AIR DEFENSE MAGAZINE

JANUARY - MARCH 1977

AIR DEFENSE MAGAZINE

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

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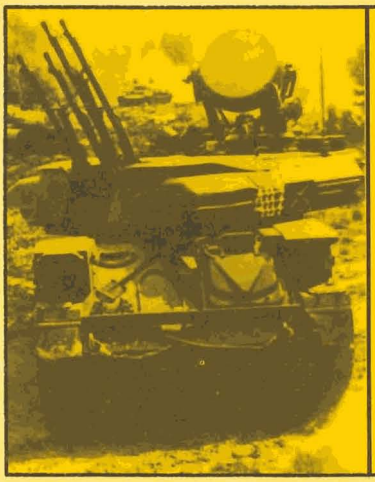
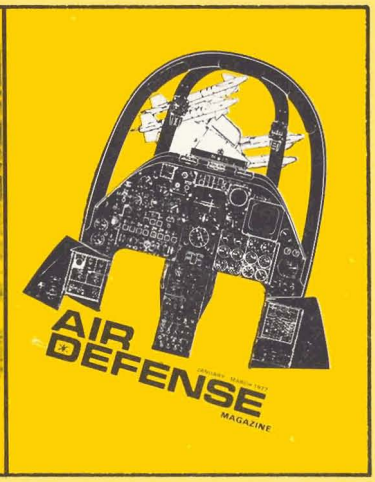
Articles and letters should be addressed to: The Editor, *AIR DEFENSE Magazine*, USAADS Box 5600, Fort Bliss, Texas 79916. Telephone numbers: AUTOVON 978-1801, Commercial 915-568-1801.

Use of funds for printing of this publication has been approved by Headquarters, Department of the Army, 23 December 1975, in accordance with AR 310-1.

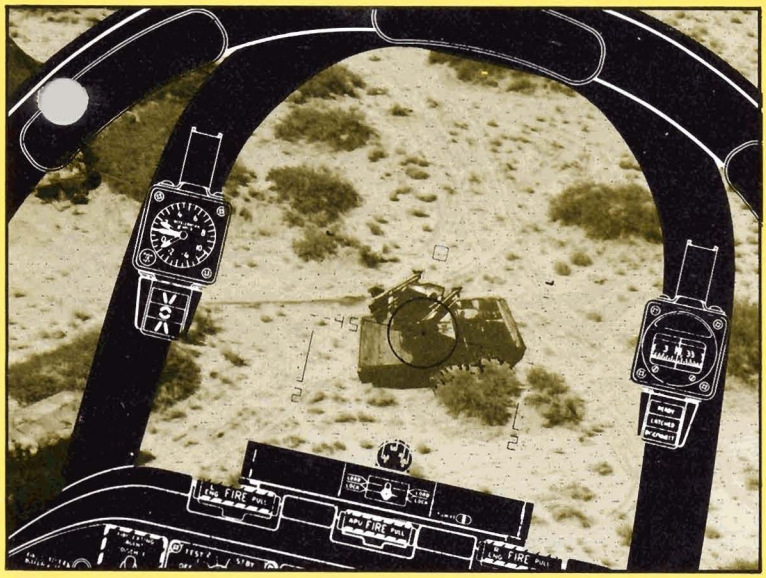
Subscriptions to ***AIR DEFENSE Magazine*** may be obtained through the US Army Air Defense Artillery Museum Historical Association, ATTN: ATZC-DPT-ADAMU, Fort Bliss, Texas 79916. The rate is $4.00 per year.

Controlled Circulation postage paid at El Paso, TX.





ABOUT THE COVERS: The front cover symbolizes an attacking fighter pilot's view of the Chaparral system and accents the lead article, "Target Chaparral," beginning on page 6. The back cover shows Soviet air defense accompanying an armored task force and corresponds to the Soviet article, "Combat Formations in the Offensive Battle," beginning on page 19.



TARGET: Chaparral!! 6

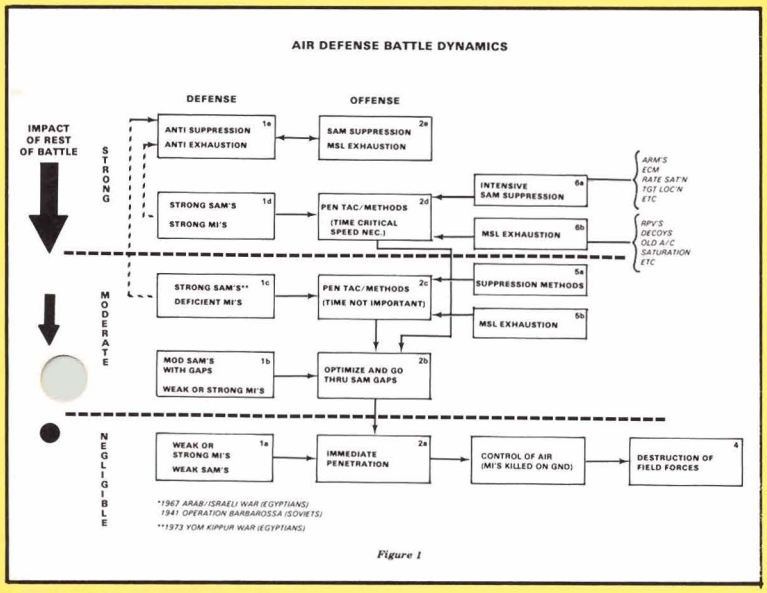
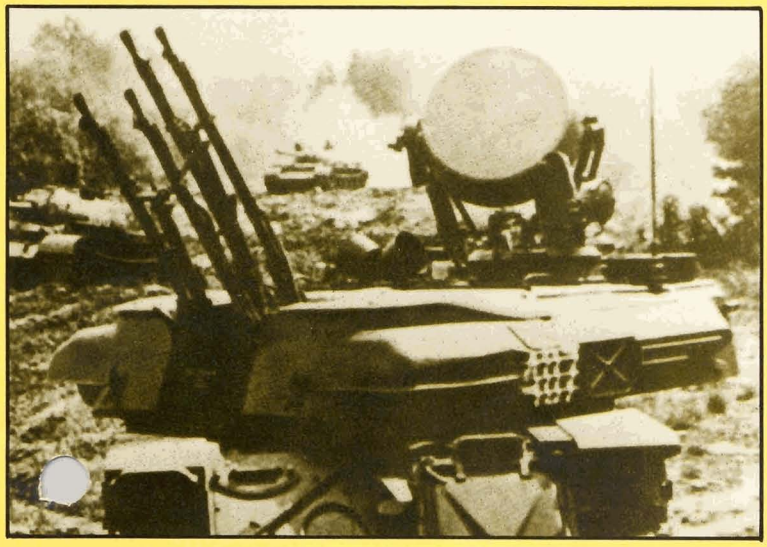


Figure 1

BATTLE DYNAMICS 12



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ENGAGEMENT ZONE

letters to the editor

AIR DEFENSE MAGAZINE POSTERS

Dear Sir:

In reviewing your magazine, this organization was very impressed with the excellent posters of the Soviet air defense weapons and the Soviet and Warsaw Pact forward area aircraft. Request that five copies of each poster be furnished to the S3 Officer, The Basic School, Marine Corps Development and Education Command, Quantico, VA 21134, for use as student training aids.

All newly commissioned officers in the US Marine Corps attend the 21-week Basic Course here, which includes instruction in Aviation and Air Defense. These posters will be a valuable addition to our instructional package and your contribution in enhancing our training will be most appreciated.

W.H.I. Moos
S3 Office
Marine Corps Development and Education Command

Dear Sir:

On a recent visit to the Royal School of Artillery I was shown a copy of your excellent display posters, Soviet Air Defense Weapons, taken from Air Defense Trends and Soviet Warsaw Pact Forward Area Aircraft, taken from AIR DEFENSE Magazine.

Since my job on board HMS ARK ROYAL entails the briefing of aircrew and furnishing them with information on current equipment and trends in the Air Defense world, I believe both these posters would be of great value to me.

I know that you have had a large number of approaches of this sort, but if you were able to furnish me with three copies of each I would be extremely grateful.

CPT J.P.M. Brown
Royal Artillery
HMS Ark Royal
London, England

Dear Sir:

In that Soviet produced air defense weapons and Soviet aircraft are of vital interest to USAF OV-10 Forward Air Controllers (FACS) operating in Korea, I would greatly appreciate 4 copies of your posters "Soviet Air Defense Weapons" and "Soviet and Warsaw Pact Forward Area Aircraft." These excellent posters will be used as training aids at the 19th Tactical Air Support Squadron at Osan Air Base, Korea and at our three forward operating locations with US Army units in Korea.

JEFFREY M. HAGE
CPT USAF
Chief of Intelligence

In anticipation of the many requests for the "Soviet Air Defense Weapons" and "Soviet and Warsaw Pact Forward Area Aircraft" posters, the AIR DEFENSE Magazine staff has stocked ample copies of both to satisfy the demand. Requests for extra copies of the posters should be submitted to:

Editor
AIR DEFENSE Magazine
USAADS Box 5600
Fort Bliss, TX 79916

NEW COMBINED ARMS SYMBOL

Dear Sir:

Reference CPT Sission's views on the need for "a new combined arms team symbol," which appears on page 6 of the July-September 1976 edition of AIR DEFENSE.

Agree that a requirement does exist for such a symbol. I believe, however, that the object now should be to choose a sign that best describes all elements necessary to win each battle on the modern battlefield. Certainly, the combat arms are

important to this end; nonetheless, they must be backed by adequate and effective combat service support. Therefore, propose that the triangle be retained but that it be redefined to show the components essential for success on tomorrow's battlefield, namely, maneuver forces, combat support, and combat service support. In this regard, each side of the triangle should be so identified.

BEN L. WALTON
Colonel, FA
Commanding
24th Inf Div Arty

CONSOLIDATION OF REDEYE?

Dear Sir:

The 172d Infantry Brigade (Alaska) is currently considering the consolidation of its five organic Redeye sections into one unit to further standardize Redeye training and simplify the administration of ADA personnel. I understand that similar Redeye reorganizations have been carried out in other units specifically the 3d Battalion (Vulcan/Redeye) 4th ADA, 82d Airborne Division.

As the Brigade Redeye Officer, I am soliciting advice, assistance, and appropriate recommendations from your readers concerning ways to accomplish this task in a light infantry brigade.

STEPHEN D. ABERNATHY
1Lt, ADA
172d Inf Bde (AK)
ATTN: AFZT-LT
APO Seattle 98749

Responses to LT Abernathy's request should be mailed directly to him at the above address.

— Ed.

QUESTIONS LESSON PLAN

Dear Sir:

The October-December 1976 issue of your magazine has reached the office where I work. This is the first time I have seen the magazine, and I appreciate the opportunity to stay in touch with AD matters in this manner. As a member of the 100th Division MTC, I also find it useful and informative.

Some years ago I edited a small professional journal and can't stop looking at any publication without checking it out from an editor's viewpoint.

It is regrettable that the lesson plan on page 17 does not conform to the concept of FM 21-6. The objectives are not in accordance with the basic doctrine in their concept. Neither the tasks, conditions, nor standards meet the criteria established in the FM. USAADS has long been in the forefront of training development. I remember very well some programed texts done by the School that were excellent, and this particular page is retrogression. I realize that the writer of the article turned in his material, it was read and edited, and probably no one really took a close look at the lesson plan. But it is inaccurate and, since it is published in ADM, many folks will accept it as gospel. The writer apparently is not familiar with the present concept of lesson plans and training objectives.

Otherwise, good show, and keep working. I particularly enjoyed the article on pages 22-23. The "View From the Field" item on pages 30-31 is a good feature that should be encouraged and continued. Let the working folks tell how it is. Also, "What Do You Do Now, Lieutenant?" is a good feature that should be continued.

JOHN R. GRAHAM
COL. INF, USAR

AIR DEFENSE IN OCS

Dear Sir:

I have just read with great interest the story "Principles and Practices of Leadership," by General George V. Underwood, Jr. (US Army Ret) in the July-September 1976 issue of AIR DEFENSE Magazine.

I am wondering if it would be possible to receive 10 copies of that issue for distribution to the North Dakota Military Academy OCS Class #20 as a training aid for leadership classes.

From time to time these articles have been very helpful in training situations and particuarly in our OCS program.

Thank you for your assistance in this matter.

DUANE A. DEHNE
LTC, CE, NDARNG
OCS Commandant

Your ten copies have been sent. We're glad to hear that AIR DEFENSE will be helpful in your OCS program!

— Ed.

INTERCEPT P

MAJOR GENERAL ROBERT J. LUNN

In this issue, I am going to discuss the ARTEP. The ARTEP was designed to measure the ability of a unit to perform its mission and to help the unit evaluate its training needs. In explaining the ARTEP, let me begin with some overview statements of the program. An ARTEP:

Applies equally to Active Army and Reserve units.

Evaluates the efficiency and effectiveness of past training of all echelons of the unit.

Provides an assessment that may be used to plan future training.

Evaluates the ability of our ADA units to function as part of a combined arms team.

The training involves actual performance by members of the unit as opposed to writing, telling, or watching training films.

The unit missions included in the program are the same as those that would be required on the battlefield. Mission analysis determines the basic tasks your unit must perform. Tactical conditions are imposed on these tasks and training standards are set forth for units to "measure up to." These standards are the minimum requirements you are expected to achieve.

Here, briefly, are the characteristics of ARTEPs.

- Emphasis is on your unit's basic, most often performed missions and tasks.
- Your unit is judged on how well it performs its missions, not on things that are "show" and not really necessary.
- Simultaneous training and evaluation from squad through battery level are encouraged.
- Unit tasks are arranged from the simple to the more difficult. This provides a guide that can be used to set training and evaluation priorities.

Training Under ARTEP.

To conduct effective training, leaders must have answers to a number of questions. Among these are: What should the unit be able to do? What can it do now? And what can it do to improve?

The ARTEP helps in arriving at answers to these questions. It has performance-oriented training objectives that help our leaders answer the first question. Knowing what the unit must be able to do, leaders can achieve effective training by adhering to the following pattern.

- Determine which of the ARTEP tasks their units can presently perform. To accomplish this, they conduct an informal evaluation of the unit as it performs an assigned task. The ARTEP specifies the

primary training/evaluation standards required for each task and can help pinpoint strengths and weaknesses in the training of the unit.

• Determine which of the ARTEP tasks requires more training by their unit. ARTEPs specify the tasks to be performed, the conditions under which the tasks are to be performed, and the standards of acceptable performance. In addition, the suggested support requirements section of the ARTEP provides guidance for estimating required training resources (e.g., key references, maneuver areas, etc.).

• Prepare and conduct the training necessary to bridge any gap between desired and current capabilities.

Evaluation Under ARTEP.

The evaluation plan is formed by selecting and organizing the ARTEP's training and evaluation outlines into a test sequence. The development process should be guided by the provisions of the unit's tactical SOP and the resources (time, ammunition, evaluators, etc.) required to conduct an evaluation. The outlines used in evaluation should be the same as those used in training so that, when being evaluated, units will not be confused by facing something that is unfamiliar to them.

Air Defense ARTEPs.

Five Air Defense Artillery ARTEPs involving Improved Hawk and Chaparral/Vulcan have been developed and released to the field. Under development for future release are ARTEPs for Air Defense Artillery Brigade/Group, Air Defense Artillery Battalion Nike Hercules, and Air Defense Artillery Battalion Roland.

To summarize briefly, the ARTEP is a program that provides a pattern for training and evaluating all elements of a unit from the lowest echelon (squad/section) to battalion. It is a complete package that should help commanders in evaluating their units, developing training programs, and training to overcome the weaknesses discovered in the evaluation.

The challenge to commanders is to maintain a high state of proficiency in their units and to use the ARTEP "road map" as a guide toward successful mission accomplishment.

Robert J. Lunin

TARGET:

Background

During the period 16-29 February 1976, air defense units from Fort Bliss, Texas, working in conjunction with the US Air Force, conducted a test called "Concept Evaluation Test of Chaparral Air Defense Systems." Units and representatives from Fort Bliss participating in the exercise included the 1st Bn (C/V) 55th ADA, the US Army Air Defense Board, and the Tactics Department of the US Army Air Defense School (USAADS).

The purpose of the test was to evaluate current doctrine and tactics of the Improved Chaparral (MIM-72C) in a special targeting environment. At present, the Air Force has modified aircraft that more closely resemble the primary threat aircraft opposing Chaparral than standard US aircraft. These modified aircraft were made available for test purposes to give the Air Defense Board an opportunity to determine realistic acquisition and detection ranges for Chaparral. This information was then provided to USAADS so the validity of current doctrine, tactics, and training could be assessed.

The MIM-72C Chaparral missile was used for the test because, as the newest version of Chaparral, it has a forward quadrisphere engagement capability, increased effectiveness, and increased lethality. The MIM-72C Chaparral has been used on previous tests, is currently in production, and is expected to be delivered to the field in the near future.

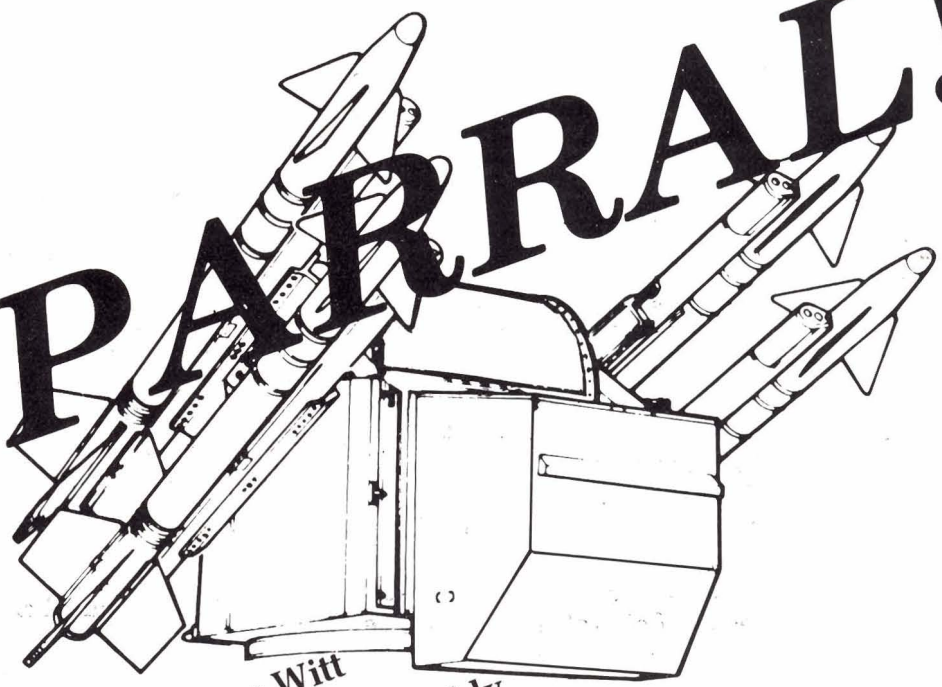
Objectives

The overall objective of the test centered on gathering data on the modified aircraft (known as the primary vehicle), then comparing these data with previous tests (DT/OT) which involved only full-size US aircraft. The primary vehicle exhibits many of the characteristics of the threat aircraft such as smaller size (compared to US aircraft), smokeless engine exhaust, and silhouette design. Specific objectives were:

- To collect engagement data on the MIM-72C Chaparral (with FAAR early warning) against the primary vehicle for comparison with known previous development test/operational test (DT/OT) engagement data.
- To measure the effectiveness (intercept) envelope of the MIM-72C Chaparral against the primary vehicle.
- To determine if the early warning by FAAR provides significant improvement to the MIM-72C Chaparral's effectiveness against the primary vehicle.

To collect data to support an evaluation of current doctrine, tactics, training, and squad table of organization and equipment (TOE).

CHAPARRAL!!



Captain Christoper Witt
and
Captain David L. Priddy

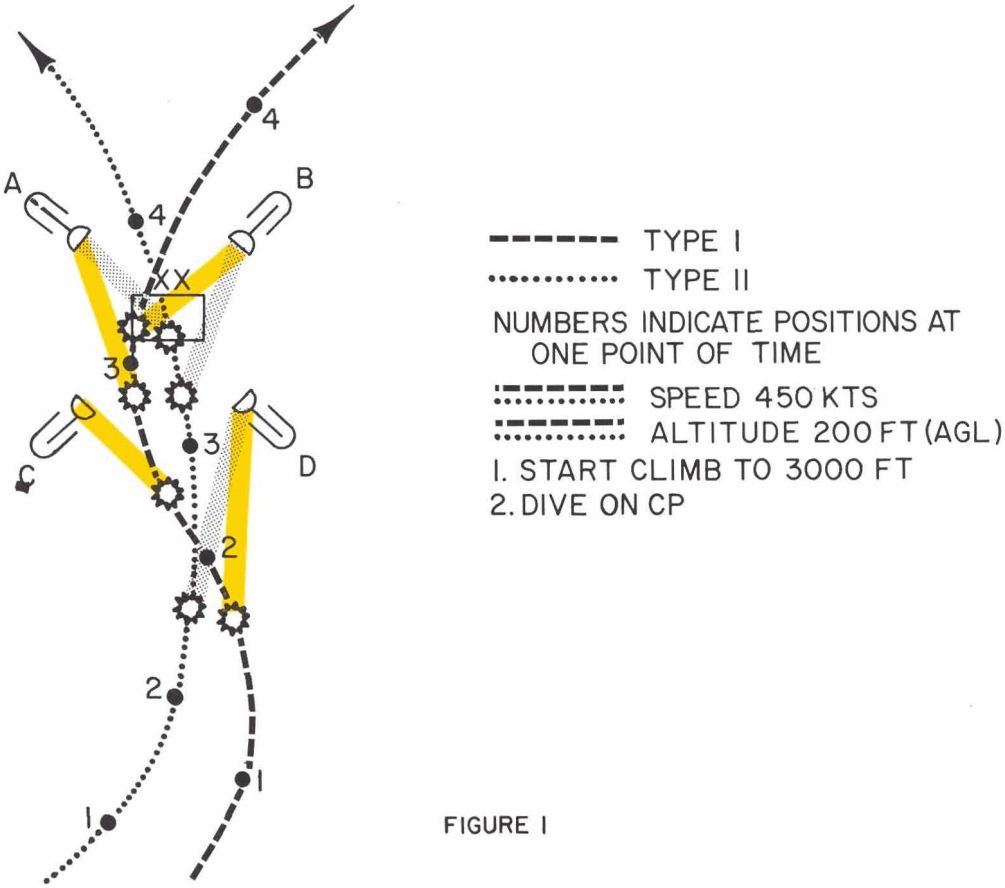


FIGURE I

Data Collection

The four fire units were deployed in a balanced-type defense of a simulated division main command post. An evaluator was stationed with each fire unit. As a crew event occurred, the evaluator recorded it via a telemetry link with a data collection van. This provided a slant range from the fire unit to the target for each event. The crew events were as follows:

Event	Definition
Crew Alert	Chaparral crew alerted that targets are approaching, provided by FAAR or AADCP.
Crew Detect	Visual detection of the target by crew member.
Gunner Detect	Visual detection of the target by the gunner.
Gunner Track	Gunner tracking the target.
Missile Lock-On	Missile tone generated by the guidance section tracking target.
Recognition	Visual determination by the squad leader if aircraft is friend or foe.
Fire	Simulated missile launch.

Crew events of all fire units were recorded on the target positions for a series of level flights at various lateral offsets, altitudes, and speeds. A complete series of the foregoing data was taken with FAAR alert and no FAAR alert. A total of 70 passes was recorded.

Prior to the test, the Air Force pilots were briefed by a representative of the Tactics Department of the Air Defense School on the capabilities of the MIM-72C Chaparral missile system. The pilots who were to fly the actual air missions were requested by the Air Defense personnel to adhere as nearly as possible to representative attack profiles that they might use in a combat situation when attempting to destroy a critical asset. Four different combat maneuvers were flown against the Chaparrals.

1st Combat Maneuver and Chaparral Crew Reaction (Fig. 1)

Two aircraft attacked the target from the same direction at an altitude of 200 feet above ground level (AGL). The lead aircraft suddenly climbed to 3,000 feet and dived toward the critical asset. The trailing aircraft maintained a 200-foot altitude and attacked the target. The separation distance between the aircraft was approximately 1.6km; the speed was 450 knots indicated air speed (IAS) for both.

The Chaparral crew members detected, tracked, and engaged the lead aircraft. The trail aircraft, maintaining a 200-foot altitude, was not detected by all of the fire units until it was too late to react.

2d Combat Maneuver and Chaparral Crew Reaction (Fig. 2)

Three aircraft attacked the target from three different directions at an altitude of 200 feet AGL.

The observation was made that when the closest aircraft to the asset was detected, crews from all four Chaparral squads reacted by looking in that direction and thereby decreased their ability to see the other two aircraft coming from two different directions.

3d Combat Maneuver and Chaparral Crew Reaction (Fig. 3)

Three aircraft attacked the critical asset from the same general direction but at varying altitudes and speeds.

Again, the experience was that all of the Chaparral crews concentrated on the first aircraft that was detected, then they shifted over to the other aircraft after they had completed engagement of the first. They did not protect their primary target lines.

4th Combat Maneuver and Chaparral Crew Reaction (Fig. 4)

Two aircraft attacked from the same direction at 500 knots. One of the aircraft was at an altitude of 3,000 feet and the other at 200 feet. A third aircraft attacked from a different direction at 600 knots and an altitude of 500 feet. When the aircraft at 3,000 feet approached within 2 kilometers of the target area, it began a dive maneuver. The Chaparral crews focused their attention on the highest aircraft and were surprised by the others.

Test Results and Recommendations

All test objectives were met satisfactorily. The specific ranges from the crews to the aircraft for each flight profile are classified but a general indication of Chaparral's performance follows:

Objective 1. The engagement data from the Concept Evaluation Test (CET) were compared with the previous DT/OT data. Both crews were alerted at approximately the same range. The ability of the squad leaders to recognize an aircraft accurately was less in the CET. Overall, the CET crews did not visually detect the aircraft at the ranges achieved during the DT/OT, but they reacted faster and engaged the target at greater ranges.

Objective 2. Chaparral's effectiveness envelope with the MIM-72C missile is much greater than with the presently fielded MIM-72A and B versions. The crews did experience some instances of gunner error as a result of simulated launches either within or beyond the missile's kinematic launch boundaries.

Objective 3. The FAAR early warning provided the crews with enough information to allow them to detect the aircraft visually at greater ranges than did the AADCP warning (3 percent for crew detect and 5 percent for gunner detect).

