AIR DEFENSE MAGAZINE

APRIL - JUNE 1978

DIVAD GUN

AIR DEFENSE MAGAZINE

Commandant
MG JOHN J. KOEHLER, JR.

Assistant Commandant
BG JOHN B. OBLINGER, JR.

Deputy Assistant Commandant
COL BILLY J. MENDHEIM

Directorate
of Training Developments
COL JAMES A. KILGORE

Directorate
of Combat Developments
COL ANTHONY J. ADESSA

Directorate of Training
COL WILLIAM O. WALKER

Directorate of Evaluation
COL JERRY D. FRYDENDALL

Directorate of Support
LTC JOSEPH M. LORIMIER

1st ADA Training Brigade
COL RUSSELL W. PARKER

The School Brigade
COL JAMES R. DEMOSS

Editor
W.E. SANFORD

Associate Editor
JUSTIN R. ORMSBY

Editorial Assistant
PEGGY E. WORDSWORTH

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 dialogue between the School and units in the field, with a view toward increased efficiency in all aspects of air defense.

Unless copyrighted or syndicated, material may be reprinted. Please credit AIR DEFENSE MAGAZINE and the author.

Articles appearing in this publication do not necessarily represent official policy or endorsement by any agency of the US Army.

Articles and letters should be addressed to: The Editor, AIR DEFENSE MAGAZINE, USAADS Box 5600, Fort Bliss, Texas 79916. Telephone numbers: AUTOVON 978-5240, Commercial 915-568-5240.

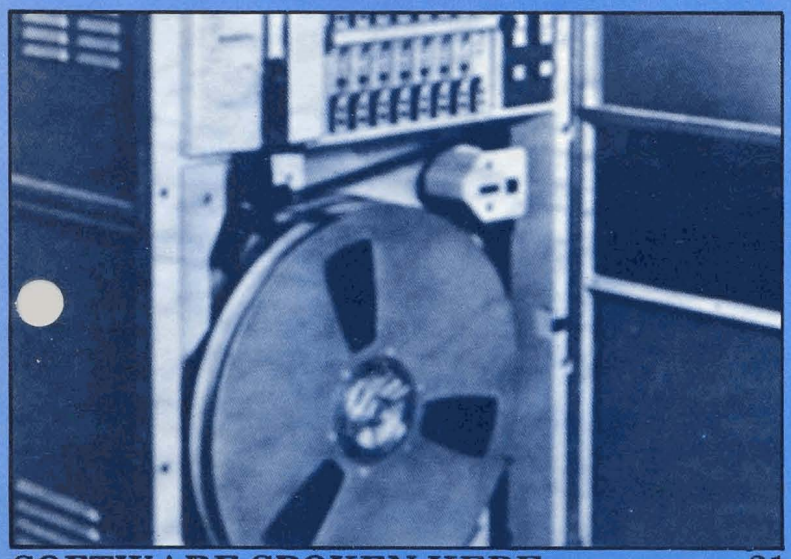
Use of funds for printing of this publication has been approved by Headquarters, Department of the Army, 23 December 1975, in accordance with AR 310-1.

Subscriptions may be obtained through the Custodian, US Army Air Defense Magazine Fund, USAADS, ATTN: ATSA-TD-LIT, Fort Bliss, Texas 79916. The rate is $4.00 per year. Make checks payable to: Treasury of the United States.

Controlled Circulation postage paid at El Paso, Texas.

Artist's concept of the Ford Aerospace and General Dynamics proposed DIVAD Guns.

AGGRESSOR PILOT 14



SOFTWARE SPOKEN HERE 21

DEFENSE AGAINST AIRMOBILITY 26

ARTICLES

DIVAD GUN 7

AIR DEFENSE OF THE GROUND FORCES 8

THE NEED FOR OFFENSIVE GROUND COMBAT OPERATIONS 18

VIEW FROM THE FIELD 30

TAKE A Q FROM THE RUSSIANS 33

SKILL RETENTION AND REFRESHER TRAINING . . . 35

WHAT DO YOU DO NOW, LIEUTENANT 38

DEPARTMENTS

INTERCEPT POINT 2

ENGAGEMENT ZONE 4

SCANNING 41

ENLISTED CAREER NEWS . . . 44

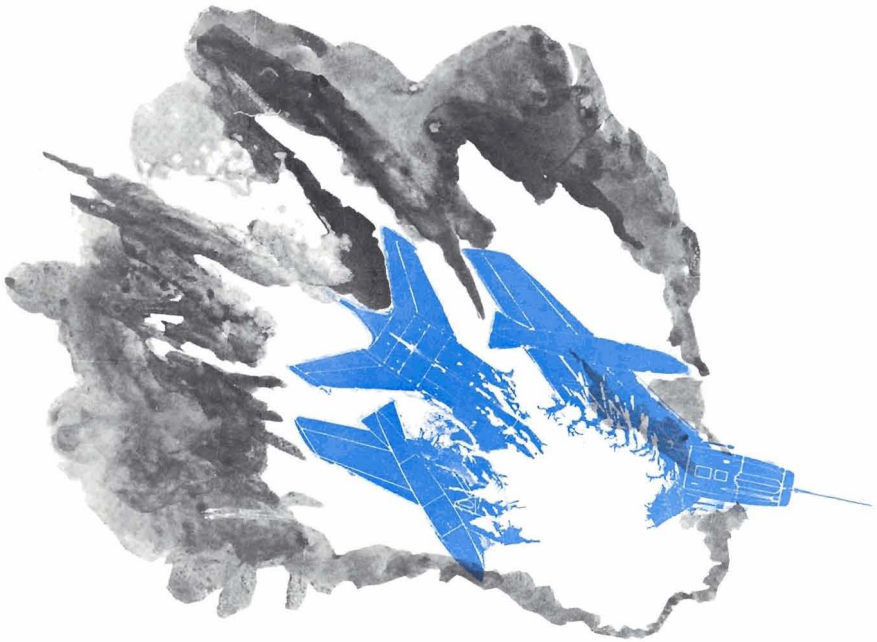
BARS TO STARS 47

COMBINED ARMS CORNER . . 51

DEVELOPMENTS 53

INTELLIGENCEWATCH 56

BOOKS 58



INTERCEPT P

MAJOR GENERAL JOHN J. KOEHLER, JR.

In my first Intercept Point, I emphasized that the Air Defense School exists for one primary purpose—to support Air Defense Artillerymen in the field. One aspect of this support involves providing units in the field with well-trained soldiers in the shortest possible time.

Self-paced instruction is one means through which the School can definitely improve performance; yet, I know from discussion with commanders in the field that there is considerable apprehension over this program. Some doubt the quality of the future graduate of self-paced operator and maintenance courses. They find it difficult to believe that a fully-qualified graduate can be produced through self-pacing in less time than it takes with conventional instruction. In this article, I want to try to clear up some of the misunderstanding that may exist with regard to self-paced instruction.

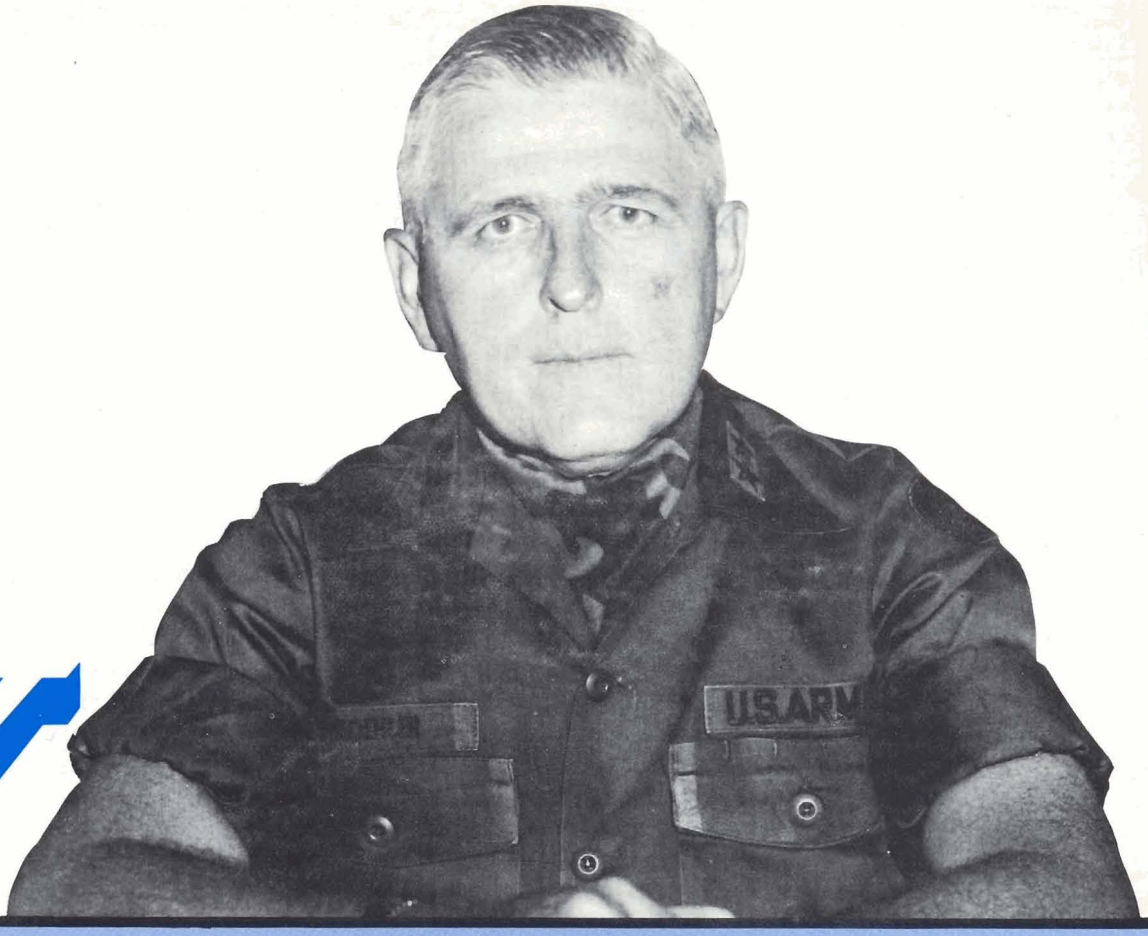
As the name implies, the soldier undergoing a course of self-paced instruction learns at his own individual rate. Those who learn faster will complete the course and reach their units of assignment sooner. Most commanders would, of course, like this aspect of the program—but not at the expense of receiving a replacement who is not well-trained. So let's examine some other aspects of the program that may not be as well known but are even more important—those that assure the replacement will know his job when he arrives at his unit.

Various types of media are used in self-paced instruction. The student first learns from the media [printed text, audiovisual equipment and material, etc.], then practices on the actual equipment. He is then examined on every critical task by hands-on equipment testing. No longer is 70 percent a passing score as in conventional instruction; 100 percent successful completion of critical tasks is required of every student before he graduates from the course and is awarded the MOS.

The instruction is consistent. Each student receives the same high-quality instruction as the next. No longer is class content unduly influenced by the whims and the capabilities and limitations of the individual instructor.

With assistance from education specialists, courses are developed by subject matter experts—people who have been in the field and know what an operator or mechanic must be able to do to perform his job in a unit. All instructional material is validated prior to its actual use.

An additional advantage of a self-paced course is that it not only can be used in the School but also can be exported to the field. This provides the unit a means of conducting high-caliber refresher training without extensive preparation by unit personnel. Moreover, commanders and other



supervisors can see exactly what the soldier is taught at the School.

If unit commanders and supervisors don't like some part of the course, or think it should contain other critical tasks, they can identify [and let the School know] specifically what they think is needed to improve the course. Courses will be updated and revised as required.

At present, the School is conducting two self-paced courses: AN/MPQ-T1 Radar Signal Simulator Maintenance and Forward Area Alerting Radar Maintenance. Development efforts are now concentrated on four operator courses for the Chaparral, Vulcan, and Improved Hawk weapon systems [MOS 16P10, 16R10, 16D10, 16E10]. Validation of the Chaparral crewman course is in progress and the course will be implemented in the 4th quarter, FY 78. The remaining three courses will be implemented in the 1st quarter, FY 79.

Another important effort is the self-pacing of basic electronics and digital fundamentals instruction. These instructional modules will be used in most of the courses taught at the School. An out-growth of this effort is a basic electronics self-paced training package that will be exported to the field to satisfy the demand for refresher training in basic electronics.

Further work is being done under a Government contract with Raytheon Company to self-pace the Improved Hawk Firing Section Maintenance Course [MOS 24C20] and to develop 106 fault isolation training exercises for MOS 24C and 24G. These exercises are designed to provide troubleshooting practice without using actual equipment or expensive mock-ups. The target date for completion of the contract is May 1978.

Future developmental efforts will focus on the following courses:

- Improved Hawk Fire Control Maintenance.
- Improved Hawk Information Coordination Central Maintenance.
- Air Defense Acquisition Radar Crewman.
- Chaparral System Mechanic.
- Vulcan Mechanic.

The use of self-paced instruction appears to be a dynamic approach that will provide a much better qualified and more experienced and self-confident graduate to the units in the field. I shall continue to monitor our graduates to insure that the program is succeeding.

John J. Koehler Jr

ENGAGEMENT ZONE

letters to the editor

VICE CHIEF OF STAFF OF THE ARMY COMMENTS

Dear Sir:

General Walter T. Kerwin, Jr., Vice Chief of Staff of the Army, recently addressed the El Paso Chapter of the Association of the US Army here at Fort Bliss. The thrust of his address was to explain the necessity for support of the total Army, and I think your readers would be interested in his remarks. With his approval, I am quoting some of them for publication.

He opened the address by saying, "I'm happy to report that because we are strong our nation is at peace," thus reemphasizing the words of President Jimmy Carter.

To a group comprised of more than 380 members of both the local military and civilian communities, General Kerwin advised that our National strength is the best guarantee of peace and the best guarantee of our National security.

Again quoting President Carter, the general noted that our security is based on our National will, combined with the strength of our Armed Forces. He also noted that, while there are problems in the strength of our Reserve forces, we must depend on our Reserve forces more than anyone realizes.

General Kerwin went on to explain that for many years the military has paid only "lip service" to the Reserve components. "All the emphasis for many, many years seemed to be on the Active component. But today, we, for National survival, are committed to the total Army, which includes the Reserve components of the Army.

"In the past, the Reserves were there for maybe a year before they were committed. Today, they will be committed at the same time as the Active force.

"More than half of the support units for the initial phase of war must come from the Reserves," the general added. "Thus, we must depend on the total Army."

He explained that there is both a philosophical and a practical reason for maintaining a total Army. From the philosophical viewpoint, the Army is part of the people. This has been one of the Army's greatest strengths.

He noted that the average person can empathize with the Army because the Army is more a people service. The Army doesn't have nuclear submarines or sophisticated aircraft that are beyond the comprehension of the average citizen. The Reserve and National Guard provide a great reinforcement for this empathy.

"Many people don't realize that the Army Reserve and the National Guard are located in more than 6,000 communities across the United States. That means that in 6,000 communities across the country there are at least 100 Reserve or Guard component personnel in the community, and many of them are leaders in their own communities.

"If Vietnam taught us anything at all, it's that the Army can succeed only if it has the support of the American people. Without that support, the Army failed and the Nation failed."

On the practical side, General Kerwin noted that we have a problem in that we must continue to provide an adequate security program without bankrupting the economy. Following World War II, we spent a lot of money on the nuclear umbrella while playing catch up with the conventional forces. "We must find a balance," he noted, "and that balance includes the Active and Reserve components.

"Our strength depends upon our Allies," he continued, again quoting the President. "We've reaffirmed our commitment to Europe. This year we are going to demonstrate this commitment by further modernizing and strengthening all our military capabilities in Europe."

To increase the effectiveness of the troops in Europe we must sacrifice certain items at home. "To accomplish this," he explained, "we are going

to withdraw equipment from both the Active Army and Reserve components in the United States and move it to Europe in prepositioned stockpiles. This will make it more readily available."

The general moved on to the pace of training and the increased tempo of combat arms training, including air defense. Specifically, he pointed to the speeding up of the Patriot and Stinger systems, the contracting for the DIVAD gun system, and the emphasis on the Roland project. All of these are aimed at achieving the readiness goal established by the Chief of Staff of the Army and the Secretary of the Army.

"Another very important goal is the people goal," he emphasized. "The goal today is to provide the Army not only with quantity people but, more importantly, with the quality of people it needs. Today, we have about the best overall quality of people we've had in many a decade."

General Kerwin praised the rapport between the El Paso and Fort Bliss communities. "There is today, between this civilian community and this military community, probably the best rapport of any place in the continental United States. There is a sincere higher level of interest in this country's defense here today than there is in most places.

"This community is really a part of the Army. As General Abrahms said not too long ago, 'The Army is people.' Regardless of what side of the fence you live on," he concluded, "whether it is El Paso or Fort Bliss, you are all part of the Army."

EDWARD C. STARNES
Public Information Officer
Fort Bliss, Texas

A WORD FROM AUSTRALIA

Dear Sir:

Enclosed is your readership survey questionnaire. I hope that my comments are of assistance. The magazine is most interesting and of excellent quality. We really look forward to receiving each copy.

Will you please send me a back copy of the September 1974 edition of Air Defense Trends or, if that is not possible, could you please photocopy the article, "Small Arms in Air Defense," by LTC Rudy J. Wagner from that edition?

For our training program, will you also include a copy of the poster "Soviet Air Defense Weapons" from Air Defense Trends, October-December 1975?

The six "Soviet and Warsaw Pact Aircraft" posters sent to us last year have contributed considerably to our battalion training program.

Thank you very much for your past assistance and for any future assistance.

SGT Ian Kuring
Air Defense Platoon, 6RAR
c/-Mil. P.O.
Enoggera, 4052
Queensland, Australia

The material requested has been provided, but our readers are advised that the supply of Soviet weapons posters is exhausted and the aircraft poster supply will probably last about 1 more month. However, the weapons poster is now available in Graphic Training Aid [GTA] format from your Training Aid Support Center, and an aircraft GTA should be available in about 3 months. -Ed.

FROM THE MARINES

Dear Sir:

In the Oct-Dec 77 issue of your magazine, you mention that you have additional copies of aircraft and air defense weapons posters available. I would like to order a complete set.

As a Marine F-4 Squadron Intelligence Officer, it is my responsibility to insure that our air crews are proficient in aircraft and SAM systems recognition and knowledgeable in their capabilities.

In a Letter to the Editor—on the same page of the same issue—mention is made of a recent AIR DEFENSE Magazine article on Soviet air defense weapon systems. Being a new subscriber, our unit didn't receive that issue. I would, therefore, appreciate information on how to order that particular back issue or at least a XEROX copy of the article.

Thank you for your assistance.

1LT DONALD S. JEFFERSON, USMC
VMFA-323 S2
MAG-11, 3D MAW, FMF PAC
MCAS, El Toro, CA 92709

We welcome the opportunity to assist in air defense in any way we can throughout the Department of Defense. -Ed.

AIRCRAFT RECOGNITION

Dear Sir:

After 4 years in Europe, assigned to a Chaparral/Vulcan battalion of a division, we are still perplexed at the inadequacy of the aircraft recognition program. A great deal of stress is

placed on the program, and most 16P and 16R personnel can master the requirements with little effort. Our concern is based on the new developments in the world political scene and how these developments affect the efficiency of the present aircraft recognition program.

Not knowing what country might be leaning which direction on any given day, the possibility exists that our air defense gunners may be faced with the problem of distinguishing MiGs or F-4s on the friendly side from those on the enemy side. This leads us to believe that some other method than the WEFT method for aircraft identification should be developed.

Several alternatives exist; possibly attack profiles or attack techniques could be included in aircraft recognition classes. Consideration could be given to including aircraft markings and pattern painting techniques. Another alternative is redesignation of aircraft recognition as a secondary means of target identification and implementing more thorough and effective airspace management practices. If successful combined arms training were conducted between the Air Force and the Army, then airspace management could viably become the primary means of identifying friendly aircraft.

All in all, aircraft recognition, as it is now taught, is proving to be less than adequate. This could become very apparent in open conflict when our air defense gunners have to decide which side that F-4 is on as it passes their positions enroute to the soft rear area.

CHRISTOPHER K. RASH
CPT, ADA
B, 3/61 ADA

WALTER P. SCHAEFER
1LT, ADA
B, 3/61 ADA

REPLY TO LETTER FROM CPT RASH AND 1LT SCHAEFER

Certainly there has been an inadequacy in aircraft recognition training. Realizing this, the Air Defense School is developing new TEC lessons on aircraft recognition, which will be fielded near the end of this year. The lessons correct many deficiencies of the GOAR Kit by adding realism, motion sequences, and paired comparisons, to name but a few of the innovations. See the Oct-Dec 1977 issue of AIR DEFENSE Magazine for a full report on this new technique.

It is also true that political situations throughout the world constantly change, so it is impossible to maintain an up-to-date program that also teaches insignia and camouflage schemes. There are thousands of different combinations. Also, upon the outbreak of hostilities, camouflage schemes are usually modified and new ones added. For these reasons, a course on this aspect of aircraft identification becomes unrealistic.

The problems of insignia, camouflage, and attack profiles and techniques, as they relate to aircraft recognition, are taught in the Air Defense Officer Advanced Course. Aircraft recognition is taught, but no attempt is made to cover all of the insignia or camouflage schemes. Further, from a study of aircraft attack profiles, it is impossible to identify aircraft based on attack profiles. Indeed, attack techniques were changed almost daily in recent conflicts to meet the changing threat and conditions.

Certainly, the problem of adequately teaching aircraft recognition exists. Problems that cannot be fully solved will probably exist for some time, but the new TEC lessons go a long way in improving the present program. With annual updates, TEC should remain the most up-to-date and comprehensive program for VACR training that is practically possible.

-MAJ D.W. Shaw III

"IMPORTANT"

Recently, an AIR DEFENSE Magazine readership survey form was mailed to all units receiving the magazine, to be completed and returned. The survey helps insure the accuracy and effectiveness of our distribution system. To date, less than 20 percent of the survey forms have been returned.

If your unit is one who has not returned the form, please do so immediately to avoid any possible delay in receiving your copies of the magazine in the future. If the survey form has been misplaced, please mail a note listing your current mailing address to: US Army Air Defense School, ATTN: ATSA-DT-TER, Fort Bliss, TX 79916.

Comments in the form of letters to the Editor regarding articles that we publish are solicited as a long-standing means of acquiring information on reader reactions. Tell us what you think about what we have published, or failed to publish, then we can act effectively as we look to the future.
- Editor

DIVAD

DIVISION AIR DEFENSE GUN SYSTEM

The US Army is developing a new divisional air defense [DIVAD] gun to replace the current 20-mm Vulcan. Scheduled to be deployed in the mid-1980s, it will provide significantly improved air defense for our forward area combat elements. It will have sufficient range, lethality, and mobility [as well as protection for crew members] to allow it to fight with, and provide continuous air defense for, maneuvering armored and mechanized infantry forces. Two major companies, General Dynamics and Ford Aerospace and Communications Corporation, were recently selected to develop separate prototype systems. The DIVAD gun will be an all-weather, radar-directed system mounted on a modified M48A5 tank chassis. Both contractors propose two-barrel gun systems. The General Dynamic's prototype will be a twin 35-mm and Ford's will be a twin 40-mm system.

The Army will allow the two companies 29 months to develop the proposed systems. Each contractor will deliver two prototype units to the Army at Fort Bliss, Texas, for developmental and operational testing [DT/OT] at the end of the 29-month period. The DT/OT will be completed in 90 days and is in effect a "shoot-off" between both contractors. The results of the "shoot-off" will constitute a vital portion of the decision process to determine which company will be awarded the initial production contract.

The focal point for coordinating personnel, logistics, and training aspects and providing user interface with the Program Manager for the new DIVAD gun is the TRADOC System Manager [TSM]. The DIVAD gun TSM is COL Gary C. Mahan. The DIVAD TSM office has been established at the US Army Air Defense Center and School, Fort Bliss, Texas. Questions or comments should be directed to the DIVAD TSM by calling AUTOVON 978-6546/7242 or writing to Commandant, US Army Air Defense School, ATTN: ATSA-SM-L, Fort Bliss, Texas 79916.

СОВЕТСКАЯ ВОЕННАЯ ЭНЦИКЛОПЕДИЯ

Air Defense of The Ground Forces

a soviet historical perspective

By
COLONEL DANIEL K. MALONE

1

А — БЮРО

Ордена Трудового Красного Знамени
ВОЕННОЕ ИЗДАТЕЛЬСТВО
МИНИСТЕРСТВА ОБОРОНЫ СССР

The Soviet Military Encyclopedia entered into print last year, with volumes I and II [of 8 planned] issued thus far. The chief editorial commission was chaired by Marshal of the Soviet Union, A.A. Crechko, former Minister of Defense. Key members of the Soviet military hierarchy comprise the editorial commission, including Admiral of the Fleet of the Soviet Union, Gorshkov and Chief Marshal of Aviation, Kutakhov. The subcommissions, reflecting the Encyclopedia's breadth of coverage, include war and politics, ground forces, air forces, naval fleet, military art, technology and armaments, and military personages.

One of the Deputy Chairmen is Doctor of Military Science, General Lieutenant P.A. Zhilin, head of the Institute of Military History and a Corresponding Member of Academy of Science of the USSR.

One of General Zhilin's Department Chiefs, MG N. Shehovtsov, visited the United States in November to deliver a speech at the US Army Command and General Staff College, Fort Leavenworth, Kansas.

Another name of current interest to US readers is Marshal of Tank Forces Professor O.A. Losik, credited for special assistance in volumes I and II. Marshal Losik heads the prestigious Malinovsky Tank Academy in Moscow which hosted the US delegation from the Nation Defense University during last year's US-USSR exchange. MG Ivan Krupchenko, head of the Chair of Military Art at the Tank Academy, delivered a talk at the Army War College, Carlisle Barracks, Pennsylvania, 17 November of last year.

The Encyclopedia's roster of contributing luminaries and high offices in the Ministry of Defense [MOD], Ministry of Foreign Affairs [MFA], General Staff, Chief Political Directorate MOD, Academies and Institutes of the Central Committee of the Communist Party of the Soviet Union, key archives, and the Academy of Science, all attest to the high quality and official imprimatur of the Soviet Military Encyclopedia. Not credited, but undoubtedly playing their usual role, are the Glavnoye Razvednoye Upravleniye, GRU, the Military Chief Intelligence Directorate, as well as the Komitet Gosudarstveni Byezopastnosti, KGB, who must have provided the censorship and nihil obstat.

