AIR DEFENSE

Trends

JULY-SEPTEMBER 1975

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FEATURES

The Strategic Importance of Air Defense

. . . . 4

ADA in Retrospect

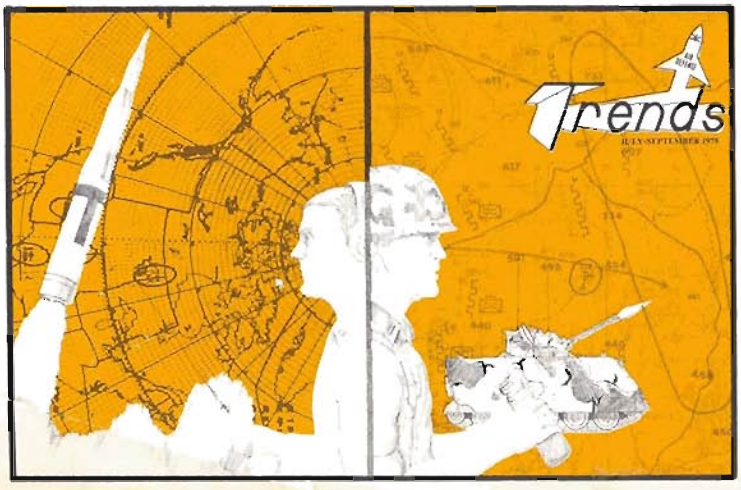
. . . . 9

Improved Hawk in Gallant Shield '75'

. . . . 14

Air Cavalry in the Desert

. . . . 18



Our cover emphasizes the strategic importance of air defense as described by the article of that name appearing on page 4. The article describes how the deployment of our field force air defenses has not only tactical significance but also important strategic implications.

AIR DEFENSE

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EMBER 1975

ARTICLES

Command and Control Operator/Maintainer for the Missile Minder 22
The Logistical Connection 24
It's a Bird — It's a Plane — It's an RPV! 28
History of Air Defense 30
SASCOM Duty 33
The New Look for ADA Training Literature 35
What Do You Do Now, Lieutenant? 36
View from the Field 38
VAR College Bowl 40
The ADA Museum 48

DEPARTMENTS

Letters to the Editor 2
Enlisted Career News 42
Bars to Stars 45
Scanning 50
Combined Arms Corner 55
Developments 58
Trends Book Review 60

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.

Distribution will be made only within the School, except for distribution on a gratuitous basis to Army National Guard and USAR schools, Reserve component training and ROTC facilities, and as requested by other service schools, CONUS armies, Active Army units, major oversea commands, and military assistance advisory groups and missions.

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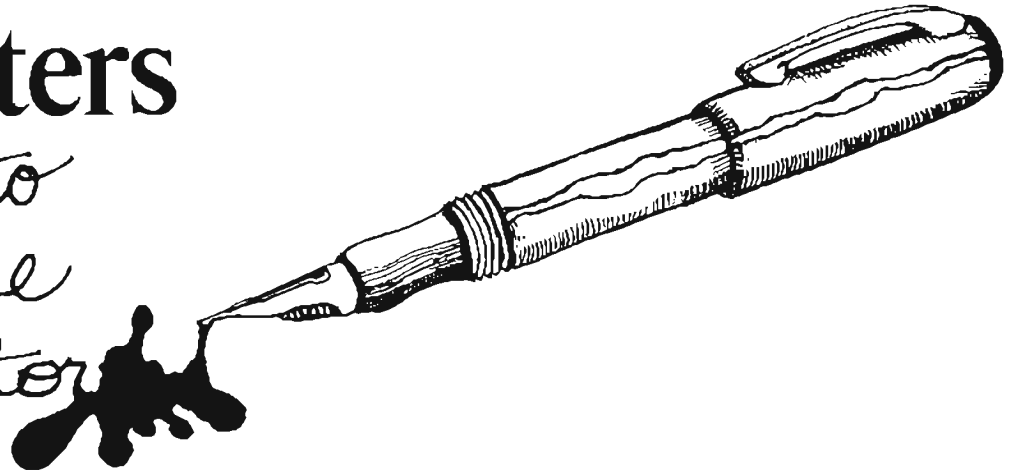
Letters to the Editor



CORRECTION

TRENDS listed the author of "Night Bird" in the April-June issue as Major Jimmy G. Yancy when actually his name is Jimmy B. Yancy.

—Ed.

Dear Sir:

My experience in ADA units in both Europe and CONUS has taught me that there is a real need for all battery officers to have a basic proficiency as CBR officers. Particularly in SP Hawk and in Chaparral/Vulcan batteries, where platoon leaders may be required to operate in a semiautonomous mode, they should be qualified to handle fallout predictions and chemical/radiological survey and monitoring. It does not benefit the platoons to have one school-trained CBR officer at the battery CP when frequently the distance factor causes communications to be intermittent at best.

I would like to suggest a simple solution to this problem that could save the Army money in peacetime and lives in combat. Include the CBR instruction, now presented in the ADA Officer Advanced Course (ADAOC), in the ADA Officer Basic Course. To indicate proficiency attained from the CBR subcourse, some documentation, in the form of a certificate or annotation of records, should be made. This would preclude sending battery officers to separate post/command CBR schools to qualify them, thus saving training time as well as dollars. The CBR subcourse taught in the ADAOAC provides all the critical knowledge as well as additional information. The instruction could be compressed to 7 working days and still provide the information needed to qualify the unit CBR officer to perform his duties. The unit CBR officer should be able to maintain cumulative dose exposure records; supervise maintenance of CBR equipment; predict fallout areas and dosage; supervise CBR survey, monitoring, and decontamination; and advise the unit commander on employment of equipment and personnel in CBR environments.

S. BOYD ADAMS
CPT, AD
Commanding Btry C, 4th Bn (C/V) (SP), 61st ADA

Perhaps Captain Adams is on the USAADS ESP frequency, or vice versa. Recently, by direction of Headquarters, Training and Doctrine Command, the School expanded biological and chemical defense training by a large overall percentage and the training is included in the Officer Basic Course.

— Ed.

Dear Sir:

The article "Reorganization of Ballistic Missile Defense Activities," which appeared in the January-March 1975 issue of Air Defense Trends, contained some outdated information. The attached article, "Reorganization of Army Ballistic Missile Defense Activities," contains the latest information on BMD organization and activities.

WILLIAM O. STAUDENMAIER
LTC, GS
Deputy Chief of Staff
Ballistic Missile Defense Program Office
Headquarters, DA

The article to which Lieutenant Colonel Staudenmaier refers appears in the "Scanning" section, page 53.

— Ed.

Dear Sir:

Thank you for the personal copy of *Air Defense Trends* which included my article on Hawk air mobility. The

treatment which you gave the text was most professional.

We are currently working on items for publication of particular interest to Air Defense Artillerymen and to those who believe in mobility as we do. Included are such subjects as Hercules air mobility and rigging procedures, the brigade's direct support detachment operations, and maintenance and its impact on mobility operations. As these subjects materialize, we will certainly consider *Air Defense Trends* as an organ for their publication.

JOHN J. KOEHLER, JR.
Brigadier General, USA
Commander, 38th ADA Bde

Dear Sir:

The 2d Bn (AW) (SP), 174th ADA, Ohio National Guard, has been a Duster unit since 1959 and along with the seven other active National Guard battalions that are still outfitted with the Dusters we feel the Duster's twin 40-mm system is not only one of the best but is a fairly cheap, trouble-free system which the US Army should not mark off completely — or at least until the system can be replaced with something besides paper dreams. I realize that to request TRENDS to get into articles on Duster-related information would be old hat for all our active ADA members; however, speaking for the eight Guard divisions and eight Guard Duster battalions that have only the twin 40's plus the Redeye at this time, some articles regarding "Light" ADA weapons/tactics would be appreciated.

If copies of TRENDS could be sent to the eight Guard divisions it might help them realize they have ADA. As you know, last year the Department of the Army and the National Guard Bureau finally directed that the divisions begin including their ADA battalions in their training.

We reproduce some articles from TRENDS for our battalion and unit officers, 36 in all, and would appreciate any copies of articles that would concern this type unit — communications articles especially.

ROBERT L. CLARK
MAJ, ADA
Executive Officer

Your favorable assessment of the Duster is justified. It performed admirably during US involvement in the Vietnam war, and several articles dealing with its value in action appeared in past issues of TRENDS.

In this issue, "View From the Field" describes how Vulcan has been employed in support of an infantry company in the attack. We will continue to publish articles of this nature.

The Army-Wide Training Support Division at the US Army Air Defense School provides training material on the Duster and Redeye upon request.

Air Defense Trends is distributed regularly to National Guard Air Defense Artillery battalions, and action has been taken to place the eight Guard division headquarters on our regular distribution list.

We would appreciate getting reports on your training activities which we would publish for the information of all ADA battalions.

—Ed.

Dear Sir:

I was pleased to read General Koehler's article in the January-March 1975 issue relative to air movement of the Hawk missile battery. However, I was dismayed at the accompanying picture which made our proud Hawk missile look like something in an intensive care unit.

The missile, with wires, tape, monitoring devices, and "prison stripes" attached to its body bears little resemblance to the sleek tactical round that General Koehler's men airlifted.

Judging from the account, the helicopter moves were far more successful than our attempts to displace the battery during a Hawk troop test in the spring of 1961. As I recall, we damaged generators, an illuminator, a CW acquisition radar, and almost dropped a loader-transporter. And because of unexpected elasticity of the slings, the H37 pilots were reluctant to lift equipment because it rose and fell like a yo-yo underneath the chopper. I believe the exercise was finally halted because of sling deficiencies.

HAROLD G. MOSS
CW4, USA
DSM Dept, USAADS

THE STRATEGIC IMPOR

LIEUTENANT COLONEL THOMAS E. BEARDEN

The strategic aims of every nation are different and are conditioned by many factors such as cultural heritage, experiences (particularly in warfare), geography, and ideology. The United States is dedicated to a defensive strategy; one in which it will not strike the first blow, but will react only to an attack upon itself or upon its Allies.

Our strategic thinking has been strongly conditioned by our geography and our experience in war. During our early history and through World War II, this nation was in a most enviable geographic situation. Bordered on the east and west by great ocean barriers and without any strong enemies to our north or south, we have been living in a natural geographical fortress, totally protected from the great wars and conflicts that have ravaged Europe and Asia. Our experience with modern warfare has been that it is conducted somewhere else rather than on our own continent. Even in World War II, there was no significant strategic threat to the heartland United States from Germany or Japan. Consequently, because of our experience in war in distant lands and our unique geography, we have sharply separated strategic war and field forces warfare in our minds. For us, field forces warfare has always been somewhere else. Even when we did not win in the field, such as in Korea and Vietnam, there was still no threat to the heartland United States. We have always had the option of losing completely in field force warfare without risking serious consequences to the heartland. Just how unique this "fortress America" situation has been can be grasped by looking at the Russian experience.

The Soviets are on the same continent with both Europe and Asia, and there are no ocean barriers between Moscow and Peking or between Moscow and Berlin. For centuries, whenever a great breakthrough occurred against the Soviet Army in the field, it has opened the way for immediate invasion of the Russian

heartland by the victorious hostile field force. This was true in Napoleon's day and it was true in Hitler's Operation Barbarossa in World War II. The Soviet Union thus has not been allowed to create a sharp division between strategic war and tactical warfare. Instead, the Soviets feel a most overpowering necessity to be victorious in the field to prevent a field disaster from immediately threatening the entire nation strategically. If there was ever any doubt in the Russian mind on this point, World War II provided an unequivocal example, and every Russian feels this lesson in his bones. Accordingly, one finds a grim and unrelenting determination on the part of the Soviet Union to assemble and maintain overwhelmingly superior forces in the field — far stronger than any opposing them. Any nation that must defend in the field against the forces of the Soviet Union, against its controlled allies, or against its proteges will face offensive forces in great numbers; armed with the most modern offensive and defensive weapons the Soviets can produce. Accordingly, those who would defend against the Soviet Bear must build and deploy bear traps of great power and very strong constitution.

It is an unwritten law in modern warfare that one's offense is only as *good* as the opposing defense is *bad*. Looking at the defensive power of the Soviet Union in the field, we find a formidable and ever-growing array of aircraft, tanks, sophisticated weapons, surface-to-air missiles, and defensive guns. The Soviet idea of adequate defense is about 16 times the defense we normally assume to be adequate. The Soviets intend their defenses to be so strong that the opponent's offense is severely limited or absolutely checked. For example, the Soviets have elevated air defense to a separate fighting arm equal to their Army, Navy, and Air Force. In that respect, some interesting conclusions can be drawn from the historical examples of the air defense problem of field forces faced by a determined modern air arm.

Figure 1 shows the historical examples of mass air attack against a large, modern, target-rich field force. Two highly successful attacks are shown: the German attack against the Soviet Union in June 1941 — Operation Barbarossa — and the Israeli attack against Egypt in 1967. The growth in attack aircraft speed and destructive power from 1941 to 1967 can be seen very clearly by the more rapid suppression of Egyptian air in 1967 than of Soviet air in 1941. In 1967, three-quarters of the Egyptian aircraft were destroyed in the first 2 hours. These two curves represent a "least lower

TANCE OF AIR DEFENSE

bound" — a superb air force that attacks by surprise, meets only token, ineffective SAM's and/or guns, and penetrates immediately: catching the enemy air on the ground and destroying it.

In 1973, the Israeli aircraft intially had to be committed to holding off attacking Egyptian and Syrian tank forces until the Israelis could mobilize their own ground forces and get them into the fight. Thus, the Israeli aircraft were first dedicated primarily to close air support of ground operations. Even when eventually freed from total dedication to the tactical support of ground operations, Israeli fighters could not penetrate the dense Egyptian SAM and gun defenses without unacceptable losses. In Egypt alone, the Soviets had deployed more major SAM systems than were in the entire US Army's active inventory. The Israelis moved primarily on the ground, even against the Egyptian SAM's. Thus the 1973 curve is a "greatest upper bound" of the air defense problem — a superb air arm forced into an initial tactical support role against ground attack and facing ground-based air defenses only, then eventually freed to provide a classic confrontation of a modern air arm against a modern, massive SAM and gun defense. For example, if a comparably good Egyptian air arm had also been encountered, the attrition of Israeli aircraft would have been much sharper, as illustrated by the postulated curve.

In case of a Warsaw Pact attack against NATO, the US air situation in Europe could conceivably be such an immediate defensive role, since our forces can be expected to be under mass attack both on the ground and from the air. In that case, the curve for US aircraft attrition rate must inevitably fall somewhere below the 1973 Israeli curve, because Warsaw Pact air provides an attrition factor in addition to that provided by its SAM's and guns.

Unless the US can provide dense, bristling SAM and gun defenses to hold back a Pact air onslaught and allow the friendly interceptors to get airborne in force, the attrition curve of US aircraft could approach the postulated curve or even the 1967 curve. Thus, unless we can sustain and quickly replenish high loss rates of both aircraft and SAM systems, a "maximum effort" Pact assault could succeed and the Pact could rapidly seize total air superiority. If confronted by the Soviets, one must be prepared to play "swapout checkers," for they are masters of that game, and they already have the necessary number of checkers to play it. One cannot play table stakes poker with only a "dollar ninety-eight" in one's pocket.

Destruction of ground and theater forces and targets lags only about 2 or 3 days behind the successful suppression of air defenses. Thus, a 3- to 6-day war results from a successful seizure of total air superiority, as can be seen from the classic 1967 curve.

These curves, based on real experience, positively bracket the air defense problem faced by our field forces in Europe. The curves have far more validity than all of our paper studies, because the primary curves are empirically verified, not hypothesized or calculated from stereotyped assumptions.

The Soviet philosophy of massive air defense would certainly be applied in the event of a Warsaw Pact attack against NATO, and one would expect to find bristling Pact air defenses so thick that our own aircraft would have great difficulty penetrating them and surviving. In addition, the massive Pact air arm, reinforced by contingents of the Soviet air arm, is capable of launching a heavy surprise air assault, coordinated with strong assault by Pact ground forces reminiscent of the Germans' Operation Barbarossa in June 1941. In such an attack, the majority of the air battle would take place over NATO forces and territory. Considering the formidable and growing Warsaw Pact air attack force, and our own thin, low rate-of-engagement, ground-based air defenses, one realizes that Warsaw Pact air attack against NATO forces has far too great a chance for success. From the historical examples in 1941 and 1967, one can affirm what a successful Warsaw Pact air attack against our field forces would mean. Quite simply, it would mean the methodical and rapid destruction of our field forces within a matter of days. In that almost unthinkable scenario, the US could be confronted by a most grave and terrible choice. That choice would be: either refrain from using nuclear weapons and accept the total defeat — and perhaps destruction — of our field forces, or else escalate the war into nuclear conflict, risking the almost certain destruction of both the field forces and possibly the heartland USA as well. A wily attacker could even further complicate the former decision by offering the losing side a "Dunkirk" evacuation instead of total annihilation.

One certainly would not envy the American President who had to decide whether or not to escalate to nuclear warfare because our air defenses were too weak to stop the spectacular success of modern and massive air attack against our field forces. Nor would one envy the commander in the field who was forced to recommend to the Commander-In-Chief that he either escalate to all-out strategic nuclear exchange or accept the enemy offer to withdraw the remnant of a beaten field force from the continent of Europe.

Field army warfare and strategic war are no longer so sharply separated for us as in the past because, for the first time in our history, the heartland United States is immediately vulnerable to strategic attack and destruction. Yet our international commitments, which are of overwhelming strategic importance to our

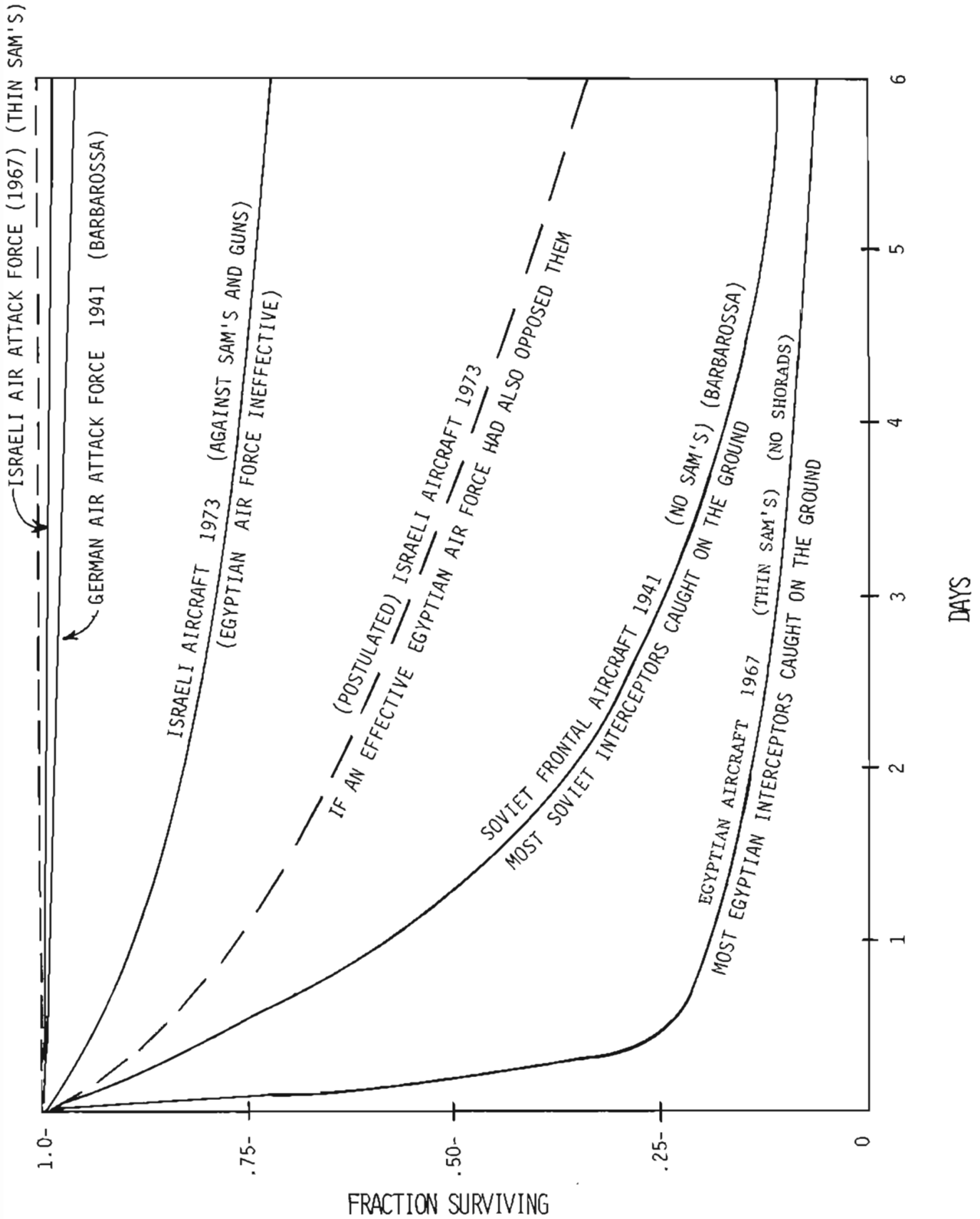
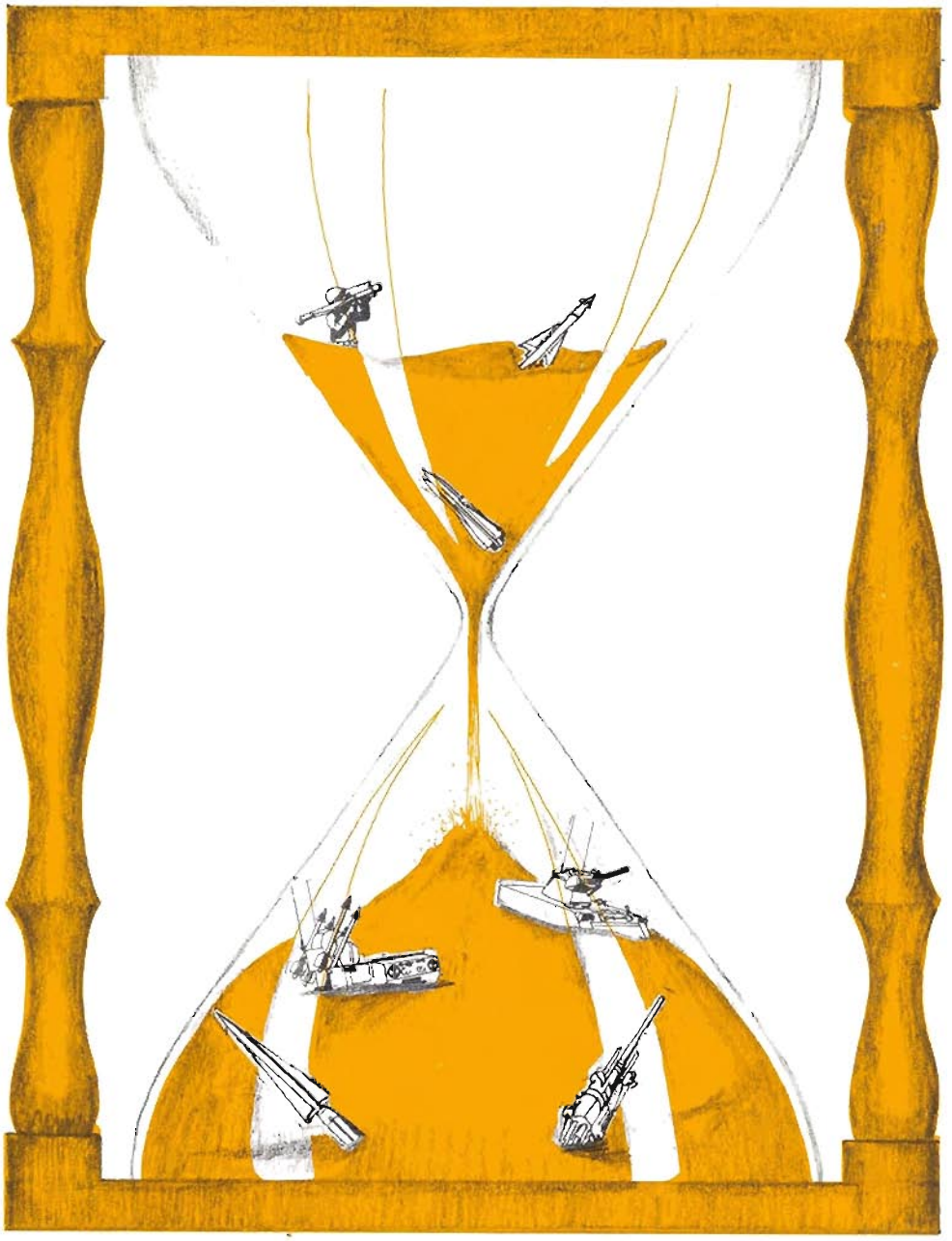

ISRAELI AIR ATTACK FORCE (1967) (THIN SAM'S)
GERMAN AIR ATTACK FORCE 1941 (BARBAROSSA)
ISRAELI AIRCRAFT 1973 (AGAINST SAM'S AND GUNS)
(EGYPTIAN AIR FORCE INEFFECTIVE)
(POSTULATED) ISRAELI AIRCRAFT 1973
IF AN EFFECTIVE EGYPTIAN AIR FORCE HAD ALSO OPPOSED THEM
SOVIET FRONTAL AIRCRAFT 1941 (NO SAM'S) (BARBAROSSA)
MOST SOVIET INTERCEPTORS CAUGHT ON THE GROUND
EGYPTIAN AIRCRAFT 1967 (THIN SAM'S) (NO SHORADS)
MOST EGYPTIAN INTERCEPTORS CAUGHT ON THE GROUND
1.0
.75
.50
.25
0
FRACTION SURVIVING
1
2
3
4
5
6
DAYS

Figure 1

agreement partners, require long-range insertion of US *field* forces to come to our partners' *strategic* rescue. If our field forces cannot meet and contain the opposing attack, the only remaining alternative to accepting defeat is to resort to nuclear weapons, which, if escalated to a strategic exchange, would guarantee the destruction of both our field force and heartland United States. Under these circumstances, effective and strong air defense of our field forces is not only of tactical significance, it is of strategic significance as well. With the strategic chess game essentially stalemated, one must be prepared to win or lose in the field alone, strictly with what forces he can bring to bear in the theater. Without strong — even massive — air defense, one cannot successfully guarantee the time necessary for long-range insertion of additional field forces against a major air power. In fact, any attempt to provide heavy insertion of forces would only result in catastrophic additional losses to air assets unless the air space can be dominantly defended by the side making the insertion.

