfare, and complicated by it, is the coordination of the use of friendly airspace. The proliferation of free-wheeling, heat-seeking missiles and quick reacting AAA in the forward area, without an adequate airspace control system, resulted in the restriction of Arab airspace to friend and foe alike. The Arab planners discovered that it is one thing to deny the enemy the use of friendly airspace and quite another to allow friendly aircraft the simultaneous use of that same airspace. The airspace coordination problem is a serious one and must be solved so that air defense can realize its full potential.

The mission of the Arabs' field army air defense was to deny the enemy the use of friendly airspace. The Syrians almost achieved this goal on the Golan early in the war. Because they did

not, passive air defense became an important Arab tactical consideration. By shrewdly combining the use of smoke with active AD, the Egyptians prevented the destruction of their Canal crossing sites. Smoke was also successful in reducing the accuracy of the TV-guided Walleye. The use of camouflage and darkness to conceal troop movements and resupply operations was as important as ever. Although not strictly a passive measure, the use of small arms and light machineguns in self-defense was beneficial, particularly against helicopters.

Just as aircraft proved to be vulnerable to air defense weapons during this war, the air defense weapons also had their own survivability problems. After the IAF blunted the Syrian offensive and was able to mount an effective flak suppression campaign, not only did their aircraft loss rate drop significantly, but only the hurried Russian resupply of SAM's sustained the Syrians in and around Damascus. This war showed that AD weapons will be high priority targets on future battlefields for enemy air, for field artillery, and for guerillas. Smokeless rocket motors, tracked mobility, short emplacement times, adequate for "shoot and scoot" tactics, small arms armor protection for AAA, and adequate perimeter defenses are items that must receive top attention if our air defense is to survive on the modern battlefield.

There are other lessons to be learned, principally about AD ammunition expenditure rates, smart bombs, and radar-homing missiles. But the premier lesson to be learned from this most modern of battlefields is the necessity to saturate the forward area with a coordinated air defense system. The inescapable conclusion of both the Vietnam and the Middle East Wars is that ground-based air defense must be dense to be effective. There is ample evidence that the Russians know this. The accompanying table shows the air defense weapons available to a Soviet Army Group in Central Europe. During wartime, the six Warsaw Pact Army groups would have 480 AAA and 102 SAM batteries. This awesome force, which far exceeds the air defense fielded by the opposing NATO armies, is deployed in a theater in which the best that can be hoped for is air parity. The US Army must heed the lesson of the Fourth Arab-Israeli War to greatly increase its field army air defense strength.

ISRAELI AIR LOSSES

Losses Due To:	Number
SAM (less SA-7)	41
AAA (ZSU-23-4 or ZSU-57-2)	31
Either SAM or AAA	3
SA-7	3
Either SA-7 or AAA	4
Aircraft	3
Unknown	18
Total	103 *

*Does not include two helicopters that were lost.
Source: Charles W. Corddry — *National Defense* May/June 1974

AIR DEFENSE WITH A SOVIET ARMY GROUP*

Weapon	Number of Fire Units/Launchers	Number of Batteries
ZSU-23-2	114	19
ZSU-23-4	128	32
ZSU-57-2	36	6
S-60	138	23
SA-6	15	5
SA-4	27	9
SA-2	18	3

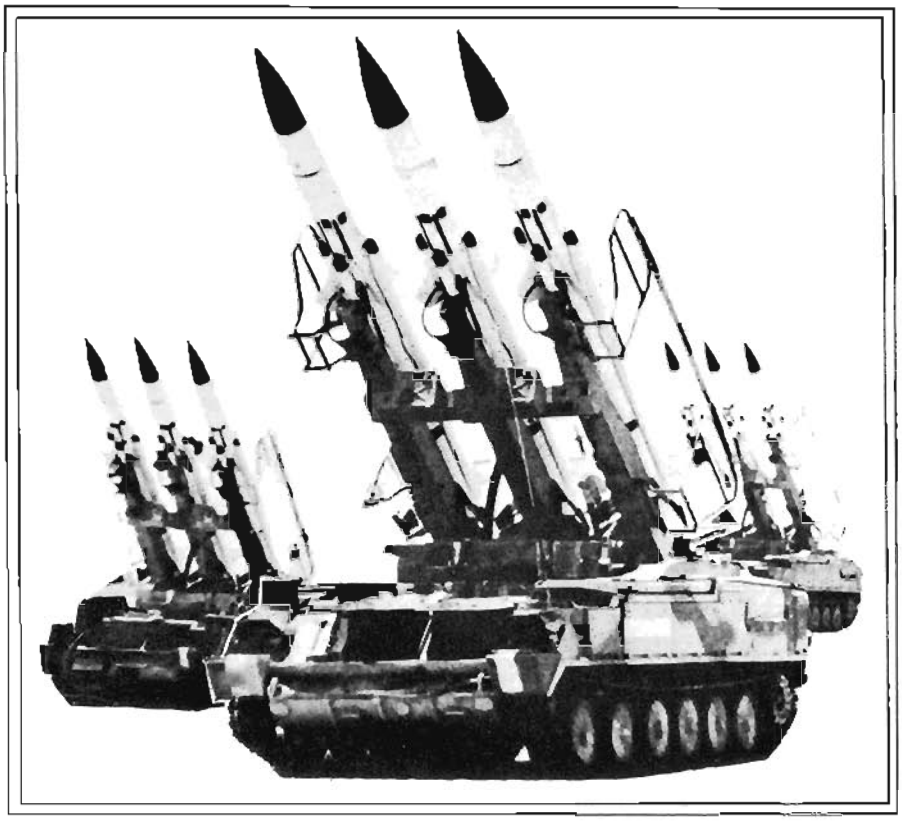
*Does not include: (1) The SA-7.
(2) 64 troops of vehicular-mounted SA-7's.
(3) The SA-3 GOA employed in point defense role (air base defense, logistic areas, etc.)

Source: International Defense Review, August 1974, page 450.

ARAB AIR DEFENSE WEAPONS

Weapon	Slant Rn	Mission
SA-2 Guidline	25 miles	High-to-Medium Altitude Air Defense (HIMAD)
SA-3 GOA	15 miles	Low-to-Medium Altitude Air Defense (LOMAD)
SA-6 Gainful	16 miles	Low-to-Medium Altitude Air Defense (LOMAD)
SA-7 Strella	2 miles	Man-Portable Air Defense (MANPAD)
ZSU-23-4	1,200 meters	Short-Range Air Defense (SHORAD)
ZSU-57-2	1,200 meters	Short-Range Air Defense (SHORAD)

Source: Jane's Weapon Systems 1971-72, R. T. Pretty and D. H. R. Archer, Editors.
Air Defense in the Soviet Union, Major Tyrus W. Cobb



SA-6 GAINFUL

Lieutenant Colonel Staudenmaier is Deputy Chief of Staff, Ballistic Missile Defense Program Office, Headquarters, Department of the Army. This is his third major article to be published, the others being, "Air Defense for Armored Leaders" (published in Armor magazine) and "Divisional Air Defense" (published in *Infantry* magazine).

ZSU-23-4

Lieutenant Colonel Arthur D. McQueen

The views expressed in this article are those of the author and do not necessarily reflect the views of the US Army Air Defense School or Department of the Army. Material used is certified by the author to come from unclassified sources.

* * *

This article was written entirely from unclassified openly-available public media sources and unclassified US Army sources. This has the advantage of allowing open and wide dissemination of the article for discussion and consideration; but has the disadvantage of not being officially authoritative. Since most of the article is from non-US Government media sources, it does not necessarily reflect the views of the US Government or the Department of the Army.

–Author

Of all weapons used in the Arab-Israeli conflict of October-November 1973, one has stood out as tremendously impressive in its devastating capability. While US tanks and antitank capabilities appeared as good as or better than the Soviet-supplied systems used by Arab forces, the Soviet ZSU-23-4, a self-propelled quad-23mm antiaircraft (AA) machinegun system proved most exceptional as a tactical AA system.

The Israeli Chief of Staff, General Ytzhak Rabin, observed, "much is left to be desired on the western side in terms of electronic warfare and weapons to cope with Russian ground-to-air systems. These systems have proved to be decisive in the sort of war we have now seen and which the Americans and their Allies have to face in Europe or elsewhere . . ."[1] These sentiments were echoed in an interview with Israeli Defense Minister, Moshe Dayan. Mr. Dayan said

he considered Soviet antiaircraft weaponry ahead of that of the United States but expected American improvement in this field. The American counterparts to the Soviet ZSU-23-4, the Vulcan and Chaparral short-range missile, are not radar-directed and lack an all-weather capability.[2]

Some insight into how these two high Israeli defense officials formed these opinions may be found in other reporting on the effects of the ZSU-23-4 in that conflict. "The one area in which Soviet equipment proved superior was in mobile antiaircraft. On both fronts, such weapons took a heavy toll of Israeli aircraft. The weapon reportedly used with devastating effect, was a radar-directed four-barrel, 23-mm machine-gun."[3] "The SA-6 scored some kills during the Golan battle, but its main contribution was sending the Israeli attack planes into their standard high-g split-S evasive dive to the deck where the ZSU-23's chewed them up."[4]

These observations concerning this weapon have already had some impact on the western allies: "Use of Soviet supplied antitank and antiaircraft weaponry during the October War in the Middle East has forced Eurogroup, a key agency of the North Atlantic Treaty Organization, to add new projects to its acquisition review . . . after study of the remarkable results of the Soviet ZSU-23-4 SP-quad-mounted 23-mm antiaircraft gun . . ."[5] The US military services have also begun developing countermeasures to this apparently outstanding Soviet weapon system.

Although first displayed on 7 November 1965 and encountered by the US Air Force flying over North Vietnam during the last stages of the Vietnam conflict, the ZSU-23-4 was most actively confronted in combat during the October 1973 war. This exposure was enough to emphasize the threat posed by this one weapon system to US combat forces. With the emphasis on airmobile assault-type operations induced by US participation in the Vietnam conflict, it is a threat which must be considered in all future airmobile operations against a Soviet-equipped force. Electronic countermeasures (ECM) against this weapon system must be quickly and effectively devised.

The Weapon System

The quad-mounted 23-mm machineguns of the ZSU-23-4 are among the most modern guns in the Soviet antiaircraft inventory. The guns are fully automatic and gas-operated. Individual tubes are liquid-cooled and different flash-hiders are used than with the standard towed 23-mm guns.[6] Each individual gun has an estimated maximum firing capability of 1,000 rounds per minute (rpm) with all four guns allowing a 4,000 rpm capacity. The guns can be fired manually by the gunner or slaved directly to the Gun Dish radar through a built-in fire control computer.[7] (See Table 1 for statistical data on armament.)

The vehicle chassis on which the quad-guns are mounted is an outstanding example of equipment standardization. The chassis, hull, and automotive components are the same as for the PT-76 amphibious tank,[8] which has been around since the early 1950's. This same chassis is used in two other Soviet combat vehicles, the BMP-76 and BTR-50P amphibious armored personnel carriers.

A remarkable component of the system is the target acquisition and tracking radar, NATO codenamed "Gun Dish." This radar functions in the "J" band at the 15.56 GHz frequency.[9] It has a very narrow band width which provides excellent tracking of aircraft and makes the ZSU-23-4 very difficult to detect or evade.[10] Since the radar operates at such a high frequency, it has a limited range. This can be partially compensated for by connecting the system to other long-range acquisition radars in the area of operations. The Gun Dish remains slaved to the acquisition radar until lock-on and then trains the guns and computes target speed and range, virtually assuring deadly accuracy. When traveling and not in use, the Gun Dish radar can be folded down out of the way behind the turret in a stowed position.

FOOTNOTES

1. Serge Fliegers, "Soviet Tactics Prove Better," *Boston Sunday Herald Advertiser*, November 4, 1973, p. 5.
2. Drew Middleton, "Dayan Says Soviet Jets in Syria May Be Mig-23s," *The New York Times*, April 2, 1974, p. 3.
3. John W. Finney, "Missile Giving New Muscle to Infantry," *The New York Times*, November 2, 1973, p. 19.
4. Herbert J. Coleman, "Israeli Air Force Decisive in War," *Aviation Week and Space Technology*, December 3, 1973, p. 18.
5. "Mideast War Sparks New Weapon Study," *Aviation Week and Space Technology*, December 17, 1973, p. 20.

Organization

The former tactical self-propelled AA system in the Soviet division was the ZSU-57-2 and it is believed that weapon system is being fully replaced by the ZSU-23-4. The ZSU-23-4 organization and deployment within the Soviet ground forces is likely the pattern for its deployment by other Soviet-trained and equipped forces. Since its appearance in 1965, the ASU-23-4 is found in virtually all of the Warsaw Pact Armies.[11] It was also used by the North Vietnamese during the closing months of the Vietnam conflict and by the Egyptians and Syrians in the October 1973 Arab-Israeli war.

The ZSU-23-4 is apparently assigned to the Soviet combat division in substantial strength. Each Soviet tank regiment has its own battery of ZSU-23-4's, and it is believed this same organization exists in the motor-rifle regiment.[12] Each of these batteries has three firing platoons with two ZSU-23-4's each for a total of six in the battery.[13] It is very likely the AA battalion assigned to each Soviet tank and motor-rifle division will contain additional ZSU-23-4's, probably in the same organizational configuration as the battery found at regiment. This would be consistent with the Soviet divisional organization pattern (i.e., each motor-rifle regiment has its own tank battalion in addition to the tank regiment at division). If the organization information and assumptions made by referenced sources are accurate, this places a very formidable ZSU-23-4 AA capability with the Soviet division. Since this gun system can also be used in direct-fire ground-support role, the ground commander also has a quite effective direct support automatic weapons capability.

The Threat

What makes the ZSU-23-4 a critical hostile target is that the US forces have no active ECM to counter the threat posed by this weapon.[14] Let's dwell on this startling statement for a moment and consider its impact on the US ground forces commander. If accurate, this statement reveals that even if the field commander finds and identifies the ZSU-23-4 on the battlefield, his only means of keeping it from accomplishing its mission of clearing the skies of US combat support aircraft is direct attack by air, artillery, or other direct fire means.

Over the past 10 years, the US Army has spent extensive time, effort, and even lives (in Vietnam) developing and perfecting airmobile tactics. The Army has organized entire airmobile brigades. We teach these tactics at our service schools to career officers who will be the top leaders and generals of tomorrow. For example, a subcourse of the US Army Command and General Staff College[15] uses a night airmobile assault scenario involving a brigade-size task force of over 60 helicopters filled with infantry troops and their command and staff elements. The scenario envisions flying an air approach route around the enemy's right flank to assault and secure an objective in his rear area. Imagine a gruesome twist to the scenario which is not presently addressed directly in the exercise: After dark, and prior to the assault, one or more batteries of ZSU-23-4's are moved into position in a valley down which the troop-loaded helicopters must fly to reach their assault landing zone. The long-range target acquisition radar supporting the ZSU batteries detects the flight of US helicopters as they cross the mountain range and swing into the valley. With ample fire-preparation time, the ZSU's wait in silence. When the largest number of US helicopters enters the range zone of the ZSU batteries, all open fire in the darkness with their firing rate of from 800 to 4,000 rpm per weapon. The chaos alone created by the ZSU attack, not counting the troop-loaded helicopter losses, would gravely disrupt the well-planned assault. The only countermeasures available to the helicopter pilots would be to attempt to immediately get out of range of the ZSU guns or to attack the ZSU's directly. In any case, accomplishment of the brigade taskforce mission becomes questionable if not impossible.

While many other factors would likely have entered into the above scenario (i.e., hopefully the ZSU's would have been detected moving into position by other intelligence means, etc.), it is used as a simple illustration to emphasize the

6. USAREUR Pamphlet 30-60-1, *Armored Vehicles, Tanks and Self-Propelled Artillery*, Volume III of Part One, *Weapons and Equipment, East European Communist Armies*, US Army, Europe, 15 February 1973, p. 103.
7. R. T. Pretty and D. H. R. Archer (Eds.), *Jane's Weapon Systems 1973-1974*, London: Jane's Yearbooks, 1973, p. 570.
8. "Soviet Anti-Aircraft Gun Takes Toll," *Aviation Week and Space Technology*, October 22, 1973, p. 19.
9. *Ibid.* Much of the background information for this paragraph may be found in this source. The current "J" band incorporates frequencies from 10 to 20 GHz and equates to portions of the former "X", "Ku", and "K" bands.
10. *Ibid.*
11. USAREUR Pamphlet 30-60-1, *op. cit.*, p. 253.

danger to US airmobile tactics by this one weapon system, and that the system must be taken into consideration when planning airmobile operations against any Soviet-trained or armed force. US ground commanders must be prepared to cope with this weapon in any situation.

Attacking the Threat

Some steps are already underway to counter the ZSU-23-4 threat. For example, the US Army Missile Command is studying air defense suppression missile prototypes built by North American Rockwell's Missile Systems Division and Martin Marietta Orlando Division under Contracts in excess of $1 million.[16] These missiles are to employ a dual-mode guidance technique enabling them to home on the Gun Dish radar RF signals or on infrared emissions from the carrier or the gun barrels. There are indications that the US Navy and Air Force are preparing to meet the postulated threat through detection and deception ECM systems. The problem with all of these systems or devices under development is that they are in the future and not in the hands of the soldier.