Although the books reveal no startling new secrets, they do represent an excellent source of information and a quality achievement by the authors, editors, and Order of Labor Red Banner Military Publishing House, MOD.

One of the entries of interest to US air defense personnel concerns the evolution of the corresponding Soviet branch of service. The entry is signed by General-Colonel of Artillery P.G. Levchenko, who is currently Chief of the Soviet Air Defense branch of service. It is interesting to note, in reading General Levchenko's entry, how Soviet perspectives of the air defense problem shaped their combat development activities toward doctrine, tactics, and weaponry that we see in active service today. Equally interesting are his observations of US and NATO developments and his perhaps stronger recognition of the revolution in military affairs brought on by burgeoning technology.

The article that follows is based on excerpts from Voyska Protivovozdushnoi Oboroni Sukhoputnykh Voisk [Forces of Anti-Air Defense of the Ground Forces], hereinafter called PVO SV. The acronym PVO by itself will be used, as in Russian, to describe the general activity of air defense.

The article includes some terms which do not translate handily. Particularly, Soviet usage describing military organization varies somewhat from our own and will be approximated or given in Russian.

Ob'yedineniye—a major field force, e.g., Army or Front.

Soyedineniye—corps, division, or brigade, literally a thing combined or united. Soyedineniye can be formed by combining elements of various branches of service.

Chast—TOE regiment or smaller unit which is administratively self-contained and is numbered. A PVO SV battalion attached to a corps would be a chast.

Podrazdeleniye—literally something divided out. A Redeye "detachment" would fit this category. So, too, do companies, platoons, and squads.

As all encyclopedias should, the entry begins with a straight-forward definition. PVO SV is a branch of the ground forces, intended for the protection of groupings of forces and objectives of their rear area from strikes by enemy air. It is composed of zenitny rockets, AA artillery, and radio-technical chast and podrazdeleniye. It is capable of independently, or in combined operation with forces and means of PVO of other types of forces, destroying aircraft and pilotless means of air attack to carry out battle with enemy air assault forces[2] on approaching flights or during descent, and also to carry out radiolocation reconnaissance and alert the forces to enemy air [threats].

At its emergence, Russian air defense weaponry, as did ours, remained fairly crude, reacting to the new threat from the skies in WW I.

Special artillery units for combat with enemy aircraft appeared in the ground forces during the period of WW I when aviation began to be used for reconnaissance and to strike forces on the battlefield and rear objectives. These units were armed with special antiaircraft guns and with equipment for firing at aircraft with the 3-inch [76-mm] field gun. The first special cannon to appear in the Russian Army for combating enemy airplanes was a 3-inch auto-mobile anti-aircraft cannon made in 1915 at the Putilov Works.

In July of 1918, after the Great October Socialist Revolution,[3] the Directorate of Chief of Formation of AA Batteries was formed in the Soviet Army. This Directorate carried out major organizational and scientific research work in the area of tactics and conduct of fire of AA artillery.

In 1918, two antiaircraft batteries were introduced into the state rifle divisions. In 1919, special schools were formed for instruction of cadres of zenitchiki [air defense troops].

Russia was not to see peace with the end of WW I. Civil war ravaged the new Soviet state until 1920, with the final rout of Kolchak along the Trans-Siberian Railway to Vladivostok which was held until 1922 by Japan. Aircraft were employed by Reds and Whites, but in limited numbers. 1918-1919 was the period of military intervention by Allied forces which found German, French, and Polish troops in the Ukraine, and British, French, and US troops in Murmansk and Archangelsk, with the latter protecting supplies provided the Russian Army to fight Germany. Soviet historians view it otherwise. Development of AA weaponry began in earnest only afterwards.

With that war's conclusion, production of types of AA weapons of the Russian Army was re-established, and from 1925 industry began to produce modern types of AA weapons. In 1928 a modernized 76-mm AA cannon type 1915/28 with increased range was accepted into service. In the years of the first Pyatilyetka [Five-Year Plan; 1928-1933] there were designed and introduced into service the 76-mm AA cannon model 1931, the model 1938 85-mm semiautomatic and 37-mm automatic AA gun model 1939, the 25-mm automatic AA gun model 1940, a combination mount [ground of AA capability with the same mount] AA machinegun type 1931 and the large caliber AA machinegun DShK 1938.[4] [12.7-mm A model 1938/46 further improved the gun to feed by belt].

At the same time major efforts were carried out in developing and perfecting fire direction instruments for AA artillery fire. In 1931, PUAZO-1 [Pribor Upravleneya Artilleriskim Zenitnym Ognyom = PUAZO] came in service; in 1935 PUAZO-2 and in 1939 PUAZO-3.[5] Russian-made optical range finders were brought in service. This sharply increased the effectiveness of fire of AA artillery. Work was begun as well to develop radio location [radar] equipment.

The quantity of AA artillery grew without interruption; from 1934 to 1941 it increased 4.3 times. In the [TOE] of rifle corps and divisions, AA artillery battalions were added, and in rifle regiments—companies of PVO.

General Levchenko underscores the need for complimenting weapons with suitable tactics by listing the several documents and manuals issued prior to WW II, and the establishment of an early training base.

In 1920 the manual for firing against air fleets by batteries armed with 3-inch antiaircraft cannon had already appeared; in 1921—instructions for application of AA artillery; in 1929— regulations for combat with enemy air fleets by means possessed in troop units [chast]; and the "Manual of Artillery RKKA"[6] [combat employment of AA artillery]. The appearance in 1936 of the "Provisional Manual for Air Defense of the Forces" held special significance.

Further growth of theory and practice of PVO were obtained with the projects of the "Field Service Regulations" of 1939 and 1941. Small schools to instruct command cadres were established, as were special facilities at the Military Artillery Academy F.E. Dzerzhinskiy and the Military Academy M.V. Frunze.

The selection of the two prestigious academies, Dzerzhinskiy and Frunze indicates the high priority the Soviets attached even at that time to air defense.

The Dzerzhinskiy Academy opened in Petrograd in 1820 and moved to its present location, Moscow, in 1938. The Academy and its faculty, reorganized several times in its history, now trains engineering and artillery officers for senior positions. It includes military scientific research

departments. The Frunze Academy, also located in Moscow, is the higher Combined Arms Academy, similar to our services' War Colleges. Frunze, founded by Lenin in 1918, produced, along with the General Staff Academy, most of the Soviet top echelon commanders.

General Levchenko's description of the situation just prior to and at the start of WW II reflects the haste and urgency of a worried world over the intentions of Hitler's Third Reich.

At the beginning of the Great Fatherland War [WW II], the military personnel of AA artillery possessed the solution of a system of armament and an efficient organizational structure. However, at the moment of attack by Fascist Germany on the Soviet Union, the rearming of PVO units was still not complete. The insufficiency of small caliber AA artillery was especially sharply felt. Thanks to measures taken by the Communist Party of the Soviet Union and the Soviet Government in 1941-1942, massive production of AA weapons and ammunition for them was set in motion. From 1942, formation was begun of Army-level regiments of PVO and later AA artillery divisions of RVGK [Reserve Forces of the Main Command...GHQ reserves]. AA artillery groups were formed to protect the major concentrations of forces of Fronts and Armies. [These measures] markedly improved the organization of PVO of the forces and increased its effectiveness.

In opening battle with the enemy aviation in the years of the Great Fatherland War, solutions were developed to the problems of concentrating AA artillery on the major axes, to maneuvering PVO means during preparation and engagement operations with the aim of providing uninterrupted protection of the forces, to [providing] cooperation among AA artillery, interceptor aircraft, and forces of PVO Strany, and to other problems. During the war, experience was accumulated and generalized in "Control of Combat Employment of Means of PVO for Protected Forces" [1944] and in other documents.

During the war, the quantity of AA artillery grew almost 8 times, in which number small caliber AA grew 17 times.

Two major tactical/technical concepts in Soviet air defense doctrine are reflected here and are worth noting because of their differences with similar US concepts.

One is the notion of maneuverability of fire—a broader concept than we usually apply to the maneuverability of a single vehicle or AA gun mount. The second is the notion of maneuvering AA assets so as to mass along a main axis—either of attack by protected ground forces or of expected attack by enemy aircraft. The scale of mass and scale of the concept of maneuverability in Soviet military writing reflects an historic predeliction for overwhelming concentration of forces at the critical point.

General Levchenko comments on the quality of WW II PVO action and goes on to discuss the post-WW II evolution.

AA artillerymen of the Ground Forces of the Soviet Army fulfilled their assigned missions and provided a significant contribution to the general work of destroying the enemy. For bravery and heroism, several tens of thousand soldiers, sergeants, officers, and generals of troop PVO were awarded Orders and Medals. Fifty-three attained the title of Hero of the Soviet Union. The distinguished honorific designation of Gvardeiski [Guards] [7] was conferred on many AA soyedineniye and chast.

In the postwar period, the theory and practice of PVO forces pivoted on the basis of experience accumulated during the course of WW II. New armament appeared in PVO ground forces...more effective complexes[8], self-propelled AA gun carriages, radar sets of various types...which enabled the conduct of battle with enemy air in all conditions of weather and at all times of day or night.

General Levchenko then presents the crux of the rationale behind the reformation of air defense in both East and West and a concise summary of the impact of the revolution in military technology on air defense doctrine.

From 1954, the appearance among the armaments of several countries of nuclear weapons, whose carriers were primarily aviation, sharply increased the role of PVO in combined arms warfare and in operations of the Ground Forces. This demanded a decisive increase in the effectiveness of PVO, and a reexamination of a series of situations concerning PVO organization and management. A principle new weapon was developed—the highly mobile AA missile complex [ZRK][9] of various types, and also AA SP artillery mounts [ZSU],[10] new means of radar reconnaissance and apparatus for the automation of the system of control.

The growth of the role of PVO in combined arms combat and operations, the increased seriousness of its mission, and the introduction into the ground force PVO of new military technology required restructuring the system of managing troop PVO. With that aim, in 1958 the branch of service PVO SV was established in the Ground Forces.

The which-came-first, doctrine or technology argument exists in the military societies on both sides of the Iron Curtain. Lenin and Engels both come down heavily on weaponry and the economic status of the state as the predeterminant of military doctrine, a precept which perhaps helps General Levchenko state cause [nuclear weapons] and effect [reorganization of PVO] so succinctly.

Nevertheless, the definitive split of PVO into a separate component of the armed forces for PVO Strany [Air Defense of the Nation] and a separate branch PVO SV with appropriate weaponry within the Ground Forces themselves was a decisive step toward not only responding to the technological challenge but also in providing the highly mobile tank and motorized rifle divisions adequate accompanying air defense to carry out the blitzkrieg tactics they plan to employ.

Formation of the separate branch PVO SV required adjustments in the training base.

In conjunction with rearming PVO SV, the demand for instruction of command and engineering cadres increased. The network of military-educational institutions of PVO SV was expanded. Cadres for the forces of PVO SV were prepared in a branch of the Military-Artillery Academy M.I. Kalinin[11] and in five higher military schools.

Chiefs of PVO SV have been: Marshall of Artillery V.I. Kazakov [1958-65]; General-Colonel of Artillery V.G. Privalov [1965-69]. From 1969 the Chief of PVO SV has been General of Artillery and from February 23, 1972, General-Colonel of Artillery P.G. Levchenko.

The article turns its attention to developments abroad. It is often the case in Soviet writings, as Penkivsky revealed, that overly severe security restrictions force military writers to discuss their own ideas in terms of foreign weapons. The military characteristics of air defense weapons noted by the Chief of Soviet PVO SV as necessary for foreign weapons are likely considered necessary for his own.

Expansion of PVO forces received wide attention also in the capitalist countries. In the 1970s the armies of the major NATO nations introduced AA missilery and AA SP artillery in wide mass, inasmuch as experience in the war in Vietnam and, especially, in the Near East convincingly pointed out that strong PVO is an indispensable condition for success in contemporary battle and operations.

The following characteristics are greatly demanded for weapons complexes designed for protesting chast and soyedineniye of ground troops from air attack:

- High mobility.
- All-weather capability
- Automatic processes for detection, identification, and hitting the target.
- Minimum time to get into readiness to conduct fire.
- The capability to destroy targets executing low-altitude flight paths.

A US reader may agree or disagree with the description of NATO air defense development to date:

The acknowledgement of these demands manifested itself in the design [from the beginning of the 1960s] in the USA, Great Britain, France, FRG, and Italy of about 10 types of missile systems [ZRK] and 7-8 types of SPAA mounts [ZSU]. From the mid-60s there was an observable tendency toward ever-increasing deployment within the field forces of maneuverable, self-contained missile systems [ZRK] capable of independently detecting aerial targets, identifying them, and launching missiles on the move or from short halts. A typical example of such a system is the American ZRK Chaparral. A special place in the system of PVO of NATO ground forces is held by the portable systems: American Redeye [1965] and English Blowpipe [1974], crewed by a single operator [gunner] [Strelkom]. These systems play an important role in the system of troop PVO. The organization of forces and weaponry of PVO in the armies of the NATO nations does not exist in a special branch of troops, but is allocated to the personnel structure of podrazdelenihi, chasti, and soyedineniyi.

Some readers may find General Levchenko's treatment of future trends in NATO and US draws some slightly premature conclusions.

Further expansion of PVO forces in armies of the major capitalist nations is surmised to be according to the following directions:

- Design of new ZRK and ZSU.
- Maximum Saturation of troop PVO with AA weaponry.
- Improvement of the organizational structure of AA podrazdeleniyi and chasti.
- Perfection of the capability to conduct PVO [air defense in general].
- Organization of more precise control and of combined action of AA troops and weaponry on the field of battle.
- Increase the level of combat training and combat readiness.

In addition to ZRK in the system of troop PVO, the necessity of having multibarrelled AA SP guns [ZSU] is recognized. In the organization of PVO great attention is given to combined operation of AA missile systems and interceptor aviation.

The brief discussion of US FRG and UK air defense deployments gives enough of a picture to a Soviet reader to grasp the essentials. A US reader should not assume the following passage represents the full Soviet appreciation of such weapons and organizations.

An even stronger system of PVO is established in the American divisions, which include a mixed AA missile and artillery battalion [24 ZRK Chaparral and 24 ZSU Vulcan] and 67 Redeye teams [1975]. In the complement of a US field Army, it is possible to form a brigade of ZRK from

several groups, each of which contains 6-7 battalions of Hawk or 4-5 battalions of Nike Hercules. American Corps are usually reinforced by a group of Hawk.

In the ground forces of FRG the basic organization of unified PVO until the second half of the 1970s remained an AA battalion of 36 40-mm M42 ZSU and 15 40-mm automatic AA guns L/70; and in the army corps—a battalion of 40-mm automatic AA cannon L/70 [45 in all]. From 1975 a 35-mm twin AA mount Gepard on a tracked tank began to appear among the weaponry of these battalions. AA artillery battalions of the FRG army corps in the 1980s expect to rearm with the shortrange ZRK Roland.

English ground forces also deploy contemporary means of PVO. For example, in the divisions of the British Army of the Rhine, infantry and tank battalions and also artillery battalions each include detachments of ZRK Blowpipe [4 each]. To protect groupments of forces from medium- and high-altitude attack, the British army of the Rhine deploys the AA missile regiment Tanderborg Mk2, in whose complement are 12 launchers of 18 km altitude and 80 km range.

One of the critical aspects of air defense alluded to several times in the Soviet Military Encyclopedia's PVO SV entry, and well known to US planners, is that of coordination and control of the air-air, air-ground battle. If there is one single area warranting closer attention and presenting serious problems, coordination—in fact by exercise of command of the various air defense resources—takes the front row center.

Colonel A.A. Sidorenko in his book, The Offensive, hints at a conflict of command and control authority between the senior PVO commander and the local ground commander. General Levchenko chooses not to tackle so large a problem in so small a space, but speaks with some admiration of NATOs resolution of the problem, as a way of closing his commentary on PVO SV, showing a solid NATO front to conduct air defense operations.

According to regulations of the armies of the countries of NATO, in organizing PVO of the forces and of [specific] objectives, commanders of corps and divisions report to the commander of the ground forces of the TVD [theater of military operations] army groups and field armies.

Comparing Soviet experience with our own in the evolution of air defense weaponry and organization brings out many similarities and several differences.

If there is a lesson to be learned, it is probably the intense concentration on combined arms operations which Soviet tacticians and theoreticians espouse, and the inclusion of air defense elements within the ground formations as part and parcel of combined arms thinking, so well presented in General Levchenko's article in the Soviet Military Encyclopedia.

[1]Zenitny—Zenith or vertical, used as an adjective to describe vertically firing artillery or rockets translates as AA and missiles vice rockets.

[2]The Russian term includes parachute or air-landed forces.

[3]Because the Gregorian calendar was not adopted until the Soviets came to power, Lenin's revolution of 7 November 1917, the military parades on Red Square occured in October 1917. The name October Revolution is retained, though the date is changed.

[4]The letters stand for Dyegtarev and Shpagin, the designers; K for heavy. Shpagin designed the drum-fed submachinegun which, before the Avtomat Kalashnikova AK-47, formed the image in most people's minds of the Soviet soldier's individual weapon.

[5]In Vietnam, S-60 57-mm AA guns with PUAZO-6 and associated radars delivered effective fire to 6,000 m. A PUAZO-7 is noted in another section of the encyclopedia.

[6]Workers and Peasants Red Army.

[7]The honorific title "Guards" dates to 17th century Russia of Peter the Great. In WW II the title was reintroduced for valor. Guards units were entitled to better weapons and equipment. Troops wear and vehicles often display the respected guard's badge. Army units receive a banner, and Naval ships add a scroll to the ship's flag. Honorific titles of Soviet units get rather long. For example: Guards, Order of Lenin, Red Banner, Order of Kutuzov, Vinnitsa Rifle Division named for Yana Fabritsiusa.

[8]Complex = a term for guns or missiles together with related direction equipment.

[9]Zentniy Raketniy Komplex - ZRK.

[10]Zentnaya Samokhodnaya Ustanovka - ZSU.

[11]The Kalinin Academy is an offshoot of Dzerzhinsky, founded in 1953 in Leningrad with a branch in Kiev.

Colonel Malone is a graduate of West Point and holds a Masters Degree from Syracuse University. He has served in Infantry, Armor, Artillery, Intelligence, and now, Ordnance. Much of his work has been of a scientific nature. He is proficient in the Russian language and has served as an armed forces attache in the Soviet Union. His overseas service also includes Korea and Vietnam. Currently, he is a Senior Research Associate at the National Defense University.

NOTES

FRO

A

AGGRE

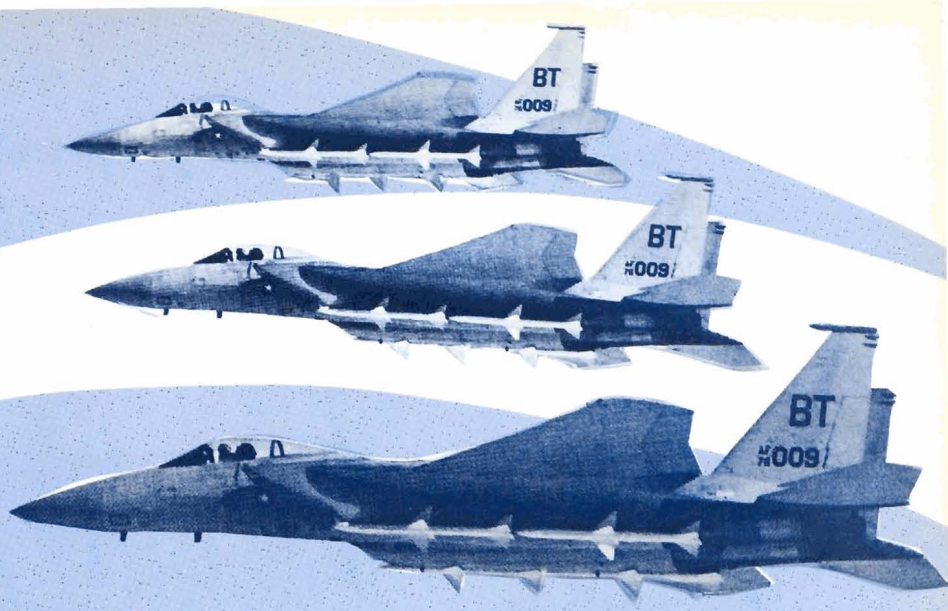
"To conquer the command of the air means victory; to be beaten in the air means defeat."
Giulio Douhet, 1921

Like seapower, airpower has two primary missions: force projection and defense. At the current state of the art, tactical force projection is a mission for manned aircraft and is beyond the scope of this article. Likewise, escort of these offensive aircraft is a defensive mission best accomplished by manned aircraft and on-board defensive systems.

Air defense of our military and economic resources is a vital, neglected mission with multiple means of accomplishment. These means span all three services and include manned and unmanned vehicles. Historically, American military forces have not had to be too concerned with air defense. Over Normandy in 1944, aircraft recognition was summarized by "if you see an aircraft, it's one of ours." Since then, our ground forces have always operated with air supremacy and we have always been able to achieve at least local air superiority over enemy territory.

Assuming that the long assembly line of Flogger Ds, Fencers, and Hind attack helicopters is not for static display, I submit that the next time we will not be given air superiority by default. However, for the most part, the American military continues to practice as though we will always have air superiority over our troops. On every exercise in which I participated with the Army during a recent tour as an air liaison officer, air superiority was "assumed" in the first paragraphs of the operations order. Even in major exercises with opposing forces, the "enemy" air force

Captain A.



OM AN ESSOR PILOT

Lee Harrell

attacks were at patently unrealistic rates, such as two sorties per brigade per day.

The phenomenal success of programs such as the Air Force's Red Flag F5 Aggressors is based on the adage that you fight like you train, or as the ancient Chinese put it, "The more you sweat in peace, the less you bleed in war." Most segments of the American military have seen operational activity this decade. This includes such disparate forces as minesweepers, B-52s, Special Forces, etc. Excluded, fortunately, are our ICBM/SLBM and air defense forces. It is the role of air defense training to which this proposal is directed.

Currently, we are not training the way we will be forced to fight. We are actually being counterproductive when we allow operations to be graded as successful that include C-130s flying at 1,200 feet [for paradrops], air field "defense" by four Redeye teams, Vulcan gunners claiming "kills" on every aircraft they point at, and a simulated 70-100 percent P_K* for all ground-based air defense systems [many of us are very grateful that real SAMs do not have a similar P_K]. Most importantly, this is counterproductive in the "mind-set" we develop in our troops and leaders. We continue to fight a two-dimensional battle when the threat is distinctly three dimensional.

To attain true combat capability, our air defenders must be forced to "fight" dissimilar aircraft employing enemy tactics in realistic numbers under conditions as closely approximating combat as is feasible.

There are at least five possible solutions to

* *The probability of kill figures are from personal records I kept at three successive exercises.*

overcoming this deficiency in air defense training. Some of those solutions will require spending USAF dollars to train Army units. Hopefully the "bean counters" will be able to see the big picture. The objective is to destroy enemy aircraft with the minimal expense to the American people. It matters not a whit whether this mission is accomplished by Army missiles or Air Force aircraft. What does matter is that the mission is accomplished efficiently and successfully.

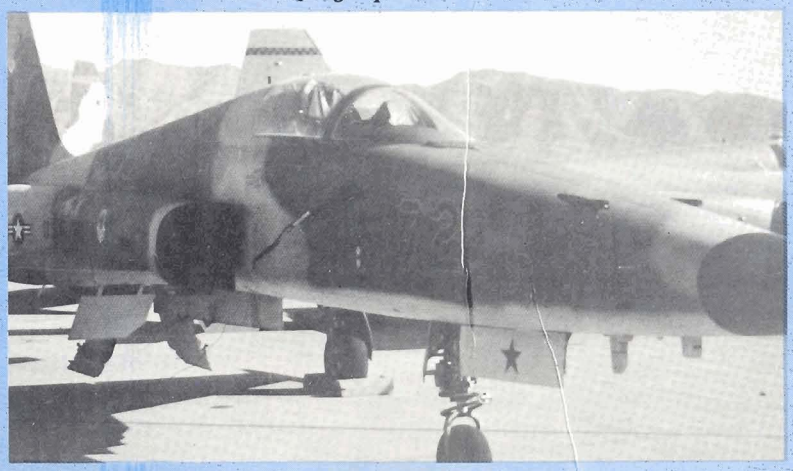
The solutions to the problem range from changing nothing to forming new units solely to train the Army. The first solution is by far the easiest: do nothing new. Besides the fact that it is the cheapest and faces no bureaucratic inertia, it does have some advantages to recommend it. Some promising projects are already under way including increased Army participation in Red Flag[1] and Military Airlift command's Airlift Survivability Study. Hopefully, exercise planners will continue to stress the importance of dissimilar aircraft for close air support/interdiction missions as well as air superiority [I was once assured that I would have "dissimilar aircraft" on an exercise for aircraft recognition training; I got Air Force A-7s on one side and Air National Guard A-7s on the other]. Army/Air Force cooperation in Europe appears to be somewhat better, but none of the current operations provides for routine dissimilar training with enemy tactics. At best, the air defense system will become proficient at destroying flights of two A-7s.

The second solution is to upgrade the current system. First, dedicated intelligence sources must disseminate information on Soviet air-to-surface tactics to the working levels [i.e., the Redeye gunner, the AWACS controller, the line air defense pilot]. Dissemination, I feel, is the most important phase of the intelligence function. The Aggressors fought, and continue to fight, the "protect sources" battle. This must be overcome if the operators are to be effective.

Secondly, Army participation in Red Flag must increase. Obviously, troops cannot be attacked with live ordnance, but weapons can be safely delivered close enough to give a sense of battle and be within air defense weapons range [at Fort Bragg, we routinely delivered live ordnance without hazard at 550 meters from troops]. Ground air defense elements could man the approaches to the drop areas and live troops could fight at the FEBA [one side with Soviet tactics] for dry missions.

Thirdly, we must make certain that the "threat" in all exercises is realistic in number and tactics. The Army must make certain that the soldiers react to the threat. The controllers [umpires] must institute realistic kill removal procedures [both air and ground] to make certain that Air Force and Army commanders realize the magnitude of the problem with which they are dealing. In my opinion, this is at once the greatest failing and the easiest to remedy facet of our exercises. We "prove" what we want to prove because the controllers may not add the necessary realism to the exercise. We must insert realism by "destroying," or aborting, aircraft and vehicles carrying vital equipment and personnel in field exercises just as we do in command post exercises. Poor tactics must not be rewarded. The offending players must be scored as "killed" for at least a time period long enough to require their commanders to plan for operations without them. We must make it hurt to be lazy or unimaginative. Finally, as a minimum, the Air Force combat experience with SAMs must be shared with the Army to preclude a belief that SAMs offer an impenetrable shield.