Building and deploying strong air defenses has serious strategic impact and the survival of both our nation and our field forces depends upon it. We no longer have the option of considering air defense of our field forces to be of tactical significance only. Against a Warsaw Pact attack, the success or failure of the air defense battle will determine the entire fate of the field forces within the first 2 hours of combat.

This is the third in a series of articles written by Lieutenant Colonel Bearden for Air Defense Trends. The others, "Air Defense Mobility vs Operational Area" and "A System Named Joe — Anatomy of a Name," appear in the Jan-Mar and Apr-Jun 1975 issues respectively. Colonel Bearden is Chief, Evaluation Branch, Military Studies Division, SAM-D Project Office, Redstone Arsenal, Alabama.



ADA in RETROSPECT

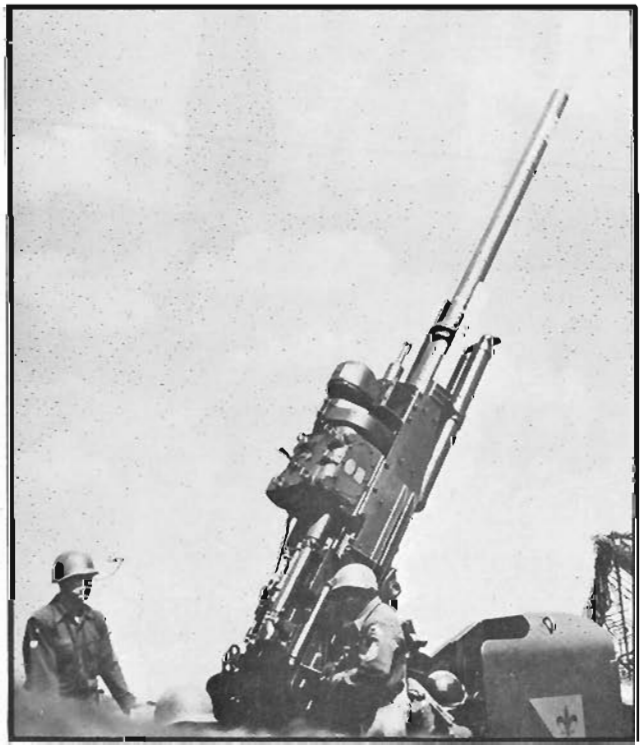
COLONEL JOSEPH RUSSO

Colonel Joseph Russo recently retired after more than 35 years of military service, most of which were spent in air defense. Prior to his retirement, we asked Colonel Russo to record some of his thoughts regarding the development of air defense over the years. We believe that this information will not only serve as a review for knowledgeable AD personnel but will serve also as instructional background for our younger air defense artillerymen.

Like most things worthwhile, air defense artillery (ADA) did not come into its own overnight but is the result of many years of dedicated work on the part of a great number of air defense artillerymen and missilemen.

I have seen ADA adjust from the status of "an arm of service" to a combat arm. This in itself has been a very rewarding experience. ADA has progressed from bulky coastal encasements to a fast-moving force with the maneuvering Army on the modern battlefield.

Looking at ADA milestones in retrospect, let's review some of the earliest milestones in the development of ADA. In 1917 the Army first recognized the need for air defense for the American Expeditionary Force then being prepared for oversea service. The mission of developing antiaircraft (AA) units was assigned to the Coast Artillery Corps (CAC). Although the AA units being formed were essentially for service with mobile field forces, the CAC took the broader view and became interested in an antiaircraft defense system for our long continental coast lines. Following WW I, the focus shifted to defense against *air attack* and the search for a proper role for Antiaircraft Artillery (AAA). During the postwar years, the importance of an AAA branch steadily increased. With the rapid development of air power, the CAC became the arm of the Army most interested in a more broadened concept of what continental defense should include. Gradually, a new doctrine for the Army's role emerged during the 1920's and 1930's. It became increasingly evident that the Coast Artillery was beginning to consider Antiaircraft Artillery a major activity.



90-mm gun, AA, M2

The Coast Artillery's interest in antiaircraft artillery and the technical capacity of its air defense weapons had sufficiently developed by 1930 whereby a clearly discernible and refurbished doctrine emerged — *point defense*. Essentially, the CAC saw its new role with the Air Force in defense of the Continent in the same terms as its former alliance with the Navy.

In the 1930's, our first line of air defense was our Air Force; the second was the Antiaircraft Artillery. The close cooperation which existed between the AAA and the AF bore the same relation as our seacoast defense bore to the Navy. In each case, the more mobile first-line defense forces were not bound to remain in the vicinity, but were free to make use of their mobility and extended radius of action in seeking out their own kind among the hostile forces and destroying them before they could approach our sensitive points.

From the foregoing, we note two characteristics of AA defense of particular interest: AA weapons are relatively immobile and have a short-range compared to airborne or seaborne forces, and constitute a form of *point defense* rather than area defense. Also, AAA is a final "close-in" barrier to hostile air attack on "sensitive points" such as air bases, industrial complexes, or population centers.

By process of adaptation, the Army was transforming its role in defense to meet a requirement which neither the Air Corps nor the Navy was likely to meet. The CAC was confident it had a proper and important role in air defense and airpower enthusiasts strengthened the claim to the importance of the AA Branch of CA. Airpower writers frequently used the columns of the Coast Artillery Journal for spreading their ideas and concepts. A good example is an article written in 1935 by Major Claire Chennault, who was to become the leader of the Flying Tigers in China in World War II. Chennault wrote:

"The outstanding characteristic of bombardment aviation is its ability to avoid conflict with the armed ground forces in order to strike directly at the social, economic, and political life in the interior of the hostile state. Taking advantage of this characteristic, bombardment aviation is more profitably employed when directed against those centers of civil population, industrial establishment, and lines of communication and supply which contribute to the enemy's ability and will to resist.

A hostile air force may be based in regions inaccessible to the Navy, or may be so strong and well-

secured that the Navy cannot operate within its radius of action. In either case, the Navy cannot serve as the first line of defense. Counter-air-force action only can be employed to oppose such a threat and counter-air-force operations must be the responsibility of the land-based air force."

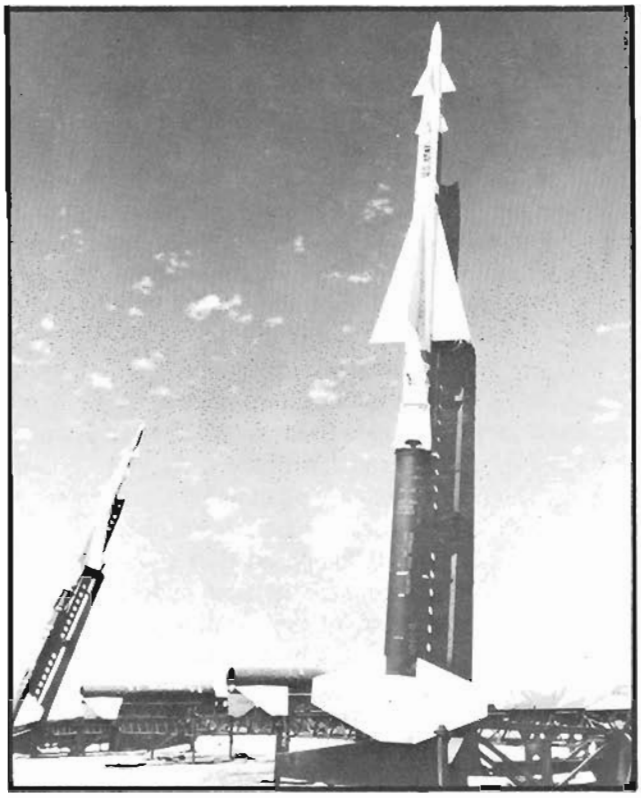
Coast Artillery officers were well aware, however, that support for their branch depended upon justifying their mission by offering a plausible *threat*.

This brings us up to my introduction to a long tour of duty in air defense, World War II, and its aftermath. An important reorganization took place following the crisis of Pearl Harbor. In March 1942, by Executive Order, the chiefs of the various arms were stripped of their powers and responsibility, and all arms were centralized in the Commanding General, Army Ground Forces. The CAC remained as a branch during WW II but most of its personnel served in AAA units. During the closing months of war, military officials took renewed interest in the constantly improving performance of aircraft, and all the services gave renewed attention to the need for improved AA weapons. The Army favored a shift to a dual-purpose, rapid-fire, 90-mm AA gun that could also fire against torpedo boats at their bases. Toward the end of the war, 90-mm guns were about the only actively manned harbor defense weapons in the US and were the principal antiaircraft guns on the East Coast.

At the close of World War II, General Marshall formed the "Patch Board" to study a post-war organization. In October 1945, the board unanimously agreed that all Artillery (including AA) be concentrated into a single Artillery arm where AAA could serve as a dual-purpose ground support force as well as in an AA role.

We had met and passed many ADA milestones; however, the future was to surface many more. Air defense took giant steps in establishing itself as a positive entity in our national defense posture following WW II. Earlier we mentioned the renewed interest in perfecting AA weapon systems. Radar-controlled AA guns had already increased the lethality of ground-based air defenses, but the outer limits of gun fires were being reached. For defense against aircraft operating at extreme altitudes, the most promising form of defense for the future seemed to be in rocket-propelled missiles.

In 1944 and 1945 the Army and Navy initiated proposals to private industry to research such a family of weapons. The Army program began in February 1945 when the US Army contracted for feasibility studies concerning the surface-to-air missile (SAM). By October 1945 experimental models looked so promising that the Army organized the First Guided Missile Battalion (Experimental) at White Sands Proving Grounds, New Mexico. The rocket-powered missiles



Nike-Ajax

then experimented with became the prototypes of the famous Nike missile family. Based on this family of missiles, the Army laid claim to primacy in Continental defense nearly a decade later.

We have traced some of the more significant milestones of Air Defense from about 1917 through WW I and II and up to 1945. Now let's look at Air Defense from 1945 through the Korean War period. With the explosions of the first atomic bombs over Hiroshima and Nagasaki in August 1945, a new and unprecedented era of warfare opened in the history of the world. They raised an entirely new set of questions about roles of armies, navies, air forces, and air defenses. During WW II an attrition rate of 20 percent was intolerable to an air defense. Today, perhaps even a 90 percent attrition would be acceptable to a hostile air force whose surviving bombers could deal total blows with atomic bombs. In 1949 the Soviet Union exploded its first atomic test device ending the US monopoly. The peril to which the Soviet Union could expose the Continental United States was much greater than at any time in our history. This posed the first real "threat" of enemy land-based air strikes against the American homeland since the advent of airpower.

At the outbreak of the Korean War in June 1950, the danger of a confrontation with the Soviet Union was a

real possibility. The policy of atomic deterrence lost much of its earlier luster. During the period 1950 to 1953, Army AAA forces were greatly expanded. The Army deployed 66 battalions of AA gun defenses for our industrial population and political centers, ports and naval facilities, Atomic Energy Commission plants, and Strategic Air Command bases, all lucrative targets for Soviet bombers. The Army's traditional role of point defense was employed with this armament, and the Air Force provided area defense with its interceptor planes.

In late 1953 air defense met another important milestone — air defense in the missile age. The Army activated its first surface-to-air missile batteries under the Nike program, armed with the Nike Ajax missile system. The Nike Ajax gave point defense greater range and altitude capabilities, and no operational bomber was above its reach. It happened that about this time the Soviet Union detonated its first hydrogen bomb. The potential air threat to the Continent was further increased during the 1950's by the Soviet introduction of numerous, modern, long-range jet bombers capable of delivering hydrogen bombs against most targets in the US.

To counter this ever-increasing threat, AD met still another milestone. In 1958, the Army replaced the Nike Ajax (located at 58 deployed battalions) with the Nike Hercules. Nike Hercules is a dual-purpose, surface-to-air and surface-to-surface missile system with either a conventional or nuclear warhead. The Hercules' 75-mile range capability made it, in the eyes of some Congressmen, a duplication of the Air Force's Bomarc missile, which the Air Force relied upon to supplement its manned interceptors. But the ensuing Department of Defense Master Plan for CONUS defense leveled off the Service programs against the aircraft threat to CONUS and, from then on, major efforts were allocated to active and passive defense against an intercontinental ballistic threat.

In response to this new threat, AD met and passed yet another milestone in its history. The Army pioneered the first antiballistic missile (ABM) system, the Nike Zeus. The era of the ABM and the characteristics of the system changed point defense to one of terminal defense.

Probably one of the most progressive milestones achieved by AD was a result of insistence by AD planners that air defense forces be able to deploy strategically and move tactically in support of ground combat forces. They held that air defense force structuring must be tailored to the mission of the supported force to allow freedom of action of ground combat forces by inhibiting enemy aerial reconnaissance, close air support of their troops, air interdiction attacks, and airborne warfare activities.

SAM-D

While protecting friendly critical assets, air defense forces contribute to gaining air superiority by the attrition of hostile air assets.

Over the battlefield, the Air Force air defense posture rests primarily on the employment of fighter-interceptor aircraft. These aircraft provide the long-range attrition of hostile attacking air forces. This capability should be considered as the outer ring of defense only. Total air defense must be based on the employment of a family of air defense weapon systems. Army air defense weapons are designed to complement the limitations of other systems in range and altitude coverage. Nike Hercules, our longest range, high-altitude, nuclear-armed system, while protecting vital areas, covers the high and medium altitudes. Hawk, an extremely accurate, highly mobile missile system designed to combat the high-speed, low-altitude threat, covers the medium- and low-altitude routes of approach to the same critical assets of the field forces. Hawk battalions also provide direct support air defense protection for the division Chaparral, another milestone in our air defense picture. Together with the Vulcan gun system and crew-served weapons of the division organic air defense battalion, Hawk (in this role) provides short-range air defense of divisional critical assets. These critical assets include

headquarters, ASP's, airfields, convoys, and maneuver forces. Redeye, a relatively new addition to AD, is a man-portable, shoulder-fired, heat-seeking missile that provides local air defense for company-size combat units and is responsive to the immediate needs of the small unit commander. The Stinger, an improved Redeye, is being developed for use in the near future. With this family of weapons, mixed and massed, we achieve an overall air defense where the capabilities of our systems are maximized and their limitations minimized. Air defense forces must be employed on the battlefield to help win the first battle by destroying or nullifying the enemy air threat. Maximum destruction of the hostile air forces must be achieved as early as possible. This can be accomplished by the family of air defense weapons supplemented by the self-defense point capability inherent in the small arms of the combined arms forces.

Let us look at today's AD milestones (2 to 3 years), and then to tomorrow's (3 to 10 years). Our air defense forces overseas are faced with a serious hostile threat that is continually increasing in sophistication, design, and capability. When comparing hostile and friendly forces, we find that US forces are outnumbered in ratios of air defense aircraft, surface-to-air missiles, and AAA guns. This presents a gloomy picture at best. CONUS air defense reserves that would normally augment our oversea forces are limited in both number of organizations and types of weapons. When faced with such a disparity in numbers, winning the first battle takes on a very significant meaning. Much greater emphasis must be given toward improving our tactics so as to increase total effectiveness and survivability of both the organic divisional Chaparral/Vulcan battalion and the division direct support Hawk air defense weapons. Success of air defense will be achieved primarily by fielding a balanced mix of guns and missile weapon systems to maximize defense effectiveness. On the modern battlefield, air defense systems must be mobile to provide essential battlefield flexibility and must possess efficient counter electronic warfare capabilities.

In these times, when defense dollars are so difficult to obtain, military planners are facing a most challenging era. Air defense materiel must be the best that advanced technology can produce. Materiel development must be oriented to the advancing threat and be operationally effective. Some of the immediate AD concerns are: proven air defense systems such as Hawk must be modified to reduce vulnerability and increase survivability; Chaparral and Vulcan both have limited growth potential and must be replaced by more versatile short-range air defense systems — systems specifically designed for an air defense mission and built with an inherent capability of advancing with technological gains. SAM-D must be perfected and fielded as soon as possible to provide advanced air defense of greater overall versatility with a reduced manpower requirement.

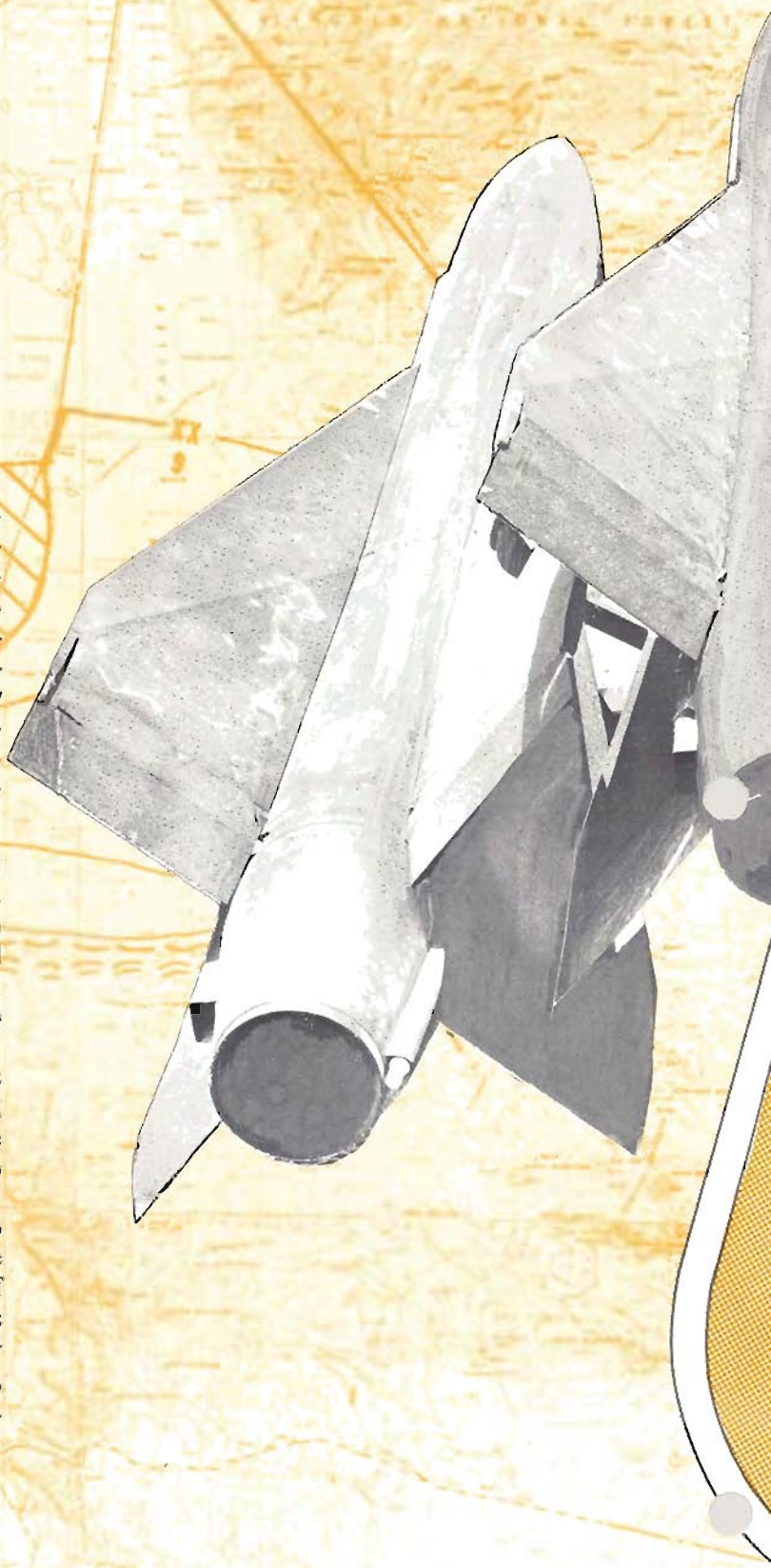
Active and reserve air defense units must be established to parallel the Army active and reserve tactical force structures. It is critical to field force survivability that an effective air defense organization be an integral part of every deployed or deployable tactical combined arms force. Force structure planning traditionally addresses the division slice. Adequate and balanced organic and supporting air defense in each division slice must be insured in every force package.

In this article I have not attempted to write a detailed, all-inclusive study or history or air defense. However, I have looked back over 35 years and highlighted some of the important milestones that were encountered during the development of air defense. A look at what the future may hold for AD has been presented. In brief, as I see it, an effective air defense is keyed to destroying or nullifying the enemy air threat. This requires the application of sound tactics, availability of effective AD systems, and the inclusion of necessary air defense units in the force structure. Updating ADA to meet the ever-changing threat is a continuing process. I am confident that future air defense artillerymen will continue to meet the challenge by providing the best possible air defense with the means available.

Colonel Russo graduated from the US Military Academy in 1945. He is also a graduate of the Command and General Staff College, Armed Forces Staff College, and Industrial College of the Armed Forces. He holds a master's degree in nuclear physics from the University of Virginia. Having served in the Korean and Vietnam wars, his last assignment was Director of Combat Developments, US Army Air Defense School, Fort Bliss, Texas.

IMPROVED HAWK IN GALLANT SHIELD '75'

MAJOR GARY Q. COE



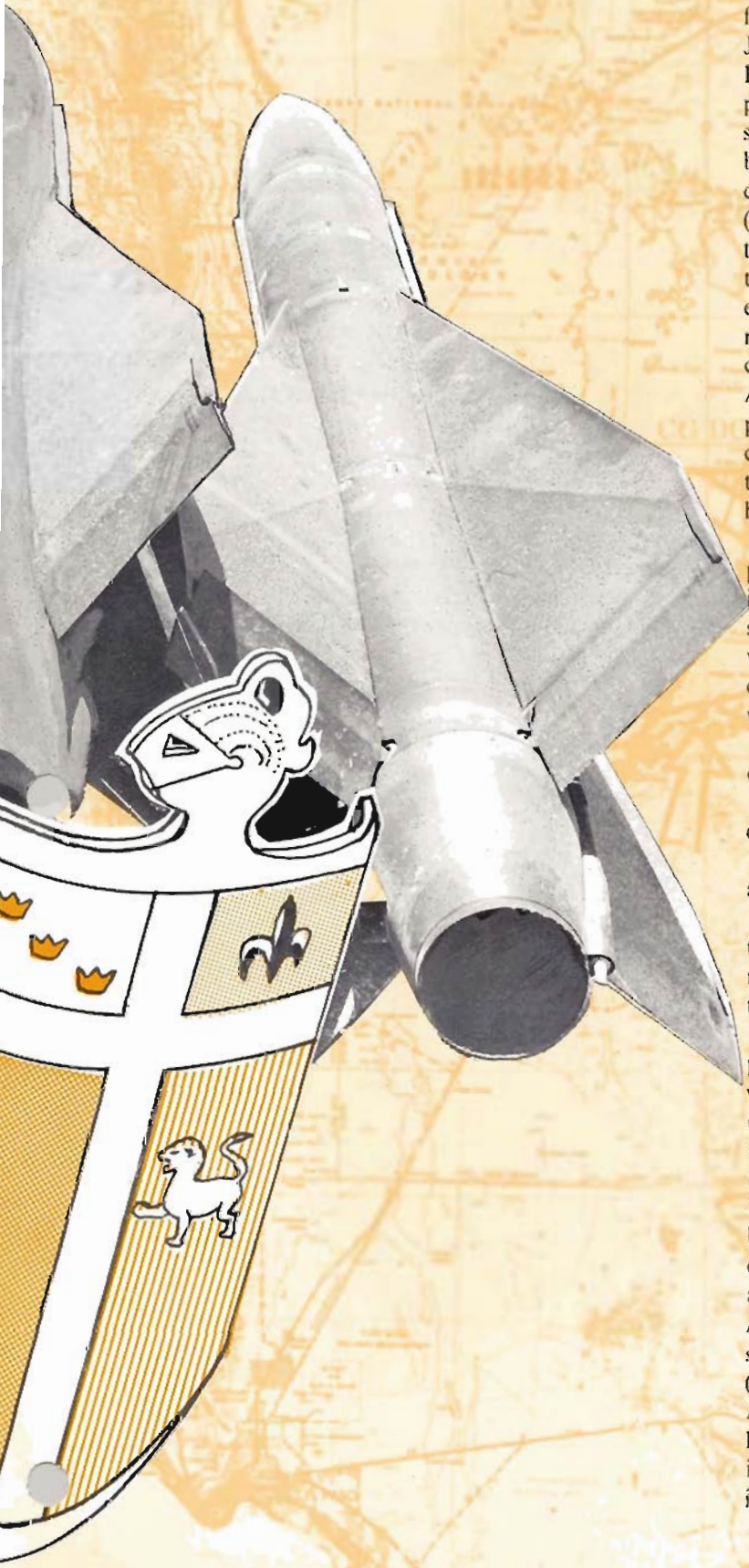
Gallant Shield '75 was a JCS-directed, US Readiness Command (USREDCOM) controlled, Joint Training Exercise (JTX), conducted at Fort Bliss, Texas, during the period 5 April to 2 May 1975. Major elements of the 9th Infantry and 101st Airmobile Divisions, 12th Air Force, 3rd Armored Cavalry Regiment, 11th Air Defense Artillery Group, and numerous National Guard, Reserve, and support units participated in this operation. The author is S3, 1st Bn, 7th ADA, and in this article he reports on the experiences of his battalion and offers his views on certain aspects of the exercise.

The 1st Battalion, 7th Air Defense Artillery (Improved Hawk), was given the mission of direct support of the 9th Infantry Division, and the 4th Battalion, 1st Air Defense Artillery (C/V) was assigned as the 9th Infantry Division's organic C/V battalion. Both ADA battalions came from the 11th ADA Group at Fort Bliss.

During the 1/7's and the 4/1's coordinating actions with the 9th Infantry Division, I asked the Division G3, "What are the division commander's priorities?" He replied by asking, "What can Improved Hawk do to protect against an enemy airmobile assult?"