Objective 4. To evaluate current doctrine, tactics, training, and squad TOE, the test team recorded these comments by the crews:

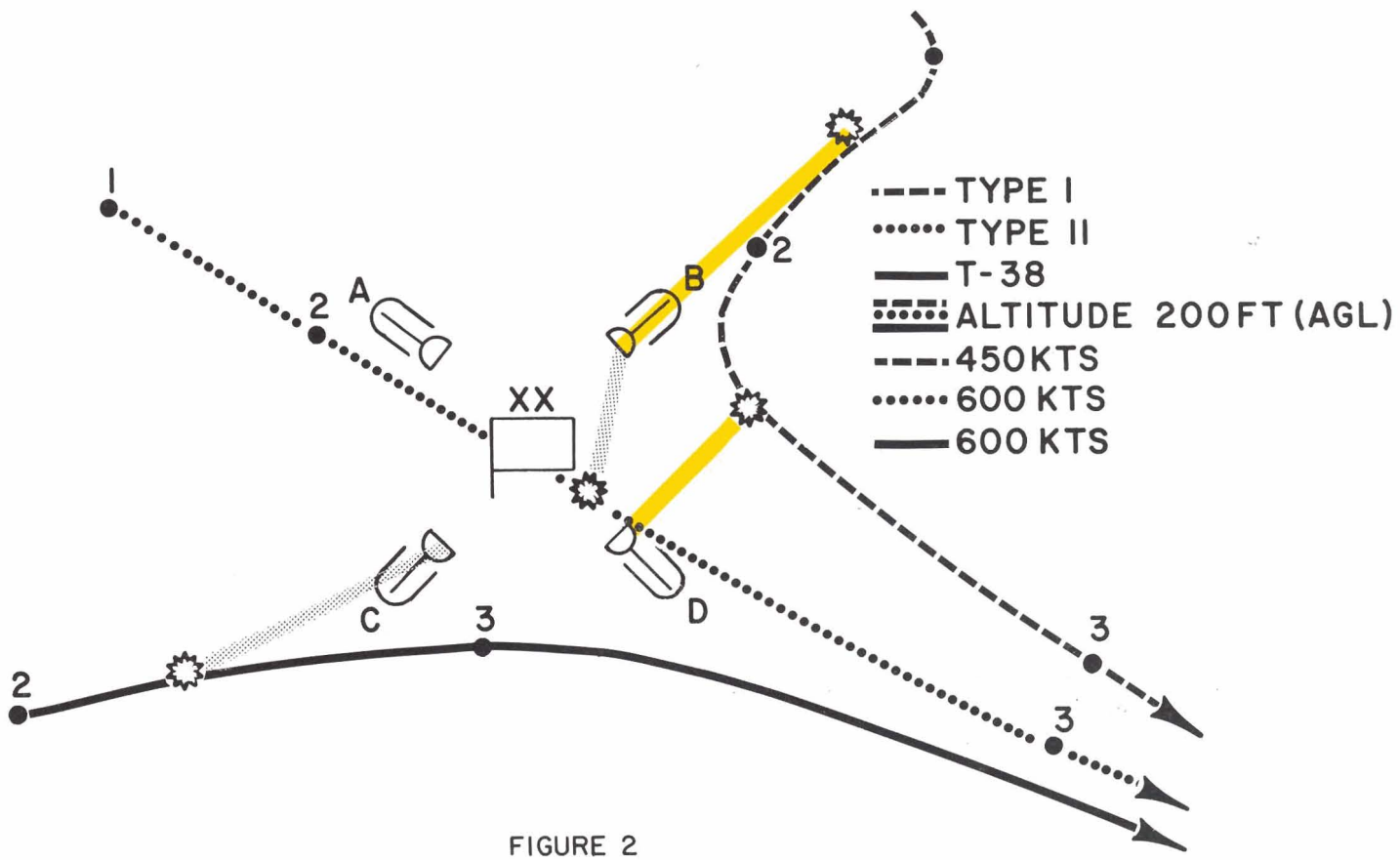


FIGURE 2

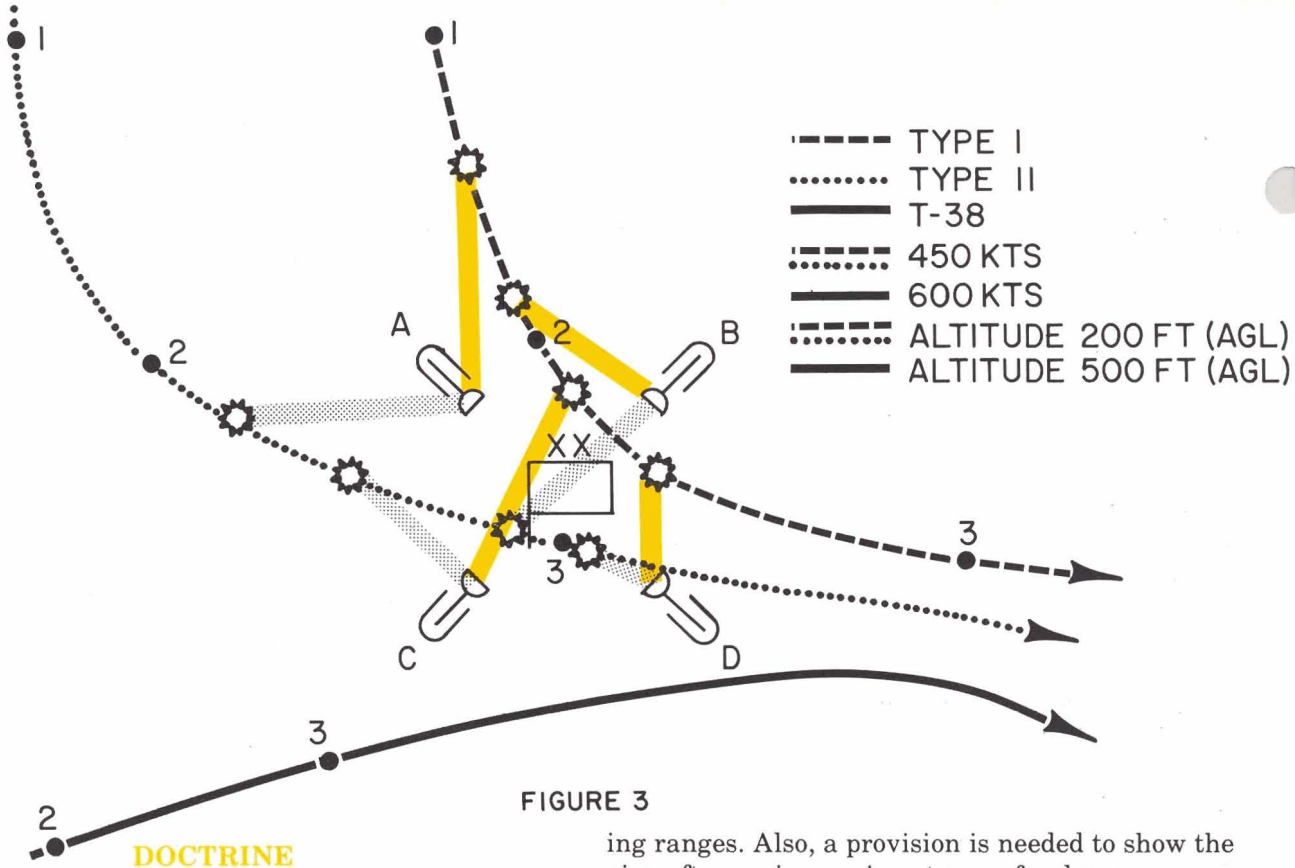


FIGURE 3

DOCTRINE

• Add range estimation and target heading to the engagement communications procedure. This allows crew members who haven't sighted the target visually to react faster in detecting it.

• Modify the term "multiple target" so the crews can differentiate between multiple aircraft in one formation and single or multiple aircraft in different formations.

• Each OP should be authorized to identify the target. This would allow the crews to engage the target sooner if the squad leader has difficulty in sighting the target visually, while the gunner is already tracking and receiving tone.

TACTICS

• Deploy both OPs out to .4km forward of the fire unit and .4km from each other in the direction of the primary target line when the fire units are deployed in a balanced defense. This would allow both OPs to be positioned strategically forward of the fire unit and reduces the possibility of the squad command post's view of the primary target line being obstructed by the fire unit.

TRAINING

• Improve ground observer aircraft recognition (GOAR) kit. Instead of using slides displaying front, side, and bottom views of aircraft at close range, provide slides showing various aspect views at varying ranges. Also, a provision is needed to show the aircraft carrying various types of ordnance.

• Place more emphasis on crew drills and maintenance. More time should be spent in engagement procedure training and on extended combat day scenarios that require more use of the equipment. As a result of the test conditions, the crews had little time for maintenance and found that they needed to develop a combat maintenance schedule.

SQUAD TABLE OF ORGANIZATION AND EQUIPMENT

• Adequate number of personnel. A five-man crew was adequate for Chaparral.

• Gunner needs a magnification device to aid in visual detection of the targets. The gunners experienced internal glare and a slight distortion of the target due to the canopy. They felt that they could visually detect the target at greater ranges if a magnified sight or monocular was used to filter out the distractions.

• Squad intercom needs to be replaced with a wireless system, preferably FM. This would significantly decrease the squad march order and emplacement times, particularly after each combat engagement.

LESSONS LEARNED

Following the exercise, the Tactics adviser from the Air Defense School made the following observation and training recommendations:

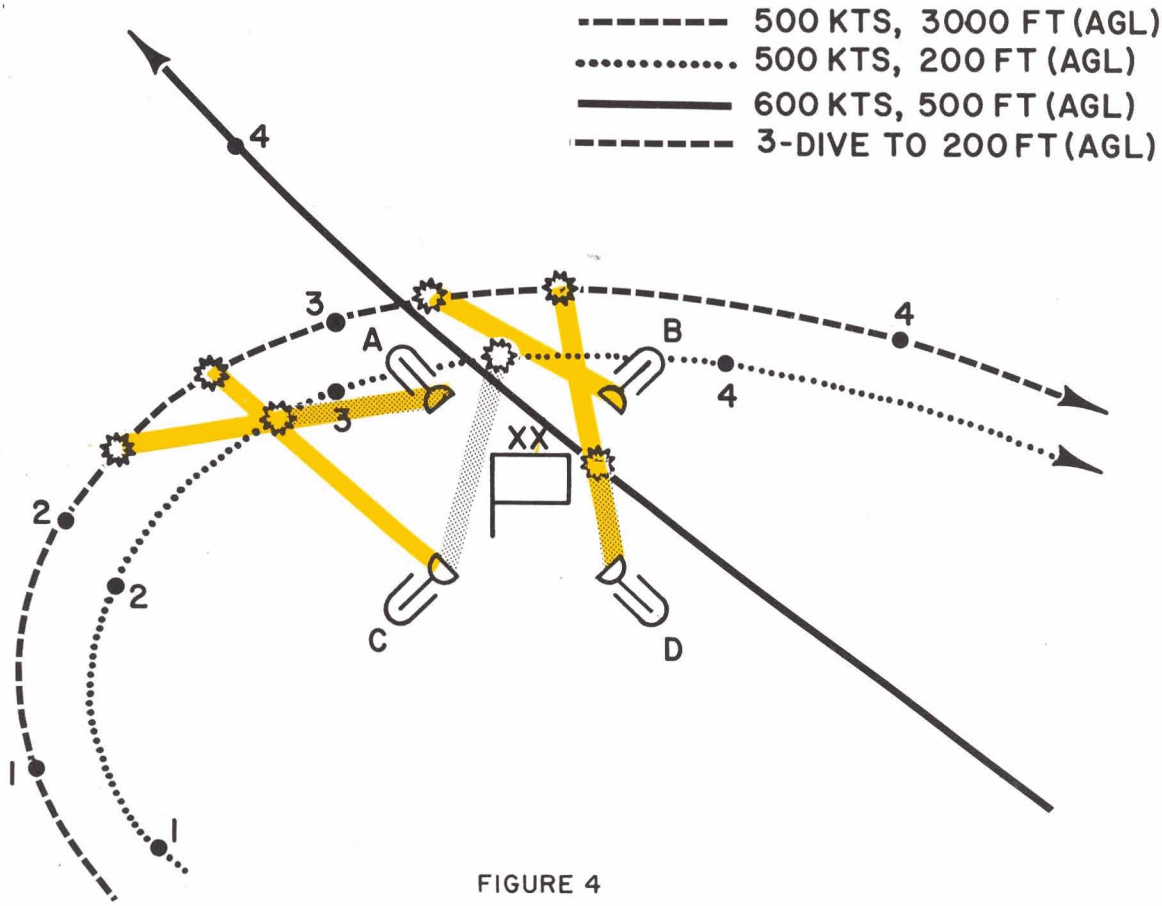


FIGURE 4

• C/V units are strongly advised to coordinate with Air Force representatives, particularly with the pilots who are to fly the actual combat maneuver missions, prior to conducting their field training, ARTEP's, etc. At this coordination meeting, the Air Defense representative should request specific realistic combat maneuvers and tactics to be flown against the C/V fire units protecting a critical asset.

• It is most important that the C/V crew members and leaders actually see and experience tactics representative of what a threat aircraft could possibly use in attacking a critical asset.

• C/V crews must be trained to observe 360° constantly to decrease the possibility that an aircraft will surprise them from any direction.

• FAAR operators should be trained to give additional information as to possible raid size to C/V squad leaders via the FM one-way voice communications.

• Pilots flying straight and level courses during training exercises *do not* present air defenders with a realistic or challenging air target.

• The Concept Evaluation Test of the Chaparral weapon system surfaced problem areas that can also be equated to the Vulcan and Redeye weapon systems.

Implementation of the lessons learned and correction of the deficiencies observed during the Chaparral concept evaluation test will increase the lethality of our air defenses and provide more effective coverage for our field forces.

Captain Witt is a graduate of the Citadel and holds a Master's degree in Education from Sul Ross State University. He has served as a Vulcan platoon leader, Vulcan battery commander, and division airspace management element air defense officer in three divisional Chaparral/Vulcan battalions and as an operations officer in a security company in Vietnam. He has just completed duty as a senior instructor in the Air Defense Tactics Branch, Tactics Department, US Army Air Defense School. Captain Witt is now assigned to 2d Battalion 71st ADA.

Captain Priddy was commissioned in Ordnance after attending OCS at Aberdeen Proving Ground, Maryland. He has completed the ordnance Missile Maintenance Course. He has served as Army liaison officer at the Navy Weapons Center, China Lake, California; Army coordinator with the Navy in R&D work with Chaparral; senior adviser and acting district senior adviser in Vietnam; and test project officer for Chaparral with the US Army Air Defense Board. He is presently pursuing a degree in Management with Park College, Fort Bliss Residence Center.

AIR DEFENSE BATTLE DYNA

The views expressed in this article are those of the author and do not purport to reflect the views of the US Army Air Defense School or Department of the Army.

A number of major studies addressing the critical variables in the theater air defense battle have been made by the United States, and, at this writing, several additional studies are in process, yet the ink is hardly dry on each new study before it begins to be seriously challenged. Then, in response to the "new" issues raised, the usual procedure is to perform yet another study. But we still have insufficient knowledge of the probable performance of an overall theater air defense of a given type when subjected to massive, theater-wide attack, optimized against those defense characteristics that are weak, sluggish, or exploitable.

It is the purpose of this article to size the major dynamic variables of the theater air defense battle, present a schematic framework for the theater-level struggle between offense and defense, and present a simple analogy which, when coupled with the schematic for battle dynamics, gives one a more incisive insight into the air defense battle.

First let us size the problem. Table I lists five major variables of the theater air defense battle. It also gives some of the typical elements of each major variable that lead to its variation. For each major variable, the minimum number of cases required to adequately examine its effect in an overall manner is estimated and this value listed. This number, therefore, represents the value of one dimension of a five-dimensional matrix representing the dynamic variation of the theater air defense battle. It is accented that each value listed in the rightmost column represents the *minimum* estimate for the number of variations of that major parameter required to adequately describe the overall dynamics of the situation. Additional values could easily be listed to provide finer grained detail, but here we are interested only in the minimum number necessary to represent the problem.

Using the matrix dimensions listed, a minimum matrix to adequately describe the overall theater air defense battle contains 10,125 separate cases. In one major air defense study, perhaps 100 major machine runs may be made. In that case, only about 1 percent of the air defense battle dynamics matrix is examined. Further, there is usually little or no systematic effort made to insure that the cases examined actually bracket the problem. Until we plough through the battle matrix (or at least a very substantial portion of it) in our analyses, our studies simply do not represent the real battle situation, and it in fact may be dangerous to rely too heavily on these studies for confidence in our force levels and the outcome of the struggle in the European theater. At this point, a simple tool to see into the battle dynamics would seem quite useful.

But before we develop such a tool, we must first

MICS:

Key to Insight

LIEUTENANT COLONEL THOMAS E. BEARDEN (RET)

develop a simple analogy. To begin, air defense can be roughly compared to a football team. Since the ground-based surface-to-air (GSA) defenses are the first point of contact for the attacking air forces, then these GSA defenses are analogous to the football line. Since most of the manned interceptors must be scrambled to get into the action, they constitute the secondary point of contact for the attacking force and are thus analogous to the football backs. Though simple, the use of this football analogy can be effective. For example, why should not one simply trade off some of the missile defenses — say the LORAD's — for more interceptors? Translated to the football analogy, one has suggested trading off the line for more backs. In that case, the opposing team simply ploughs immediately into the backfield before the backs can get into position and motion and clobbers the ball carrier. One cannot win football games with such a foolish strategy, and neither can one win air defense battles with it. Without the LORAD's, the enemy aircraft will simply overfly the SHORAD's and guns and catch most of the interceptors on the ground. If one severely reduces or eliminates *any essential element* of the GSA defense, the same outcome results.

On the other hand, why should not one trade off the manned interceptors for more missile defenses — say LORAD's? Translated to football, one has suggested eliminating the backs, and using a strong line only. Even with a strong line, the opponent will mass and maneuver to blast his way through and open a hole in the line. Then he will commit an exploitation force through the hole and exploit the penetration, again clobbering the ball carrier, since there are now no backs to oppose the penetrators and break up his exploitation. Similarly, in air defense the attacker will eventually succeed in suppressing or destroying the SAM's in his main attack corridors. At that point, the SAM's are helpless to seal the gaps in sufficient time to prevent the penetration of the exploitation force, which will immediately pour through the open corridors in the SAM defense. Without interceptors to attack and nullify these exploitation forces, the attack will succeed in reaching and destroying vital targets all across the theater. Many other such questions can be immediately answered by first translating the question into the football analogy, but the two examples given suffice to show the worth of this method of reasoning.

Let us now develop the overall theater air defense battle. Figure 1 is an overall qualitative schematic of the air defense battle dynamics that is valid for the European theater. The assumptions of this diagram are: (1) two large modern armies oppose each other, (2) the attacker intends to win as swiftly and efficiently as possible, (3) a coordinated, combined air and ground operation is planned for the attack, (4) terrain is generally suitable for blitzkreig warfare, (5) the situation is nonnuclear, at least at the beginning, (6) the attacker believes that a sufficiently swift, decisive win in a nonnuclear strike may result in a

TABLE 1. AIR DEFENSE BATTLE MATRIX

MATRIX ELEMENT	MAJOR VARIABLE	TYPICAL ELEMENTS POSSIBLE	MINIMUM ESTIMATED SIZE
A_1	Strategic Situation	(1) Little or no warning (2) Extensive warning (weeks, months) (3) Days (Red optimizes attack against Blue buildup)	3
A_2	Air Offense	(1) Number of waves (2) Composition/loading (3) Targeting (4) Scheme of attack (a) equal left/right (b) main left, supporting right (c) main right, supporting left (d) end run left (e) end run right (5) Altitude (a) low (b) medium (c) high (d) combination (6) Tactics (7) Penetration aids/means	15
A_3	Air Defense	(1) Deployment (a) belt plus points (b) area (c) points (d) spectrum siting (complex of complementary weapons at each site) (e) elemental siting (a single weapon system at each site) (f) c^3 systems (2) Employment (a) mobility (b) tactics (c) special features (ambush systems, decoys, dummy sites, etc.) (3) Composition (4) Weapon system performances (5) Defense performance (thresholds) etc.	15
A_4	Natural Environment	(1) day/night (2) visibility (3) hot/cold (4) wet/dry (5) terrain etc.	5
A_5	Ground battle impact on air defense battle	(1) negligible (2) moderate (3) strong	3
Totals 5	**5**	**Many within each**	**10,125**

negotiated withdrawal of the remnant of the defense forces to prevent nuclear holocaust.

On the schematic, the left column of blocks characterizes the defense. Three SAM cases — weak, moderate, and strong — and two manned interceptor cases—weak and strong—are incorporated. The middle column of blocks characterizes the offense. The offensive action required to succeed is optimized at each level against the level of air defense effectiveness shown adjacent to it at the left.

The vertical words, *negligible*, *moderate*, and *strong*, at the left serve a dual purpose. Each characterizes the defensive situation at that level. Each also refers to the degree of impact of the ground battle on the air defense battle, in which case it is summarized by the leftmost symbol as zero, small degradation, or larger degradation.

To proceed through the schematic, let us start with blocks 1a and 2a. If the GSA defense is weak, as shown in block 1a, it can be immediately penetrated because it has serious gaps and deficiencies by definition. Accordingly, the offense will immediately penetrate (block 2a) and go directly into the exploitation. This will result in destruction of most of the interceptors on the ground and immediate seizure of control of the air (block 3). The air superiority struggle has been lost by the defense at this point, and this may occur catastrophically in as short a time as 2 or 3 hours. With the seizure of air superiority, the methodical destruction of critical theater targets and theater forces follows shortly (block 4). This may occur in as short a period as 3 to 6 days under combined air and ground attack. Note that if the defense is characterized by weak GSA defenses (block 1a), it is of little consequence whether the defense has a good interceptor force or a weak one. Also note that strategic reinforcement (buildup) is not possible under such conditions, and any attempt to insert additional forces and material behind weak SAM forces is simply a prelude to greater disaster. In fact, the first insertion task must be to put in sufficient SAM's and guns to provide a strong SAM defense. Only then can insertion of other forces and materiel be safely accomplished. Block 1a

characterizes exactly two classic cases of air attack versus air defense: the 1941 German attack against the Soviets (Operation Barbarossa) and the 1967 Arab-Israeli War. In addition, the Japanese attack against Pearl Harbor generally fits this block.

Next we raise the level of defense to moderate SAM's (block 1b), that is, the GSA SAM's and guns are now better and more numerous, but by definition there are still some gaps and shortcomings that can be exploited by the attacker. Again, it makes little difference whether the interceptor force is strong or weak; the attacker can simply optimize against the SAM's and quickly penetrate, with the same results as before. His required action is to optimize his attack against known SAM gaps (block 2b). A specific gap, for example, might be in firepower. Any missile system that is slow-firing (low multiple simultaneous engagement capability or only one engagement at a time) can simply be saturated and overrun or destroyed. *Defense* firepower, however, can be attained by redundancy. But unless large numbers of the single-engagement systems exist and are densely and redundantly deployed, these systems are not *defense* effective against saturation attack.

We now raise the level of GSA defense effectiveness to that provided by a strong SAM defense, both in quality and quantity. One must now differentiate between the case where a strong interceptor force is also possessed by the defense and the case where the interceptor force is deficient, either in quality or quantity or both. Block 1c is the case for a deficient interceptor force; in this case, the overall air defense effectiveness must be classed as only moderate, even though a strong SAM defense exists. The attack requirements are characterized by block 2c. Penetration tactics and methods now become dominantly important because the strong SAM defenses must be penetrated without catastrophic losses. However, the time required to penetrate the SAM's is not critical because once penetration is successful the attacker can quickly overcome the ineffective interceptor defenses and drive in for the exploitation. Blocks 5a and 5b are now shown since special effort by the attacker is required to penetrate the SAM's. This level of defense characterizes the 1973 Mideast War. For example, block 1c characterizes the Egyptian air defenses of that war. The Israelis quickly discovered that the Egyptian SA-6 missile was fairly sluggish. It could be outmaneuvered much of the time, and they could successfully attack it from a steep angle. They found the ZSU 23-4 radar-directed gun to be deadly at close range and learned to avoid it wherever possible. In addition, they moved against many of the SAM sites on the ground and reduced them with direct tank gunfire. Several days could be afforded for these operations because the Egyptian air force was totally outclassed by the Israelis. Thus, the Israelis had time to probe and uncover a gap between two Egyptian armies and then drive between them and cut off an Egyptian army. Had a formidable Egyptian air arm also opposed them, the latter operation may not have been possible. The point is, for a defense with strong SAM's but weak interceptors, time required for the air attacker to penetrate the SAM defenses is not critical.

Also, we note that block 1c illustrates the minimum required level of air defense because it is the first level at which the attack does not immediately succeed in a fashion catastrophic to the defense.

Next we examine the case for a truly complete and strong air defense, one containing both strong SAM's and strong interceptors. This case is shown by block 1d, and it is the first level of air defense that can be described as strong; i.e., as *effective*. The Soviet air defense is the only air defense in the world today that can be so characterized. The requirements for the attack against such a defense are characterized by block 2d. Note that the difference now is that the time required for the air attack to penetrate the SAM defenses is highly critical. Utmost speed is necessary because the defending interceptors must be caught on the ground and destroyed there if at all possible. If this is not done, the interceptors will take to the sky in great numbers, loiter until the penetration occurs or is imminent, and then directly counterattack the attacker's exploitation forces, nullify them, and restore the defenses by sealing off the penetration corridor. They can then hold this corridor sealed until new SAM's can be moved in to replace those destroyed or damaged and the SAM line is restored. At this level of defense, the attacker must place paramount importance on penetration tactics and methods, specifically on SAM suppression means and on missile exhaustion means. As an example, one of the simplest and most effective ways to assure the success of the attack is to inundate the defenses with several hundred older aircraft, such as MIG 17's and MIG 19's, equipped for the SAM suppression role. A few modern aircraft would be included to force the issue. The idea, of course, is simply to missile exhaust both the GSA defenses and the interceptors. Here, highly unfavorable exchange ratios would be quite acceptable to the attacker. For example, the loss or destruction of several hundred expendable older aircraft (with pilots undoubtedly drawn from the lower 20 percent) is of little consequence, since if missile exhaustion of the defense is successful, the SAM's

are temporarily out of bullets, and *so are most of the interceptors, if they have been committed*. The exploitation force is guaranteed success in this case. The defense counter is to have a dense SAM defense, many missiles, very rapid reload, and use some nonradiating SAM systems held in reserve until after the first attack wave. Blocks 6a and 6b have been drawn in double lines to show the overwhelming importance of specialized SAM suppression and missile exhaustion schemes to the attacker when a strong SAM defense backed up by a strong interceptor force awaits him.

The end result of both a good offense and a good defense is the classic countermeasures versus counter-countermeasures game. But, as can be seen from the schematic, this becomes true only when the defense possesses both strong SAM's and strong interceptors. Contrary to many biased advocates of either the SAM or the interceptor, both are essential to the survival of the theater forces.

The final variant in the schematic is the impact of the rest of the war — specifically of the ground battle — on the air defense battle. Here we show three levels of interaction: negligible, moderate, and strong. We have already discussed the case for negligible impact. By moderate impact, we mean such things as several SAM sites knocked out by guerrilla action or SSM attack, or some SAM's forced to pull back and relocate due to advancing enemy ground forces. We also include such things as competition of both ground units and air defense units for roads and bridges, the loss of communication and control centers due to guerrila action or SSM attack, loss of supplies, location and targeting of air defense sites by the enemy, etc. By strong impact, we simply mean more interference with the air defense from these other factors. The effect is simply to degrade the air defenses by forcing more systems to be on the road, out of action, damaged, or destroyed. Therefore, the overall effect is to reduce the level of the defense in the block 1 column. For strong impact, one can arbitrarily define this reduction as at least to a level of one block lower. The overall result is to require the defense to be stronger from the beginning to allow for this inescapable degradation factor. As a rough estimate, for moderate impact one should have at least 25 percent more SAM's and interceptors, and for severe impact one should have at least 50 percent more SAM's and interceptors.

The real reason for the Soviet production and deployment of so many defensive aircraft, SAM's, and guns is now apparent. The Soviets have simply done their homework. Not only have they calculated the density of single-shot air defense systems required in a static FEBA situation, but they have also allowed for the additional numbers needed to counter air defense degradation caused by the interaction between the ground and air defense battles when the FEBA is not necessarily static.