[1]*Editor's Note. Operation Red Flag involves two "Russian" squadrons of crack US fighter pilots at Nellis AFB, Nevada, who fly F-5E Tigers that closely resemble Soviet MiG 21s and bear Warsaw Pact camouflage patterns.*



The third solution tests the Total Force Policy to the limit. The proposal is to designate certain Air National Guard/Air Force Reserve units as primary mission air-to-surface Aggressor squadrons. A-37 and/or F-100 aircraft would be good simulators of the primary Soviet daytime VFR attack aircraft. The tasked squadrons would not lose their combat capability because they would maintain American air-to-surface tactics as a secondary mission. Indeed, the increased training, flexibility, and professionalism of an Aggressor role would probably increase their combat capability. This increased professionalism would be manifested in the requirement to become single-source experts on Soviet air-to-surface tactics. Ideally, the selected unit should have fellow Reserve/Guard intelligence personnel to assist in the training and dissemination roles. There could be some manning problems, but most major exercises are currently meshed with Reserve/Guard manning; all have long enough lead time to allow for planning of active duty man-days. At least one squadron per Numbered Air Force would be required to provide the necessary Aggressor density and cut down on travel time/cost. Air refuelable aircraft would provide an oversea capability. The relative inexpense of the Guard and Reserve make this an attractive option.

The next solution simply expands on the roles of the current Aggressor squadrons. As long-time experts in being the bad guy, the Aggressors would simply have to learn Soviet air-to-surface tactics and employ them during joint and Army air defense exercises. Each squadron could increase from 18-24 aircraft to handle the additional requirements. Alternately, a separate air-to-surface squadron or detachment could be organized near major exercise sites [such as Eglin AFB/Hurlburt Field] to cut field cost. There is no reason to believe that air-to-surface Aggressors would not be as successful as their air-to-air counterparts.

A final solution would be to create a joint "Red Force" under TAC/TRADOC Command. It could be controlled by the Air Land Forces Application [ALFA] Directorate or REDCOM. The Red Force would contain air-to-air and air-to-surface Aggressors, the current Red Force assets at Nellis AFB, and the Army's budding Red Forces. A similar [or joint DOD] USMC/USN Red Force could be effectively employed so that our forces could face a truly joint threat. The joint threat would have to be organized not as a mirror image of our Army-Navy-Air Force, but to reflect the Soviet operational and geographic organizational structure. None of the forces committed to this joint task force need lose its combat capabilities or its responsiveness to its parent command any more than it does when it is commanded by US Atlantic Command during joint training exercises. The advantage would be a professional, well-trained "enemy" force managed by experts in joint doctrine. It would normally be employed as a composite unit during major joint exercises, but the component units could continue to provide specialized unit training throughout the year.

None of these proposals is mutually exclusive. We can easily and cheaply increase joint air defense effectiveness by making our training more realistic and by sharing service experiences. Dedicated air-to-air and air-to-surface Aggressor squadrons fighting in triservice joint exercises would be ideal, but we need not refuse less ambitious improvements while striving for our final goals. Our objective is to instill added realism in tactics, numbers, friendly loss rate, etc., so that if we are faced with the real thing we will have that satisfying feeling of having "been there before." We must not forget that when one service provides training for another, it is its own longevity that is increased.

** *The Aggressor's mission is to emulate the enemy aerial threat in training, doctrine, tactics, and fighting philosophy. Aggressor pilots are experienced USAF fighter pilots who fly the F5E using enemy formations and tactics.*

Captain Harrell is a graduate of the University of Miami and holds a Masters Degree in Systems Management from the University of Southern California. He has also graduated from the Air Force Squadron Officers School and the Air Command and Staff College. His previous assignments include 7 years flying the F4 Phantom in Japan, Korea, Okinawa, and Vietnam. He is currently assigned to the 65th Fighter Weapons Squadron Aggressors at Nellis Air Force Base, Nevada, where he flies the F-5E.

MAJOR JOHN P. ROSE

THE NEED FOR OFFENSIVE GROUND COMBAT OPERATIONS

The Army's mission is to be able to engage in successful land warfare—to close with and defeat the nation's enemies. Whether battles were fought at Yorktown, Saratoga, Bunker Hill, or Normandy, the basic mission of the ground soldier was to close with and destroy the enemy.

Americans have always understood that, much as we would prefer other means, there is only one effective response to naked power, and that is countervailing power. To the aggressors of the world, bent on forcefully imposing their desires, their vision of the future on those who reject those desires and those visions, there is only one deterrent that is certain to work: adequate defensive physical force.

As a nation, we have sometimes been slow to recognize this need. So far, we have awakened in time to ward off disaster. And we have learned that the effort is worth it — that it is worth, in truth, any price. As General Eisenhower once remarked, "Americans—indeed, all free men—remember that in the final choice a soldier's pack is not so heavy a burden as a prisoner's chain.

General Earle G. Wheeler
Chairman, Joint Chiefs of Staff
19 May 1966

In war, as in everything else worthy of note, there must be an overriding purpose to which all else is subordinated. That purpose in war is to win. The army exists for one ultimate purpose — success in battle, victory in war. General Douglas MacArthur, speaking before the United States Congress in 1951, said:

Once war is forced upon us there is no alternative than to apply every available means to bring it to a swift end. War's very objective is victory, not prolonged indecision. In war there can be no substitute for victory.

The expressions, "defense," "defense forces," "defensive posture," and "defensive alliance," have always been popular between wars. They arise from the desire to demonstrate that one has no aggressive thoughts and that the only reason for having an armed force is to enable one to respond in the event of an attack upon one's self. The thinking behind these expressions is both limited and weak. From notions of defense, little serious thought is given to winning in the event of war. "Attack," instead of being synonymous with "defense," has come to be regarded as something almost unmentionable—even unthinkable. This is especially true of the way many Americans see nuclear war.

The advent of the nuclear era has brought a growing civilian-scientific influence into the shaping of national policies. Where classical strategists once sought to serve political ends via military victory, modern strategists have been preoccupied with avoiding war, not with winning it. Bernard Brodie, in The Absolute Weapon, wrote:

Thus far the chief purpose of our military establishment has been to win wars. From now on, its chief purpose must be to avert them. It can have almost no other useful purpose.

Since 1945, strategy has passed from thoughts and notions of limited war to massive retaliation, to deterrence, to graduated response, counterforce, unacceptable damage, assured destruction, mutual assured destruction, sufficiency, parity, and so forth. However, this progression of theory and thought had little to do with the conduct of US Army military operations in Korea and Vietnam.

Offensive Operations

In ground combat operations, the offensive is the act of attacking to secure the initiative, to preserve freedom of action, and to impose one's will upon the enemy. The advantage of offensive operations is in allowing the attacker the selection

... the dominant principle in our military doctrine has always been...that wars can be won only by offensive operations.

of objectives and the place, time, and means for accomplishing the mission. Generally, only by means of offensive operations can a decisive victory be attained.

United States Army tactical doctrine has never lost sight of the notion that offensive action is the necessary forerunner of victory. There may be occasions when it will be delayed, but until the initiative is seized and the offensive taken, victory is impossible. Defensive operations do not win wars. Lieutenant Colonel William F. Kernan wrote some time ago that—

Questions we should be asking ourselves, and answer, are NOT HOW CAN WE DEFEND OURSELVES? but how can the war be taken to the enemy? How can the striking power of an enemy be threatened at its source? When and by what means is democracy going to launch its counterattack?

To defend the United States, it hardly seems sufficient to defend American soil. The defense of the United States from those who would destroy it seems to be accomplished best by advancing and seizing the territories of the attacker once hostilities commence.

Mobility generally supports the offensive. The ability to move rapidly may allow an attacking force to exploit various weak spots or blind spots of the force that is in place. General Lyman L. Lemnitzer once stated:

There is nothing new about the Army's interest in mobility. Historically, the US Army has always based its philosophy of tactics upon the war of movement. Putting it another way, the dominant principle in our military doctrine has been, as it always must be, to emphasize that wars can be won only by offensive operations.

Offensive doctrine is based on the concept of employing combined arms forces to carry the battle to the enemy. An offensive doctrine envisions the use of firepower and maneuver in an attack to accomplish offensive missions. Decisive results are obtained when strong, mobile forces are operating deep in the enemy rear areas. Offensive operations must be executed boldly and aggressively to close with the enemy, destroy his attacking force and, if necessary, pursue and destroy those that remain. Although advances in technology have had an impact on tactics, the basic offensive concepts of finding and fixing the enemy, fighting, following, and finishing him have not changed.

Ultimate success in battle can be achieved only by offensive action and even when on the defensive a commander must take every opportunity to seize the initiative and carry the battle to the enemy. A commander's primary aim is to destroy the enemy's capability to resist; this can be accomplished only by concentrating superior combat power at the critical time and place for a decisive purpose.

—The Need For Offensive Operations on Land.

The Spirit of the Offensive—The Will to Win

The main battle involves the killing of the enemy's courage rather than of the enemy's soldiers. This is Clausewitz's formula for the familiar military saying that a battle is never materially lost unless the commander's or the Army's spirit is defeated. In the last analysis, it is the will which stands predominant and commanding in the center of the art of war, like an obelisk toward which the principal streets of a town converge.

—Strategic Surrender.

From reading military history one learns that victory comes to the one who, after carefully weighing the situation, is willing to accept risks and follows through with his plans with bold action. War is an art that admits of the use of the intelligence. It differs from the other arts in that it cannot be properly exercised without risk. It appears to be true that every mistake in war is excusable except inactivity and the refusal to run risks. When Napoleon was asked how one might become a great captain he reportedly responded: "Wage offensive war like Alexander, Hannibal,

Once war is forced upon us there is no alternative than to apply every available means to bring it to a swift end.

Caesar, Gustavus, Adolphus, Turenne, the Prince Eugene, and Frederick." The common trait among these men was their obsession with the offensive to the exclusion of any other form of military operation.

The spirit of the offensive is not automatic. It must be instilled in the minds of the personnel—especially the officers leading the military organization.

A spirit of the offensive can be instilled in a military organization by a long winning tradition, by appointing leaders who will inspire their subordinates by their character and actions, and/or by developing it via persistent training and instruction. While the offensive spirit can be attained in wartime by consistently winning battles, the only sure way to maintain it during peacetime is through the instruction, training, and indoctrination of the officer and NCO corps. The military cannot always depend upon Patton-type leaders to automatically emerge with the fighting spirit for each war.

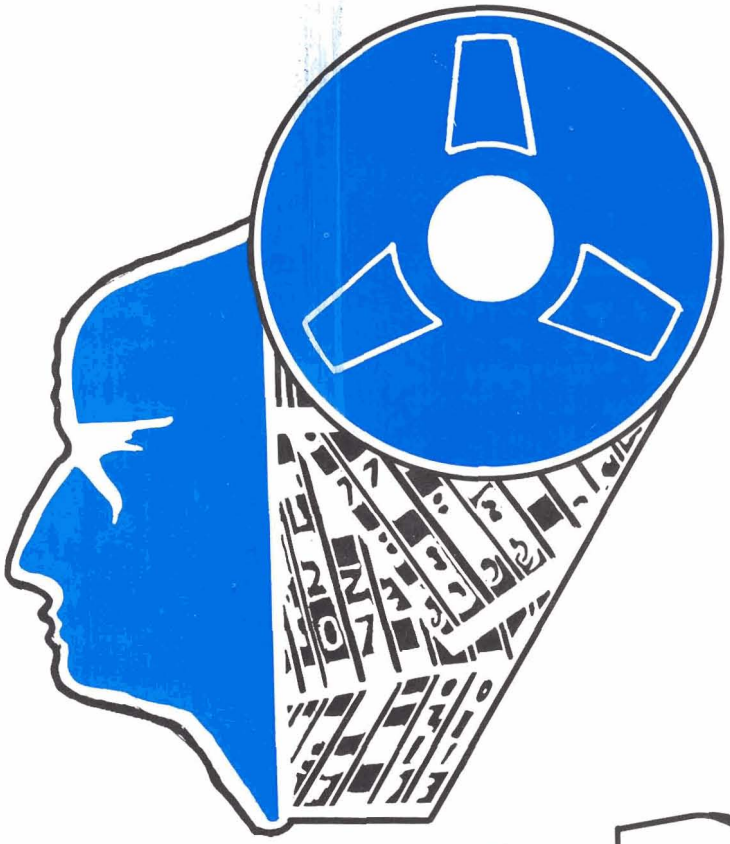
The application of the offensive spirit results in the employment of the maximum force in active rapidly conducted operations against the enemy. This equates to the conduct of offensive operations. Training units in offensive operations includes indoctrination in aggressive tactics and instilling the idea that only offensive operations can lead to success. It has long been a military notion that victory can be won only by offensive action.

The influence of the commander upon his unit can be great. Officers and NCOs need to be convinced during peacetime that a spirit of boldness and the willingness to take risks will be demanded during wartime. Officers and NCOs must understand that success in battle should not be relaxed but instead the enemy must be pressed ever harder until total defeat. The spirit of the offensive was expressed well in the words of General Willard G. Wyman who said in June 1958:

> *Let those who fear the fury of atomic blows remember that the safest place for a unit on any battlefield is the command post of the enemy! And we won't get there by thinking now in terms of defensive killing zones or any other concept predicated solely upon defensive use of our offensive capabilities. The quickest way to get anywhere is to go! The victorious army of the future will not be a rapier employed in delicate thrust and parry. It will be a mailed fist driven at the heart of the enemy.*

While the United States is not an aggressive country by nature and many of our war plans are oriented on defense, this outward appearance should not be misinterpreted as isolationism or orientation on continental defense to the exclusion of other options. Despite statements and speeches about the defensive role of the nation's alliances and foreign policy, or about the nature of available military force, military leaders must have a military policy that adhers to the doctrine of the offensive and must be prepared to launch an offensive and pay the cost of carrying it out.

Major Rose is a graduate of the University of Dayton and recently received a Ph.D. in International Relations from the University of Southern California, with emphasis in US Defense and Strategic studies. Currently a student at the command and General Staff College, he has served in Hawk batteries in Germany and Vietnam.



SOFTWARE SPOKEN HERE

MAJOR CHARLES E. STEPHENS

Probably no other technical development will produce as profound a change in air defense as the computer. Today, the applications of computer technology to air defense weapon systems pervade almost every system. Computers can be found in diverse systems such as Improved Hawk, Patriot, Roland, Missile Minder, and the new Division Air Defense Gun.

Early in the development of computers, the physical components of a computer were referred to as computer "hardware." At the same time, it became popular to use the word "software" to describe nonhardware components, in particular, the programs that were needed to make computers perform their intended tasks. The term "software" caught on and is now an accepted term.

For this discussion, we will define software as a combination of associated computer programs and computer data required to enable the computer equipment to perform computational or control functions. In air defense weapon systems, software has the dual role of performing computations to solve the engagement question and controlling system hardware. We will also review current air defense software applications and look briefly at future needs.

SOFTWARE APPLICATIONS TO COMMON AIR DEFENSE PROBLEMS

Shown in figure 1 are the functions and problems common to air defense. We will see how software offers increased capabilities in these areas.

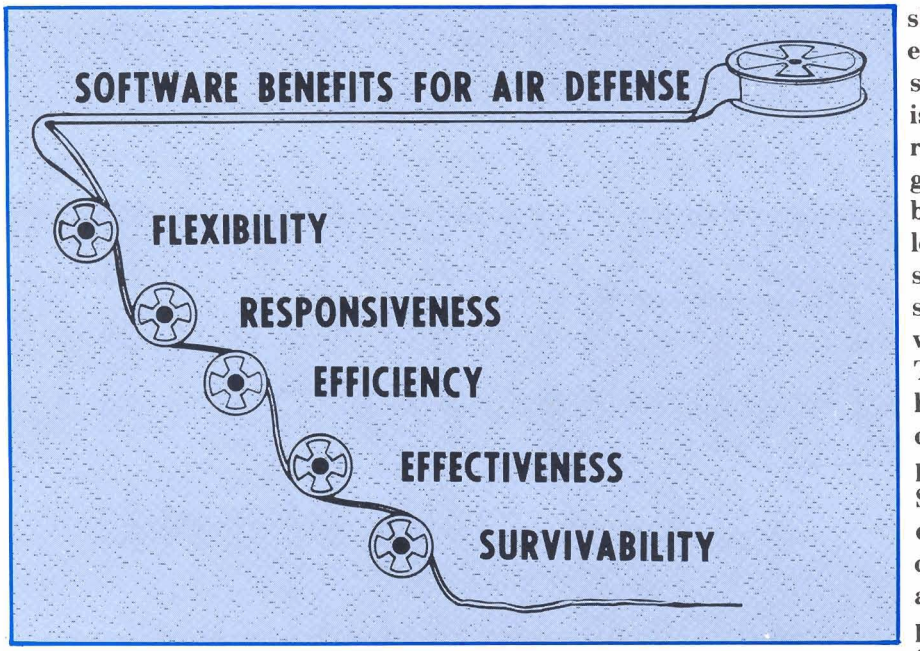
Detection.

With respect to software, detection involves collecting and processing sensor data to arrive at a logical conclusion as to the existence of an object. Once collected and processed, an initial data base of information concerning the object will be available to support other system functions.

The data base established by the detection function is characteristic of all air defense systems containing digital computers. The data base serves as the corporate memory for the weapon system. It is from this base of information that the system will communicate with the operator, solve the engagement question, and share its information with other systems.

Identification.

Previously, identification was limited to electronic IFF in addition to the operator's knowledge of current ID procedures. Since it can be assumed that the data base represents the most accurate collection of target information available, why not use that information to aid in the identification process? Thus, the complete flight history of the aircraft in the data base allows for more sophisticated and accurate means of identification.



Through software, a weapon system could ask and answer such questions as:

- Did this aircraft originate over hostile territory?
- Has this aircraft emitted unauthorized ECM?
- Has this aircraft violated a prohibited zone?
- Is this aircraft flying in a safe corridor?

Now, the operator is more certain that the aircraft under engagement is, in fact, hostile and is not a friendly aircraft returning home with its IFF nonoperational due to battle damage.

Threat Evaluation

Threat evaluation is the software process of determining which targets in the data base are a threat to the defended assets or to the weapon system. As long as the weapon system was able to conduct only one engagement at a time, this was a relatively simple task for the operator, and a computer was not required. Today, the task is vastly more complex. The Patriot system is capable of conducting many simultaneous engagements. Proper use of threat evaluation software will allow selection of these engagements to protect both the system and its defended assets. Thus, the system is capable of more than an attrition role. Obviously, keeping pace with the capability of this system is beyond the ability of the human operator; a computer is therefore required to achieve the most efficient use of the system.

Weapons Assignment.

Weapons assignment is the optimum allocation of available weapon resources by the software to engage targets effectively that are selected for engagement. It should be pointed out that the software simply is not allocating resources to engagements now, but is actually looking ahead to schedule the resources of the weapon system. The software has been developed with this purpose in mind. Since real-time data will be exchanged among all systems composing a defense, weapons assignment at the macro* level will retain the principle of centralized control and decentralized execution. This is another feature of software that puts the computer-based system far above the man-based system.

Engagement Assessment.

Engagement assessment is the continuous, real-time analysis of engagement data to determine the success of the on-going engagement. The analysis can be broken into four distinct time periods during the engagement: launch, guidance and flight, intercept, and kill assessment. The software will interpret data supplied by the sensor to arrive at answers to engagement assessment questions.

CURRENT SOFTWARE-BASED AIR DEFENSE SYSTEMS

**A single computer instruction that stands for a sequence of operations.*

There are currently three air defense systems containing computers and software. One of these systems, Improved Hawk, is in the field today. The other two, Patriot and the AN/TSQ-73, are in the final stages of development.

Improved Hawk was our first air defense system to employ software and, as such, should be considered a first generation application of computer technology to a weapon system.

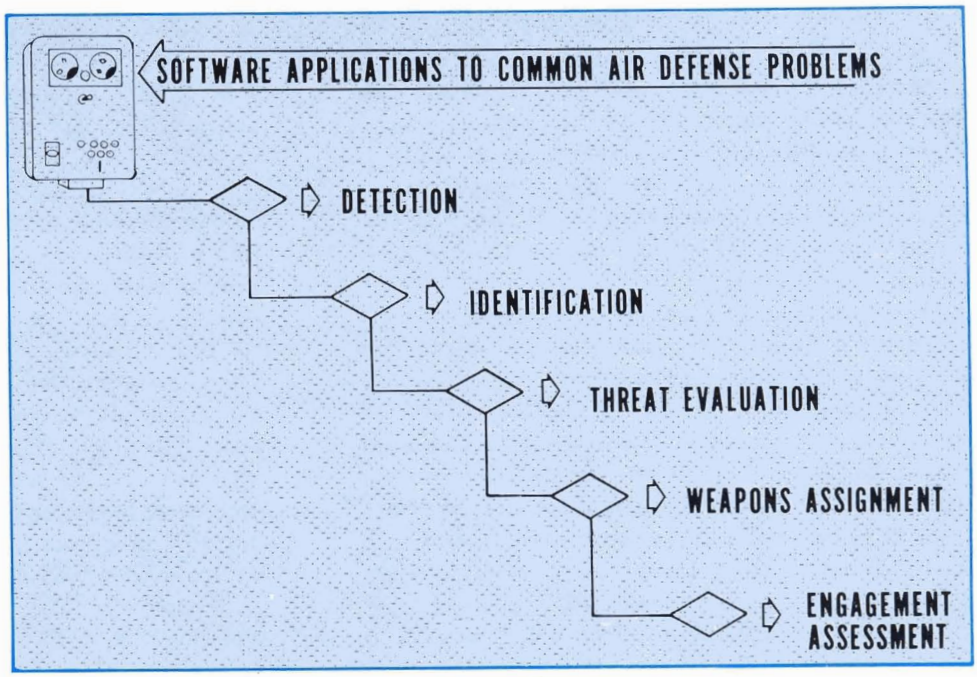


Figure 1

The computer consists of an 8,000-word, general-purpose, digital computer. Once placed into operation, the computer accepts data from two surveillance radars and correlates these data with data collected on previous scans of the radar to build the data base. Identification of aircraft is by means of the AN/TPX-46 IFF equipment. No other identification aid is available to the computer.

Threat evaluation is essentially a time-to-last-launch calculation. Weapons assignment is based on selecting the current fire section that is free and has a ready missile. No provisions are made to schedule future launches. As no provisions are made for software engagement assessment, the operator must evaluate each engagement and take action to fire another missile if the first does not destroy the target.

Improvements underway include increasing the memory size to provide a digital data link between the fire unit and the battalion command and control system. With the increased memory and data link, each Improved Hawk fire unit will have available to it all target information available at the battalion level command and control system.

AN/TSQ-73 Missile Minder.

The AN/TSQ-73 Missile Minder will provide the battalion command and control system for the Improved Hawk battalion and group. Tactical firing doctrine is embodied in the identification, threat evaluation, and weapons assignment functions of the software. The software includes all the functions necessary for controlling and coordinating the fire units of the battalion. These functions include: airspace surveillance, target tracking, identification, threat evaluation, weapons assignment, and data link communications. These functions also include operator communications with the computer and automatic recording of important operational data for later review.

Simulation programs drive the built-in target simulation hardware to produce a realistic training environment. Use of this equipment allows operator training and equipment exercising without the need for additional training devices.

The group system will provide the link between Army air defense and joint service interoperability systems. In addition, assisting in resolution of identification conflicts within the battalions and engagement assignments to battalion level systems are envisioned as group level functions.

Patriot.

The Patriot system is the Army's newest major air defense weapon system. It is the first truly automated, fully software driven air defense weapon system to be developed by the United States. The computer actually schedules and controls functions in the radar to include surveillance, tracking, missile guidance, IFF, and ECCM. It determines wave forms and power to be used for each function, pointing angles for each beam, and information to be uplinked for missile guidance. The computer provides the man-machine interface and formats information to facilitate operator decision making.

By way of comparison with Improved Hawk, the Patriot engagement control station software program has 160,000 words of instructions and data. This represents a twentyfold increase in software application between Improved Hawk and Patriot.

The Patriot software is designed to perform all air defense functions discussed previously, in addition to several new functions.

■ Target detection consists of processing data obtained by the radar to build the track data base.

■ Classification, a new function, attempts to determine whether the object under track is an air breathing threat or other type object; for example, tactical ballistic missile or air-to-surface missile.

■ Identification establishes a target identity based on a number of evaluated parameters in addition to electronic IFF.

■ Engagement eligibility, another new function, determines whether the fire unit is allowed to engage the target under the air defense rules of engagement and control status currently in effect.

■ Threat evaluation answers the question: is this one of the most threatening targets to the system and its defended assets?

■ Engagement decision evaluates the criticality and engageability of each threatening target and arranges the most threatening in a priority for engagement.

■ Weapons assignment actually allocates resources—missiles, guidance channels—to carry out the engagement and determines the optimum time to initiate the launch sequence.

■ Engagement assessment asks the software to evaluate the intercept event and provide the operator with the result.

■ The battalion level software provides tract management and command and control functions for the firing platoon similar to those provided by the AN/TSQ-73 for Improved Hawk. Additionally, it provides the data interface with the group AN/TSQ-73, adjacent battalions, and [when required] other services' command and control systems.

EVOLVING SOFTWARE CONCEPTS

Air Defense believes that through the software embedded in a computer, we can realize capabilities that have been less than optimum in prior systems. In addition, software offers a flexible response to increased threat capabilities. For the future, we see the impact of software in the areas shown in figure 2.

Data Sharing.

Data sharing and radar netting of all radars and computers are seen as keys to successful battle management, resource allocation, increased survivability, and effectiveness.

Today, the Army is out-gunned, out-tanked, and lags its adversaries in sheer number of soldiers. It is critical, therefore, that our commanders have available to them the most current information concerning the enemy and his activities. Air defense units are exceptional sources of information concerning the enemy's activities. Air defense must make a contribution to the interoperability data base and extract from it additional information required to accomplish its mission more effectively.

Embedded Firing Doctrine.

Because there are some areas that currently lack a good working solution, fully software embedded firing doctrine has not been achieved. Areas like kill assessment and object classification still require a great amount of work.