The answer to my question came the week prior to our deployment to the field, at least with respect to the first part of the field training exercise (FTX) portion of the JTX. We were advised that this FTX phase was expected to follow a scenario that included a 48-hour defend/delay posture, followed by 24-hours of defense, and concluding with 48 hours of offensive operations. The division commander's priorities for the 1/7 were:

- Army Forces/9th Division Command Post.
- Division Support Command.
- The maneuver elements.



The division commander's question about Hawk's capabilities against an airmobile threat was not as easily answerable. I was unconvinced that helicopters flying at an altitude of 200 feet or less, as required by JTX air control regulations, could be seen on Improved Hawk radar scopes when not squawking IFF/SIF. To provide early warning and/or identification, not to speak of engagement of such targets, seemed to me to be a big question mark. Helicopters were to be considered hostile if flying in a multiple formation (three or more aircraft), flying at 125 knots or less, transmitting negative IFF/SIF, or without clearance by the flight control center (FCC). These rules of engagement were coordinated with the airspace management element of the 9th Division, and later cleared by the 12th Air Force Commander acting as the Area Air Defense Commander. In spite of some problems, Improved Hawk demonstrated a definite capability to acquire, track, and destroy the heliborne threat as well as to provide early warning of enemy heliborne activity.

In working with the 4/1 and the division G3, one primary area of interest was to accomplish air defense integration; i.e., including all air defense weapons in the scheme of maneuver, and employing them in concert with current ADA doctrine according to their capabilities and limitations. Whenever possible, ADA weapons were used basically as follows:

- Redeye — with the supported force, well forward of the defended asset.
- Vulcan — moving with the maneuver force or on a defended asset.
- Chaparral — around and well-out from a defended asset.
- Hawk — firing elements in the brigade area so that its coverage extended over and beyond forward maneuver forces to provide air defense overwatch for the division.

For all ADA weapons to operate as efficiently as possible, there must be a means to disseminate early warning and to provide identification and air defense control and status information. A prime training objective of Gallant Shield was the 1/7's provision of timely air threat information for the division. Information on approaching Aggressor aircraft was broadcast over AM radio from the 1/7's Army air defense command post (AADCP) to the C/V AADCP and to individual Redeye teams of the division. This Aggressor aircraft information came from three sources: 1/7, using its own defense acquisition radar (DAR); long-range early warning information from the Air Force control and reporting center (CRC) at Holloman Air Force Base; and backtell early warning information from Hawk batteries. Air defense status information originated at the CRC, division airspace

management element (DAME), or the Hawk AADCP as appropriate. The Army forces' defense early warning net was operational throughout the exercise.

One aspect of air defense integration that proved unsuccessful was electronic integration between the Hawk battalion operations central (BOC) and the CRC. The function of this integration is to provide the air battle commander greater centralized direction. It also provides Hawk battery commanders assistance (e.g., early warning, identification, etc.) in executing decentralized air battle actions. Unfortunately, incompatibility of the Air Force 407L and the Hawk battalion (AN/TSQ-38) automatic data processing equipment precluded the achievement of this integration. As an alternative, voice circuits were established through the division and battalion VHF communications network. The air battle was controlled primarily by the Hawk battalion ADDCP under the direction of the CRC in a manual configuration.

Perhaps the 1/7's most satisfying exercise achievement was its ability to respond to an actual airmobile threat. The battalion and battery elements were not only able to detect low-flying, rotary-wing threats at acceptable distances for early warning and/or engagement, but also were able to determine that aircraft were enemy and that they were in multiple flights. Batteries were able to engage these targets (flying under 200 feet, using nap-of-the-earth (NOE) flying techniques) before they completed their insertions. Early warning passed to the short-range air defense missile and gun weapons also allowed them to engage the aircraft flights in their areas. The only problems worthy of note were the delays encountered in receiving clearance from the flight communications center (FCC) for engagement of these targets. It became an unmanageable task for the FCC to correlate target information with friendly flight information. This was due in part to the lack of reliable communications between the FCC and Army aviation, and partly because of a faulty assumption in the development of hostile criteria for rotary-wing aircraft. As mentioned earlier, a hostile criterion for helicopters was aircraft flying in multiple formations (three or more aircraft). Groups of friendly aircraft, maintaining distances of about 1 kilometer apart, believed they were sufficiently dispersed so as not to be considered a multiple formation. However, a 1-km distance transferred to an Improved Hawk radar scope shows very little separation; consequently helicopters maintaining the 1-km separation were seen by Hawk units as multiple flights.

During the exercise, 70 rotary-wing aircraft were engaged and killed. Many others would have been engaged if the FCC had provided timely clearance on friendly helicopter flights.

The 1/7 was significantly involved in the airspace management objectives of the exercise. The center of airspace management in the division is the division airspace management element which includes personnel from Army aviation, the organic C/V battalion, and the direct support Hawk battalion (in this case, the 1st Bn, 7th ADA, LNO).

The 1/7 had an element from the FCC located at its AADCP. The flight control center element (FCCE) communicated with Army aircraft via FM radio, and with the FCC in the DAME via VHF. The FCCE provided the following services to Army aviators:

- Aircraft position and directional assistance.
- Assistance in IFF transponder checkouts.
- Information concerning known hazard areas.
- Aircraft locations and identification to requestors.

The source of information for this assistance was the battery and battalion acquisition radars.

Army aviation's role in airspace management could have been improved. The FCC reportedly was able to provide information on only a small percentage of the 1,000 friendly Army aviation sorties flown. One reason for this seemed to be Army aviation's reluctance to use its IFF/SIF transponders.

Some FCC personnel feel that they simply lack a flight-following capability: citing a limitation of line-of-sight radios (FM) in the face of nap-of-the-earth flying

techniques, overcrowded flight control networks, and the fact that aviators are actually under the control of their own operations (not responsive to the FCC).

A sidelight of the exercise that demonstrated the Improved Hawk capability was when one exercise controller questioned Improved Hawk's ability to acquire low-flying helicopters. To accommodate him, an OH-58 was sent to a location he designated and hovered at an altitude of 100 feet. An Improved Hawk battery was told to locate the rotary-wing aircraft. Not only did the battery locate the target, but was able to accurately describe its maneuvers as it moved about its position. Another example concerned a remark by a helicopter pilot to the Commander, 1st Bn, 7th ADA, "Today I flew past one of your batteries and noticed a peculiar tone over my fox-mike each time the big radar completed a revolution. Then I noticed another tone as another radar was pointed constantly in my direction. I knew that it was locked onto me. I said to myself, 'I'll take care of that; I'll fly to the deck.' But it didn't do any good. The radar remained locked on. What else could I do?" The Commander replied, "You could shut off your engine."

The exercise also provided a high-performance aircraft threat, allowing all air defense participants a rare opportunity to fully employ their systems and personnel. Some 918 friendly and 400+ enemy sorties were flown by high-performance aircraft. Enemy air included the F-111 and F-100. In addition, well over 1,000 heliborne sorties were flown, to include 31 enemy airmobile combat assaults. Improved Hawk engaged and destroyed 585 aircraft, including 70 rotary wing.

Coordination between the 1st of the 7th and the 9th Infantry Division was not restriced to air defense matters. The Improved Hawk batteries in the forward areas of the division offered lucrative targets for enemy airmobile assaults, artillery concentrations, gunship attacks, and airstrikes.

Exercise activity was quite extensive. One battery, 18 km behind the FEBA in the late evening, found itself surrounded by an enemy armored column the next morning. There was no prior warning. An airmobile assault against another battery resulted in the capture of one of its officers. Headquarters, 1st Bn, 7th ADA, was strafed and harassed by would-be heliborne insertions and was attached by sappers. Controllers provided various other inputs: radar jamming, loss of communications, etc., but these inputs were not nearly as effective as those enemy actions which required real-life responses by the units. As the Battalion S3, I was very pleased at our ability to react correctly to these situations.

Problems were expected with communications. However, intrabattery, intrabattalion, and inter-battalion communications were maintained in a highly reliable state throughout the exercise. Although a high failure rate of radio equipment was attributable to the environmental characteristics of the desert, the 1/7 experienced a low failure rate due to battalion elements occupying high ground and emphasis on first echelon maintenance requirements in a sandy environment.

A potential area for communications problems was the relatively large number of circuits that terminated in the battalion AADCP. The 1/7's AADCP maintained three VHF circuits with each firing battery plus FM and AM backup; lateral communications with the 4th Battalion, 1st ADA, and with the 9th DTOC; plus VHF circuits with the CRC. We also provided VHF circuits and AM and FM radios to 4th Battalion, 1st ADA, and FCC liaison personnel. Problems were caused by this concentration of circuits at the AADCP.

This exercise identified problem areas that need further evaluation:

- Rules of engagement for helicopters.
- Automatic integration between Hawk and the CRC.
- The volume of communications networks terminating at the AADCP.
- Operations of the FCC/Army aviation.

In conclusion, JTX Gallant Shield '75 can be considered a decided success for Improved Hawk.

- The Improved Hawk battalion demonstrated that it can effectively provide direct support to the division and that its radars can provide valid early warning and identification.
- In particular, Improved Hawk demonstrated that it is capable of defending against an airmobile threat to the division.
- Improved Hawk confirmed that it can provide valuable information for airspace management.

Major Coe is a graduate of the United States Military Academy and also a graduate of the Armed Forces Staff College. He has commanded air defense artillery units and served in staff assignments up to brigade level. In Vietnam he was a province and later a district advisor.

Statements made by prominent United States and Israeli officers regarding the Mideast war have been published in many national news publications. These statements have questioned the validity of employing tactical helicopters during a midintensity desert conflict. Unquestionably, a midintensity conflict waged in a desert environment is a brutal experience for man and machine. Not only must they survive an extremely hostile natural environment, they will be confronted with the most sophisticated and deadly arsenal of ground and air weapons known in the history of warfare.

These problems have been confronted in a training environment by many units of the US Army. Air Cavalry Troop, 3d Armored Cavalry Regiment, has trained extensively in a midintensity desert environment. Should this unit and its parent regiment be deployed to a hostile environment, what threat would they encounter and what lessons have they learned to counter this threat?

The basic Aggressor threat will involve an overwhelming number of air defense weapons. These will include surface-to-air missiles (SAM) such as the SA6 (this missile is similar to the US Hawk missile) and the SA7 Strella missile of Vietnam fame. The Aggressor will supplement his air defense weapons with conventional automatic weapons to include the 23-mm and 57-mm cannons which are organic at all levels.

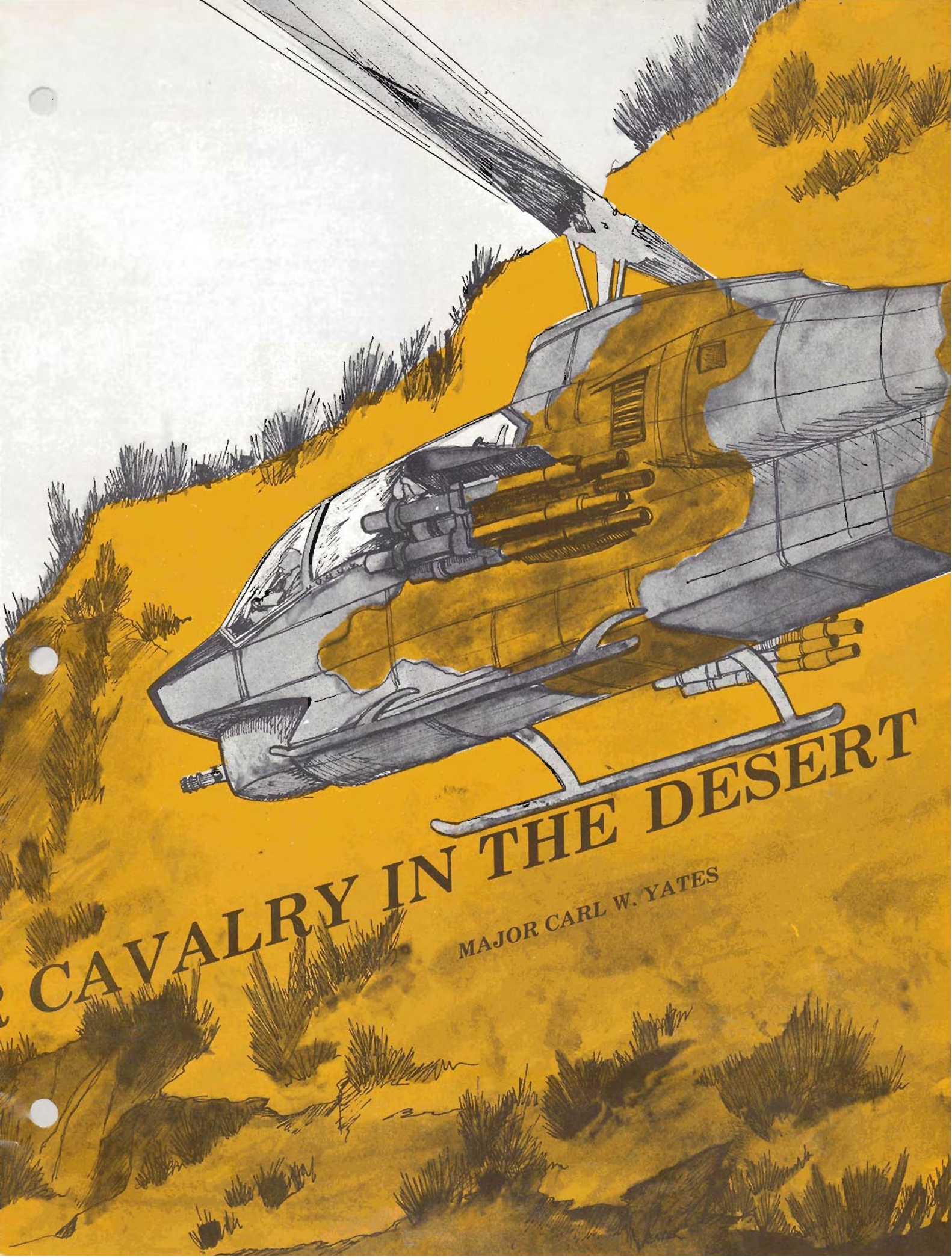
Small arms fire from individual troops will possibly create the greatest threat which an air cavalryman will encounter in a midintensity conflict. Inadvertent flight over an area occupied by an Aggressor infantry or armor force will bring a deadly hail of small arms fire, including individual weapons, crew-served weapons, and vehicle-mounted air defense weapons.

Artillery air burst must be considered a potent threat to the air cavalryman. An Aggressor, analyzing nap-of-the-earth (NOE) avenues of approach into his area and helicopter ambush locations, can employ air-burst artillery and barrage fire to eliminate or intercept the helicopter threat in these areas. The shrapnel effect of the artillery will neutralize thin-skinned helicopters.

One of the most formidable threats to the aircraft of an air cavalry troop employing NOE tactics is the environment itself. Sand will erode main rotor blades, tail rotor blades, turbine vanes, and windscreens at an astonishing rate. Additionally, many areas of the desert will provide very little cover or concealment to the air cavalryman; therefore, he must be highly proficient in NOE flight and terrain analysis if he is to survive the enemy's direct fire and radar-controlled weapons. Tremendous daily temperature fluctuations and high-density altitudes will test the strength and endurance of aviator and aircraft alike, causing commanders at all levels additional aircraft maintenance and aviator fatigue problems.

Unit commanders operating in the desert will find that radio communications effectiveness is reduced by weather conditions. Planning distances for FM radio reception will be reduced from 20 to 30 percent (5 to 10 kilometers). Range reduction is due to extreme dryness, thermal heating, and "dead spots" found in dune areas or where electrical grounding is extremely poor.

The desert provides poor grounding due to high mineral content and lack of surface moisture. Upward energy radiations can be intense during daylight and this radiation distorts the VHF spectrum. The use of sufficiently grounded directional antennas aids in the range of transmissions during daylight. During darkness, communications are improved over those during daylight hours.



CAVALRY IN THE DESERT

MAJOR CARL W. YATES

conduct in-depth mission briefings with special emphasis on areas pertinent to each platoon. Primary concern at this stage of planning must be airspace management of friendly fires. Passage points and fire coordination lines must be understood; failure to do so may result in loss of aircraft to friendly weapons fire. Each crew member conducts a comprehensive map reconnaissance to be familiar with the area of operation.

Having received the platoon briefing, each crew prepares its aircraft for the forthcoming mission. Special consideration is given to contingency plans concerning in-flight emergency. Aircraft are equipped with survival kits and extra stores of water. At the beginning of morning nautical twilight, the aero scout team conducts a passage of lines, having made prior coordination with friendly ground elements. Each team occupies its assigned zone and screens forward of the squadrons to establish contact with hostile units.

Screening continues on order until an accurate frontline trace of the hostile unit is available and friendly ground units are in contact with them. To obtain better observation, pilots land their aircraft and dismount to conduct binocular reconnaissance of suspected locations. Such procedures allow maximum observation of the enemy with minimum exposure time to the aircraft. When a lucrative target has been located, and permission to engage has been granted by higher headquarters, the aero scout team links up with an aero weapons team, forming a hunter-killer team.

The aero scouts select a firing position at maximum standoff range and guide the weapons team into position. The scouts then issue a fire command consisting of target description, range, and azimuth. On command, the AH-1G unmasks, fires, remasks, and departs by a concealed route. The entire fire mission must be accomplished before the Aggressor is able to react. Surprise is the key to any successful mission. The weapons team will often remain deep in hostile territory by occupying a hasty holding area. During the period the aircraft are located in a holding area, the copilot/gunner remains dismounted to provide security and early warning for the aircraft.

As the mission continues, the aero scouts maintain contact with the enemy by rotating teams on station. Hunter-killer operations continue until darkness precludes further operations and, at this time, the mission to observe and report the activities of the enemy is transferred to the aero rifle platoon. The platoon, organized into OP's and LRRP's, has been deployed during the hours of darkness and begins operations. Every effort must be undertaken to insure their positions are not compromised. Once the teams are deployed, aircraft cannot be permitted to return to the areas in which they are operating. The teams are resupplied by prepositioned water/ration caches. Extensive use of LRRP's by the air cavalry troop during major tactical exercises has produced impressive results. Squad-size units are extremely difficult to detect in wide, desert expanses; by carefully selecting terrain that will afford the best observation, the OP may observe an entire corps front. When positions are compromised, the teams are extracted in prearranged evasion and escape corridors. Despite formidable obstacles, the air cavalry troop has continued to successfully operate in a desert environment. Confronted by a hostile environment as well as a sophisticated Aggressor air defense threat, the unit has repeatedly obtained timely and accurate information about the enemy. A major problem area, which will affect air cavalrymen worldwide, will be reliable airspace management between friendly forces. The method which is finally adopted must be efficient in all weather, and must be exceedingly reliable if the air cavalrymen are to survive. The 3d Armored Cavalry Regiment has experimented with several such methods. Each possesses valid capabilities but is hindered by some drawback in positively corrdinating airspace or identifying aircraft. Air Cavalry Troop, 3d Armored Cavalry Regiment, will continue to develop expertise in desert operations and is anxious to pioneer new techniques as well as receive suggestions from interested persons Army-wide.

Major Yates was commissioned in 1963 after graduation from Arkansas Technical College. He commanded an armored cavalry troop in Vietnam and attended the Command and General Staff College upon his return to the US. He is presently Executive Officer, 2d Sqdrn, 3d Armored Cavalry Regiment, at Fort Bliss, Texas.

Command and Control Operator/Maintainer for the Missile Minder

Lieutenant Colonel Tom Adams, Jr.

The Missile Minder (AN/TSQ-73), to be deployed in the near future, will be the most advanced command and control system of its kind in the US Army. The system will incorporate almost a decade of technological advances over the Missile Mentor (AN/TSQ-51) which is the current Army air defense command and control system (ADCCS). The Q-73 broad design features include:

- Fully microelectronic system elements.
- Design based on proven hardware.
- Real-time processing capabilities.
- Air-transportable shelter.
- Automatic fault detection and isolation.

These features provide extensive improvements over earlier and similar systems. The design features, which

will provide automatic fault detection and isolation, coupled with anticipated high system reliability due to technical innovations, support the operator/maintainer concept.

The concept envisions one individual to perform both operator and repairman functions as opposed to the current practice of employing different individuals for operators and repairmen. Implementation of the concept would involve career progression courses including entry and senior levels. The entry level individual will be trained as an operator with limited training in the maintenance area. The maintenance training involved would be restricted to that which would enable the individual to recognize and take action on some problems — primarily those indicated by the automatic fault detection and isolation features of the system. The individual trained in the senior MOS skill level would be able to perform as an operator and as a fully qualified maintenance technician.

The maintenance philosophy applicable to the AN/TSQ-73 supports the operator/maintainer concept and is best summarized by the following extracts from a contractor pamphlet.

"Designers have been quick to use integrated circuits, medium scale integration, and more recently, large-scale integration. Taking advantage of the improved reliability and other features of modern digital techniques, they have designed the AN/TSQ-73 as a new concept in militarized equipment and not simply a retrofit of previous systems. Thus, through the intelligent application of integrated circuits, the reliability of the AN/TSQ-73 has reached a level which was impossible with the limitations of discrete component circuitry.

"Due to the AN/TSQ-73's maintainability concept, training requirements can be reduced. Since the need for specialized maintenance personnel for the AN/TSQ-73 system is minimal, lengthy maintenance training courses are not required. Requirements for detailed field and technical manuals can also be reduced."

Assuming that the system reliability exceeds that for all current ADCCS, and the separate operator and repairman scheme is continued, feedback data would dictate that the idle time for the maintenance technician will increase. In the case of the AN/TSQ-51, the reliability figures are considered outstanding. It has been said that due to system reliability, maintenance technicians must engage in some academic study to stay proficient. So, why not use a maintenance technician as an operator if system reliability is such that he is not functioning during a large portion of a maintenance shift?

In summary, it is believed that the AN/TSQ-73, providing design specifications are achieved, will have technical innovations that will allow the implementation of the operator/maintainer concept in ADA for the first time. A system such as the AN/TSQ-73, which is designed to provide a high degree of automation and reliability, easy maintainability, and uncomplicated logistics, will also help to ease the manpower reduction problem and be in harmony with Volunteer Army efforts.

Lieutenant Colonel Adams is a graduate of West Virginia State College with a degree in General Science. He attended the ADA Officers Advanced Course and graduated from the Command and General Staff College. He is now serving as Assistant Director, Missile Science and Electronics Department, US Army Air Defense School.

and the company aid station will be located here also. Additionally, a fluctuating number of Class I, III, and V trucks will be present at any given time, but for survivability reasons, positive efforts are always made to keep vehicle numbers at an absolute minimum.

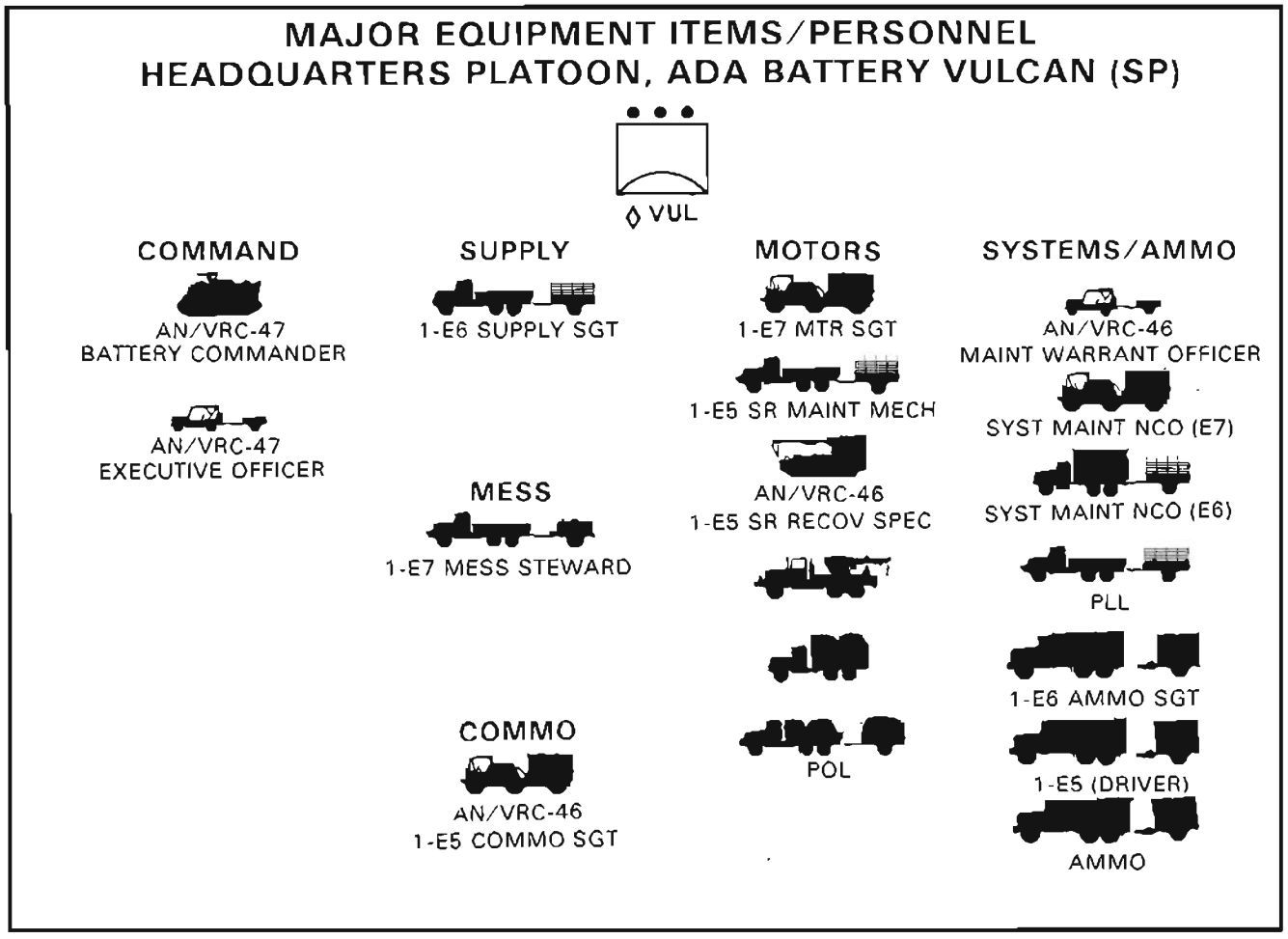
While the primary function of the company train is to distribute, recalled Johnson, the main tasks of the battalion combat trains are to coordinate and supply. These trains are located in the vicinity of the battalion reserve, and they are headed by the battalion S4 or motor officer. They include a varying number of Class III and V vehicles, maintenance contact teams, recovery vehicles, and the battalion aid station. Captain Johnson remembered that it is here that the logistical effort is coordinated. The S4 or motor officer monitors the logistical situation in the forward area and, using the assets collocated with him, keeps the front resupplied and evacuates downed vehicles to the battalion collection point. To retain flexibility, the S4 will always keep some Class III and V vehicles with him.