The schematic and the analogy provide the skeleton of the theater air defense battle dynamics, and it is on this skeleton that the other details are mounted. The schematic can actually be expanded to a more detailed block diagram level, but that is beyond the scope of this article. After one grasps the battle dynamics in the context presented, many questions become directly amenable to answer. As examples:

Q: Why does one need strong interceptors in addition to strong SAM's?

A: The interceptors are analogous to the mobile reserve and the counterattack force. Without a strong interceptor force, no effective counterattack can be made against the exploiting wave of aircraft. Thus, without interceptors, once a major penetration in the GSA defense is made, the air superiority battle will shortly be won by the attacker, with the resulting destruction of the ground combat forces and critical targets throughout the theater.

Q: Why does one need strong SAM's in addition to a strong interceptor force?

A: The SAM's are analogous to the main line of defense. Without a strong SAM defense, only a weak line exists and it will be immediately and massively overrun. In that case, most of the manned interceptors will simply be caught on the ground and destroyed. The air superiority battle is thus won by the attacker in the first few hours, and shortly thereafter the destruction of the ground combat forces and critical targets throughout the theater follows.

Q: At what level of defense can one characterize the SAM's as being strong?

A: When: (1) they have no significantly exploitable weaknesses or gaps in the SAM/gun defense as deployed, (2) the defense firepower level is sufficient to prevent moderately easy saturation, (3) the characteristics of the SAM's allow them to function and perform their mission in the presence of fairly strong interference from the rest of the battle (particularly from the ground battle and hostile location and targeting systems), (4) their number, deployment density, and counter-countermeasures capabilities are sufficient to compensate for the impact of the rest of the battle and for attack optimization of penetration tactics and methods, (5) they can hold against optimized attack long enough to seriously deplete the initial attack force, allow the manned interceptors time to become airborne, and allow the deliberate use of the interceptors in a mobile reserve counterattack role against the exploitation attack, (6) their ease

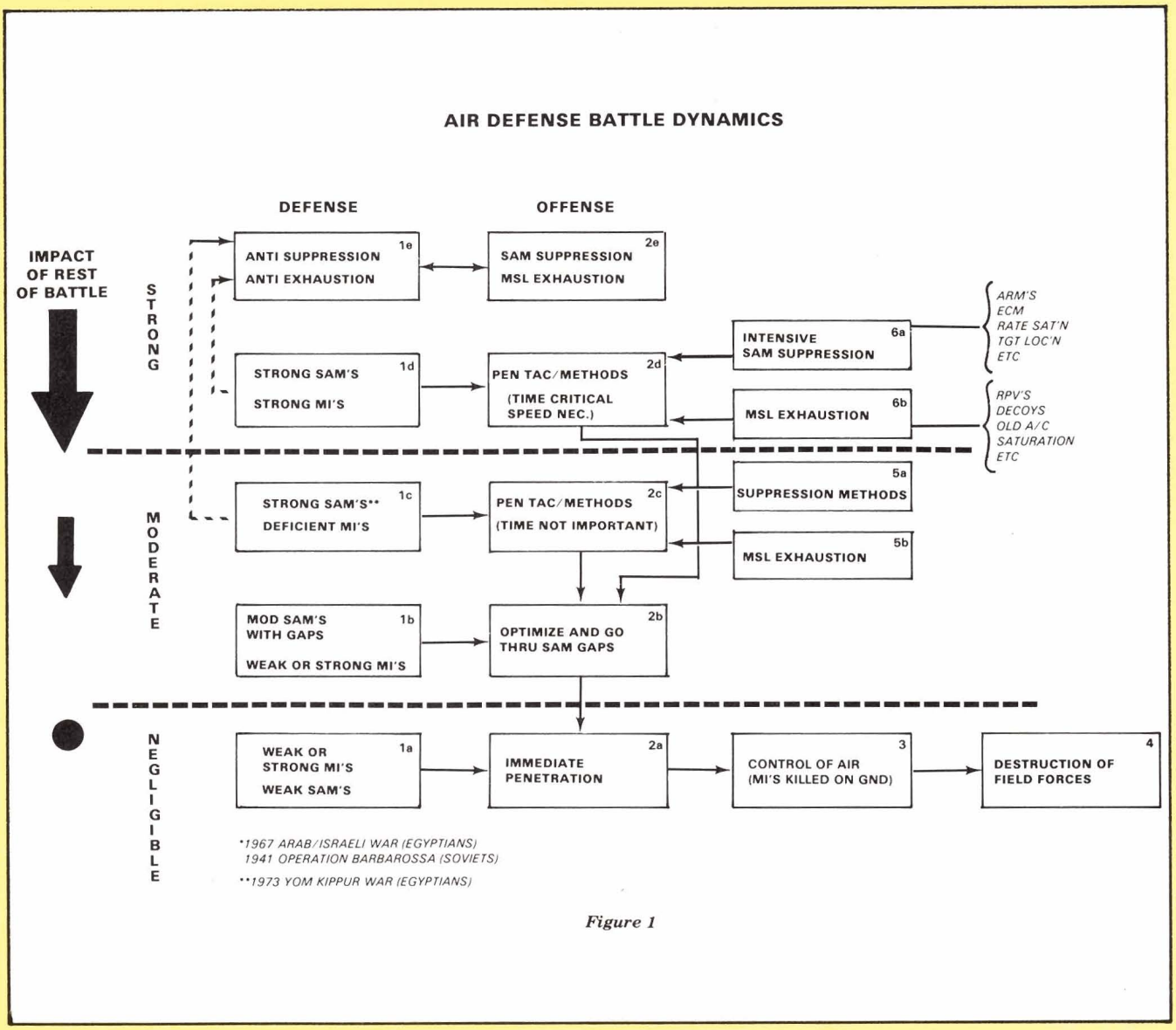


Figure 1

of maintenance, operational reliability, mobility, and endurance are sufficient to withstand days or weeks of sustained operations.

Q: At what level of defense can one characterize the interceptor force as being strong?

A: When: (1) the interceptors are at least the equal of their adversaries in combat, (2) their reaction time is sufficient to enable the major portion of the force to be airborne prior to serious penetration of the SAM defenses by a large exploitation force, (3) their number and characteristics enable them to counter the exploitation force that breaks through the SAM's, (4) they are protected on the ground, (5) their turnaround time, ease of maintenance, and operational reliability are sufficient to withstand allout combat pressure for days or weeks of sustained operations, (6) they have no significantly exploitable weaknesses or gaps such as lack of an all-weather capability, (7) sufficient numbers are available to allow for the impact of the rest of the battle and to replenish losses, (8) sufficient trained personnel are available so that personnel limitations and endurance do not limit or seriously degrade the other requirements.

Q: Against a good interceptor force, what is the best attack tactic?

A: Penetrate quickly through the SAM's and catch the bulk of the interceptor force on the ground where it may be destroyed easily.

Q: Which is the most essential part of the air defenses, SAM's or interceptors?

A: SAM's, since without them the interceptors will be caught on the ground and destroyed immediately. However, one must bear in mind that the SAM's will be penetrated eventually, and without Blue interceptors, Red then quickly wins.

Q: What is most likely to be the major target in the first wave of the attack?

A: The LORAD/HIMAD's. There are fewer of them, hence fewer must be suppressed or destroyed to open up avenues for exploitation. Suppression or destruction of the LORAD/HIMAD enables the use of medium and high altitudes for the exploitation force, optimizing its range, speed, armanent loading, etc. It also provides easy overflight of the SHORAD's and guns and their suppression and destruction from safe altitudes.

Q: Does this schematic fit actual battle experience?

A: It does. The three major modern air attacks—the 1941 German Operation Barbarossa against the Soviet Union, the 1967 Arab-Israeli War, and the 1973 Mideast War — all precisely fit the schematic. Several other examples, including the Japanese attack on Pearl Harbor in December 1941, can also be fitted in. In addition, the Soviet design and procurement philosophy can be matched rather precisely to the diagram.

We have long since gained an appreciation for the battle dynamics of ground combat. We know how to deploy and employ ground combat units for every situation, and we train our officers intensely and in depth in the detailed features of ground combat. At the Command and General Staff College, for example, every officer receives several months training in ground combat. He goes through many map exercises and wargames where all his training and experience are applied.

Yet, essentially, he is given no training at all in the dynamics of the air defense battle, even though air attack is the ultimate blitzkreig in nonnuclear war, and even though the air defense battle is likely to determine the outcome of the entire theater conflict, on the ground as well as in the air. Because of this significant lack of training in air defense battle dynamics, many of our higher level staff officers and commanders can only hypothesize about the air defense battle or what massive and unrelenting air attack can do to our ground forces. The day is fast approaching when not a single US Army commander will be left who has directly experienced a significant and sustained threat to his ground units from hostile aircraft.

A simple schematic and a crude analogy in no way replace the need for comprehensive and thorough modelling and study of the air defense battle dynamics matrix, and neither do they replace the need for comprehensive and thorough air defense battle wargames and map exercises at the Command and General Staff College. Instead, these simple tools are intended to give at least some insight into the air defense battle dynamics to fill the present void, and hopefully to further convince ourselves that the air defense problem warrants much more systematic, detailed, organized, and sustained study than we have accomplished to date.

Lieutenant Colonel Bearden (US Army Retired) has contributed a number of excellent articles on various aspects of air defense during the past year. He has also written numerous papers on the science of parapsychology. His assignment before retiring was Chief, Evaluation Branch, Military Studies Division, SAM-D (now Patriot) Project Office, Redstone Arsenal, Alabama.

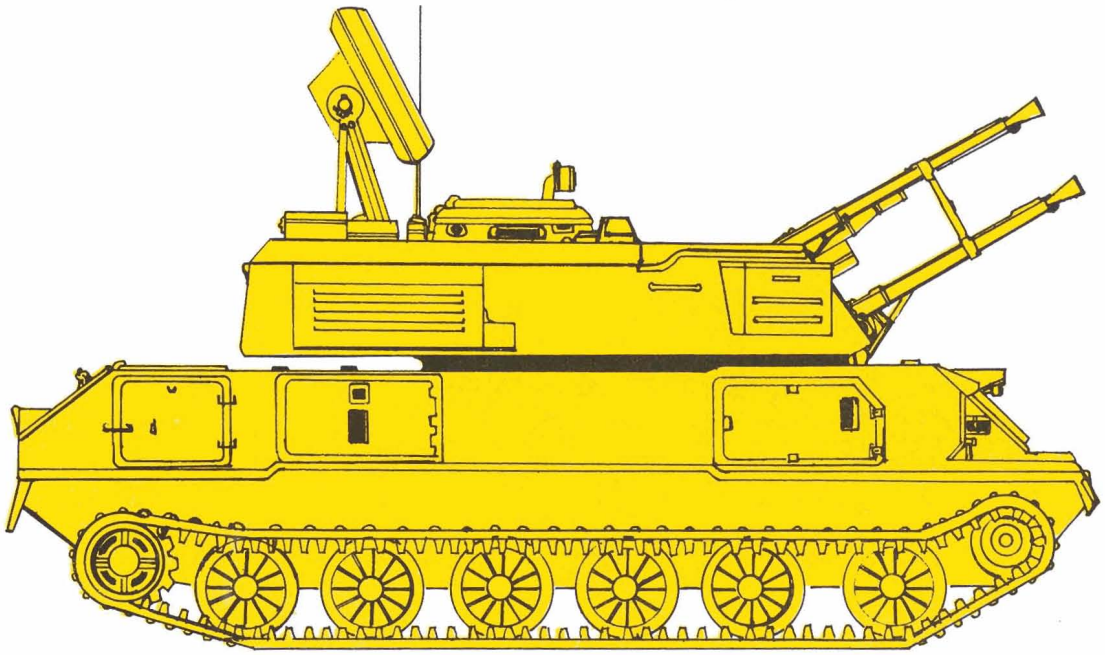
COMBAT FORMATIONS in the OFFENSIVE BATTLE

Colonel R. Todurov

Translated from the Soviet Military Herald No. 1, 1976

Joining in the presession socialist competition,[1] air defense personnel of Northern Group of Forces are conducting a successful struggle for outstanding accomplishment, first and foremost, of tactical training missions. In exercises and firing, under conditions close to those in combat, the zenitchiki[2] are studying the teamwork and mobile action essential for provision of reliable protection to a force from enemy aerial attack.

The most important task of officer preparation in



this period of training has to be the acquisition of skills and habits of drawing up combat formations of air defense units[3], dependent on tactical conditions that develop on the field of battle.

It is known, for instance, that the air defense battery and air defense gunners[4] operate, as a rule, directly in the combat formations of combined arms units and provide protection from enemy air strikes to specific targets: a company, battalion, command post, or an artillery battalion. For the conduct of battle, the battery is deployed in a combat formation consisting of platoon formations and the battery command post. Platoon combat formations include platoon command posts and mounts[5] in [firing] position or following in the march, approach march, or combat formations of covered units.

AD gunners are sited on BMPs[6], APCs, trucks, or in launch positions.

The art of the commander consists of the ability to draw up, under any circumstances, a combat formation that can insure full accomplishment of the assigned mission and which will correspond to the situation, objective, and character of action of the covered unit. But this is not so simple as it might appear at first glance. For instance, I have seen that officers were not successful in reacting to changing conditions on the battlefield because they did not know clearly and completely the tactics of motorized rifle and tank units, because they poorly visualized what had to be managed when deciding to change combat formations.

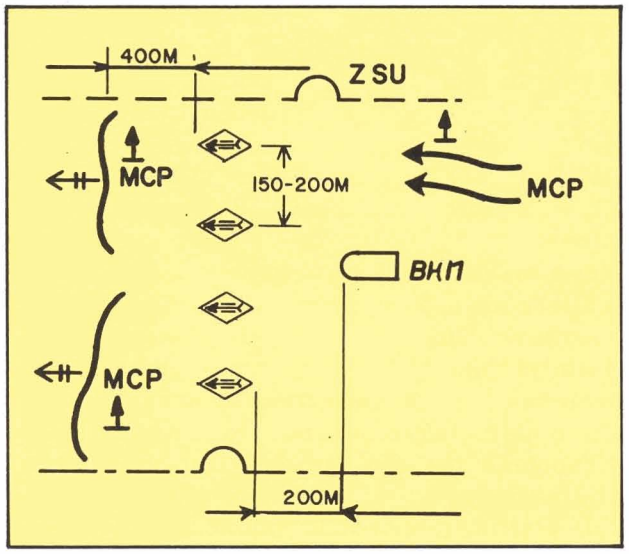
Under these circumstances, it was necessary to devote considerable attention to this question in demonstration lessons and in exercises. And immediately definite successes were achieved.

Now, air defense officers, designating the combat formation of their units, strive to use the maximum combat characteristics of weapons, means of reconnaissance, and control so that detection and destruction of enemy aircraft takes place at maximum range from the protected unit, so that maneuver of air defense assets on the battlefield is ensured, and so that stable and continuous control is exercised over the ZSU 23-4s or air defense gunners.

In tactical exercises, many variations of employment of ZSU 23-4 units and air defense gunners have been developed. In the offense, for instance, a battery of self-propelled air defense mounts often gets the mission to protect from enemy air attack a motorized rifle [tank] battalion that is operating as advance guard, in the first echelon, or even a second echelon battalion during its commitment to the battle. Here, each air defense platoon constructs its combat formation differently, in dependence on the mission, terrain, and actions of the protected force. It is expedient, for instance, to site the mounts in one line when the battalion operates on a wide front. During battalion operations on a narrow front, it is more advantageous to have the mounts one behind another, since their zone of damage is extended in depth and they can conduct concentrated fire on aerial targets that appear from any direction.

Certainly the intervals and distances between mounts do not come out the same. They are determined both by the width of the battalion's advance zone and the depth of its combat formation, the length of the column, etc. In each case, it is necessary to fulfill the requirement for insuring control over fire and maneuver of the battery and survivability of mounts against normal enemy weapons.

Practice and calculations indicate that the separation of the ZSU 23-4 in the first line from the



attacking tanks, or motorized riflemen on line, must not exceed 400m (fig. 1). This is the optimum distance, since it extends the zone of fire into enemy territory and at the same time reduces the probability of damage to the mounts by enemy fire.

To gain the best control over mounts and prevent mutual damage when firing on low-altitude targets, the mounts are positioned 150-200m in from one another in frontage or depth; the platoon command post is to the rear within direct view, but no more than 200m. Ammunition trucks displace as required at a distance of 1,500-2,000m behind the platoon.

Very often, *zenitchiki* have to form up a combat formation of ZSU 23-4 platoons in columns of mounts, as when they cover battalions advancing to the assault position or pursing a retreating enemy. Such a formation permits keeping the unit compact and using all mounts at any moment to deflect an attack by enemy aircraft or helicopters. Another variant cannot be excluded, where two mounts from the battery operate at the head of the battalion column and two at the rear.

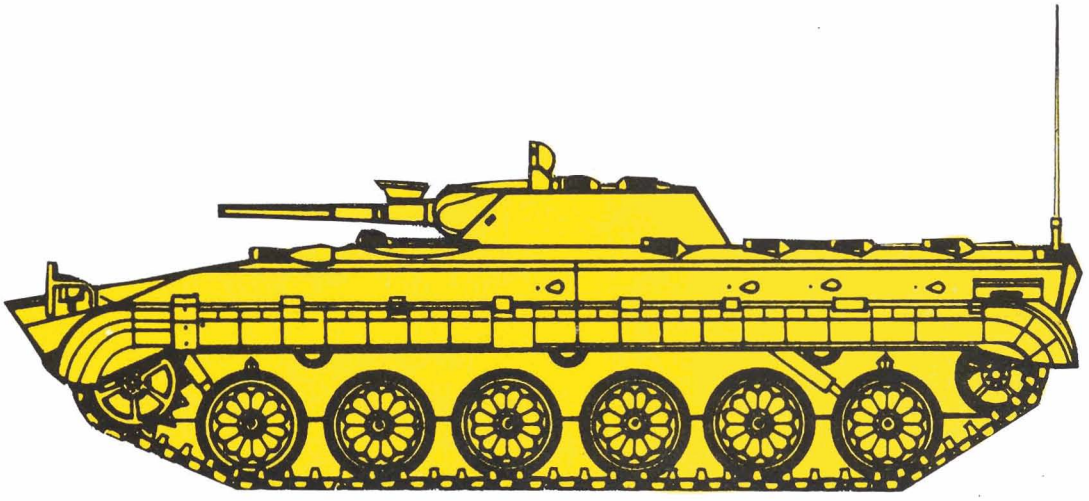
Air Defense gunners conduct fire either directly from BMPs, APCs, or trucks; or they move on foot behind the motorized riflemen on line, falling back to launch missiles against aerial targets. With the transition to pursuit of the enemy, the air defense gunners take their places in BMPs or other means of transportation.

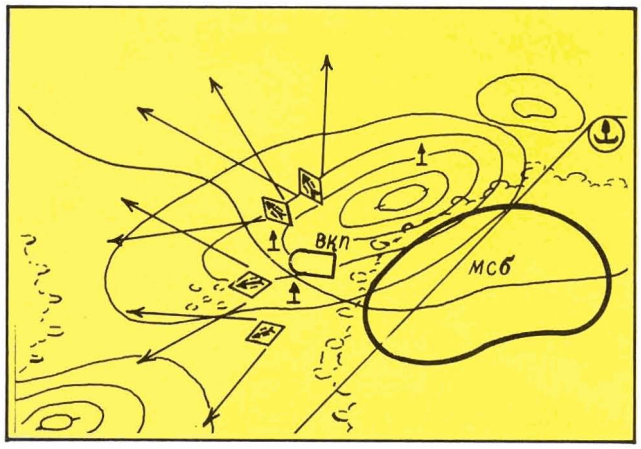
In the assault crossing of a water obstacle, air defense gunners cross over to the far shore with their own units, prepared to fire while afloat. Sometimes an element of gunners is detailed as a special group for coverage of the crossing site, bridges, or tank sealing area[7]. Launch positions in this instance (and also when covering other stationary targets) are selected with consideration of the assumed direction of attack by the probable enemy, size and configuration of the target, presence of other air defense assets, and terrain.

There is a prime consideration to site air defense gunners at one launch position within the boundary of the protected target or at a short distance from it. This facilitates control and increased probability of damage to the airborne enemy.

To show in detail some of the questions touched on above, I shall describe a tactical exercise that developed the subject of motorized rifle battalion in the offensive with assault crossing of a water obstacle.

Before the battalion's advance to the assault position, the ZSU 23-4 battery and the air defense gunners occupied positions as shown in Figure 2. The given variant combat formation promoted the rapid inclusion of mounts into the motorized rifle column and the rapid seating of air defense gunners in BMPs.





In another battalion, the air defense unit was disposed differently, inasmuch as the motorized riflemen were situated in a grove at some distance from the main body of the regiment. Here, the battery was formed into two lines of mounts.

Before beginning the advance, the air defense platoons assumed their positions in the battalion column, and the air defense gunners took their places in vehicles. After deployment of the units into company columns, the air defense platoons in both battalions were each in the middle of the approach formation of the covered unit. This was necessary in particular for coverage of all companies which, at any moment, might be attacked by enemy air.

Of course such a variant is not the only correct one. Captain Tarakanov for instance, in an exercise where the covered motorized rifle battalion moved via forest roads and clearings, almost to the line for deployment to platoon columns, suggested moving his battery ahead to the attack position, following the tanks and direct fire artillery. In this instance, the defense of the unit from enemy air was strengthened and at the same time deployment of the motorized riflemen into platoon columns, on to line and dismount was protected.

The initiative of this officer was supported. During the night before the attack, the *zenitchiki* prepared positions, quickly dug out emplacements for the mounts and platoon command posts, and camouflaged them. In the morning, after the motorized rifle battalion reached the line for deployment to platoon columns, and as tanks and guns emerging in front of the "enemy" FEBA opened fire on points not destroyed during the artillery preparation, aircraft appeared in the sky. The *zenitchiki* quickly opened fire.

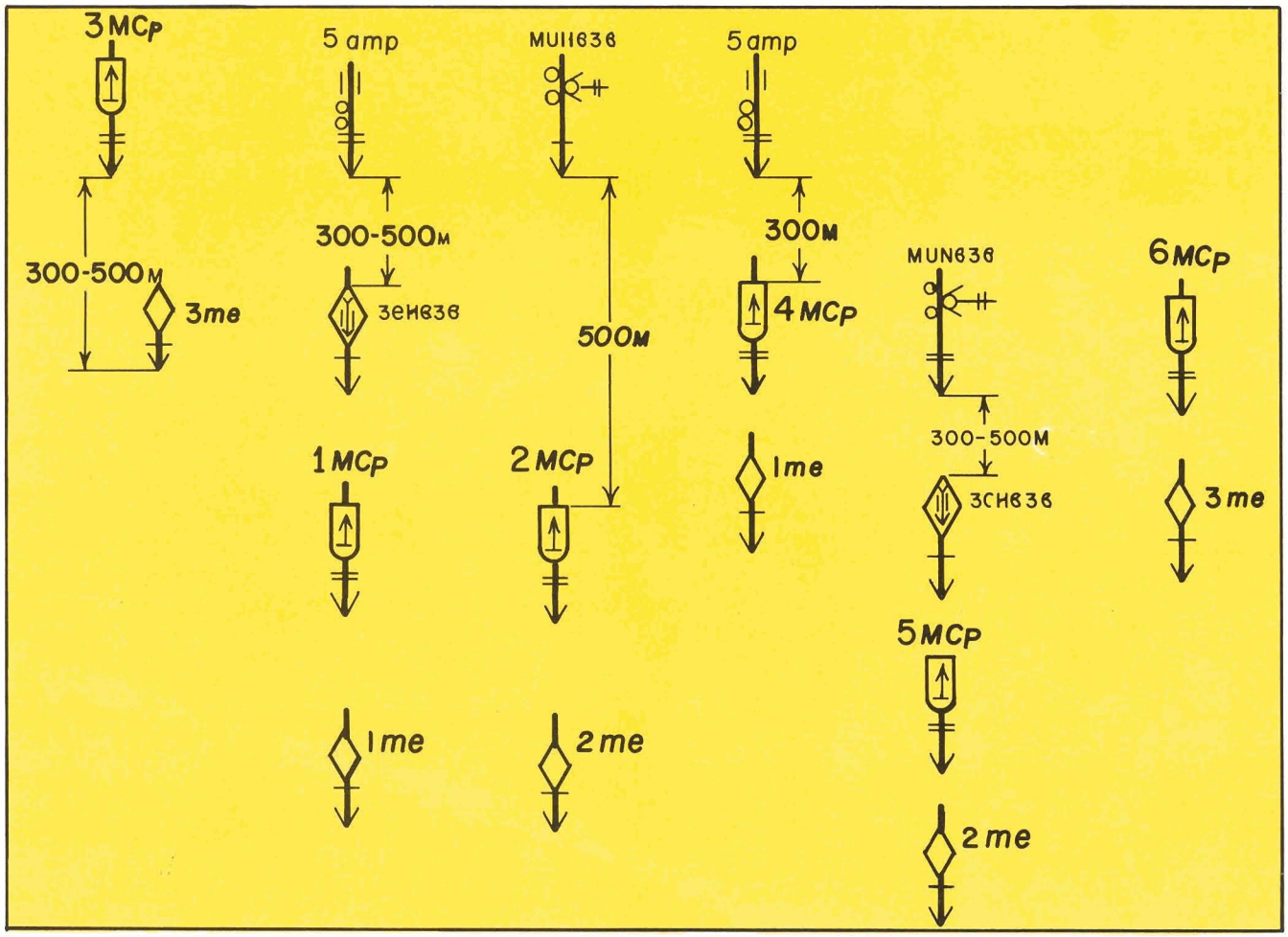
But let us return to the first example. When the companies of the first echelon battalion, following ranks, went into the attack, the air defense platoons followed them. They operated in a line of mounts, firing both on the move and from the short halt, and quickly adjusted the combat formation so as to traverse a lane through a minefield and contaminated area. Air defense gunners operated with companies, trailing the skirmish lines 20-30m from the company commanders and 15-20m from one another.

However, it is necessary to emphasize that during the attack air defense platoons do not necessarily follow "in the nape of the neck" of the covered units. Certainly the situation may demand a change in the scheme taken. I cite the actions of one of the platoons in the battery commanded by Senior Lieutenant Yefimov during tank battalion tactical exercises with live fire.

The platoon received the mission to cover the battalion from air strikes during movement from the rear and during the battle. In reconnaissance, the officer didn't direct his attention to a helicopter threat. This escaped the notice of the battalion commander. During the attack, the platoon followed on the right flank 500-600m beyond the assault line of tanks.

Unexpectedly, eight "enemy" helicopters appeared on the left from behind the crest of a hill. The ZSU 23-4 platoon opened fire on them, but the range was great and the fire had little effect. They managed to destroy only one target. The rest, if they had been actual aircraft, could have broken up the attack.

In the depth of the "enemy" defense, the platoon commander already acted more wisely. He began to displace the platoon so that the mounts followed no farther than 200-300m from the protected tanks, and, if they deployed for attack, closer to that flank from which a repeated helicopter attack might be expected. The ZSU commanders in carrying out the orders guided their vehicles so that the combat for-



mation resembled an echelon. This enabled each mount, without interfering with another, to fire on low-flying targets appearing on the flanks.

With the transition to pursuit of a retreating "enemy," the ZSU 23-4 platoon reformed into a column of mounts and moved with the lead company. When a water obstacle appeared in the way, the *zenitchiki* again deployed into a line within the battalion crossing area and occupied their own positions not far from the bank in readiness to repulse an air attack. Soon the mounts, one after another, crossed on GSP (self-propelled tracked ferries) at the same time as the tanks. In this manner, the unit was protected at the moment of crossing and on the far shore, which was especially valuable.