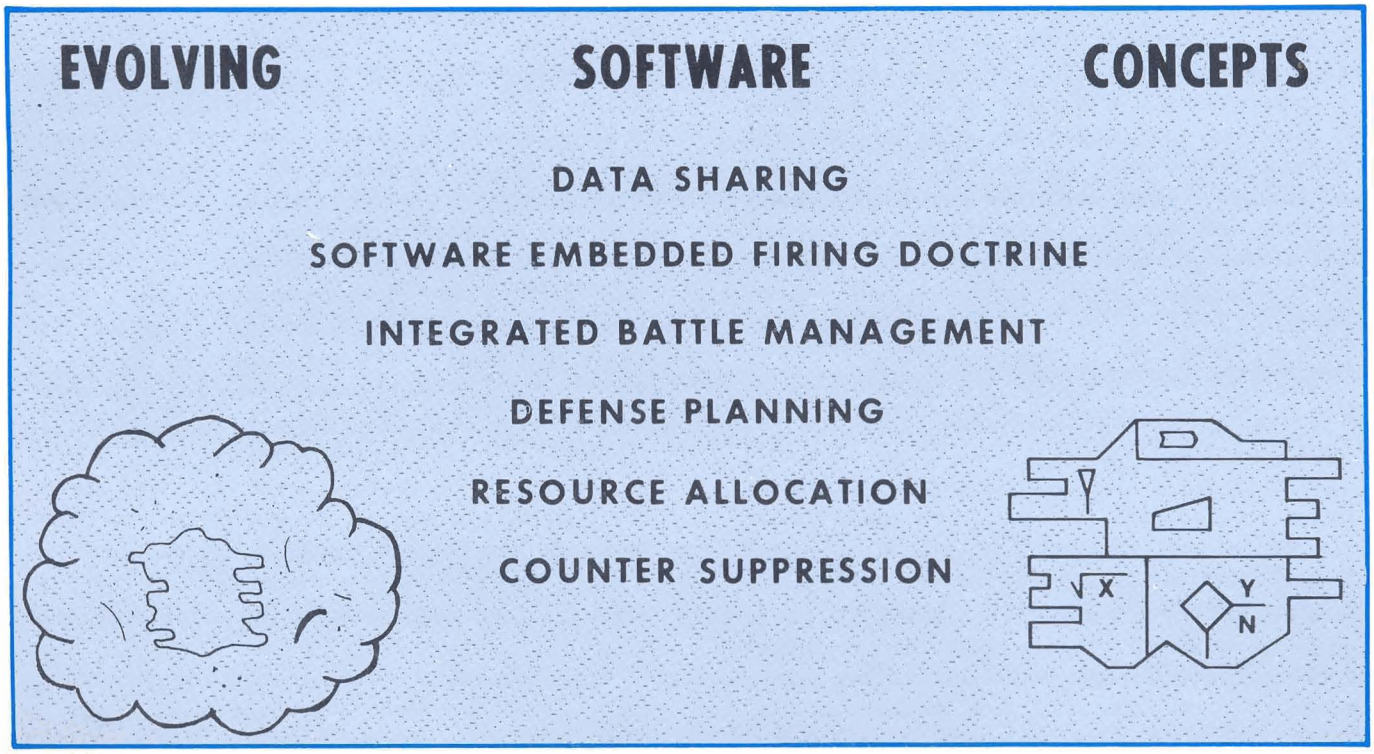


Figure 2

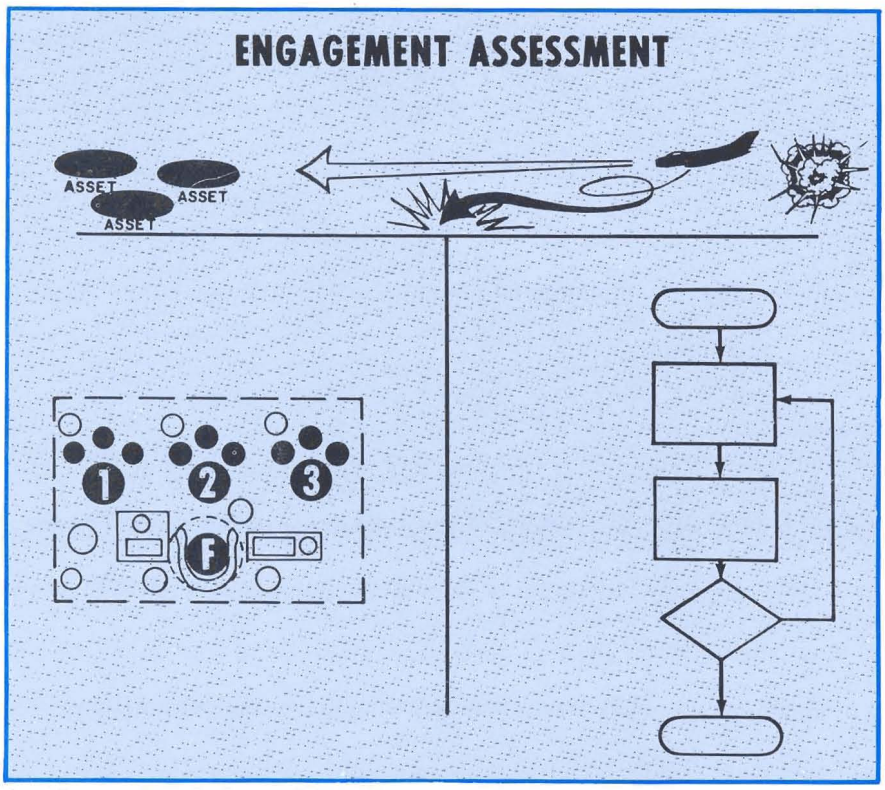


Figure 3

Integrated Battle Management.

Integrated battle management through interoperability systems comes closer every day—although SHORAD integration is still in the conceptual stage.

Defense Planning.

Defense planning is a conceptual scheme whereby the air defense planner can pretest his defense deployment in the software using arbitrary site locations, a digitized terrain data base, and representative threat scenarios.

Resource Allocation.

Resource allocation is central to the above concepts—getting the best possible defense effectiveness with the given resources. All of our weapon systems have a limited number of missiles. They must be used at the right place and time to achieve optimum results— we cannot afford overkill.

Countersuppression.

Countersuppression is a catch-all phrase from a number of active and passive measures that air defense can employ:

- RF emissions controlled by software to counter the antiradiation missile threat.
- Target information automatically down-linked to fire units when their organic search radars are shut down or are nonoperational, and in the case of SHORAD systems, while on the move.

These are just some of the concepts that air defense wants realized through software applications. They are not without substantial challenges. One typical example is engagement assessment [fig. 3]. The growth in air defense software is best illustrated by comparing the software of the air defense systems discussed earlier.

However appealing this technology appears, air defense will continue to stress that the application of computer technology must be an extension of the human operator rather than a replacement for him.

Major Stephens graduated from Georgia State College with a degree in Mathematics. He is also a graduate of the Guided Missile Systems Officer Course and the Command and General Staff College. He is currently a tactical software analyst with the Directorate of Combat Developments, US Army Air Defense School, where he is involved in the development of Improved Hawk software.

DEFENSE AIRMO (A Doctri

Major Ker

Views expressed in this article by the author do not necessarily represent the views of the US Army Air Defense School or the Department of the Army.

The Soviet air threat has the potential to effectively neutralize NATO forces on the battlefield. The total air threat consists of several components, the largest component being high-performance jet aircraft. Due to the continuing growth of Soviet close air support capabilities, United States forces have developed a viable body of defensive doctrine against this component of the threat. However, a lesser component, the airmobility threat, appears to be virtually ignored. The emerging Soviet airmobility capability warrants special attention and a body of doctrine directed specifically at countering this new component of the air threat.

This report will provide some insight and direction for the development of defensive doctrine against airmobile operations. It is directed principally at operations in the European theater. The contents of the report are drawn from unclassified material published in professional journals, Army field manuals, and personal observations and experience as an air defense officer. The experience as the S3 officer of the Hawk air defense battalion that opposed the 101st Airborne Division [Air Assault] during the 1976 REFORGER Exercise provided the stimulus for this report.

A review of published material on airmobility shows a preoccupation in the American military with the conduct of offensive airmobile operations—the heliborne movement of men and material and assault helicopter operations in a hostile air defense environment. In contrast, Soviet literature on airmobility reflects interests in both the conduct of airmobile operations and defense against airmobile operations. One Soviet article emphasizing defensive tactics, "When Helicopters Are Airborne," by Lieutenant General of Artillery, V. Gatsolayev, has received coverage in several American military publications.

There appears to be a preoccupation among American Army officers with offensive airmobility. This attitude can be attributed to the success and publicity of airmobile operations in Vietnam and the continuing high visibility of units such as the 1st Cavalry Division's Air Cavalry Combat Brigade and the 101st Airborne Division [Air Assault]. Considerable combat experience and continued experimentation and development by the US Army with airmobility may well lead to the belief that the United States has "cornered the market on airmobility." Although Soviet commanders do not have the experience American commanders have with large-scale, sustained combat airmobile operations, Soviet airmobility constitutes a very real threat. The level of the threat and the level of Soviet interest were highlighted in an article in the United States Army Aviation Digest:

> "The Soviet Union's armed forces have a large [2,500] helicopter fleet that is being rapidly modernized . . .
>
> "The Soviet armed forces preoccupation with the violent, swift attack and the importance placed on the principles of mobility, surprise, combat activeness, and massing and dispersion of forces [so necessary on a nuclear battlefield] all combine to indicate that helicopters and

AGAINST
BILITY
al Void)

y L. Hines

airmobile tactics are becoming increasingly more important to the Soviet Union..."

Further indications of the Soviet interest and awareness of the potential of airmobility are evidenced by an increasing number of articles in Soviet military journals on airmobility and helicopters. Professor John Erickson estimates that the airmobile capability of the Soviet armed forces is sufficient to allow the Soviet command to commit up to ten battalion-sized, helicopter-borne assaults for the seizure of important tactical objectives in support of an attack on NATO forces.

Several factors combine to increase the potential of the Soviet air mobile threat to NATO forces beyond that readily apparent in the numbers and capabilities of Soviet helicopter forces. The first and most significant factor is the low density of NATO air defense forces. Air defense units are among the most expensive to equip and maintain. Western defense budgets simply will not support large air defense forces except at the expense of other type units. The low density of forces requires that air defense fire units be positioned where they can provide sparse volume coverage or concentrated coverage of only the most critical assets. This leaves many assets and areas totally void of air defense protection. The second factor is a corollary of the first. As a result of the low density of forces, units are deployed well forward in a defensive belt, leaving the interior/rear areas minimally protected.

The third factor is the environmental conditions of the European battlefield, specifically the terrain and weather. With the exception of the North German Plain, NATO forces face Soviet forces over terrain with numerous, extreme variations of relief. These variations in relief provide multiple low-level air avenues of approach for from one up to a full battalion-size lift of helicopters. In many cases the use of these avenues is enhanced by the rivers and highways that traverse the valleys and serve as excellent navigational aids for low-level or nap-of-the-earth [NOE] flying. The weather extremes in Europe, particularly during the winter months, can create conditions highly unfavorable for tactical jet aircraft and likewise impose considerable limitations on ground mobility. Operational studies and tests conducted in Europe have shown that helicopter minimum peacetime flying conditions, however, are acceptable over 90 percent of the time.

Collectively, these factors create an environment that lends itself to airmobile operations—multiple avenues of approach that are available over 90 percent of the time, shielded from radar coverage during passage through the defensive belt, and providing access to numerous soft, critical targets. This environment, coupled with the growing Soviet helicopter force, would certainly give adequate justification for Soviet commanders to place increasing reliance on helicopters for close air support and battlefield mobility.

The report thus far has been concerned with the threat and the operational environment. Before proceeding to an analysis of antiairmobility tactics, it is important to determine why current air defense tactics and doctrine, fortified by an increase in air defense forces, will not provide adequate defensive capability against the airmobile threat. A partial explanation has already been mentioned—money. The provision of sufficient air defense forces to develop a solid forward

and rear area defense would exceed the defense budget allowances of most NATO nations.

The real answer, however, is derived from an analysis of the basic air defense mission—to destroy, nullify, or reduce the effectiveness of enemy air attacks. Mission performance involves three functions: detection, identification, and interception. Aircraft must first be detected and identified as hostile before they are intercepted by air defense forces. The execution of the detection and interception functions against helicopters, because of their special flight characteristics, differs considerably from established doctrine for fixed-wing aircraft. A reasonable analogy of this difference between fixed-wing and helicopter flight characteristics can be made with the mobility characteristics of mechanized versus foot infantry. The foot infantry can move under practically all weather, visibility, and trafficability conditions. They move slowly and deliberately, taking advantage of all terrain variations and vegetation for cover and concealment. They can infiltrate through defensive strong points. The mechanized infantry, on the other hand, can move more rapidly but has to move more in the open. The mechanized force is more subject to detection; however, it arrives in the objective area with a greater fighting capability than the force on foot.

In a manner relative to the foot infantry, helicopters can infiltrate through a conventional air defense network, taking maximum advantage of terrain and vegetation for cover and concealment. Also, in a manner relative to the mechanized infantry, helicopters have the capability for swift movement with a large payload. Stated directly, helicopters are air vehicles that can operate in the ground environment. It is this unique capability that requires special considerations to defend against helicopters. Because helicopters combine both the air and ground environments, concepts must be drawn from both air and ground defense to counter airmobile operations.

The fundamental task in the establishment of an air defense network against airmobility is an exacting terrain analysis to identify every low-level air avenue of approach. Although this critical task forms the cornerstone to the development of a defense, it is not a well-developed art [or science] among intelligence or air defense specialists. Basic guidance is found in paragraph B-16, Appendix B, FM 30-56.

The identified low-level air avenues of approach provide the basis for positioning available air defense fire units. Volume coverage, longer-range systems are placed in positions to intercept along primary threat routes; with short-range systems defending smaller approaches. The likelihood of having sufficient fire units to cover other than the primary threat routes is small because the limited number of units will be assigned to cover command and control and support facilities. Some much needed assets will be available in the combat zone if the Division Air Defense Artillery [DIVADA] concept is adopted. The DIVADA concept will, in particular, increase the number of automatic air defense guns in the forward areas. This will be of significant benefit against airmobile threats because automatic weapons have proved more effective than missile systems against low-flying helicopters. As discovered by American helicopter pilots in Vietnam, automatic weapons are more difficult to detect and more difficult to defeat.

The limitations on the availability of air defense assets to cover the many avenues of approach require that other methods be employed to deny the use or provide surveillance of these routes. Volume coverage can be obtained from airborne surveillance systems that have the added advantage of looking down into the avenues of approach and over the horizon. Modern systems such as the airborne warning and control system [AWACS], side-looking airborne radar [SLAR], and stand-off target acquisition system [SOTAS] can help fill the gaps in ground-based radar coverage. A critical requirement in the employment of these systems is the need for the immediate processing of their information inputs. Air defense operations are conducted in real-time, and information on hostile air activity must be input directly to the air defense weapon system if the threat is to be intercepted.

Ground troops, counterbattery/mortar radars, and other battlefield surveillance assets can provide valuable information on hostile airmobile activity. However, as with the airborne systems, there is the same requirement for the immediate input of information to the air defense weapon systems. The communication channel currently available for these assets is up-tell through division channels to the division airspace management element [DAME], cross-tell to the air defense battalion operations center [BOC], and then down-tell to the air defense fire units. The delay through this cumbersome process can easily exceed 5 minutes and offers numerous opportunities for error. Information from the airborne surveillance assets normally enters Army channels first at the corps battlefield information coordination center [BICC]. As with the information flow from ground-based assets, the delay in the information reaching air defense fire units can easily preclude interception of fast-moving aircraft. The development of a real-time communications link for cross-telling information on hostile air activity is the most pressing problem to be resolved before a fully integrated defensive system can be achieved.

A detailed analysis of most avenues of approach should reveal "choke points," or places along the avenues where low-level flight is restricted either vertically or horizontally. These choke points can be used to develop an airmobile barrier system in a manner similar to the way a barrier system is employed to impede ground mobility. The natural obstacles to low-level flight can be tied together with artificial obstacles. Cables or heavy wire screens emplaced at the choke points can either intercept the heliborne force or cause the force to gain altitude to avoid the obstacles and thus be detected by air defense radars. Remote sensors can also be emplaced at choke points and provide information for the employment of concentrated indirect fire against flights of helicopters. Smoke rounds could be used to disrupt the force by restricting pilot visibility. High-explosive, variable time projectiles could be used with the intent of catching the helicopters in the fragmentation pattern.

Communications and navigation aids should also be attacked. Command and control communications, obstacle detection devices, and radar detection devices in helicopters are very susceptible to electronic countermeasures [ECM]. ECM can be used effectively to disrupt navigation aids and communications during periods of restricted visibility when pilots would be placing extra reliance on these items. The loss of the use of their navigation aids may cause an airmobile force to leave protective cover and concealment rather than risk crashing. Disrupting communications can splinter the force into isolated aircraft. Disrupting navigation aids during periods of good visibility can cause the airmobile force to rely more on visual flight aids [roads and rivers] and, in so doing, be more susceptible to detection and interception. Any action that decreases the effectiveness and availability of warning devices to helicopter pilots increases the probability of successful detection and interception of the helicopters by friendly forces.

In addition to the requirement to supplement air defense detection capabilities, there is the need to supplement air defense interception capabilities. Quick response engagements of fixed-wing aircraft can be conducted by jet interceptors. However, cockpit visibility from high-performance interceptors and the maneuverability of these aircraft do not allow them to be equally effective against helicopters flying NOE. It is quite possible that helicopters armed with air-to-air missiles or using existing on-board automatic weapons could prove to be effective interceptors of airmobile forces. Another possible airborne interceptor is armed cargo aircraft [something like the AC-130 configuration in Vietnam]. Such aircraft have considerable time on station, can provide a large volume of fire and have some night vision assistance capability. The negative aspects of the employment of any aircraft in an interceptor role are their exposure to hostile air defenses and the additional problems caused in airspace management.

Airspace management over the modern battlefield persists as an unresolved problem. Management procedures must insure that all components of combat power can be effectively employed. Many of the measures used to disrupt enemy airmobile operations can have an equal effect on friendly airmobile operations. Corridors for the safe passage and egress of friendly airmobile forces must be established through forward areas. The random wandering of "ash and trash" flights must be prohibited. Provisions must be made for the emergency recall of all friendly aviation from an area in which an enemy airmobile force has been detected. The recall will clear the area so that the enemy force can be engaged without endangering friendly aviation. Detailed records must be maintained on all obstacles to prevent their being hazards to friendly aviation. Such airspace management procedures will allow the employment of friendly airmobility without degrading airmobility defense measures.

Helicopter pilots flying NOE or terrain following must exert complete concentration to overcome the effects of air turbulence, avoid obstacles, and maintain the desired course. The close proximity to the ground gives the pilots little opportunity to react and recover from any situation that disrupts normal flight. The thrust of airmobility defensive efforts then should be toward the creation of all possible disruptions.

The defensive concepts proposed in this report are intended to stimulate thought for the development of a body doctrine for defense against airmobility. Many of these concepts could prove unsatisfactory after testing. We must not allow our enthusiasm over our success with airmobility to cause us to overlook the Soviet airmobile threat. Our broad base of experience in airmobile employment must be applied toward the development of a defensive doctrine that insures our retention of the advantage in the first and subsequent battles of any future war.

Major Hines is a graduate of Virginia Military Institute and holds a Masters Degree in Soviet Studies from Southwestern State College. He has served as a Hawk Battery Commander in Continental United States, Korea, and Germany and is experienced as an ADA battalion S3 officer. He is currently enrolled in the Foreign Area Officer Course at the US Army Institute for Military Assistance, Fort Bragg, North Carolina.

VIEW from the FIELD

FORWARD AREA ALERTING RADAR

FIRST LIEUTENANT MANUEL E. GONZALEZ

This article proposes a change to the forward area alerting radar [FAAR] that would give the Chaparral/Vulcan battalion a capability it does not now have; i.e., a reliable means of transportation.

The FAAR Platoon, 1st Bn, 68th ADA, Fort Hood, Texas, discovered through experimentation that a FAAR system with all gear [including the generator] can be mounted on an M730 Chaparral chassis without any modification to either the radar or the carrier, thus providing a safer and more effective means of transportation.

The need for this equipment change is amply illustrated by the following inadequacies experienced in the use of the FAAR prime mover, the Gama Goat.

■ The Gama Goat is overweight to the point that it causes numerous mechanical breakdowns. The majority of deadline items is due to the Gama Goat and not the radar. Common failures include the transmission and axles when trying to negotiate steep slopes leading to tactical positions necessary to mission performance.

■ The weight of the Gama Goat rides so high on the chassis that it gives the system a very high center of gravity characteristic, causing the radar to become unstable at speeds over 20 mph, even on paved surfaces. The high center of gravity makes the system extremely susceptible to overturn while moving cross country. This has occurred, causing considerable damage to the equipment.

■ The movement of the system [in my opinion] is too slow to properly support the front-line units in a maneuver environment, again, due to the high center of gravity.

■ The system does not have a "swim" capability, resulting in a great handicap when crossing water obstacles.

Because of the foregoing disadvantages of the Gama Goat, I propose the previously mentioned alternative means of transportation for the FAAR, namely the M730. Since the carrier M730 is already in the Chaparral/Vulcan battalion, the unit is prepared to handle maintenance within its present capabilities.

In experimenting to learn whether the radar shelter could be properly mounted, along with the generator, on the M730 without any structural modification to the carrier or shelter, we found that a simple frame constructed of common angle iron could be bolted to the M730 carrier at its four mating bolts. The prefabricated angle iron framework was then used to secure the radar to the M730 carrier. Next, this assembly was secured to the iron frame by means of the airlift straps provided for the radar. The generator was placed [by means of the two C beams on which it is mounted] on the rear of the shelter and tied down by airlift straps. As can be seen, there was no modification to the M730 carrier.

Here are the advantages:

■ A much lower center of gravity so as to virtually eliminate the danger of overturning and, thus eliminate needless damage to equipment and injury to personnel.

■ A much greater ability to climb slopes, which is critical to the accomplishment of our mission.

■ A permanent hook up of the generator to

the radar shelter, which cuts the time of emplacing and march ordering the FAAR, resulting in a greater degree of survivability.

■ The radar, because of its position in the opposite end of the shelter's entrance, eliminates the distraction that comes from the noise of the generator.

■ An improved maneuver speed is achieved due to the low center of gravity, which enables the FAAR to keep 2 to 3 kilometers behind the front on either a fast-moving offensive thrust or a tactical withdrawal.

■ The FAAR acquires a "swim" capability. This is a very important advantage when one considers that both the Vulcan and Chaparral can "swim" and that for the FAAR [3-km back] to support them properly, it must also have a "swim" capability.

■ Maintenance can be provided by assets already contained in the division's C/V battalion.

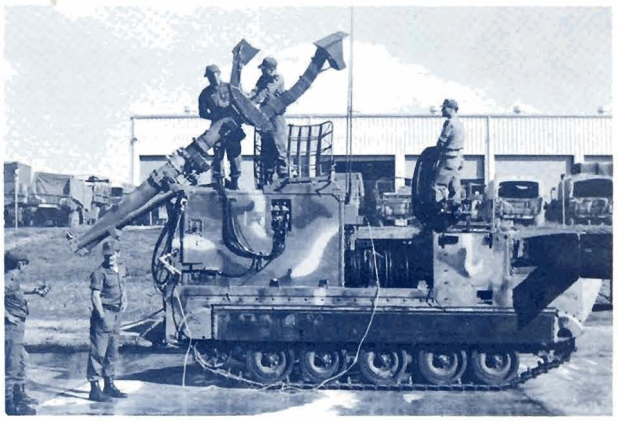
■ No modification is required for the carrier or the radar set. The mounting frame can be constructed from angle iron that can be welded together in 1 hour.

■ Even though the M730 carrier is more expensive than the Gama Goat, after some of the Goats roll over and the price of the damage to the Goat, radar, and personnel is determined, one can surmise that in the long run the M730 would be cost effective. In addition, the M730 would provide significant tactical advantages.

Following are some additional attributes found in employing the M730 as the transport vehicle.

Vibration and Shock

The suspension system of torsion bars on the M730 gives the Ark III a much smoother and even ride over rough terrain than that provided by the Gama Goat. We found that the Ark could negotiate terrain that the Goat could not. The feel of the M730 taking bumps and depressions can be compared with a boat going over relatively choppy water.



Installing feed horn assembly

The Ark negotiating a muddy ditch that would stop the Gama Goat.

The vibration of the engine is roughly equivalent to that of the Gama Goat. The mobility of the Ark over rough terrain is much improved over that afforded by the Goat. Speed and mobility are much greater and fear of tipping over is no longer a concern. The Ark brings added stability on rough terrain, which is sorely needed by the FAAR.

Hill Climbing Ability

Perhaps one of the biggest drawbacks of the Gama Goat used in conjunction with the FAAR is its inability to ascend the steep slopes to terrain that is essential for mission accomplishment. The total weight of the FAAR and the Gama Goat results in poor capability to climb some of the grades that are crucial. This weight was mainly responsible for three systems being disabled due to broken axels while attempting to negotiate Castle Mountain at Fort Hood. The Ark III negotiated the grades on Castle Mountain and many other hills very easily without mishap or stalling.

Since the Ark has no trailer, we also have the added advantage of the vehicle not sliding backwards and jackknifing the trailer, a common problem with the Gama Goat.

Swimming Capability

The Ark III, the first "swimming" radar in air defense, performed its task admirably. It rode much higher in the water than the Chaparral mounted on the M730 and the extra weight on one side of the FAAR, as opposed to the weight of the M730, was negligible. As a result, the Ark III was level in the water, even when negotiating turns.

The Ark is more seaworthy than the Chaparral system. This gives the FAAR the ability to move with the units it is supporting that may have "swimming" capabilities.

Emplacement Time

With our proposed system we are now able to leave the feed horn and reflector half assembly on

Castle Mountain is no obstacle to Ark III.

The Ark rides much higher in the water than the Chaparral system. It is very stable, even without ballast, and negotiates turns handily.

the mast, which is then retracted to its normal march order configuration. We can also have the generator hooked up and running while moving, which gives us the added advantage of having the radar warmed up.

When the vehicle is stopped, all that has to be done is raise the antenna assembly, level the system, and aline to grid north. This will cut the emplacement time to 1½ minutes and it also allows us the advantage of immediately leaving the area in march order configuration, in case the need should arise.