The battalion field trains are located with the brigade trains in the brigade rear area. They are administered by the battalion support platoon leader, whose mission is to process the paperwork needed to draw Class I, II, III, IV, and VII supplies from the Division Support Command's forward issue points, which are also in the brigade trains.

The support platoon leader establishes an area in which in-depth maintenance can be performed, Class A rations can be cooked, and supplies can be temporarily stockpiled. Constant liaison between the support platoon leader and the battalion S4 in the battalion combat trains is needed to insure that supplies are ordered and transported forward promptly.

The S4 gave Captain Johnson the service support overlay for the operation and assured the air defender that he would advise his personnel that elements of the ADA headquarters platoon would be joining them later.

Light rain was falling when Johnson returned to his command post. He checked in with his executive officer and first sergeant and settled down to prepare the air defense plan for the upcoming attack. After placing his Vulcan platoons in direct support of the three company teams, Johnson's thoughts turned to logistics. "OK," . . . thought the Vulcan commander, "What do I want to do, where do I put what?"



After some thought, Johnson decided he wanted the positioning of his logistical elements to meet three requirements. First, he wanted to integrate his recovery, maintenance, mess, and supply capabilities into the TF 1-5 operation by collocating as many of his support people as possible with their armor counterparts. With the battalion S4's help, this could lead to a spirit of cooperation and avoid a duplication of effort. The Vulcan support had to be far enough forward so that it could be responsive to the needs of the platoons, yet not so far forward that it would be constantly vulnerable.

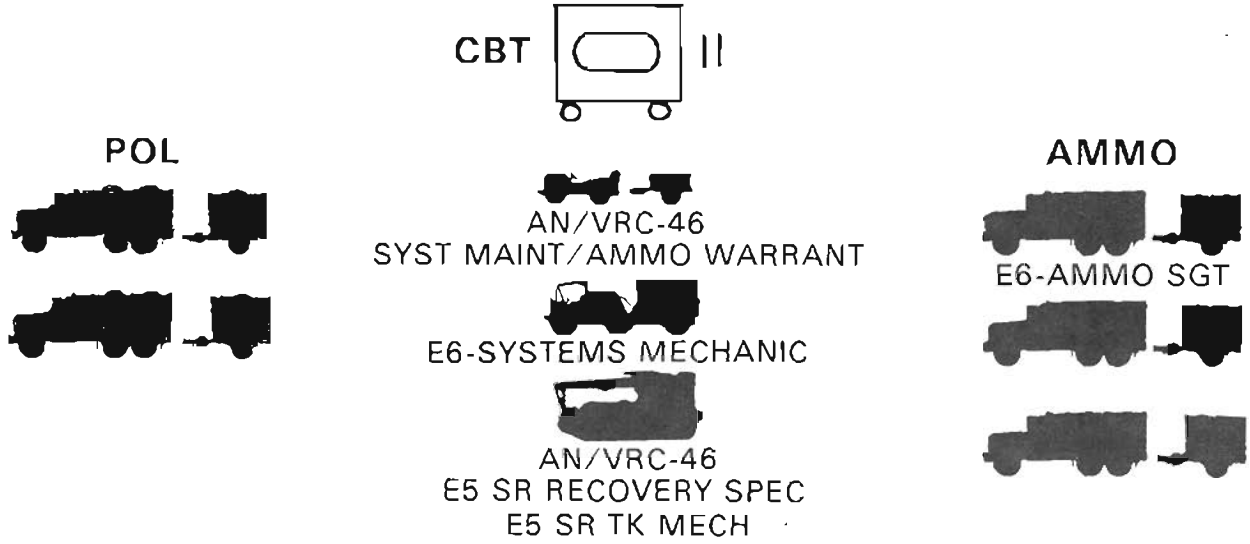
With the supported unit trains concept and the three logictical objectives of integration, responsiveness, and survivability in mind, Captain Johnson finalized his plans, then briefed his maintenance warrant and executive officer on their responsibilities in the battery support plan. Johnson began the meeting by telling his subordinates he would direct the platoons to top off with POL and draw as much ammunition as possible in the battery assembly area before joining their assigned company teams that night. He emphasized to the warrant officer that every available inch of space on all vehicles, including the platoon leader's APC, would be used to transport ammo. The remaining ammunition would be redistributed among the battery's three 5-ton ammo trucks so that one or two of these vehicles could be immediately dispatched to the Corps ASP for resupply. The same process applied to the POL tankers, with the exception that POL could be drawn from the DISCOM Class I issue point in the brigade field trains. Johnson also instructed the XO to have 3 days' C rations issued to each squad. The battery commander then turned to his system maintenance/ammunition officer.

"Chief, you're going to head our contingent in the battalion combat trains. Take your jeep, the full ammo and POL trucks, the ammunition and system maintenance E-6's, the M578 VTR with crew, the system maintenance Gama Goat, and the senior track mechanic with you. Your mission there is to rapidly fix or evacuate any downed equipment and to supply the platoons with ammunition and POL when they request it. You will maintain constant liaison with Captain Smith, the TF 1-5 S4."

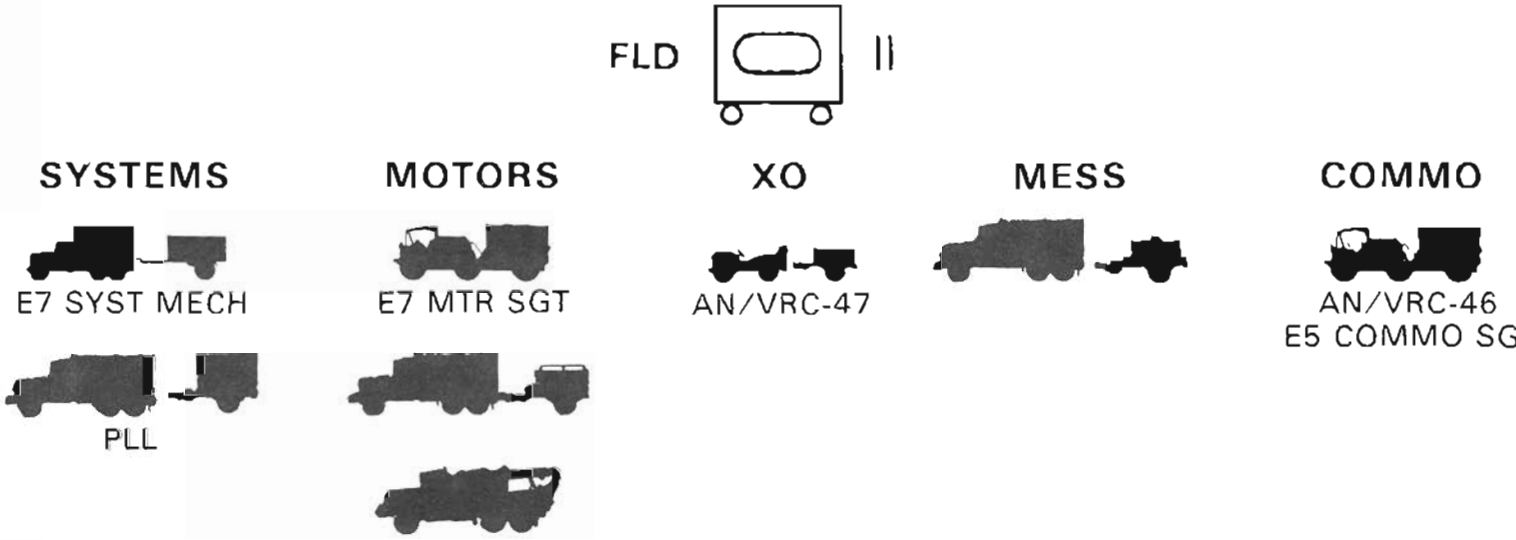
Captain Johnson gave this further guidance: "Chief, coordinate with Captain Smith as much as you can. Although requests for assistance or supply will come over the battery command frequency from me or the platoon leaders, coordinate any supply runs with Captain Smith, not only to avoid confusion but to avoid any duplication of effort. If you get in a bind, don't hesitate to ask him for help."

Johnson terminated his instructions to the warrant by stating that the XO would be in the battalion field trains also monitoring the battery command net. The maintenance officer was instructed to frequently coordinate with him so that the XO had enough reaction time to procure supplies on a timely basis.

MAJOR ITEMS EQUIPMENT/KEY PERSONNEL BATTALION COMBAT TRAINS



MAJOR ITEMS EQUIPMENT/KEY PERSONNEL
BATTALION FIELD TRAINS



"XO," continued Johnson, "you're going to coordinate our efforts in the battalion field trains area. I want you, the motors and system maintenance NCO's, the supply and communications sergeants, and the mess steward to establish an area within the battalion field trains. Your mission is to draw needed supplies from DISCOM forward elements, prepare hot rations, and transport them forward to Mr. Jones in the battalion combat trains. You will also repair, or arrange for the repair of, any battery vehicles evacuated to the TF 1-5 collection point. You will establish liaison and constantly coordinate with Lieutenant Green, the TF 1-5 Support Platoon Leader, especially in the area of consolidating supply runs. Insure that the commo section monitors the C/V battalion command net and relays any pertinent information to me on the battery command net."

Johnson's APC arrived at the objective. The stark bareness of the artillery-pulverized hill shocked him. TF 1-5 was digging in, and the air defender noted that his Vulcans were redeploying in accordance with his contingency plan. The attack had progressed steadily, sputtering only when subjected to sporatic antitank and aerial attack. The Vulcans had performed well, maneuvering with the tanks, helping to minimize halts by engaging both air and ground targets. The battery headquarters platoon had also done well by integrating itself into the TF 1-5 logistical effort. The battery warrant's contingent in the battalion combat trains had moved and supplied alongside its armor counterpart. The XO's personnel drew supplies, performed in-depth maintenance, and prepared hot rations in the TF field trains area. The battery support personnel had been positioned far enough forward to be responsive, yet not so far forward as to sustain losses. The battery had operated as a member of the combined arms team both tactically and logistically. "It takes not only good tactics but also good logistics to win battles . . . ." mused Johnson, "and I'm integrated on both counts."

Captain Semmens is a graduate of Colorado State University and holds a master's degree in history from that institution. He has served as Vulcan battery commander and S1 and S3 of a Chaparral/Vulcan battalion. He is presently serving as a senior instructor in the Tactics Department, US Army Air Defense School.

LIEUTENANT COLONEL BILLY A. LYLES

Although not quite as fast as a speeding bullet, some RPV's (remotely piloted vehicles or, in some quarters, remotely controlled vehicles) can leap tall buildings and perform various other impressive feats. What is an RPV? In generic terms, it may be defined as a vehicle that is directed in its movement and activity by an external control system. These vehicles may move underwater, over ground, or above the earth's surface. To meet the definition, the only requirement is that they be able to do their thing without having a manned command center on board. An example of the underwater type might be the remotely controlled submarines that carry television and/or movie cameras in underwater exploration. Over-ground RPV's range all the way from wire-guided toy trucks and cars to remotely controlled tanks that are used in some training areas as moving targets. The above-the-surface RPV's seem to be the most prolific in number and type. These range from the radio-controlled model airplane through the guided missile spectrum and even include orbiting satellites. It must be concluded, therefore, that RPV's are not new. We've had them around for some time but perhaps we haven't really considered them as a distinctive class.

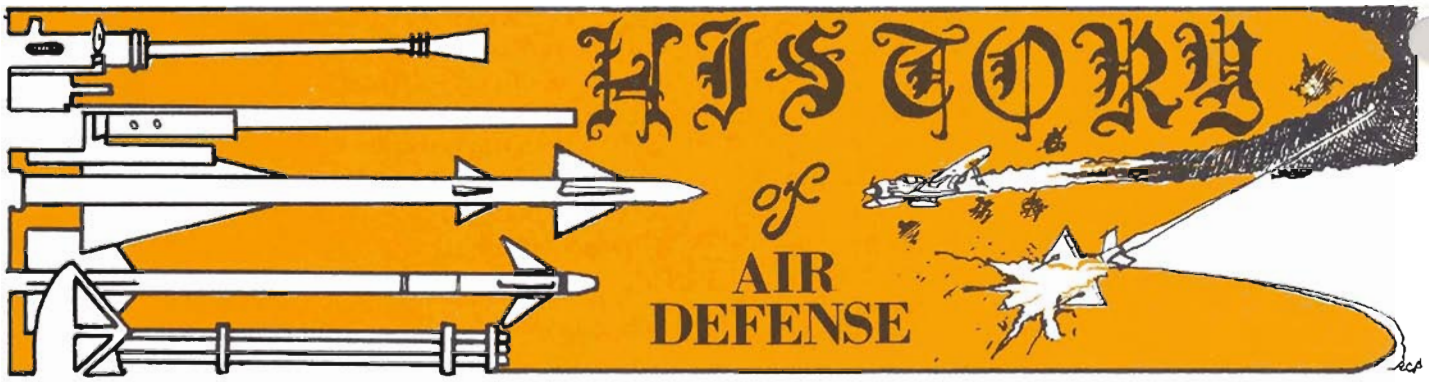
Remotely piloted vehicles have a multitude of different uses. Underwater types can be used for exploration, rescue work, mine clearing, and tactical operations. Over-ground types can be used for ground reconnaissance, surveillance, mine clearing, signal relay, training targets, and tactical operations. Above-the-surface RPV's can be used for reconnaissance, surveillance, signal relay, and strategic as well as tactical operations.

Let's consider some of the pro's and con's of RPV's. On the plus side, RPV's do not require on-board pilots and consequently can be smaller than conventional vehicles, or they may carry additional equipment in the space normally occupied by a pilot. They allow man to extend his senses into environments in which humans cannot survive. A major plus lies in the low cost of the RPV. Another plus is the fact that human life is not placed in jeopardy if the RPV is damaged or destroyed. This benefit is becoming ever more valuable as our people costs go up. On the minus side, RPV's require a rather sophisticated remote control system if they are to be operated any appreciable distance from the control center. In addition, the vulnerability of any electronic guidance system to enemy electronic countermeasures (ECM) is certainly of no small consequence. This is especially true with RPV's in that the controlling signal will become attenuated by distance as the RPV nears the source of enemy ECM. An exception is orbiting satellites whose distance from the good guys and bad guys on a tactical battlefield is essentially the same.

Now that we have taken a look at what RPV's are, what they are used for, and some pro's and con's regarding them, let's see how they affect air defense forces in accomplishing their mission. In general terms, underwater and over-ground RPV's will probably present no problems for us while above-the-surface RPV's most certainly will. In general, we can further narrow the field to deal with small pilotless aircraft. The first problems of consequence is that of separating our RPV's from those belonging to the opposing forces. Either we must equip ours with some sort of identification, friend-or-foe, or we must further burden our soldiers with additional aircraft to identify visually. Also, we must become more camouflage conscious as RPV's appear on the scene. It is already technically feasible to have an RPV provide real-time target location to aerial and ground weapon delivery units. Also well within the realm of possibility is the warheaded RPV which is guided into its target area and then provides the information needed to accomplish the final guidance corrections for its suicide mission. Finally, there is the consideration that most RPV's will provide a smaller and consequently harder to hit target for air defense forces, once a hostile determination is made.

What does the future hold? Air Force experimentation with RPV's is producing favorable results. Headquarters, Modern Army Selected Systems Test Evaluation and Review (MASSTER), Fort Hood, Texas, and the US Army Field Artillery School, Fort Sill, Oklahoma, are presently developing a program of evaluation for aerial reconnaissance-type RPV's. The TRADOC Systems Analysis Activity is pursuing a master plan for analyses of RPV's. Should results of these efforts prove the RPV concept to be viable, we may expect a proliferation of RPV's on tomorrow's battlefields.

LTC Billy A. Lyles is the US Army Air Defense School Representative at MASSTER located at Fort Hood, Texas. He holds a Bachelors Degree in Mechanical Engineering from Auburn University and is a member of the R&D Specialty Program. His Air Defense experience includes assignments in Nike Ajax, Nike Hercules, and Hawk units.



Probably the most impressive, if not the most effective, employment of antiaircraft in the European theater during World War II was the British barrage technique over Malta early in the war.

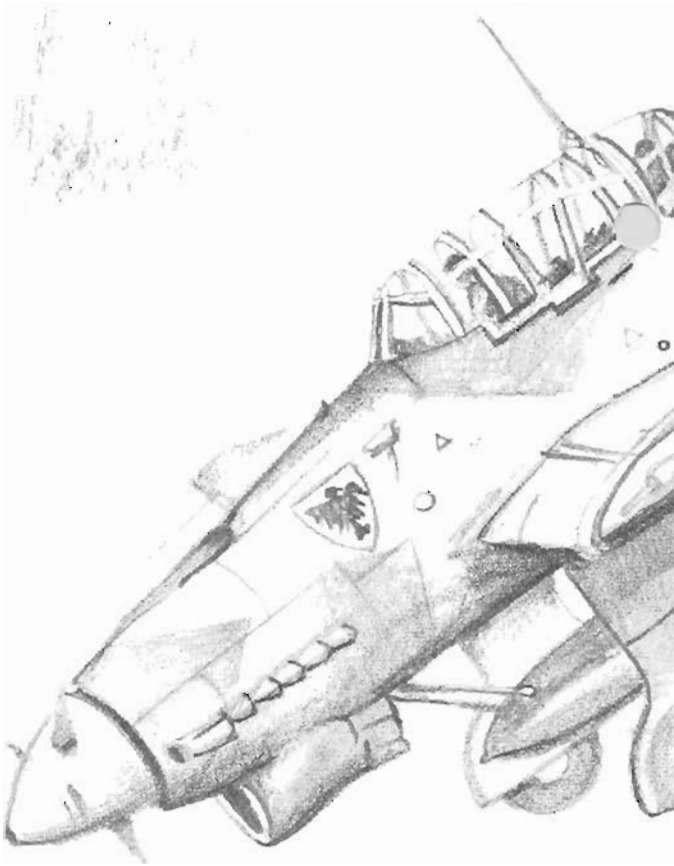
The Air Defense of Malta

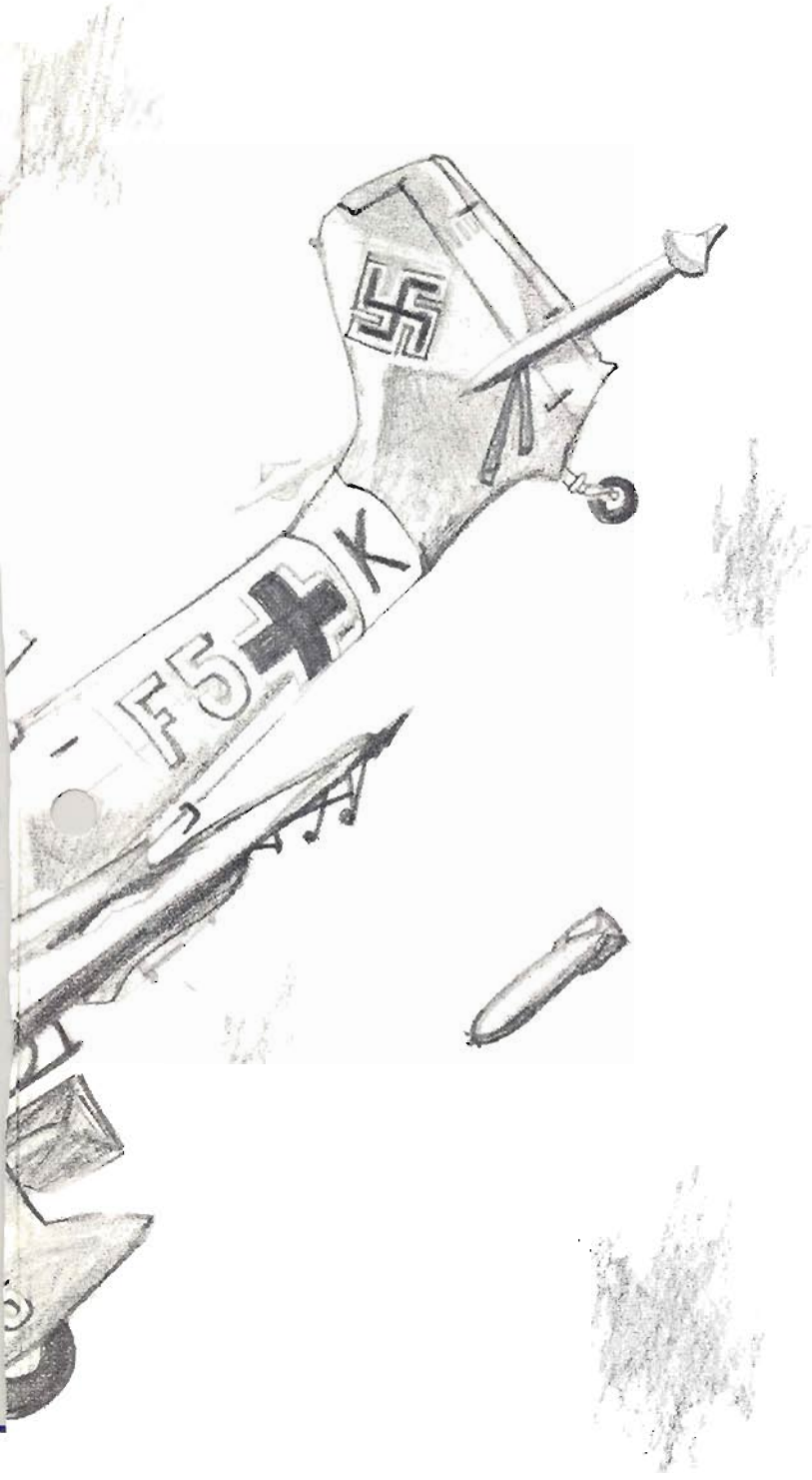
Malta was essential to the British in that it provided a base from which aircraft could attack Italian and German convoys operating between Europe and North Africa. In the summer of 1941, these attacks were successful to the extent that losses inflicted on Italian and German naval forces became so excessive that the Germans decided to move Luftwaffe units into the Mediterranean area for the express purpose of neutralizing Malta.

Italian and German naval losses in the Mediterranean, from June 1941 until October 1941, amounted to at least 220,000 tons; the RAF and the Fleat Air Arm accounting for 115,000 tons. Three-fourths of these sinkings were attributed to aircraft based on Malta. The Germans reasoned that Malta was a base that had to be neutralized if German successes were to continue in North Africa.

In November 1941, the German high command moved units from the Russian front to Sicily and placed Kesselring in command of all Luftwaffe units in the Mediterranean area. By the end of December 1941, Kesselring could mount an attack of 250 bombers and 200 fighters from Sicily. At the same time, the British air commander at Malta had only 70 serviceable fighters. Up to this point, the Germans had normally flown about 60 sorties a week against Malta. In spite of this, RAF bomber aircraft based on Malta had inflicted heavy damage on Axis shipping. As a result, the Axis position in North Africa was becoming increasingly precarious.

Strategically, Malta was a prime possession for either adversary, particularly in the struggle for control of the Mediterranean. Germany, however, could be accused of a strategic error by not implementing invasion plans after the heavy air attacks of early 1942. In any





37B-1 "Stuka"

event, Malta survived and remained a stepping stone for the Allied invasion of Italy.

As of 1 June 1942, the antiaircraft defenses of Malta amounted to 112 heavy antiaircraft guns, 142 light antiaircraft guns, and 57 searchlights. Initially, there were no facilities for centralized control of antiaircraft, and the only available radar was used for early warning. The information obtained from this radar normally was relayed to the guns, but fire control was entirely visual, with altitude either being estimated or provided by the RAF. Some time later, a gun operations room was placed in operation after a few gun-laying radars arrived on the island. However, accurate altitude remained a problem and continued to be estimated by the CO, Gun Operations Room. This resulted in a series of barrages of different altitudes and configurations being plotted and fired when needed. While this method, initially, did not destroy many enemy aircraft, its deterrent effect was considerable, particularly against the Italians.

The Germans, on the other hand, were not deterred by the barrages and soon learned to fly above, below, or around them. Various types of barrages were devised, and probably the most successful was the X barrage. This became the main defense against the mass raids of 1942, and the number of enemy bombers shot down by this method testifies to its efficiency and flexibility. For example, a box barrage was fired against the first mass attack by German Ju 87 "Stuka" dive bombers on 16 January 1941. During the ensuing 4 days, the enemy made 24 raids on the harbor and lost 45 aircraft, of which 18 were destroyed by the guns — all by barrage firing. In their greatest mass attack on Hal Far aerodrome, the Germans used 120 aircraft and lost 38, 19 of which fell to the guns.

After a long period of relative inactivity, the German Air Force began a series of mass raids over Malta. The average daily number of bombers was 170, although, on at least one occasion, as many as 300 were over the island. In these raids, the enemy concentrated on the AA guns themselves, which consequently suffered severely, but were not knocked out.

In early May, 1942, HMS "Welshman" arrived from Gibraltar carrying antiaircraft ammunition. As she arrived at Grand Harbor, the Luftwaffe launched concentrated attacks but were met by what was considered to be the greatest barrage ever put up — "it looked like a solid cone of flaming steel." The planes that survived the barrage fell to the fighters. In 2 days, 102 enemy aircraft were destroyed or damaged.

In October 1942, the Luftwaffe returned in force. The fighters met them at sea and antiaircraft fire broke up the formations that slipped through the fighter screen. Their losses were enormous; 118 planes were shot down in 7 days. From the 3d to the 20th of March, the island was under attack 75 percent of the time. During the

whole of March, attacks averaged 50 percent of the time. The longest raid lasted over 13 hours, and the most concentrated attacks came on 8 and 9 March, when Malta was under air attack almost 100 percent of the time.

The greatest tonnage of bombs dropped in 1 month was in April 1942, when 6,729 tons of bombs were dropped on the island. The heaviest weight of bombs dropped in 1 day was 500 tons on 7 April.