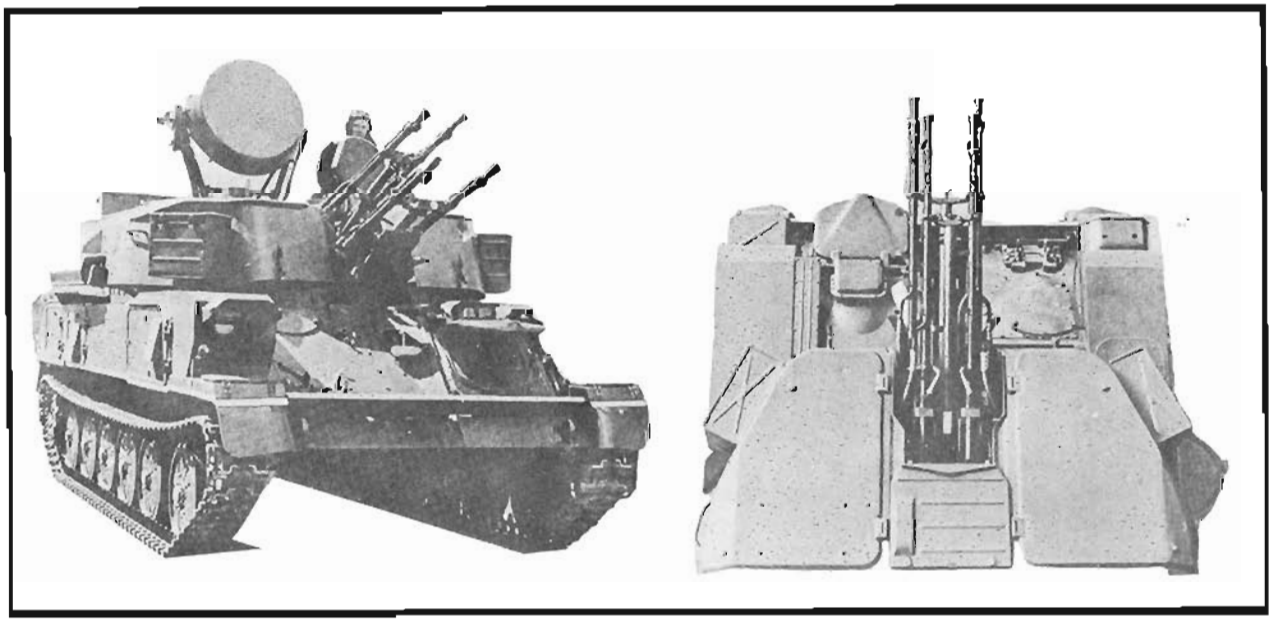
The threat posed by the ZSU-23-4 system to US Army airmobile and air assault operations must be planned for and dealt with in training *now*; because the ZSU-23-4 exists now and is available to a potential enemy in large numbers. The present Army aviation and ground commander must be prepared to indentify, locate, isolate, and attack the ZSU-23-4 on the modern battlefield if Army aviation is to be able to function over and beyond the FEBA and not just in friendly rear areas.

In addition to the research and development measures already mentioned, desirable ultimate goals appear to be:

- Development of receivers and direction-finders to identify and rapidly locate the Gun Dish radar when it is turned on.
- Development of ECM equipment to neutralize the Gun Dish radar whenever confronted on the battlefield.
- Development of on-board warning systems to alert Army aviators when a Gun Dish radar is in the vicinity and capable of detecting the ZSU-23-4 before coming into its range.

In the meantime, the field commander must continue to use tried and tested combat techniques such as:

- Educating all personnel of the command



12. "Die Sowjetische PzFlakKp ZSU-23-4," *Soldat und Technik*, May 1973, p. 255.
13. *Ibid.*
14. Barry Miller, "Israeli Losses May Spur ECM Restudy," *Aviation Week and Space Technology*, October 29, 1973, p. 16
15. *Division Operations VI*, Subcourse 23/3, Lesson 5, Fort Leavenworth, Kansas: US Army Command and General Staff College, April 1973.
16. "Army Missile to Counter Soviet Quad-23," *Aviation Week and Space Technology*, November 20, 1972, p. 77. Much of the background information for this paragraph may be found in this source.

about such weapon systems, their capabilities, and the threat they pose to friendly forces.

- Train all personnel in rapid reporting techniques when a ZSU-23-4 is observed in forward combat areas. Since these weapons provide an antiaircraft umbrella for armor forces, this may also be an eminence of attack indicator.
- Fully utilize existing division intelligence agencies (i.e., Army Security Agency specialists, imagery interpreters, prisoner interrogators, etc.) to locate and keep tabs on ZSU-23-4 units.
- Make the ZSU-23-4 a priority target for all elements of the division whenever and wherever confronted on the battlefield.

ZSU-23-4 ARMAMENT

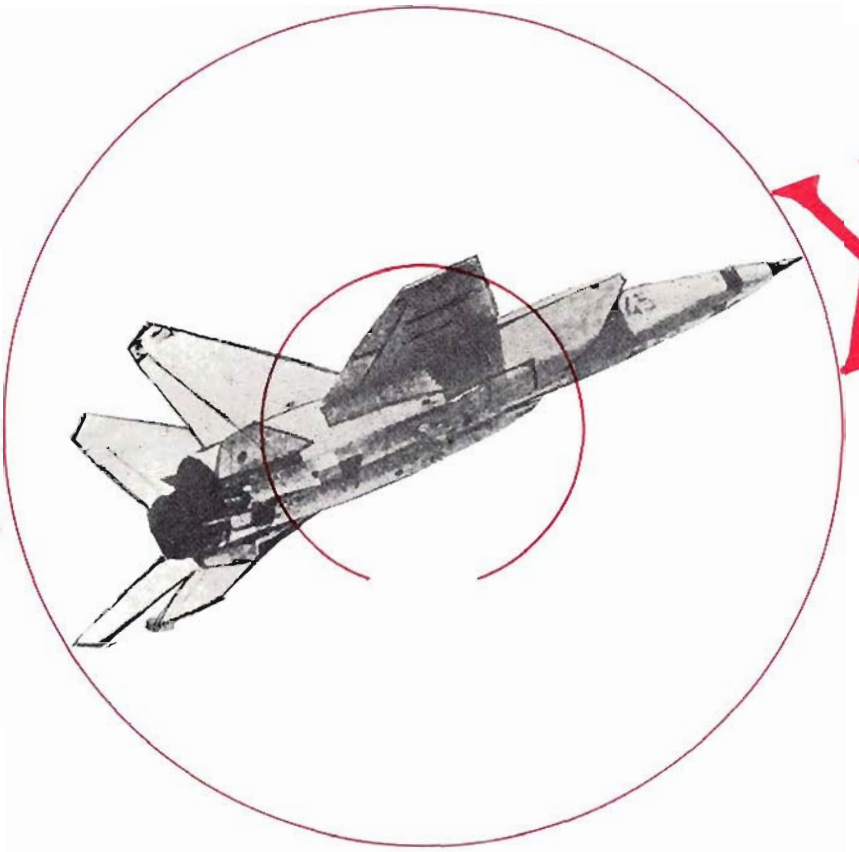
Caliber	mm	23
Length of Tube in Cals		81
Length of Tuber Overall	mm	2,010
Elevation	0	+80
Depression	0	−5
Traverse	0	360
Rate of Fire Per Tube:		
Cyclic	rpm	800-1,000
Practical	rpm	200
Feed		Belt
Projective Weight:		
HE/HEI	kg	0.19
AP/API	kg	0.189
Muzzle Velocity:		
HE/HEI	m/s	970
AP/API	m/s	970
Maximum Range:		
Horizontal	m	7,000
Vertical	m	5,100
Effective AA Range	m	3,000
Pointblank Range - AP/API		
2m high target	m	900
Armor Penetration - AP/API		
0°/500m	mm25	

Source: USAREUR Pam 30-60-1, Part One, Volume III, dated 15 February 1973.

TABLE I

Lieutenant Colonel McQueen is a graduate of Henderson State College in Arkansas and holds a Masters Degree in Education from Boston University. He was formerly a Foreign Armies Instructor at the US Army Security Agency Training Center and School and is currently S2/S3 of the 525 Military Intelligence Group, Presidio of San Francisco.

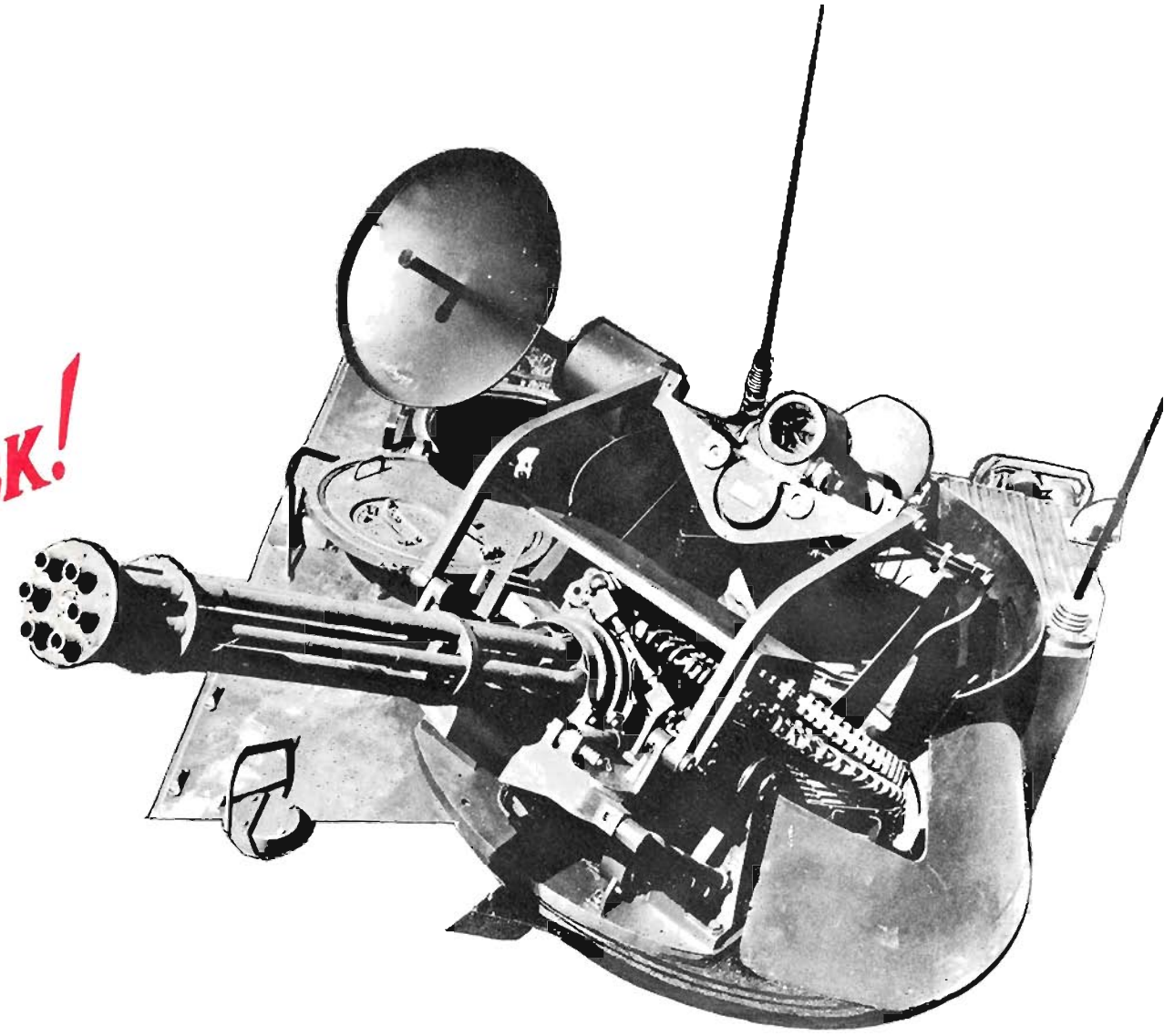
FOXBAT NINE O'



Lieutenant Colonel James R. Webb

Private Thompson felt naked, confused and very alone. His brief time in the Army had, at least to his mind, left him unprepared for this moment. He tried to recall everything they had taught him back at Fort Bliss about being a Vulcan gunner but somehow it just didn't make him feel any safer up there in his exposed gunner's position. He kept watching the big Sheridan tanks lumbering majestically through the desert ahead of him and wishing he had just a bit more protection like their thick-skinned hulls instead of his thin-skinned Vulcan.

Thompson's platoon leader, Lieutenant Wyatt, himself as new to the Army as Thompson, had been barely able to conceal his excitement that morning as he briefed the members of his four-gun Vulcan platoon on the upcoming support operation. His voice occasionally breaking slightly with tension, he had told them they were moving forward to provide air defense protection to a combined armor/mech force which was attacking to secure a hill which would provide the brigade control over a river crossing. None of this meant very much to Thompson as far as the



big picture went but he did recall going through those hot, dusty training exercises with the 3d Cav back in the Texas desert. As best he could recall, the primary objective was to stay up close to the rear tank section that was overwatching the lead platoon in order to shoot down any aircraft that might attack it. His small tinge of pride at these remembrances was immediately squelched by other recollections of a never-ending series of frantic dashes followed by endless waits, squinting into the sun from which the aircraft would come. Thompson wondered if the attack this afternoon would be just as boring and noisy.

Somehow now that it was afternoon, however, it all seemed different. True, the desert was pretty much the same with its endless sand and heat, but there was an eerie and threatening silence which Thompson couldn't recall from Bliss and the rumble of the tanks and his own tracks seemed uncomfortably loud.

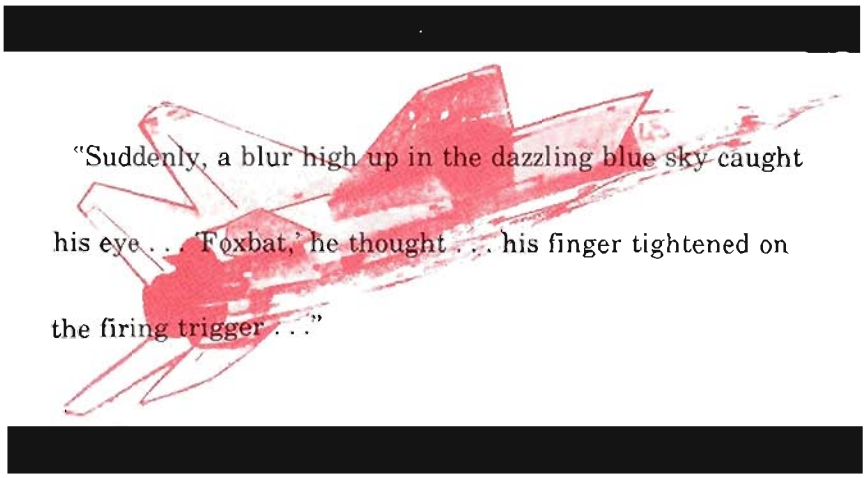
Thompson glanced ahead to the command group for reassurance where Lieutenant Wyatt rode and then settled back to scan the skies

where his enemy lurked. Suddenly, a blur high up in the dazzlingly blue sky caught his eye. His mind unconsciously registered wings, fuselage, tail. "Foxbat," he thought, and somehow without knowing why, he knew it was on a reconnaissance mission. His finger tightened on the firing trigger then relaxed with the realization that the plane, moving with such speed, was far beyond the range of his guns. There was a certain sense of frustration at his inability to attack this aircraft as he had been trained to do, but just as he was about to pull his eyes away, there was a burst of white smoke near the plane. "Hawk," he thought, as the Foxbat made a violent climb to get above the range of the sister AD battalion providing overhead coverage for the division. Thompson felt a little better knowing that other eyes than his, eyes with far seeing radars to help them, were also guarding the airspace over the people in the division.

Feeling somehow that the aircraft he had been watching boded a threat to himself, Thompson returned to scanning the skies even more carefully.

Suddenly his track turned slightly and picked up speed. A glance told him that the company team was changing formation. His track pulled up close to and slightly inside of the tank ahead. Thompson realized that was the formation used when contact was expected and felt his hands grow moist. Just as they got into this new position the heavy silence was split by a high whistle, followed almost instantaneously by two loud cracks. Looking back, Thompson saw smoke drifting up behind them. The radio crackled and Lieutenant Wyatt's voice came on. "Those are 152's ranging on us," he almost yelled. "Don't close up too much!" Thompson's track shuddered violently as it veered away from the tank it had been snuggling up to for protection. The whole formation veered off toward some hummocks which offered some scant protecton from these terrifying forces so foreign to all Thompson's experience.

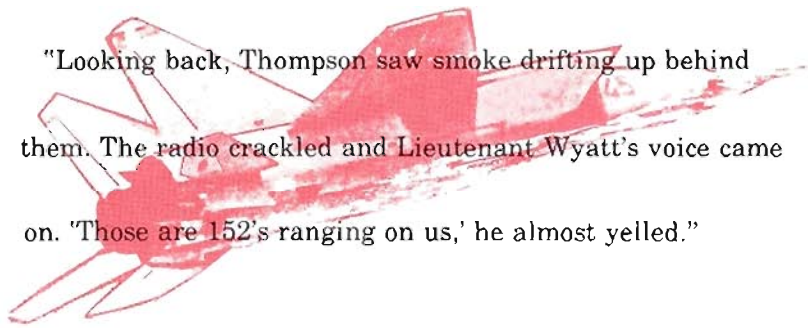
They traveled much more carefully now with one platoon moving while the other covered. Sometimes the AD guns stayed back and sometimes they moved with the lead elements. It all depended on Lieutenant Wyatt's guidance over the radio and seemed to be predicated on how far they had to move. It was stopping and starting, dusty and noisy, but somehow very different from those maneuvers they had practiced in training.



Thompson kept his eyes glued to the sky but knew he must also be ready to shoot at ground targets if Lieutenant Wyatt called on him. Suddenly, as they were waiting to move forward, one of the lead tanks up ahead belched smoke and flame. Thompson didn't know it but the tank had been hit by a T-12 antitank gun squatting in hull defilade more than 2 miles away. Its gunners, like Thompson, were proud of their ability to do their job. He was trained to shoot down aircraft while they could kill a tank at 8,000 meters. Thompson shuddered to think what they could do to his thin-skinned personnel carrier.

As Thompson's gaze shifted from the smoking tank to his front, his eyes caught movement further ahead. Two fast-moving blurs popped up over the hazy desert skyline moving perpendicular to the tank formation. Again, those endless

hours of aircraft recognition training paid off as Thompson's eyes registered their details, cataloged them, and called forth from his memory bank their designation and tactics. "Fencers," he thought, and there was no doubt in his mind that these sleek shapes met all of the hostile criteria he had studied so diligently in the battalion SOP. He knew they were completing their recognition run and soon would be climbing and turning so as to attack the formation he was defending. As they began a slow lazy turn Thompson began the firing preparations he had practiced a hundred times before. Quickly he looked down to see that his mode switch was in the radar position and that his M61 sight was uncaged. The aircraft had completed their turns and were heading for the rapidly dispersing tanks. Thompson sighted on the leading plane and punched the foot pedal activating the range only radar. "Slowly, slowly," he thought as he centered the ever-increasing silhouette of the aircraft in his sight. Suddenly, acquisition time delay occurred and the sight reticle drifted upward and to the right. Thompson slowly, oh so slowly, brought the plane back into the reticle. "Now," he muttered and squeezed off a 60-round burst. The track was immediately engulfed in smoke. "Keep tracking, keep tracking, smooth, smooth," thought Thompson as he blindly continued to move the gun to the left. As the smoke momentarily cleared Thompson again centered the reticle of his sight and squeezed off another burst. Despite an almost uncontrollable desire to duck, Thompson continued to squeeze off carefully aimed 60-round bursts. Through occasional gaps in the smoke haze he could see the tracers of the other three Vulcans converging on the aircraft and could barely hear through the deep-throated roar of the gatling guns the sputter of the tank machineguns as they tried to help. Suddenly, just as it seemed as if the planes were about to strike his track, one of them exploded with a deafening roar and the other pulled up sharply and clawed for altitude. Thompson knew he should be firing at the escaping plane as it banked away but he was weak with tension and fear and just couldn't traverse his weapon away from the fireball of the burning aircraft 800 meters away. He did, however, hear the distant sound of an explosion as the other plane, trying to escape the incessant chatter of 20-mm guns from the ground, had inadvertently strayed into the territory of the ever-present Hawk, far to the rear. "Two for two — that's not bad," thought Thompson, as he breathed a deep sigh and, feeling very much the veteran, prepared to continue the advance.