In conclusion, I would like to stress the importance of an early warning radar with the primary mission of providing low-altitude early warning to both division combat units and air defense units. The new radars incorporated within the Roland and the DIVAD gun have the same capabilities as that of the surveillance FAAR but, in my opinion [due to their missions], they are not capable of providing adequate early warning for ground troops. I base this opinion on the following reasons:

■ The DIVAD gun will have as its primary mission the role of supporting ground combat units by destroying the aircraft threat; therefore, the crew will be limited in its choice of terrain essential to providing early warning. It will either move along main avenues of approach supporting a maneuvering force or will be deployed leapfrog style along the closest available high ground, which is necessary to support the maneuver units and to destroy hostile aircraft. So it's easy to see why it cannot maximize terrain to insure effective early warning.

■ The DIVAD gun could be given the mission to select the best terrain for early warning but that would defeat its purpose, which is to destroy aerial targets in support of ground forces. It is not realistic to consider that any commander would allow one of the guns to go unused in the support of his unit just to provide early warning.

■ The DIVAD gun radar operator will be too busy detecting targets and locking on to give out any early warning. It would also require another radio within the system even if there was time to engage in early warning.

By discarding the TADDs and using early warning voice, we have proved at Fort Hood that we can pinpoint targets within six digit coordinates and bring artillery fire on them. We can also give combat units quick, easy-to-read, four-digit coordinates so they can bring their main guns and TOW weapons on the helicopters flying NOE techniques. We can say realistically that the FAAR is indeed a very effective system against the air threat. With a few improvements, such as the adaptation for use of the Lolamy system and mounting the FAAR on the M730, we can concentrate on bringing to bear all the appropriate weapons of a division to destroy the air threat. To do this, we simply provide effective low-altitude avenues of approach warning that other ADA equipment cannot provide.

The author has drawn a set of plans for use of the M730 as a FAAR prime mover which he is willing to make available to authorized individuals. His address: HHB, 1st Bn, 68th ADA, 1st Cavalry Division, Fort Hood, Texas 76545.

Lieutenant Gonzalez graduated from the US Military Academy in 1975. Since then he has served in the 1st Battalion, 68th Air Defense Artillery and is now the FAAR Platoon Leader in Headquarters Battery. This is his second article to be published in AIR DEFENSE Magazine, the first being, "Innovations in FAAR Employment," appearing in the October-December 1977 issue.

Editor's Note: Other members of the 1st Bn, 68th ADA who worked with the author on the experiment include SSG Sylvester Jordon, SP4 Thomas Garner, SGT Robert Reed, CPT Roy Hudson, and SP4 James Curry.

TAKE A FROM THE RUSSIANS

Colonel V. Samylkin, who is Chief of Physical Training and Sports for the Soviet Air Defense Forces, is credited with most of the material in this article. We publish it as an item from which our own airdefensemen can perhaps profit. Paragraphs indicated by an asterisk are interjections by our own editorial staff.

There is the usual humming of electric fans at the battery command post. The operator's eyes are glued to the greenish screens. They are fighting a long and hard battle with an air "enemy. There are quite a few targets in the air. In tracking them, the operators have to single out the most important ones and supply precise data. The strain is enormous.

Junior Sergeant Anatoly Vodoleyev is particularly attentive. He was the first of the duty team to locate and track an aircraft heading for the installation at a low altitude. After a short break, during which the team warmed up a little, the commander complicated the situation. Now, the operators had to work wearing gas masks for a long time. The exercise ended at last. The commander asked Vodoleyev how he felt. "Quite well!" was Vodoleyev's reply. Judging by his appearance, he still had a considerable reserve of strength in him.

"Vodoleyev is a good sportsman," the commander explains. "Generally speaking, our profession is inconceivable without sport."

And so it is indeed. Due to an increase in the intensity and strain of work in the Soviet Air Defense Forces, the role of specialists', especially operators', physical training has grown immensely. *We see a marked similarity between the Soviet operators' on-the-job experience and that of US operators.

An operator is one of the leading specialists. During combat duty, he has to face up to various irritations which adversely affect the serviceman's nervous system. Special investigations have shown that the pulse of operators with insufficient special, psychological, and physical training level beats faster and blood pressure increases when exposed to strong irritations, resulting in a poorer performance. The time required to transmit one message increases by 50 or 100 percent, and the number of errors in determining the azimuth and the target range is also higher.

The commander who plans and organizes the servicemen's physical training must not fail to consider the conditions in which the operator has to work: the high humidity, temperature, and carbon dioxide content in the cabin as well as the noise, flickering of screens, and continuous straining of the same muscles. Stationary position gives rise to a special kind of fatigue, which has a negative effect on the attention and memory and even on well-practiced habits and skills. That is why work involving great emotional and volitional strain must be followed by a correctly organized rest to remove fatigue and restore efficiency. *The question arises as to what extent our unit commanders are aware of these problems and whether they give adequate attention to possible solutions.

Practice shows that operators' efficiency is best when 2 hours' work is alternated with 4-hours' rest. Sports and games in the open air completely restore their ability for work. In the above-mentioned AA missile battalion active rest, systematic physical exercise, sports and games, and hydrotherapeutic procedures allow the servicemen to withstand long strains easily and to keep up combat activity during the entire period of duty. They take part in cross-country and skiing races, go in for gymnastics and track-and-field athletics, play table tennis, etc. For instance, our acquaintance Anatoly Vodoleyev is an acknowledged sprinter and the unit's 100- and 200-m champion.

The battalion, under Lieutenant Colonel Sergei Vasilyev, has excellent indices in combat training. It has won many sports awards, which are kept in the Lenin Room. Over 90 percent of the servicemen have fulfilled the requirements of the

Military Sports Complex [MSC] and many of them have sports ratings. But the main thing is the ability to make physical steeling dependent on the interests of combat training. Much is being done in this respect. By organizing mass sport activities, the commanders and the unit sports committee see to it that sports help the servicemen develop coordination of movements, stamina, and the capacity to maintain emotional and volitional stability for long stretches of time.

*Close personal attention of the battalion commander appears to be an ingredient of the successful physical training program.

Proceeding from the specifics of the servicemen's combat activity, the commanders and sports organizers select the most suitable sports and special physical exercises. For instance, launching crews have to apply considerable physical efforts and to withstand great nervous stress, because limited time compels them to act skillfully, quickly, and to carry out a large volume of work in a short time. That is why members of launching crews must develop physical strength and endurance. Most useful in this respect are 100- to 400-m running, skiing races, and speed swimming. In the case of launching crews, it is advisable to begin any kind of physical training with a cross-country race.

It should be emphasized that physical training and mass sports are closely interconnected. Take, for example, the daily physical exercises. In Lieutenant Colonel Vasilyev's battalion, they are carried out in accordance with the general instructions on physical training but necessarily include various exercises for specialists and elements of the Military Sports Complex. The physical exercises are directed by sergeants under the supervision of officers who know exactly who is incapable of standing big loads easily and who finds difficulty in overcoming fatigue. For such soldiers, general body-building exercises and additional training are prescribed.

*Physical readiness is a fundamental of combat readiness, and the Soviet pursuit of sports is certainly an effective way to insure physical readiness.

The main specific feature of the Soviet Air Defense Forces is their constant combat readiness, even in peacetime. Combat duty requires of each specialist maximum efficiency and the ability to maintain high combat activity during the whole period of duty. Apart from the necessary political and psychological qualities, each serviceman must be well fit physically. It is common practice for the relieving shift to do a special set of physical exercises to improve the organism's general tone and capacity for work before entering on, during, and after duty. Prior to and following duty, the teams do the complex, as a rule in the open air under the commander's supervision.

*The following regimen seems a logical antidote to the handicap of fatigue on the job.

Before entering on duty, a specialist does the so-called introductory limbering-up exercises including motions resembling the motor components of his combat activity. Operators, for example, are recommended to do exercises... developing quick reaction in fluid situations and also stability and shift of attention. General body-building exercises include free exercises acting on different groups of muscles, twin exercises and simple exercises on apparatus, as well as walking and running at slow and medium speed. The exercises last for 15-20 minutes.

During the tour of duty, a short-time [5-10 minutes] set of physical exercises is done with apparatuses and instruments at workplaces in a sitting or standing position and include: stretching the arms outwards and upwards, alternate bending of the knees and then bringing them up to the chest with the aid of the hands, turning the trunk right and left, bending and rotating the head and other exercises. The set is repeated every 2-3 hours during the shift.

After the shift, the men play table tennis, volleyball, basketball, and handball. Swimming, of course, has a very beneficial effect on the whole organism. It removes completely the stress accumulated during the shift.

*Evaluation of the physical training for airdefensemen was in itself a revealing and useful part of the program.

An investigation carried out in units has shown that the usefulness of physical exercises and sports during combat duty, as well as before and after, can hardly be overestimated. It was established that radar operators who fulfill the whole cycle of these "production" exercises punctually and conscientiously maintain a relatively high efficiency during the entire period of duty and restore it completely after 7-hours' rest. Those who neglected the prescribed sets of exercises showed a lower capacity for work and could not restore it after the 7-hours' rest.

Outside combat duty, the servicemen participate in mass sports activities that are the same for all, irrespective of speciality. Sports sections and teams in the units regularly have training periods. On holidays and days off, competitions are organized in fulfilling the exercises of the Military Sports Complex, in track-and-field athletics, weight lifting, and games. Also popular among the servicemen are military applied sports such as military cross-country racing, radio sport, officers' combined events, and many others.

Systematic physical training and sports activities not only contribute to the servicemen's physical steeling but also help them master successfully their military speciality, develop purposefulness and persistence in attaining their goal, and perform reliably and vigilantly their service of guarding the Soviet skies.

SKILL RETENTION AND REFRESHER TRAINING

MICHAEL H. STRUB, PhD

The US Army Research Institute [ARI] is a field operating agency of the Deputy Chief of Staff for Personnel and a developing agency for personnel performance and training [RDTE]. ARI conducts R&D activities at its headquarters in Alexandria, VA, and at its nine field units located throughout CONUS and in USAREUR. The projects reported in this article are part of an ongoing program on individual performance-based training in air defense.

How well does AIT prepare a soldier for first assignment in an ADA unit? How much is forgotten by the AIT graduate by the time he reports for duty? How should refresher training be administered in the unit and how often? How should training aids and materials be used to assure maximum training benefit? The answers to these questions are important in deciding how to allocate Army training resources. To assist Army training developers in answering these questions, ARI initiated a program of research to learn more about the retention of skills acquired in AIT and the factors that contribute to high-level training in units. Three of these research efforts that relate directly to air defense are:

- Chaparral Skill Retention Program.
- Fort Lewis Case Study.
- Training Implementation Program [TIP] in Air Defense Units.

Chaparral Skill Retention Program.

This program concerns the acquisition and retention of Chaparral skills. The 16P MOS [Chaparral Crewman] was selected as the target MOS after analyses of field density, AIT flow rate, and scattered reports of "skill retention problems."

In 1976, ARI's Individual Training and Skill Evaluation technical area initiated the project. The Air Defense School provided training support and USAREUR provided troop and training support.

A research and survey procedure was used to identify the tasks requiring refresher training. Soldier's Manuals were reviewed and interviews were conducted with field personnel in USAREUR to determine which critical tasks would most likely be assigned to a 16p AIT graduate. The tasks identified were:

- Preenergizing the M-54 launch station.
- Energizing the M-54 launch station.
- Deenergizing the M-54 launch station.
- Before-operations PM checks on the M730 carrier.
- Operational checks on the TA-312/PT telephone set.
- Emplacement and operator checks and adjustments on the target alert data display set [TADDS] AN/GSQ-137 [XO-2].

These tasks formed the basis for the development of a Chaparral Skill Retention Performance Test. Estimates of retention and requirements for refresher training were obtained by giving the hands-on performance test to AIT students upon graduation and upon arrival at the unit. As shown in Figure 1, the AIT graduates were then divided into three groups and were retested and given refresher training at either 1-, 2-, or 4-month intervals after arrival in seven USAREUR ADA battalions. To assist the units in administering the performance tests and refresher training, a Squad Leader's Guide was prepared, which is a self-paced, short course that teaches administration of performance oriented training, including how to:

- Give an effective demonstration.
- Supervise practice.
- Select required refresher training when people fail particular items on the test.
- Prepare equipment.
- Conduct and score the performance tests.
- Self-administer performance tests to improve proficiency and administration skills.

At present, ARI is completing the data collection phase of the project, and the results will be described in a research report to be published in July this year. While publication of the report will complete the Chaparral Skill Retention Program, ARI is continuing to investigate the factors that contribute to effective training in

	AIT GRADUATE				
	Graduation	On Arrival	Arrival + 1 Mo.	Arrival + 2 Mo.	Arrival + 4 Mo.
Group 1	TT	TT	TT		TT
Group 2	TT	TT		TT	TT
Group 3	TT	TT			TT

TT = Test/Train

Test and Training Schedule for Chaparral Skill Retention Program

FIGURE 1.

units. At the request of MG John J. Koehler, Jr., Commander, Fort Bliss, the Chaparral Performance Test [tasks 1-5] was used to assess the proficiency of 16Ps within the 1st Bn, 67th ADA at Fort Lewis, WA, commanded by LTC Joseph H. Felter, Jr.

Fort Lewis Case Study.

The Chaparral Performance Tests [minus the TADDS task, since TADDS had not been issued to the unit] was administered to 60 16Ps [12 squads] in the 1st Bn, 67th ADA. The results, shown in Figure 2, indicated that overall performance was quite high. Figure 2 also reflects a definite experience factor; that is, performance improves consistently with increased time on the job. Based on the median percentage of performance measures passed, those who have been a 16P for 3 years or more are achieving near perfect scores. ARI is examining these results and the unit in more detail to determine the contributing factors and activities that produce high training performance before this information is disseminated to other ADA battalions. Interviews with 1st Bn, 67th ADA personnel suggest that command emphasis is essential. The high priority given to training and the innovative training programs undoubtedly contributed to the high scores achieved by the unit.

One innovative effort established by LTC Felter is called the Logistical/Tactical Excellence Program [L/TEP]. Based on the assumption that logistical and tactical proficiency constitutes the core elements of combat readiness, the L/TEP uses competition, praise, recognition, awards, and rewards to develop professional soldiers who are highly proficient in their maintenance responsibilities and tactical skills.

Each Vulcan, Chaparral, and Redeye crew [and their vehicles] is evaluated at least twice during quarterly competition periods. Each quarter, a Vulcan, Chaparral, and Redeye crew is distinguished for its performance. Crews to be evaluated are selected at random and evaluations are conducted during scheduled maintenance periods as prescribed by battery training schedules.

The L/TEP appears to use incentives effectively by maximizing the use of those that are within the control of the battalion commander to administer. A common problem with incentives, as indicated in surveys, is that those preferred by the soldier are the most difficult to provide due to regulations, policies, or limitation of funds. However, the L/TEP awards listed below are both possible and apparently quite effective.

- Ninety-day exemption from all duty rosters.
- Three-day [mid-week] pass per month for 3 months.
- Certificate of appreciation for inclusion in official file.
- Command letters of commendation for inclusion in official file.
- Guarantee of attendance at successive on-duty education [10 weeks].
- Distinguished soldier award recommendation.
- Soldier of the quarter and NCO of the quarter.

Quarterly winners compete for soldier and NCO of the year awards. The platoon leader and platoon sergeant whose platoon receives the highest average during quarterly evaluations receive letters of commendation for their official files. The battery commander, motor officer, first sergeant, and motor sergeant whose battery receives the highest overall average are recommended for general officer letters of commendation for their official files.

Several other innovations may have contributed to the high performance achieved by the 1st Bn, 67th ADA. For example, the battalion staff and headquarters participate in four evaluated ARTEPs a year in conjunction with other divisional units undergoing their ARTEPs. In a recent ARTEP, the battalion was judged the most combat-ready ADA organization encountered by the evaluator.

While these programs appear to have a positive effect on unit proficiency, the relative effectiveness of each innovation has not yet been determined. A more systematic attempt to control and evaluate factors contributing to high proficiency in unit training is being carried out by the ARI Field Unit, Fort Bliss, in a research project entitled Training Implementation Program [TIP] for Air Defense Units.

More and more individual training materials and aids are being produced for use in the units as they take on a greater responsibility for individual training. While the number of training materials has increased, there has been relatively little effort to date to structure the units' programs, where the materials will be managed and applied. In response to this need, TIP was initiated and will attempt to develop a management structure or program to permit effective implementation of Army materials and aids. The TIP project was organized around five major tasks:

- Conduct a training management analysis of individual training in units.
- Develop a model TIP.
- Conduct a limited validation of the model TIP.
- Install TIP in one or more ADA battalions.
- Evaluate the effectiveness of TIP.

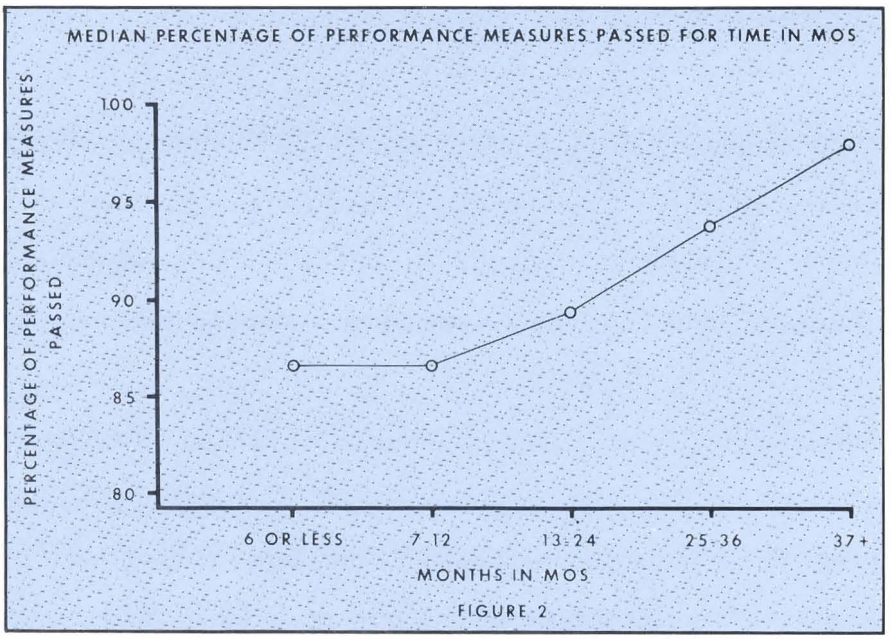


FIGURE 2

The training management analysis suggested that TIP consist of self-paced workshops for refresher training in skills required for:

- Training and Evaluation Outline [T&EO]—Analysis of mission to include collective/individual tasks and development of performance systems.
- Training Management—Development of a training information base for a battalion, selection of tasks for training, and development of a training information flow.
- Precision Management—Effective use of time and personnel and guidelines for minimum essential record keeping.
- Incentive Management—Application of incentives by squad leaders.
- Performance-Oriented Training-Preparation, conduct, and evaluation of criteria referenced [i.e., GO/NO GO] training and testing.

Since training responsibilities vary for different personnel within the battalion, such as the commander and squad leaders, the workshops are structured differently for each group. Presently, workshop materials are being validated and preparations are being made to train a military installation team to administer the workshops to appropriate personnel from the 1st Battalion, 7th ADA and 2d Battation, 55th ADA at Fort Bliss. The military installation team will consist of a project officer and NCO from the US Army Air Defense School and a training officer and NCO from each of the target battalions. At the same time, ARI will be collecting baseline data in each of the battalions to obtain an estimate of training proficiency prior to the introduction of TIP. The installation phase of TIP will begin after the battalion personnel have completed the designated workshops. Data will, however, continue to be collected in the target battalions for a 6-month period to permit longer term effects of the training to surface.

Evaluation of TIP will be accomplished using both objective and subjective criteria. The objective measure will be an estimate of crew proficiency. Skills used by unit trainers will be noted and compared with measures of crew proficiency. Subjective criteria will include the use of questionnaires and interviews before, during, and at the end of the TIP evaluation phase. These will measure changes in attitudes and motivation within the units.

While TIP was originated and developed for ADA application, it is hoped that the structure of TIP and the skills trained in TIP workshops will assist in training non-ADA units as well. In an Army Training Board sponsored project, ARI's Presidio of Monterey Field Unit is developing an Individual Extension Training System [IETS] for infantry units. Infantry troop support for the IETS project is being provided by the 7th Infantry Division at Fort Ord, CA. When both research efforts have achieved generalization beyond their initial developments, the efforts will be integrated into a combat arms training program to provide uniformity and standardization to FORSCOM training procedures as the products from these R&D efforts move into the field.

Dr. Strub graduated from Fordham University and acquired a Masters Degree and PhD in Engineering Psychology at Ohio State University. He served as a research scientist at the Army Research Institute Headquarters, Alexandria, Virginia, from 1968 to 1975. Since then, he has been Chief of the ARI Field Unit at Fort Bliss, Texas.

WHAT DO YOU DO NOW,

LIEUTENANT?

Prepared by Tactics Department, USAADS

SITUATION:

You are the Redeye Section Leader assigned to 1st Bn, 325th Field Artillery [155 towed]. Your three Redeye teams are currently deployed providing low-altitude air defense protection for firing batteries A, B, and C as they move to support the tactical situation. The battalion commander has just given you a warning order for a new mission. Battery B has been tasked to move into position and prepare for an on-order nuclear fire mission. Due to the asset's criticality, vulnerability, and the nature of the enemy air threat, the battalion commander desires that all three Redeye teams be deployed around Battery B in a static defense.

As shown below, Battery B will occupy a position approximately 7 kilometers south of the line of contact. MSR 1 runs through a valley extending into enemy territory to the north. After looking at your map, you identify five possible Redeye team positions. Locations of the Forward Area Alerting Radar and Redeye CP are as shown in figure 1.

SOLUTION:

Defense of a stationary asset with Redeye is designed primarily to counter low-level attack by jet aircraft. This artillery battery may be attacked by enemy aircraft either as a target of opportunity or a planned mission. It must be assumed that the enemy can attack the asset from any direction, and attack on the first pass is highly probable. A minimum of three Redeye teams is normally required to provide an adequate, all-around defense of this type asset from jet aircraft. These teams should be positioned in accordance with Redeye employment guidelines—position requirements, early engagements, and overlapping fires.

As compared with Redeye in defense of maneuver units, the selection of Redeye positions for the defense of a static asset can be more deliberate. The Redeye section leader selects tentative positions based on map analysis and then determines suitability based on a ground reconnaissance. The purpose of the ground reconnaissance is to evaluate each location against the five position requirements for Redeye teams:

- **Observation and Fields of Fire—A primary consideration; positions should afford all-around visibility and allow the weapon to be fired in any direction.**
- **Communications--FM line of sight between FAAR and Section CP.**
- **Physical Security—Security against ground attack.**
- **Cover and Concealment—Because of the**

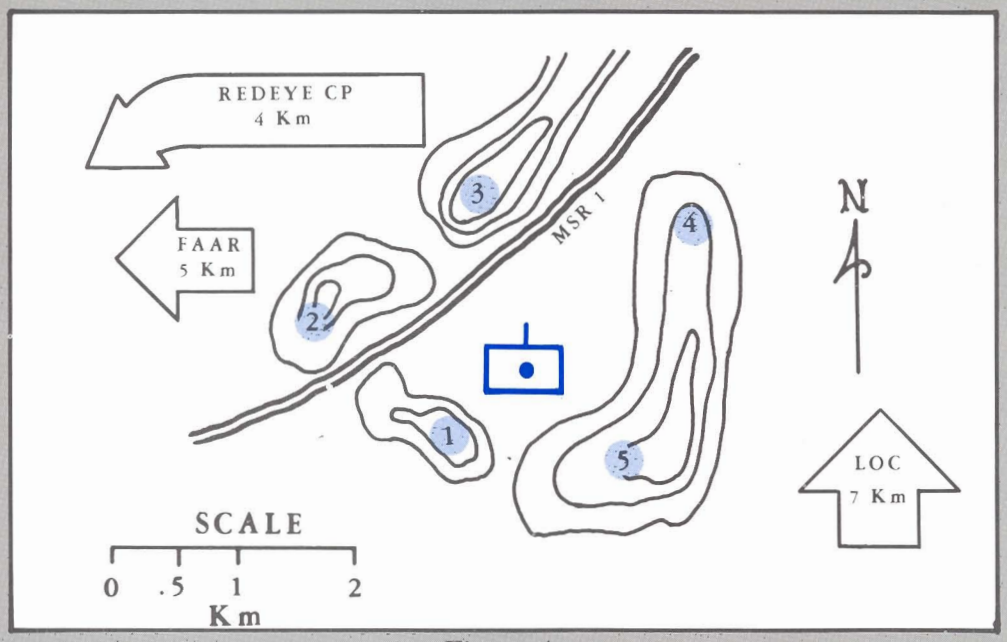


Figure 1

telltale smoke signature produced by the missile firing, the team should be afforded protection from enemy observation after a missile engagement.

■ Technical Requirements—Every Redeye weapon has a 13-meter backblast area that must be clear of exposed personnel and equipment.

In the case of this particular field artillery battery, a ground reconnaissance conducted by the section leader determined that the hill [fig. 2] on which position one is located is covered by a dense growth of tall foliage; a Redeye team could observe avenues of approach only in a southerly direction. Observation from position four is restricted by higher terrain to the south; a team from this position could, however, see in all other directions. Due to a dense growth of trees on the northern portion of the hill for position two, a team at this location could observe in all directions except north. Both positions three and five offer good observation and fields of fire, and all five tentative locations meet the remainder of the position requirements.

The next employment guideline that must be considered is that of early engagement. Redeye teams should be positioned so they can engage an aircraft before it releases its ordnance on the unit or asset being defended. Because of a lack of forward engagement capability against jet aircraft, Redeye teams should be positioned away from the defended asset [1-2 km] or well forward in the direction of the expected air attack. Unless terrain restricts low-level attacks to particular avenues of approach, it should be assumed that aircraft can attack our asset from any direction. In many instances, well-defined low-level attack routes cannot be identified.

The final employment guideline that must be considered by the section leader is overlapping fires. Redeye teams should be positioned so that the engagement capability of one team overlaps that of an adjacent team. This guideline guards against the possibility of an aircraft slipping through the defense without being engaged by at least one Redeye team. Positioning teams 2-3 km apart normally provides this coverage.