The antiaircraft guns shot down 102 planes in April alone. This was practically double any previous number destroyed by any one service. The enemy admitted to even heavier losses, but the British claimed only those of which they were certain and which the RAF would confirm. In May, when a large reinforcement of Spitfires arrived, the Royal Air Force accounted for 112 enemy planes and the combination of those two actions broke the Luftwaffe in Sicily. On the 13th of October 1942, the 1,000th enemy plane was destroyed over the island.

Statistically, a minimum density of 80 AA guns could concentrate their fires at any one point in the sky over that part of the island which contained the important installations. This density rose to over 100 above Grand Harbour and Luqu Air Field. In addition, 144 AA automatic weapons were deployed in an area approximately 9 miles by 6 miles.

Malta was, after all, principally an unsinkable aircraft carrier. The air defense of Malta showed that a strong, tenacious, determined defense not only could survive but eventually could defeat an equally determined offense, even though the offense had all the advantages, including almost overwhelming odds.

Another effect of the antiaircraft action on Malta was to make the occupation of Sicily by German forces untenable.

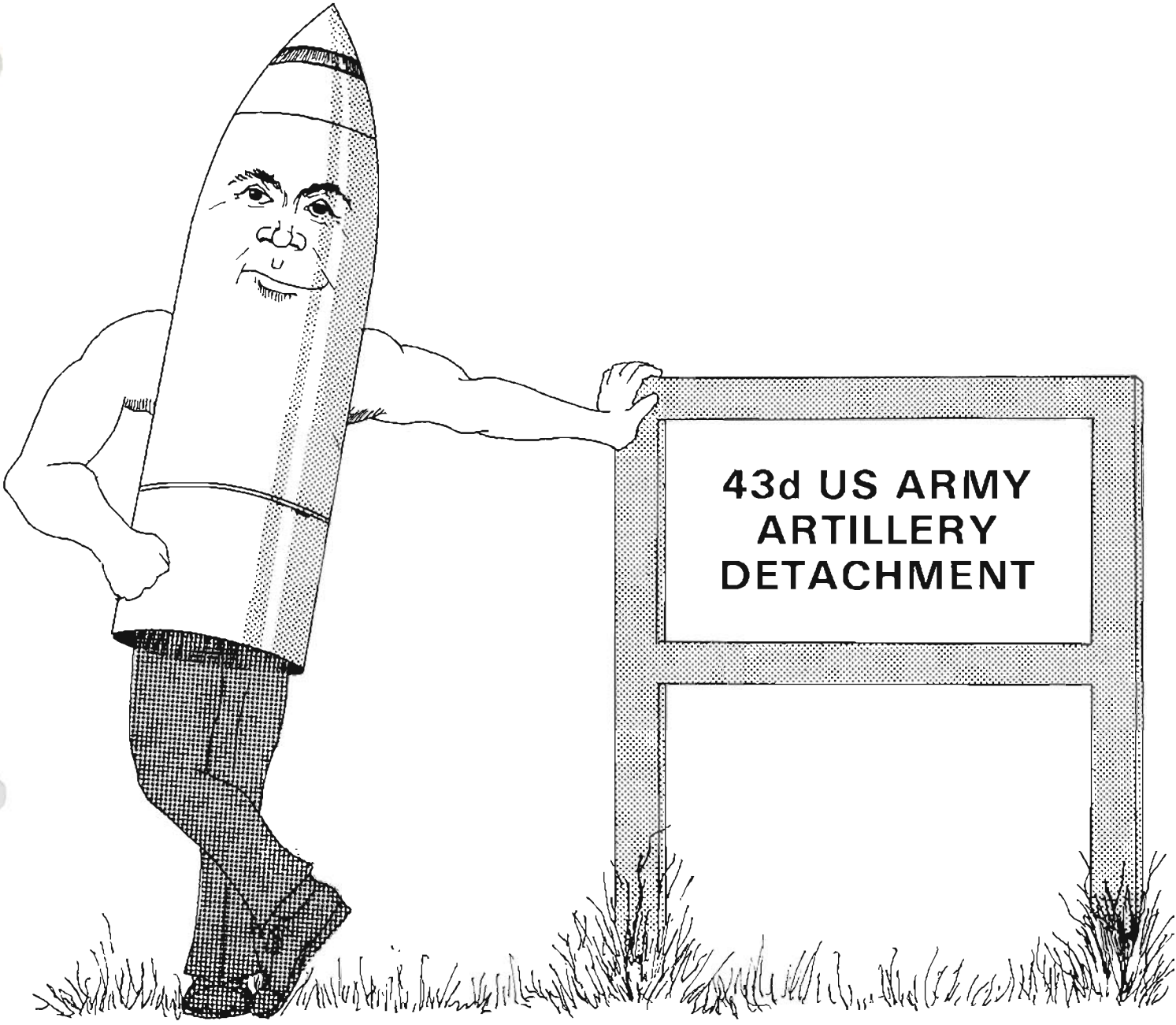
The German Retreat From Sicily

The Sicily campaign began with landings by American and British troops on the island on 10 July 1943, and ended on 17 August when the Allies entered the town of Messina. By 1 August, the Germans had decided that the island must be evacuated, and plans were drawn up. The exact dates of the evacuation, which was to require 6 days, subsequently were established as 11-17 August. Three German divisions were on the island, plus an indefinite Italian force. The plans called for the evacuation of all forces, with the Italians doing the best they could with their own transportation; German plans concerned only the saving of their own forces. This was to be a major effort, and antiaircraft troops, aircraft, and shipping were to be made available in sufficient quantities to guarantee the withdrawal.

As early as 8 August, equipment and troops not needed for delaying actions in the ground battle began to cross the Strait of Messina. Plans were carefully made, even to details as to when units would reach assembly areas and which roads would be used. By the 11th, the Allies began concentrated air attacks on the evacuation area and the fleet of small craft used. Wellingtons flew about 85 sorties each night, while medium bombers and fighter bombers flew some 1,170 sorties up to the 17th against the beaches, the mainland, and the evacuation fleet.

Antiaircraft units from all of Italy were used against the Allies, even to the extent of withdrawing them from airfields and industrial vital areas. Some 400 AA guns were emplaced to cover the retreat across the Strait which measured only about 5 miles in width.

The Allies claimed destruction of 23 boats, hits on 43, and near misses on some 205. In spite of the losses, which appear to be rather light, the Germans were able to evacuate practically all of their troops (and equipment) at the rate of 7,000 to 10,000 a day during the 6-day period of withdrawal. Assisted by a small number of aircraft, the antiaircraft density was sufficient to permit the retreat in the face of overwhelming Allied air attacks, attesting to the value of antiaircraft artillery in this action.



SASCOM DUTY

CAPTAIN FREDERICK H. PRITIKIN

One of the little-known and certainly under-publicized facets of Air Defense Artillery (ADA) assignment options is duty with the 59th Ordnance Group, Special Ammunition Support Command (SASCOM). Critical comments regarding the group, or a detachment, range from "babysitters for warheads" to "NATO Drinking Club." My experience is that an assignment to an ADA detachment working with SASCOM is one of the most satisfying and professionally rewarding jobs available for the air defense artilleryman.

As a member of an ADA detachment in Europe, an

individual will be living in Germany or the Netherlands, working with the members of the participating NATO forces — The Belgians, Dutch, and, of course, Germans, in support of Nike Hercules battalion-size units.

The 43d USA Artillery Detachment, to which I am assigned, is in support of the 13th Missile Wing, Belgian Air Force. The 43d is supporting the wing with three teams, collocated with the three squadrons (batteries) of the wing, nestled in the North Eifel region of North Rhein — Westfalia in the Federal Republic of Germany. Our mission is to maintain the custody and security of US weapons and to insure their reliability. The proof of our abilities is corroborated through joint technical proficiency inspections and joint security inspections. The keynote here is the word "joint."

Mutual understanding and recognition of problems peculiar to each NATO member nation are essential if problems are to be properly dealt with in accordance with the accomplishment of the detachment's mission. Assignment to a unit of this type requires personnel endowed with patience and understanding, reinforced by perseverence.

The 43d Detachment is organized into a headquarters and three teams. The headquarters and team A are collocated in the vicinity of the supported squadron and the wing headquarters. The other two teams are located with the supported squadron. The teams are further subdivided into a Security Section and an Assembly and Monitoring Section. The names seem self-explanatory; however, there is more involved than meets the eye. The Security Section is responsible for the custody and security portion of the mission. It maintains access control and records during its 24-hour duty day. Together with the administrative and dining facility personnel of the team, it forms a compact unit with a serious responsibility.

For accompanied personnel, Belgian government quarters are provided in most cases, although many personnel live on the economy in surrounding villages. Medical care is provided by the Belgian Medical Service. Involved medical problems are referred to US medical facilities. There is a commissary available, and the Belgian commissaries which are nearby may be used. Each team maintains a small site exchange with a limited inventory which can obtain, by special order, those exchange items generally available in Europe. There is a unit lounge at each team location. Vehicle support, administrative supplies, and telephone and teletype communications are provided by the Belgian Air Force. Ammunition, US self-service supplies, and administrative support are provided by the 5th USA Artillery Group, our next higher headquarters located about 150 miles away. This distance is indicative of the autonomy under which the detachment must operate.

The strength of the unit is less than 100 officers and men, but the challenge to leadership abilities and problem-solving techniques is very prominent. This duty requires demonstration of self-confidence, fairness, and a great deal of professionalism on the part of both officers and enlisted personnel. The rewards of the job are many. The knowledge that a small group can function effectively on a daily basis to provide the "teeth" of NATO, and receive recognition for its efforts, is immensely self-satisfying. The international relationships developed with both NATO counterparts and civilians, on and off the job, provide an understanding of other cultures and the development of life-long friendships.

Units such as the 43d USA Artillery Detachment are spread over the northern parts of Germany and the Netherlands. Living, working, and enjoying life with their NATO counterparts, they provide the "punch" to the NATO alliance through US weapons support and prompt the motto of the 43d USA Artillery Detachment, "Peace Through Deterrence."

Captain Pritikin is Commander of the 43d US Army Artillery Detachment in Europe. Before his current assignment, he spent several years at Air Defense Artillery sites, followed by service as a unit commander in Vietnam.

THE NEW LOOK in ADA TRAINING LITERATURE

The Air Defense School is retailoring its doctrine, curriculum, training techniques, and especially its training literature to conform more closely with its role as a member of the combined arms team. This change in focus — from weapons in static defense postures to defense of the combat maneuver force — has been caused by the need for doctrine to adapt to the dynamics of the modern battlefield.

The field manual remains the primary document for disseminating air defense doctrine, tactics, and operational procedures, but its format and style are being drastically changed. Its language is now simple and direct. It is highly illustrated. Color and the latest ideas in typographical design are used extensively. The combat scenario is used to explain the application of doctrinal and tactical principles. Material contained in other publications or that is not needed for the conduct of combat operations and training is not included. The new field manual is interesting to read, brief and concise, and far more understandable than the old style manual.

There are three distinct types of field manuals. Each is distinct in the information it contains and the audience to whom it is addressed. Air defense artillery doctrine and tactics are contained in a group of manuals called "How To Fight" that are aimed at the air defense commander and staff officer. Operational procedures and techniques, and drills and training are contained in manuals aimed at the battery, platoon, and squad level. A series of "Soldier's Manuals" communicates to the individual the skills the Army expects him to master in order for him to be proficient in his MOS and duty position.

Four "How To Fight" field manuals are being prepared at this time. FM 44-1, Air Defense Artillery Employment, contains the broad doctrinal and tactical guidance for the conduct of air defense artillery operations and is the cornerstone manual for air defense. The "How To Fight" version of FM 44-1 is in final draft form and publication is expected before the end of the year. Three system specific "How To Fight" field manuals will support FM 44-1 with the detailed doctrine and tactics appropriate for each weapon. These manuals are FM 23-17, Redeye Guided Missile System; FM 44-3, Air Defense Artillery Employment, Chaparral/Vulcan; and FM 44-90, Air Defense Artillery Employment, Improved Hawk.

Most of the old "procedures and drills" field manuals are programed for conversion to the new style and format over the next 5 years. Some manuals supporting equipment near obsolescence will not be revised and will be rescinded when the equipment is removed from the inventory.

Each ADA MOS will be supported by a soldier's manual that will provide the individual holding that MOS the training tasks and performance tests he must master to demonstrate qualification in his duty position.

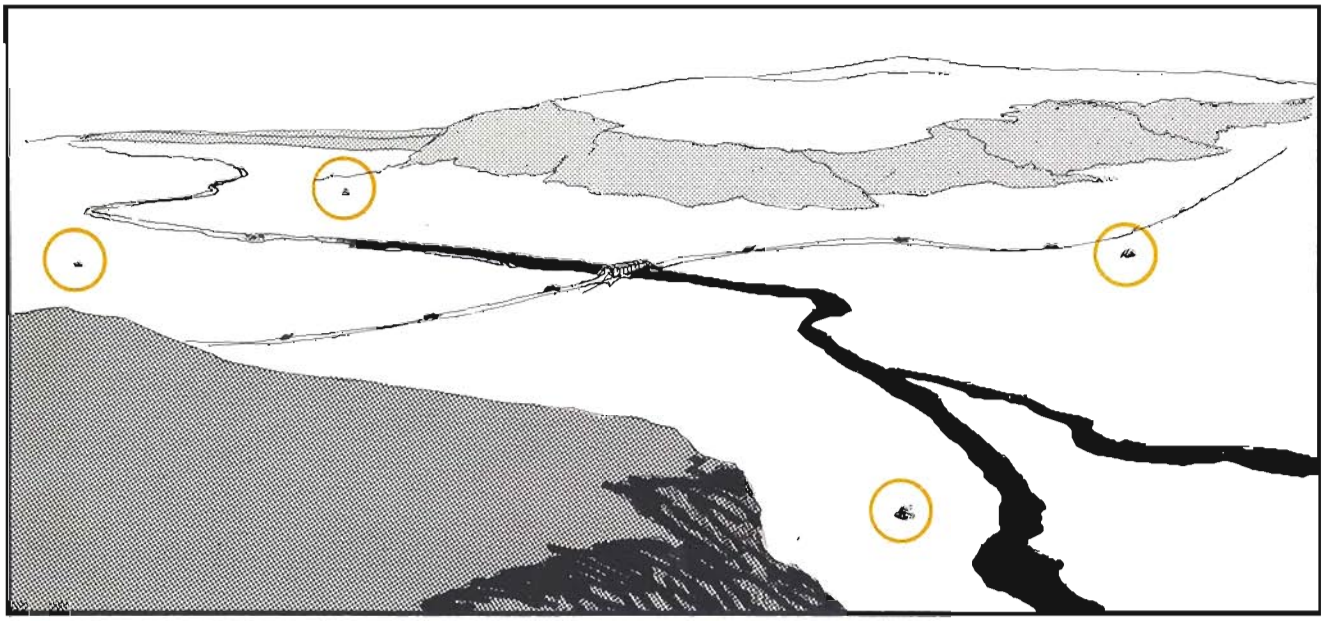
Because field manual preparation is a long-term task, the short-term need is being met by publishing a series of combat operations training circulars (TC's). Five of these TC's have been published recently. These are TC 23-44, Small Arms Defense Against Air Attack; TC 44-3-1, Training the Air Defense Artillery Battery in the Conduct of RSOP; TC 44-5, Fastest Gun in the West; TC 44-71-1, Redeye — How to Use It; and TC 44-71, Commander's Guide to Redeye. Other TC's are programed for publication over the next few years. They will cover subjects such as battlefield survivability, Vulcan combat operations, Improved Hawk and Chaparral engagement procedures.

As always, the Air Defense School invites comment, suggestions, criticism, and assistance from the field. As you receive these "new look" publications, whether in draft form or as DA publications, study them, try the new procedures and techniques, consider the readability, aptness, and usefulness of the publication, then let us know your ideas and opinions. Write the Commandant, US Army Air Defense School, ATTN: ATSA-TD-TL, Fort Bliss, Texas 79916, or call AUTOVON 978-6006/6001. We will listen and respond. Help us to provide you the effective training literature you need.

WHAT DO YOU DO NOW,

LIEUTENANT?

SITUATION: You are the platoon leader of 1st platoon, Battery C (Chaparral), 441st ADA, 52D Mechanized Infantry Division. Your platoon is presently deployed in defense of a bridge 100 meters long, which the Division's support elements must cross to move forward in support of a division attack. You have placed two of your Chaparrals on each side of the river as shown below.



Your orders are to join the remainder of the battery, which will assume the defense of the division tactical operations center (DTOC) located to the north of the bridge, after all the support units have crossed.

The tactical situation is progressing well. Your Chaparrals are at battle stations searching for targets. The last unit of the Division's support element is crossing the bridge when suddenly a flight of four FENCER aircraft screams down the valley and attacks the bridge. Two of your Chaparrals commence engagement as the two lead aircraft pass them, and seconds later they both fire again. The lead FENCER bursts into flames and crashes into the river, but the second aircraft releases a 1100 pound bomb directly on the bridge. The two trailing FENCERS release their ordnance, but miss. Your other two Chaparrals also engage the flight and destroy one aircraft.

You immediately report the engagement to your battery headquarters and join the convoy commander on the now unusable bridge. He informs you that he is rerouting the last of the convoy to another bridge 15 km downstream.

PROBLEM: What are your actions? Are you going to attempt to immediately link up your platoon or consider another alternative?

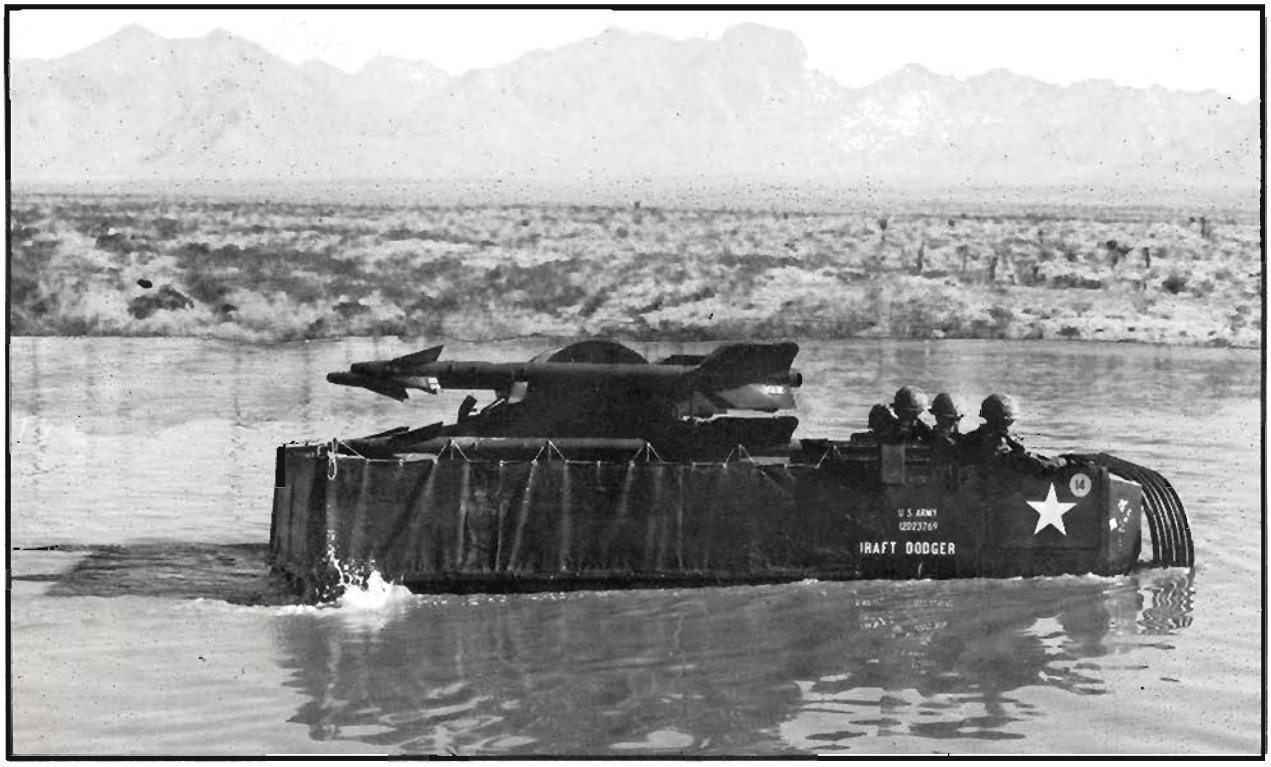
SOLUTION: Your mission is to rejoin the remainder of the battery at the DTOC once the crossing is complete. Your two Chaparrals on the south side of the destroyed bridge can provide very little air defense for a moving convoy. Under the command of the platoon sergeant, the two Chaparrals on the north side of the river should be dispatched to the DTOC immediately. You should attempt to link up your platoon ASAP by swimming the other two Chaparrals across the river. You should report your actions to your battery headquarters.

There are several considerations involved in performing a river crossing operation. The first factor to consider is the speed of the current. The maximum velocity of a stream in which the Chaparral vehicle can be operated depends on the choppiness of the water, amount of debris or ice in the water, and maximum downstream drift distance that the unit can accept. When the rate of flow is greater than 4 miles per hour, you must pay particular attention to drift distance, balance of loads on the vehicles, point of entry into the water, and ability of the drivers.

Next, you must select a good entrance site into the water on gently sloping firm ground so as not to cause a large wave. If necessary, the entrance site can be improved by using available pioneer tools.

Your next consideration is to insure that your squad leaders have properly prepared their vehicles for the swim. This includes installing a flotation curtain around the launching station, insuring that the hull drain plugs are installed, the bilge pumps are turned on and are operational, and the vehicle tailgate and cab doors are closed and watertight. More detailed swim preparation information can be found in TM 9-1450-585-10.

Lastly, you should insure that your drivers have been briefed on the procedures to exit the water. They should avoid steep, mushy slopes and approach the bank at a 90° angle so that both tracks strike the bank simultaneously.



VIEW from the FIELD

VULCAN SUPPORT OF AN INFANTRY COMPANY

MAJOR PETER C. SWENSON

This is an account of how one division chooses to employ Vulcan in support of its infantry companies. Current US Army Air Defense School doctrine differs in some respects from the guidelines presented in the article. TRENDS would like to hear from its readers concerning the tactical considerations presented herein. Comments on the guidelines for the employment of Vulcan are encouraged.

A and B Batteries, 1st Battalion, 59th Air Defense Artillery (C/V), 8th Infantry Division, recently supported the 2d Battalion, 28th Infantry and the 2d Battalion 87th Infantry, in an exercise at the Baumholder Training Area, West Germany. The two infantry battalions were conducting company-level, tactical exercises. The Vulcan batteries participated with platoon support of the companies. As a result of these exercises, certain guidelines were presented to the maneuver battalions of the division for employment of Vulcan with the company team.

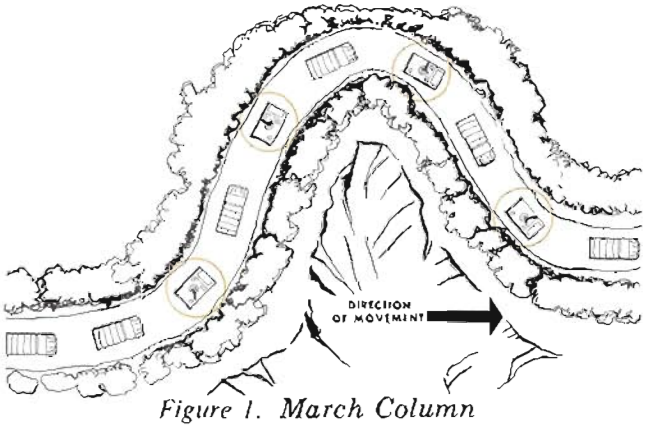


Figure 1. March Column

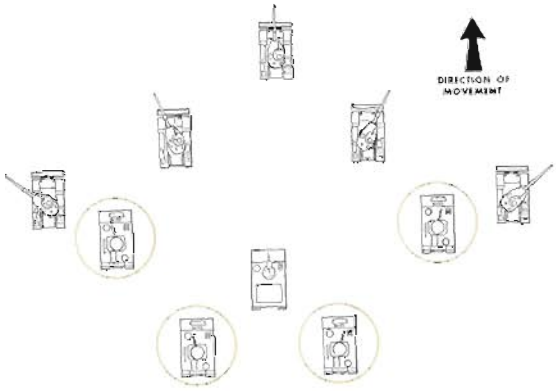


Figure 2. Movement to Contact

MOVEMENT TO CONTACT

Vulcan should be concentrated near the front and rear when providing air defense coverage of a maneuver force in march column. If a platoon is available, two Vulcans would be positioned near each end of the long axis of the column. Any additional assets may be dispersed throughout the column (figure 1).

As the unit deploys, Vulcan may be employed in two ways. Depending on the air threat, Vulcan may be placed near forward elements for early engagement of hostile aircraft or farther back to provide coverage over the entire force (figure 2).

When the hostile air threat does not exist, Vulcan may be employed to provide ground support for the force in the event of ambushes during the movement.

ATTACK

Two employment methods were used during the

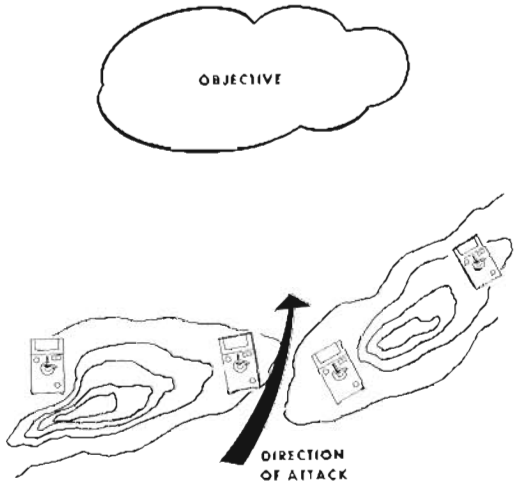


Figure 3. Attack (Vulcan Provides Overwatch)

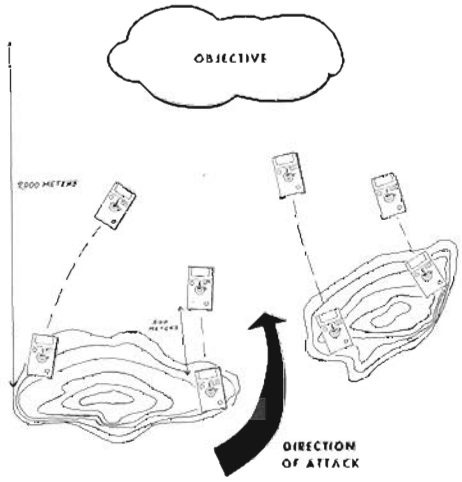


Figure 4. Attack (Shoot-Move-Shoot)

attack. One concept was to provide Vulcan overwatching fires as the maneuver units advance on the objective. This required that Vulcans be positioned to the rear and on higher terrain than the route to the objective. This method provides optimum air defense and ground support (figure 3).