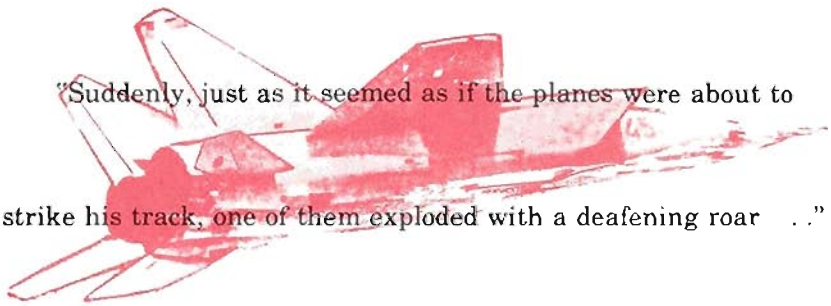
"Looking back, Thompson saw smoke drifting up behind them. The radio crackled and Lieutenant Wyatt's voice came on. 'Those are 152's ranging on us,' he almost yelled."

They were getting close now. That was easy to tell from the staccato chatter of PK machineguns up ahead and the smoke and occasional flames as the SPG-9's and RPB-7's sought and sometimes found their marks. The Vulcan stayed back with the supporting platoon as the tanks and mechanized infantry deployed to begin their first assault of the hill. Thompson could see "Fitters" coming "in" to provide close air support to the defenders and he began to fire at these planes as he had been trained to do even though he knew they were well out of range. Faced with this barrage, the aircraft veered away only to be attacked by the tank/mech team's organic Redeye weapons as the planes flashed their heat

source to these infrared homing-weapons which had left the platoon leader's command track and scattered out to firing positions to help Thompson and the other gun crews.

The fire ahead was deafening and Thompson felt very exposed even though his section chief had sought and found what cover he could. The hill ahead was defended by infantry and T-62 tanks in hull defilade and they poured out a withering fire even though the friendly artillery was pounding the hill with salvo after salvo. Thompson, in response to Lieutenant Wyatt's orders, joined in this fire, squeezing off burst after burst which described a gradual red arc as they sought out the infantry defending the hill. Thompson's attention was distracted as the tank alongside reared up, accompanied by a deafening explosion. Slowly it spun in a slow arc as one track slithered away. Again, Lieutenant Wyatt's voice crackled over the radio. "Saggers," he called, "look to the right." Thompson looked but saw nothing at first. Then a helicopter jumped up from behind a hillock and Thompson saw the silhouette of a missile being launched. Thompson knew the helicopter was too far away to effectively engage but he remembered that a burst or two might cause the gunner to lose his concentration. However, in spite of his efforts he had a sick feeling as the missile described a slow arc before impacting with another tank. Another helicopter popped up, this one much closer, and Thompson almost as a reflex sighted and fired. The missile, although launched, was never to reach its intended destination for Thompson's 20-mm shells found their mark long before the helicopter crew could guide the missile to its target. The other helicopter, seeing its companion destroyed, pulled out and Thompson turned his attention back to the battle for the hill. Things here were rapidly reaching a climax as the deployed infantry mopped up the defenders while the enemy armor was driven back or destroyed by the tanks, friendly artillery and close air support.

Much remained to be done for the position had to be consolidated but when the tank/mech team finished preparing hasty fortifications on the hill and had deployed their Redeyes for air defense, the Vulcan's job was done.With friendly waves from tankers and infantry, they pulled back in order to prepare for other tasks more urgently needed by the division commander. As they retraced their steps they passed burned-out tanks, broken tracks and the wreckage of the aircraft they had destroyed, each mute testimony to the lethality of today's battlefield and each providing evidence of the vital necessity for each element of the combat team.



"Suddenly, just as it seemed as if the planes were about to strike his track, one of them exploded with a deafening roar . ."

GLOSSARY

(In order of appearance in the article)

VULCAN: A 20-mm air defense gun system mounted on an armored personnel carrier or a two-wheeled towed trailer; operates on a rotary barrel principle, capable of firing at the rate of 3,000 or 1,000 rounds per minute; radar aimed through a computer controlled gunsight; normally employed with Chaparral system.

CHAPARRAL: An air defense missile system derived from the Sidewinder (AIM-9) missile; utilizes an infrared homing guidance system. Fired from a launching station which carries four missiles; launching station is mounted on a self-propelled tracked vehicle, or can be mounted on the ground; eight additional missiles are carried on the vehicle carrier; crew of five.

FOXBAT: NATO code name for Soviet manufactured MIG-25 fighter aircraft. Primarily used as an interceptor and high-altitude reconnaissance aircraft. Capable of operation at altitudes above 80,000 feet and at speeds greater than Mach 2.

HAWK: An air defense missile system; utilizes both pulse type and continuous-wave radars to perform low- to medium-altitude air defense coverage and intercepts; usually one battalion of three or four firing batteries is deployed in support of a combat division. Range - 40+ km.

152-mm GUN-HOWITZER (D-20): A towed artillery piece firing 4 rounds per minute; range 18,500 meters; basic load - 36 rounds; crew of 10.

T-12 ANTITANK GUN: A towed antiarmor gun; 100-mm, rate of fire - 10 rounds per minute; lethal against armor out to 8,500 meters, fires HEAT and APDS; crew of six.

FENCER: NATO code name for the Soviet manufactured SU-19 aircraft; first Soviet aircraft designed specifically for ground attack; incorporates a variable geometry wing; capable of carrying a wide range of ordnance including anti-radiation missiles.

PK MACHINEGUN (GROUP): A series of 7.62 machineguns in various configurations; general effective range - 1,000 meters; sustained rate of fire - 250 rounds per minute.

SPG–9 RECOILLESS GUN: A tripod mounted antitank weapon, firing a fin-stabilized, rocket-assisted 73-mm projectile; effective range - 1,000 meters.

RPG-7: A shoulder-fired recoilless antiarmor weapon capable of penetrating up to 14 inches of armor at 500 meters; normally employed at 300 meters or less; weight - 14.4 pounds.

FITTER: NATO code name for a series of Soviet-manufactured aircraft including the SU-7, SU-17 and SU-20. Aircraft are fighter types used primarily in the ground support role; SU-17 and SU-20 employ a variable geometry wing.

T-62, MEDIUM TANK: Weight approximately 36 tons; mounts 115-mm gun; with proper gunner training is lethal at 3,000 meters and beyond, normally engages at approximately 1,500 meters; carries a coaxially mounted 7.62 machinegun, may also mount a 12.7-mm machinegun; basic load - 40 rounds; road speed - 30 mph; range - 300 miles; may be equipped with deep fording snorkle and night-firing devices; crew of four.

REDEYE: A shoulder-fired air defense missile utilizing an infrared homing guidance. Deployment in two-man teams with company-size combat units.

SAGGER AT-3: A wire-guided antitank missile; may be manpacked (3-man crew) or mounted on carriers; range in excess of 2,500 meters; must be tracked all the way to target; effectiveness requires a high degree of gunner training and practice.

LTC James R. Webb has commanded batteries and served as battalion operations officer in both Hawk and Nike Hercules units. He holds a Masters Degree in Educational Administration and Supervision and is currently serving as The Tactics Division Chief in the Tactics Department at the United State Army Air Defense School.

NIGHT BIRD

Chaparral does not have a capability to engage targets at night. FALSE! Chaparral does have a capability to be loaded and fired under dark night conditions. The following is a culmination of data that the 3d Battalion (C/V), 6th Air Defense Artillery, Fort Bliss, Texas, has compiled during the course of organizing, planning, training, then loading and firing a total of nine Chaparral missiles — two at twilight and seven at night.

Background

Current air defense doctrine indicates that the Chaparral missile system is a fair-weather, daylight system. Consequently, there are no guidelines that provide for nighttime training in preparation for firing of Chaparral. To provide a ground commander a viable air defense network, Chaparral may be required to fire at night. Current annual service practices (ASP) do not make provisions for evaluating C/V units' abilities to function at night. After analyzing nighttime needs, we proceeded to conduct night training with the intent of providing a concept to aid in establishing doctrine for night firings. Our training program was designed to instill confidence in each crew member to perform at night and to generate ideas in deploying Chapparral to its optimum capability. We feel the results will help provide C/V units with ideas from which they can draw.

Execution

In July 1974, the battalion conducted a night firing exercise with Vulcans and tracking practice with Chaparral (ADT Jan-Mar 75). The purposes were:

- To determine the capabilities of Chaparral and Vulcan crews to perform at night.
- To establish the necessary training guidelines for the conduct of a nighttime ASP for Chaparral.
- To determine the maximum and minimum requirements of target presentations for conducting night firings.
- To identify safety requirements.

Crews were exposed to a night operation in which they were required to perform crew drill with minimum light sources. Conclusively, Chapparral gunners did easily track all targets and could have engaged. With this new-found data, we embarked on a training program in October 1974 that would:

- Enhance teamwork, promote proficiency, and instill confidence in the Chaparral crew's ability to function under darkness.
- Supplement crew drill outlined in FM 44-4.
- Identify safety constraints and incorporate solutions peculiar to nighttime operations.

The training program implemented consisted of 53.5 hours encompassing preparation for action, missile load and off load, misfire and hangfire procedures, tracking practice utilizing the remote model aircraft trainer (RMAT), and the simulated infrared target Chaparral (SIRTCH). (See "Scanning" p. 55, this issue.)

Training Observations

Based on gunner observations, the RMAT was the best available training aide for an experienced gunner. Unfortunately, the use of the system was limited to a daylight environment because the aircraft operator could not control the aircraft at night. In our opinion, the SIRTCH was the best training target for inexperienced gunners. The training system was very effective in preparing the Chaparral gunner because it can be controlled and maneuvered in a simulated nighttime environment. Although the SIRTCH can be used to train gunners in inclement weather, its continual use presented little challenge to gunners as they became accustomed to fixed target characteristics. We feel that the SIRTCH is a good first step and recommend it for training new gunners.

Annual Service Practice

In November 1974, Battery C conducted a portion of its ASP at McGregor Range and engaged in night firing. As indicated in the chart below, the left safety limits being 200 mils, gunners were unable to slew and track the BATS from launch, but rather had to acquire after launch.

During the night phase, the crews accomplished those tasks necessary to engage aircraft at night.

Specifically, a crew accomplished preparation for action, missile load, and actual target engagement with the first round fired at night. The loading of the Chaparral from the missile storage compartment was accomplished in darkness with the squad leader using a red-lens flashlight for checking the umbilical cable pins and an IR flashlight for checking the seeker. Nighttime crew drill and missile load posed no problem for the crews. Of the six gunners that fired, only one had fired before and it was during daylight; two of the six gunners were 16B transition into the 16P MOS. Two crewmen performing live missile load had formerly held 16B and 16C MOS.

Crew Drill Modifications

After analyzing Chaparral crew drills, it became apparent that certain procedures (*not* outlined in FM 44-4) had to be modified and implemented to insure continuity of crew performance, promote safety, and maintain control of crew activity while performing under darkness.

The squad leader assumed a more active supervisory role. Each of the modifications was tested and analysed during the training phase prior to the actual firing. The modifications are workable and have proved to be effective when launching a missile under darkness. As observed, there were no problems encountered in performing adjustments, gunner checks, and missile load. The following improvisations were made:

- A call and response method of performing crew functions was instituted and used throughout the night firing phase. This proved very effective in keeping the squad leader appraised of the flow of the crew drill during periods of limited visibility.
- Crewman No. 3 connected a TA 312 field telephone to the intercom on the master control panel in order to control the mount in event of safety violation and to insure that the gunner had completed his checks prior to conducting missile checks.
- Crew members were prohibited from placing any equipment atop the track.
- A flashlight (red-lens) was used to check and seat the umbilical cable.
- The dome covers were removed, the guidance section checked with an IR flashlight, and then the rolleron protective covers, safety pins/streamer, and tape around the target detecting device were removed rather than removing the safety pins/streamer first as outlined in FM 44-4.
- The squad leader was required to personally check and verify that the dome covers, safety streamers, and torque wrenches were removed and returned to the tool compartment.

Implemented Safety Procedures

With safety always a major consideration during any operation, we identified and implemented all the obvious safety requirements necessary for conducting a safe firing. To preclude unnecessary movement, all systems were prepared and emplaced on the firing line prior to darkness. There were no accidents, injuries, missile hangfires, or misfires during the entire operation.

For the sake of simplicity, our safety procedures have been divided into two categories — firing range safety and crew safety.

Firing Range Safety

- Left and right firing safety limits were marked with field artillery aiming stake lights (low intensity) color coded red and green.
- An azimuth reading of the right and left safety limits was taken from the azimuth indicator on the center control panel of the Chaparral and given to the gunner.
- A single strip of red illuminous tape, three feet long, was placed vertically on the mount and two strips placed vertically at the base of the launching station, indicating the right and left safety limit. The tape on the mount being alined between the tape on the launching station indicated to the safety officer that the gunner was within safety limits.

Crew Safety

- The senior gunner was given a flashlight to check and insure proper seal of the canopy prior to firing.
- The senior gunner was required to open the canopy and direct a flashlight with both hands while the squad leader removed the tape on the target detecting device, the dome covers, and the safety pin with streamer.

• Engineer tape was used to mark a path from the safety bunker to each firing position.

• Lifting shackles on the system were removed to prevent crew members from tripping.

Findings

• A properly prepared Chaparral system and a well-trained and disciplined crew can function effectively at night.

• Nighttime annual service practices are realistic, practicable, and serve to instill confidence and promote efficiency among crews.

• The BATS launched with two tail-mounted W112B infrared flares and a nose-mounted M2540 IR POT were not realistic in that they provided too much target illumination. As configured, the BATS simply does not present a challenge to an experienced gunner. Its straight line trajectory and known launch point are not realistic.

Another Challenge

Back to the drawing board, we decided that an unaugmented BATS (one with only the residual heat from the 2.75 rocket boosters) would present more of a challenge. In January 1975, Battery C once again returned to McGregor Range to launch a missile. The mission was to determine if, under clear night (full moon) conditions, a Chaparral gunner could track, engage, and destroy a BATS using only the residual heat from the 2.75 rocket booster. The test was to determine whether a gunner could more easily track the target using moonlight reflected from the BATS or using the moon to provide a silhouetted target; however, the cloud cover was extremely dense and dark night conditions prevailed. The decision was made to launch a BATS at 2018 hours and, if the senior gunner could track, he would engage. After launch, the gunner momentarily lost missile tone; however, by shifting the center of the reticle slightly off the target, he regained missile tone and engaged. The engagement was successful. Time from target launch to missile launch was 7.63 seconds and time from missele launch to intercept was 5.16 seconds. The missile trajectory code was determined to be Echo with little missile maneuver at enablement and no discernable maneuver immediately prior to intercept. The four 2.75 rocket booster cluster burned out 1.5 seconds after launch, giving only a slight red glow as a target. The target was launched at a 40° angle and an azimuth so as to give a predominantly outgoing target sight picture.

Comments

• A Chaparral gunner can effectively engage and destroy a target with a minimal IR output under conditions of darkness.

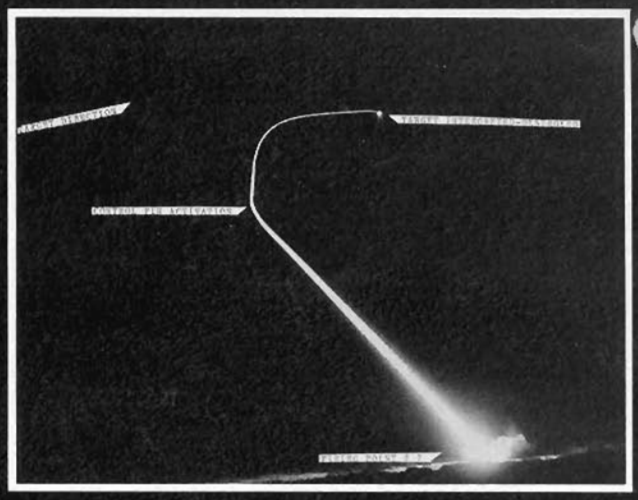
• An unaugmented BATS presents a target much more representative of the IR output of a hostile aircraft than one with the tail mounted W112B flare infrared and the nose mounted M2540 infrared POT.

• To make use of an invaluable training environment and to provide a more realistic comparison in different gunners' capabilities to detect and engage an unaugmented BATS, we selected two gunners who had never fired at night and scheduled a firing for 11 February 1975, under dark night conditions. Once again, the results proved that it could be done since both gunners tracked, engaged, and successfully fired on unaugmented BATS, destroying both of them.

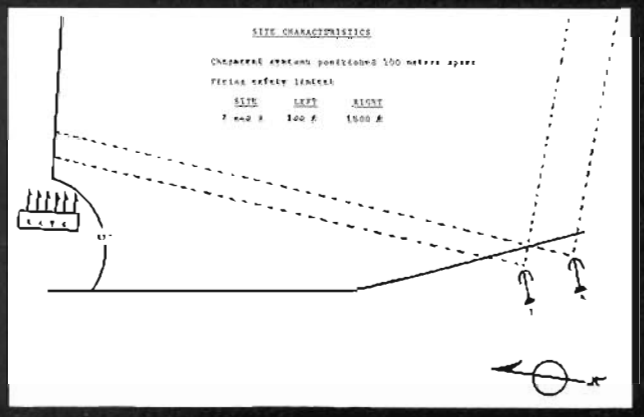
Conclusion

Experience has repeatedly shown that Chaparral crewmen and the missile can perform effectively at night. Without doubt, night training is realistic and invaluable in expanding the role of Chaparral. Crew confidence, in both their ability and in the system, warrants a need for commanders to continue to stress the importance of night training revolving around actual firings. Although we have attempted to share our experiences, there are still untraveled paths and unopened doors that will further enhance our role with the ground commanders we defend. Without question, a more realistic target that provides maneuverability and identification techniques needs exploring. Further modifications enhancing the realism of the annual service practice are also much needed improvements. Naturally, there will be unavoidable range and operational restrictions; however, the formulation of new Chaparral firing doctrine will, for the most part, depend on the inventiveness and ingenuity of the air defense commander.