As previously mentioned, the section leader must choose the three best firing positions from

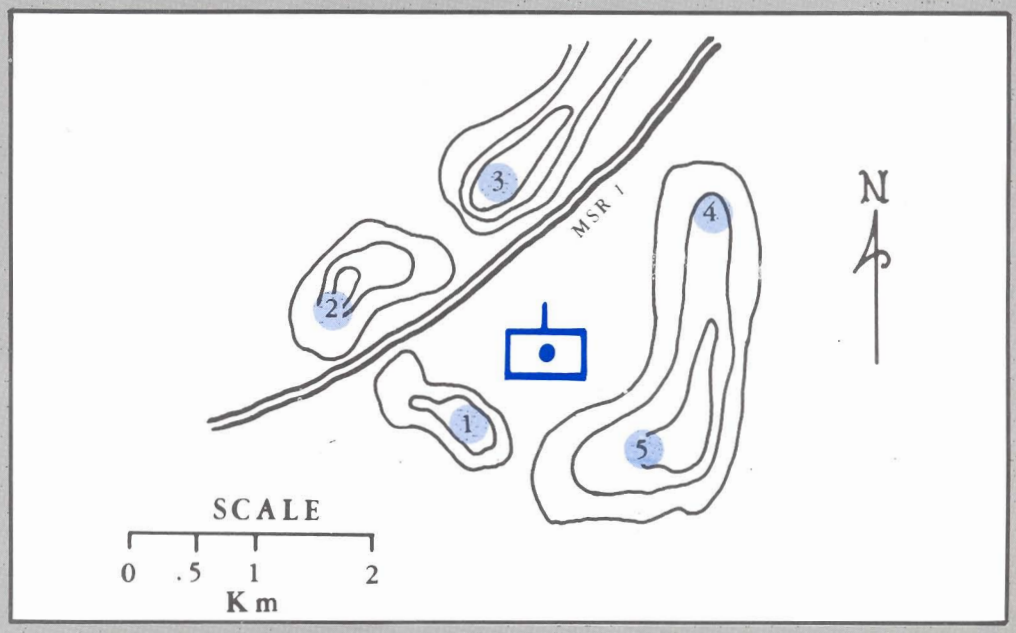


Figure 2

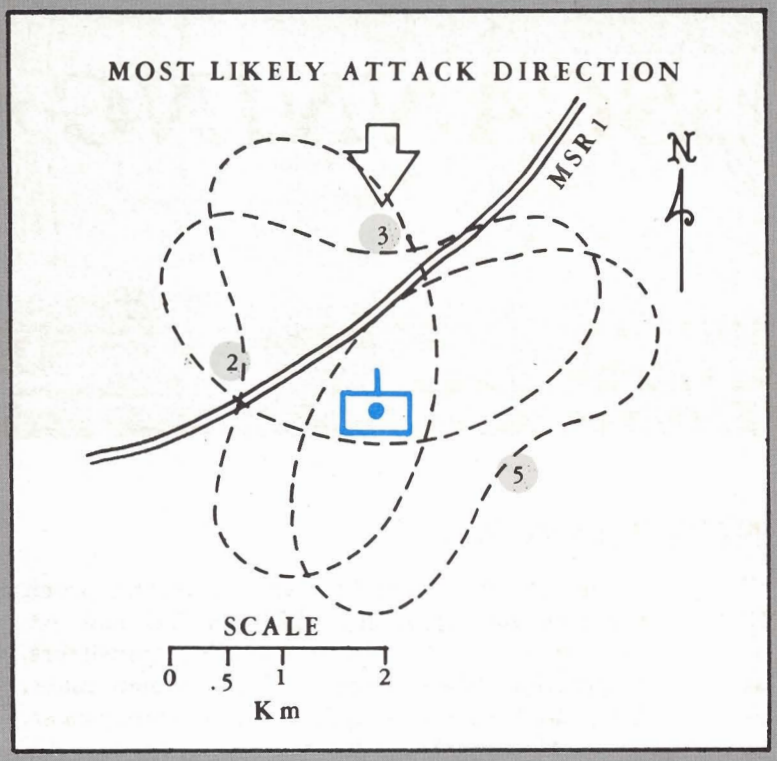


Figure 3

the five tentative locations identified [fig 2]. Positions three and five meet all position requirements as well as provide for early engagement of aircraft attacking from the north, east, and south. Since observation and fields of fire are greatly restricted at position one, the section leader chose position two as his third location to establish an early engagement capability against attacks from the west and southwest.

In this situation, Redeye effectiveness zones [fig. 3] are shown to illustrate how Redeye coverage against jet aircraft is influenced by attack direction. The size and shape of these effectiveness zones vary considerably, depending on characteristics of the aircraft being engaged and the point at which infrared acquisition is achieved. The use of effectiveness templates by section leaders in defense design is not recommended. Redeye teams should be positioned in accordance with the separation distances applicable for early engagement [1-2 km from defended asset] and overlapping fires [1-3 km between teams]. As a minimum, three Redeye teams are normally required to provide a viable, all-around defense. In any situation, the addition of more teams improves the defense by increasing the redundance of overlapping fires and extending the early engagement capability.

CUSTODIAN, US ARMY AIR DEFENSE MAGAZINE FUND
USAADS, ATTN: ATSA-DTD-LIT
FORT BLISS, TEXAS 79916

AIR DEFENSE MAGAZINE

SEND AIR DEFENSE MAGAZINE TO THIS ADDRESS (PLEASE PRINT)

RANK NAME SSAN

UNIT OR STREET ADDRESS

APO OR CITY STATE OR COUNTRY ZIP

☐ $ 12.00 3 YEARS
☐ $ 8.00 2 YEARS
☐ $ 4.00 1 YEAR

YOUR PERMANENT ADDRESS

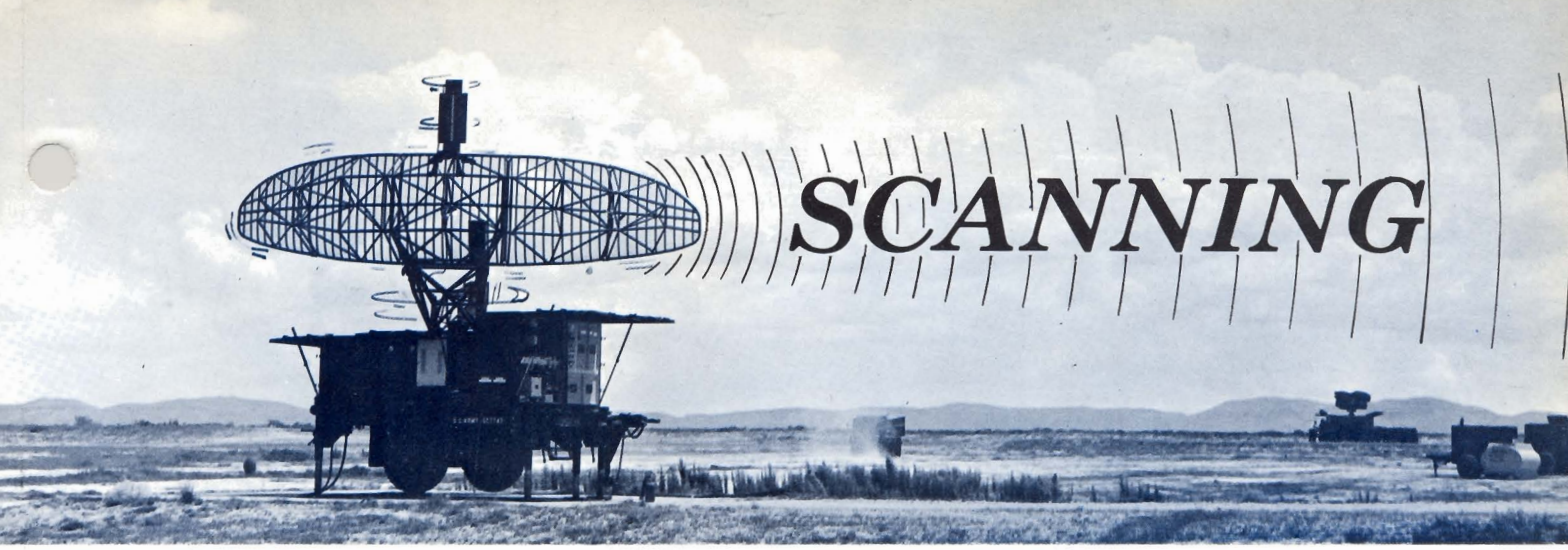
☐ NEW SUBSCRIPTION
☐ RENEWAL
☐ CHANGE OF ADDRESS

STREET ADDRESS

Foreign (non-APO) subscribers add $1.00 per year for postage.

CITY STATE OR COUNTRY ZIP

MAKE CHECKS PAYABLE TO: TREASURY OF THE UNITED STATES



ELECTRONICS TRAINING

The US Army Air Defense School [USAADS] has developed an exportable basic electronics [BE] training package to satisfy the field's need for refresher training in BE. The package was developed for individualized, self-paced instruction using the ED-LAB 650 basic electronics trainer.

The ED-LAB 650 trainer provides a hands-on capability to upgrade and maintain the students' skills in basic electronics. The trainer is rugged, easy to use, self-contained, protected against damage due to students' incorrect wiring, and [in conjunction with the printed material] is self-paced. It is housed in a portable unit with all circuit connections made via cable jumpers using standard banana jacks furnished with each trainer. The trainer is 16 inches high x 25 inches wide x 14 inches deep and weighs approximately 20 pounds. Ancillary equipment required for course study consists of an oscilloscope and a multimeter for each trainer, which must be furnished by the using unit. Power requirements are 120 VAC 50/60 Hz, with all power supplies, circuits, and components short-circuited protected.

The EC-LAB 650 training package will provide a complete basic electricity and electronics circuit program for upgrading skills in DC and AC electricity and electronics, including transistors, unijunction, SCRs, Zener, FETS, vacuum tubes, integrated circuit, switches, lamp, transformer, and radio tuneable inductor.

Topical material consists of 26 books per set for administration purposes and 20 books for each individual selected for the course. USAADS furnishes 12 sets per ED-LAB 650 trainer.

The School conducted a 30-day validation of the trainers and manuals, and the results of the validation are under study. While awaiting approval by TRADOC, the trainers and topical material are being prepared for shipment. Initially, all 19 ED-LAB 650 trainers will go to the 32d AADCOM.

Shipment will be through the Training and Audiovisual Support Center [TASC] supporting the 32d AADCOM. One ED-LAB 650 system [plus three backup systems] will be available to each battalion. Topical material, consisting of enough modules to support 12 trainers, will be shipped directly to each battalion. Expected shipment date is the latter part of May 1978; however, final delivery is contingent on shipping data confirmation.

ADA POSTERS

The Soviet Air Defense Weapons and Soviet and Warsaw Pact Forward Area Aircraft posters, originally published and distributed by the AIR DEFENSE Magazine, have recently been converted to graphic training aids.

The Soviet Air Defense Weapons poster is now GTA 44-2-4 and has been distributed to Training and Audiovisual Support Centers [TASCs] Army-wide. The local supply of this poster has been depleted, therefore, we ask that requests for it be discontinued.

The Soviet and Warsaw Pact Forward Area Aircraft poster, which has been converted to GTA 44-2-5, is in production printing and should be distributed to TASCs before the end of 1978. A limited number of the original are still available through the AIR DEFENSE Magazine, and we will honor requests until the supply is exhausted.

GTAs can be obtained by submitting DA Form 3903-R, Training Audiovisual Work Order, to local supporting TASCs.

ROLAND EXECUTIVE PROGRAM REVIEW

A Roland air defense missile system planning group, made up of some 250 delegates who are engaged in the production and deployment of the French-German developed weapon system, gathered at Fort Bliss, Texas, recently for the US Roland Second Annual Executive Program Review. The meeting's prime purpose was to exchange data and bring participants up to date on the current status of the program.

MG John J. Koehler, Jr., Fort Bliss Commander, opens the 2-day Roland conference.

Hosted by Fort Bliss' TRADOC System Manager Office for Roland, the conference delegates represented the Department of Defense, Department of the Army, Army Materiel Development and Readiness Command, Army Roland Project Office, Army Air Defense School, Hughes Aircraft Company [prime contractor for the weapon system], and Boeing Aerospace Company [major subcontractor], as well as other Army agencies. Representatives from France and Germany also attended.

MG John J. Koehler, Jr., Fort Bliss Commander, opened the conference with a welcoming address. Conferrees then began 2 days of fruitful discussions, which included topics ranging from system performance and operation to maintenance and training equipment. The group also observed a test firing of the missile at White Sands Missile Range, NM.

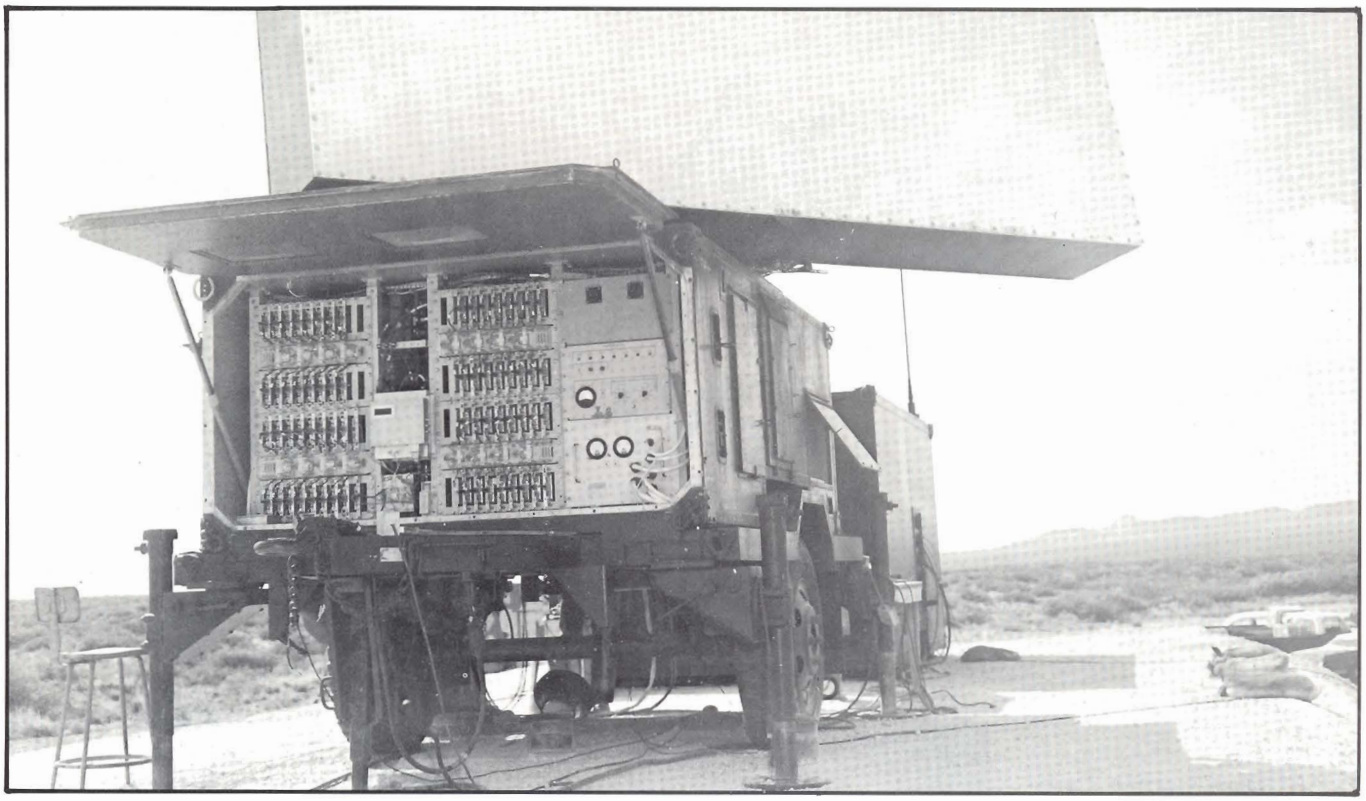
Roland is the first major European-designed weapon system produced in the US for deployment with the Army. Initially, some 30 missiles will be delivered to the Army by Hughes Aircraft Company and Boeing Aerospace Company which will be used in a joint test program by the US and NATO Allies. The new system is expected to replace the Chaparral missile system in the 1980s.

The US Roland provides an all-weather, short-range, air defense system capable of engaging and destroying low-altitude aircraft attempting to attack below radar coverage. Designed to protect air bases, fortifications, and rear area targets, the new system consists of a fire-unit module armed with 10 missiles mounted on a tracked vehicle. It uses various radars and control equipment and can be transported by wheeled vehicles or helicopter.

BG Frank P. Ragano, Project Manager for the US Roland System [left], and Col Joseph L. Hunter, US Roland TRADOC System Manager.

A highlight of this year's conference was a dinner party at which the Honorable Walter B. LaBerge, Under Secretary of the Army, spoke to the delegates. General of the Army Omar N. Bradley, along with White Sands Missile Range Commander, MG Orville L. Tobiason, and Fort Bliss and Air Defense School officials also attended the evening function.

PROMISING RADAR TEST



The US Army Air Defense Board has completed a test to determine whether the two Improved Hawk acquisition radars could be replaced by one transportable surveillance radar [TSR]. The TSR, developed by Raytheon Company, as a possible replacement for the improved pulse acquisition radar [IPAR] and improved continuous wave acquisition radar [ICWAR], is an all solid state pulse doppler radar. During radar operation, data correlation checks are made each time the TSR scans an aircraft target. This action, in conjunction with the Improved Hawk equipment, allows determination of target range, azimuth, and range rate in one scan.

The TSR, integrated with the Improved Hawk system provided by the 5th Bn, 57th ADA, was observed during a 4-week testing period at Dona Ana Range, New Mexico last October. The Directorate of Combat Developments, serving as the proponent for the test, requested that the Air Defense Board determine the compatibility of the TSR and the Improved Hawk system in the areas of cabling, power source, computer operations, and alinement requirements. In these areas, the TSR was found to be compatible with the Improved Hawk system.

The technical manual on the Improved Hawk integrated systems checks and instructions, supplemented by special instructions on the TSR from the contractor, was used as a basis for testing the compatibility of the TSR with the Improved Hawk system.

An interface buffer provided TSR target information to the automatic data processor, console displays, and the ICWAR input channels, which activated the functions of the Improved Hawk system. The target information from the TSR to the Improved Hawk system was passed over a twisted pair field wire [WD-1]; therefore, the standard heavy, bulky data cable was not required. For march ordering, the antenna remains on the TSR and is lowered hydraulically.

The detection capabilities of the TSR in an ECM [electronic jamming] and non-ECM environment were tested and the TSR proved capable of detecting targets in either environment. An A-7 and a B-57 aircraft flying at prescribed altitudes and speeds were used as the target aircraft.

TRADOC Concept Evaluation Program [CEP] funds were used to support the TSR test. The purpose of TRADOC CEP funding is to provide limited program funds for initial testing to determine whether a particular concept is feasible before an extended development program is approved.

Based on the results of the Air Defense Board TSR test, the concept of the TSR as a possible replacement for the IPAR and the ICWAR was determined to be feasible. A final decision will be made in the near future on whether a prototype TSR will be built and whether more extensive tests will be conducted.

ENLISTED CAREER NEWS

TRADOC CAREER COUNSELOR OF THE YEAR

SFC Donald G. Fields, Fort Bliss, Texas, is TRADOC's Career Counselor of the Year for 1977. In recognition of his achievement, he was awarded the Meritorious Service Medal by General Donn A. Starry, TRADOC Commander.

Fields attributed his success to maintaining communications and gaining command support. He also believes a career counselor should have a steady rapport with officers and NCOs as well as with reenlistment prospects to be effective. The counselor should create a personal relationship with reenlistment prospects and show a real concern for their needs, according to Fields.

Educational opportunities, money, and security are some of the more important reasons why soldiers reenlist, reported Fields.

General Donn A. Starry and SFC Donald G. Fields pose for official picture following ceremonies at which General Starry awarded the Meritorious Service Medal to SFC Fields for being selected as TRADOC's 1977 Counselor of the Year.

CERTIFICATES OF APPRENTICESHIP

A National Apprenticeship Standards Agreement was signed recently at Fort Bliss, Texas, which will make soldiers with electronics-related MOS eligible for apprenticeship documentation towards civilian journeymanship for their militarily-acquired job skills. An agreement between representatives from the Department of Labor and MG John J. Koehler, Jr., Commander, Fort Bliss and Commandant of the Air Defense School, effected the program that certifies a soldier's training and experience.

The agreement establishes apprenticeship training standards for soldiers in MOS 24C, E, G, P, and Q; 25D, G, H, J, and K; 26H; and 24M, N, and U. The new program will affect personnel who qualify in jobs as electronic technicians in radar, radio, TV, and weapon systems.

Skills documentation consists of a record of a soldier's training and hands-on experience for specific tasks related to his apprenticeship program.

Upon completion of 6,000-8,000 hours of work processes and related classroom instruction, the individual will be awarded a Certificate of Apprenticeship from the Department of Labor for satisfying the required tasks of the program. This certificate will be honored in the civilian labor community.

Documentation of work processes or record of job experience is the responsibility of the soldier. After his work log has been certified by a supervisor, the soldier must handcarry the data to an education counselor on a quarterly basis. The counselor will forward the information to DA. The Department of the Army will check the skills documentation for accuracy and send the work processes to the Department of Labor. The Department of Labor will award the Certificate of Apprenticeship to the soldier when the program requirements have been fulfilled.

Soldiers in certain MOS will be eligible for more than one program; however, each one must select the program he is most likely to complete. Also, the soldier must maintain an on-going documentation to earn the certificate. One hundred forty-four hours of related formal instruction for each 2,000 hours of hands-on work processes is required.

The program will also offer up to 50 percent credit for work the soldier has already performed on pertinent tasks, provided the time is documented and authenticated by a supervisor.

For information concerning a similar agreement and program [other than at Fort Bliss], contact your local unit education counselor.

BEAR

A new reenlistment program is being tested in 12 MOS that allows soldiers to change jobs and still draw reenlistment bonuses. The program, Bonus Extension and Retraining [BEAR], started early this year and will allow soldiers reenlisting for a second or third term to leave an overstrength MOS and train for 1 of 12 shortage MOS. After training, soldiers will be allowed to draw bonuses in MOS for which they reenlist. DA officials have not yet set a date for ending the program, but it is expected to continue as long as soldiers show an interest in it.

Qualification for the program is basically the same as any other reenlistment qualification, but several policy waivers give applicants some flexibility. BEAR participants may receive training between PCS assignments or may be trained and returned to current CONUS installations subject to local job openings.

ADA MOS open in the BEAR program to soldiers with 21 months to 6 years service at reenlistment are: 16C, 16D, 16P, 24C, and 24M. ADA MOS open in the BEAR program to soldiers with 6 to 10 years service at reenlistment is 24G.

Job descriptions in the shortage MOS and information on the BEAR program are available through local reenlistment offices.

ASSIGNMENTS AFTER KOREA

Some soldiers scheduled for tours in Korea will not receive homebase and advanced assignments prior to departure. Since early last year some have received assignment instructions for returning them to their current posts or to the installations where they will be assigned upon return from Korea. These assignments are usually made 18 to 24 months before the soldier's return from Korea.

Military Personnel Center [MILPERCEN] officials can no longer give advance instructions to all soldiers because of changing requirements anticipated by the planned withdrawal of most soldiers from Korea. Those assigned to Korea will be able to retain military family housing as provided by the homebase assignment policy and those now in Korea will receive assignment instructions as soon as possible before returning to CONUS.

AIR ASSAULT BADGE

The Army Chief of Staff, General Bernard W. Rogers, announced that he has approved the Air Assault Badge for Army-wide wear. The qualification badge, previously authorized for local wear by qualified soldiers assigned to the 101st Airborne Division [Air Assault], Fort Campbell, Kentucky, may now be worn throughout the Army. Action is currently being taken by the US Army Military Personnel Center to finalize a change to the Awards Regulation [AR 672-5-1] that will implement the Chief of Staff's decision. The Air Assault Badge is designed for the individual soldier who serves in an air assault unit, demonstrates a high level of professional knowledge and skill, and meets stringent specified criteria. Chief among these critera is successful completion of the standard air assault course, taught at the Air Assault School, Fort Campbell.

Requirements for award of the Air Assault Badge are similar to those of the Parachute Badge. Any soldier who satisfactorily met these requirements [as verified by an Air Assault Course Certificate] on or after 1 April 1974, is authorized to wear the Air Assault Badge as a permanent part of the uniform.

CONUS REUP OPTION TEST

There is good news for some first-term soldiers reenlisting in 1978. A test program allows some first-term soldiers stationed in CONUS to reenlist for another CONUS station. The program may be expanded to include more MOS and eventually all first-term soldiers if the test results support such action.

Soldiers must meet the following requirements to qualify to be included in the test:

- Have a social security number ending in 1, 3, 5, 7, or 9.
- Be a first termer in grade E-6 or below.
- Have a position open at the station of choice by grade and MOS.
- Reup for 3 to 6 years.
- Not already have assignment instructions.

The option is available to eligible soldiers in numerous MOS, including 16P and 16R. Unit reassignment or change in grade or MOS will void station guarantee and subject soldiers to assignment to fill DA needs. The test program is not open to soldiers serving overseas. Your career counselor has more information on the new option.

BRIEF NOTES

■ Recent feedback from the field on Task 441-16P-1061 [Redeye Ranging Aircraft category] has resulted in the US Army Air Defense School granting a scoring exception for this task; i.e., all examinees will receive a GO for the hands-on component task. The numbering sequence imprinted on the slides caused some examinees to be tested with slides incorrectly sequenced, resulting in failed performance measures and NO-GO ratings. Also, the shadow slides used caused difficulty in determining proper aircraft aspects.

■ A new correspondence subcourse [AD 0064, Inspection of Redeye, Engagement of Hostile Targets, and Deployment of the Redeye Team] has been printed and is ready for issue. The subcourse is in programed format and was developed from, and parallels, TEC lessons 043-441-7870-F, -7871-F, -7872-F, and -7873-F.

The subcourse is the first completed in a program to develop correspondence subcourses from virtually all air defense TEC lessons.

To enroll in the subcourse, forward completed DA Form 145, Enrollment Application, to: Army Correspondence Course Program [ACCP], US Army Training Support Center, Newport News, VA 23628.

As additional subcourses of this type become available, announcement will be made in the Air Defense Bulletin.