When forced by terrain or weather conditions to move with the maneuver force, Vulcan should be employed on the flanks of the force to deny hostile aircraft the long axis of attack. In the ground support role, Vulcan will employ the alternating shoot-move-shoot technique, by fire unit, to provide continuous fire support for the force (figure 4).

RETROGRADE

Depending on the type of retrograde operation being conducted and the enemy air threat, two employment concepts seem the most feasible. Vulcans should be positioned with detachments left in contact (DLIC) to provide air defense coverage for the force. This will add a representative weapon system and also help to deceive the enemy as to the force's actions. Should the commander set his priority with the withdrawing units, or if the withdrawal is made without contact, the best employment of Vulcan is within the retrograde columns or prepositioned along withdrawal routes.

PERIMETER DEFENSE AND ASSEMBLY AREAS

Vulcan is positioned in a balanced defense and weighted toward avenues of approach as assessed by the platoon leader or battery commander. When a company is conducting a perimeter defense, the air defense unit commander should coordinate and select alternate positions. These positions should incorporate the Vulcans in the company fire plan. In case the air threat dissolves or ground defense becomes the primary priority, the Vulcans can then deploy to alternate positions which provide effective ground fire and enhance the defensive fires of the company (figure 5).

The primary role of Vulcan is air defense. When considering the mission, the maneuver unit commander must seriously weigh the loss of air defense when

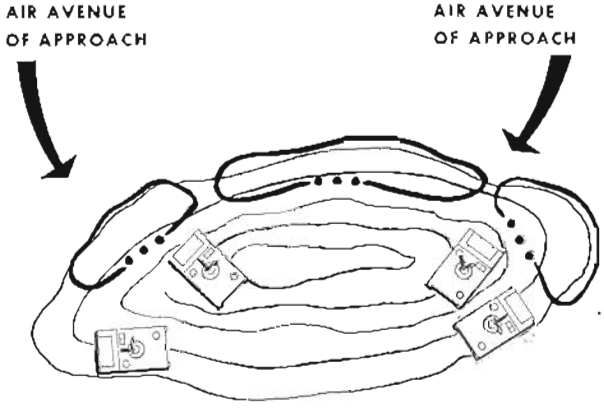


Figure 5. Defense, the primary role of Vulcan . . .

Vulcan is employed for ground support. It is the responsibility of the small unit air defense commander to keep the maneuver unit commander informed of the air threat in his area of operations. The air defense commander must advise the maneuver unit commander on the employment of Vulcan and deploy to support the priorities established by the maneuver unit commander.

Major Swenson is S3 of the 1st Battalion, 59th Air Defense Artillery (C/V). He has served in various other levels of command in air defense as well as a tour with the 23d Infantry Division in Vietnam. He holds a Masters Degree in Political Science from Kansas State University.

VAR COLLEGE BOWL

CAPTAIN DANA F. KWIST

To beat the humdrum feeling of training in visual aircraft recognition (VAR) in the battery, I took a suggestion from a friend in the 82d Airborne Division and adopted a battery version of television's College Bowl. The reaction to the game-like method was so enthusiastic that it turned visual aircraft recognition training into one of the most enjoyable periods of the week.

The game involves platoons grouped into separate areas of a room, a slide projector with as many different slides of aircraft as one can use, a few referees, and an instructor. To win, teams must accumulate the largest number of points by properly identifying the actual aircraft flashed quickly on the screen. As a secondary means of receiving points, the wings, engine, fuselage, and tail (WEFT) are described by contestants. This encourages closer attention to VAR.

If you make and use a list of random player numbers you will cause keener interest by the class since no man will ever know exactly when his number will be called. The list should consist of enough numbers to include all the players in the largest platoon.

Sit each platoon in a different part of the classroom and start by giving player numbers to the platoon with the greatest number of men participating. If the 2d Platoon, for example, should happen to have 30 men in the group and the 3d Platoon can muster only 5 men on a particular VAR day, you will have to give each member of the smaller 3d Platoon six different player numbers so that each platoon will have the same number of chances.

When everyone knows his player number or numbers you will be ready to explain the rules:

1. The team which accumulates the greatest number of points wins.

2. Each platoon will be given a player number for each turn.

3. Only the soldier of each platoon whose player number is called is qualified to answer. The player number will change for each new slide.

4. Use a rotation method after each slide so that if the 1st Platoon answers the first time, the 2d Platoon will then be able to answer first on the next turn, etc. Designate which platoon will answer first, second, third, and so on, each time the slide changes to insure a fair number of first chance replies from each team.

5. Four points are given to the team whose player identifies the aircraft. In addition:

1 point is given for correct description of the wings.

2 points are given for correct description of the engine placement.

2 points go for accurate discussion of the fuselage shape.

1 point is given for correct description of the tail. (You will find that it is more difficult for a soldier to identify the fuselage and engine than the wings and tail.)

6. A total of ten points can be accumulated each turn. If the first player cannot answer any or all of the questions, the unearned points are available to the next platoon's man with the same player number, and so on until all the points are earned or all the men with the same player number fail to answer any further. At that time the slide is no longer in play. A new random number will be selected for the next slide.

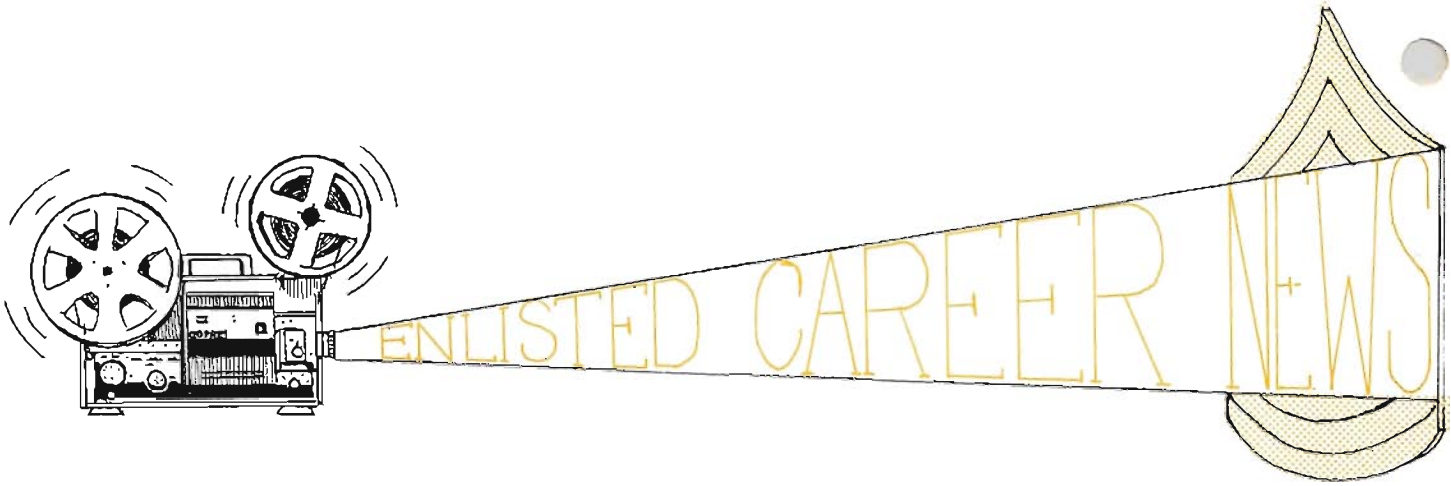
7. Because careless VAR in combat can cost lives, firepower, and dollars, any soldier who answers incorrectly should be assessed a deduction of points double those shown in rule 5.

8. Referees will sit between platoons and assess penalty points for any loose talk or hints being offered to the player who is up.

The pace must be fast to build up the feeling of competition and enthusiasm in the room and the winning team should receive some type of recognition or reward to be decided by the unit commander.

Try the game the next time you teach VAR, and add your own ideas to put more challenge into the competition as time goes on. The troops will enjoy it far more than any other method of practicing visual aircraft recognition.

Captain Kwist served as a forward observer with the 173d Airborne Brigade in Vietnam and later as executive officer of a Vulcan battery in the 11th ADA Group at Fort Bliss. He recently completed an assignment as a Hawk battery commander with the 38th ADA Brigade in Korea and is now attending the ADA Officers Advanced Course at Fort Bliss.



PROMOTION CAPABILITY UNUSED

Here are some statistics that ought to make commanders and others in the chain of command take notice. There are now about 29,000 soldiers in grade E-3 and 16,000 in grade E-4 who are eligible for promotion consideration to the next higher grade without waivers.

The fact that there are a high number of promotion-qualified soldiers going unpromoted could mean many soldiers are not being considered fully. When a soldier leaves a unit unpromoted, it often means he will have to spend additional time in his new unit to mark himself qualified for promotion.

The chain of command needs to check and recheck to make sure qualified and deserving soldiers who meet time in serve and other promotion criteria are adequately considered for promotion.

Another factor that can contribute to less than full use of promotion capability is the unit-of-choice (UOC) rotation policy. Most UOC soldiers are assigned overseas between their 20th and 23d month in service. At this time, many E-3's are just reaching the 21-month nonwaiverable E-4 promotion point. If they leave the unit unpromoted, they will probably have to spend additional time in their new unit reestablishing eligibility.

A similar situation exists for soldiers who received early promotions to E-4. They became eligible for E-5 waiver promotion consideration in their 19th month of service. Commanders can help overcome this UOC hurdle by promoting a soldier or placing him on a promotion list before he leaves for his new oversea assignment.

Soldiers who are unqualified or undeserving of promotion should be counseled. Those who are qualified should be given maximum consideration. Army regulation 600-200 has the latest enlisted promotion criteria.

PINPOINT ASSIGNMENTS TO USAREUR

Pinpoint assignment procedures to USAREUR were recently placed in effect for senior NCO's in pay grades E-6 through E-9. The purpose of this method is to streamline the assignment system and improve the morale of senior enlisted personnel assigned to USAREUR. The new assignment plan will help to satisfy USAREUR requirements and at the same time permit MILPERCEN to give better service to the Europe-bound soldier. A notice from USAREUR to the soldier designating the specific assignment there should be in the soldier's hands within 7 to 14 days after receipt of the initial oversea notification. In addition to providing E-6's and above their specific USAREUR assignments, the commands will also inform them as to whether they are authorized concurrent travel.

WANT TO BUY SOME TOOL$?

Effective with the latest changes to AR 735-1 and 710-2, soldiers who lose hand tools through their own negligence will have to pay for the replacement of the lost items. The soldier's unit will be credited with the amount that has been deducted from the soldier's pay so the unit can obtain replacement tools through requisition or the self-service supply system.

The new changes to the regulations are the result of recent Army Audit Agency and Inspector General inspections. These inspections revealed that an excessive amount of Government funds is being spent for hand tools. The Army hopes the new changes well help to reduce this high cost by motivating soldiers to be more security conscious about their hand tools.

ARMY ENLISTED WOMEN

Following are Department of the Army guidelines covering a variety of matters affecting assignment, utilization, and training of women in the Army:

- Army women are noncombatants and will not be trained or employed in combat roles.
- Women will not be assigned to Category I TOE units.
- WAC personnel will deploy with their units of assignment.
- Department of the Army has announced weapons training instructions for female soldiers. Effective July 1, 1975, women entering the Army are required to take individual defensive weapons training as part of basic combat training.
- Women will participate in the field training activities of their units. They will not be precluded from participating in defensive training which prepares them to defend themselves and their units.
- Women who volunteer to carry arms and are qualified with an appropriate weapon may perform guard duties in selected areas.
- As local circumstances permit, WAC units will be inactivated and all command and control of enlisted women will be vested in their units of assignment.
- Under certain and specified conditions, female personnel may be detained in military police detention cells. Returnees will be processed in the same manner as male returnees.

NEW SENIOR NCO MANAGEMENT PROGRAMS

Improved management procedures for senior noncommissioned officers have just become effective. Two new programs — the First Sergeant and the Sergeants Major — were both approved recently by the Army's Deputy Chief of Staff for Personnel. The First Sergeants Program establishes management policies and procedures for the selection, assignment, and retention of the most highly qualified and motivated E-7's and E-8's to serve as First Sergeants. The program, which has been under study at MILPERCEN since last summer, calls for the awarding of a new special qualification identifier (SQI) of "M" rather than a separate 1SG MOS.

To be eligible for the 1SG SQI, an individual must have served for at least 90 days in a 1SG position or must have successfully completed a unit administration course for 1SG's, which is scheduled for implementation at the Senior Noncommissioned Officer Education System (NCOES) level under the Enlisted Personnel Management System (EPMS) during the next fiscal year.

In all cases, individuals must be recommended for the 1SG SQI by a battalion or equivalent level commander. This recommendation, along with an Enlisted Preference Statement indicating the soldier's desires for 1SG duty, will then be forwarded to the installation or division commander who has the final authority to award the SQI.

The second new program is the Sergeants Major Program, which MILPERCEN officials say will result in more effective assignment and utilization of SGM's. In this program, all SGM's and individuals whose names appear on the DA approved selection list for promotion to SGM will be assigned within their career management field (CMF), within a related CMF, or to a position where the individual SGM can best serve based on his individual abilities and the needs of the Army.

Under the new program, requisitioning of SGM's will be eliminated. MILPERCEN's career managers will make direct SGM unit assignments based on projected vacancies of authorized positions. As a result, a one-time field report of incumbent data will be required to initiate the SGM direct assignment system. Positions to which SGM's will be nominated will be limited solely to Presidential support activities and the Offices of the Secretary of Defense, Secretary of the Army, and the Joint Chiefs of Staff.

Both programs will be outlined in detail in a future revision of AR 614-200.

FY 77 USASMA SELECTION BOARD SCHEDULED

A US Army Sergeants Major Academy selection board is scheduled to convene on 22 July 1975 to select approximately 368 Active Army NCO's to attend the USASMA resident course during FY 1977. The board is also expected to select approximately 130 Active Army applicants to attend the FY 77 USASMA Nonresident Course #3.

The Enlisted Records Center is continuing to update the number of individuals in the zone of consideration. The zone for the resident course is presently projected to include approximately 5,000 individuals. Approximately 700 applicants are projected to be considered for the nonresident course.

Twenty-one Active Army students of Nonresident Class #1, which began last July, have been assigned to attend the 1-week resident phase of the course beginning 13 July 1975. The resident phase will be used to evaluate the effectiveness of the nonresident course.

MOVEM SUPPORTS MOVEMENT

Moving soldiers across the country and overseas effectively is a vital link in the Army's chain of activities. To facilitate accurate controls and eliminate empty seats on aircraft flying overseas at the Army's expense, MILPERCEN has developed the movement oversea verification of enlisted members (MOVEM) report. Under the MOVEM concept, 30 to 45 days prior to a given arrival month overseas, port calls are matched against assignment information on the enlisted

master file. DA-approved deletions and deferments are then scratched from the report and soldiers specified by DA to move during that arrival month, but who do not have port calls, are identified. The MOVEM report, indicating soldiers unlikely to meet their port calls, is then prepared and forwarded to major commanders requiring either movement or an explanation of any unauthorized deviations. In this way new arrangements can be made to transport those soldiers to their new assignments, if necessary, or arrangements can be made for other soldiers (on stand-by status) to fill their seats.

Since its implementation early this year, MOVEM reports have been sent monthly to the affected commands. Comments on the report and suggested improvements were solicited and have been active and useful. As the MOVEM program progresses, it will continue to provide effective verification of port calls for soldiers moving overseas and save the Army money by filling the seat of a "no show" with a soldier who needs the seat but normally wouldn't have the priority to get it.

TIME-IN-GRADE CHANGE FOR RETIREMENT

The requirement for Army members in grades E-7, E-8, and E-9 to serve a minimum of 2 years in grade before being eligible for nondisability retirement has been suspended until 30 June 76. Individuals in those grades who have completed all their service obligations and who are otherwise eligible may apply for voluntary retirement between now and 30 June 76, providing they have completed 6 months active duty in that grade — effective from the date of their promotion.

Interested individuals should refer to the procedures contained in Chapter 4, AR 635-100, and Chapter 12, AR 635-200, for submitting applications for retirement.

ASI T8 (FAAR) MOS CONVERSION

Soldiers holding ASI T8 will be given the opportunity to select MOS 16J (Defense Acquisition Radar Crewman) as either their new PMOS or new SMOS under the CMF 16 Enlisted Personnel Management System (EPMS) conversions scheduled for September 1975. DA Circular 611-41 dated 19 March 1975, which directs the ASI T8 conversion to PMOS 16J, is being changed to reflect this option. Award of 16J as either PMOS or SMOS is mandatory to maintain identity of FAAR trained soldiers. Soldiers scheduled for conversion to 16J should request correspondence courses from the US Army Air Defense School because no formal schooling will be provided.

59 SRB MULTIPLIERS CHANGED

MILPERCEN recently announced that Zone A and Zone B selective reenlistment bonus (SRB) multipliers applied to 59 MOS will be modified — either added, increased, decreased, or terminated. The SRB multiplier is a preset number multiplied by the basic reenlistment bonus figure for each MOS. The multiplier varies by MOS depending on whether the MOS is considered understrength, at desired strength, or overstrength.

In the latest multiplier changes, 2 MOS will be added to the Zone A SRB list and 10 MOS will be added in Zone B. Other changes include 1 MOS having an increased Zone A multiplier with 5 MOS increased in Zone B, 29 decreased Zone A multipliers, 9 Zone A multipliers and 3 Zone B multipliers terminated.

Individuals who reenlist on or after 1 July 1975, regardless of their normal ETS date, will be paid the SRB level in effect 1 July. Those desiring to learn if their MOS have been affected by the latest changes should refer to MILPERCEN message 031700Z June 1975.

TIGHTER DEPENDENT MOVEMENT POLICY

MILPERCEN has implemented new policy guidance to reduce transportation costs and avoid double movements of dependents and household goods as a result of a single oversea assignment. The new policy limits the conditions under which dependents and household goods may be moved twice.

Changes from an "all others" movement category to a "with dependents" category will be approved only if the change meets one of three prerequisites: the move can be made at no additional expense to the Government; entitlements to Government transportation of household goods and dependents have not already been used in connection with the present assignment; extreme personal problems are involved that would make approval in the best interest of the Army.

Soldiers are reminded that unless they are absolutely sure they will not want to bring their dependents overseas at a later date they should not move them from their present CONUS location.

OPD'S UPDATE *for* BARS TO STARS

TWO YEARS IN GRADE REQUIREMENT CHANGED

The requirement for Army members in grades CW3, CW4, 0-5 and 0-6 to serve a minimum of 2 years in grade before being eligible for nondisability retirement has been suspended until 30 June 76. Individuals in those grades who have completed all their service obligations and who are otherwise eligible may apply for voluntary retirement between now and 30 June 76, providing they have completed 6 months active duty in that grade — effective from the date of their promotion. Officers of the Reserve components and the Army of the United States without components who are serving, or have been offered retention beyond 20 years' service as an exception to policy, will not be involuntarily released from active duty earlier as a result of this suspension.

Interested individuals should refer to the procedures contained in Chapter 4, AR 635-100 and Chapter 12, AR 635-200 for submitting applications for retirement.

REVISED OFFICER RECORD BRIEF

Beginning in 1975, a revised version of the Officer Record Brief (ORB) hit the field for the first time. Highlights of the revision include an easier-to-read-and-understand format, space for Officer Personnel Management System specialties, an expanded remarks section, and more room for listing previous duty titles and assignments. Instructions on the new form are oriented toward the individual officer and personnel specialist, and more complete explanations of codes and abbreviations are now included. Individual officers are reminded that the annual audit of the ORB is mandatory for all commissioned and warrant officers. Results of a recent MILPERCEN study of ORB audit return rates have revealed that as many as 15 percent of our officers fail to respond to this requirement.

LATE OER SUBMISSIONS

The US Army Military Personnel Center is now providing each major command with a monthly statistical summary of late Officer Evaluation Report (OER) submissions. Each summary — broken down by command and station code — includes the total number of completed OERs received for processing by MILPERCEN's Evaluation Report Branch, the total number that arrived after the 45-day time limit set by Army regulation, and an indication of approximately how late a command's reports actually were. MILPERCEN officials hope these statistics will provide commanders with enough information to identify problem areas and take appropriate action to insure that completed OERs originating in the command reach the personnel center on time.

During calendar year 1974, nearly 38 percent of all OERs Army-wide was received from the field after the 45-day time limit. Allowing reports to become overdue can cause delays in personnel management decisions at HQDA level. Since OERs are the major factor in determining whether officers are promoted, selected for certain schools and specific assignments, or retained on active duty, MILPERCEN is reminding individual personnel officers, raters, indorsers, and reviewers to recognize the importance of handing OERs expeditiously within the command.

OFFICER GRADUATE SCHOOLING

Improved management practices have caused some changes in the Army's graduate civil schooling programs. Emphasis is now placed on approximately 50 shortages, disciplines, and fields of study including automatic data processing, foreign area studies, comptrollership, operations research/systems analysis, logistics management, procurement and contract management, engineering, and behavioral science.

Officers seeking masters degrees may apply for civil schooling in the shortage disciplines only. Likewise, the academic discipline should align with the officer's basic

entry or projected alternate specialty under OPMS. Only those officers who possess a military performance record that demonstrates long range promotion potential will be selected to participate in the advanced civil schooling program. As a general rule, only those whose overall manner of performance places them in the upper third of their contemporaries are being considered. In exceptional circumstances, some officers in the upper half of their peer group may be selected to meet specific Army requirements.

The maximum time allowed for graduate study under the fully-funded masters degree program is 18 months. Partially-funded programs (degree completion, cooperative degree, advanced degree program for ROTC instructor duty) are restricted to shorter periods. Upon graduation, officers are required to serve a three year utilization assignment in a position that has been validated by the Army Educational Requirements Board.

Application procedures are outlined in AR 621-1, "Training of Military Personnel at Civilian Institutions." Officers with questions regarding the new policies are advised to contact their management division in MILPERCEN's Officer Personnel Directorate.

OPD MANAGEMENT TV TAPE

MILPERCEN has produced a 16-minute, color TV program tape for FORSCOM and TRADOC installations which explains the functions and advantages of the Officer Personnel Directorate (OPD) under the Officer Personnel Management System (OPMS). The tape is aimed at key officer personnel managers and service school instructors teaching officer personnel management electives as well as all commissioned Army officers except Chaplains, JAG's and AMEDD's. Titled "Officer Personnel Management System," the video tape explains the process of selecting officers for assignments under OPMS and discusses how the reorganization of OPD is designed to assure a smooth transition from a "by branch and grade" system of assignments to a "by specialty and grade" system.

CONUS organizations wishing to receive a copy of the tape should refer to the tape number (TVT 12-1) when contacting their local audio-visual support centers. A 16-mm film version of the tape is being prepared and will be sent to overseas locations in the near future.

Installations using the TV tape may arrange for a live telephone question and answer session with OPD representatives following a local showing of the program. Arrangements should be made at least 3 days in advance of the desired question and answer session. Procedures for arranging the session are detailed in MILPERCEN message 211404Z May 75.

OFFICER PROMOTION BOARDS

Three DA officer promotion boards are presently scheduled to convene through the months of July and August 1975. A Regular Army Colonel's board is scheduled to convene 22 July to consider Army, Chaplain, and Women's Army Corps Lieutenant Colonels for promotion. The COL, RA, selection board for Army Medical Department (AMEDD) officers is slated to begin 11 August. The zones of consideration for both these boards will include all Regular Army LTC's with permanent dates of rank of 31 December 1972 and earlier.

Tentatively scheduled to convene 19 August is the Captain, AUS, selection board for Active Army and WAC 1LT's. The zones of consideration for this board, however, have not yet been determined.

Results of the Lieutenant Colonel, AUS, selection board which adjourned 12 May have been approved by the Secretary of the Army and were scheduled to be released on or about 27 June 1975. The release date, however, could vary pending Senate approval of the LTC nominees. The nomination lists from the Captains and Majors RA boards, which adjourned February 14 and 28 respectively, were scheduled to be released about 20 June 1975.

EARLY RETURN OF RIFFED OFFICERS FROM OVERSEAS

Officers assigned overseas who are to be involuntarily separated from the Army by the FY 76 reduction in force (RIF) may return to CONUS before their separation date. Present PCS restrictions, however, prohibit these officers from being reassigned or commencing their movement prior to 1 July 1975.

Officers returning early will be assigned, until their separation date, to the major installation with a separation transfer activity closest to their home of record or place of entry on active duty.

If an officer has a least 8 years of continuous active duty, with no break in service exceeding 90 days, he may select a location other than the home of record for the separation move. These officers will be entitled to travel and transportation allowances to the newly selected location from the last duty station and will be assigned to the major installation with a separation transfer activity nearest the desired location.

Officers choosing to remain overseas until their separation date will be separated upon their return to CONUS at the port of debarkation. Travel allowances for these officers will be computed from the port of entry to the home of record, place of entry on active duty, or, for officers with more than 8 years continuous active duty, selected location. Only one move of household goods and dependents is authorized in conjunction with separation.