When both ZSU 23-4s crossed, the platoon continued to operate as before. It is necessary to give due respect to platoon commander Senior Lieutenant Yu. Orapu, who was able to organize correctly the actions of his subordinates in difficult crossing conditions under "enemy" ground fire.

This is how *zenitchiki* in the Northern Group of Forces create combat formations to cover attacking forces. The know-how of officers to select each time the optimum variant in large part contributes to successful combat mission accomplishment by units participating in exercises.

[1]*Inter- and intraunit competition to meet or exceed various norms, done in honor of the 25th Congress of the Communist Party of the Soviet Union (February 1976).*

[2]Zenitchik *(plural* zenitchiki*), air defense person, a soldier whose role is air defense; translation of the handy Russian word is cumbersome.*

[3]*Soviet usage distinguishes units by size with separate words for subunits (generally, battalion or lower), units (regiments), large units (divisions) and formations (armies). For simplicity, except where the echelon is specified, "unit" in this translation refers to a battalion or smaller command.*

[4]Strelki-zenitchiki, *literally rifleman (or gunner) — zenitchik, a term used to describe a soldier armed with the SA-7 man-portable, shoulder-fired, surface-to-air missile. The equivalent US position is Redeye gunner.*

[5]*"Mount,"* ustanovka, *is the "U" in ZSU 23-4 and is the usual way of referring to the SP AD Gun without using the full nomenclature.*

[6]*BMP, Soviet Infantry Combat Vehicle which carries a motorized rifle squad and is armed with a 73-mm gun, machinegun, and antitank guided missiles.*

[7]*Area where tanks are prepared for deep fording, involving, in part, hermetrical sealing.*

DIVADA —*Division*

The Army is currently studying ways to restructure our primary fighting element — the division. This important study, which was directed by General DePuy, Commander, Training and Doctrine Command (TRADOC), is being headed by a special study team that works directly for him.

As a part of the study, the Combat Development Directorates of each TRADOC school submitted their concepts for inclusion in the new division. This article highlights results of the division restructuring study to date and discusses the US Army Air Defense School (USAADS) input to the study, which contained a recommendation that a new air defense organization (a Division Air Defense Artillery (DIVADA)), be integrated into the restructured division.

The new ideas for a DIVADA resulted from a special task force in the Studies and Concepts Division, Directorate for Combat Developments (DCD), USAADS, whose product was then perfected by the Director, DCD.

WHY A RESTRUCTURED DIVISION

Primarily two needs drive the requirement for a restructured division:

- To prepare the Army to integrate into the force the more capable weapon systems of the early 1980s and optimize their employment.
- To correct inadequacies in the current organization.

The new weapon systems are sophisticated, capable, and expensive. Total investment for the complete Army family of new weapon systems that will fight in the future division is about $62 billion. Force planners and structurers are obligated to our nation and its soldiers to optimize the potential of these new weapons.

Additionally, against a future enemy, the United States could find itself outmanned and outgunned. If we expect to win the land battle of the next war, we had best develop now concepts that make the most of our capabilities.

WHAT CONCEPTS ARE EVOLVING

The division restructuring study has as its foundation several concepts that merit brief discussion because they influence the structure of the proposed DIVADA organization. These concepts are:

- Integrate combined arms at battalion level versus present thinking which focuses on company level integration.
- Develop smaller, faster units that can better support the new land battle concept, which hinges on rapid movement of troops at the critical time to the critical place.
- Increase fire support organic to the division. Each direct support field artillery battery will have eight guns versus six as now; and each battalion, including the GS battalion, will have four batteries versus the three in the present organizations. This gives a 60 percent increase in firepower over the present division.
- Improve mobility-countermobility of maneuver forces. The focus of forward engineers is on slowing the enemy while simultaneously providing our forces an improved mine-laying capability and obstacle system. The role of air defense is to focus on the third dimension. That translates to providing an umbrella of protection that facilitates the freedom of maneuver essential to success in the land battle.
- Move administration from company to battalion. This concept is intended to free the now overburdened company commander from most paperwork responsibilities, thus allowing him to focus on the operational and maintenance aspects of his command.
- Weapon system oriented logistics which streamline both maintenance support and spare part replacement. This concept focuses on moving the maintenance support closer to the front line. This results in giving faster turnaround in combat of deadlined equipment, more rapid spare part replenishment, and improved support for major weapon systems.
- Staff realinement of the operation and intelligence functions. Both functions will now be combined under one staff section.

From an air defense force structure viewpoint, we need to take advantage of the increased weapon capability of the future family of weapons. But, additionally, in designing such an organization, those concepts listed above that provide the foundation for fighting the next land battle must be considered. Where these concepts are summed, the total equals an increase in the emphasis placed on forward air defense in maneuver elements while simultaneously maintaining air defense or rearward critical assets.

THE DIVADA ORGANIZATIONAL GOALS

In designing the DIVADA structure, three organizational goals were established. These goals formed the foundation upon which the organization was built:

- *Goal No. 1. Better utilize the increased capabilities of future family of weapons.* These

Air Defense Artillery

LIEUTENANT COLONEL DONALD R. INFANTE

capabilities are considerable. Just to note a few: the forward engagement aspect of Stinger; the greater range, mobility, and survivability of the new DIVAD gun; the all-weather forward aspect capabilities of Roland; and the tremendous increase in area defense coverage and target destruction capability provided by Patriot. These increased capabilities require that a hard look be taken at what organization optimizes their use.

• *Goal No. 2. Exploit the increasing sophistication of enemy aircraft avionics.* In a mirror image response to US aircraft design, enemy attack aircraft are becoming increasingly sophisticated by relying more and more on complex, on-board electronic equipment. Although this increased sophistication improves the aircraft attack capability, it also creates a vulnerability to electronic warfare. Air defenders need to exploit that vulnerability.

• *Goal No. 3. Reduce the span of control facing the ADA commander.* As previously stated, one of the needs driving the requirement for a restructured division is the need to correct current organization inadequacies. Without doubt, the biggest organizational problem confronting today's division ADA battalion commander is his span of control requirement. He commands 48 weapons and has staff responsibility for approximately 72 Redeye teams spread throughout a division area that, with present tactics, is generally 1,600 sq km (40 km x 40 km). Because of the division size, he must place heavy reliance for weapons integration on junior commanders with low experience levels. The end result is usually a series of defense pockets that in many cases are not totally responsive to division needs. In a nutshell, span of control is inconsistent with the requirement for close responsive control. If Army air defenders are to provide maneuver forces with the freedom of movement essential to battlefield success, span of control reduction is vital.

One additional and important point underlies the DIVADA design. A key division tactic is the rapid movement of maneuver forces on the battlefield to effect a concentration of forces at the critical time and place. Air defense support of these forces near, and in some cases in front of, the FEBA is essential to successful execution of this tactic. Further, the air battle fought over the FEBA will differ substantially from that fought in the rear area. Therefore, ADA must be organized to fight these two different air battles: the forward battle, which requires defense of a rapidly moving maneuver force; and the rearward battle, which requires defense of critical assets not necessarily of a highly mobile nature.

Keep this point in mind during the following discussion of specific actions taken to accomplish each organizational goal.

BETTER UTILIZATION OF FUTURE WEAPONS

The first organizational goal centered on better utilization of the future family of weapons' increased capabilities. Classification restricts discussion of specific capabilities beyond what has been mentioned above. To utilize these increased capabilities more effectively, the following weapon employment guidelines were derived:

• Stinger will be consolidated into a battery organization and allocated in accordance with defense priorities. Frequently, it will be with maneuver elements, but it will also complement gun/Roland defenses and, where necessary, establish Stinger-only defenses. The consolidation will not only allow allocation by priority needs but should also overcome the training problem experienced with Redeye, which is presently scattered throughout the division on a fixed unit allocation basis. To soothe the fears of our Infantry, Armor, and Artillery brothers (who fear that consolidation means they will never see Redeye/Stinger again), that is not the case. Redeye/Stinger will frequently be attached to maneuver battalions. What consolidation does guarantee is that, when needed most, more air defense will be provided.

• The DIVAD gun organization will be forward-oriented with committed units. Our forward maneuver elements are vulnerable today to attack helicopters employing antitank guided missiles from stand-off positions. Improved munitions and delivery accuracy are also increasing the vulnerability of maneuver elements to attack by high-performance aircraft. This increasing vulnerability is the driver behind the increase in the number of more capable ADA guns. Air defenders must insure the freedom of movement that forward maneuver elements require to change the land battle odds in our favor.

• The Roland system is better suited for and will be used to defend critical assets in the division and brigade rear areas. Therefore, the missile organization will be rearward oriented in a critical asset defense role.

• A Stinger gripstock and missiles will be carried on board each AD gun system. The gun will have a three- or four-man crew but needs only one crewman to engage targets. Thus, when in a stationary position, one of the crew members can take a Stinger system and move out 50 to 100 meters from the gun and double the engagement capability with no attendant personnel increase and only a slight increase in Stinger procurement costs.

• Integrate the coverage of the DS Hawk/Patriot battalion with division ADA weapons. Coverage at altitudes above that of division organic weapons is essential to providing a comprehensive, cohesive air defense umbrella over the division area. Without DS Hawk/Patriot coverage, the enemy has preferred attack options—overfly the division weapons in attacking rearward targets or minimize attack exposure time when attacking division targets. With Hawk/Patriot DS coverage, the enemy has equally unattractive courses of action, thus complicating attack planning. But more importantly, all-around defense coverage is provided to our own troops. This area coverage capability provides a measure of air defense protection to all division assets while higher priorities are also defended by division weapons.

EXPLOITING ENEMY AIRCRAFT SOPHISTICATION

The second organizational goal was exploiting the increasing sophistication of enemy aircraft avionics. Key to success in achieving this goal is an electronics warfare (EW) platoon that is organic to the division combat and electronic warfare integration (CEWI) battalion. This EW platoon will be in direct support (DS) of the DIVADA. The DIVADA will integrate EW platoon operations with the overall air defense operation.

The platoon will have both an offensive and defensive capability. Offensively, the jamming of enemy radar and navigation devices will cause enemy mission abortion or, at a minimum, will interject unacceptable bombing errors. Additionally, terrain-following aircraft will be forced to increase altitude, thus increasing their vulnerability to attack by the complete family of air defense weapons. Defensively, the passive detection of attacking aircraft provides another measure of warning to supporting air defense weapons. At times, air defense systems will need to radiate only during the engagement phases. Thus, air defense vulnerability to antiradiation missile attack is lessened by the decreased radar radiation requirements.

REDUCING SPAN OF CONTROL

Actions taken to accommodate the third goal of reducing the ADA commander's span of control focused on the realization that the forward and rear air battles must be fought differently. A command headquarters to control each of these battles is a reasonable span of control and allows a more intense focus on the task at hand. Two air defense battalions are required:

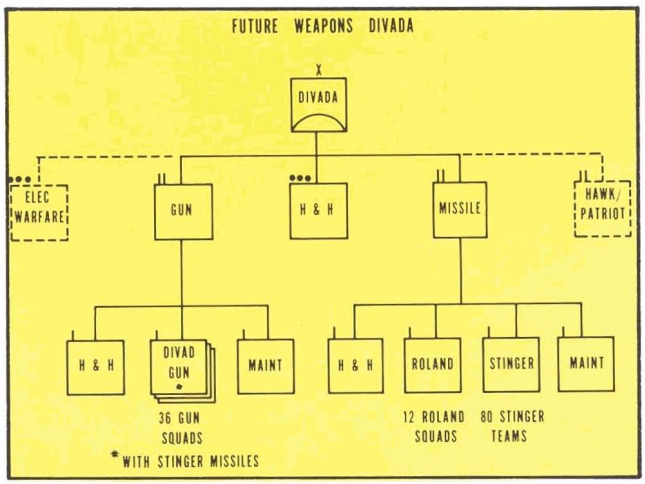


FIGURE 2

• A gun battalion that focuses primarily on the forward combat zone and provides the control over air defense weapons in the brigade areas.

• A missile/MANPADS battalion with a SHORAD missile battery that focuses on the division rear area and a MANPADS battery that supports both rear and forward areas.

An overall manager is needed to:

• Provide command and control for the two ADA battalions.

• Integrate air defense with the division scheme of maneuver and priorities.

• Interface with the direct support Hawk battalion and EW platoon.

• Coordinate with the Air Force.

Moving these management functions from battalion level allows the battalion commanders to concentrate on the fight while simultaneously insuring effective integration of the air battle. The end results will be the capability to do a better job of concentrating air defense assets at the critical times and places in support of the land battle.

THE RESULTING FUTURE DIVADA

The resulting organization shown at Figure 1 accomplishes all design goals. The DIVADA commander will be a colonel. He has a small staff to orchestrate the division air defense battle and to integrate it with the ground battle. There are two small battalions, one (all guns) oriented toward the forward division area and the other (a Roland/Stinger battalion) oriented on division rear and general support. The Stinger weapons will be allocated by platoon or section, and even occasionally by team, as needed.

This organization has approximately 850 personnel spaces. A current armored division has 834 air defense personnel spaces (C/V battalion plus 72 Redeye teams). Thus, there is a net personnel increase of only about 2 percent. If we followed the old organizational concepts in the restructured division, we would need 900 spaces (C/V plus 90 Stinger teams).

In terms of weapons, there are 120 AD fire units in a current armored division. The new organization has 128 plus 36 Stinger grip stocks with missiles on the DIVAD guns. Essentially, the number of air

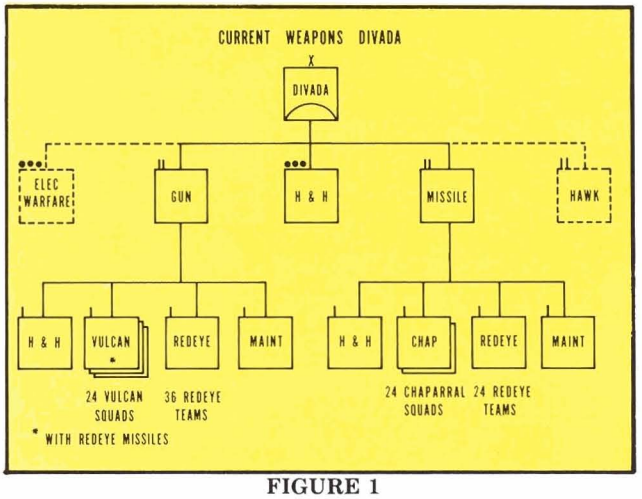


FIGURE 1

defense weapons has been increased 37 percent with a 2 percent personnel increase.

A TRANSITIONAL ORGANIZATION

Because of the delay in fielding the new family of weapons, this organization cannot be fully implemented until the mid-1980s. However, there is no need to wait that long because many current organizational problems can be overcome in the near term using present weapons. The transitional organization shown in Figure 2 considers current force structure and present weapon capabilities.

This organization is similar to the future organization in that it overcomes many of the current problems such as span of control and Redeye training and utilization. The major difference is that this organization has two small Redeye batteries. This partially compensates for Redeye capabilities that do not allow it to be employed the same as Stinger, as well as the fewer number of guns in the gun battalion.

The transitional organization has 848 personnel spaces. This interim structure incorporates the concepts contained in the future organization and will be tested as part of the restructured division.

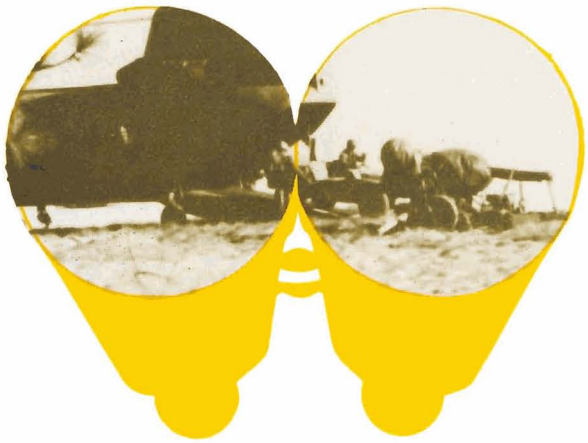
THE TEST PLAN

To validate the merit of the DIVADA concepts, testing will be divided into three phases:

- Phase one will occur in the January-September 1977 time period, primarily at Fort Bliss and Fort Huachuca. This phase will focus on testing those concepts that do not require interface with maneuver forces, and test results will be supplied to the Restructured Division Test Team. Adding MANPADS to each gun, electronic warfare integration, and DIVADA early warning dissemination top the list of items that needed to be tested in this phase.
- Phase two will occur in the January-December 1978 time period at Fort Hood in conjunction with restructured division testing. The 1st Cavalry Division has been selected as the test division. A division (-) test will be conducted with a DIVADA as one of the tested elements. DIVADA control concepts and electronic warfare integration top the list of items that need testing with the required maneuver force interface.
- Phase three will occur in the December 1978 to September 1979 period at a location yet to be determined. This will be a full division test with normal supporting corps assets. So, besides a DIVADA, it is anticipated that a DS Hawk battalion will participate. The test will provide the final look at DIVADA's worth before a decision by the Army Chief of Staff.

In summary, the new DIVADA structure goes a long way toward solving many of the problems we now have with division air defense. If testing validates that it does do a better job in providing division air defense and the effectiveness increase is worth the slight increase in equipment and personnel, it could be implemented throughout the Army by 1980. The first step toward a DIVADA has been taken.

Lieutenant Colonel Infante is a graduate of Youngstown State University and has a Masters degree in Operations Research from Rensselaer Polytechnic Institute. Prior to his current assignment as Director, Studies and Concepts Division, Directorate of Combat Developments, USAADS, he was a student at the Army War College.



VIEW from the FIELD

US HAWK UNIT RECONSTITUTES WITH ROK BATTERY

LIEUTENANT COLONEL JOHN H. PECKHAM

"B/1-44 AND D/133d have been heavily damaged by enemy air attack. Damage assessment indicates that sufficient equipment remains to reconstitute an AAFU from the two batteries."

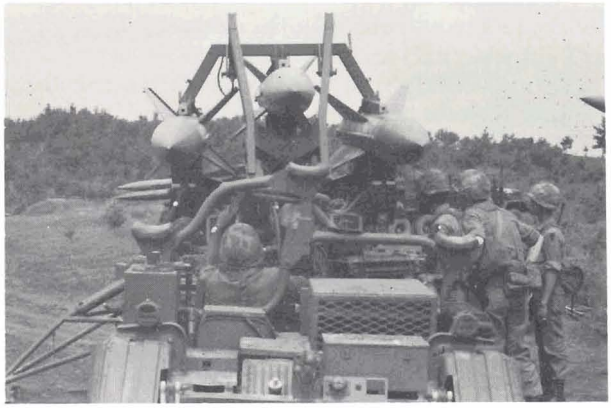
So read the "frag order" that recently began a link-up of elements of two Hawk batteries in Korea to form an Augmented Assault Fire Unit (AAFU). This particular reconstitution was different from any previous exercise of this type, however. The difference was that one battery was a US unit (Btry B, 1st Bn, 44th Air Defense Artillery), and the second was a Hawk battery from the Republic of Korea (ROK) Army (Btry D/133d ROK ADA).

Although US Hawk units in Korea have practiced reconstitution plans in the past, reconstitution had never been performed with sister ROK ADA Hawk batteries.

The idea occurred to me as Commander of the 1st Bn, 44th ADA, during visits to batteries that compose the most "spread out" Hawk battalion in the world. It seemed logical that the exercise would enhance the readiness posture of the Eighth US Army air defense forces and ROK air defense forces as well.

The 38th ADA Brigade S3 personnel arranged the initial coordination meeting with Republic of Korea Army Air Defense Command (ROKAADCOM) personnel at B/1-44 ADA tactical site, which overlooks Kunsan Air Force Base on the coast of the Yellow Sea. There, the plans were made for the operation, to include a joint reconnaissance by the two battery commanders.

The operation began at 0400 on 24 June 1976 when the B/1-44th convoy rolled out of Kunsan. The simulation called for Battery B's tactical site being damaged by enemy fire with only a launcher section remaining. The convoy included three launchers, nine missiles with pallets, a loader transporter, and associated power equipment and cables.



The link-up with the "ROK half" of the AAFU (HIPIR, CWAR, and AFCC) was scheduled to take place at a field site northwest of Kwangju, a long 85-mile trip for B1-44 on Korean roads through small villages.

At 0845, Battery B reached the release point and the advance party was sent to the field site where it was met by the ROK advance party that had arrived earlier. The two main bodies arrived simultaneously at the field site at 0900 and personnel from the two units immediately began to emplace the equipment.

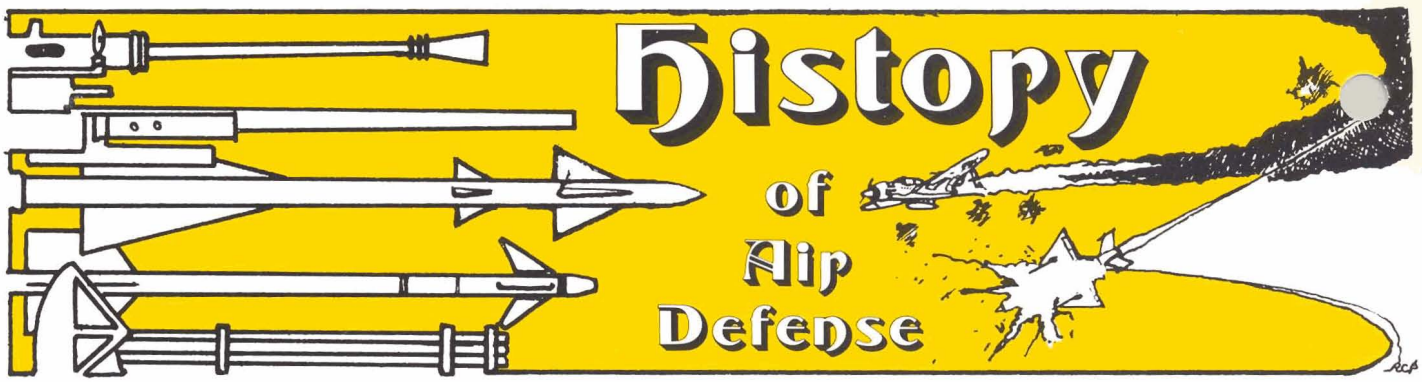
During the emplacement operations, the AAFU was visited by MG Shin, Hak Jin, Commander of ROKAADCOM, and BG John B. Oblinger, Jr., then Commander of the 38th ADA Brigade. The two commanders wanted to view the AAFU during emplacement rather than after it was set up to see the US and ROK air defenders working together.

After emplacement, the joint AAFU was ready for the final test that would determine the success of the operation — the operational readiness evaluation (ORE). At 1300, a joint ROK/US ORE team called the AAFU to Blazing Skies. The expected problem of communication did not materialize because a sufficient number of ROK personnel spoke English and a KATUSA (Korean Augmentation to the US Army) soldier from Battery B was stationed at the launcher section control box along with a ROK soldier.

The ORE was rated "operational" with the fire control element being rated "satisfactory" and the launcher section getting a "superior" rating.

The first ROK/US reconstitution exercise proved to be a success; in fact, personnel involved were surprised to see just how smoothly the operation went. Still, however, valuable lessons were learned that will be applied to future reconstitution exercises.

Lieutenant Colonel Peckham served as Commander of 1st Battalion, 44th Air Defense Artillery in 1975-1976. Prior to that time he served 3 years as Associate Professor of Electrical Engineering at West Point. His present assignment is Deputy Director of Materiel Systems Division, Directorate of Combat Developments, US Army Air Defense School.



New Year's Day 1945, *in what was probably the most extensive single day's antiaircraft activities in the European Theater, no less than 465 enemy aircraft were destroyed or probably destroyed by antiaircraft fire.*

From the beginning of the Ardennes offensive in December, the German Air Force had been especially active. Heavy and determined attacks had been made against Allied positions. These attacks reached a climax on 1 January 1945 when at least 800 planes attacked Allied forward airfields. This was the first large-scale effort by the Luftwaffe since D-day, and it proved to be their last. Altogether, some 17 different airfields in Holland, Belgium, and France were attacked.

Intelligence reports indicated that the operation was " — a brilliantly planned but not so brilliantly executed effort to wipe out the Allied Tactical Air Forces." The objectives of the raid, planning for which was started in November, were eight Allied airfields behind the British and American lines. The Germans endeavored to surprise and saturate the Allied defenses and to neutralize the warning system. The approach was made at treetop level by ME-109s and FW-190s, led by Ju-88s. Although a measure of surprise was achieved, many pilots lost their way and either attacked the wrong targets or otherwise failed to reach their objectives.

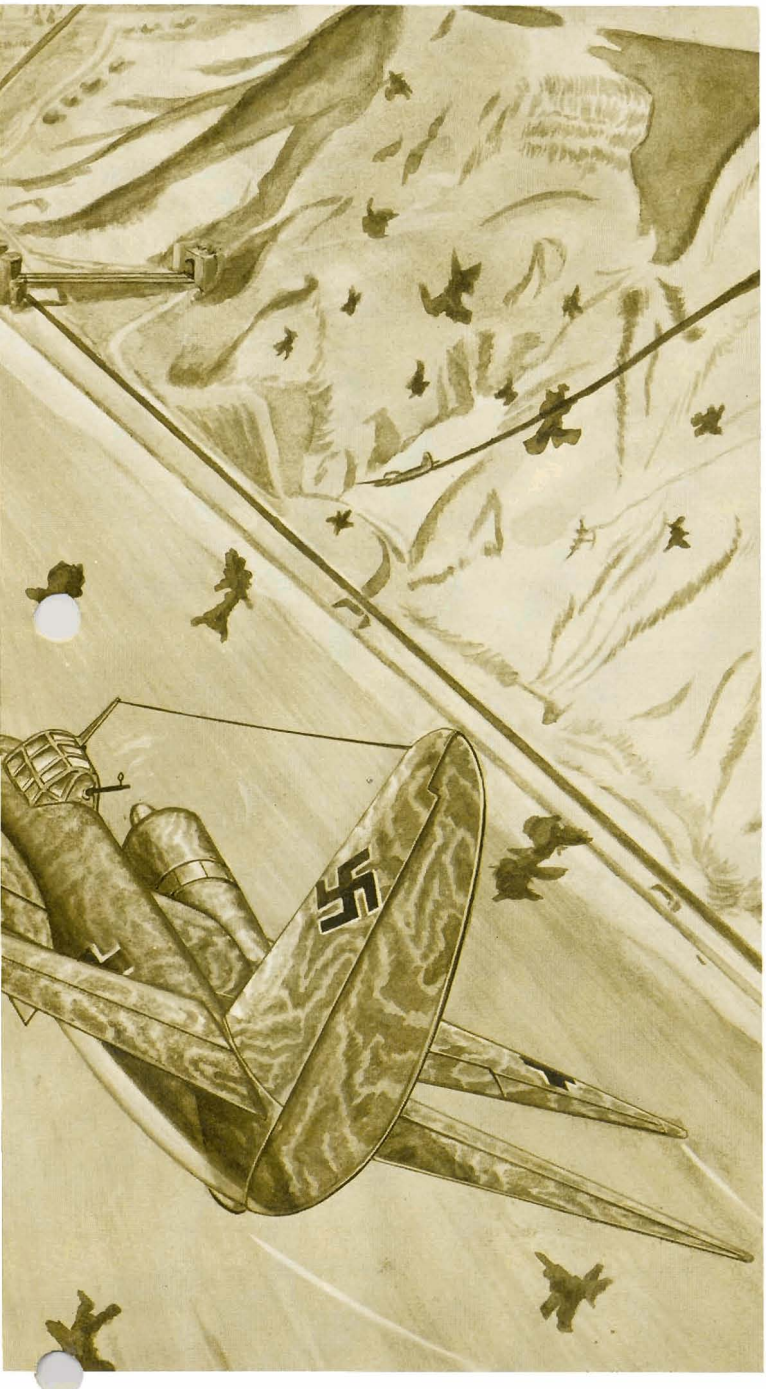
The action was relatively short-lived, lasting only from about 0800 to 1100. The heaviest attacks were in the Third US Army area, but activity was heavy all the way north and into the 21st Army Group sector. Generally, no warning was received in the British sector, but from 2 to 6 minutes' warning was received by American units.