Chaparral firing at a BATS equipped with a nose-mounted M2540 IR Pot and a tail-mounted W112B flare. Note high visibility of BATS trajectory.



Chaparral firing at a BATS using only the heat from the rocket motors for acquisition and engagement. Note very faint visibility of BATS trajectory.

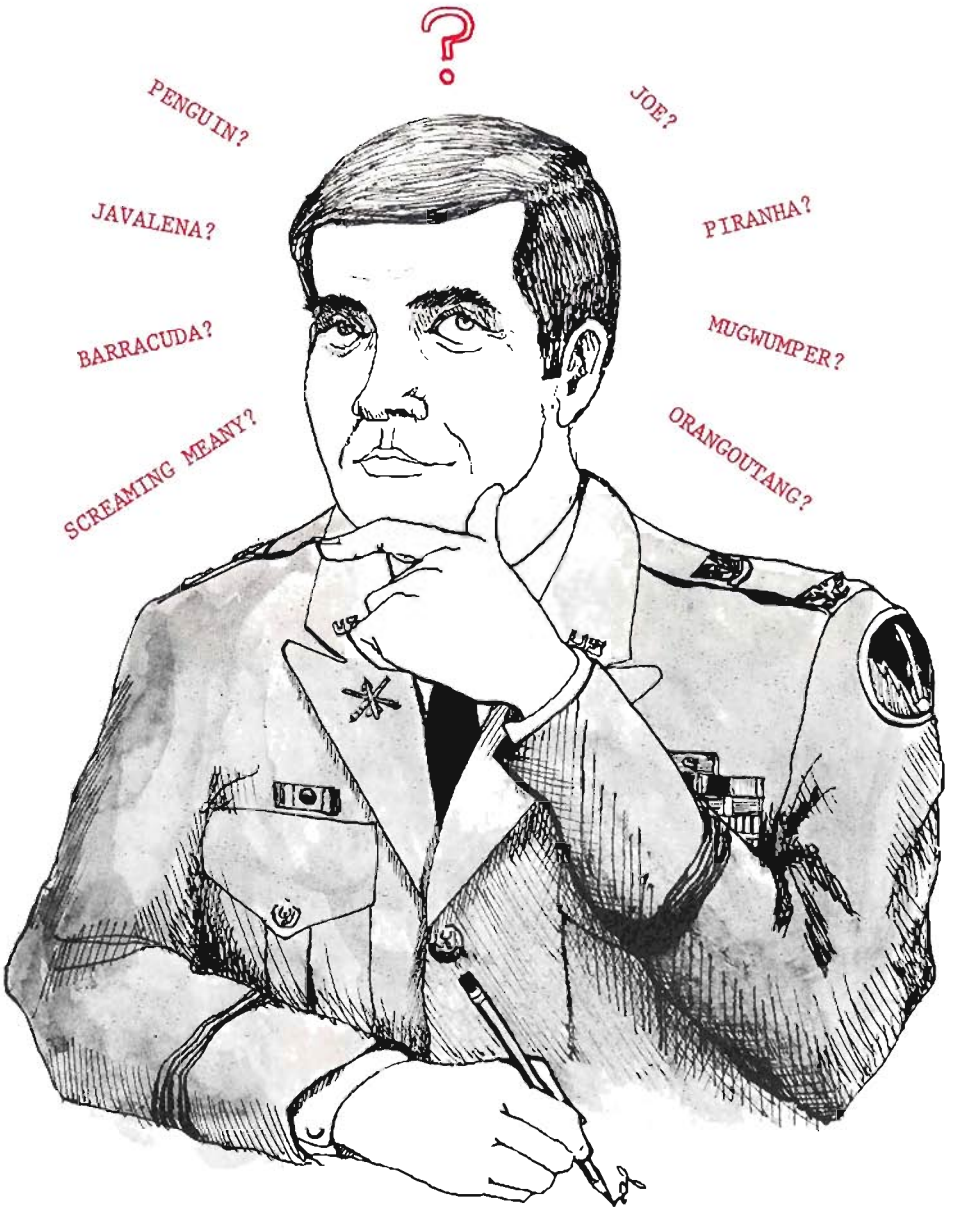


Six missiles were launched, all achieved kills, two at twilight and four under clear night, full moon conditions. Six BATS were launched 87° from the firing line, approximately 1,200 meters from the first Chaparral firing point.

Major Yancy holds a Bachelors Degree in Mathematics from the University of Southern Mississippi. He has served two tours in Vietnam and was involved in the cease fire arrangements. He is presently S3 of the 3d Battalion (C/V), 6th ADA at Fort Bliss, Texas.

A SYSTEM NAMED JOE:

Anatomy of a Name



Lieutenant Colonel Thomas E. Bearden

Finding just the right name for anything can be a frustrating experience. This frustration spans the entire spectrum of name calling, e.g., naming a child, a pet, a park, a street, an item of hardware, or even a system — to be more specific, an air defense missile system. Have you ever really thought about the names and/or acronyms we have selected for many of our air de-

fense weapon systems? It is a common belief that names, titles, and labels should closely relate to and identify the product. Ask any large company about the importance of a brand name and its image.

It would seem that we have chosen few good names for our air defense systems. One of the better ones which comes to mind is, "Hawk." This name, "Hawk," connotes a keen eye to seek out the intruder, it brings to mind a sense of accuracy, sharpness, swiftness, and an ability to soar in and claw its enemy. Yes, Hawk is a good identifier for an accurate missile system with killer capabilities. At the opposite extreme we have the "Redeye" missile system. Redeye relates to bleary eyes, something wrong with our sighting apparatus, seeing red when we should be on target regardless of the color. The Redeye missile system deserves a great deal better than this. Redege is an accurate, effective, and devastating killer system. The name Redeye would not seem to relate this. Other examples of poor choices are: Ajax - a foaming cleanser, Zeus - sounds like goose, loose, or even juice, Safeguard- a good soap that supposedly protects rather than destroys.

With the foregoing in mind, I think it would be well for us (at least for those involved with the responsibility of naming our future missile systems) to have what amounts to an analysis or guide when selecting a name for an air defense missile system. Some desired connotations of a good name for an air defense weapon system are:

- Fiercely determined (heroic, stands against blitzkrieg air attack).
- Voracious (firepower, devours the enemy).
- Shields (barrier, fortress, protection, etc.).
- Deadly (instills the element of fear in the hearts of its enemies).
- Viciousness - implies no quarter given. Communicates to the foe that he is totally lost - will not even be permitted to flee.
- Tribal totem. This requires evoking additional imagery other than threat images alone.

These include:

1. Beauty
2. Admiration/deep respect.
3. Masculinity (pride, male dominance).
4. Desire to emulate.
5. Identification with the name.
6. Potency (power to rend or dismay enemies).
7. Awesomeness (the feeling that a force larger than man is evoked). This is the magic, medicine, voodoo, cross, holy war, God's warrior, etc.

Primal elements of a threat that pose the strongest dangers are:

- Pointed sharpness - our genes fear sharp teeth, sharp arrows, sharp missiles. This is the fear of being punctured by a sharp object (images of sharp teeth, pointed claws, thorns, daggers, arrows, spears, etc.).
- Edge keenness - the fear of being cut by sharp edges (image of slashing teeth, razors, swords, etc.).
- Speed - elemental carnivores, serpents, etc., are characterized by speed (leaping, springing, rushing, striking). For this reason, by natural selection, most of the human eye has been structured to differentiate the out-of-focus image on the retina (sensitive to movement). The only place the image is in focus in the eye is on the control portion of the retina — the tiny fovea centralis (sensitive to detail). Humans carry, genetically, a fear of rapid movement.
- Power (dominance) - outgrowth of primate dominance (image of bruising, blunting, battering, mauling). Struggles for primate dominance may be mauling or maiming, but are not usually fatal.
- Massivity - fear of being crushed (image of irrepressible movement). Ponderous movement is characteristic of all large objects and subliminally communicates the fact that the movement of the object cannot be resisted.
- Lurking - sly, cunning. Fear of the unknown (images of tiger hiding in grass, leopard hiding in tree, snake-in-the-grass, etc.).

After reading the above and then reviewing some of the connotations associated with current names for air defense missile systems' and studies, names, and acronyms, there may be a cause to believe that the image of air defense and air defense systems has suffered some loss of dignity; e.g.,

- The FAADS Study (is the study a "fad?").
- The DADS Study (good ole dad is a pal, a buddy). No threat there!
- The ADS-1 (reducing candy?)
- The GLAADS Study (what's so funny?).

• SAM-D - "Sam: is a "good ole country boy" image - colorless. "D" is "very weak." Therefore, SAM-D would imply a colorless, weak, country bumpkin. The system projects a "born loser" image.

• Hercules - fair name. Heroic, strong, identification, but too defensive. Not a formidable threat. Not a tribal totem.

• Defender - almost colorless. "Minute Man" image is only good image evoked. No indentification, threat, or tribal totem. A "farmer" or "summer soldier" rather than a "warrior."

• Mauler - not too good. Not sharp, keen, etc. Just a battering brute. Not incisive. Not a totem.

• Stinger - a little better. Sharp, painful, seldom deadly, flying insect. Does not project the image of stopping, shielding, or giving protection; projects "annoying pest" instead. Not a totem that can stand alone.

Several names have been proposed for SAM-D to enhance its image. It is recognized by many that "SAM-D" is essentially a colorless name evoking no feeling of identification. The name "Defender" was at one time seriously considered by the Project Manager. However, the name "Defender" is a lackluster name offering little or no image improvement. A proper change of name would be highly beneficial. The overall image of surface-to-air missile air defense tends to cluster about the LORAD system. Every time the name of a system is read, heard, or printed, the subliminal images it carries are evoked and engraved in the mind of the perceiver. Thus, the connotation of the name is far more important than its denotation. A fairly extensive search for suitable denotative/connotative names for SAM-D has yielded two acceptable candidates not already associated with other systems.

• Barracuda.

• Piranha.

Both of these names strongly project most of the subliminal images required. In addition, they are totemic (shark's teeth worn as necklaces, etc., project synonymous totemic imageries). The image of voracity (firepower) is especially accented. Of the two, Piranha may be slightly better from the viewpoint of voracity, since it implies collective action, while Barracuda implies single-shot.

Note: *Since Lieutenant Colonel Bearden submitted his analysis for publication, Piranha has been adopted as the name of a prototype gun system.*

Lieutenant Colonel Bearden has written at least a dozen military and scientific papers, most of which have been published. His work involves paraphysics, parapsychology, and UFO's. He is presently Chief, Evaluation Branch, Military Studies Division, SAM-D Project Office, Redstone Arsenal, Alabama. (See Jan-Mar issue of "Trends" for his article, "Air Defense Mobility vs Operational Area.")

VIEW from the FIELD

NONDIVISIONAL CHAPARRAL/VULCAN

Captain Frank B. Adams

Question: How does a nondivisional C/V battery commander defend an air base and also keep his unit ready to execute mobile missions?

Answers: When the C/V unit goes to the field, the commander

☐ Hires eight airmen to stand guard with 12-gauge Browning automatics while the air base C/V unit is in the boonies.

☐ Builds mock C/V track vehicles using organic M151 jeeps and wooden crates to occupy firing positions.

☐ Loads one, each, air base on M751 10-ton trailer and carries it to the Boonies with his unit.

☐ All of the above.

The answers appear ludicrous, but it's a real problem to the C/V commander with the job of defending an air base. This article points out some of the difficulties and some of the benefits he faces.

Like any commander, budgeting training time to meet all operational requirements is a constant job. But why should the air base battery commander's training job be a bit tougher than say a divisional C/V battery commander's?

• First, his organization is different. Instead of having all Chaparrals or all Vulcans in his battery, he has a mixture — two platoons of four Chaparrals and two platoons of four Vulcans. This means setting up dual training programs —

one for Chaparral and one for Vulcan leaders and crewmen. Also, headquarters platoon includes mechanics for both systems.

- Second, he knows he has other missions besides defending the air base . . . that of deploying quickly to defend corps critical assets, reinforcing a divisional C/V unit, or being assigned to one of the corps' separate brigades. Training time must be directed toward doing the air base defense mission well, but also, troops must be trained to conduct mobile operations in support of the field force. All of these training requirements are subject to the fact that a significant percentage of weapon crews must be manning their weapons at all times.
- Third, much of the equipment cannot be released from air base defense requirements long enough for use in field exercises. This leaves classroom instruction and short unit-conducted field exercises as training vehicles for mobile deployment requirements. The possibility of damaging or disabling weapons that must be used to defend the air base is a consideration in any decision to conduct field exercises.

Although the operational requirement of being constantly ready to defend the air base affects training in mobile operations, there are some training benefits. Personnel are constantly exposed to two different air defense weapons. This provides opportunities for informal cross-training. Officers, NCO's and crewmen perform each others duties in both the Chaparral and Vulcan systems. The same cross-training exposure advantage holds true for maintenance personnel. The maintenance personnel can observe first and second echelons of repair and testing techniques on both weapon systems.

Air Base Employment.

Of prime importance to good air base defense is selection of firing positions. Unlike the critical assets divisional Chaparral/Vulcan units defend, the air base is permanent . . . it will not move. But fire units have to move to survive. The solution is to have a number of alternate positions. To avoid detection of all fire unit positions and defend against sabotage, exact locations must be classified. This eliminates constructing permanent barriers or field fortifications. In addition, the use of actual firing positions for training and for practice alerts should be avoided.

The nondivisional C/V unit must establish good liaison with the air base commander and with higher headquarters. Although the unit's organization does not provide for liaison, you must have, at the minimum, one individual to establish liaison/communications link with the air base commander. His primary areas of concern will be to obtain for the fire units up-to-date information on friendly air traffic, changes in the state of alert, and the base commander's estimate of the tactical situation.

Command of a nondivisional C/V unit is a challenge. The measure of your success as a commander will be dependent on your imagination and ingenuity in deriving workable solutions to meet the challenges inherent in this assignment.

Captain Adams is Assistant S3, 3d Battalion (C/V), 6th Air Defense Artillery, at Fort Bliss, Texas. Since his graduation from the US Military Academy, he has served continuously in Air Defense Artillery, including service with the 32d AADCOM in Germany.

38TH BRIGADE AIRLIFTS HERC BATTERY

Battery A, 2d Battalion, 44th Air Defense Artillery, 38th ADA Brigade, made air defense history recently as it airlifted an entire Nike Hercules battery.

Led by the battery commander, Captain Gary S. Tyer, the men of Camp El Paso moved 11 pieces of equipment and 50 men to an empty field 18 kilometers away. Four hours after the last load was delivered the battery was operational for a surface-to-surface role.

The two Chinook CH-47C helicopters used during the airlift exercise were supplied by the Black Cats, the 213th Company, 19th Aviation Battalion.

Although first to airlift an entire tactical site, Battery A wasn't the first to move a Nike Hercules missile by air. Two weeks earlier, members of Battery B, 2d Battalion, 44th Air Defense Artillery airlifted a missile and a launcher to Special Eighth Army Range. The uniqueness of these exercises is that all loads were external, suspended from the bottom of the aircraft. The missiles were completely assembled, less explosive arming and initiating devices.

During the first airlift exercise, it was discovered that a need existed for designing a way to aline the missile and launcher. Chief Warrant Officer, W-4, E. B. Blanchette, Jr., missile assembly chief, supervised the designing of a docking slip that acts as a funnel. The helicopter eases the missile into the slip and continues forward until the slip stops the forward motion. This puts the missile within six inches of the launcher. Then a winch is attached to the missile and side rail and pulled until the missile and launcher are alined. This process will be used until extension racks are received from CONUS.

All slings for the move were rigged the day before, with the assistance of riggers from the 2d Infantry Division. On the day of the move, Captain Robert W. Messmore, Battery Commander, Battery B, 2d Battalion, 71st Air Defense Artillery, and Staff Sergeant Richard S. Cavin, of Brigade S3, along with members of the 2d Infantry Division and Brigade Adventure Training Team, were on hand to advise and assist in the task of sling loading the equipment. Captain Messmore's battery was the first Hawk battery to go airmobile.

Sergeant John Henry and Sergeant Roger Wiseman, both pathfinders, were at the landing site to guide the big birds in. The initial sortie airlifted a five-man security force, a conex container carrying missile launcher equipment, and a dozen other key personnel. The launcher and blast pad came next, followed by the first missile on its rail. Altogether the choppers hauled over 56 tons of equipment and nearly 50 soldiers over the 18 kilometers.

Later in the morning a 45-kilowatt generator with an eight-man crew was brought in. Next a loaded, integrated fire control conex container was flown in, along with 19 more personnel, including five more guards.

During the afternoon, the helicopter picked up a missile tracking radar, a director station trailer, target tracking antenna trailer, and another generator with its complement of personnel. After the equipment was set down, operational checks and adjustments were made in both the launcher and integrated fire control areas. Then integrated tests were conducted involving the entire battery, including erecting the missiles and performing command calibration. The battery suffered no problem with equipment after its 30-minute flight.

The exercise began at 0730 on 27 August and terminated on 31 August. During its time in the field, the battery underwent two brigade combat readiness evaluations. The battery received food, water, and fuel from Headquarters and Headquarters Battery, 2d Battalion, 44th Air Defense Artillery.

Another move is being planned for Battery A to refine airmobile procedures. The brigade and battalion S3's are jointly documenting the airmobility moves to be submitted to the Transportation School at Fort Eustis, Virginia. The intent is to acquaint air defense units Army wide with the airmobility concept.

Airmobility as applied to air defense was introduced into the brigade with the Hawk missile system and now with the Nike Hercules. The concept behind airmobility is the ability to move, engage the enemy, then move again before the enemy can retaliate.

Brigadier General John J. Koehler, Jr., Brigade Commander; Battalion Commander, Lieutenant Colonel William G. Ganey; and Lieutenant Colonel William J. Hennigan, Commander of the 19th Aviation Battalion, attended the exercise, along with representatives of both the brigade and battalion headquarters, plus some members of the 2d Infantry Division.

NEW CAMOUFLAGE FOR US ARMY

In the early days of our history when the westward movement was on, the Army often found itself in conflict with the Indian. And he was a tough cookie. One of the things that made the Indian so tough was that he was extremely well-versed in the art of camouflage. The Indian was perhaps the first to employ nature's foliage as camouflage in warfare.