Senior Air Defense Artillery Commanders

MG Robert W. Fye
32d US Army Air Defense Command

BG John B. Oblinger, Jr.
38th Air Defense Artillery Brigade

MG Daniel H. Wardrop
31st Air Defense Artillery Brigade

COL R. M. Singletary
The School Brigade

COL David A. Hufnagel
The Air Defense Artillery Training Brigade

COL Avon R. Omps
11th ADA Group

COL James P. Maloney
108th ADA Group

COL Richard J. A. Guertin
10th ADA Group

COL Cary B. Hutchinson, Jr.
69th ADA Group

COL Walter J. Mehl
94th ADA Group

COL Charles G. Scott
559th ADA Warhead Support Group

LTC Joseph M. Lorimer
2d Battalion, 67th ADA (C/V)

LTC James C. Cercy
2d Battaltion, 60th ADA (C/V)

LTC William C. J. Hickey
6th Battalion, 56th ADA (C/V)

LTC Harry L. Quinlan
3d Battalion, 59th ADA (Hawk)

LTC Charles Charpentier
2d Battalion 62d ADA (Hawk)

LTC Ivo J. Cavoli
2d Battalion, 2d ADA (Hawk)

LTC William A. Bradley
1st Battalion, 1st ADA (Hawk)

LTC Charles Szendry
3d Battalion, 7th ADA (Hawk)

LTC Nathaniel R. Roache
2d Battalion, 57th ADA (Hawk)

LTC Francis M. Williams
6th Battalion, 52d ADA (Hawk)

LTC James J. Kernan
3d Battalion, 60th ADA (Hawk)

LTC John F. Crater
2d Battalion, 56th ADA (Herc)

LTC James W. Evertt
3d Battalion, 71st ADA (Herc)

LTC James E. Rambo
2d Battalion, 1st ADA (Herc)

LTC Travis N. Dyer
5th Battalion, 6th ADA (Herc)

LTC Charles W. Binney
2d Battalion, 59th ADA (C/V)

LTC Wallace C. Arnold
3d Battalion, 61st ADA (C/V)

LTC Cecil L. Jernigan
3d Battalion, 67th ADA (C/V)

LTC John R. Hubbard
1st Battalion, 59th ADA (C/V)

LTC Francis G. Mathison
1st Battalion, 2d ADA (Hawk)

LTC John Peckham
1st Battalion, 44th ADA (Hawk)

LTC William C. Ganey
2d Battalion, 44th ADA (Herc)

LTC Donald R. Infante
2d Battalion, 71st ADA (Hawk)

LTC James B. Statler
2d Battalion, 61st ADA (C/V)

LTC Edward J. Horton
1st Battalion, 68th ADA (C/V)

LTC William Winzurk
2d Battalion, 5th ADA (C/V)

LTC Hugh H. Trumbull, Jr.
4th Battalion, 61st ADA (C/V)

LTC Henry M. Reed II
3d Battalion, 4th ADA (C/V)

LTC Roger L. McLeod
1st Battalion, 3d ADA (C/V)

LTC Terrance D. Wharton
1st Battalion, 67th ADA (C/V)

LTC Richard W. Hanlin
1st Battalion, 43d ADA (Herc)

LTC Oscar G. Scoville
1st Battalion, 62d ADA (C/V)

LTC Howard E. Espin, Jr.
3d Battalion, 68th ADA (Hawk)

LTC Billy W. Riley
1st Battalion, 65th ADA (Hawk)

LTC Francis R. Stevens
2d Battalion, 52d ADA (Herc)

LTC Hunter G. Haselton
1st Battalion, 7th ADA

LTC Samuel L. Hayton
2d Battalion, 55th ADA

LTC Ronald L. Peden
4th Battalion, 1st ADA (C/V)

LTC James A. Landgraf
3d ADA Training Battalion (MSL)

LTC Donald A. Campbell
4th ADA Training Battalion (FAW)

LTC Ernest H. Tobin
Staff and Faculty Battalion

LTC James V. Gannon
Student Battalion

LTC Fred W. Balkovetz
Allied Student Battalion

LTC Thomas L. Ricketts
3d Battalion, 6th ADA

LTC Ronald O. McLaurin
5th Battalion, 57th ADA (Hawk)

LTC Bobby R. Huggins
4th Battalion, 62d ADA

THE AIR DEFENSE

The US Army Bicentennial observance by the US Army Air Defense Center and Fort Bliss, on 14 June 1975, included the dedication and official opening of the US Army Air Defense Artillery Museum at Fort Bliss, Texas.

Major General CJ LeVan, Commander of the US Army Air Defense Center and Fort Bliss, presented the dedication speech. In his speech, the General remarked that the ADA Museum, like our nation, experienced humble beginnings but would gain prominence with time. He further stated that the Museum would grow and develop through the years because of the dedication, interest, and esprit de corps of all who are now, or have been in the past, associated with the Air Defense Community and its development.

The new AD museum comprises over 10,000 square feet in the old officers' club (building 5000) on Pleasonton Road near the Chelsea Drive gate. The contents of the museum document an era dating from the days of the Coast Artillery Corps to today's sophisticated Air Defense Artillery weaponry. Exhibits within the building include historical documents, AD publications, uniforms, small arms, audiovisual displays, and actual air defense equipment. Visitors can actually man a command console and see displayed a simulation of an air defense operation from the detection of a target to its destruction.

Outside the museum building is a static equipment display of air defense artillery and target drones dating from very early antiaircraft guns to modern-day weapons and missiles. All exhibits are representative of the Air Defense Artillery's diverse missions and activities.

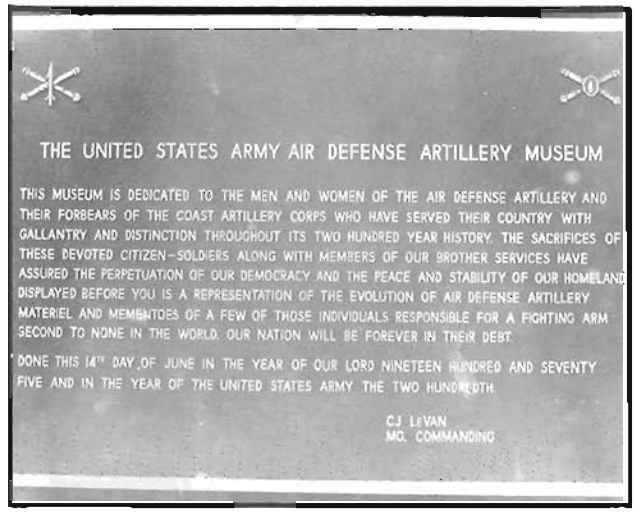
The Air Defense Artillery Museum offers a suitable repository for the collection of items that tell in

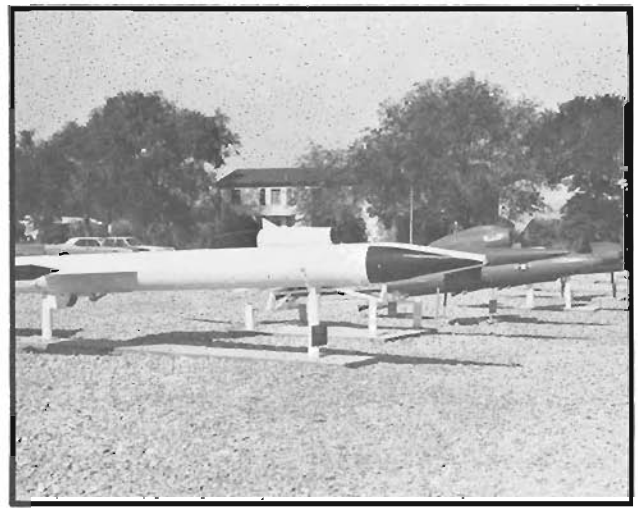
TILLERY MUSEUM

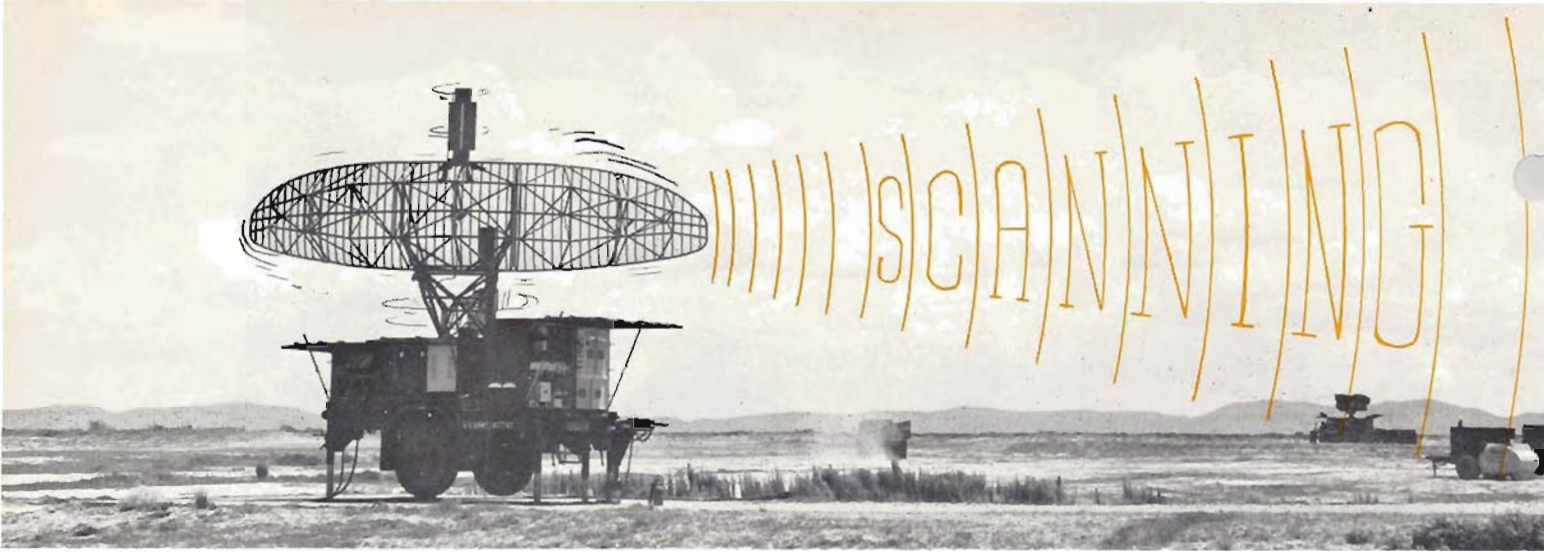
dramatic form the story of the origin and development of air defense as well as a glimpse to its future. Military museums are not new. Many other combat arms have had, for years, branch-related museums. It is significant that at last the Air Defense Artillery has established its own show place of lineage and accomplishment.

In conjunction with the Air Defense Artillery Museum, the US Army Air Defense Artillery Museum Association has been established at Fort Bliss, Texas. The principal function of the Association is the general support of the museum. Objectives of the Association include acquiring historical properties peculiar to Army Air Defense Artillery and engaging in activities to educate and promote esprit de corps within the Air Defense Community. The Association will also be involved in furthering the favorable interest of the civilian population in the Army and in particular Air Defense Artillery. Fostering good community relations and continued interest in the Air Defense Museum will be a continuous objective of the Museum Association.

US Army Air Defense Artillery missilemen the world over can take just pride in their new museum. However, to aid its growth and development, the interest and support of all the Air Defense Community is needed. There are many ways that this interest and support can be extended. An obvious one is by financial assistance. Another is by donating or loaning for exhibit by the Museum, any article, documents, or piece of equipment related to the history and development of air defense. All donations will be safeguarded and proper credit given to donors. For additional information concerning membership in the Museum Association, or regarding tax credits for donations, write Mr. Scott L. Norton, Curator, Air Defense Artillery Museum, Fort Bliss, TX 79916.







SAM ELECTRONIC WARFARE ASSESSMENT

The US Army has established a program for the complete electronic warfare assessment of the surface-to-air missile development (SAM-D) missile system. The program is conducted by the Electronic Warfare Laboratory, Office of Missile Electronic Warfare (MEW), Army Electronics Command, and includes analysis of the system design as well as hardware testing. Since the SAM-D missile system has employed a state-of-the-art concept in many of its subsystems, the MEW Office has responded with a complete inventory of modern, threat-oriented, electronic countermeasure (ECM) devices with which to test and exercise the substantial electronic counter-countermeasure (ECCM) capabilities of the system.

The first of these devices is the ECM environment test transmitter which is a full-threat level jammer configured specifically to exercise the complete range of ECCM capabilities of the SAM-D weapon system. As such, this ECM device contains a full array of electronic warfare modulations.

All control functions are on a central console so that many individual tests can be performed during any given mission. The operator can effectively "dial in" the various jamming sequences as required by the test scenario. This jammer is expected to be placed in MEW's airborne platform nicknamed "Big Crow."

Big Crow is a modified Air Force NKC-135A designed to provide the Army with the capability and flexibility of conducting many varied and precision electronic warfare experiments applicable to electronic warfare research and development. This flying laboratory is capable of creating ECM environments for the susceptibility/vulnerability analyses of missile and missile support systems such as the SAM-D missile system now in development.

The various facilities and equipment available in Big Crow provide the user with a multitude of data heretofore unavailable for a single platform. The airborne platform includes five research and development stations which may be configured with any specialized electronic warfare equipments such as the ECM test transmitter.

Also included as onboard equipment in Big Crow are four stations which house microwave/electronic warfare receiver systems, in addition to other subreceiver systems. This equipment provides the capability of receiving in the frequency range of .5 MHz to 18 GHz, with growth capabilities to 40 GHz.

Various standard ECM devices are carried on board and may be interchanged with others to expand and/or concentrate capabilities according to mission requirements. A total of 10 of these systems may be used at one time. Two modified AN/ALE-32 chaff dispensers are available to aid in the evaluation of the chaff rejection capabilities of the SAM-D system.

A data acquisition station is available for recording on tape the user's analog and digital data requirements. The user may correlate his data on this system with onboard inertial navigation data and synchronized timing data as required.

A total concept of Big Crow is the flexibility of an airborne laboratory that will provide the SAM-D Project Manager's Office and other users the capability to conduct investigations within a very tight time frame and with the least amount of expense.

Besides Big Crow, a family of unique pod-mounted jammers designed for supersonic flight provides an additional electronic warfare capability beyond that of Big Crow and the project-related ECM devices on board. These other devices can be operated as self-screening jammers in both barrage and deceptive modes and can be carried on either manned or drone aircraft which exhibit flight and tactical characteristics exactly like hostile aircraft penetrating the defended zone for SAM-D.

The total electronic warfare capability developed in the MEW program for the assessment of the SAM-D electronic counter-countermeasure capability represents the most severe electronic warfare threat yet employed in the development of air defense systems.

AD TRAINING MATERIALS

The US Army Air Defense School provides Active Army and Reserve units with training materials in the form of lesson plans, special texts, and supporting materials such as advance sheets, work sheets, and student outlines through USAADS Pam 350-16, Special Catalog of Instructional Material. The current catalog contains over 250 items selected for their usefulness to unit trainers. All materials listed in the catalog are stocked by the Army Wide Training Support Division and requests from the field are normally filled within 72 hours. Future developments of this program will focus on quality improvement, insuring that all material is department current and also insuring the addition of new material as it becomes available and needs are identified. The incorporation of videotape programs into the inventory is an example of new materials being tested.

SEA RANGE

Playing a crucial part in the defense of Korea's airspace, the 38th Air Defense Artillery Brigade maintains a high state of combat readiness. Every year, units of the 38th ADA Brigade travel to Special Eighth Army (SEA) Range to test their combat readiness and proficiency. Each battery spends 5 days at SEA Range testing its ability to assemble, test, and fire a missile. Battery personnel are thus able to witness their air defense system during actual firing rather than a simulated exercise.

When a battery arrives at SEA Range (on a Sunday), personnel are briefed by the evaluators on what will be tested and how the scoring is done. There are 38 Hawk evaluators and 34 Nike Hercules evaluators. Phases included in the evaluations are: missile assembly and check, equipment check, systems check, launcher loading, and missile arming. A major portion of the score is based upon the firing of a live missile at a real or simulated target. The battery's evaluation stops once the missile leaves the launcher.

On Monday morning, the batteries are given an acceptance hour to decide whether they want to use the equipment or turn it over to the host batteries for repairs. Battery B, 2d Battalion, 44th ADA, is the host battery for Nike Hercules and Battery D, 1st Battalion, 44th ADA, is the host battery for Hawk. Once the battery accepts the equipment, it is given 8 hours to bring the equipment up to initial readiness. This involves decanning and assembling the missile, performing inflight simulations, connecting and testing the radars, attaching the warhead, and loading the missile on the launcher. The battery is then given an operational readiness evaluation (ORE). If it passes the ORE, it is placed on a 3-hour status. These phases are run on Tuesday and Wednesday.

Firing Day.

The battery members rise early on Thursday to perform their daily and weekly checks on the radars and launchers to insure that all will go well. Two Hawk batteries and one Nike Hercules battery will fire. The Hawk batteries are divided into two firing sections, the Assault Fire Command Console (AFCC) and the Battery Control Central (BCC); each section will fire one missile. The Nike Hercules system is capable of firing at a point in space, but the Hawk requires a tangible target on which to home. For this, a Firebee-Towbee system is used. A Firebee drone is launched carrying a Towbee under each wing. The Towbee is a small, inexpensive fuselage that is towed 5,000 feet behind the Firebee on a cable, giving the Hawk missile a moving object to lock on. Once the Towbee is in range, the battery has a short time to lock on, obtain a fire light, and fire at the target.

The SEA Range facility, in supporting these activities, is a valuable asset to US air defense readiness.

Men and equipment move into position for SEA Range annual service practice.

STINGER ALTERNATE SYSTEM

A new air defense weapon tracking device with an innovative guidance system based on a laser beam rider concept was demonstrated recently at the Air Defense School.

Called "Stinger Alternate System," it is designed to do essentially the same job as Stinger (now in the engineering development stage), but the Stinger Alternate is equipped with the new guidance system. The uniqueness of the 15.7-pound guidance unit lies in its uncanny ability to "enslave" the launched missile in the laser beam and guide it to the target.

Consisting of a complex optical system that is boresighted to the laser "gun" and emitting a 6-meter diameter ray, the laser beam captures the missile immediately after launch and controls its flight path throughout the engagement period.

Operational sequence calls for the gunner to sight the target, take aim, and press the trigger. Gyroscopic stabilization of the optical sight and laser beam transmission takes place when the trigger is squeezed. The gunner simply keeps tracking the target, with trigger depressed, and the missile rides the beam. Tracking time is normally less than 10 seconds.

Plans for the man-portable, shoulder-held weapon — a back-up system to Stinger — called for it to be a viable alternate forward area weapon system not subject to the type of enemy countermeasures applicable to the Stinger. The special design technology of the alternate system's guidance package is said to meet this criteria.

Whereas Stinger's guidance system depends on passive infrared homing with the gunner having no control of the missile after launch, the Stinger Alternate System, with its laser beam guidance, is totally ground-guided until impact.

AIRCRAFT RECOGNITION SATURATION POINT

The US Army Air Defense School has requested a study be conducted on the subject of aircraft recognition saturation point based on the following considerations:

One of the major questions confronting Redeye and Chaparral/Vulcan trainers is how many aircraft can the average soldier (aircraft observer) learn and retain within practical training time limitations? It can be expected that at some point (number of aircraft) in the aircraft recognition training process a soldier will become saturated; that is, to learn additional aircraft beyond this saturation point will require an inordinate amount of training time. Along with determining what the saturation point is, additional information should "fall out" of the study, such as the amount of training time required to reach the saturation point and the training time (hours per month) required to maintain the average soldier at the saturation point level.

The saturation point and corresponding training times will be invaluable information for all units/individuals responsible for developing aircraft recognition programs, since it would not be practicable (because of time limitations) to develop recognition programs requiring knowledge of more aircraft than the saturation number.

REORGANIZATION OF ARMY BALLISTIC MISSLE DEFENSE ACTIVITIES

During FY 75, the Army realined its ballistic missile defense (BMD) activities under the direction of a single BMD Program Manager (BMDPM). The BMDPM, who reports directly to the Army Chief of Staff, has the overall responsibility to determine requirements, establish priorities, and plan and execute the nation's BMD Program.

The broad activities of the BMD Program emphasize the development of a research base sufficient to maintain the lead in BMD technology and preserve the option to rapidly deploy an advanced BMD system. The Program Manager is also responsible to provide operational BMD forces for the active defense of the US and to operate a test range at Kwajalein for the strategic weapons test programs of all services.

The new Ballistic Missile Defense Organization was structured within the guidelines provided by the Deputy Secretary of Defense to maintain a coordinated technology program and reduce management overhead by combining the principal agencies involved in BMD into a single organization. The new organization consists of the following elements:

- Ballistic Missile Defense Program Office (formerly Safeguard System Office) — an element of the Office of the Army Chief of Staff established to assist the BMDPM in the exercise of his responsibilities.
- Ballistic Missile Defense Systems Command (formerly Safeguard System Command) — a field command established to accomplish the research, development, acquisition, installation, and support of ballistic missile defense systems.
- Ballistic Missile Defense Advanced Technology Center (formerly Advanced Ballistic Missile Defense Agency) — conducts research and development programs involving advanced component and function technology.
- US Army Safeguard Command — exercises command of the Stanley R. Mickelsen Safeguard Complex at Nekoma, North Dakota.
- Ballistic Missile Defense Operations Activity (BMDOA) located in Colorado Springs, Colorado — essentially the operational staff for the Ballistic Missile Defense Program Manager (BMDPM) and is responsible to monitor surety, nuclear safety and security, training, and perform operational evaluation for the BMDPM. It is also the BMDPM point of contact with CINCONAD.

Through this organization the BMDPM directs the four major interrelated BMD programs: the Safeguard BMD system, the Site Defense Program, the Advanced Technology Program, and the Kwajalein Missile Range (KMR).

The Safeguard Site achieved an initial operational capability on 1 April 1975 and will be fully operational in October 1975. The operation of this unique BMD system, under the operational command of CINCONAD, provides protection of portions of the US strategic retaliatory forces and, equally important, it provides valuable experience in the operation and maintenance of a deployed BMD system.

The site defense program is a major systems technology R&D effort that emphasizes the development and integration of subsystems (interceptors, radars, data processing, C^3) and their components in a systems context. By actively advancing the state of the art in systems technology, the US retains its capability to develop and deploy an advanced BMD system. This program interacts with the advanced technology program to assure that payoffs in new technology research result in realistic system application.

The advanced technology program is designed to produce advances in all aspects of BMD technology. This is accomplished by exploiting new technologies and developing the most promising ideas beyond the conceptual stage. The program focuses on those ideas, techniques, and components deemed to have a potentially significant application to future BMD systems.

The BMDPM operates Kwajalein Missile Range as a national range. Located over 5,000 miles from CONUS and spread over 14 islands in the Kwajalein Atoll, KMR is a sophisticated and highly instrumented strategic weapons test facility. It supports not only BMD tests but the Air Force and Navy strategic offensive system programs as well.

These wide-spread, diverse, highly technical activities were consolidated under a single manager to improve the coordination of US BMD programs and to assure the retention of US supremacy in the complex field of BMD technology.

ADA FTX

In keeping with the doctrine of applying in the field what one has learned in the classroom, the Tactics Department, USAADS, has recently completed its second Air Defense Artillery Officers Advanced Course Field Training Exercise (FTX). The FTX is designed to allow the student to perform the duties of various ADA command and staff positions during a 3-day controlled exercise to reinforce previous ADA advanced course instruction. Each day during the exercise, the student changes job positions and weapon systems. In addition to recalling previous classroom instruction in that weapon system, the student must apply principles of

command and leadership which he has learned throughout his military career. The student deploys a Chaparral/Vulcan and a Hawk battery, operates AADCP's, fulfills AME functions, and fills staff positions in a dynamic air defense environment. High-performance aircraft, helicopter gunships, and Aggressor ground forces provide a realistic hostile threat. The problem is designed to effectuate several daytime unit moves, as well as at least one move per type unit each day under conditions of darkness. Feedback from students as well as instructors indicates that the exercise has been highly successful. The weapon system cross-training conducted in a field environment enhances instruction by allowing the student to be innovative in his job performance, as well as helping him understand and appreciate the problems and uncertainties that may occur in various areas such as communications, equipment, and survivability.

ACADEMIC CREDIT FOR USAADS COURSES

An evaluation team from the American Council on Education recently visited USAADS to obtain a better understanding of the curricula for AD MOS training. As a result of the visit, the Council recommended the following equivalent categories and semester hour credit to civilian educational institutions.

Categories:

Vocational-Certificate (VC)
Technical-Associate Degree (TAD)
Upper-Division Baccalaureate (UDB).