Allied losses on the ground were high: 127 planes destroyed and 133 heavily damaged, mostly British. Replacements were available, and there was little overall effect on subsequent Allied operations.

A few Germans were shot down by Allied fighters,

but the battle was an antiaircraft one. Confirmed antiaircraft results were:

	Destroyed	Probably Destroyed
21st Army Group	122	32
12th Army Group	194	67
6th Army Group	2	1
2d TAF (RAF Regt)	43	—
IX Air Defense Command	2	2
Totals	363	102



The losses suffered by the Luftwaffe during this single engagement were disastrous. This attack constituted, for all practical purposes, the end of the German aerial offensive. Following the attack, the Germans continued operations until the end of the war, but on a very limited scale.

Some 2 months after this eventful day, one of the greatest concentrations of Allied antiaircraft weapons ever assembled occurred when US Forces reached Remagen, Germany.

The Remagen Bridgehead.

On the afternoon of 7 March 1945, the 9th Armored Division of the First US Army reached Remagen and captured the Ludendorf railway bridge intact. Elements of Combat Command B crossed the bridge and were the first Allied troops on the east bank of the Rhine River. The First Army commander elected to exploit this bridgehead and to reinforce it as quickly as possible. To provide an effective antiaircraft defense of this vital area, units were withdrawn from the Roer River crossings and immediately deployed at Remagen.

The first battalion whose elements reached and crossed the bridge was the 482d AAA AW Battalion (SP), the organic antiaircraft unit attached to the 9th Armored Division. Thereafter, the buildup proceeded at a rapid rate until, within a matter of days, the Remagen bridgehead had become the most heavily defended vulnerable area since the Normandy beaches. The 16th AAA Group (attached to III Corps) was responsible for antiaircraft defense of the crossing and was later assisted in its mission by the 11th AAA Group. Peak defense was reached on the 14th of March.

Enemy communications at the time of capture of the Ludendorf bridge were extremely poor, and no air attacks were launched against the bridge until late in the afternoon of 8 March. By that time, sufficient automatic weapons were in a position to meet the initial attacks. The enemy's air effort was persistent but usually executed by aircraft operating singly or in pairs, and no concerted attacks by large formations were attempted.

Although some sections of the 842d AAA AW Battalion (SP) arrived at Remagen on the afternoon of 7 March, it was not until 0300 on 8 March that the majority of this battalion was in position. By this time, 1½ batteries were on each side of the river.

The 634th AAA AW Battalion (M) crossed the Rhine on the morning of 8 March and immediately began to prepare positions on the east bank. the 413th AAA Gun Battalion (M) moved into position

on the west bank of the Rhine at the same time. These deployments were effected under constant German artillery fire which continued for the first few days.

Effective from 1900 on 8 March, the Remagen Inner Artillery Zone, an area of 15,000 yards radius and with a height limitation of 10,000 feet, was defined and promulgated.

It was intended to deploy two gun battalions on each side of the river as soon as possible, but the east side of the river was as yet untenable for 90-mm guns. The 109th AA Gun Battalion (M) arrived on 9 March and took up positions on the west bank, the defenses of which were also augmented by the addition of the 563d AAA AW Battalion (M) which had the supplementary mission of defending corps artillery.

On 11 March, one organic battalion from each of the 9th, 78th, and 99th Infantry Divisions and 7th and 9th Armored Divisions were attached to the defenses of the bridge. On this date, and the days following, resources were further increased by the addition of the 639th AAA AW Battalion and the 110th and 134th AAA Gun Battalions, which raised the total defenses to 16 gun batteries (all on the west bank) and 25 automatic weapons batteries (equally divided between east and west banks).

On 13 March, the 413th AAA Gun Battalion was able to cross the river, and the chain of command was strengthened by the arrival of the 11th AAA Group to which all battalions in the area were reattached while the 16th AAA Group reverted to its normal corps mission. The gun operations room for the Remagen area was established at the 11th AAA Group. On the same day, A Flight, 974th Balloon Barrage Squadron, RAF, arrived and was deployed within a 2,000-yard radius of the bridges. Balloons were flown at an altitude of 2,000 feet.

By 14 March, the gun defenses had been built up to the following formidable totals:

90-mm guns	64 (16 batteries)
M51 mounts (4 caliber .50 machineguns mounted in a power-driven turret on a four-wheel trailer)	128
M16 mounts (Half-track vehicle mounting 4 caliber .50 machineguns on a power-driven turret)	100
40-mm guns	216
M15 mounts (Half-track vehicle mounting one 37-mm gun and two coaxially-mounted caliber .50 machineguns on a power-driven turret)	24
Caliber .50 water-cooled machineguns	140

Coincident with the attainment of these peak defenses, the Remagen Inner Artillery Zone was declared a special area and was exempted from having to impose hold fires because of the presence of friendly aircraft, all of which were ordered to avoid the area. The size of the restricted area was increased on 17 March by the promulgation of an Inner Artillery Zone by night centered on the adjacent town of Plittersdorf. The radius of this zone was also 15,000 yards and height limitation 10,000 feet.

Thereafter, there occurred little further change in the total number of units deployed, though considerable movement was occasioned by the return to divisions of their organic battalions and their replacement at Remagen by Army and corps units.

The defenses of the bridge involved 90-mm AA guns, automatic weapons, and barrage balloons manned by the 974th Squadron, RAF. Searchlights and an SCR-584 radar were employed in river surveillance upstream of the bridges to detect German efforts to mine the river. By 16 March, the day on which the Ludendorf bridge finally collapsed due to stresses unrelated to air attack, additional bridges had been completed in the Remagen area, and the antiaircraft defenses had successfully completed their mission. No enemy aircraft had damaged or destroyed the Ludendorf bridge or any other bridge in the Remagen area.

A total of 442 enemy aircraft were active over the Remagen crossings and bridgehead area during the period from 7 to 21 March 1945. Of these, 142 were destroyed and 59 probably destroyed by antiaircraft fire.

At 1800 on 21 March, the special status of the restricted area at Remagen was terminated and it reverted to normal Inner Artillery Zone procedure.

Tactics employed by the Allies at Remagen will be discussed in the next issue of AIR DEFENSE Magazine.

— Ed.

humility

as a leadership trait

STAFF SERGEANT ROBERT R. CORDELL

The Army's leadership bible, FM 22-100, details well the fundamentals of leadership in today's Army. A recent review of this publication, especially Chapter 2, left me with a feeling that there may be a place for one more leadership virtue — Humility.

Humility, perhaps described best as having courteous respect or being modest in spirit, is a leadership trait that distinguishes an able leader. The continence of a humble leader radiates an air of tranquility and self-control so valuable in the heat of battle. Also, in the training environment of peacetime the esteem of a capable leader shines forth as a beacon.

> Humility must always be the portion of any man who receives acclaim earned in the blood of his followers and the sacrifices of his friends. — Dwight D. Eisenhower

Looked upon as an element of self-discipline, humility might be considered a part of the concept of mental behavior, regimenting one's thinking into the intent of placing concern for others first. A company commander's sharing of the good and the bad, the dangers and security, gives evidence that he considers his subordinates as important in their role as he is in his. Knowing that raising the prestige of others does not diminish your own position is in itself one of the fruits of humility.

In a graduation address at Fort Benning in 1974, General Melvin Zais carried home the theme, "You Must Care." He reflected on his long and distinguished career in the light that successful leaders he had known were those that cared. Caring, like humility, is realizing that without your subordinates "you ain't nothing."

Confidence, a firm belief in oneself and one's abilities, is not to be confused with a lack of humility. Rather, it may add to this characteristic. Every leader must scrutinize himself to know the limit as well as the threshold of his abilities. One danger linked with an inflated ego is the impediment to self-improvement. Having the sense of arrival at a degree of achievement all too often stymies personal growth, thus causing stagnation. Through acknowledgement of our faults, we may continue to progress.

In considering the adage, "know your abilities and accept your limitations," the philosopher Gracian concludes, ". . . disabilities, if they are recognized and heeded, could be compensated for easily, and soon; with care, the compensation could become the natural person." We can then see that perhaps the root of humility is honesty — honesty with one's self.

> The first step to knowledge is a realization of the lack of it. — David O. McKay

With the advent of human relations study in many of the Army's courses, Maslow's "Hierarchy of Needs" has been given wide exposure. So while we are busily engaged in satisfying our ego needs and self-actualizing, the difference between self-actualization and self-centeredness must be realized. The need for a feeling of personal self-worth is fundamental to a healthy personality. Those in leadership positions should understand the direction of Maslow's theory. However, ego and developmental needs are to be met without the often resultant air of superiority. Neurotic, inferiority feelings are at times easier to cope with than neurotic superiority passions.

A basic requirement of anyone cast in a leadership role is the development of his subordinates. Along with the delegation of authority, this is a constant and difficult leadership challenge. However, a leader who is sure of himself and his abilities

is far better prepared to accept this leadership opportunity. A lack of humility often reveals itself as apathy, thus countering any initiative and sense of responsibility that subordinates might have.

The words of Brigham Young, "When a man is proud and arrogant, flattery fills him with vanity . . . ," ring true as we consider award recommendations and efficiency reports. It is common knowledge that inflation has eroded the value of efficiency reports as the management tool they were designed to be. Similarly, award recommendations are often filled with superfluous adjectives and embellishments so as to appear as if the intended recipient "walks on water." It doesn't take many of these ego trips to cause a person to begin thinking that maybe he is the best thing that has happened to the Army since Yorktown.

The desired modesty of spirit is countered by many things that we in the military have been taught since the day we first raised our right hands. Drilled into us has been pride — pride in ourselves, the uniform we wear, the unit to which we are assigned, and everything these stand for. This esprit de corps is an essential part of every successful military organization. It is the "green tape and commo wire" that holds a military unit together. In military units this pride, this sense of belonging to the best, is a security blanket made necessary by turbulent times within our service.

Knowing that raising the prestige of others does not diminish your own is in itself one of the fruits of humility.

Pride in one's unit is somewhat different, however, from pride in oneself. Each of us must take pride in ourself and our job within the Army. Yet, personal pride must be tempered — tempered to a degree with meekness forming a mix of righteous self-confidence coupled with a knowledge of one's flaws — a mixture to be labeled as humility.

One interpretation of the Freudian concept of the id is described as an unconscious, raw, primitive, struggling for gratification. This aggressive natural force serves often as an obstacle to regarding our own achievements as anything less than the highest. At the same time others' accomplishments may be given minimal recognition. An individual's maturity may well be gauged according to his self-control (control of the id).

The saying, "giving credit where credit is due," is familiar to all. Any leader who fails to realize that the squad leader is not the squad any more than the division commander is the division is himself a failure. The Army's strength is in the quality of its squads, platoons, and companies. And it is the people in these units that must receive credit for the success (or failure) of the mission. It is these people who merit the praise if any is forthcoming. It is these people who are to wear the medals. And a perceptive (and humble) leader will see that they do. This commander obligates himself in seeing that success is not his alone but a result of teamwork.

Humility + Leadership Ability =
— Respect: self-respect, mutual respect.
— Leadership with grace.
— Concerned leadership.

The greatest of faults is to be conscious of none. — Thomas Carlyle

Let's take a look at three leaders from the viewpoint of their humility:

General Pershing termed him the outstanding soldier of the AEF; Marshal Foch called him the first soldier of America; but, Sam Woodfill considered himself just a country boy from Indiana. Woodfill was a hero, a hero with modesty and grace. Being awarded the Medal of Honor did not change his courteous, dignified manner. He was a leader who was fully aware of his abilities but had the humility not to let his success hinder him — a simple, rustic fellow whose leadership ability was enhanced by his self-confidence coupled with self-abasement.

"Humility and strength." These two words best summarize the character of General Creighton W. Abrams. Considering himself "cannon fodder," Ab-

rams was violent in the execution of war; yet, he assumed a low key role when it was appropriate, as it was at the University of Alabama. His personal concern for the individual soldier and his problems is said best in his own words, "People aren't in the Army, they are the Army." Even after attaining the top position in the Army, his quiet dignity continued. General Abrams' power with grace is worthy of the emulation of every leader.

At first thought it may seem strange to see the name of George S. Patton, Jr. appearing in an article concerning humility; however, there is a correlation. I feel that the flamboyant, rough, tough Patton was far overplayed for the press while helping to fulfill America's need for a hero during the trying days of WW II. I also feel that, to some extent, Patton assumed the attitude of bluster and boast because the situation necessitated such a showman. Seeing the response of his tankers, willing "to go to hell and back" for him, may well be proof that his style of stimulation was in fact a requirement for the mission he faced. Beams of humility become obvious if we look aside from the folk hero image. While in North Africa, Patton proved to be a superb diplomat yet did not consider himself such. He turned down the opportunity to become an ambassador. Even taking 5 years to graduate from West Point does not detract from Patton's being a military scholar par excellence. Learning from his mistakes perhaps propelled him to greater academic heights. Recognizing his own shortcomings in staff work, Patton surrounded himself with a capable staff to compensate for this particular weakness. Finally, aboard the Augusta enroute from Norfolk to Casablanca, he spent the time reading the Koran, not only in preparation for the Moslems to be encountered in North Africa, but as a source of spiritual strength. General Patton was a man of true humility, a humility difficult to see and often difficult to understand.

Humility is the most difficult of all virtues to achieve; nothing dies harder than the desire to think well of oneself. — T. S. Eliot

Drilled into us has been pride in ourselves, the uniform we wear, and the unit in which we serve.

What humility isn't:

— something once you have it you always have it. If you are proud of your humility, you aren't humble.

— an excuse for not knowing. Being able to identify your weaknesses may be an indication of humility but it is not an excuse for ignorance.

— a reason not to correct or pass on criticism. Okay, so mistakes have been made and the responsibility belongs to the leader; the subordinates need to know and deserve to know their shortcomings.

— moping or yielding to gloom.

— a substitute for any of the other leadership traits.

A humble leader is an example setter; one who cares; one who shares. A humble leader will succeed because his people will give their all for him. Humility, freedom from pride and arrogance, ". . . prepares the mind to receive knowledge and the heart truth. Humility is the solid foundation of all the virtues . . ."

Staff Sergeant (P) Cordell is serving as NCOIC, NATO Liaison Office, Turkish General Staff, Ankara, Turkey. A 9-year Army veteran, he has served overseas in England and Germany with USACOMZEUR and in Vietnam with the 46th Engr Bn and HQ USASUPCOM, Saigon. A graduate of the University of New Hampshire, SSG Cordell has also graduated from the USMC Command and Staff College and worked as part-time management instructor for the City Colleges of Chicago.

WHAT DO YOU DO NOW,

LIEUTENANT?

Prepared by Tactics Department, USAADS

SITUATION

You are the leader of a Vulcan platoon in Task Force 2-69 Armor. The combined arms team consists of two tank platoons, one mechanized infantry platoon, and your Vulcan platoon. The combined arms team is a part of a larger element that has been given the mission of capturing a key enemy position as part of the overall division offensive operation. Your platoon's mission is to provide air defense for the combined arms team of the task force.

Current intelligence information indicates that the enemy air threat will probably consist mainly of HIND helicopters using rockets and SAGGER antitank guided missiles. It is important to remember that the HIND helicopter can standoff at 3,000 meters and engage targets. At that range your Vulcans cannot effectively engage a target. Proper application of passive air defense measures, such as terrain masking, will not only provide you with some degree of protection, but will also decrease the range at which you can be detected and subsequently engaged. The enemy has a high-performance capability, although presently this threat is considered minimal. The air defense warning is RED and the weapons control status is WEAPONS TIGHT.

The terrain in the area of operation consists of gently rolling hills with woods and trees slightly restricting fields of fire.

The team leader informs you that he will use the traveling technique from the assembly area to the LD because enemy contact is not likely and speed is of the utmost importance. The team will move on a column axis with platoon interval based on visibility, terrain, and other usual constraints. Within platoons the vehicles are dispersed but maintain visual contact.

Once the LD has been crossed, the team will use the traveling overwatch technique because of the likelihood of enemy contact. The team keys its moves on the trail element of the lead platoon, always maintaining visual contact. Each vehicle in the team uses the terrain to reduce its exposure. This is not a fixed formation and the distance between vehicles will be governed by visibility and terrain.

Once the team makes contact, receives enemy fire, or when directed by the team commander, it will use the bounding overwatch technique. The overwatch element covers the progress of the bounding element from covered, concealed positions from which it can fire on enemy targets. It can immediately support the bounding element by fire if the bounding element comes under enemy engagement.

As the Vulcan platoon leader, you should now be reviewing the employment guidelines to determine how you will position your fire units to support the flexible operation most effectively.

GUIDELINES FOR EMPLOYMENT

The Vulcans should be positioned to maintain air defense coverage forward of the maneuver element to provide *early engagement* of attacking aircraft.

Vulcans should also be positioned to insure *mutual support* between adjacent Vulcans so they can cover each other.

Vulcans should also be positioned within the formation of the supported unit and in close proximity (50-100m) to their weapons to enhance survivability against enemy ground attack.

When the Vulcan unit is in support of a maneuver element, the platoon leader should adhere to the following:

- Deploy Vulcans in pairs to provide mutual support.
- Coordinate placement of Redeye if they support the maneuver element.
- Use movement techniques of the supported unit.
- Locate Vulcans behind moving elements.
- Provide air defense coverage forward of the lead elements.
- Do not interfere with maneuver of supported unit.
- Stay near the commander.

PROBLEM

What are your actions?

How do you place your fire units to support the maneuver force?

SOLUTION

Since your mission is to provide air defense for the maneuver element, you must take action to insure that your fire units are situated in accordance with the employment guidelines.

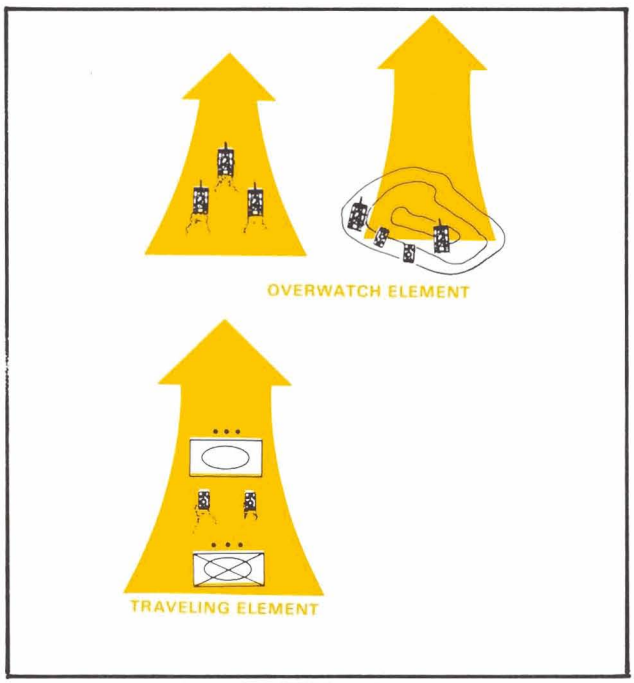


FIGURE 1

In the traveling position you should recommend to the team commander that two Vulcans be employed trailing the lead platoon. The distance between the tanks and Vulcans depends on the terrain and visibility. The other two Vulcans should be preceding the trail platoon.

Once the team moves to the traveling overwatch technique (fig. 1), your Vulcans should stay in the same relative position as in the traveling technique. The two lead Vulcans should move with the overwatch element of the lead platoon but not interfere with their maneuver or move in front of them and mask their fires. The two rear Vulcans should stay in front of the trail platoon.

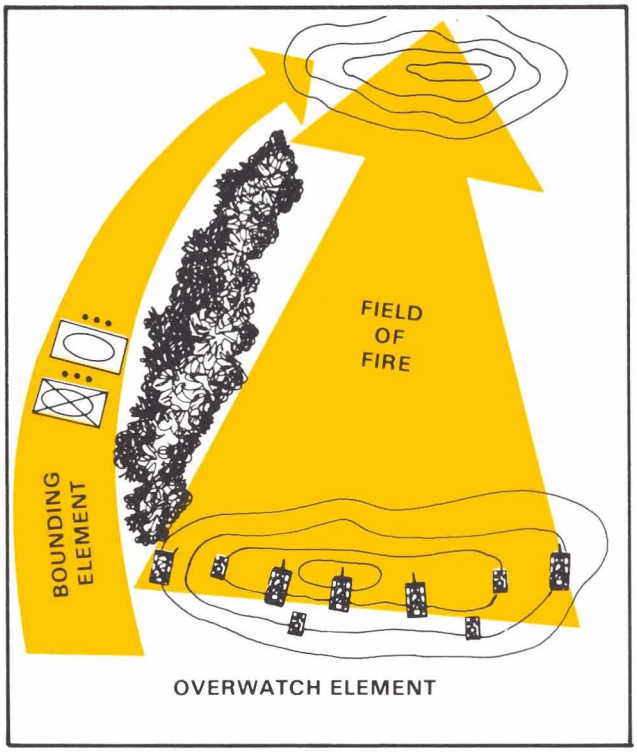


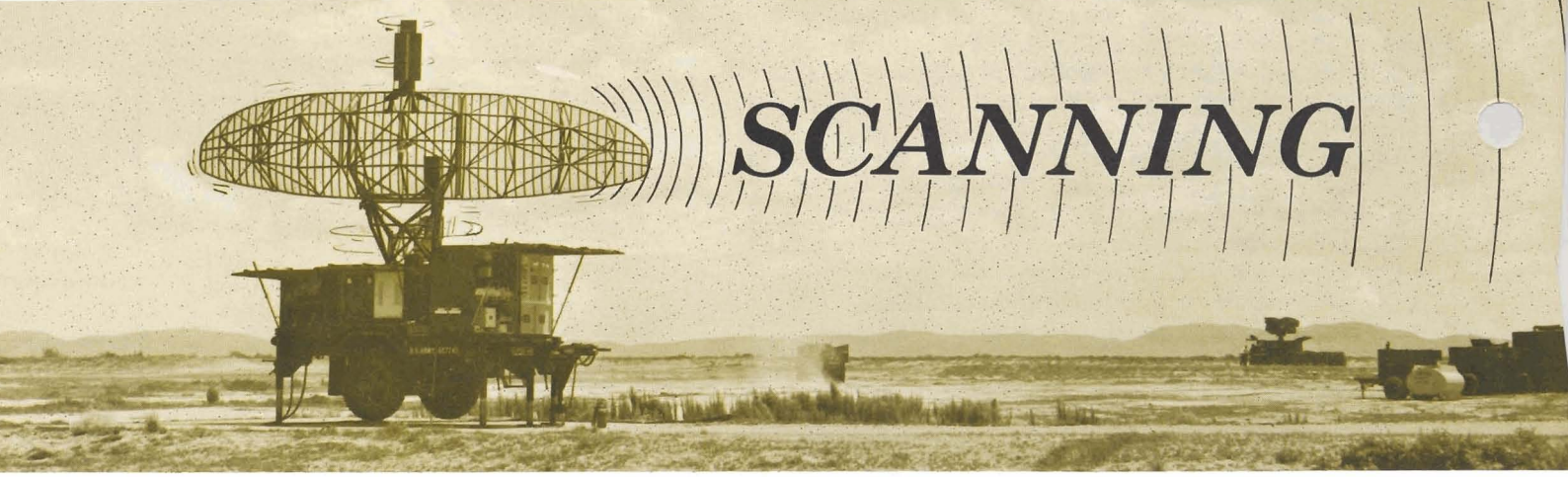
FIGURE 2

When the combined arms team moves using the bounding overwatch technique (fig. 2), the bounding element moves to a forward position from which it can take up the overwatch mission. The bounding element is the element that should make initial contact with the enemy. The length of the bound depends on the terrain, range of the overwatch element's weapons, and visual contact between vehicles. If conditions permit, the entire Vulcan platoon will remain with the overwatch element. The Vulcans should not move forward of the overwatch element but must maintain air defense coverage forward of the bounding element's next position. A Vulcan section may accompany the bounding element if:

- A high probability of an attack against the bounding element exists.
- Coverage cannot be maintained from the overwatch position because of terrain interference or range limitations.

Before Vulcans are emplaced with the bounding element, consideration should be given to the high risk involved and the fact that Vulcan assets are few and, if lost, are difficult to replace.

With proper planning and the employment guidelines, you, as a Vulcan platoon leader, can provide continuous, effective air defense for this and any other operation you may be called upon to support.



PATRIOT TEST A SUCCESS

The first tactical prototype of the "brain" of the Army's new Patriot air defense missile system, Firing Platoon No. 1 (FP-1), has made its successful debut at White Sands Missile Range, New Mexico, as Patriot intercepted a Firebee drone flying in a countermeasures environment. FP-1, comprising the radar, engagement control station, and launcher, acquired and guided the Patriot missile to target intercept despite countermeasures generated by an Air Force T-39 jet equipped with a standoff jammer. The drone was flying at medium range and high altitude.

The firing, the 15th fully guided Patriot flight, was significant because it is the first test using the tactical fire platoon station and the first attempt to intercept a target in a countermeasures environment. The missile was launched from its sealed tactical canister which serves as both shipping container and launch rail.

Following some 4 months of search, track, and guidance tests against both benign and ECM targets, the live shot continues Patriot's record as one of the most successful flight programs in Defense Department history and paves the way for more sophisticated and complex flight tests.

For Patriot, 1976 has been a very good year. The Army concluded a 14-missile flight test program to prove out Patriot's guidance technique earlier this year and got the green light to resume full-scale development. In August, the Army awarded a $425 million contract to Raytheon Company, Patriot prime contractor, to complete its portion of engineering development. Under the 49-month contract, Raytheon will design, build, and test three additional sets of tactical Patriot equipment and will provide documentation to support initial production.

Patriot will be the cornerstone of field Army air defense against medium- to high-altitude targets in the sophisticated, highly-technical land warfare environment predicted for the 1980s and beyond. Being developed to replace both Hawk and Nike Hercules, Patriot features a high kill probability and fast reaction time and can handle saturation attacks against highly maneuvering targets in an intense countermeasures environment.

The highly mobile, all-weather Patriot employs a multifunction, electronically scanned, phased array radar (controlled automatically by a digitial computer) and a guidance technique that uses command guidance to midcourse, followed by a track-via-missile terminal phase to accomplish intercept. These features, coupled with automated built-in test equipment, reduce manpower and maintenance requirements over existing systems.

Martin Marietta Corporation is principal subcontractor to Raytheon, responsible for the missile, canister and launcher and Thiokol Company is subcontractor for the single-stage solid propulsion unit.

REDEYE TRAINING NOTE

Active Army, US Army National Guard, and Reserve units can now obtain the Redeye TV trainer mounting brackets for Redeye gunner training by requesting them from their local Training Aids Support Office (TASO). TC 44-7 (TV Redeye Trainer), also available from TASO, explains how to prepare the trainer for Redeye gunnery training.

An addendum to TC 44-7 is being published and will include the following information not contained in the basic circular.