Now, the Indians and the Army have joined hands for the production of military camouflage. The camouflage the Indians will produce is not foliage as used by their forefathers; nor is it the old standby, burlap-garnished cotton twine nets. It is plastic netting garnished with a radar-reflectant control fabric and a support system of poles and batten spreaders.

It all came about through the cooperation of the Army, the Small Business Administration, the Brunswick Corporation, and the Devil's Lake Sioux Manufacturing Corporation, located just west of the historic Cavalry Square at Fort Totten in North Dakota.

The Indians have received an Army contract for nearly $12 million for assembly of the camouflage system. The camouflage is of two basic types, namely radar transparent and radar scattering. The radar transparent camouflage will be used over active radar equipment to inhibit its location and identification by visual and photographic means and devices. The screen inhibits surveillance by all known means and devices except radar.

The primary usage of radar scattering is to place it over temporarily halted military vehicles, weapons, and materiel, and over semi-permanent positions and installations so as to inhibit the location and identification of the object by enemy target acquisition including visual, photographic and radar, and infrared detection capability.

The basic module system comes in two cases, each weighing 65 pounds, provides 900 square feet of coverage, and may be repeatedly joined to produce almost any configuration. A repair kit is provided for repairing holes.

The new camouflage system has greater reliability and weather resistance than the old system. It is adaptable to the environment in which used in that the screens are provided in woodland, desert, and snow color blends, which add significantly to the tactical effectiveness of troops in the field.

Camouflage is primarily a defensive tool, and the Army needs this new camouflage because it will have a significant impact on the survivability of personnel and equipment on the battlefield. The main interest is in providing every possible protection for our soldiers, and the advantages of this new lightweight, long-lasting synthetic net are considered a big plus factor in our support of the field soldier.

Indian employees of the Devil's Lake Sioux Manufacturing Corporation inspect and patch camouflage nets as the nets pass overhead.

Indian workman affixes camouflage materials to a plastic net using a hog ring gun.

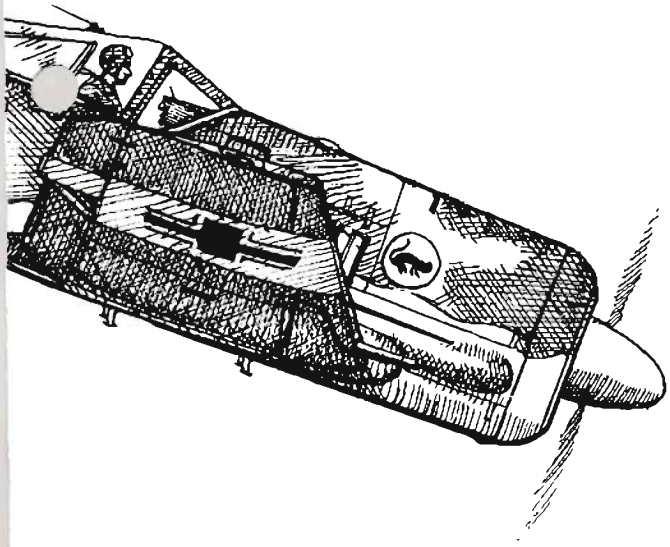
run" raiders were primarily targets for automatic weapons but, because of their high speed and the effect of terrain masking, they were exposed to fire for only a few seconds. In most cases, the attackers would make only one or two passes at a target town before fleeing across the Channel to safety. Defense against such attacks presented a number of problems. Because of the military insignificance of the towns attacked, it was difficult to plan defenses. Often, towns were struck only once, and there were many likely targets for such attacks. Basically, the main problem was to place air defenses where the next strike might occur, but another problem was the availability of weapons.

By late 1941, during the Battle of Britain, the meager supply of automatic weapons available was being drained by requirements of the Far East defenses and of the United States, which was woefully short of automatic weapons at the time of the Pearl Harbor attack. At the beginning of May 1942, only 43 Bofors 40-mm weapons were deployed in the coastal area subject to these attacks; by the end of September, the number of Bofors had grown to 267, most of them obtained from inland vital points and by production of new weapons.

Early warning of attacks was difficult and practically nil for the low over-water approach, a technique which exploited weak spots in the radar location network and allowed the enemy to approach below the radar coverage. Of 39 attacks analyzed in August, warning was received in only 8 cases — in September, defenses were alerted in only 1 of 24 raids. Lacking early warning, gun crews were required to keep at least three men constantly on the Bofors guns during daylight to insure immediate fire on attacking aircraft that might appear suddenly within range.

Continuous efforts were made to increase the number of weapons throughout the zone of attacks. For a while, one-third of available Canadian Army antiaircraft units were assigned to augment daylight defenses. These weapons were situated in likely places of attack and changed locations every 48 hours. (The RAF took a dim view of the plan and complained that their pilots were continually being shot at from places where there should have been no guns.)

In October 1942, there were 27 raids on 19



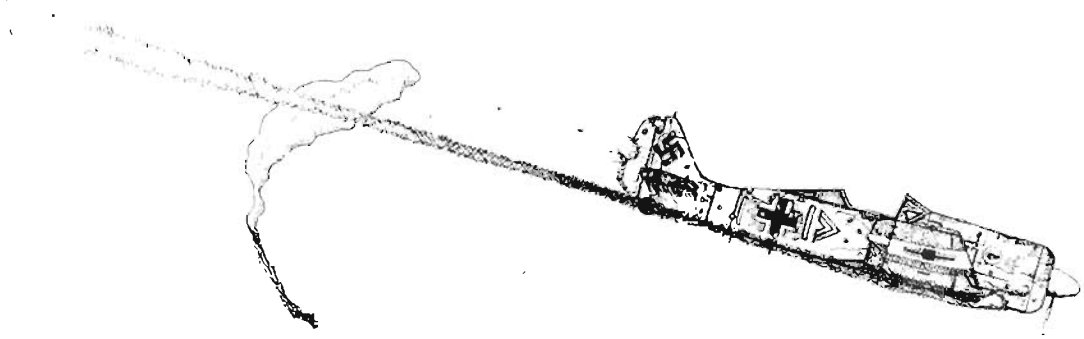
Fw 190A-1

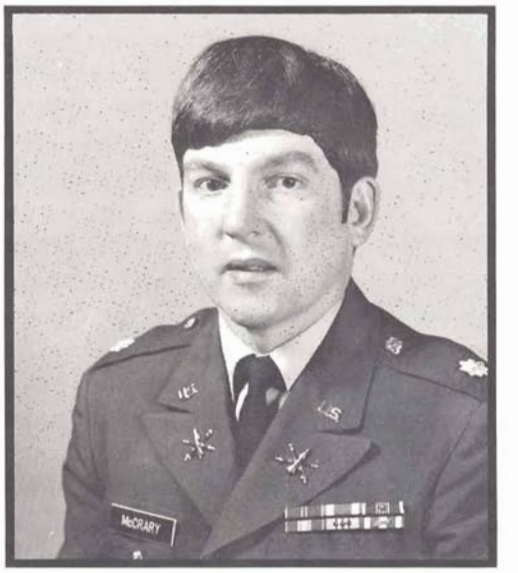
places, including 5 which had not been attacked previously. During the month, only one raider was shot down and about five were damaged. Although there was no noticeable increase in aircraft kills, there was an increase in the number of weapons deployed and, consequently, an increase in the number of areas capable of putting up defensive fires. By April 1943, the defenses included 917 Bofors 40-mm guns, 424 20-mm guns, 506 twin Vickers 2-pounders, 168 light machineguns, and a large number of AA rockets. This represented one-third of available 40-mm guns and two-fifths of available light antiaircraft regiments.

Effectiveness of the antiaircraft defenses was continuously improving against the "tip-and-run" raiders. In the early months of such raids, one or two raiders a month was about the score made by the defenses. On 23 May 1943, 3 of 20 FW-190's attacking Hastings were hit, 2 of which were destroyed. On the same day, 4 of 22 raiders at Bournemouth were hit with 2 destroyed; 6 of 24 at Brighton were hit on 25 May with 4 destroyed; 6 of 15 were destroyed at Torquay; and 4 out of 20 at Fronton on the 30th. In the month ending 6 June 1943, antiaircraft destroyed 25 and damaged 13 attackers, while the RAF shot down 17 and damaged 4. June 1943 marked the end of the "tip-and-run" raids as an offensive effort of the Luftwaffe against Britain.

Concurrent with the "tip-and-run" raids, the Germans launched a series of night raids on open towns and places of historical, rather than military, significance. The German name Baedeker, for tourist guidebook, was used in reference to this series of raids. Such attacks were executed on Hitler's orders in retaliation for British large-scale raids on the German cities of Lubeck and Rostock. They normally were made by forces of 25 to 75 bombers. The first such attack occurred on the night of 24 April 1942, when 25 bombers hit Exeter. The next night Bath, where there were no antiaircraft defenses, was attacked by 50 planes and the following night by 65. On the night of 28 April, York was attacked by 30 to 40 aircraft. Starting 31 May, Canterbury was struck for three nights in a row with high-explosive bombs and incendiaries in retaliation for the 1,000-bomber raid of 30 May on Cologne. Raids continued through July at a lessened pace and, by August, had dwindled to nothing more than a nuisance to a number of small towns. As with the "tip-and-run" raids, the lack of mobile AA to defend a large number of rather insignificant towns was a definite problem. To relieve this situation, mobile guns at training camps were replaced by static guns, thus providing about 28 more AA guns for the Baedeker defenses.

Although the towns chosen for "tip-and-run" and Baedeker attacks were militarily insignificant, the fact that attacks were occurring was significant to the towns' inhabitants whose lives and property were endangered. Consequently, there was great effort on the part of the AA Command to secure defensive weapons and establish as many defenses as possible. Likewise, the RAF committed considerable fighter effort. At times, to counter Baedeker raids, antiaircraft fire was restricted to give night fighters freedom of action. In most cases, heavy damage was suffered on the ground. In regard to this situation, General Sir Frederick Pile, commander-in-chief of the AA Command during this time, noted that ground damage always was heaviest when antiaircraft was not present or when it was not permitted to fire.





LTC RICHARD F. McCRARY
Chief, FA/ADA Branch
Enlisted Personnel Directorate

We as your Branch representative in EPD are pleased to have this opportunity to contribute on a regular basis to Air Defense Trends. The Army's enlisted personnel policies are changing rapidly. Many new programs such as Drill Sergeants and the Enlisted Personnel Management System (EPMS) are being implemented. These programs, naturally, impact upon our Air Defense soldiers' careers. It is our goal to keep you informed of these changes. If you need any information or have any questions concerning your career, please write to MSG Kenneth L. Turner, Chief, Air Defense Artillery Section, SFC Roger Sizemore, Air Defense Artillery Advisor, or to me.

Richard McCrary

ADA NCO'S AS DRILL SERGEANTS

MILPERCEN has been selecting professionally qualified and highly motivated Air Defense Artillery NCO's in grades E-6/E-7 to serve as Drill Sergeants at Fort Bliss, Texas and Fort Dix, New Jersey.

Since the primary MOS OOF has been eliminated, ADA NCO's selected as Drill Sergeants will retain their current PMOS and be awarded an SQI X upon successful completion of Drill Sergeant School. Soldiers entering the new program will suffer no financial loss since special duty assignment proficiency pay, uniform allowances, and distinctive uniform items will be continued as recognition for the special position and

nature of Drill Sergeant duty.

Soldiers selected for duty as Drill Sergeants are considered the most competitive among their contemporaries. Their normal tours of duty will be limited to 2 years, but outstanding Drill Sergeants will be permitted to volunteer for an additional year.

Depending upon requirements, an individual may perform a 2-year tour as a Drill Sergeant in both grades E-6 and E-7. In no case, however, will he be assigned again to Drill Sergeant duty without first serving an intervening tour with a troop unit.

PROMOTION BOARDS WORK

How does a promotion board work? Let's look at the typical enlisted man's promotion board. The board consists of 26 members (including) both female and minority group members) headed by a general officer. Colonels assigned must have commanded at brigade level and have graduated from a senior service school. Lieutenant colonels must have commanded at battalion or equal level and have graduated from the Command and General Staff College. Command sergeants major and sergeants major must have recent CSM experience in both required levels and career fields. Once MILPERCEN selects the best qualified of those recommended, the list is forwarded to DCSPER for final approval. While DCSPER determines the composition of the board, staff members of the Army Enlisted Records Center, Fort Benjamin Harrison, Indiana, complete the screening and updating of official military files. DCSPER and MILPERCEN are informed of the final count of eligible soldiers in each career field. TDY orders are issued to the board members who proceed to Fort Benjamin Harrison to begin their painstaking assignment. Following a series of briefings, with the thrust on the importance of the board's mission and the receipt of detailed instructions on voting procedures, the board is convened, sworn, and organized. All boards have five panels who consider soldiers in five career groupings: combat arms, communications-supply, general support, engineer-transportation, and special categories. Each panel has three specific tasks:

- To select those to be promoted.
- To identify unsatisfactory performers.
- To designate the promotion MOS for those selected whose normal career progression MOS is overstrength.

The promotion board members go over each file and record a score on each of five career groups, ranging from 1 to 6. After the panel has voted, the scores are totaled. The lowest possible is 5; 30 is the maximum. Scores are arranged in numerical sequence in each career field.

Now comes the actual promotion selection. For example, assume that a panel examining eligibles in the communications-supply career field considers and ranks 198 eligibles in the primary zone. Further assume that the board's "letter of instructions" said that 62 could be chosen in this field; then the top 62, according to their score, are recommended for promotion. The same procedure is used for selection in the secondary zone where, for example, the letter of instructions may have stated that six could be promoted. MOS status is checked next. If the MOS group is overstrength, the panel designates a promotion MOS in an understrength MOS but in the same career field as the PMOS. If the panel cannot determine the understrength MOS, the record is referred to MILPERCEN for selection of the MOS into which the person will be promoted. Once all career management fields have been considered, the names of those recommended for promotion are typed on a list.

At this point, you might think that the promotion board has completed its work, but it hasn't. Now comes the search for the unsatisfactory performers. The records of all those who were considered for promotion but not recommended are thoroughly researched. At the same time records of those in the zone but not eligible for promotion are also reviewed. The net result of the board's review of these files is the listing of unsatisfactory performers who, in their judgment, should not be reenlisted for future military service. This recommendation is provided the commanding officer of the EM concerned.

Understanding what is involved in the selecting of a promotion board and how it works should give us a greater appreciation of the board's work and confidence in the system that selects our future NCO leaders.

ADA enlisted men can now be assured of efficient career management because of the New Enlisted Personnel Managemcmt System (EPMS) of the Army. It involves a major restructuring of the enlisted career management system so that, for the first time, enlisted soldiers will have a comprehensive, carefully designed, and equitable career management system.

The goal of EPMS is that there be no "dead-end" MOS. To achieve this goal, some career fields are being redesigned, but the emphasis is on developing a structure to enable career NCO's to embrace broader knowledge and supervisory responsibility as the soldier advances in his career field.

For air defense, Career Management Field (CMF) 16 will be the first to be implemented under EPMS. A number of changes are scheduled. The following MOS will consolidate at grade E-7:

- 16C (Hercules Fire Control Crewman) merges with and becomes 16B (Hercules Missile Crewman).
- 16E (Hawk Fire Control Crewman) merges with and becomes 16D (Hawk Missile Crewman), as currently exists.
- 16P (Chaparral Crewman) merges with and becomes 16R (Vulcan Crewman).
- 16J (Defense Acquisition Radar Crewman) merges with and becomes 16H (ADA Operations and Intelligence Assistant).

In addition, the Redeye duties have been added to 16P, and MOS 16K, OOG, and 31R are being dropped from CMF 16, with 16K's becoming 16H's.

The US Army Air Defense School will offer, through the Army Correspondence Course Program, a series of correspondence courses that have been tailored to the MOS consolidation under EPMS. Additional information regarding course content and course availability will be sent to the field through letters to commanders and individuals in each affected MOS.

EPMS will impact significantly on all aspects of a soldier's career: training, evaluation, classification, assignment, and promotion. There will be various levels of training: basic and advanced individual training, plus four levels of noncommissioned officer courses-primary, basic advanced, and senior. These courses will prepare soldiers for positions at the next immediate grade they will hold, not for a job they may be assigned to several years later.

Promotion, evaluation, and classification are tied closely together in EPMS. One of the salient principles of the system is that soldiers must qualify in the skills of the next higher grade before being promoted to that grade.

So what would a soldier have to do to be promoted? There are two ways to earn eligibility for promotion: one is to work satisfactorily in your PMOS and score high enough on the skill qualification test; the other is to attend certain MOS-related schools and score high enough on the tests.

Skill levels have been changed to conform more directly with grades: Skill Level 1 - E1 through E4; 2 - E5; 3 - E6; 4 - E7; and 5 - E8 and E9.

What are the "skill qualification tests?" These are tests that will eventually replace the current MOS tests. Soldiers in grade E-4 and above will be required to take a skill qualification test in the PMOS every second year, while the SMOS test will be required only once during their career. *Minimum passing scores* will verify qualification at the present grade; *higher passing scores,* if coupled with sufficient on-the-job experience or schooling, will result in a soldier being awarded a skill level corresponding to the next higher grade.

Reprinted from Tips, Winter 1974/75.

'Why Not Me?'

Master Sergeant Popoff burst into MILPERCEN's Promotions Branch. "Lemme talk to somebody about centralized promotion boards," he huffed.

"Follow me, please," said the receptionist, leading him to a rather harried-looking sergeant major.

"I wanna know why I wasn't promoted!" he thundered.

"Have a seat, Sarge," said the E9. "First of all, I can't tell you why you weren't promoted. No one but members of the promotion board knows that."

Popoff seemed about to explode.

"Centralized promotion boards meet in secret . . ." began the sergeant major.

"But that's not fair!" interrupted Popoff.

". . . and they never give reasons why a soldier is or is not selected."

"I don't have to stand for that crap," snorted Popoff. "I'll write The Inspector General! I'll write my Congressman! I'll write to the President himself." And he turned to leave the room.

The Promotions Branch sergeant major looked after him sadly. "Go ahead," he sighed to the departing sergeant's back. "But it won't do you any good."

You personnel specialists should be able to identify with the situation we just described, because someday you may be considered by a centralized board yourself. Or you'll be cornered by a rejected NCO hunting for someone to hear his anguished plaint -- "Why not me?"

You can't tell him, of course. No one but the board can -- and the board is sworn to secrecy.

"Why?" you may ask. "What do board members have to hide?"

Nothing. But if they explained to one troop, they'd have to answer everyone who asked. And that comes to more than 30,000 why-didn't-I-get-promoted letters a year. The administrative burden would be too great.