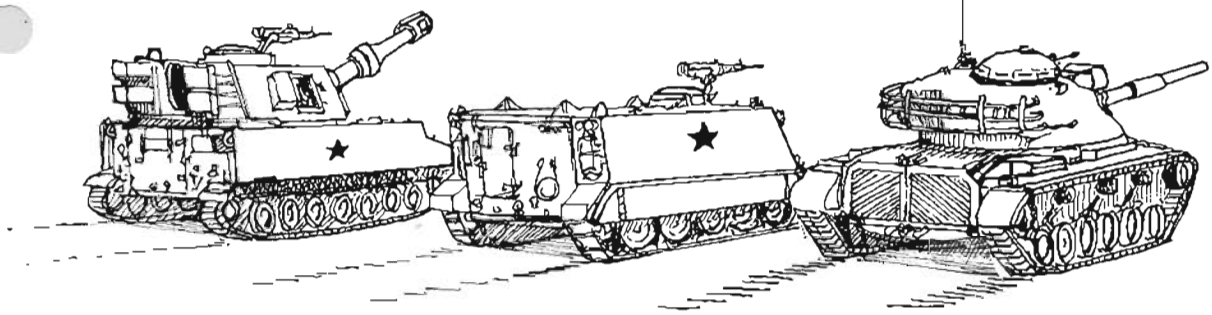
Credits: The credit recommendations to civilian institutions are advisory in nature. College and university officials are free to accept, modify, or reject them in accordance with institutional policy. Credits may be awarded as follows:

- Safeguard Ballistic Missile Defense Unit Commander, 2F-1111 (VC, TAD, UDB — 4, 3, and 2 semester hours, respectively).
- Safeguard Staff Officer, 2G-1115 (VC, TAD, UDB — 6, 4, and 3 semester hours respectively).
- Guided Missile Systems Officer, 4F-1181 (TAD, UDB — 36 or 30 semester hours, respectively). A possible 15 to 17 additional semester hours may be assigned on the basis of a separate evaluation by a team in mechanical or aerospace engineering.
- Improved Hawk Organization Maintenance Supervisor —Transition) 4F-223D-T (VC, TAD, UDB — 12, 6 and 6 semester hours, respectively).
- Chaparral/Vulcan System Technician, 4F-224B (VC, TAD, UDB — 8, 5, and 2 semester hours, respectively).
- Nike Hercules Electronic Maintenance, 4F-221B/221-24U20 (VD, TAD, UDB — 2 or 4 semester hours and credit in electrical laborabory on the basis of institutional examination).
- Safeguard Missile Maintenance Technician/Specialist, 4F-221C/221-28M20 (VC, TAD — 3 and 2 semester hours, respectively).
- AN/TSQ-51 System Maintenance, 4F-361A/150-25K20 (VC, TAD, UDB — 12, 7, and 3 semester hours, respectively).
- Improved Hawk Firing Section Maintenance Supervisor, 121-24C40 —VC, TAD, UDB — 5, 3, and 2 semester hours, respectively).
- Improved Hawk Firing Section Maintenance (Transition), 121-24C40-T (VC, TAD, UDB — 6 and 3 semester hours respectively and credit in radar or communications on basis of institutional examination.)
- Improved Hawk Fire Control Maintenance, 121-24E20 (VC, TAD, UDB — 6 and 3 semester hours and elective credit in electricity or electronics on basis of institutional examination, respectively).
- Improved Hawk Fire Control Maintenance (Transition), 121-24E30-T/121-24E40-T (VC, TAD, UDB — 4, 2, and 2 semester hours, respectively).
- Improved Hawk Fire Control Maintenance Supervisor, 121-24E40 (VC, TAD, UDB — 5, 3, and 2 semester hours, respectively).
- Hawk Fire Control Maintenance, 121-24F20 (VC — 2 semester hours and credit in electronics laboratory on basis of institutional examination for TAD and UDB).
- Improved Hawk Information Coordination Central Maintenance (Transition), 104-24G40T (VC, TAD, UDB — 9 semester hours and 6 credit hours on basis of both electronics laboratory and digital systems institutional examinations).
- Improved Hawk Information Coordination Central Maintenance Supervisor, 104-24G40 (VC, TAD, UDB — 5 and 6 semester hours and credit on the basis of institutional examination).
- Vulcan Mechanic, 121-24M20 (VC, TAD, UDB — 2, 2, and 1 semester hours, respectively).
- Forward Area Alerting Radar System, 121-24M30/24N30 —VC — credit in Electronics Laboratory on the basis of institutional examination).
- Air Defense Acquisition Radar Maintenance, 104-24P20 (VC, TAD — 4 and 2 semester hours, respectively).
- Improved Nike Hercules Fire Control System Maintenance, 121-24Q20 (VC, TAD — 6 and 4 semester hours, respectively).
- AN/MPQ-T1 Radar Signal Simulator Maintenance, 121-24Q30 —VC, TAD — 3 semester hours and credit on basis of institutional examination).
- Operations Central Repair, 150-25J20 (VC, TAD, UDB — 8, 6 and 3 semester hours, respectively).
- Air Defense Radar Repair, 104-26H20 (VC, TAD, UDB — 12 and 6 semester hours and credit on basis of institutional examinations, respectively).

When published, these credit recommendations will appear in the first annual edition of the *Guide to the Evaluation of Educational Experiences in the Armed Forces.*

Those who complete any of the foregoing courses and desire college credit should see an education counselor for information on the correct procedure to follow.

Combined Arms Corner



NEW SMALL ARMS AMMO CARRIER

The US Army Infantry Board has recently announced that the small arms ammunition case presently being used by infantrymen may be replaced with an improvised ammunition carrier. The present ammunition case, worn on the pistol belt, holds two 30-round magazines of 5.56-mm ammunition for the M26A1 rifle. The Board is testing four versions of a proposed replacement carrier (shown here) that holds six 30-round magazines and may be carried slung over the shoulder or around the waist by using an attached carrying strap.

The results of the comparative evaluation will be used to determine the most suitable carrier and method of wearing it, along with other load-carrying equipment.

—Infantry

NEW NATO CARTRIDGE

A cartridge developed at the Frankford Arsenal — the XM256E1 — was recently demonstrated successfully at Fort Benning. Cartridges were fired by the 7.62-mm M14 rifle, the 7.62-mm M60 machinegun, and from a special 7.62-mm lightweight machinegun which was chambered for the NATO cartridge.

According to Frankford Arsenal, a need exists for a multipurpose assault-type cartridge because of factors such as jungle and open field environments. Also, recent small arms development throughout the world has shown there is a growing need to arm the infantryman with intermediate power ammunition.

In-house engineering at Frankford Arsenal has shown that "reduced recoil momentum," coupled with an increased capabilty to obtain multiple hits in the burst fire mode, makes the XM256E1 an ideal cartridge for use by the foot soldier and provides him a multipurpose assault capability when he is engaged in guerrilla, counterguerrilla, and other specialized operations such as air assault.

The new cartridge has a 90-grain bullet, copperplated with a steel core, a conventional 7.62-mm brass cartridge case, standard M34 percussion primer, and a propellant charge of 42 grains.

Studies and engineering tests indicate that the effectiveness, accuracy, and lethality of the XM256E1 low-recoil ammunition does not differ significantly from the same effectiveness parameters of the 7.62-mm NATO family of ammunition and the 5.56-mm M193 cartridges out to ranges of 500 meters. Study results also showed that the recoil momentum of the M14 rifle was reduced 37 percent when the new cartridge was used, thereby giving the rifleman more control over the weapon during burst and full automatic firing.

An adaption kit was also introduced along with the development of the XM256E1 cartridge. The kit provides a multipurpose weapon capability for jungle and open terrain combat by replacing the wooden stock on the M14 rifle with a lightweight folding stock.

— Infantry

HELL FIRE

Army Missile Command gunners recently fired two laser missiles almost simultaneously and hit two tanks, marking the first successful ripple fire demonstration of the Army's new Hellfire weapon system. The missiles were launched from a helicopter. One tank was illuminated by an airborne helicopter and the second tank by a ground designator. The tanks were approximately 60 feet apart. The missiles were "coded" to home on their respective targets. All test objectives were accomplished, according to the Hellfire Project Manager, who called the accomplishment a major step forward in Hellfire development.

A rapid fire demonstration was also conducted in which a Cobra gunship launched two missiles 8 seconds apart and both scored direct hits, using only one laser designator. To further demonstrate Hellfire's "quick kill" potential, the Cobra launched two missiles only a split second apart with similar results. Two designators were used to illuminate the tanks, one located on the ground and the other on an airborne helicopter. Both designators were located at their maximum design range from the tanks.

Hellfire, being developed for air launch from attack helicopters, will provide the Army with a family of terminal homing seeker modules and a common airframe to engage a variety of tank and hardpoint targets. It's the first antitank weapon designed especially for helicopter launch.

FASTER RESPONSE TO CALL FOR ARTILLERY FIRE

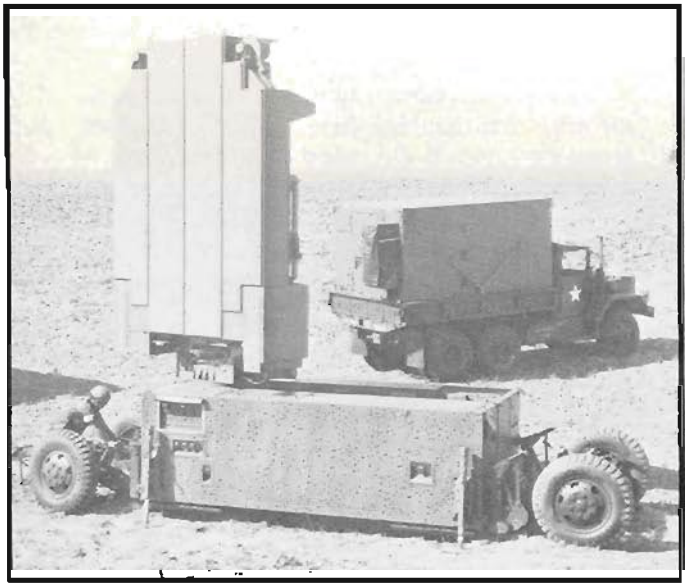
On the modern battlefield, one of the most critical periods of time may be between the call for fire and the impact of the first rounds. The Gunnery Department, US Army Field Artillery School, is working to reduce that time period with production of a single, all-charge graphical plate designed to fit on currently issued aluminum range defection protractors (RDP). Responsiveness tests have proven that procedures using the device produce first-round fire data faster than RDP/GFT procedures, and normally faster than field artillery digital automatic computer depending on time of flight.

The new graphical plate is designed to eliminate the time normally required for the computer to determine firing data. Charge, fuze setting, deflection, and elevation are announced by the chart operator as rapidly as he can adjust the cursor to the target. The computer need only relay the chart operator's information to the guns, adding average site to elevation for quadrant elevation.

The GFT fan adapter package for the RDP includes two mounting/securing screws, the graphical plate, and instructions for use. Complete adapter packages have been distributed to all active M102 and 155 SP units.

— *Field Artillery Journal*

ARTILLERY LOCATING RADAR



The AN/TPQ-37 Artillery Locating Radar, designed by Hughes Aircraft Company, can pinpoint enemy artillery — sometimes even before the first incoming shell hits the ground. Complete automation provides for automatic location of weapons with minimum operation action. This will eliminate operator fatigue and efficiency drain peculiar to the existing AN/MPQ-4A which has been in service since 1958.

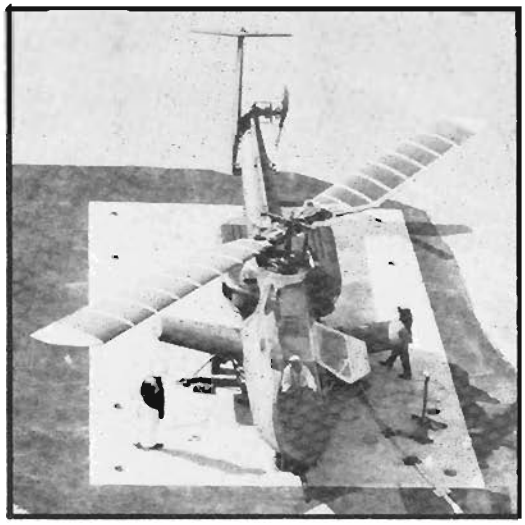
—*Field Artillery Journal*

YAH-63 BEGINS GROUND RUNS

After final instrumentation and checkout, Bell Helicopter's ground test YAH-63 has begun ground run tests. The ground test vehicle is the first of three prototypes being built by Bell as their entry in the Army's Advanced Attack Helicopter program.

Ship number two, the first flying prototype, is scheduled to fly this summer and number three is in final assembly. After extensive testing, both aircraft will be delivered to the Army for competitive evaluation in May 1976.

— U.S. Army Aviation Digest



DIVISIONS GET MOBILE ADP SYSTEM

The Army has approved the extension of the computerized Combat Service Support System (CS_3) to all Active Army divisions. CS_3 is a system on wheels that will move when and where tactical units in the field move. Its main objective is to increase the responsiveness of combat service support required by the Army in the field through the application of data processing.

Currently, three divisions — the 1st Cavalry Division and the 2d Armored Division at Fort Hood, Texas, and the 101st Airborne Division at Fort Campbell, Kentucky — are operating the CS_3. The CS_3 extension to the remaining Active Army divisions is in progress.

CS_3 is designed to provide, through integrated automation, a computer-supported logistics and personnel system. Each division will control and operate its own computer complex — a division date center (DDC) using the van-mounted IBM 360/30 system.

The DDC consists of two 35-foot vans housing expanded memory and associated mass memory devices. Associated with the DDC is a group of five remote data transceiver terminals. Each brigade will have a transceiver for processing supply transactions. The other two transceivers will be placed in the division's personnel services division and materiel management center.

The concept of CS_3 was identified in combat development studies as early as 1956. In May 1965, the Army approved an implementation plan for the development of the automatic data systems within the Army in the field (ADSAF). ADSAF consists of two other systems besides CS_3: TACFIRE — the tactical fire direction system, and TOS — the tactical operations system.

CS_3 is being developed and project-managed by the US Army Computer Systems Commany (USACSC) at Fort Belvoir, VA. USACSC is responsible for the design, development, test, installation, programming, and system support of the Army's multicommand automatic data processing system.

TANK RANGEFINDERS

Laser rangefinders are being developed for proposed use in the Army's XM-1 battle tank. Prototypes of the XM-1 tank, a mobility test vehicle, a chassis, and a turret for ballistic testing under Army research and development are being build by contractors. Following a competitive evaluation set for mid-1976, the Army is expected to select a single contractor for full engineering development of the tank. The laser rangefinders will be tested as part of the tank fire control system.

In operation, the telescope-like optics of the rangefinder are aimed at a target and the laser is fired. The light beam, traveling at 186,000 miles per second, reflects off the target and back into a receiver telescope. Elapsed time for the laser's round trip is registered and the target's distance automatically computed. This information is displayed as a numerical readout or is fed directly into the tank's fire control system. As a result, the laser rangefinder-equipped tank fires far more quickly and with a much higher first-round hit probability.

Laser rangefinders are also being produced for the Army's M60A2 and M551 Sheridan vehicles. A full-solution laser fire control system for an improved version of the Army's M60A1 tank is also in the works.

Developments

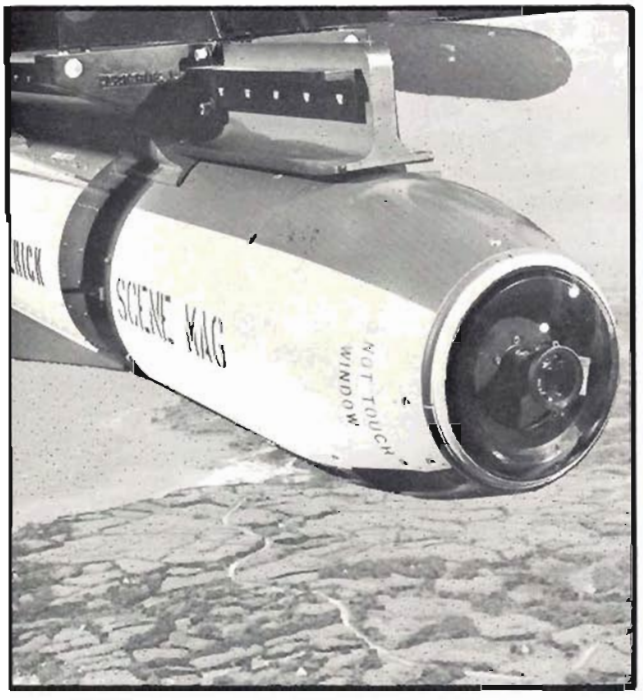
DAY OR NIGHT IR MISSLE SEEKER

A new type of infrared missile seeker that produces a TV-like image on a cockpit viewing screen and enables pilots to find and attack land and sea targets at night has just been developed. The seeker, called imaging infrared, scans a scene somewhat as a TV camera does and produces an image by sensing the small differences in infrared heat radiated by objects in view. Because the seeker does not require light, it produces images as well at night as during daylight. It is also effective through haze. When the seeker is operational, a pilot can locate a target on his cockpit display and lock on the target. After launching the missile or glide bomb, the pilot can leave the area and the weapon will continue toward the target.

Earlier infrared seekers, on missiles such as the Falcon and Sidewinder, did not have the ability to produce a picture but merely sensed the heat from aircraft engine exhaust and homed on the heat source. The new seeker can be used against any ground target that is visible on the pilot's display.

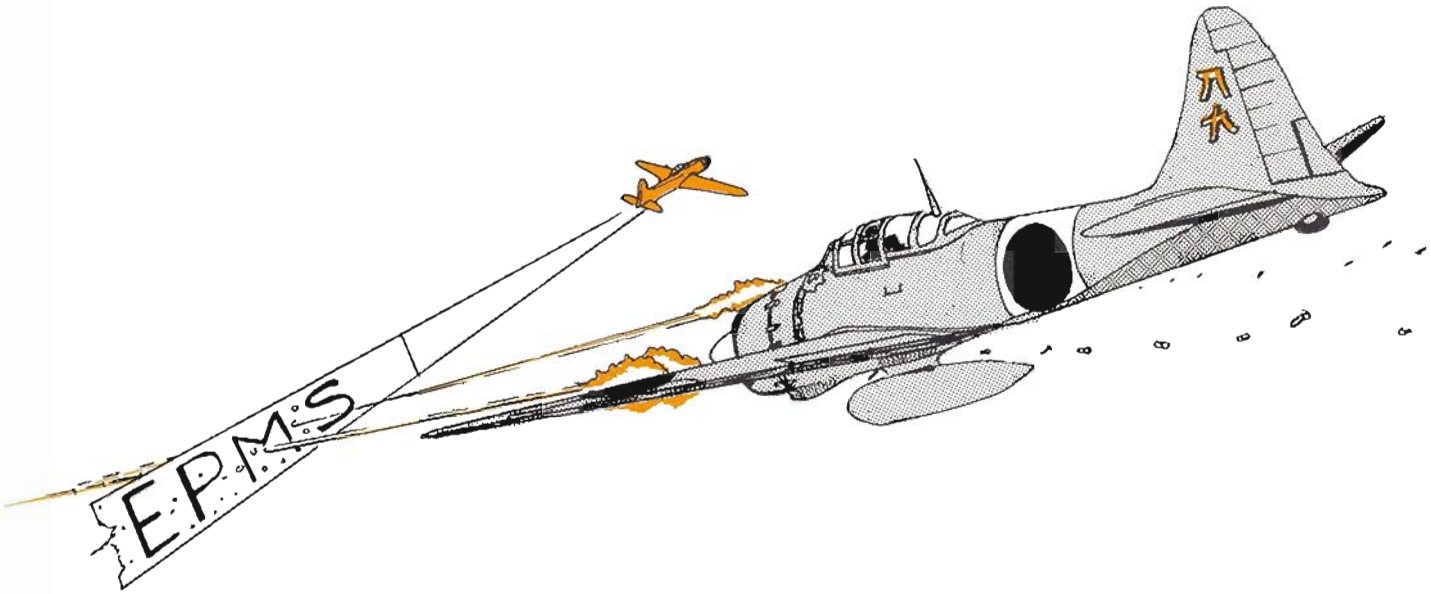
Development is part of a Department of Defense program directed toward providing electro-optic guided weapons with a 24-hour capability.

NEW SIGHT FOR SOAR EYES



A new sight allows this AGM-65B Scene Magnification Maverick missile to spot, lock on, and be launched against a target at greater range than the standard AGM-65A Maverick produced for the US Air Force. Successful captive flight and launch tests of the air-to-ground missiles, with improved optics in the nose-mounted television camera, have prompted the Air Force to convert up to 2,000 Mavericks on order to the "B" configuration. In operation, the aircraft pilot scans a battle area for targets through the missile's television eye, watching on a cockpit monitor. He selects a target, centers the missile's camera on it, launches the missiles, and veers away. The television eye guides the Maverick to impact.

ZERO IN ON EPMS!



You can zero in on EPMS and meet those MOS training requirements head-on. Major changes of EPMS on 1 Oct 75 include consolidation of duties in several MOS of CMF 16. WE CAN HELP YOU IN THESE TRAINING AREAS! The Army Wide Training Support Division of USAADS offers free study material for nonresident courses of instruction to help you get up to speed with EPMS. Correspondence material is now available for:

Skill progression courses for all MOS in CMF 16

Transition training courses for:

- ADA Command and Control System for MOS 16H personnel
- FAAR/TADDS for MOS 16H personnel
- FAAR/TADDS for MOS 16J personnel
- DAR (16J) for FAAR Personnel being transferred to MOS 16J
- Redeye for MOS 16P personnel
- Courses for consolidation of duties at the E7 level for the following paired MOS: 16B-C, 16D-E, 16H-J, and 16P-R

In addition, a TEC lesson on FAAR will be available in October 1975.

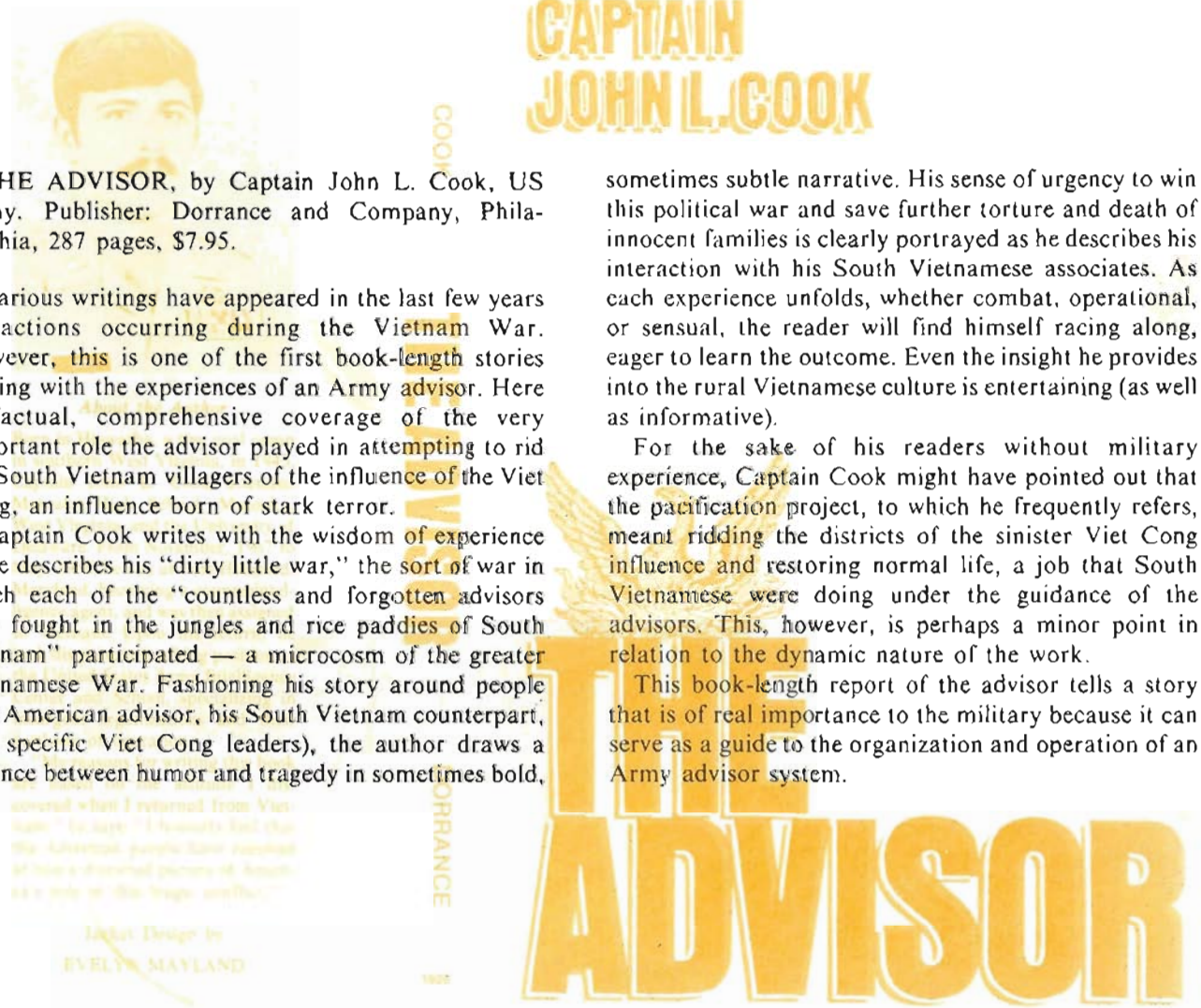
(For additional information about EPMS, see DA Cir 611-41 19 March 1975)

ACT NOW —

1. Complete one copy of DA Form 145, Army Correspondence Course Enrollment Application.
2. Submit completed DA Form 145 to your commander for indorsement.
3. Forward the completed application to:
   Army Wide Training Support Division,
   US Army Air Defense School
   P.O. Box 5330
   Fort Bliss, Texas 79916

Trends

Book Review



THE ADVISOR, by Captain John L. Cook, US Army. Publisher: Dorrance and Company, Philadelphia, 287 pages, $7.95.

Various writings have appeared in the last few years on actions occurring during the Vietnam War. However, this is one of the first book-length stories dealing with the experiences of an Army advisor. Here is factual, comprehensive coverage of the very important role the advisor played in attempting to rid the South Vietnam villagers of the influence of the Viet Cong, an influence born of stark terror.

Captain Cook writes with the wisdom of experience as he describes his "dirty little war," the sort of war in which each of the "countless and forgotten advisors who fought in the jungles and rice paddies of South Vietnam" participated — a microcosm of the greater Vietnamese War. Fashioning his story around people (the American advisor, his South Vietnam counterpart, and specific Viet Cong leaders), the author draws a balance between humor and tragedy in sometimes bold, sometimes subtle narrative. His sense of urgency to win this political war and save further torture and death of innocent families is clearly portrayed as he describes his interaction with his South Vietnamese associates. As each experience unfolds, whether combat, operational, or sensual, the reader will find himself racing along, eager to learn the outcome. Even the insight he provides into the rural Vietnamese culture is entertaining (as well as informative).

For the sake of his readers without military experience, Captain Cook might have pointed out that the pacification project, to which he frequently refers, meant ridding the districts of the sinister Viet Cong influence and restoring normal life, a job that South Vietnamese were doing under the guidance of the advisors. This, however, is perhaps a minor point in relation to the dynamic nature of the work.

This book-length report of the advisor tells a story that is of real importance to the military because it can serve as a guide to the organization and operation of an Army advisor system.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1975—671-592/1

The Editor Comments

In the April-June 1975 issue of Air Defense Trends we talked about the progress of the publication in terms of type of articles and embellishment. Now let's talk about progress of a different nature — progress we want to see unfold. I refer to the fruits of intelligent debate — benefits that derive from differences of opinion. Worthwhile end products are almost always the result of logical argument on the part of several knowledgeable people. Examples range from an operations order to the Constitution of the United States.

Controversial ideas, then, are a dimension of journalism we feel should be a part of the TRENDS makeup. Without this aspect of journalism we are not sowing the essential seeds of progress.

Controversy for controversy's sake is meaningless. Controversy in pursuit of developing sound doctrine, tactics, employment, etc. is the life blood of our branch's progression and development. Your ideas and articles are the expression that triggers this development.

W.E.S.