- The M49 Redeye tracking head trainer should be pumped to the proper pressure level before affixing the bracket and camera to the M49.
- When pressure in the M49 is expended, only the camera need be removed to enable free pump handle movement.
- When placed on the mounting bracket, the camera is triggered by pressing the button located at the lower right on the front panel to activate the recording process.

HAWAIIAN UNIT CHECKED BY FORT BLISS EVALUATION TEAM

An evaluation team from the 1st Bn (C/V), 55th ADA, 5th Mechanized Division, located at Fort Bliss, Texas, recently conducted a Vulcan annual service practice (ASP) evaluation of Battery B, 1st Bn, 62d ADA, 25th Infantry Division, headquartered at Schofield Barracks on the island of Oahu, Hawaii.

The purpose of using an evaluation team from another command was to obtain an objective ASP evaluation of the 1st of the 62d. While at Schofield Barracks, the evaluation team was also to train 1st Bn, 62d ADA evaluators in the conduct of Vulcan ASPs.

Areas evaluated included:

- Preparation for action drills that encompassed initial squad drills, bore sighting, drum loading, and target engagement procedures.
- Ground firing while moving through a 2-mile course configured to simulate enemy ground defenses.
- Ability of gunners to engage different types of aerial targets, including multiple targets.

Target engagement was accomplished using ballastic aerial targets (BATS) launched from two different firing points. This arrangement provided the gunners the opportunity to fire at crossing and outgoing targets.

During the ASP, Major General Scott, the 25th Infantry Division Commander, visited the site and discussed the importance of Vulcan in support of his division.

VULCAN NICAD BATTERY CHARGERS

The US Army Air Defense School has been investigating the possibility of obtaining a high-quality NICAD battery/charger analyzer for field use. A test conducted at Fort Hood, Texas, under the sponsorship of HQ TRADOC Combined Arms Test Activity (TCATA), formerly MASSTER, indicated that the commercially available Christie analyzer/battery charger RF80GT was superior in performance to the ECOM developmental item AN/USM-490 analyzer/battery charger.

The Army will continue development of a NICAD battery/charger analyzer; however, it could be 3 years away.

The Christie is currently being used by at least six C/V battalions (purchased locally under the provisions of appendix D, para 3g, AR 310-49) and has also been used for several years by field units participating in REFORGER exercises. All users reported that they experienced no failures with the Christie.

The Christie is further identified in SF 700-20 as line item A 55070 NSN or ACVC 6130-00-562-8900, analyzer battery charger/analyzer Christie Elec. Unit, Price $3,106.00, Budget code 5, reference data MDI-RF80GT.

SOLDIER FIRES PATRIOT

On 28 January 1977, SGT John Pearce of White Sands Missile Range became the first soldier to fire the Patriot air defense missile.

The missile, which was fired during a system flight test, intercepted a maneuvering drone in the presence of a stand-off jammer.

MARINES EXCEL WITH REDEYE

Marines of the 4th Marine Aircraft Wing's 4th Forward Area Air Defense Battery at Pasadena, CA, have for some time claimed to be the best Redeye gunners in the business. They not only validated that claim recently but one of them became the Corps' first Redeye "Ace." Twenty Marines armed with the Redeye scored 20 "kills" with 20 shots, and SGT Robert E. Bland, a Redeye instructor for the Pasadena Marine Air Reserve Missile Training Unit (MARMTU), recorded his fifth consecutive "kill," which according to MAJ R.R. Borowics, Commander of the MARMTU, qualifies him as a Redeye "Ace." The 20 for 20 "kill" ratio and Bland's fifth "kill" were first-time achievements.

During the Battery's January drill, the 20 sharpshooters were presented Redeye pins, and SGT Bland was awarded a plaque designating him as the Corps' first "Ace."

Reserves handled the entire shoot, which included range control and complete launch control of the ballistic targets.

It's perhaps a little known fact, but 4th FAAD Battery Marines travel internationally to demonstrate their skills. They have participated in exercises in Norway, Denmark, and the Caribbean.

Brigadier General Robert S. Raisch, 4th MAW's Assistant Wing Commander, presents a plaque to SGT Robert E. Bland, designating him as the first Marine Corps Redeye "Ace."

With their experience and these credentials, the Pasadena missilemen's claim to being the "best in the Redeye business" is hard to deny.

NATO ECCM TRIAL

Responding to tasking by DA, JCS, and SHAPE, the MICOM Hawk Project Office has provided an evaluation team to support the recent NATO Trial of Live ECCM Training for the Allied Command Europe (ACE) integrated air defense system.

The North Atlantic Council recognized that the multipartite air defense system, composed of assets from the member nation, could not be successfully exposed, exercised, and trained in ECCM techniques at the national forces level. Therefore, SHAPE was tasked to implement and evaluate, through SHAPE Technical Center (STC), a training trial to ascertain the present NATO force structure capability to perform periodic live, defense-wide ECCM training. This task was inordinately complicated by the European civil constraints on peacetime electronic emissions and exercise artificialities prompted by contiguous Warsaw Pact national boundaries.

The MICOM team's specific support mission was to instrument and evaluate Hawk batteries in Germany and Italy to determine effectiveness, including operator and equipment response, of the ECM produced by NATO elements for live ECCM training. This was successfully accomplished during the Central and Southern Region trials in April and June 1976. Results of the MICOM evaluation, published in September 1976, have been briefed to the USAADS and US air defense forces in Germany and Korea. The final SHAPE findings are expected to be published in a classified format in early 1977. The report will be made available to air defense commanders at that time.

EXPANDED ROLE FOR HERC?

With the inactivation of the US Army Air Defense Command, the need for the Nike Hercules missile system in an air defense role was reduced drastically, relegating many Hercules systems to an excess status. But now, because of their surface-to-surface capability, the excess Hercules systems may again become active. It appears that they have the requisite capability and growth potential to help meet the interim need for a long-range weapon. Accordingly, USAADS has evolved a concept for employment of Hercules in a surface-to-surface role. It involves organizing reduced-size Hercules surface-to-surface batteries equipped with the excess equipment and satelliting the batteries on the existing air defense structure for support.

The concept has struck a favorable note with the TRADOC Commander; consequently, USAADS plans to demonstrate the feasibility of the concept through a live-firing program. A recommendation to field Nike Hercules batteries with surface-to-surface missions has been made contingent on the success of the feasibility demonstration.

Improved Hawk Package Training

MAJOR RAY T. SMITH

The end of 1976 saw the completion of a highly successful effort to convert United States Basic Hawk batteries in Korea to the Improved Hawk configuration. The conversion was unique in that it used a modified packaging technique to accomplish training and replacement of personnel.

The training was accomplished at Fort Bliss, Texas, by the Eighth US Army Improved Hawk Training Detachment (IHTD). The advantage in training in CONUS was that required released time from the peacetime air defense mission of the 38th Brigade was reduced. The low density of Hawk units in Korea did not allow for the extended release time required for new equipment training on site.

Only a nucleus of personnel from each battery was trained by the IHTD and not the entire unit. Also, personnel packages trained on equipment that belonged to the IHTD and not on equipment that would eventually be placed on site.

It was decided that a Hawk battalion at Fort Bliss (5th Bn, 57th ADA) would provide administrative and logistical support. The School Brigade would provide training guidance and the initial training outline would be prepared by the Department of Plans and Training of the Air Defense School. It was further decided that two battery packages would be trained each training cycle.

The IHTD was organized as follows:

- A command section (commander, first sergeant, clerk).
- A training section (two training officers, two Hawk warrant officers, a senior instructor in each Hawk maintenance area, two senior fire control area instructors, two senior launcher crew instructors, a Hawk target simulator mechanic, a target simulator operator).

Photos by Sp4 David R. Craig, Jr.

• A supply section (property book officer, supply sergeant, repair parts clerk).

It was also decided that each battery package would include all Hawk mechanics normally assigned to an Improved Hawk battery. This would provide fill for the batteries in Korea in these MOS upon arrival of the package. In addition, each Hawk battery package was filled with a nucleus of Hawk personnel that is common to both Basic and Improved Hawk, to include the battery commander, firing platoon leader, platoon sergeant, six fire control operators, and six launcher crewmen. Each battalion being trained also had a battalion control element that was assigned to and worked with the detachment during the time the first two batteries of the battalion were with the detachment. The battalion control element included the battalion operations officer and the electronic missile maintenance team. It deployed to Korea with the first two batteries and served as a project team for the conversion of the units there. All personnel, including those in the battalion control element, were assigned to the IHTD directly from the personnel supply stream.

The IHTD was issued two Improved Hawk systems. Each battery package being trained used one of these systems as its own in the conduct of the training program. The methods used in training personnel were firmly established only after the IHTD was activated.

All personnel were qualified to work in their jobs before they arrived in the detachment. The objective was to have the packages capable of working together as efficient teams when they arrived at their units on site in Korea.

One way teamwork could be developed was to have the battery packages handle their own training. The detachment made a training outline (adjusting it as the training cycles progressed) of those areas that must be covered by the packages in their training cycles. The outline was translated into a flexible training schedule that the batteries used in planning their training. Formal lesson plans were not used. Rather, use was made of field manuals, technical manuals, and crew drill and operational readiness evaluation procedures. Technical manuals were the constant companions of operators and maintenance personnel as they conducted periodic checks, orientation and alinement, integration of the system, and troubleshooting.

Training of personnel was conducted much like that expected in a unit on a tactical site. The advantage of the package was that training could be concentrated into a short period of time. Batteries had no commitment except training.

Teamwork was developed early in the cycle with periodic checks being performed together by operator and maintenance personnel. The battery commander and firing platoon leader exerted complete direction of the battery in managing the integrated system checks from the battery control central. Training progressed with battery orientation and alinement. Individual sections worked on launcher and fire control area crew drill and section maintenance problems. The entire battery performed integrated crew drills and operational readiness evaluations, including preparations for annual service practice.

Fire control sections got the most extensive team training because of the nature of their jobs. The tactical control officer (firing platoon leader) and members of the fire control crew work together in fighting the air battle. To provide a simulated combat environment for this effort, each system was provided the AN/TPQ-29 Hawk target simulator. Only the fire control crew is involved in the actual conduct of this training. The remainder of the battery conducts its own section training during this time. Fire control operators were shown how their equipment worked and were given instruction on how to combat jamming and enemy tactics that were put into the system by the simulator. The real training came when firing console operators were required to engage the simulated targets. Tactical evaluation runs (simulated air attacks) were pitted against the battery by the simulator crew. The tactical control officer made the tactical decisions necessary to engage the targets under the watchful eye of a detachment training officer. By the time the package undergoes a tactical effectiveness evaluation in its 7th week of training, the fire control crew is a cohesive organization.

During the time that fire control crews received simulator training, launcher crewmen received training on various aspects of their jobs. They became proficient in decanning and assembling ready rounds (missiles). The launcher crew mastered the crew drill. Instruction was given on operating and loader transporter and missile transfer procedures and transferring missiles from the pallet to the launcher.

The training schedule was built around the requirements of the launcher section and fire control

section. However, most of the men in each battery package were maintenance personnel and their needs for training had to be met in the program. Part of their training was in working with operators in performing periodic checks and other team tasks. It was also necessary that they get experience in troubleshooting problems in the Improved Hawk system. Training personnel to troubleshoot and correct problems was handled by having them solve actual problems as they occurred. As system problems would occur, battery warrant officers would attempt to isolate them to particular end items of equipment and have appropriate maintenance sections further isolate and correct the faults. This on-the-job training gave maintenance personnel experience that many of them did not have just coming out of schools.

Where possible, operators trained around equipment problems. However, much maintenance was planned for other than normal training hours, and maintenance sections were put on shifts similar to those on tactical sites early in the training cycle. If equipment problems during training hours interrupted training, corrections were made at that time. Most of the troubleshooting occured on shifts during other than training hours.

Each training cycle was 10 weeks in length, and package personnel spent 12 weeks with the detachment, including processing time. The first 7 weeks of training were used as outlined to this point. The last day or two were used for an evaluation by the Air Defense Center Test and Evaluation Team to evaluate the abilities of the fire control crews to engage targets in a simulated combat environment. Several evaluations were conducted on each package during this 7-week period, including at least one by the ADA Center Test and Evaluation Team. The real test of how effectively the battery packages could operate was made in weeks eight through ten.

The 8th week was used for a 4-day field training exercise (FTX). With the help of 5th Bn, 57th ADA vehicles and drivers, each battery package made one tactical move each day of the FTX. Aircraft were scheduled 1 hour each day for 3 days for air defense exercises. At least two operational readiness evaluations were administered each battery during the FTX by detachment and battalion control element personnel. Tactical moves included one move under blackout conditions for each battery. The FTX helped in the development and maturing of teamwork within the batteries. Night displacement required particularly careful planning to be accomplished at all, yet all batteries successfully displaced at night with minimal confusion. Battery personnel developed confidence in themselves and in the Improved Hawk system as they saw their abilities to become operational and engage tactical aircraft develop. Their confidence was further strengthened when the system seemed to work better in the field than in the previous training environment. With the test of the FTX behind them, the packages were moved to firing pads on McGregor Range on the 4th day of the exercise.

Batteries spent the 9th week at McGregor Range preparing for annual service practice (ASP) and the 10th week in the actual conduct of the ASP. It was here that the effectiveness of the team training could be determined. The battery commander was responsible to see that all requirements for the ASP were accomplished without confusion. Package personnel had to show their skills to evaluators as they prepared their systems for firing a live missile at a drone target. The score of the ASP served as the Air Defense Center's certification of the readiness of the battery package to be deployed to Korea and also served as the ASP score for the gaining unit in Korea for the current fiscal year.

The effectiveness of the training can be measured in the ASP scores of the 12 batteries that were trained. Scores ranged from 92.5 percent to 97.3 percent, the average being 94.6 percent.

Packages deployed to Korea after certification and became integrated with the gaining battery there. The package personnel helped prepare the new Improved Hawk equipment that arrived on site at the same time the package arrived and helped train personnel already on site on the operation of the Improved Hawk equipment. After passing a certifying operational readiness evaluation on site, the battery was declared an operational unit and assumed its role in the air defense mission of the 38th Air Defense Artillery Brigade.

The modified package training used to convert Hawk batteries in Korea was successful. Making battery leaders responsible for the training and maintenance of their own units during training was a key factor in this success. Being flexible with a training schedule, making maximum use of published materials, and hands-on (on-the-job) training were important factors. The training used by the IHTD demonstrated a method that could be used successfully not only for converting Basic Hawk units to Improved Hawk but in the initial deployment or conversion of any complex weapon system. This is something to think about for our future weapon systems.

Major Smith was commissioned in Artillery after completing Officer Candidate School in 1963. He holds a Bachelor's Degree in Physics from Brigham Young University. He has Hawk unit command and staff experience, as well as having commanded the Eighth US Army Improved Hawk Training Detachment. He is currently engaged in writing "How-To-Fight" manuals for Directorate of Training Developments, US Army Air Defense School.

ENLISTED CAREER NEWS

SOLDIER'S MANUAL DISTRIBUTION

TRADOC has announced that no soldier will be penalized if he did not receive his Soldier's Manual.

If a soldier fails to receive his manual because of distribution problems, it would be grossly unfair to require him to take the SQT (Skill Qualification Test).

The intent is for every soldier to have personal copies of the Soldier's Manual covering his MOS, skill level, and next higher level 6 months prior to the SQT. Since a commander has 6 months in which to schedule the SQT, each soldier should have adequate time to get ready for his test.

Some units experienced a shortfall in initial Active Army distribution and some soldiers scheduled to participate in the October-to-December shakedown of the system could not participate.

The distribution problem is being corrected. Test control officers (TCOs) provide information on distribution shortfall with bulk shipments sent to the TCO to fill stated shortages. To assure proper distribution of MOS 11D and 11E manuals for the April 1977 SQT, a quick-fix intensively managed special printing and distribution system is being used.

Shipments during FY 77 will now be accomplished by sending Soldier's Manuals to battalion rather than company level. TCOs will also be provided bulk shipments for replenishment. Soldiers graduating from AIT or one station unit training will receive their copies before leaving for their first permanent assignment.

The new system will also provide extra copies as another means of preventing shortfalls.

ARMY PREPARES SOLDIERS FOR CIVILIAN LIFE

Soldiers looking toward the future and civilian life can prepare for the transition by taking part in the Army-wide apprenticeship program. Soldiers can now train in an MOS and become qualified journeymen in that MOS specific skill through the apprenticeship program.

The program was designed to gain formal recognition and certification of Army skills by civilian employers. The soldier who completes the program will be competitive in a civilian trade. Upon successful completion of the program, he or she will become a certified journeyman in the MOS and the US Department of Labor will award a certificate of apprenticeship completion.

Participation in any of the programs is voluntary. A soldier's MOS must match the apprenticeship program entered, and the soldier must be performing satisfactorily in that MOS. A specified number of hours of apprenticeship training must be completed to be certified a journeyman in that skill. In addition to on-the-job training, a minimum number of hours of formal, related instruction is required.

Nine MOS are already part of the program. The Army Transportation School at Fort Eustis, VA offers apprenticeships in the following areas: sheet metal worker (aircraft); hull repairer, ironworker (boatbuilder, steel); electrical mechanic (aircraft); and marine heavy duty mechanic (heavy duty mechanic, diesel).

The Signal School at Fort Gordon, GA offers radio communications technician and aircraft electrical mechanic apprentice programs; the Ordnance School at Aberdeen Proving Grounds, MD, auto mechanic; the Engineer School at Fort Belvoir, VA, operator mechanic; and the Quartermaster School at Fort Lee, VA has the cook apprentice program. The program will eventually have 60 MOS.

E-7 BOARD CONVENED

A DA E-7 selection board convened 11 January 1977. In addition to selecting individuals for promotion to E-7, the board screened records of E-6s who were considered unsatisfactory performers under AR 600-200. Those E-6s who meet the primary and secondary zone considerations but are ineligible for promotion because of education will be screened for the Qualitative Management Program.

The primary zone includes all E-6s on active duty with a date of rank earlier than 30 September 1971. The secondary zone will include E-6s with a date of rank between 1 October 1971 and 30 September 1974. All individuals must have a high school education or an equivalent GED to be considered.

An exception to the promotion policy will be E-6s who will complete 24 years of active service by 30 April 1978 without regard to their date of rank. These individuals will receive one consideration for promotion in the primary zone.

Individuals in the secondary zone of consideration with ETS prior to 30 June 1977 will not be permitted to reenlist until the results of the board are announced. Extension of terms of service will be authorized in some cases. Soldiers with assignment orders or who receive assignment orders and do not have enough time remaining to complete the assignment will be allowed to extend for the minimum amount of time to fulfill the assignment. All other individuals in the secondary zone with ETS prior to May 1977 can extend up to 30 April 1978.

E-6s are encouraged to review their files completely to insure that all pertinent data are in the records.

ACCELERATED SRB/VRB PAYMENTS

Selective and Variable Reenlistment Bonus (SRB and VRB) recipients facing legitimate financial hardship or experiencing compelling compassionate reasons are entitled to apply for accelerated payment of one or more annual bonus installments under the provisions of paragraph 9-15, AR 600-200 (Change 57). These requests are not approved automatically, however. As final approval authority, MILPERCEN's Monetary Incentive Management Branch (MIMB) evaluates each request for accelerated payment on an individual basis.

An accelerated bonus payment is not intended to alleviate indebtedness caused by financial mismanagement on the part of the soldier or his dependents. Instead, payment is designed to help the soldier back into a position whereby he can meet his monthly expenses without suffering financial strain. Normally, requests involve situations in which the soldier's net monthly income (including his wife's) is used for payment of debts and normal living expenses, leaving little or nothing for miscellaneous expenses or emergencies. Cases of severe financial hardship generally will warrant accelerated payment of not more than two bonus installments.

Depending on individual circumstances, accelerated bonus payments may be approved for compassionate reasons. Examples include an immediate need for financial assistance to cover funeral expenses or to pay medical costs not covered by military or commercial insurance plans.

To qualify for accelerated payments for compelling compassionate reasons, MIMB requires applications supported by verification statements from doctors, lawyers, Red Cross representatives, clergymen, or the soldier's commanding officer. If approved, either one advanced installment or two accelerated payments normally are authorized and paid.

ALTERNATE APOE OPTION

Soldiers on orders for overseas may choose to report to an alternate Aerial Port of Embarkation (APOE) at their own expense. The current CONUS APOE options are McGuire AFB, NJ, or Charleston AFB, SC for Germany-bound troops.

Those on orders to Korea may fly out of Travis AFB, CA, or Seattle-Tacoma International Airport, WA.

The alternate APOE policy was adopted to cut possible financial hardships on troops. Many soldiers, especially recent AIT graduates, take leave before they depart for oversea stations. Often, they may be closer to an alternate APOE that is not listed in their assignment instructions.

Regardless of which APOE site the soldier selects, the government will pay a travel allowance only to the APOE nearest the soldier's last duty station.

Some soldiers choosing an alternate have miscalculated the time required to reach the APOE. All soldiers moving overseas must report at least 1½ hours prior to the departure of the flight. The flight time is listed on the Military Transportation Authorization (MTA) as item 10. Soldiers arriving later than the required 1½ hours prior to takeoff will not be allowed to board the flight.

NCO ACADEMY OPENS

A new concept in NCOES—an NCO Academy for the lower-ranking soldier — is being shaped at the US Army Air Defense School.

Designed to develop leadership skills and techniques in the combat arms soldier, the academy will conduct both a Primary NCO Course for Combat Arms (PNCOC/CA) and a Basic NCO Course for Combat Arms (BN-COC/CA). Instruction in the two courses will focus on nine combat arms MOS: 11B, 11C, 11D, 11E, 12B, 13B, 13E, 16P, and 16R.

The PNCOC/CA — for soldiers in grade E-4 — is branch immaterial and will train soldiers for key duty positions of grade E-5. The course is expected to become a mandatory requirement for promotion to grade E-5 in the future for soldiers serving in the nine combat arms MOS.

The 4-week PNCOC/CA block of studies is divided into two phases: skill development and practical application. The student will first master leadership and training techniques, then will apply those skills in a combat-type exercise where he will be required to lead and train his peers in selected tasks.

The BNCOC/CA, also spanning 4 weeks of instruction, is a revised version of the basic course formerly taught at service schools but discontinued last April. Aim of the comprehensive training course is to develop a weapons system/equipment expert competent in skill level 3 critical tasks in his MOS, as well as to develop a skilled NCO who can effectively train and lead his subordinates.

Consisting of three phases — Pretesting and Performance-Oriented Training, MOS Unique Training, and Field Training — BNCOC/CA is designed to train soldiers in grades E-4 and E-5 who are actually performing a staff sergeant's duties in one of the nine MOS listed above and soldiers preparing to perform those duties.

The NCO Academy opened its doors to the first BNCOC/CA class in early January. Late February is the scheduled starting date for the PNCOC/CA class.

Named to the prestigious position as the first Commandant of the NCO Academy is CSM Wallace E. Hargrove, a 20-year Army veteran and a former first sergeant at the Fort Bliss-based US Army Sergeants Major Academy. His staff includes Assistant Commandant MSG George Bradford, 21 instructors and some 15 administrative and support people.

SQT UNVEILING

Initial reaction to the new Skill Qualification Test (SQT) now being administered Army-wide is highly favorable. Soldiers who thought the tests would be easy were surprised to find them challenging.

The SQT "shakedown" is turning up a few administrative bugs, but that's why it was decided to test the *system* this time, not the soldier. You might say the soldier is getting a free ride from now until December. He gets a chance to look at it (SQT) and find out how he stands before taking the test "for the record." Soldiers participating in the Army-wide trial run include those in MOS 16J (1-2).

SQT, which includes three major components, will be administered "for the record" to soldiers in Career Management Fields 16J and 16P during the period July to September 1977.

Do not think the SQT will be only hands-on. SQT includes a written test, but questions come right out of the Soldier's Manual.

If a soldier can perform the critical tasks listed in the Soldier's Manual, the SQT will not be difficult. Questions on the written portion are realistic and every effort has been made to provide simulation devices or tools that normally would be available to the soldier in a real job situation.

Tasks that are more accurately measured on the job will be included in the hands-on portion. In addition, those tasks that are time consuming or too large or expensive to test will be certified by the commander.

Every soldier will receive his personal copies of the Soldier's Manuals that cover his MOS, current skill level, and next higher skill level.

WO MOS OPEN

Thirty-five warrant officer MOS are currently open to enlisted personnel. Active and Reserve soldiers with training or educational qualifications in fields listed below are especially encouraged to apply.

In general, applicants must be between 18 and 46 years of age (minimum age for women is 20), have a GT score of at least 110, and have education and practical experience in the field desired. Additional information concerning eligibility can be found in AR 135-100.

ADA warrant officer MOS now open (not available to women) are 222B—Air Defense Missile Fire Control Tech; 223D — Air Defense Missile System Tech, Improved Hawk; 224B — Chaparral/Vulcan System Tech; 251B — Air Defense Missile Repair System Tech, Nike.

More than 30 other MOS in a wide variety of fields are open to both men and women.

Applicants may seek assistance from their local MILPOs, or they may contact the Warrant Officer Division at MILPERCEN by writing to the Commander, USA MILPERCEN, ATTN: DAPC-OPW-P, 200 Stovall Street, Alexandria, Virginia 22332.

BARS to STARS

OPMD UPDATE

The "Bars to Stars" input for this issue of AIR DEFENSE Magazine has been furnished by Major Frank Laster, who is the ADA Specialty Monitor, Professional Development Division, MILPERCEN.

Material to be published is processed by the ADA Personnel Management in OPMD before release. This procedure will give you accurate, up-to-date information for career management participation.

ASSIGNMENTS

Assignment personnel are continually reviewing the files of the officers they serve looking for particular expertise gained in civilian/military institutions and other military supported programs. They identify potential selections for jobs in such fields as attache, ADP, ORSA, education, foreign area officer, and engineering, to name a few areas where needs exist. Some entries can be highlighted on the preference statement but should be an official entry in your file. Be sure to include your present AUTOVON duty phone number and a point of contact when in transient status. The current residence block indicating ownership, renting, or occupying government quarters should be completed.

Be sure to check your official and career management individual file to insure that all entries are correct and properly reflect your abilities. Pay particular attention to your officer record brief (ORB). You and your MILPO are responsible for the correctness of your ORB. This document is seen by every selection board and used during the assignment process. If errors go undetected, your record is not complete. Follow up on corrections with your MILPO.

Officers are encouraged to submit preference statements annually, when a job change renders a previous statement inaccurate, or when a change to a family situation occurs. Assignments can be made without your input, but why not take an active part by insuring that a current and complete DA Form 483 is on file with your Career Management Division.

Career managers are located in the Hoffman Complex, Building #2, 200 Stovall Street, Alexandria, Virginia 22332.

PROMOTION BOARDS FOR 1977

The DA Secretariat has announced the promotion board schedule through September 1977. The dates may change a few days but are considered firm enough for planning.

Board	Dates
CPT RA (APL)	1 Mar-25 Mar 77
MAJ AUS (Screen)	29 Mar-29 Apr 77
LTC AUS (APL)	5 Apr- 6 May 77
CW ¾ RA (APL & AMEDD)	5 Apr-13 Apr 77
MAJ AUS (APL)	19 Apr-27 May 77
COL AUS (Screen)	3 May-27 May 77
CPT AUS (APL)	10 May- 3 Jun 77
COL AUS (APL)	14 Jun-20 Jul 77
COL RA (APL)	2 Aug-19 Aug 77

At the same time the Secretariat announced the tentative promotion board schedule, other DA selection boards were announced:

Board	Dates
RA Integration	22 Mar- 1 Apr 77
WO Senior Course	12 Apr-29 Apr 77
SSC Non-Resident Instruction	18 Apr-22 Apr 77
Command Sergeants Major	14 Jun-24 Jun 77
SSC Screen	6 Jul- 5 Aug 77
USA Sergeants Major Academy	19 Jul-29 Jul 77
C&GSC Screen	16 Aug-16 Sep 77
SSC Selection Board	23 Aug-23 Sep 77

OPMS COMMAND

The recently announced Command Selection Board results reflect the policy that allows colonels to serve in only one OPMS command position.