Besides, the selection process isn't really such a mystery. The board looks for certain things, and it gives more weight to some areas than to others.

Primary and secondary zones of consideration are established by ODCSPER. If a soldier falls within one of these zones, he'll be considered for promotion by the board.

The primary zone contains soldiers who meet basic time in grade requirements. The secondary zone is composed of enlisted men and women who meet lowered time in grade requirements.

For example, the primary zone for promotion to E8 might include each E7 with a date of rank of September 30, 1968, or earlier, a high school diploma or equivalent, and a basic enlisted service date of March 31, 1966, or earlier. The secondary zone might contain those with dates of rank of October 1, 1968, to June 30, 1969.

Each unit determines its eligible people and

has them review their MPRJs. After the review, each soldier signs a copy of his or her Personnel Qualification Record to certify it's correct. The PQRs are sent to the Enlisted Records Center at Fort Benjamin Harrison, Indiana, where they are screened again to insure each soldier is actually eligible. There, they are filed in the OMPF, which is submitted to the board. Based upon data in the OMPF, the board selects troops for promotion, retention in grade, or for bar to reenlistment.

Budgetary limitations and the current Army strength authorization dictate how many troops are to be promoted. Often, the promotion rate is low, so some qualified soldiers don't get promoted simply because there aren't enough promotions to go around. In this situation the board picks the best of the best.

And since selection is by Career Management Field (CMF), troops only compete against those in their CMFs, not against the total zone of consideration. If one CMF is understrength in a particular grade, the selection rate for that grade will be higher than for another CMF that is overstrength or even.

There are general guidelines established that pertain to all centralized promotion boards. But it's entirely possible -- even probable -- that no two boards give exactly the same weight to the same consideration factors.

Before you pull the old "Popoff" trick, consider this -- an E8 board authorized to select 3,000 E7s from a group of 10,000 eligibles can be a little more liberal than if it were authorized to select only 1,000 from the same group of soldiers. Remember, budgetary limitations, current strength authorizations and the like dictate promotion ceilings, not the boards themselves.

But let's get back to those general guidelines we just mentioned. Staying on top in these areas is always an asset.

A board biggie is MOS test scores. These carry a lot of weight, since they are direct measures of professional ability. For instance, all other things being equal, a soldier whose three most recent MOS evaluation scores were 95, 105 and 115 might be promoted before another with scores of 115, 107 and 94. The trend is up for one, down for the other -- and trend is an important consideration.

In conjunction with test scores, the board also gives healthy consideration to the Enlisted Evaluation Report Weighted Average (EERWA). This is the composite of all EERs a soldier has received since July 1, 1970. The MOS tests indicate how well a soldier knows his specialty, the EERWA shows how his raters see his performance on the job.

A file full of letters of reprimand, Articles 15 or courts-martial is a sure promotion scuttler. Of course, one Article 15, or even a court-martial, for missing bed check 10 years ago isn't as serious as one for being AWOL last year. >>>

As we indicated earlier, the board looks for trends. Its members want to know how well a soldier would do his job if promoted, and nothing scares them off faster than a string of recent disciplinary actions.

On the other hand, an above average level of education, both military and civilian, can help land a centralized promotion. A high school diploma is a must, naturally. Anything above that makes you look that much better. Ditto for resident and nonresident military and MOS-related courses.

No amount of schooling can offset low EERs, low MOS test scores or serious disciplinary actions. But, excluding these factors, a steady forward movement in civilian/military academics can only be an asset. And there are other considerations, as well.

For instance, it's difficult to say how much weight the board puts on awards. No one is promoted because of awards alone, but they are considered.

Also, a soldier's variety of experience in the Army is an indicator of his or her potential value. So assignments at different levels of responsibility are noted. But board members also realize that most troops have little control over their assignments, and that certain MOSs tend to restrict the people who hold them. This is taken into account when evaluating total background.

"OK," MSG Popoff might say at this point. "So what do I do to get on top of the situation?"

The most practical thing anyone can do is to insure that his or her Personnel Qualification Record and OMPF are accurate and up-to-date. This is where you MILPO people come to the fore -- don't miss a PQR/MPRJ review suspense for your people, and, whenever possible, help them set up an OMPF review at one of the following sites:

- Enlisted Records Center, Fort Benjamin Harrison, Indiana (AUTOVON 699-3361).
- Enlisted Personnel Information and Assistance Office, MILPERCEN (AUTOVON 221-7792).
- Reserve Components Personnel and Administration Center, St. Louis, Missouri (AUTOVON 698-7410).

And don't forget to pass on these two facts. (1) Appointments are necessary, so do a previsit checkout. (2) If a soldier can't get to one of the three sites himself, he can designate someone else to review his OMPF for him -- as long as he puts it in writing and signs it.

There's one more thing that might help your troops keep themselves on top of the selection pile. That's to take an objective look at themselves in comparison to their CMF peers. Then do a self-evaluation using promotion board general guidance found in the back of each promotion announcement circular, DA Circular 624-series. It starts out saying:

"An evaluation of demonstrated professionalism or potential for future service cannot be measured without a complete and objective review of the individual's entire background. An isolated example of excellence or mediocrity should not be used as a determinant for selection or nonselection. The analysis of the individual's background will include, but not be limited to, a careful evaluation of the following factors . . . ." Then it goes on to list 10 major areas of concern -- from "scope and variety of assignments and how well performed," to "general physical condition."

Knowing that the Army wants only outstanding soldiers promoted (not "good" troops, but "outstanding" ones), your people can come up

with a self-evaluation scale of their own. For example, one person might set a scale of from 1 to 10 for each of the factors involved. The more 10s he achieves, the more competitive he is.

Let's say he finished high school, went to an MOS-producing course early in his career, but hasn't pursued his civilian or military education since then. Let's also say that he scored 110, 109, 109 on his last three MOS tests. He'd probably give himself a 5 for civilian/military education and a 7 for his efficiency trend. Not too good when he's shooting for outstanding 10s. So he sets up a program of night school with the local education center, takes MOS-related nonresident correspondence courses from one of the Army schools, knuckles down with his MOS test study guide, and homes in on improving the other areas tallying less than 10 on his scale.

This won't insure promotion, but it will give your troops a good idea of why they were or weren't selected -- if they're honest in the self-evaluation. Not only that, but it could help them prepare for the next board up the promotion ladder. Career planning doesn't start at the promotion consideration point, it begins back down the line.

Just one more word -- to MSG Popoff, who introduced this subject.

Phone calls and visits to MILPERCEN's Promotions Branch won't net you answers to your "why-not-me?" questions. Letters to TIG, Congressmen and even the President won't help, either.

The best advice we can come up with comes from old Will Shakespeare -- "This above all: to thine own self be true . . . ." And when you've done that, set up a positive action plan to make yourself one of the outstanding soldiers promotion boards are looking for.

OPD'S UPDATE *for* BARS TO STARS

COLONEL ARCHIE S. CANNON, JR.
Chief, Air Defense Artillery Branch
Officer Personnel Directorate

Due to recent economy measures, the Officer Personnel Directorate (OPD) Quarterly Newsletter from the ADA Branch Chief is no longer being published. To keep ADA officers and commanders informed of major personnel activities, we at ADA Branch are providing inputs direct to the Air Defense Trends. This information will be highlighted in the regular feature, "Bars to Stars," in each issue of TRENDS. As a result, you the ADA officer in the field will be kept up to date on current OPD programs, directives, and activities which will influence and shape your careers in the Air Defense Artillery.

Archie S. Cannon, Jr.

05 Command Selection . . . Key Features

Now that battalion level commanders will be selected by a DA Command Selection Board, it is important that the methodology and requirements of the centralized selection process be understood by all eligible ADA officers. Some important general comments concerning the process are as follows:

- Eligible ADA LTC's and MAJ(P)'s are automatically considered each year unless they decline command consideration — this may be accomplished telephonically between the officer and Branch but must be confirmed in writing. Officers who have declined command consideration may withdraw their declination and be con-

sidered by the next DA Command Selection Board the following year. Officers who have commanded a designated unit at the battalion level or who have been relieved from battalion command are ineligible for consideration. An officer retains his eligibility for annual command consideration while he remains in the grade of LTC or MAJ(P).

• At present ADA has 48 DA OPMS designated *Branch Material* battalion commands. Additionally, ADA officers may be selected for *Arms Material* battalion commands such as basic training battalions, aviation battalion commands, and foreign area officer (FAO) type commands (i.e., PSYOP battalions, civil affairs battalions, and special forces battalions). Eligible officers may be also considered for command in their alternate OPMS specialty provided their specialty contains designated command positions. These include enforcement, logistics, intelligence, communications electronics, and engineer. Eligible officers will be selected to command only *one* battalion-level organization in the categories discussed above.

• Availablility is *not* a consideration in the centralized command selection process. All eligible ADA LTC,s and MAJ(P)'s will be considered by the DA Command Selection Board regardless of location or stabilization policies. Availability will be a factor in the slating of command selected officers for command of specific units.

• To assure maximum equity and objectivity in the prescreening activity of the command selection process, each eligible ADA officer will be considered by two independent selection agencies — a DA Phase I Board and the ADA Branch. Each of these agencies, after independent deliberation, will provide the DA Selection Board with an alphabetical roster of nominees *without* any OML considerations. The DA Selection Board will have consolidation listing of the two rosters, with duplications eliminated, to work with during the selection process.

The DA circular announcing the selection of commanders is scheduled for publication in May 1975 and assignment of commanders to designated commands will commence 1 July 1975. Each individual's command possibility is directly related to demonstrated performance and command potential, and the centralized selection system maximizes the probability that the most deserving officers will have an opportunity to command.

Future Project Managers . . . Under New Management

OPD is establishing a revised Project Manager Development Program (PMDP) to identify, select, and train officers as future project managers. A special office within OPD designed to manage the PMDP has been organized under OPD's Deputy for Professional Development and Plans. Officers interested in pursuing project management as a career field should consult DA Pamphlet 600-3, para 30-4(a) and (b), for specific instructions.

Warrant Officers . . . Perspectives

Increased Retirements: A potentially serious problem developing in the warrant officer management field is centered on age and years of active federal service. The average CW4, for example, is 45 years old and has completed 25 years of active service. The average CW3 is 41 years old and has completed slightly over 20 years of active service. Significantly, approximately 57 percent of the total ADA warrant officer population are CW3's and CW4's. At present, it is statistically possible that 84 percent of the ADA warrant officer population could retire within 3 years. Although it is not expected that all retirement eligible warrant officers will leave the service shortly, the statistical possibility is nevertheless alarming. Branch has already experienced an accelerated rate of retirements as a result of the inactivation of ARADCOM, severe reductions, and retention rates under the Long-Range Active Duty Program. Branch lost 75 warrant officers to retirement during the first 6 months of FY 75 — 48 were voluntary retirees

and the remainder were Reservists who were not retained beyond their release dates. Branch currently knows of an additional 26 warrant officer losses who will retire during the last half of FY 75.

RA Program: The decreased retention of nonregular warrant officers under the Long Range Active Duty Program has inspired renewed interest in the Regular Army Warrant Officer Program. There has recently been a considerable increase in RA applications from warrant officers who were relying on the Long-Range Active Duty Program to achieve their career objectives — 24 years, 26 years, or until the next promotion. Warrant officers rightfully perceive the RA appointment as the most promising possibility to realize their career ambitions beyond 20 years of service. The time is rapidly approaching when the nonregular warrant officer, like his commissioned counterpart, will have no option other than an RA appointment to serve more than 20 years. For those interested nonregular warrant officers with strong service records, the Warrant Officer RA Selection Board has been in continuous session since July 1974 and will remain in session until the RA warrant officer strength approaches the DA authorized levels.

Advanced Civil Schooling . . . Reduced Authorizations

Congress and DOD continue to scrutinize educational requirements of the officer corps in light of cost effectiveness, time away from the job, and rising tuition costs. Accordingly, ADA officers can expect to see fewer opportunities for Army-sponsored advanced civilian education. Current policy permits officers to pursue advanced academic disciplines for which the Army has a critical shortage. The disciplines most often associated with ADA officers are primarily the physical sciences and engineering (engineering, ORSA, and ADPS). There are also opportunities in area studies. Additionally, under OPMS, training in the graduate officer's primary and/or alternate specialities. Graduate civil schooling will be a significant factor considered in the designation of an officer's alternate specialty. Officers interested in advanced civil schooling should contact the ADA Branch Schools officer.

COMING IN NEXT *Trends*

"Senior Air Defense Artillery Commanders List"

MILPERCEN TO REORGANIZE OFFICER PERSONNEL DIRECTORATE

Major changes are in store for MILPERCEN's Officer Personnel Directorate (OPD). Under the changes, mandated by the requirements of the Officer Personnel Management System (OPMS), all officers will be managed by OPMS specialties and grade, thus providing for better professional development and utilization of officer personnel.

Three Field Grade Divisions

Beginning 1 June, field grade officers will be managed within divisions based on respective grades-colonels have had this form of management since 1962. All lieutenant colonels and majors, regardless of their branch, will be managed by specialties in the new Majors and Lieutenant Colonels Divisions.

Within the three field grade divisions, each headed by a colonel, there will be a professional development branch, support branch, and multiple specialty management elements. Specialty managers throughout each field grade division will be responsible for the professional development and assignment of officers. An officer will normally look first to his primary specialty manager for guidance, assistance, and professional development advice. However, he can still seek advice from his alternate specialty manager.

Following is one specific example [illustrated in red on the OPD Reorganization Chart (P. 50)] of how the system works:

An SP 45 (Comptroller Specialty) requisition coming in from Europe will be validated by specialty and grade and go to the comptroller speciality manager in the LTC's Division. Here the first advantage to this system becomes apparent. All LTC comptroller requirements will go to one place to be matched against all LTC's who are projected for a comptroller assignment in a given time frame. With all comptroller position requirements and available officers known to a specific specialty manager, we see several immediate advantages.

- First, we will be organized to make the best possible man-job specialty match.
- Secondly, it will improve our ability to honor officers' professional and geographic preferences.
- Thirdly, it provides for centralization of specialty management expertise.

Three Company Grade Divisions

Management of company grade officers by specialty and grade, in the current branch framework, is desirable since these officers receive a majority of their assignments in their primary specialty and most do not have a designated alternate specialty. Therefore career branches will be retained under three new company grade divisions: combat arms, combat support arms, and combat service support. A colonel will head each division. The branch chiefs within each division will be lieutenant colonels. The presence of respective professional development branches is part of an effort to insure continuity of officer development throughout the company grades.

New Warrant Officers Division

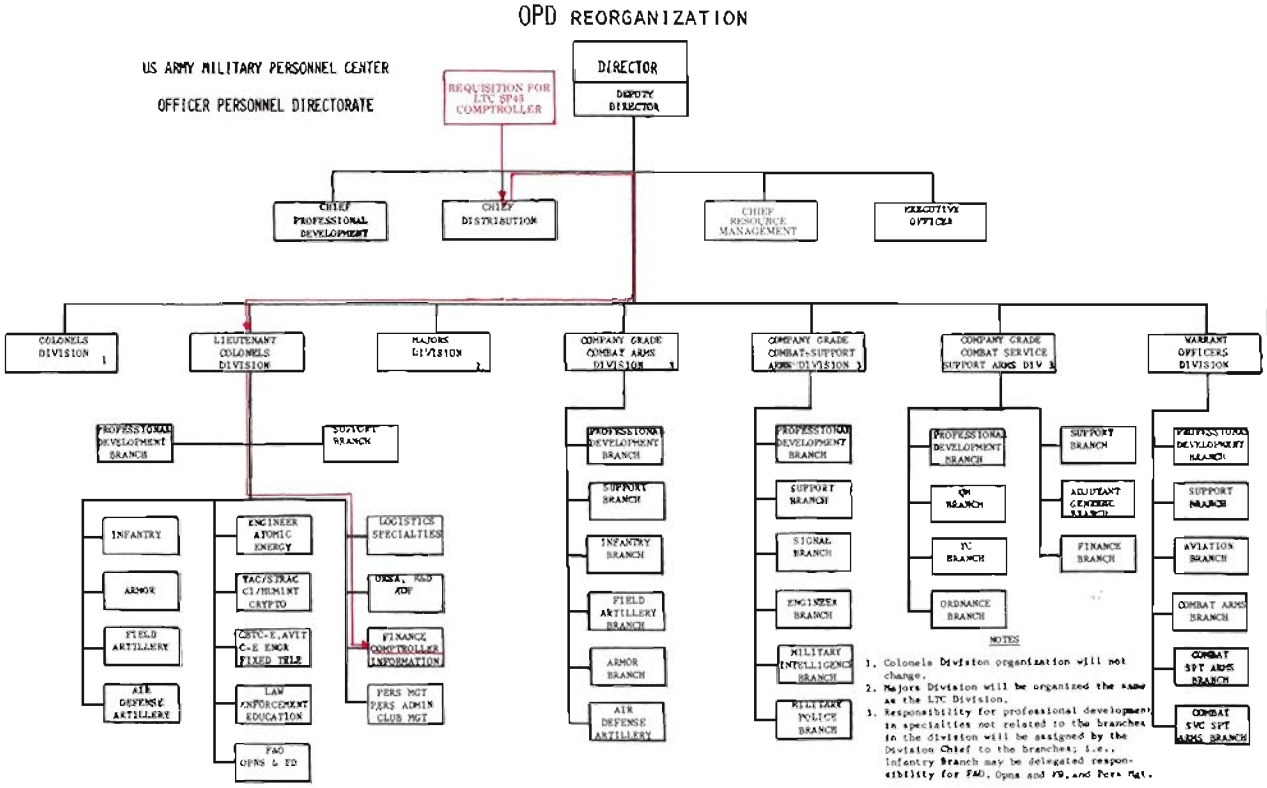
Management of all warrant officers will be centralized in a New Warrant Officers Division. Only aviation warrant officers are now managed centrally by a single branch. All others have been managed by their respective branches. Formation of a single division offers distinct advantages because the problems associated with warrant officer management differ from those of commissioned officer management. For example, in highly technical areas such as Hawk missile maintenance, it is important for a warrant officer to maintain his proficiency. A central division can pinpoint an assignment, if necessary, for an ordnance warrant outside his branch in such areas as air defense, where he could maintain needed proficiency. Another problem that a central division resolves is that of aviation warrant officers who are not needed to fill aviation slots. A division setup can more effectively find suitable assignments for these officers.