■ TRADOC has directed the various service schools to prepare a Job Book to complement each Soldier's Manual. Job Books will be used by first-line supervisors as an informal training record for each soldier's progress in accomplishing the tasks listed in his Soldier's Manual. ADA Job Books are pocket size and contain a listing of all tasks for skill levels 1 and 2. Current plans do not call for development of Job Books for skill levels above level 2.

Job Books have been published for all 16-series MOS with the exceptions of 16C and 16F. The Job Book for 16C should be published by 1 May 1978 and the 16F Job Book should be available by 1 January 1979.

■ Some enlisted soldiers will be required to serve up to 36 months after having completed attendance at service schools instead of the former 24-month obligation. The lengths of courses and the service obligation required after course completion are: 30-32 weeks, 25 months; 33-36 weeks, 26 months; 37-40 weeks, 27 months; 41-45 weeks, 28 months; 46-50 weeks, 29 months; 51-55 weeks, 30 months; 56-60 weeks, 31 months; 61-65 weeks, 32 months; 66-70 weeks, 33 months; 71-75 weeks, 34 months; and 76-80 weeks, 35 months. Courses running 81 or more weeks will require the full service obligation of 36 months. Service obligation for courses of 29 weeks or less remains the same, as indicated in AR 614-200.

BARS to STARS

OPMD UPDATE

PROMOTION TO MAJOR AUS

Attention is now being drawn to the 1978 Major, AUS, Selection Board. For those captains in or near the primary zone, the next few months will mark a period of increasing anticipation. What can we reasonably expect the zone of consideration to be? What will be the selection rate? How stiff will the competition be? Most questions cannot be answered until after the Board's decisions are announced. However, we can gain some insight into what to expect by studying the results of recent selection boards.

The 1974 Major, AUS, Selection Board signaled the beginning of an era of extremely keen competition and relatively low selection rates. In 1974 the Army promotion list [APL] selection rate for officers considered in the primary zone for the first time was only 58.8 percent, down from a high of 79 percent in 1969. No board was held between 1969 and 1974. Since 1974, however, there has been a slight but continuing improvement in APL selection rates. Although the 1976 and 1977 selection rates were up to 64.1 percent and 76.3 percent, respectively, there is no indication that the competition for promotion is lessening. On the contrary, the general quality of officers entering the primary zone is exceptionally high. Most of these officers were commissioned during the Vietnam buildup and most have been through three RIFs. Unfortunately, continuing manpower constraints will result in some of these officers not being selected for promotion. Secondary zone selections are not following the upward trend of the primary zone. In fact, the 1976 APL secondary zone selection rate was 8.9 percent, down from 15 percent in both 1974 and 1975. The 1977 APL secondary zone selection rate was 6.8 percent. Indications are that this reflects the recent change to the variable or "floating" zone, which allowed the '76 and '77 Boards to select between 5 and 15 percent from the secondary zone, depending on the quality of the officers in the zone. Under the 1977 Board guidance, the secondary zone selectee had to be competitive with the upper third of those selected from the primary zone. In short, expect the competition to be as stiff for the next board. Guidance to recent selection boards has continued to reflect the Army's commitment to OPMS. This is best exemplified by the instructions to the 1977 Major, AUS Selection Board, which stated that promotion in the Army is based on the board's determination of the potential of an officer to perform in the higher grade and that, in making this determination, the board must place greatest emphasis on more recent performance in his specialties. The guidance to the 1978 Major's Board is expected to continue the focus on specialty development and away from the "generalist" approach of years past.

WARRANT OFFICERS

Women Warrant Officers. Under the Army Chief of Staff's recently announced combat exclusion policy, 57 of the 59 warrant officer specialties are open to women. The only two remaining closed are MOS 100E [Attack Helicopter Pilot] and MOS 224B [Short-Range Air Defense Systems Technician]. Qualified women are encouraged to submit applications for warrant officer appointments. Procedures are given in DA Circular 601-73.

Regular Army Program. The RA program will be relied upon to provide the Army with tenured warrant officers. Upon termination of the Managed Tenure Program, the last cycle of which is now in progress, the Army will cease retention of nonregular warrant officers beyond their 20th year of active service. All nonregulars already approved for entry into tenured status will be permitted to serve out the approved period, but thereafter all warrant officers who are not members of the Regular Army upon completing 20 years service will be mandatorily released from active duty as provided in paragraph 3-31b, AR 635-100. Replacing the Managed Tenure Program

will be an RA "decision point" process that works as follows:

■ The point at which nonregular warrant officers will be asked to make a decision for or against integration into the RA will be either by completion of 15 years active service or completion of OBV, whichever is later. Warrant officers who have not become members of the RA at an earlier time as a result of individual application under AR 601-100 will be automatically considered by an RA Selection Board during the year in which they complete their 14th year of service or their second year of OBV.

■ Individuals selected by the RA Board will be tendered RA appointments with option to accept or decline. Both those who decline and nonselectees may continue to submit individual applications for RA appointment up to their 19th year of service [ref para 1-17, AR 601-100]. However, all should be aware that after the decision point has passed, vacancies within a specialty may be very sparse or nonexistent.

■ In July 1978, an RA Selection Board will convene to consider all nonregular warrant officers who will complete 14 years of service during FY 78. In addition, as an inaugural "catch up" action, the board will consider all other nonregulars who have over 14 years service, including those already in a tenured status. The zones of consideration and personnel to be considered will be published about April/May 1978 in a DA Circular 601-series. Tender of RA appointment will be issued to all personnel selected by the board.

■ Beginning in 1979, one of the two semiannual RA Selection Boards each year will be devoted to automatic consideration of all nonregular warrant officers in the year group concerned; i.e., personnel who will complete 14 years service or 2d year of OBV [whichever is later] within the year of consideration. Selectees will then be notified in time to exercise their option of accepting or declining RA appointment prior to reaching the decision point cutoff.

■ About 6 months after each board that automatically considers a year group population, the second semiannual RA Selection Board will meet [each year]. This Board will consider individual applicants from any year group. The first such board is tentatively scheduled for January 1979, 6 months after the inaugural year group board that will meet in July 1978.

■ To insure that the RA force is maintained within legally prescribed ceilings [ref 10 USC 3213], each RA Selection Board will be provided quotas reflecting the maximum number that can be selected in each specialty and year group. Consequently, individuals who apply for RA appointment before their year group comes into the zone for automatic consideration will stand proportionally better chances for selection.

Accreditation of Military Training And Experience. The American Council on Education [ACE] is nearing completion of its study of the warrant officer program. This study was contracted for by HQDA as part of the Army's general educational development program. Via publication in the ACE Guide, the Council is recommending that colleges, universities, technical institutes, and vocational schools grant specified credits to Army warrant officers for the learning they have demonstrated through assignment and experience in their MOS. Use of the ACE recommendations will provide warrant officers a greater degree of mobility toward achievement of MOS-related degrees.

DA SELECTION BOARDS

The basic reference for communication to promotion boards is AR 624-100. Key points in paragraph 2-5d are:

■ Any officer in the primary zone may write to the board inviting attention to any matter of record concerning himself. These letters become a matter of record in the OER section of his official file.

■ Letters cannot criticize other officers or reflect on their character, conduct, or motives.

■ Appeals of efficiency reports will not be included in correspondence.

■ Letters are not accepted from officers in the secondary zone.

■ Third party letters on behalf of other officers being considered for promotion are not accepted.

■ Acceptable correspondence, if received within 10 days after the convening date of the board, will be reviewed by the board.

Tips for communication with boards:

■ Communication should be considered on an exception basis. OERs are the major documents considered by boards, not letters.

■ The board is extremely busy reviewing every record in the zone. Your communication should have visual impact. Facts, briefly presented as a summary on a single sheet of paper, may present the best approach. You may choose to add anexes to amplify important facts.

■ Have your communication arrive at the board 2 weeks prior to its convening date if possible to permit sufficient time for administrative processing.

Address your communication to:

■ [Inside] President, 1978 MAJ AUS Board [example]
DAPC-MSS-B, US Army Military Personnel Center
Alexandria, VA 22332

■ [Envelope] Commander
US Army Military Personnel Center DAPC-MSS-B
200 Stoval Street, Hoffman II, Alexandria, VA 22332

EVALUATION REQUIREMENTS

An important provision of the Officer Evaluation Report [OER] System is that you are to receive a locally reproduced copy of your completed OER. In those cases when the OER is not prepared until after your departure for a new duty station, it is up to the losing command to forward your copy to your new address. Unfortunately, this system is not perfect and reports do get lost. If you haven't received a copy of your last report, our advice is to query your former command after a reasonable time has elapsed to determine whether it was forwarded. If it was mailed but lost, the unit personnel officer—who is required to maintain file copies of all reports for 120 days after the closing dates—should be able to mail you another copy.

OER appeals must be submitted within 2 years of the "THRU" date reflected on the DA Form 67-7 in question. Meanwhile, the 5-year time limitation on the submission of OER appeals of reports rendered on DA Form 67-6 and earlier report forms remains in effect. Reports beyond this time limitation are not subject to appeal if MILPERCEN can determine conclusively that the officer knew the OER in question had been in his official record for at least 2 years.

ASSIGNMENT TO USMA

Career officers are eligible for an assignment to the US Military Academy at West Point, New York. Since the majority of the positions requires 2 years of graduate schooling followed by a 3-year assignment, officers are considered available only if they have met certain critical objectives. Company grade officers selected for assignment to USMA must be qualified in their entry specialty and junior enough to permit a post USMA assignment in their alternate specialty before they enter the primary zone for promotion to LTC.

To be selected, officers must have outstanding military and academic records, hold at least a baccalaureate degree, have had a successful company-level command, and be graduates of an advanced course. Officers already possessing appropriate advanced degrees are eligible for direct assignment. If otherwise qualified, the Officer Personnel Management Directorate declares officers available and suitable; however, USMA determines final acceptance. More detailed information concerning the different positions and graduate schooling available may be obtained by writing to the Superintendent, USMA, ATTN: MAAG-P, West Point, New York 10996.

OPMS REVIEW

Professional development is the enhancement of professional attributes, skills, and knowledge of Army officers, through planned assignments and schooling, to meet current and future Army requirements.

DA Pamphlet 600-3, the basic source of OPMS philosophy and concepts, states that the objectives of the Officer Personnel Management System are:

- To develop officers in the right numbers and with the right skills to satisfy Army requirements, taking maximum advantage of the abilities, aptitudes, training, and interests of the individual officers.
- To assign an officer according to the Army's needs and the individual's competence and desires.
- To improve the motivation, professionalism, and professional satisfaction of the officer corps through a disciplined dual specialty development system.

Possibly the greatest misunderstanding surrounding OPMS involves the terms primary specialty, alternate specialty, control specialty, and projected specialty. There is a tendency to consider the primary specialty the more important of an officer's two designated specialties. This is not the case. DA Pamphlet 600-3 defines the primary specialty as the one that will receive emphasis in an officer's professional development and utilization during the company grade years. The alternate specialty will be designated prior to the completion of 8 years of commissioned service. It is <u>not</u> the second most important specialty in which an officer is designated. An officer's two designated specialties have equal importance.

Another source of misunderstanding is the term control specialty, which is simply that specialty to which an officer has been assigned by Officer Personnel Management Directorate [OPMD] and which is also the key for distributing and accounting for officers under OPMS. For example, an officer with Infantry and Automatic Data Processing as his designated specialties [who is being assigned to USAREUR to fill a requisition for a position requiring ADP skills] would normally have Specialty Code [SC] 53 as his control specialty and should be utilized in an ADP position. Commanders have the flexibility of placing an officer in other positions necessary to meet changing operational requirements, but use of the control specialty ensures that commands do not requisition officers in excess of their authorization for the specialty concerned. In short, a control specialty is an accounting device for strength reports and other reports related to the commissioned officer.

The projected specialty is a tool that provides a method of looking ahead and projecting the

specialty in which an officer should be placed in his next assignment. The projected specialty will normally be an officer's designated primary or alternate specialty. Continuing our previous example: At the time this officer was designated ADP [his control specialty], he would normally be designated Infantry as his projected specialty. Twelve months prior to availability date, the OPMD specialty manager reevaluates, and possibly redesignates, the officer's projected specialty to ensure that the most recent data are included in the officer's professional development pattern.

The implementation of a new management system is a complicated and time-consuming task. There is resistance to change:in the case of OPMS, attitudes and values of Army officers must be reoriented and confidence instilled in the minds of the officer corps.

The Officer Personnel Management System envisions that officers will acquire professional skills in two designated specialties. A variety of assignments within an officer's primary and alternate specialties provides the foundation for advancement to positions of increasing responsibility and ensures that the officer possesses the necessary skills, knowledge, and experience for the position to which assigned. The Officer Personnel Management System is based on the rationale that diversity expands the professionalism of the US Army and imparts flexibility to the officer corps.

DOCUMENTS IDENTIFICATION

Many documents sent to MILPERCEN for filing in official military personnel files [OMPF] do not include enough information—particularly the social security account number [SSAN]—to identify the officers to whom the documents pertain.

MILPERCEN receives numerous letters of appreciation and commendation that do not include the SSAN. Other documents are received without all the necessary identifying information and promotion orders, certificates of training, and academic reports.

The SSAN is essential in determining the file location of the master microfiche OMPF and for ensuring that the document is added to the correct record. Although the capability exists to do name searches with the microfiche system and through the Active Army Worldwide Locator, the process is time-consuming and has probability of error.

Another area of concern is the large number of documents received that are of poor legibility and thus not suitable for photo reduction during conversion to microfiche.

All documents submitted for addition to the OMPF should be reviewed closely by the officer and the servicing MILPO before submission to MILPERCEN. Such a service will ensure prompt addition of high-quality document images onto the microfiche OMPF.

THREE PANEL SYSTEM

Officer promotion boards are currently organized into three panels of three to five members each [depending on the size of the board] and a recorder. Each panel meets independently and recommends selections from among the eligibles. The President sits as a member of one panel to preserve the independence of panel deliberations. The recorders do not participate in panel voting.

The separate panels later merge as one board to analyze the results of the independent panel selections and to make the final selections. The analysis establishes three groupings of names of zone eligibles:

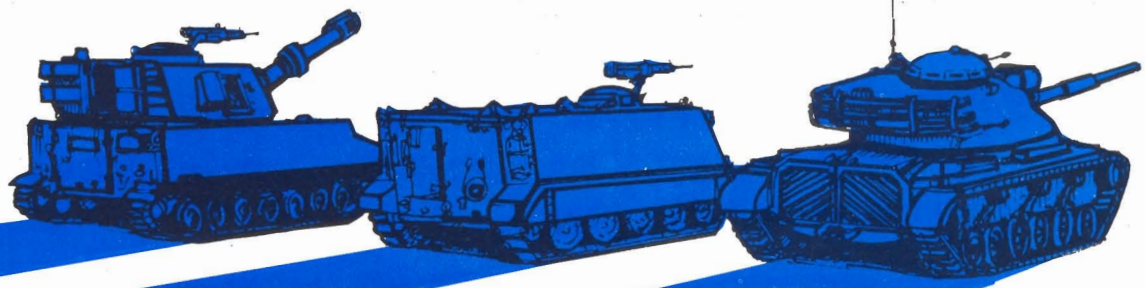
- Those officers selected by all three panels.
- Those nonselected by all three panels.
- Those selected by one or two panels.

From these data, the Board reconsiders and revotes the files of those officers who were not unanimously voted in or out during the independent panel deliberations. The Board then selects from this group those who in its judgement are best qualified to perform the duties and exercise the responsibilities of the next higher grade. The names of these officers are then advanced to fill the remaining promotion quotas.

Designed for use only in conjunction with promotion boards to captain through colonel, RA, and captain through brigadier general, AUS, this three-panel system was formally approved by the Secretary of the Army for use during the 1975 Brigadier General AUS Board session. It has been used for each succeeding officer promotion board except those convened for the Army Medical Department [AMEDD]. The AMEDD promotion boards do not use this system because of the limited availability of a sufficient number of professionally qualified officers who could be selected to serve on a multipanel board.

The three-panel system is considered an improvement over previous board procedures. It not only increases the likelihood of choosing the most deserving officers for advancement, but also insures a more comprehensive and careful comparison of officers at the margin to meet the objective of selecting the best qualified for promotion to the next higher grade.

COMBINED ARMS CORNER



XM-1
UNDER TEST AT FORT BLISS

Members of the 2d Sqdn, 3d ACR, Fort Bliss, Texas will test the new XM-1 main battle tank beginning 15 May and continuing throughout the year 1978.

The tests will involve the use and comparison of five XM-1 and five M60-A1 tanks in the areas of survivability, hitting performance, fightability, target acquisition, human factors, and mobility.

The testing program will be conducted in three phases: training, live fire, and maneuvers. Phase I will deal primarily with the tactical transition training required to convert current tank crewmen to the new tank system. Comparative firing performance will be tested in Phase II, with the tanks' maneuverability in both nonfiring and live-fire maneuver exercises under test in Phase III.

The tanks will be tested at the tank facilities of Dona Ana Range, NM, under the direction of Regimental Commander, Colonel Joseph C. Lutz.

Although the tanks to be tested will be armed with the US standard 105-mm gun, the Army has already requested a Congressional go-ahead in the development and testing of a German-designed 120-mm smoothbore gun system for inclusion on the final version of the XM-1 tank. The date when the 120-mm gun is introduced in production line XM-1s depends on successful completion of development and test efforts. The 120-mm German gun is standard gear on the German Leopard 2 tank.

Selection of the 120-mm gun follows an 11-month evaluation of the American 105-mm system, British 120-mm rifled bore system, and the German 120-mm gun.

Secretary of the Army Clifford A. Alexander said a decision to begin production of the 120-mm guns, depending on Congressional funding and development authority, could be made as early as 1981.

GUARD OVERSEA TRAINING

The National Guard Bureau recently described its policies on sending Army Guard units overseas for annual training periods. The announcement explained how units are selected for oversea training missions and what agencies are responsible for transportation, equipment, and other logistical matters.

Twenty-five Army Guard units, varying in size from a company to a battalion, are scheduled for outside the continental US [OCONUS] training periods in 1978. Most of the units will be going to US Army Europe [USAREUR] for training in West Germany, Italy, and other NATO countries.

However, the Utah Army Guard's 19th Special Forces Group and its 142d Military Intelligence Company will be going to Korea for their OCONUS training. Also, elements of Minnesota's 47th Infantry Division will be going to Norway under a unit exchange program with that nation.

Army Guard units currently selected for oversea training are those with early deployment missions and of a type required by the OCONUS commands. The purpose is to provide realistic training in mission-oriented functions and in the area of potential deployment for ARNG units.

Units selected for OCONUS training will deploy with a minimum of 90 percent of the units' authorized strength and a maximum of 100 percent strength. The formation of "composite units" for OCONUS training is prohibited. Also, new enlistees who have not completed REP-63 training cannot be deployed.

TNT PROPELLING CHARGE

TNT is replacing Composition B in some artillery rounds. Composition B has long been used as a filler for artillery projectiles to achieve greater ranges. Cannon artillery weapon systems officials prefer Composition B explosive over TNT because of its greater effectiveness. However, Composition B as currently manufactured has not been fully qualified and certified for use with higher velocity propelling charges.

The new top zone charge [M203] for the M198 towed howitzer cannot be used with the Composition B-filled M549 projectile, but it can be used with the TNT-filled projectile [M549A1].

The change from Composition B to TNT is an interim measure and does not represent a trend in any projectiles. A detailed program is on-going to improve the Composition B explosive so that it can be used with higher performance propelling charges. This is a 2-year program, and it is believed that upon completion of the program the use of Composition B will be resumed.

SIGNAL COURSE AT FA SCHOOL

Fort Sill is best known as the home of the Field Artillery. However, many are not aware that it is also the location where one of the most important Signal Corp [SC] courses is taught. The course is the Communications/Electronics Staff Officers Course [CESOC].

The CESOC is 9 weeks and 3 days long and is the only course of its kind available for tactical communicators. The purpose of the course is to prepare Signal Corps officers for assignments as C/E staff officers at battalion through brigade level in non-Signal Corps units and Combat Signal Officer SS1025A.

CESOC graduates are proficient in a myriad of SC-related skills required for communications in non-Signal units. Students also receive a general knowledge of organization, mission, and employment of Field Artillery, Armor, and Infantry battalions and brigades.

A large number of non-Signal Corps students come directly from non-Signal units.

TWO-SECOND SMOKE COVER

The Army has adopted a protective smoke screen system for use on the M60A1 tank and other armored vehicles. Designed by the British, the new smoke grenade and launcher system provides a smoke screen cover within 2 seconds. Current systems take from 8 to 10 seconds before becoming effective.

The British smoke screen system is designed to prevent accurate enemy fire against friendly armored vehicles. The system consists of 24 phosphorous smoke grenades that are fired in groups of 6 or 12 at a time.

NATO tanks in Europe will be equipped with the new system first. US-based equipment will follow when NATO requirements are completed.

The Army's decision to adopt the British smoke screen system supports the overall standardization program in effect within NATO nations.

SIGNAL GROUP IN BOLD EAGLE

The 11th Signal Group, Fort Huachuca, Arizona, provided the communications for Exercise Bold Eagle conducted in the Eglin Air Force Base area, Florida.

The main objective of Bold Eagle was to apply in practice the total force concepts with both the Army and Air Force participating. The 40th Signal Battalion laid 8 km of special 4-cable and 7,583 meters of telephone wire and installed 120 phones at Exercise Directorate Headquarters. The signal group also supplied the WECO Dimension Switch, a communications center, and two technical control units. — The Army Communicator

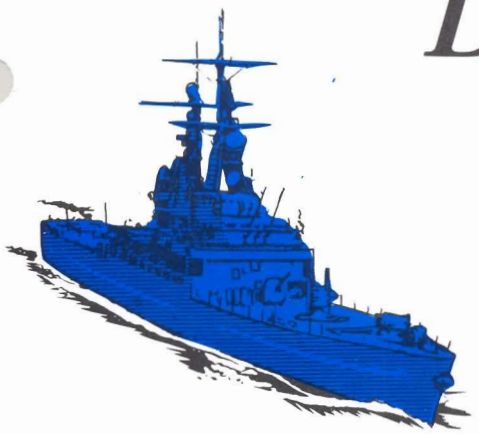
[*See related note regarding Bold Eagle on page 42, Jan-Mar '78 issue of AIR DEFENSE Magazine.*]

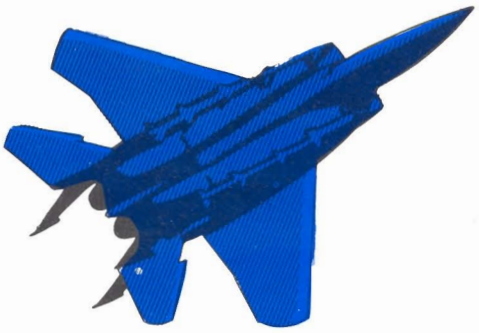
DUAL PURPOSE WARHEAD

The Naval Surface Weapons Center Dahlgren Laboratory has tested a dual-purpose warhead that can penetrate "soft" targets such as sandbagged bunkers before detonation but will detonate on impact upon striking the usual harder targets such as metal or masonry construction.

The new dual purpose weapon is designed for the shoulder-launched, multipurpose assault weapon [SMAW]. Tests showed that the SMAW explosion will penetrate to a maximum tested depth of 9 inches of reinforced concrete and 40 inches of sand and timber.

DEVELOPMENTS





GERMAN GUN SYSTEM

The Secretary of the Army, with the concurrence of the Secretary of Defense, recommended to the Congress recently that the US begin development and testing of Federal Republic of Germany's 120-mm smoothbore gun system design for adoption as the future main armament system for the XM-1 tank. This selection will provide the US with increased capability against long-range armor threats, as well as enhance the prospects for interoperability of the next generation of tank guns within NATO.

Since 1973, the US Army has engaged in a cooperative effort with the United Kingdom and the Federal Republic of Germany to seek a common, optimal tank main armament system for NATO forces. Although the British system was not selected, the US Army plans to work out a mutually agreeable arrangement to continue to work with the British on ammunition technology.

With successful completion of development efforts, the Army expects that the XM-1 production with the 120-mm gun could be initiated in 1984.

NEW ARMY ROCKET

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

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

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

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

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

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

GUIDED MISSILE FRIGATE

The first ship of a new class of guided missile frigates, Oliver Hazard Perry [FFG-7], was commissioned recently at Bath, Maine. The 445-foot long ship is powered by gas turbine engines that generate a top speed of more than 28 knots. Armed with surface-to-surface missiles, surface-to-air missiles, a new model 76-mm, rapid-fire gun, antisubmarine torpedoes, and helicopters, the Perry and her sister ships are designed primarily to protect merchant shipping and amphibious forces against air, surface, and submarine attack.

GLIDE WEAPON SUCCESSFUL

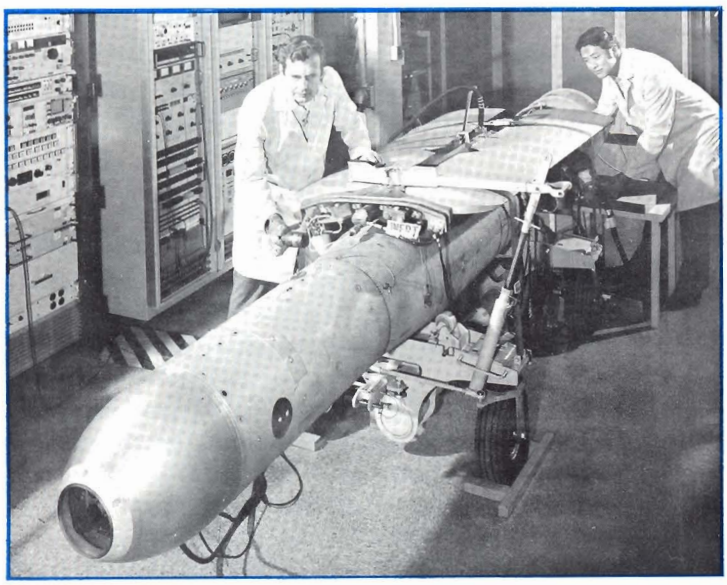
A GBU-15 Planar Wing Weapon, launched from a US Air Force B-52 bomber, scored a "lethal" hit on a simulated power plant target during its first flight test conducted recently at White Sands Missile Range, New Mexico.

The Planar Wing Weapon is a major version of the Air Force modular GBU-15 air-to-surface glide bomb family. The 12-foot-long weapon has an 11-foot-wide planar wing, resembling a small glider. The wing is extended after launch, increasing the glide weapon's range so that the launching aircraft may "stand-off" at a safe distance while accurately guiding the weapon to the target.