REVIEW OF OFFICIAL FILE

You can make arrangements to review your official file by:

Writing:
HQDA (DAPC-PSR-S)
200 Stovall Street
Alexandria, Virginia 22332

Calling:
Commercial: 202-325-9618
AUTOVON: 221-9618

At least 2 working days advance notice is required to insure availability and completeness of the file. If you plan to review your official file prior to the convening of a selection board for which you are eligible, do so at least 2 weeks prior to the convening of the Board. If you are unable to review your file personally, two options are open:

- Provide another officer visiting MILPERCEN with a letter of authorization to include visiting officer's name, rank, and SSN, as well as specific authority granted, i.e., to review files, make copies of files, etc.
- Write Commander, MILPERCEN, ATTN: DAPC-PSR-SR, and request a complete copy of your file be made and forwarded to you. The charge is $2.00 for the first six pages and 5 cents for each additional page. If the file has been converted to microfiche, it will be provided only in this mode. The charge is $2.00 for the first fiche and 5 cents for each additional fiche (an 06's fiche rarely exceeds four). The bill will accompany the reproduced file. You may cut costs by requesting only the efficiency section (the section that goes before a selection board and includes OERs, letters of appreciation, etc.). Any officer can request his/her entire file, and there is no restriction on the number of times an officer can have his/her file duplicated.

COMMAND AND GENERAL STAFF COLLEGE

Selections have been made for this year's Command and General Staff College class. Many of you have been placed in a deferred category, which means you have not satisfied the 24 months stability criteria as of 1 September 1977; have not completed five-sixths of your overseas tour; or, you are "operationally" required in your present job. However, if you are in YG 62, these policies do not apply and you will attend this year.

PROMOTIONS

Captains with DOR through 31 August 1969 will be in the primary zone for Major (AUS). If you are in the zone of consideration, you should be getting your official file reviewed and ready. Some things to consider:

- Current official photo — Required every fourth year during your birth month (AR 640-3).
- Updated officer record brief — Reviewed annually (Chapter 6, AR 640-2-1).
- As applicable, service school and civilian institution academic evaluation reports (AR 623-1).
- Transcript of college credits (AR 621-1 and AR 640-10).
- Individual letters of commendation and appreciation.
- Officer Efficiency Reports:
  — Missing reports.
  — If applicable, "complete the record" report (Paragraph 2-2p, AR 623-105).

ADVANCE DEGREE PROGRAM FOR ROTC INSTRUCTOR DUTY (ADPRID)

Company Grade Combat Arms Division has 95 openings for officers to enter partially funded graduate school to obtain a master's degree for a period of up to 15 months and remain at the same institution to serve a 3-year tour as a ROTC instructor. In cases where a university does not have a master's program, the graduate degree will be pursued elsewhere. Officers must study in one of the following shortage disciplines:

Accounting/Auditing
Area Studies
Business, ADPS
Business, Comptrollership
Business, Logistics Management
Business, Management Research
Business, ORSA
Criminology, Corrections
Education, Audio-Visual Aids
Engineering, ADPS
Engineering Administration
Engineering, Aeronautical
Engineering, Automotive
Engineering, Civil
Engineering, Chemical
Engineering, Communications
Engineering, Electronics
Engineering, Explosive
Engineering, Guided Missiles
Engineering, Nuclear Effects
Engineering, ORSA
Engineering, Petroleum
Engineering, Systems
Engineering, Physics
Geodetic Science
Hotel & Restaurant Management
Journalism
Physics-Optics
Physics, Nuclear
Psychology, Applied
Psychology, Clinical
Psychology, Experimental
Psychology, Industrial
Psychology, Social
Police Science & Administration
Procurement & Contract Mgt.
Production, Motion Picture
Safety
Telecommunications Mgt.
Topography-Photo

ADA CONTACTS IN OPMD

- Colonels Division (DAPC-OPC-A)
  ADA assignments LTC Robert "Pete" J. Frazier, Jr. X7863
- Lieutenant Colonels Division (DAPC-OPL-A)
  ADA assignments LTC Travis (Rusty) W. Dyer X9549
- Majors Division (DAPC-OPM-A)
  ADA assignments MAJ Carlton H. Smith X0687
- Combat Arms Division (DAPC-OPE-A)
  ADA Branch Chief, LTC Thomas L. Ricketts X0115
  Captain Assignment, MAJ James L. Smith X0117
  Lieutenant assignment MAJ James L. Frederick X0115
- Professional Development Division (DAPC-OPP-S) ADA Specialty Monitor MAJ Frank Laster X0250

Note. Commercial telephone line: Listed numbers preceded by Area Code 202-325-

Autovon Line: Listed number preceded by 221-

If you cannot call, please write to the following address:

Commander
US Army Military Personnel Center
200 Stovall Street
ATTN: (appropriate office symbol)
Alexandria, Virginia 22332

ADVANCED CIVIL SCHOOL

Company Grade Combat Arms Division has 80 openings in the following disciplines for fully-funded advanced civil schooling during FY 1977. Officers who are selected study for a period of up to 18 months and are required to serve a 3-year utilization tour immediately following graduation. If interested, apply under the provisions of AR 621-1, chapter 4, dated 6 May 1974.

Journalism
Operations Research/Systems Analysis (Engineering)
Operations Research/Systems Analysis (Business)
Comptrollership
Automatic Data Processing (Engineering)
Automatic Data Processing (Business)
Electronics Engineering
Nuclear Physics
Social Psychology
Area Studies
Management Research
Aeronautical Engineering
Guided Missile Engineering
Nuclear Effects Engineering
Engineering Physics
Education Audio-Visual Aids

HOME BASING/ADVANCED ASSIGNMENT

Effective 15 January 1976, OPMD began implementation of a Homebase/Advanced Assignment Policy for officers selected for 12- and 13-month, dependent-restricted, short tours. This policy requires that officers being considered for a dependent-restricted short tour be informed of their projected CONUS reassignment before their departure for overseas. This DOD policy was developed to reduce PCS expenditures associated with the displacement of family dependents concurrent with a PCS to and from a dependent-restricted area. Hopefully, the family would elect to remain at its current location or to proceed in advance of the officer to the vicinity of his/her new duty station, thereby saving one dependent PCS relocation cost. It is anticipated that many families, where the sponsor is homebased, will elect to remain at their current location rather than opting to move to a designated location to await the sponsor's return. This option continues to be authorized IAW AR 55-46. In this regard, DA has recently announced a family housing support policy that permits personnel assigned to 12- and 13-month dependent-restricted areas and occupying government quarters to voluntarily retain these quarters during the period of absence from their families. These actions would reduce PCS cost incident to family travel.

RA INTEGRATION

Reserve officers who have demonstrated above average potential for future development and advancement are encouraged to apply for the Regular Army in accordance with DA Circular 601-64, dated 30 September 1976.

The following provisions of the circular are highlighted:

- Applicants in Year Groups 1956-67 must have a general officer's endorsement due to RA overstrength in these year groups.
- Regular Army selection boards will convene in September 1977 and in March 1978. Applications should be submitted prior to the end of June 1977 for the September board and prior to the end of January 1978 for the March board.
- Officers who are selected by one RA board may reapply after 1 year.

CORRECTION

The item "Officer Education," appearing on page 36 of the October-December 1976 issue, is misleading regarding airborne training for officers. Airborne training is open to qualified officers even though their next assignment is not to an airborne unit. Interested officers should refer to AR 614-105 (which is currently under revision) for detailed information.

COMBINED ARMS CORNER

LASER FIRE CONTROL SYSTEMS FOR TANKS

A contract has been let for production of 69 laser tank fire control systems for the Army's main battle tank. The contract (with Hughes Aircraft Company) signals the start of an extended production program to equip M60A1 tanks with a fire control system to improve the accuracy of the tank's 105-mm gun.

The system is designed to increase the tank's first-round hit capability against both standing or moving targets, enhancing crew survivability. The equipment, described as a full-solution fire control system, includes a laser rangefinder and a ballistics computer. Units already have undergone extensive field tests and evaluation by the Army under varied weather conditions.

In operation, the rangefinder is aimed at a target and the laser is fired. The beam, traveling at the speed of light, is reflected by the target and returns to a receiving telescope. The elapsed time of the beam traveling to the target and back provides accurate range information that is fed to the computer. The information is processed by the computer in milliseconds with other data such as crosswind velocity, air temperature, gun trunnion tilt, air density, altitude, target tracking rate and ammunition ballistics, which then provides the correct azimuth and elevation firing commands to the tank gunner and commander.

ANOTHER USE FOR LASER

Many types of gunnery devices have been developed to train tank crews to shoot accurately, some very expensive, others not so expensive. None of these devices, however, requires the complete interaction of the crew in the performance of firing duties to obtain simulated target destruction.

A technique employing the M-55 laser has been developed at the US Army Armor School to train the tank crew effectively in acquiring and dry firing on various targets at different ranges, using different types of ammunition. The system can be used to train M-60A1, M-48A3, and M-551 crews. An additional feature of the system that is not found in other current training systems requires the tank commander to range accurately on the target to obtain a hit.

After all crew firing duties have been properly performed, including the loading of a dummy main-gun round and placing the safety in the FIRE position, the gunner lays on a target downrange, depresses the electrical firing trigger, and the laser beam strikes the corresponding silhouette on the magnetic board.

Known as the Stout Device, the system can be used in testing tank crews and is an excellent way to practice firing from range card data.

— ARMOR

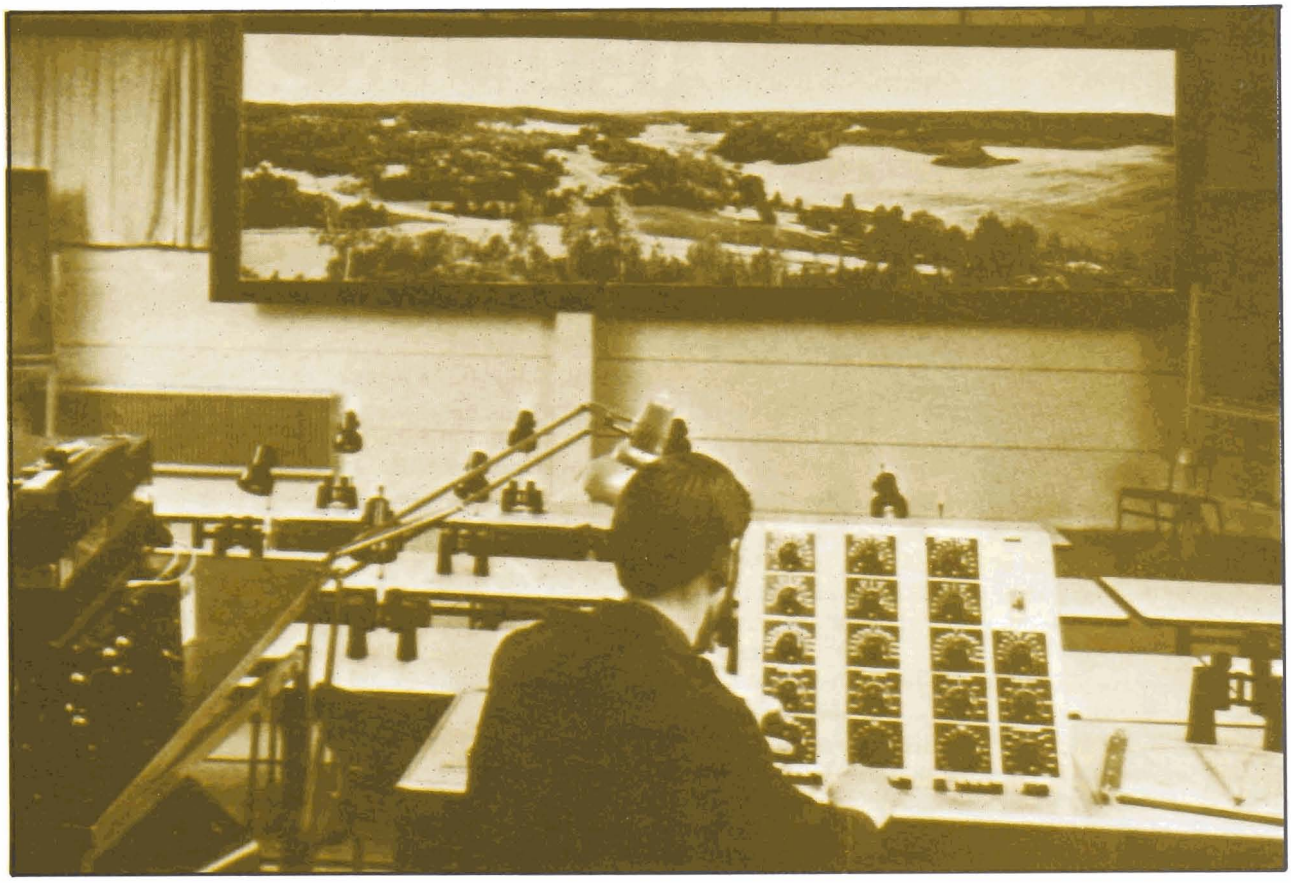
IMPROVED M-48A5

The US Army Armor and Engineer Board, Fort Knox, is currently evaluating a product improvement (PI) package for the M-48A5 tank. Major items under test are a low-profile commander's cupola, mounts for M-60D machineguns at both the TCO and loader's stations, and improved stowage for main gun ammunition.

The low-profile cupola features a four-position hatch which affords the commander overhead protection, yet allows unobstructed direct vision to the front and side. The external machineguns are M-60D's, which were originally developed as helicopter door guns. The improved main gun ammunition racks provide stowage for 54 rounds, an increase from the 43 rounds currently carried.

— ARMOR

OBSERVER TRAINER



The BT-33 Fire Control Simulator consists of a target area display, a control unit, and observer area.

The Field Artillery School is the proponent for evaluating the BT-33 Fire Control Simulator, an electronic training device capable of projecting various terrain scenes onto a panoramic screen and simulating artillery engagement of targets within those scenes. The BT-33 has been made available to USAFAS through a lease agreement with SAAB-SCANIA of Sweden.

The primary objectives of the USAFAS evaluation are to validate simulation as a method of training observers and to document the degree simulation can effectively be substituted for observer live fire training in the current program of instruction. The BT-33 evaluation parallels the ongoing development of a US observed fire trainer that is similar in technology to the SAAB device. However, the US version will be a self-contained portable unit in its final configuration.

The BT-33 is currently used in the training of artillery observers by the military forces of Denmark, the Federal Republic of Germany, Norway, Sweden, the United Kingdom and Yugoslavia. In addition to the United States, countries interested in the BT-33 include Canada, Japan, USSR, and Iran.

— Field Artillery Journal

HELLFIRE ENTERS ENGINEERING DEVELOPMENT

A contract was awarded recently for engineering development of the Hellfire missile system, planned as the primary armament on the Army's new advanced attack helicopter for use against hardpoint targets. The cost plus incentive fee contract will be funded over 5 years. The Hellfire program has just completed 2 years of advanced development under competitive contracts.

Hellfire is a modular missile system that will provide the Army with a family of terminal homing seeker modules and a common airframe to engage tanks and a variety of other hardpoint targets. The initial Hellfire configuration will use semiactive laser guidance, but the modular design can accommodate future terminal homing seekers, as technology matures, without completely redesigning the system.

Hellfire is perhaps one of the Army's most tested missile systems at this stage of development. Its accuracy and versatility have been demonstrated with direct and indirect launches from the ground and helicopters against both stationary and moving targets. Army combat soldiers from the Armor and Aviation Schools have fired several missiles.

UTTAS UNDER DEVELOPMENT

The Sikorsky Aircraft Division of the United Technologies Corporation has been selected to develop the US Army utility tactical transport aircraft system (UTTAS). The UTTAS engine will be produced by the General Electric Company, Lynn, Massachusetts. DA plans call for the purchase of about 1,100 of these helicopters over the next 8 years, with the first aircraft scheduled for delivery in August 1977.

The UTTAS helicopter, will, for the first time, permit a fully equipped 11-man infantry squad to be transported to frontline action in extreme temperature and altitude conditions. The twin-engine UTTAS will replace the work horse Huey in air assault, air cavalry and aeromedical evacuation missions. It will transport troops and equipment into combat, resupply those troops, and perform the many support functions related to the battlefield. It will carry the squad faster and with greater chances for combat survival than have ever been available to the infantry soldier.

In addition, the UTTAS will offer substantially improved maintainability, reliability, and performance. It will have two to five times more troop and cargo lift capacity than the Huey over typical operating ranges and up to 40 percent more speed and range. The aviation company equipped with UTTAS will need fewer aircraft and less maintenance labor for the same mission accomplishment than the present UH-1H equipped companies.

The UTTAS will not replace the Huey on a one-for-one basis. In the assault companies, DA plans to replace 23 Hueys with 15 UTTAS. At the end of the 8-year period, two or three thousand Huey's should remain in the fleet.

ADVANCED ATTACK HELICOPTER TO BE DEVELOPED

Hughes Helicopters Division of Summa Corp. has been awarded the contract to develop the Advanced Attack Helicopter (AAH). The full-scale engineering development contract, to be incrementally funded, culminates the competitive airframe development phase of the program. During that phase, Hughes Helicopters developed and produced two prototype aircraft and a ground test vehicle. These prototypes underwent Government competitive tests from July through September of 1976. Test results plus information contained in proposals submitted by the contractor during the last 4 months were used in making the selection.

During the next phase of the program, three additional prototype aircraft will be built, the associated subsystems and weapons will be integrated, tested and qualified as a complete attack helicopter system.

Integral to the full-scale engineering development phase, the Army also will develop a target acquisition and designation system (TADS) and pilot night vision system (PNVS) for integration into the air vehicle.

The Advanced Attack Helicopter is expected to be vastly superior to current armed helicopters. It will use the Hellfire Modular Missile System, as primary armament with a 30-mm cannon and 2.75-inch rockets for area and suppressive fires. The TADS-PNVS will provide laser designation and range-finding for day and night operations. The advanced attack helicopter should provide more accurate fire, improved first-round hit capability and substantially increased survivability over existing attack helicopters.

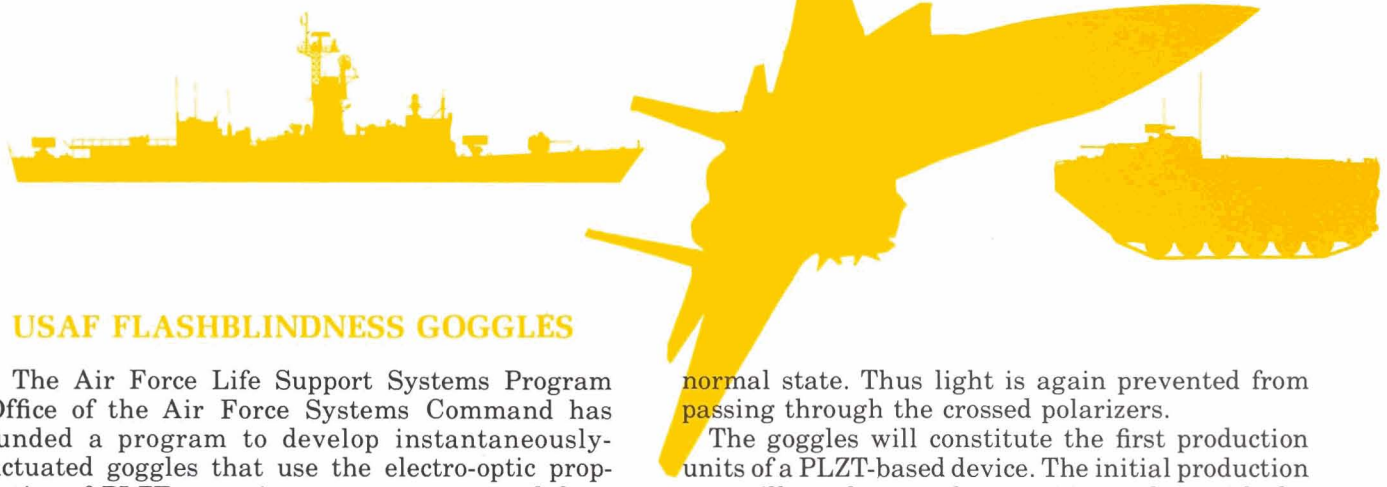
GROUND LOCATOR DESIGNATOR

Field testing of a prototype ground laser locator designator (GLLD), built by Hughes Aircraft Company, is underway at the Army Missile Command facility at Redstone Arsenal. Operational testing of the device at other military test locations will follow the evaluation at Redstone.

The GLLD, a precision laser rangefinder and designator for ground troops, will guide laser-homing missiles or projectiles to their targets. Maverick, Hellfire, and CLGP* will profit by the GLLD. The laser light being reflected from the target enables laser homing weapons to guide themselves down the cone of light. GLLD also may be used to pinpoint the range and bearing of fixed and moving targets for conventional artillery.

**Recently renamed Copperhead.*

DEVELOPMENTS



USAF FLASHBLINDNESS GOGGLES

The Air Force Life Support Systems Program Office of the Air Force Systems Command has funded a program to develop instantaneously-actuated goggles that use the electro-optic properties of PLZT ceramic to protect personnel from retinal burns and flashblindness.

The goggles (to be developed by Sandia Laboratories) will be used to protect aircrew members from thermal burns and flashblindness that might result from a nuclear detonation. The device can be switched from transparent to opaque in a few microseconds before the incoming light from a nuclear burst would deliver sufficient energy to cause permanent retinal or skin burns or produce flashblindness. Flashblindness is a temporary visual impairment such as that produced when a photo flashbulb is discharged near the eyes.

The goggles will have two large front lenses and two rectangular side lenses. A flash hazard is detected by photodiodes that activate a discriminator circuit to switch the goggles to their opaque state. After protection has been achieved and as the light intensity of the flash gradually diminishes, the circuit controls transmission through the goggle lenses so that the light intensity reaching the eyes always matches the intensity which existed prior to the burst. Consequently, the wearer's vision is never completely blocked—he always retains some external visual capability. This feature of the goggles enables the pilot to perform critical maneuvers throughout the time of the threat.

The goggle circuitry, which will weigh less than an ounce and measure about one cubic inch, will draw about 15 milliamps when the goggles are functioning. Power will come from the aircraft power supply.

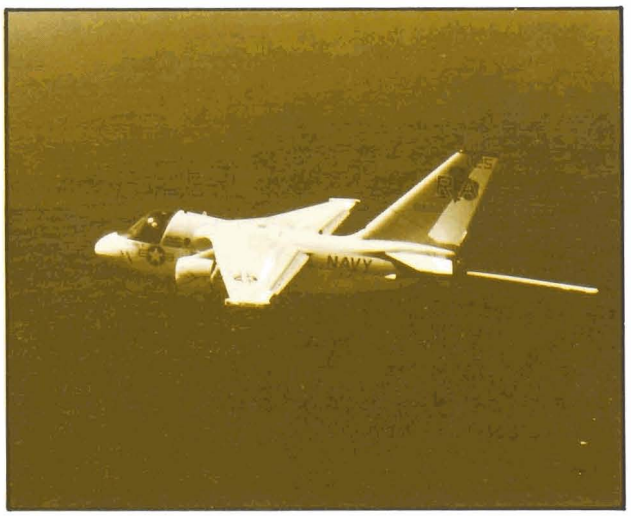
The goggle lenses consist of a 0.015-inch-thick transparent PLZT wafer sandwiched between crossed polarizers — an arrangement that allows virtually no light to pass through the goggles until a voltage is applied to metallic interdigital electrodes on the ceramic surfaces.

When the diodes and circuitry indicate that certain light levels and rise times have been exceeded, the voltage is removed and the ceramic reverts to its normal state. Thus light is again prevented from passing through the crossed polarizers.

The goggles will constitute the first production units of a PLZT-based device. The initial production run will total more than 6,000 goggles, with deliveries to be made during a 3-year period beginning in 1977.

The Air Force is also continuing a program to develop prototype PLZT thermal/flash protective windows for aircraft to further shield air crews against thermal burns and flashblindness.

US NAVY'S ANTISUBMARINE WARFARE CAPABILITIES STRENGTHENED



The US Navy has added the new Navy/Lockheed S-3A Viking to its antisubmarine warfare (ASW) capabilities. The S-3A is a high-performance jet aircraft complete with an array of sensors with weapons controlled by advanced computer technology. The new aircraft will provide the fleet with the most modern operationally effective carrier-based antisubmarine warfare aircraft built.

The flying qualities of the S-3A, including its automatic flight control system, ASW sensors, and automatic carrier landing features was recently demonstrated in a 2-hour flight from the deck of the USS America. Some of the major features of the new aircraft demonstrated during the flight included:

- Left and right aileron rolls.
- Extended-speed-brake dive of more than 30° designed to reach sea level from 30,000 feet in less than 2 minutes.
- Low-level buffet-free performance with 2g turns at 45° bank angles at a loiter speed of approximately 180 knots.
- Antisubmarine sensors.
- Touch-and-go carrier landings.

The S-3A has two underwing General Electric TF34 axial flow turbofan engines. During the test flight, the engines developed 9,275 lbs. of thrust each. The gross weight at launch was 47,000 lbs.

At one point during the flight, an analog flew the aircraft. The flight control system within the S-3A is fully powered and integrated with the automatic flight control system to relieve the pilot of performing routine maneuvering for antisubmarine warfare work. The pilot can revert to manual operation for emergency or in case of system failure.

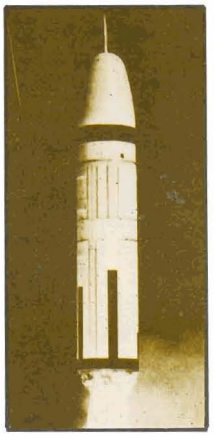
The S-3A is equipped with a high-resolution AN/APS 116 radar (sensor) and an AN/ASQ-81 magnetic device, both Texas Instruments products. The heart of the aircraft's sensor/weapons and navigation system is a Univac 1832 digital computer. When a magnetic anomaly is detected and classified, the contact position is entered into computer memory. Each contact point for the target is predicted, and the prediction appears on a cathode ray tube located at each flight station.

The S-3A has many additional features and an ultramodern communications system. The new aircraft adds new dimensions to the Navy's ability to effectively conduct carrier-based antisubmarine warfare.

TRIDENT TESTED

Navy officials have announced the successful test of a TRIDENT missile's destruct system. A test vehicle was destructed after flying 4 seconds and achieving the programed altitude of about 185 feet.

The test was conducted to evaluate the destruct system before full-scale Trident test launches are attempted in Cape Canaveral, Florida. A second test has been tentatively scheduled in early summer.



It is designed for use on both the POSEIDON and the new improved TRIDENT Fleet Ballistic Missile submarines. The missile is 34 feet in length, has a diameter of over 6 feet and weighs more than 65,000 pounds.

TRIDENT is currently being funded under a $1.9 billion contract from the Navy's Strategic Systems Project Office. The prime contractor and missile system manager is Lockheed Missiles and Space Company, Inc., Sunnyvale, California.