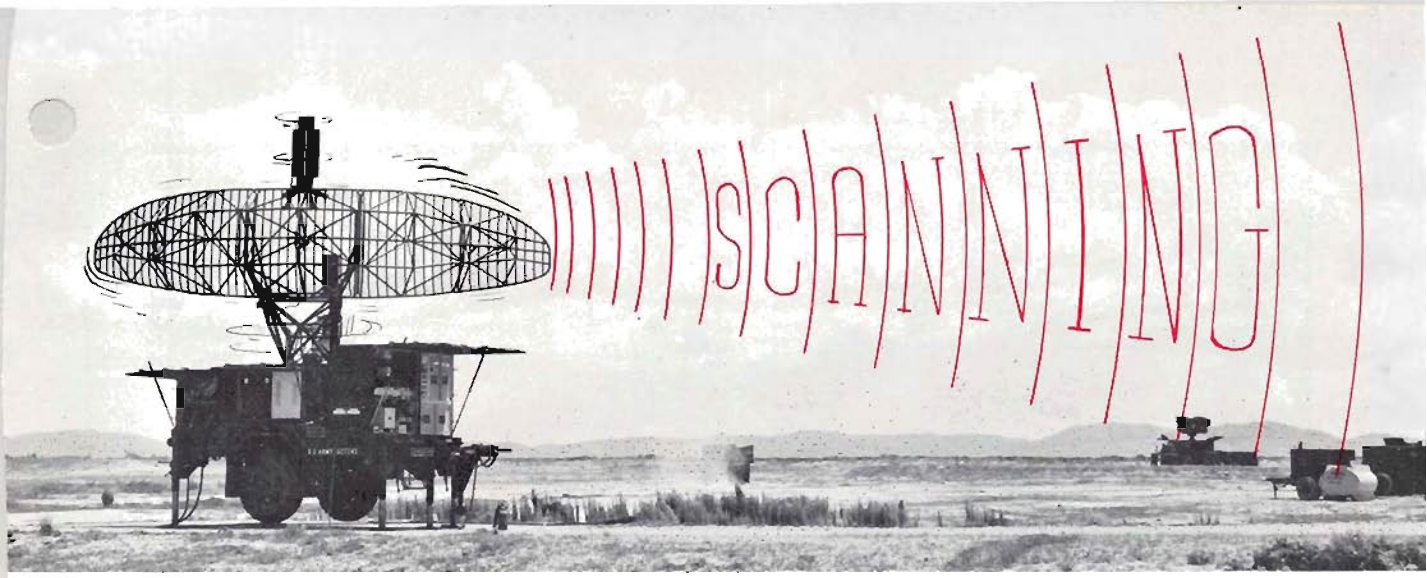
The changes at OPD will begin during May 1975 and by September specialty designations for all captains, majors, lieutenant colonels, and colonels will be complete. The new alinements in no way modify current branches of the Army as established by law but a major impact does occur at the career branch level. The assignment officer at MILPERCEN will play an expanded role

in the professional development of officers whose assignments he oversees. The professional development officer and the assignment officer will be free to coordinate with their counterparts in the other divisions, and at the deputy level, on assignment matters and other actions affecting the individual officer.

A specialty monitor element in the professional development branch will coordinate professional development efforts in the divisions. Specialty monitors will also be the points of contact for outside agencies wanting to coordinate plans and policies about any of the specialties.

The reorganization of OPD will be carefully handled to insure a smooth transition from the current branch/grade system to a specialty/grade system





CONTRACT AWARDED FOR SHORT-RANGE ALL-WEATHER AIR DEFENSE SYSTEM

The Army has awarded a contract for development of a short-range, all-weather air defense system. More than $10 million was immediately obligated for engineering development of the system based on an existing European-designed system called Roland.

This action terminates 3 years of competition in which 21 firms were solicited and four proposals received by the Army's Missile Command. The other competing systems were Crotale, a French-designed missile system; Rapier, a British system; and an all-weather version of Chaparral.

Roland consists of a turret assembly and equipment module to be mounted on a single vehicle. A four-man crew is the system's normal complement, but a single individual can operate Roland if necessary. Two automatic missile launchers, a low-frequency-band pulse-doppler search radar, and two-channel pulse-doppler track radar are mounted on the turret. A command transmitter and computer, command and gunner consoles with associated target displays, and control equipment comprise the fire control package.

Each Roland vehicle carries 10 missiles for the close-in intercept mission. A booster motor will provide initial missile thrust with a sustainer motor to provide thrust for the duration of the flight. Reloading is automatic.

The system will be able to search for enemy aircraft while on the move. The search radar supplies raw target data to the system computer for evaluation. Determination of friend or foe and pinpoint representation of the target location are displayed on the operator console screen by the system computer. The operator then selects a target and slews the turret to proper azimuth. A second radar tracks the target at night or in heavy weather. An optical tracker is provided for clear weather use. Missile guidance commands are generated by the system computer and beamed to the missile via RF link.

A comprehensive, illustrated description was in the June 1973 issue of *Air Defense Trends*.

The name of the American version of the Roland system, and what differences are planned, has not been announced.

CHAPARRAL TAKES A SWIM

This Chaparral crew from Battery D, 4th Bn (C/V), 1st Air Defense Artillery, proves that the Chaparral system is amphibious as they put it through its paces in a training swim.

NIKE HERCULES SURFACE—TO—SURFACE FIRING TEST

A two-phase firing test of the Nike Hercules missile system in the surface-to-surface role is being conducted at Fort Bliss, Texas.

The Nike Hercules system first proved its effectiveness in the surface-to-surface role over 13 years ago. During the interim between 1961 and 1974, several major modifications have been applied to the system and the effects of these changes on the surface-to-surface capability of the system have not been fully determined. In addition, a short method for surface-to-surface mission computations, using new firing tables and procedures, will be tested.

Some objectives of the 26-round firing program are to:

- Validate the new short-method firing tables and procedures.
- Test the effects of modifications to the system on the surface-to-surface capability.
- Verify that the new procedures will significantly reduce the time to change from an air defense role to a surface-to-surface role.
- Test and validate new missile dive methods and a direct-reading target data unit.
- Provide ground-burst data on the high-explosive warhead.

The firing tests are scheduled for February through December 1975. Five missiles will be fired in the first phase and 21 missiles in the second. Test ranges will be 30, 50, 125, and 180 km. All firings will be conducted at McGregor Range; however, missiles fired at 125 and 180 km will impact on White Sands Missile Range.

A special team of experienced, skilled, and dedicated specialists will be formed from personel already trained and stationed at Fort Bliss to operate the system and assemble missiles for the program.

VULCAN IMPROVEMENTS

Armaments Command has proposed a series of improvements to the Vulcan air defense system. These improvements will increase system operational availability and hit probability, provide increased ammunition stowage, reduce antenna damage, and simplify reloading. The cost of the total improvement program is estimated to be approximately $45 million.

Once the Vulcan system is modified, it will receive a distinct model designation such as M163A1 or M167A1. This will insure proper repair parts requistioning. When Vulcans are modified the owning unit will receive technical manual (TM) changes that will bring the TM's up to date for the modified Vulcan.

Installation of the improvements will be by a depot level retrofit team. Twenty of the improvements to the self-propelled and towed Vulcans will be installed beginning with the training equipment at Fort Bliss early in 1976. At the same time, the direct support shop equipment will also be modified. There are ten other improvements that are in the planning stage, with installation anticipated during 1978 or 1979.

The product improvements cover the following areas:

Phase One (1976)

Turret electronics

Ammunition feed systems (M163 only)

Equilibrators

XM61 sight

Antenna protection

Ammunition storage

Carriage hydraulic system (M167 only)

Auxiliary power unit (M167 only)

AN/TSM-115

TS-2656

Phase Two (1978/79)

Cannon

Muzzle clamp

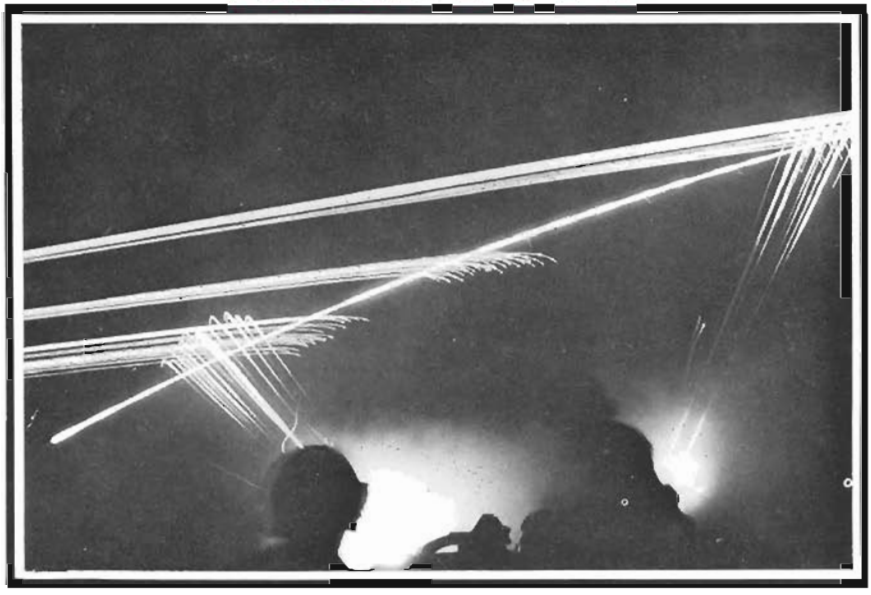
Burst length and ready to fire circuitry

Fail safe circuit for K8 relay

Chassis and carriage (M167 only)

Armament Command also expects that the AN/MWM-3 Test Set, which will replace the present AN/MWM-2, will be fielded during 1976.

Vulcan Power



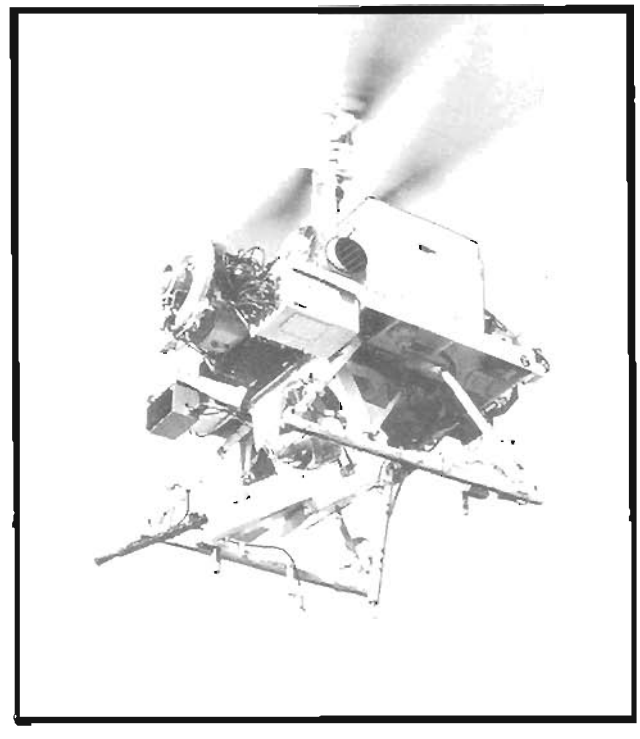
The Vulcaneers of the 3d Battalion, Airborne, 4th Air Defense Artillery, 82d Airborne Division, the Army's only Airborne Air Defense Artillery Battalion, light up Fort Bragg's sky during a night firing exercise as part of their annual service practice.

VULCAN TOW TARGET TEST

Looking more like a moon landing vehicle than what it really is, the Navy QH-50 coaxial helicopter was recently employed as a target towing vehicle in a feasibility test for Vulcan gunner training. Once used by the Navy in antisubmarine warfare, rescue, and cargo delivery, the remotely piloted QH-50 can carry up to 1,000 pounds at speeds up to 85 kilometers per hour.

The target was a 4- by 12-foot banner type equipped with an electronic hit counter. Twenty-nine passes were flown at altitudes up to 300 feet, at ranges of from 500 to 1,500 yards, and at a speed of 85 kmph. All runs were on a line perpendicular to the weapon's position. Hits ranged from 0 to a maximum of 19 on the various passes. The gunners were trainees from The Air Defense Artillery Training Brigade without previous experience in Vulcan firing.

No decision has yet been made on whether the Army will continue to use the aircraft for towing targets.



MISSILE MINDER DEVELOPMENT

Army technicians operate electronic console displays of the Missile Minder (TSQ-73) system.

The AN/TSQ-73 (Missile Minder) has successfully completed the second phase of Developmental and Operational Testing. Following DT/OT II and IIA, the system was type classified Limited Procurement (LP) for the production of four systems (one initial production test model and three laboratory-configured trainers). The initial production test model will be used for DT/OT III while the trainers will be used by the Air Defense School for training operators and maintenance personnel.

The AN/TSQ-73 (Missile Minder) is an automatic data processing Air Defense Command and Control System programmed to replace the currently fielded AN/MSG-4 Fire Distribution System. The AN/TSQ-73 system, designed for use with Nike Hercules and Hawk units, will be fielded in both the battalion and the group level configurations. The basic AN/TSQ-73 consists of a general purpose digital computer with two central processing units, input/output devices, two general purpose display consoles, radar interface and processing unit, communications interface

units, simulation unit, and a digital data display group. The track handling capacity of the Missile Minder will be more than twice that of its predecessor. Design goals for the system include better reliability and easier maintainability.

Like all systems under development, the program is under continuous evaluation and additional testing will be conducted before full scale production begins.

The Directorate of Combat Developments, USAADS, is the TRADOC representative for system development. The program is managed by the Project Manager, Army Tactical Data Systems, FT Monmouth, NJ.

NEW TRAINING TECHNIQUE

A new training device has been developed by members of the Chaparral Branch, Forward Area Weapons Division, Direct Support Materiel Department, US Army Air Defense School (USAADS). The device is used to enhance instruction in the operation of the Chaparral air defense system. The device has been named, "Project SIRTCH" (simulated infrared target for Chaparral).

SIRTCH consists of a model train engine, long track, control transformer, an elevated wooden platform, a small light bulb (for the IR source), a small airplane (for realism effect), and associated wires for connections. The track is mounted on the platform with several roller coaster type hills to provide elevation. The airplane is mounted on top of the engine. The IR light is mounted on the aircraft. Wires are run from the train engine to the light bulb to allow the light to illuminate when the engine is running. The train engine is then run around the track and a Chaparral system with a live guidance section connected to an M30 training missile can track this target. The result is realistic gunner training. The complete operation of the system can be checked out by a mechanic, and the Chaparral monitoring set AN/TSQ-T3 can be attached to the system for a complete tactical checkout of a Chaparral gunner.

Depending on the amount of track used, the cost of SIRTCH may range from $200 to $350. A few benefits are: multiple operator training (more than one Chaparral system may be used), variable target speeds and patterns, all-weather, 24-hour training (SIRTCH may be set up inside), incorporates the Chaparral monitoring set AN/TSQ-T3 for maximum training and evaluation of gunners, SIRTCH is very easy to maintain and operate requiring no special training.

Following is a detailed description of the SIRTCH currently being used at USAADS:

Target - model airplane scaled 1:72 represents an actual airplane, Category II, approximately 15 meters length.

Chaparral is 25 yds from target — the image in modified powered reflex sight appears as an actual target would at 7 km.

Tracking rate conversion table:

Vt = Actual speed of simulator

Va = Simulated velocity of 1:72 scale CAT II aircraft (FM 44-4)

R = Simulated range of CAT II aircraft (FM 44-4)

D = Actual range simulator from fire unit

Vt in Feet Per Second	Va in Miles Per Hour	R
.427 ft/sec	100 mph	7km
.854	200	7km
1.281	300	7km
1.708	400	7km
2.135	500	7km
2.562	600	7km
D = 25 yds for all speeds		

As D increases, Va decreases.

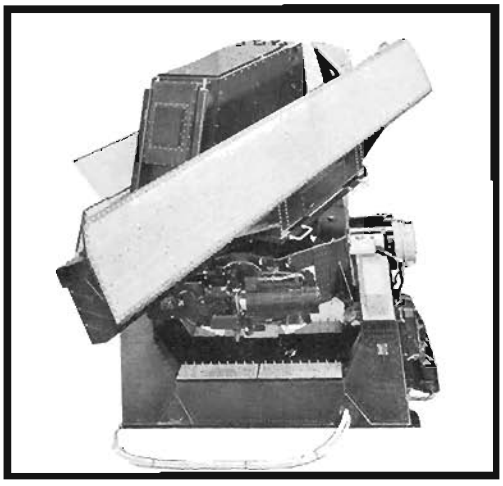
As D decreases, Va increases.

Example D = 20 yds Va = .478 ft/sec

Simulator speed should be set up with a stopwatch.

Va will vary approximately 10 percent due to stopwatch eyeball error.

INFRARED/RADAR FOR AIR DEFENSE



DOUBLE VISION – Above is shown the topside assembly for the Improved Point Defense/Target Acquisition System. The system is the first to integrate radar with infrared sensors. The radar antenna is shown at front with the infrared antenna and search set directly behind.

A new shipboard air defense system, that for the first time integrates infrared sensors with conventional radar and correlates the returns from both, has been tested successfully by its designer. The system will be integrated with the NATO Seasparrow Surface Missile System to form the Improved Point Defense Surface Missile System. The NATO nations that have Seasparrow are Denmark, Norway, Italy, Belgium, and The Netherlands.

The combination of sensors will be used in an Improved Point Defense/Target Acquisition System (IPD/TAS) to speed the detection, identification, and tracking of approaching targets. This means a single ship can quickly employ its own missile system to protect itself. Some ships now rely largely on umbrella-like fleet area defenses. IPD/TAS will provide the reaction speed needed for each ship to take action against threats that "pop up" over the horizon.

The complementary action of the two sensors will provide exceptionally accurate target data that could not be achieved by one alone.

Infrared provides data on elevation and bearing and has the advantage of being a silent sensor — it cannot be detected and used by an enemy to locate and identify the point of origin. The high-data-rate, wide-band radar provides information on a target's range and closing speed. It is not affected by atmospheric disturbances and employs the latest techniques for canceling clutter or undesired radar reflections. This enables detection of targets under the worst of natural backgrounds, man-made clutter, and electromagnetic interference. A further advantage of the system is that the two sensors, revolving every 2 seconds on the same pedestal, give an accurate correlation of target returns. A 75-degree angle of coverage in elevation permits the detection of very high- or very low-flying targets, and a narrow angle in azimuth provides precise information on bearing.