NEW USMC BOMBING SYSTEM BOOSTS ACCURACY

Day and night bombing accuracy of US Marine Corps aircraft is expected to be significantly improved by a new angular rate bombing system (ARBS) now in preproduction. ARBS provides automatic tracking of ground targets plus first-pass automatic day/night acquisition of laser-designated targets, providing an important night-bombing capability. Although designed for the Marine's A-4M aircraft, the system will also be compatible with the AV-8 Harrier VSTOL jets. In addition to accurate close-support delivery of unguided ordnance, ARBS will also be compatible with guided ordnance and will accurately direct gunfire and air-to-ground rockets.

ARBS is basically a simple angular rate system. The tracker, after locking on a target, provides the aircraft-to-target line-of-sight angle and angle rate to the weapon delivery computer (WDC). This information, combined with the true airspeed and altitude (from the air data computer), is processed by the WDC yielding the weapon delivery solution. Target position, weapon release, and azimuth steering information are generated for display to the pilot via a HUD (head-up display). Unlike most current operational bombing systems, neither measurement of range to the target nor inertial quality platform inputs are required by ARBS.

ARBS consists of a dual-mode laser/television tracker (DMT), a general purpose digital computer, and a control subsystem. Weight is about 138 pounds. The system works in concert with existing cockpit controls and aircraft sensors.

The DMT is the heart of the system. A television tracker with television camera shares a common optical element with a laser spot tracker detector on a three-gimbal stabilized platform. Tracking filter electronics, an output signal converter, power supplies, and control logic complete the DMT.

A dichroic filter behind the optics separates the laser energy from the visible light for sensing by a four-quadrant laser detector. During the testing of Phase I, ARBS laser target acquisition and lock-on were achieved quickly and consistently with each pass beginning in the search mode. Tracking was precise.

Transition from laser to television tracking mode can be accomplished with no fear of losing the target because of the common optics feature. The visible light is directed to form an image on the TV vidicon. TV tracking of small, low-contrast, poorly-defined moving targets through changes in aspect ratio and in the presence of competing clutter (and even when partially lost to view behind rocks and other obstructions) was demonstrated with the Phase I system. Tests proved laser and television mode automatic release to be equally accurate, and that includes night delivery in the laser mode under most operational conditions.

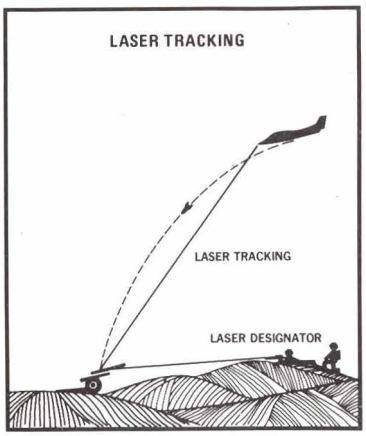
Operating in the laser mode, the sensor automatically acquires the target and, via the WDC, presents steering signals for the pilot on the HUD. After head-up television acquisition, the pilot is shown a magnified image of the target on the cockpit TV monitor. He may use a hand control to slew the tracker gate to a new track point or to a nearby alternate target. Release in both laser and optical tracking modes is either automatic or manual.

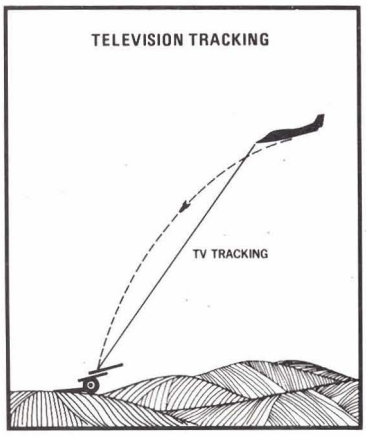
A weapon data insert panel provides entry into the weapon delivery computer of weapon characteristics and rack type for ordnance being carried on a particular mission. Necessary ballistic parameters for all weapons are stored in the WDC memory. The WDC also provides the computational and control capability for performing the ARBS operational readiness test and fault isolation testing of itself and the dual-mode tracker.

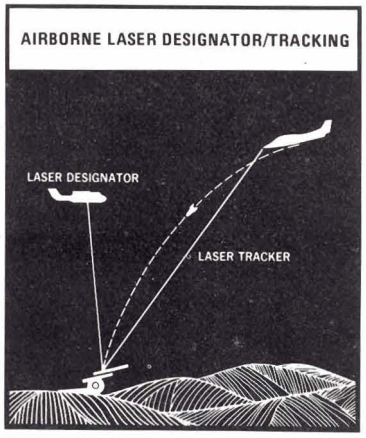
Genesis for ARBS was the Marine Corps' need for highly accurate close-support delivery of ordnance under day and night visual flight conditions. Technical feasibility of the angular rate bombing concept was demonstrated in flight test evaluations using a Naval Weapons Center-developed experimental angular rate bombing system with single mode TV tracker at China Lake between June 1971 and June 1972.

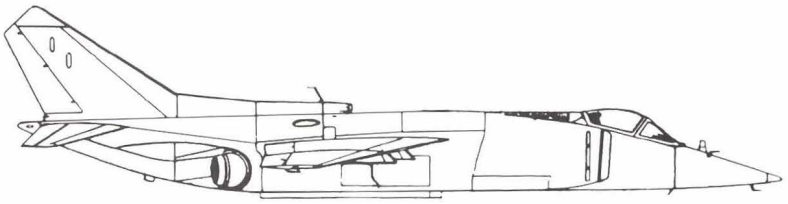
As a result of these tests, the Phase I ARBS development program was initiated in February 1973 to further demonstrate the technical feasibility and operational suitability of the concept using a dual mode tracker. Phase I consisted of the flight testing of the system and a flight system entry by the Naval Air Test Center, VX-5 squadron, and Naval Weapons Center pilots ending in August 1974.

The first preproduction system is scheduled to be delivered in April, with flight testing scheduled for later this summer.

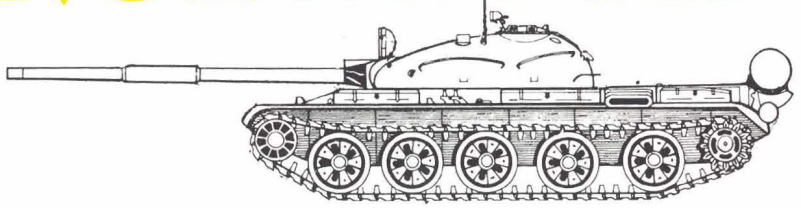








INTELLIGENCEWATCH



NEW SOVIET MICV

GT-T M1970 infantry combat vehicle. New photos of the 11 t GT-T MICV used primarily by mechanized infantry in marshy areas around Leningrad (note logs atop fighting compartment for extraction when bogged down). Photo also shows specially widened tracks (0.55 m) to reduce ground pressure and increase traction. The amphibious vehicle has a crew of 3, and carries an 8-man squad in fighting compartment, fitted with firing ports. Turret mounts a 7.62-mm MG. 200 hp diesel engine gives maximum road speed of 50 km/h. Road range is 500 km.

— International Defense Review

JOINT HELICOPTER PROJECT

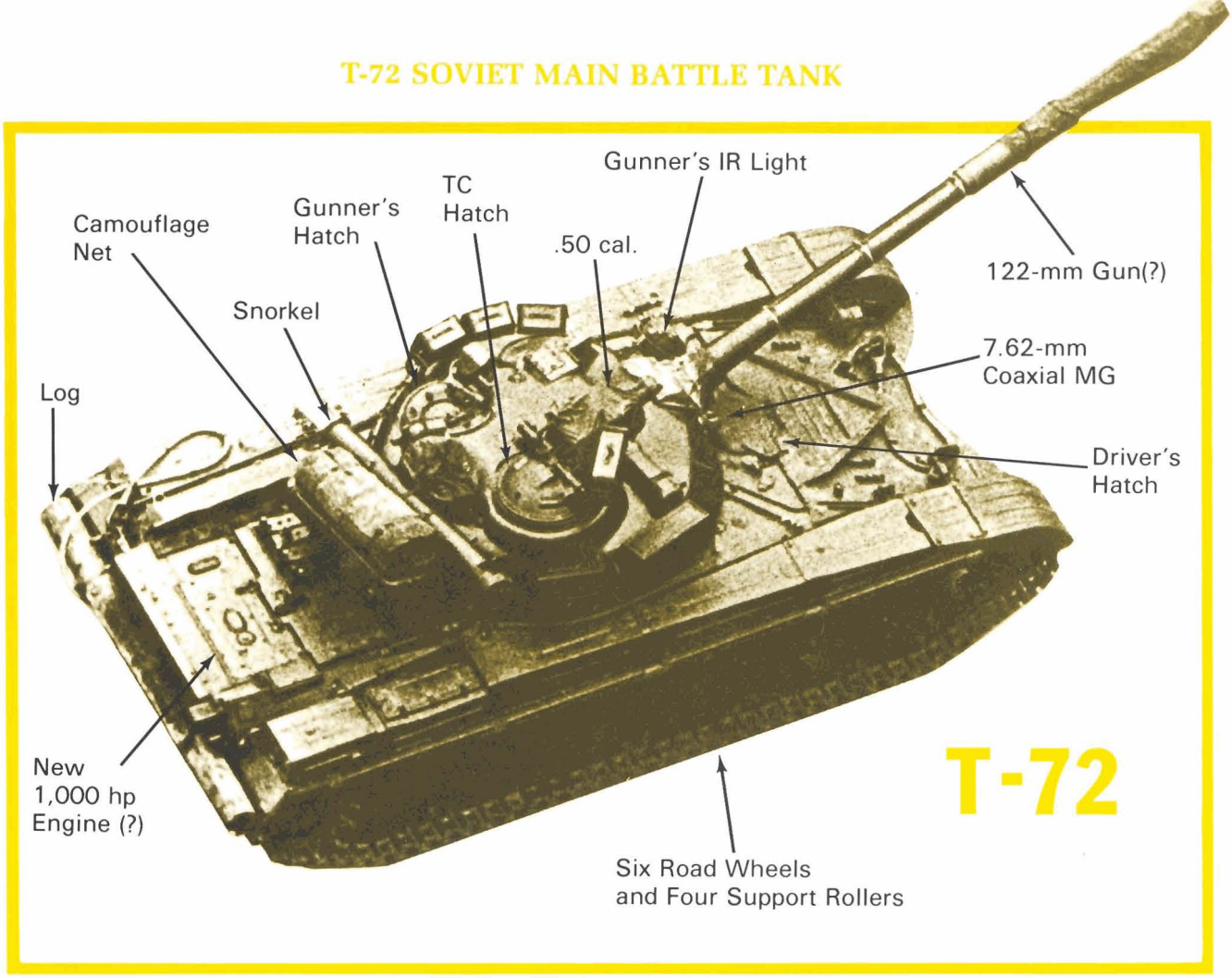
The development and production of a medium-sized utility helicopter were jointly agreed upon between Kawasaki Heavy Industries, Ltd., and West Germany's Messerschmitt-Boelkow-Blohm. The helicopter will be designated the BK-117.

Gross weight of the 8-12 passenger craft will be approximately 6,500 lbs. The BK-117 will have two Lycoming LST-101-650B engines giving power to a four-bladed rigid rotor.

Kawasaki will design and produce the fuselage, transmission system, landing gear and other minor components. MBB will be responsible for the main and tail rotors, tail unit and hydraulic systems.

Current plans call for a prototype first flight test during the summer of 1979.

T-72 SOVIET MAIN BATTLE TANK



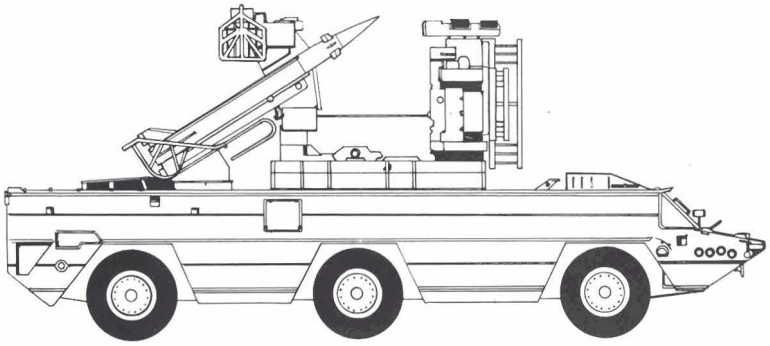
Soviet forces in East Germany are receiving the new T72 Soviet main battle tank. The silhouette of the T72 resembles the Standard T62 and c54/55 series; however, the hull, turret, and suspension are completely new. The main armament appears similar to the current 115-mm smoothbore gun; however, some European observers believe the main armament to be a 122-mm cannon. It is believed that the T72 is equipped with a new fire control system including laser range finding. An automatic loader allows a three-man crew operation instead of a crew of four. The new Soviet tank has an improved power plant which weighs about 35 metric tons. About 2,000 have been produced since the tank's initial production in 1974.

NEW SOVIET SYSTEM FOR EAST GERMAN FORCES

The Soviets have introduced their newest antiaircraft missile system, the Soviet SA-8 GECKO, to the East-German military forces. The system is designed to engage and destroy low-flying planes. The SA-8 uses a radar-guided missile system which reportedly can fire and track two missiles simultaneously at a single aircraft.

The SA-8 becomes the second new advanced system to be given to the East-German forces. Last November the Soviets gave East Germany the T-72, which is heavily armored against antitank missiles. The T-72 can fire accurately while in motion.

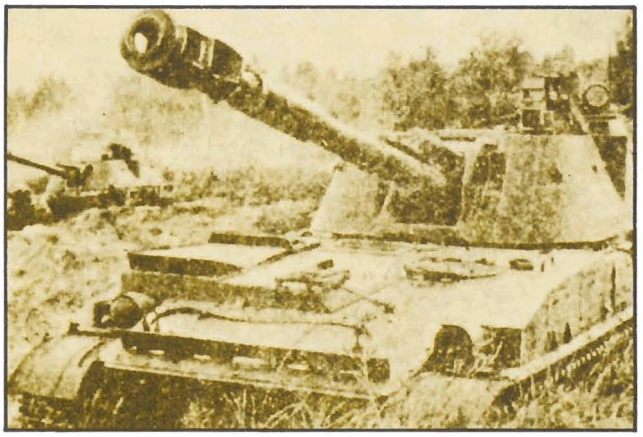
— Armies and Weapons



RUSSIAN M-1973 152-MM SP HOWITZERS

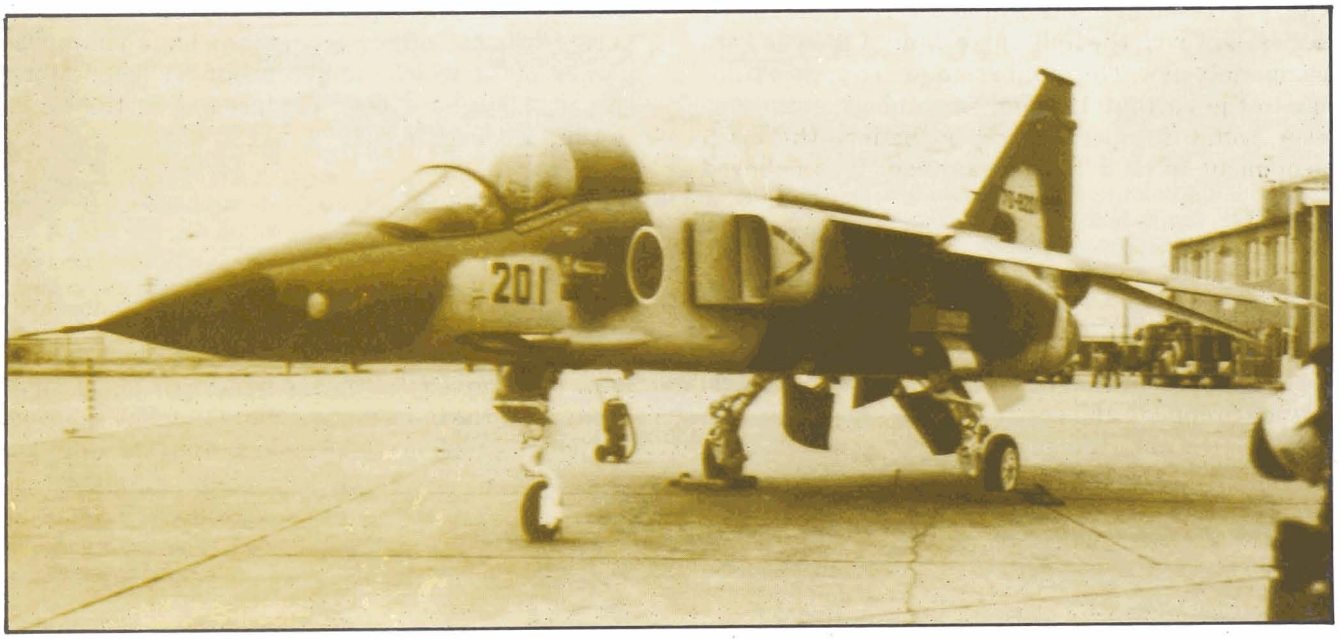
Two Russian M-1973 152-mm SP howitzers deployed in the field. This is believed to be the first photo of the M-1973 to be published in the West. Ordnance appears to be that of the standard D-20 towed gun-howitzer, with a fume extractor added behind the muzzle brake. Because of twin recuperators above barrel, elevation is restricted to about 60°. Commander's cupola mounts a searchlight, image intensifier sight, radio antenna and several unidentified equipments. Chassis is similar to that used as launch vehicle for the SA-4 Ganef, with seven PT-76 type road wheels, indicating a weight of under 30 t. D-20 fires 54 kg HE and 59 kg AP projectiles, plus incendiary and illuminating rounds, at a rate of 4 per minute. Max HE range of the D-20 is 18.5 km, but the M-1973 may achieve 24 km or farther, with rocket-assisted projectiles.

— International Defense Review



MITSUBISHI F-1 CLOSE SUPPORT FIGHTER

First production version of the Mitsubishi F-1 close-support fighter recently rolled out at the manufacturer's Komaki plant near Nagoya. Mitsubishi plans to begin flight testing the aircraft in late May and deliver it to the Japanese Air Self Defense Force (JASDF) by the end of September. Powered by two Rolls-Royce/Turbomeca Adour turbofan engines, the Mach 1.6 F-1 was developed to replace the obsolescent Rockwell International/North American F-86s in the inventory of the JASDF.



AIR DEFENSE Book Review

The Professional Army Officer In a Changing Society, by Sam C. Sarkesian. Chicago, Illinois, Nelson-Hawll Publishers, 1974. 243 pages, $12.00.

The author states that his purpose in writing the book was to develop some understanding of the way the military profession operates from within, in the hope that the professional as well as the civilian may gain a better understanding of the military. In pursuing this goal, he discusses most of the circumstances and experiences impinging on the lifestyle of the professional officer. What he is, his desires, strengths, and weaknesses are revealed in various settings that add depth and substance to the discourse on how he functions.

The author's treatment of the professional involves:

- The new breed of young officers, among whom he lists the Modernists, i.e., those who believe that conventional employment of troops can't win in revolutionary war in an alien culture, as was the case in Vietnam.
- The middle ranks, wherein are found the Transitionalists, i.e., those who believe that proper application of power with *new* techniques could have given an advantage to US Forces in Vietnam.
- The senior officers, among whom we find the Traditionalists, i.e., those who believe greater application of power in accordance with Western concepts of the principles of war would have won in Vietnam.

This codification according to experience and age group is rooted in the officers' beliefs regarding the Vietnam war, and indeed Sarkesian's deepest concern about the Army is its image and what it faces as a result of that war. He indicates that the evils of war, the wrongs and ills of society, and a general suspicion of the motives of some Government agencies have combined to place the Services at a low level in public esteem.

Despite differences in their doctrine concepts, all officers will follow essentially the same pattern of life during their military careers, from commissioning to schooling, varieties of assignments, family life, social life, accomplishments, disappointments, honors, and retirement. True, there will be some minor variations due to individual differences, but the military purpose is indeed combat, and this dictates the necessity for a set of stringent laws and regulations equally applicable to all. This rigidity allows very little difference in life patterns of the professionals.

With his emphasis centered on the Vietnam war and its results, the author points out that in that conflict we exerted only military effort, almost completely neglecting the more important issue of political legitimacy and social justice, the very foundation of effective government. Under these circumstances we were surely bound to fail. Supporting a corrupt government was disastrous, and the greatest casualty was the military profession itself.

He believes that greater sensitivity, responsiveness, and honesty, as espoused by the Modernists, offer some hope for improvement in the military image. He also proposes the idea of a new professionalism. With peace prevailing and public sentiment staunchly opposing any form of warfare, the military as a profession may have to search for a new purpose—a role expansion. An identity crisis is imminent and there is an increasing possibility of institutional irrelevancy and professional decay. The Army may have to search for meaningful roles of essentially peacetime tenor. Examples include domestic and civic actions, social welfare, education, ecology, and domestic disorders. This would be a return to an earlier role of peaceful use of military forces when there were nation builders instead of killers. But he points out that the forces still must be capable of the killing business because the existence of this power is the cornerstone of peace.

What can actually be done to restore the good name of the Army and once more instill public confidence in the military establishment? At this point in time, the author says that the search for answers goes on. Sarkesian believes that the greatest hope for our society and for the military is in the existence of professional military men who are moved by compassion, troubled by injustice, and are still able to take pride in their professional commitment.

THE SOLDIER REPORT WESTMORELAND

SENIOR AIR DEFENSE ARTILLERY COMMANDERS

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

BG William E. Cooper, Jr.
31st Air Defense Artillery Brigade

BG Walter J. Mehl
38th Air Defense Artillery

COL Russell M. McGraw
The School Brigade

COL Gary C. Mahan
1st Air Defense Artillery Training Brigade

COL Merle D. Starr
USA ADA BCT Brigade

COL John T. Weathers
11th ADA Group

COL J. Hollis V. McCrea, Jr.
108th ADA Group (C/V)

COL Eugene Fox
10th ADA Group

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

COL Richard T. Lambert
94th ADA Group

COL Larry E. Honsinger
559th Warhead Support Group

LTC George E. Botelho
570th USA Artillery Group

LTC Fredrick W. Kulik
552d USA Artillery Group

LTC Samuel Liberatore
5th USA Artillery Group

LTC Robert Tozier
2d Battalion, 67th ADA (C/V)

LTC Edmond S. Solymosy
2d Battalion, 60th ADA (C/V)

LTC Raleigh R. Meyer, Jr.
6th Battalion, 56th ADA (C/V)

LTC Franklin Alexander
3d Battalion, 59th ADA (Hawk)

LTC Bruce M. Hamilton
2d Battalion, 62d ADA (Hawk)

LTC Peter C. Hixson
2d Battalion, 2d ADA (Hawk)

LTC Martin G. Olsen
1st BCT Battalion

LTC Ernest H. Tobin
2d BCT Battalion

LTC Alvie P. Ashley
1st Battalion, 1st ADA (Hawk)

LTC Michael Schmidtman
3d Battalion, 7th ADA (Hawk)

LTC Robert J. Weinfurter
2d Battalion, 57th ADA (Hawk)

LTC David E. Roberts
6th Battalion, 52d ADA (Hawk)

LTC Terrence L. Shaw
3d Battalion, 60th ADA (Hawk)

LTC Carl C. Neely, Jr.
2d Battalion, 56th ADA (Herc)

LTC James E. Leach
3d Battalion, 71st ADA (Herc)

LTC Kurt L. Keene
2d Battalion, 1st ADA (Herc)

LTC John H. Birrane
5th Battalion, 6th ADA (Herc)

LTC Laurence P. Kenney, Jr.
2d Battalion, 59th ADA (C/V)

LTC Robert C. Horn
3d Battalion, 61st ADA (C/V)

LTC(P) John J. Connolly, Jr.
3d Battalion, 67th ADA (C/V)

LTC Robert N. Mathis
1st Battalion, 59th ADA (C/V)

LTC Patrick J. Cunningham
1st Battalion, 2d ADA (Hawk)

LTC Raymond E. Starsman
1st Battalion, 44th ADA (Hawk)

LTC George O. Evans
2d Battalion, 44th ADA (Herc)

LTC Harold B. Dennis
2d Battalion, 71st ADA (Hawk)

LTC Robert J. Lander
2d Battalion, 61st ADA (C/V)

LTC Charles E. Johnson
1st Battalion, 68th ADA (C/V)

LTC Frank V. Lindstrom
2d Battalion, 5th ADA (C/V)

LTC William Solomon
3d Battalion, 4th ADA (C/V)

LTC Richard C. Dean
1st Battalion, 3d ADA (C/V)

LTC Joe B. Thurston
1st Battalion, 67th ADA (C/V)

LTC John D. Crandall
1st Battalion, 51st (C/V)

LTC Donald J. Beebe
5th Battalion, 52d (C/V)

LTC Richard F. McCrary
1st Battalion, 62d ADA (C/V)

LTC Welton E. Hamilton
3d Battalion, 68th ADA (Hawk)

LTC John B. Sampson
1st Battalion, 65th ADA (Hawk)

LTC Richard B. Baldwin
2d Battalion, 52d ADA (Herc)

LTC Richard E. Minor
1st Battalion, 7th ADA (Hawk)

LTC Jack E. Morgan
2d Battalion, 52d ELM

LTC Richard D. Stageberg
1st Battalion, 55th ADA (C/V)

LTC Leslie L. Custer
2d Battalion, 55th ADA (Hawk)

LTC Peter W. Bradley
4th Battalion, 1st ADA (C/V)

LTC Carl S. Gustafson
3d ADA Training Battalion (MSL)

LTC Dale G. Hobbs
4th ADA Training Battalion (FAW)

LTC John Loeffler
Staff and Faculty Battalion

LTC Harrell G. Hall, Jr.
Student Battalion

LTC Gustave Villaret III
Allied Student Battalion

LTC John P. Wilson
5th Battalion, 576th ADA (Hawk)

LTC Avril L. Queen
4th Battalion, 62d ADA (Herc)

LTC Elton R. Shauf
4th Battalion, 61st ADA (C/V)

The Editor Comments

Leading off this initial issue of 1977, "Target Chaparral," by Captains Christopher Witt and David Priddy, provides some good lessons learned that can benefit all air defenders. The article describes the reactions of Chaparral crewmen as they defended a critical asset against realistic attack profiles by US Air Force jets during a recent test exercise.

"Air Defense Battle Dynamics: Key to Insight," by Lieutenant Colonel (Ret) Thomas E. Bearden, discusses his views on countering the known threat and advocates more systematic, detailed, and sustained study of the air defense problem.

We also bring you "Combat Formations in the Offensive Battle," written by a Colonel in the Soviet Army, which highlights Soviet air defense tactics and employment during offensive operations.

"DIVADA—Division Air Defense Artillery," by Lieutenant Colonel Donald R. Infante, provides a look into the future organization of air defense artillery.

"Improved Hawk Package Training," "History of Air Defense," and "Humility as a Leadership Trait" round out this issue along with our regular features: "Scanning," "View From the Field," "Combined Arms Corner," "Developments," "Intelligencewatch," etc.

A highly informative article to watch for in the April—June issue is "C/V Tactical Employment in the 8th Infantry Division," which describes experiences of the 1st Battalion, 59th ADA in REFORGER 76.

As always, we enthusiastically welcome any comments, pro and con, that members of the combined arms team or other branches and services may have on articles and information presented in ***AIR DEFENSE Magazine***.

This is my last issue as Editor of ***AIR DEFENSE Magazine***. As I depart, I want to thank all contributors who have enabled ***AIR DEFENSE Magazine*** to become one of the finest military professional journals available today.

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