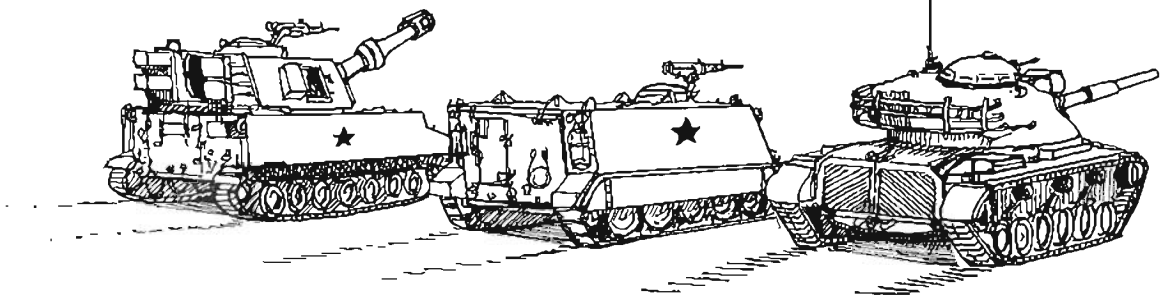
Five IPD/TAS sytems will be developed. The first is an integrated system with infrared and radar systems on the same pedestal supported by a computer, data displays, and related equipment.

The modular design of the integrated system permits four single-sensor configurations. They include: automatic infrared, automatic radar, manual infrared, and manual radar. The latter two do not include a computer and are equipped with different displays.

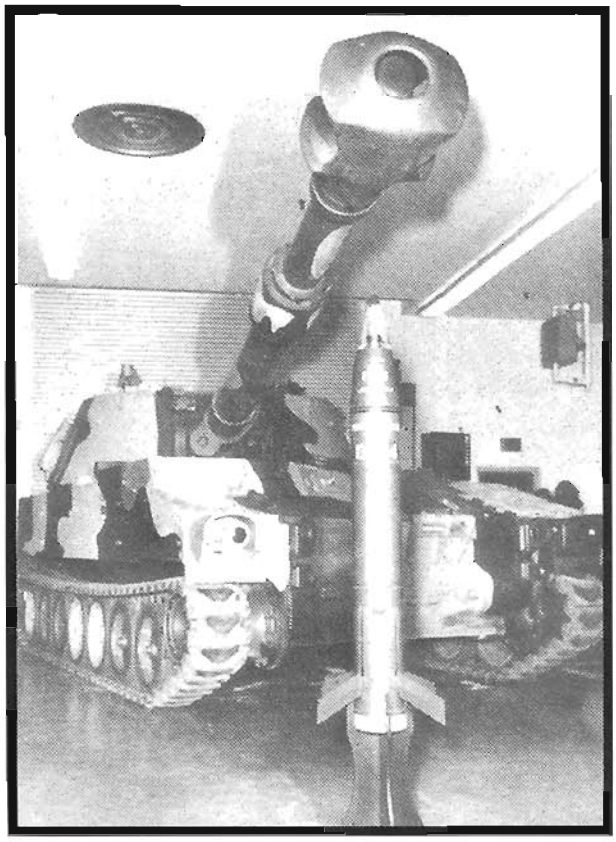
Because point defense systems must weigh the value of a ship against the cost of the system required to defend it, the integrated model would probably be used for such high-value ships as aircraft carriers. The derivative systems with lesser performance capability and lower costs are available as options. These might be employed on ships to provide a level of self-defense appropriate to their value and mission.

Land-based tests have been completed on all system configurations. Each developmental model will go through an objective evaluation in a stringent shipboard demonstration and testing program this year aboard the USS Downes.

Combined Arms Corner



APPROACHING FIRST ROUND HIT CAPABILITY



155-mm CLGP

Here is a prototype model of the Army's 155-mm CLGP (cannon-launched guided projectile) with an M-109A1 self-propelled howitzer at Fort Sill, Oklahoma. CLGP allows conventional artillery to attack a variety of hard targets with a high single-shot kill probablility. The new rounds have scored direct hits on stationary and moving tanks at ranges of 8-12 kilometers in recent firing tests at White Sands Missile Range, New Mexico.

NEW NIGHT SIGHT

In its continuing effort to improve the effectiveness of weapons at night, the Army has developed this new night sight. Here it is mounted on the Dragon missile system. Using the sight at night, the Dragon has scored direct hits. The sight employs a passive infrared device and five-power telescope lense. If test results are acceptable, the new sight will be used with both the TOW and Dragon antitank missile systems.

CAMOUFLAGE FOR A COBRA

If the test results are favorable, soon all Army aircraft might be painted with the same tiger stripes that this Huey Cobra helicopter has. The stripes were put on as part of a test by the US Army Aviation Systems Command to find the most effective camouflage for in-flight aircraft. The stripes form an irregular design and are put on with a special paint that reduces reflection.

DUNE BUGGY

An XR-311 "dune buggy" reconnaissance vehicle is used to scout for "aggressor" activity at Fort Hood, Texas. The vehicle is equipped with a TOW (tube-launched, optically-tracked, wire-guided) missile system to give it a tank-killing capability. The activity is part of an experiment being conducted by MASSTER (Modern Army Selected Systems Test, Evaluation and Review) to compare the operations and capabilities of various Army vehicles when used as scouts.

TOW RANGE IMPROVED

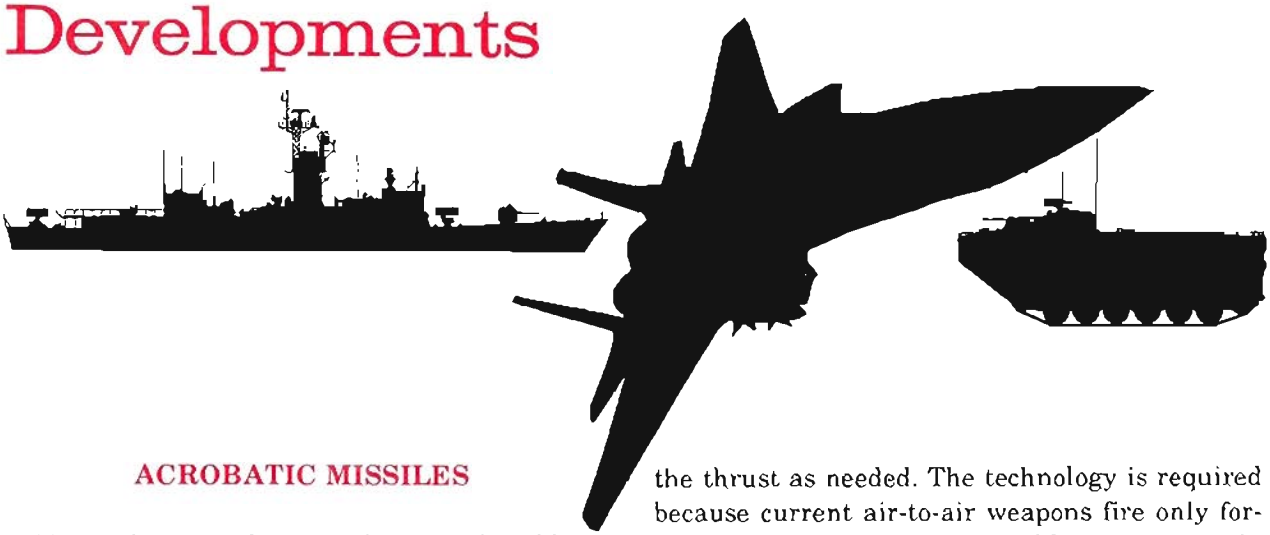
An extended range version of the Army's TOW antitank missile has been demonstrated successfully in a series of helicopter firings at ranges up to 2 1/3 miles — an increase of 25 percent. In the series of test firings conducted at Redstone Arsenal, Alabama and Fort Hood, Texas, TOW missiles scored hits at ranges that varied from 3,500 to 3,750 meters. In operation, a TOW gunner fixes the crosshair of his sight on his target and launches the missile. He then merely needs to hold his sight on the target, whether moving or stationary, and the missile is automatically guided to impact on the spot at which he is sighting. The launching platforms were the UH-1M and AH-1Q Huey Cobra helicopters, with flight patterns varying from a hover position to traveling speeds up to 90 knots. The currently-operational TOW (tube-launched, optically-tracked, wire-guided) missile has a maximum range of approximately 3,000 meters-under two miles. The additional range of 750 meters was achieved after engineers devised a means of increasing the length of the missile's existing spool without requiring any missile design changes. The hair-thin wires, through which the missile receives its steering signals, unreel from the spool during flight. The longer-range TOW increases the safety of the helicopter crew by providing a greater stand-off capability. Plans are being considered to incorporate extended range missiles for the TOW airborne application into the present production program.

LIGHTWEIGHT LASER DESIGNATOR

A versatile hand-held laser equally suited for guiding attack aircraft to enemy targets or for pinpointing the position of ground forces is being developed for the Army. The AN/PAQ-1 lightweight laser designator (LWLD) resembles a stocky, short-barreled rifle. Infantry forces can designate enemy targets with the laser's light beam, which is invisible except to sensors in specially equipped aircraft and helicopters. The aircraft can home on the beam, bringing their weapons to bear where needed most. Cut off infantry units may also use the laser to make their position known to rescue or supply aircraft with little chance of enemy detection. The Department of Defense, recognizing the LWLD's versatility, has designated the laser a tri-service device.

The designator consists of three easily replaceable modules designed to withstand rough field handling on a 4-inch by 5-inch circuit card which contains the equivalent of 10,000 transistors etched into the microcircuitry. The first designator has been delivered to the Army's Electronics Command for field testing.

Developments



ACROBATIC MISSILES

Air combat missiles someday may be able to pivot up to 180 degrees in any direction after launch to intercept missiles or aircraft attacking from anywhere in the sky. Thrust control or "air-slew" technology research leading to mid-air missile acrobatics is being developed under a research contract.

Wind tunnel testing of two systems that direct rocket motor thrust to slew the missile is now being conducted. The technique employed involves mounting the thrust nozzle on a pivoting gimbal or installing movable jet tabs to deflect the thrust as needed. The technology is required because current air-to-air weapons fire only forward, leaving aircraft vulnerable to rear attack. Increased agility is being built into some missiles, but none affords the 360-degree protection this air-slew technology would provide.

The air-slew technology eventually would be mated with a missile airframe designed for hypersonic speeds and with aerodynamic control surfaces for long-range flight. Design of an aerodynamic flight control system will follow the wind tunnel testing. Selection and design of a missile configuration to satisfy requirements will complete the contract.

NEW COMBAT RADIO

A new virtually automatic manpack radio that provides use of 280,000 high-frequency-band channels to communicate over distances of thousands of miles, yet is only slightly larger that one volume of the Encyclopedia Brittanica, is in production. About 5,000 of the new radios will be built for the Marine Corps.

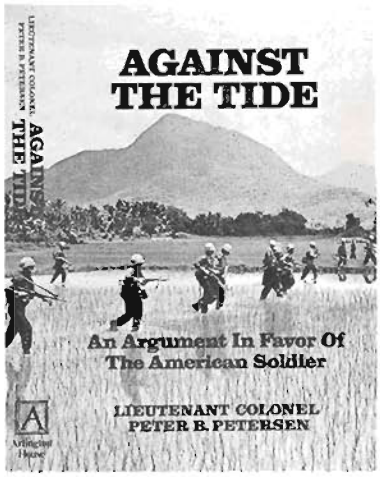
The radio has so many automatic features that it is virtually a "hands-off" set. The radioman simply goes into the transmit-receive mode, selects his frequency, and hits the press-to-talk switch. The antenna is tuned, the set is alined, and the transmitter comes up full power automatically. With 280,000 high-frequency channels available, the radioman has a better chance of finding a clear frequency, thereby gaining more reliable communications.

The Marine Corps has earmarked a number of the sets for delivery to the Air Force for testing, and to several allied nations for procurement under the foreign military sales program.

The new manpack radio-known officially as the AN/PRC-104 is designed to lighten the burden of a combat radioman and to provide the highest degree of flexibility in tactical communications. The PRC-104 employs advanced circuit design and micro-miniaturized solid state devices to achieve high performance and ruggedness in an extremely small package. The radio with its battery forms a package only 12-½ inches wide, 11-½ inches tall and 2-5/8 inches thick. Each unit weighs only 12-½ pounds including its battery pack. The silver-zinc battery provides at least 16 hours of service before recharging is necessary.

Trends

Book Review



Colonel Petersen graduated from Infantry Officer Candidate School in 1954. He commanded two units during the Vietnam conflict - in 1962 a special force unit and in 1969 he commanded the 3d Bn, 60th Inf. Colonel Petersen holds a Masters Degree and Doctorate of Business Administration from George Washington University and graduated from the Army War College in 1972. At the present time he is assigned to the Pentagon.

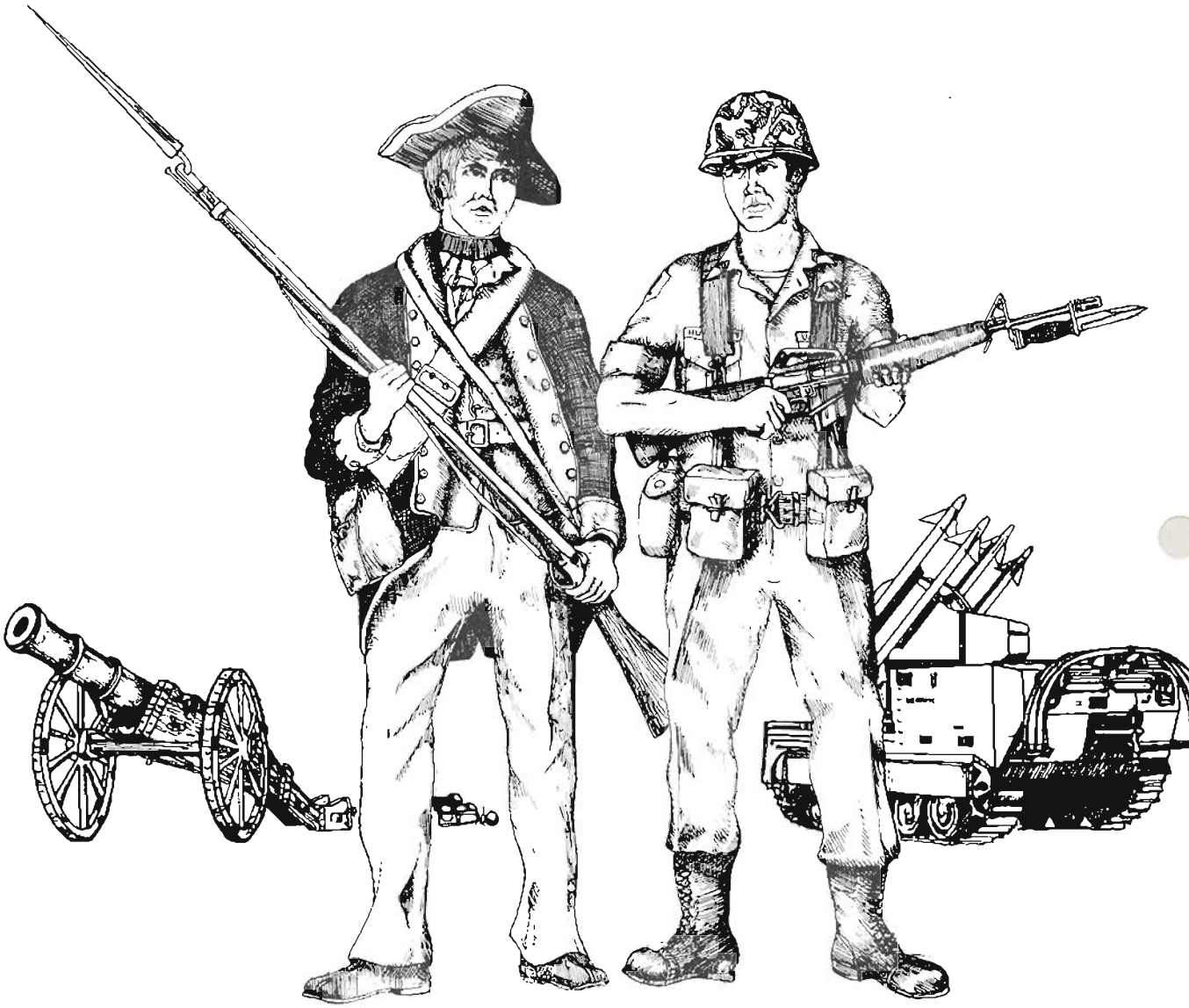
AGAINST THE TIDE, An Argument in Favor of the American Soldier. By Colonel Peter B. Petersen, US Army. Publisher: Arlington House, New Rochelle, New York, 287 pages, illustrated. $9.95

An argument in favor of the American soldier —that's exactly what Colonel Peterson presents in his scholarly book, *Against the Tide*. Holder of a Doctorate in Business Administration, and experienced as an infantry combat commander with 22 years of military service, Colonel Petersen is eminently qualified to conduct and evaluate the 6 years of study and research that back up his evaluation of today's American soldier.

Aware of the wrong that is being exacted upon the American soldier by the news media and the public, Colonel Petersen set out to prove that our soldiers are not a band of bumbling, disrespectful sadists ruled by the "Military Mind," as many seem to believe. His studies began with the examination of thousands of men, in different training environments, at the time they began their instruction and concluded with follow-up examinations several years later. The conclusions, scientifically arrived at, erase any doubt that the American soldier is basically different from normal young men in American society. The book is replete with unquestionable comparisons that staunchly sustain the author's argument.

The work is so methodically developed and comprehensive that this book could be invaluable to any school or training agency in developing its programs of instruction.

The Editor Comments

As we enter our seventh year of publication, and examine some early issues of *Air Defense Trends*, we readily note a decided improvement in the design and content of the publication. Responses from our readers indicate an obvious awareness of the progress we have made in the short time TRENDS has been in business. However, we feel that a perfectionist attitude should be our course mark to the goal of complete, quality service to the air defense community, and in this connection we call your attention to our stated mission: to maintain a stimulating and mutually productive dialog between the School and units in the field. Accomplishment of this mission, then, requires action on our part and that of our readers. Responses from the field to what we print is an important facet of the "gem" of success. We, therefore, not only welcome but *need* your comments on all aspects of the magazine. Another important facet of the "gem" is original input from the field. Original, informative articles of any length, from all levels of command, are absolutely essential to the success of your branch magazine. Unit Information Officers can be most helpful, but we also need individual letters and articles telling of professional experiences, describing ideas, or offering suggestions relative to air defense functions and activities. We would especially like to hear from members of units regarding their thoughts on training, weapons, doctrine, and tactics. And don't be afraid to complain, TRENDS listens to everything that is said, evaluates, and acts accordingly, with the interest of the air defense artilleryman in mind.

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