System integration for the GBU-15 Planar Wing Weapon is being conducted by Hughes Aircraft Company under contract to the Air Force Armament Development and Test Center. Hughes is also responsible for development of the digital autopilot, the planar wing module, and the weapon data link. The autopilot is a small digital computer that converts sensor and guidance commands into appropriate steering signals as well as performing many on-board logic functions during flight.

A mid-course guidance system directs the weapon to the target area. A television guidance unit in the nose enables the weapon system's operator in the launch aircraft to visually acquire the target on a cockpit TV monitor and switch to the TV seeker for accurate terminal guidance. The weapon data link provides a video communications link between the weapon and the launch aircraft.

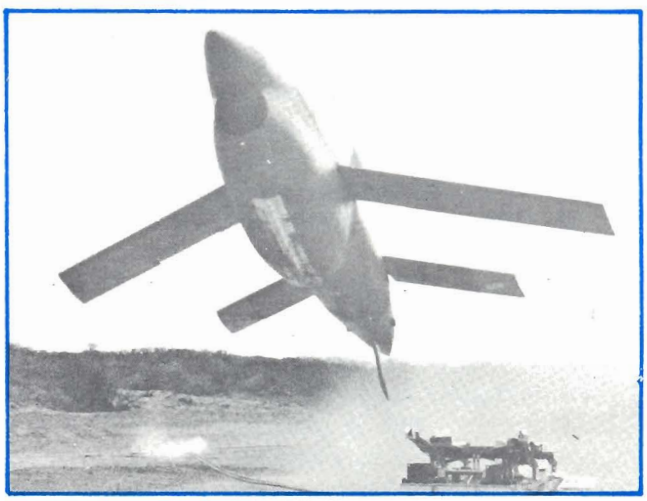
A modular system, the Planar Wing Weapon has numerous configurations made possible by changing modules such as guidance and warheads. This versatility allows the weapon to be used for a variety of mission requirements.



GLIDE WEAPON – GBU-15 Planar Wing Weapon undergoes testing by engineers prior to its first flight test held recently at White Sands Missile Range, New Mexico.

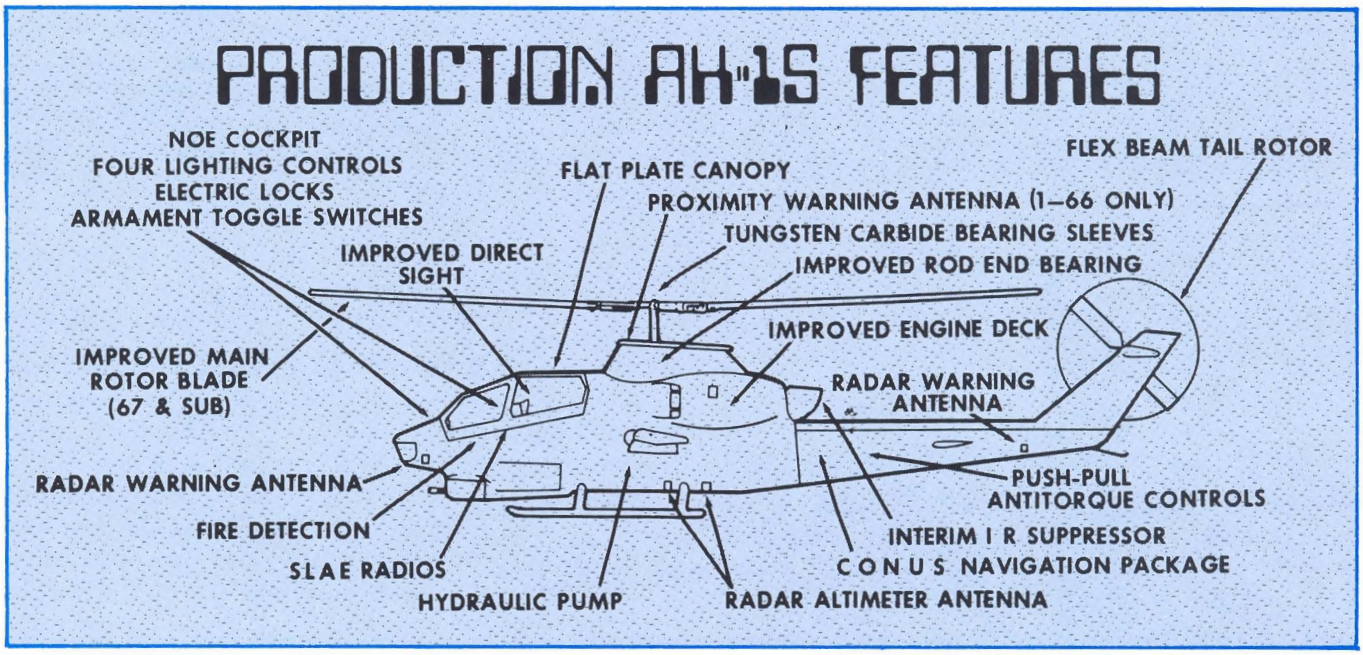
QUICK LIFT

A catapult launch system slings a jet drone aircraft into flight. Recently installed at White Sands Missile Range, NM, the catapult is being evaluated as a less expensive means of launching drones at White Sands and other defense test facilities. Drones are pilotless aircraft used as targets in testing air defense weapon systems. With the catapult concept, drones could be launched at 10 percent of the cost of rocket-assist takeoff with no loss in performance.



AH-1S HELICOPTER

The US Army has exercised an option to purchase 83 additional units of its most modern antiarmor helicopter, the Bell Helicopter Textron's AH-1S improved Cobra. This latest buy is part of a planned Army acquisition of production models of the AH-1S. More than 75 percent of these aircraft are now on order. The first production AH-1S was delivered in March 1977. Deliveries of the 83 additional aircraft will take place in 1979 and 1980. The AH-1S is equipped with the TOW missile system, an improved engine, and an uprated drive train. It incorporates additional operational and maintenance improvements.



AHAMS

The US Army Missile Research and Development Command has awarded contracts of about $200,000 each to five companies for their ideas on developing the Army's new advanced heavy antitank missile system [AHAMS].

Concept definition study contracts have gone to Ford Aerospace and Communications Corporation, Newport Beach, California; Hughes Aircraft Company, Canoga Park, California; Northrop Corporation, Anaheim, California; Martin Marietta, Orlando, Florida; and McDonnell Douglas, Huntington Beach, California. Each of the five companies will perform a 4-month study outlining technology approaches for developing the new tank killer. They have until 30 May to respond.

These studies will be used by a special Army task force to be established to study all Army antitank candidates, including missiles, guns, and recoilless rifles. The task force will recommend to the Defense Department the system that best meets the Army's future antiarmor requirements.

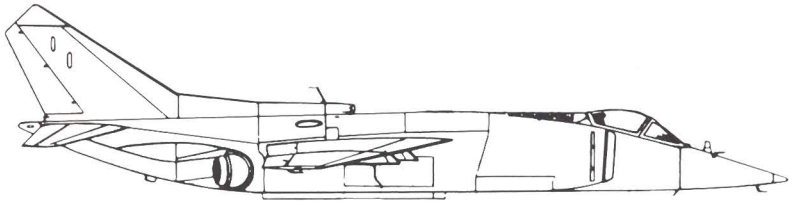
USAF JAMMING SYSTEM

The US Air Force recently displayed its first complete supersonic tactical jamming system, the EF111A, which will replace the EB-66B system, now retired by the Air Force.

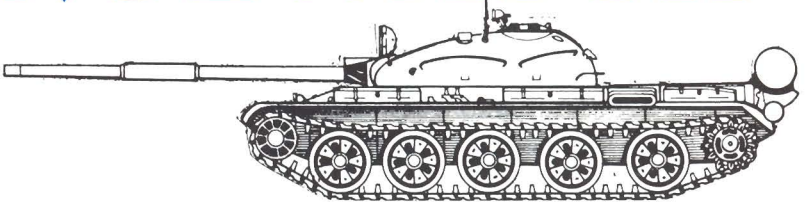
The new system combines the speed and range of the F-111 airframe with the superior electronic warfare capability of the ALQ-99E electronic jamming system. The EF-111A has a three-way advantage over previous jamming systems. It is effective in escort into and out of target areas, close-in support jamming, or loiter to protect aircraft over both hostile and friendly territory.

The new system is controlled by a single electronic warfare officer who controls both active and passive equipment through an on-board computer. Previous systems required several operators. The aircraft carrying the jamming system contains high-power jamming transmitters and powerful receiving antennas. A 16-foot-long, canoe-shaped radome extends along the underside of the fuselage.

— Military Electronics



INTELLIGENCEWATCH



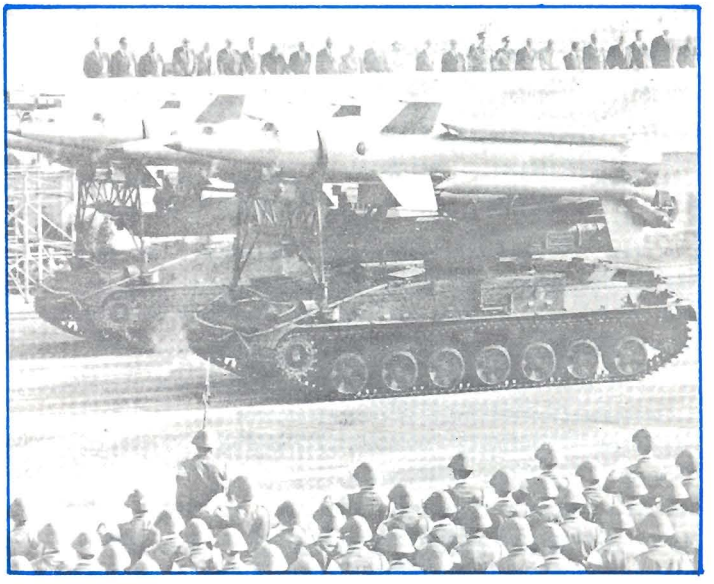
SWEDISH SAM SYSTEM

The first SAM system with optical aim and laser control, the RBS-70, was recently introduced in Sweden. The system can be carried in three parts, missile with storage/launch container, gyro-controlled aiming device, and mounting stand with seat. It is operated by one person and can be deployed in less than 30 seconds. IFF can be incorporated. The system has good tactical mobility and long range [approximately 5 km] as well as high kill probability. Missile length is 1.3 m and weight is 15 kg [21.5 kg with the 1.58-m long and 15-cm diameter launch tube]. The RBS-70 is to eventually replace the US Redeye and the 20-mm and 40-mm AA guns. —SOLDAT und Technik

Editor's note: For information on other aspects of the RBS-70, see "Man-Portable Air Defense Systems" in the Oct-Dec 77 issue of AIR DEFENSE.

SA-4 GANEF

The SAM system [SA-4] GANEF [below] was shown in October 1977 as part of an elaborate military parade of the NVA in East Berlin. The weapon system GANEF was first seen in public in May 1964. In the past few years, the system has been incorporated in the armies of the German Democratic Republic [GDR] and Czechoslovakia. The weapon system also consists of the target acquisition radar [LONG TRACK] and fire control radar [PAT HAND] on the same tracked vehicle as the launcher. The missile is launched by four jettisonable booster rockets, which are attached to the outer missile body. Air intakes for the missile's pulse jet engine are located around the warhead section. —SOLDAT und Technik



BRAZILIAN TANKS

Brazil has made considerable progress in the production of armored vehicles. Recently, they have produced in quantity the EE-9 Cascavel armored car and the EE-11 Urutu wheeled armored personnel carrier. A third and more powerful vehicle, the EE-17 Sucuri tank destroyer, equipped with a 105-mm gun, is in the prototype stage.

The Cascavel has a two-man turret mounting a 90-mm smooth-bore gun and a 7.63-mm machinegun. Complete with crew, the vehicle weighs over 10 tons.

The standard version of the EE-11 Urutu has a 12.7-mm machinegun and can carry 15 men. Its overall weight is 11 tons and it can accomplish speeds up to 60 mph. Unlike the Cascavel, the Urutu is amphibious.

The Sucuri EE-17 is an 18-ton, six-wheeler with a crew of three to four men and mounts a 105-mm gun.

EE-9 CASCEVEL

EE-11 URUTU

EE-17 SUCURI

SOVIET CHEMICAL WARFARE

Within the military structure of the Soviet Union, training to fight under chemical attack is not only standard procedure but is highly emphasized in all individual and unit tactical training. Individual soldiers are well-protected with personal masks, protective clothing, and chemical detectors, and they are taught to use effective antidotes. According to Voyenny Vestnik it is Soviet doctrine that all troops don full protective gear whenever there is incoming artillery fire. Chemical defense units are organic to nearly all levels of command. Russia also has an active program to train the civilian population.

The Soviet division has organic decontamination companies that can quickly decontaminate and return to combat an entire battalion of tanks or motorized rifle troops. Special equipment such as the TMS-65 turbojet spraying vehicle is used.

It is known that during World War II Russia had artillery, mortars, and minefield delivery systems for chemical agents, as well as air-delivered bombs and sprays. Some Soviet chemical agents are reported to include mustard gas, phosgene, nerve gas, and other World War II agents. Of concern are hydrogen cyanide [HCN], somon, and what the Soviets label VR-55. Any of these agents can be fatal to unprotected individuals. Hydrogen cyanide is a nonpersistent blood agent that is a hazard only in high concentrations. Nerve agents, such as somon, are much more persistent and fatal in much lower concentrations.

NATO chemical weapons will not be used unless general release authority has been granted and this would be only in response to an enemy's use of such chemical warfare. In contrast to this policy, and according to Oleg Penkovsky in the Penkovsky Papers—

"Soviet artillery units are regularly equipped with chemical warfare shells. They are at the gun sites, and our artillery is routinely trained in their use. And let there be no doubt: if hostilities should erupt, the Soviet army would use chemical weapons against its opponents. The political decision has been made, and our strategic military planners have developed a doctrine that permits the commander in the field to decide whether to use chemical weapons, and when and where."

ORGANIC SOVIET GROUND FORCE WEAPONS WITH *[1] CW CAPABILITIES

UNIT	122mm	130mm	152mm	BM-21	FROG	SCUD
MR Rgt	6	—	—	—	—	—
TK Rgt	—	—	—	—	—	—
MR Div	36	—	18	18	4	—
TK Div	60	—	—	18	4	—
ARMY	—	36	18	—	—	3

*This table counts only those weapons identified by Professor Erickson. There may be others which he does not mention.

Arnhem 1944, *by Janusz Piekalkiewicz, Charles Scribner's Sons, New York, 1978. 112 pages, $12.95*

Reviewed by
Brigadier General Jack A. Rogers, USA [Ret]

A large, ambitious military operation that misfires always raises questions. Operation Market Garden, the Allies' airborne assault into Holland in the early fall of 1944, poses its share, among them: Should it have been mounted at all? Was it, as Cornelius Ryan suggests in his A Bridge Too Far, too ambitious? Was intelligence ignored, forced to play handmaiden to policy? And, most tantalizing of all, had it succeeded would it, as claimed, have shortened the war in Europe by 6 months?

ARNHEM 1944 is more a succinct presentation of events than an analysis, but it does provide the facts upon which to base informed conclusions. Mr. Piekalkiewicz concentrates on the British 1st Airborne Division's struggle to seize the highway bridge over the lower Rhine at Arnhem and to hold it until armored forces driving north from the Belgian-Dutch border could link up. Devoting a chapter to each of the battle's 10 days, he uses an unusual but interesting technique. The Allied Command's view of events is presented in the words of its communique of the day, followed by the German High Command's version. A spare, almost barebones account of the day's fighting then concludes the chapters. The effect might have been that of a military study, had not the author wisely spiced his text with personal touches from survivors' accounts and illustrated it liberally. The nearly 250 photographs are excellent. Of fine quality and skillfully chosen, they present both faces of war: the fair and the grim. In the first hours after the landing, there are smiling British faces, lunch al fresco on the hood of a jeep, grateful Dutch offering food and drink, and marches down peaceful, tree-shaded roads. These give way to grimy soldiers in action, prisoners of war, casualties, and the debris of battle; and finally to survivors grinning in relief through their exhaustion. It is not surprising in a work published originally in German to find very good coverage of German forces; in fact, the bulk of the photographs in the book are from the Bundesarchiv. And the battle is reflected in German faces precisely as it is in British.

Technically, the book has but two faults. First there are too many typographical errors for a work of such otherwise good quality. Second—and this plaint is so common to reviewers of military books that it should be kept permanently set in type—the maps are not entirely adequate.

The outcome of Market Garden is well known. The 1st Airborne Division dropped, not into the midst of rag-tag German forces, but onto a Panzer Corps whose divisions, although battered, were still full of fight. The 1st Airborne got only one battalion onto the north end of the bridge, which was its objective. The remainder of the Division was penned into a perimeter west of town, and both forces were overwhelmed when the relieving armor was delayed, linking up only in time to withdraw the Division's remnants.

The author holds that "the Allied Airborne Army—a modern winged cavalry intended for employment only in decisive battles or for special tasks—was nonchalantly sacrificed" to the "insatiable ambitions of individual Allied military commanders." This judgement is hard to swallow. In the late summer of 1944, the German Army in France and Belgium was in shreds, its fragments streaming back toward the Reich in a near route. And this did generate in the pursuing Allied armies a euphoria hard to communicate to those who did not experience it. Almost certainly, senior commanders shared this feeling, but it is doubtful that it was the basis for Market Garden. They were surely moved, not by "nonchalance" but by a sound desire to reestablish the offensive pressure lost in late September when logistics virtually halted the Allies. Further, Market Garden was not "insatiably" ambitious. It was intended to be decisive, and to be decisive the objective had to be a bridgehead over the Rhine. That breaching the Rhine would prove fatal to Germany was demonstrated almost precisely 6 months later by the Remagen and Wesel crossings. Mr. Piekalkie-

wicz himself underscores this when he notes that holding the Rhine at Arnhem "brought the Germans their last victory of the war."

There were Allied errors, and serious ones. Reports of Panzer forces in the drop area should have been rigorously followed up; enemy armor could be a nightmare to lightly-armed WW II airborne troops. To so neglect or mismanage communications that the 1st Airborne was not only effectively isolated from its parent command in Britain and the relieving force, but also virtually denied close air support was close to criminal. Most damaging, however, was a failure to appreciate the recuperative power of the German Army. Its commanders, led by the freshly recalled von Runstedt, had made the most of the lull granted them. With energy and skill they had welded fragments together, equipped and manned the resulting forces as best they could, and turned them around to fight again and to fight well.

Perhaps the lesson of Arnhem is this: with discipline and motivation, skilled and energetic leaders, and a little time to breathe, an apparently beaten force is capable of surprises—from the enemy to you, or you to him.

Brigadier General Rogers is a former Assistant Commandant of the US Army Air Defense School and as such was the primary influence behind establishing Air Defense Trends, the forerunner of AIR DEFENSE Magazine. Since his retirement, General Rogers has remained active in air defense and other military affairs.

THE RISE OF THE LUFTWAFFE 1918-1940, *by Herbert Molloy Mason, Jr., The Dial Press, New York, 402 pages.*

Reviewed by LTC Joseph P. Frankoski

The author traces the growth of the Luftwaffe from its secret birth just after WWI to its combat experiences in early WWII. The Treaty of Versailles prohibited an air arm for Germany. The Allied Control Commission was to ensure this prohibition was to be followed. What occurred was a series of covert operations to disguise the formation of the German Air Force. General Von Seeckt, Chief of the Reichswehr [National Army], had aviators assigned to the Truppenamt [Troop Office] and almost 200 placed in the military districts. These aviators had the job of making the army commanders "think air." In field exercises the commanders "imagined" German aircraft supporting them—a novel way of practicing air-ground operations.

In April 1922, Germany and the USSR signed the Treaty of Rapallo, which reestablished commercial and diplomatic ties. Clandestine military exchanges took place culminating in the establishment of a German flying school at Lipetsk in the Soviet Union. In Germany, private flying clubs were the recipient of funds delivered by the Truppenamt aviation officers. These officers took great interest in civilian plane designs that might have military applications. Despite political and social unrest within Germany, the Reichswehr remained politically uninvolved and, in reality, a state within a state.

On 1 January 1924, Sportflying, Ltd, was founded and soon included a number of flight training centers or schools. Over $1 million was funneled to these schools secretly by the Reichswehr. May 21st, 1926 marked the Paris Air Agreement, which removed the last of the technical limitations that had been placed on German civil air industry. That same year saw independent air operators merged into Deustche Lufthansa, a state monopoly. This merger gave the Reichswehr its bomber training command.

Training at Lipetsk in the latter part of the decade emphasized air-ground cooperation. Fighter aircraft returned to Germany from Russia were disguised as tow planes pulling beer advertisements.

With Hitler's rise to power, Herman Goering was appointed Reich Air Commissioner. Colonel Walther Wever became Chief of the Air Command Office. The author credits Wever with developing a concept of strategic air war. This concept was concerned with the destruction of the enemy's Air Force, Army, Navy and armament industries. Wever, interestingly, was an infantry officer. Killed in an air accident in 1936, he was replaced by General Albert Kesselring.

Germany withdrew from the League of Nations in 1934. Two years later Hitler established the Luftwaffe as a separate service.

German air played an important role in the Spanish Civil War. Not only did German aircraft ferry Franco's troops from Africa over the heads of the Republican fleet, but the Condor Legion had a combat mission.

Flak units, including 20-mm and 88-mm, were part of the Condor Legion and protected airfields. The Germans used terror bombing of populated areas as well as carpet bombing.

In 1938 Hitler directed Goering to increase the strength of the Luftwaffe. It was determined about 20,000 aircraft were needed. Having taken away the antiaircraft arm from the Army the Luftwaffe, decided 2,500 88-mm guns and 3,000 37-mm and 20-mm cannon were needed.

During the war with Poland, the Luftwaffe lost 285 aircraft, mostly due to ground fire. However, it paved the way for German ground forces by close air support and destroyed the capital city of Warsaw. The Luftwaffe played a critical role in the invasions of Denmark and Norway by ferrying in ground troops and

dropping paratroopers onto their objective areas. In France, the German air units again provided close air support for the advancing divisions. The crossing of the Meuse River was greatly assisted by the dive bombing Stukas that quickly neutralized antiaircraft fire. However, the Luftwaffe failed to prevent the evacuation at Dunkirk, despite Goering's contention that his air arm could do the job alone.

The Battle of Britain marked the first major defeat for the Luftwaffe. With just over 800 operational medium bombers, German air was unable to eliminate British industry. As Germany entered the war against the USSR, it still lacked the strategic bombers that Wever had foreseen as a requirement for strategic victory.

Mason has written a very readable book and admirably sketches the rise of the Luftwaffe from a covert, secret arm to the polished, effective force that made the Blitzkrieg possible.

Lieutenant Colonel Frankoski, Infantry, holds a Masters Degree in History from Old Domain University. Currently, Deputy Chief of Public Affairs, Japan, he has served previously in Germany and Vietnam. His article, "The Silent Bombers," was published in the April-June 1976 issue of AIR DEFENSE Magazine.

F4U CORSAIR AT WAR, *by Richard Abrams, Charles Scribner's Sons, New York, 1978. 160 pages, Illustrated, $12.50.*

Reviewed by
Major Richard J. Armour

The Corsair was the result of a design contest conducted by the Navy in 1938 to develop a high-speed, single-seat fighter for use on aircraft carriers. After 4 years of flight testing and modification, the first production F4U Corsiar was delivered to the Navy on 31 July 1942. Although designed as a carrier aircraft, initial problems encountered by the F4U when landing on the deck of an aircraft carrier caused the Navy to relegate the Corsair to land-based use with the Marine Corps.

The first Marine unit to get the new Corsairs was Marine Fighter Squadron 124 [VMF-124] formed in California in September 1942. Beginning in February 1943, the F4U Corsairs of VMF-124 went into action in the Pacific. It did not take long for the Corsair to prove itself in combat as a very effective fighter that was also able to take a great deal of punishment and keep on flying.

One of the most famous squadrons to fly the F4U Corsair was Marine Fighter Squadron 214 commanded by Colonel [then Major] Gregory "Pappy" Boyington. The story of the Black Sheep, as the squadron called itself, is vividly told by the men who took part in the action. These accounts portray the thoughts, anxieties, and even the monotony of men in day-to-day combat operations. The Black Sheep became one of the most successful fighter squadrons of World War II.

The author, currently Manager of Flight Test Mission Planning and Chief Test Engineer at Rockwell International's B-1 Division test facility at Edwards AFB, California, tells his story of the Corsair not only through an excellent narrative but also through the words of the men who flew these aircraft. In addition, he has included verbatim excerpts from official US Navy air operations memoranda prepared during World War II by the Air Force Commander of the Pacific Fleet. Through the inclusion of these memoranda and first person accounts, the author provides a living history of the Corsair.

As with all aircraft and weapon systems, modifications and improvements were virtually continuous for the F4U. However, even with these modifications, the Navy did not really accept the Corsair for use as a carrier aircraft until the end of 1944. At that time, primarily due to the Japanese Kamikaze threat, the decision was made to increase the number of fighter aircraft aboard the carriers. To do so, the Navy called upon the Marine Corsair squadrons to augment the Navy squadrons already on the carriers. Even though initial difficulties were encountered both with the lack of carrier training of the Marine pilots and with the characteristics and performance of the aircraft itself on carriers, the Corsair proved itself to be an effective carrier-based fighter well able to pull its share of the load.

Use of the Corsair was not limited to US forces during World War II. In his book the author describes the Corsair's role and performance with both the British Royal Navy and the Royal New Zealand Air Force. Corsairs served with these forces from 1943 until well after the end of World War II. In addition, Corsairs served with the French Navy beginning in 1952 and were used in a variety of roles, including defense of the Suez Canal during the 1956 Arab-Israeli war. French Corsairs were also used during the Indo China war.

A major modification to the Corsair was the conversion in 1942 and 1943 of some of the aircraft into night fighters. The major change was the installation of radar equipment on the starboard wing, along with a radar scope in the cockpit. Additional modifications enabled the Corsair to eventually be used also for night bombing missions. For various reasons, described in the book, initial success with night fighter operations was limited. However, after improvements in the ground control intercept system, changes in night

fighter tactics, together with improved pilot experience, the kill rate increased and night fighter operations proved successful.

During the last year of World War II, Corsairs were proving themselves to be the finest naval fighters of the war. They participated in raids on Tokyo and in the major landings and battles in the Pacific, including Iwo Jima, Okinawa, and the Phillipines. As the war neared its end, the Corsairs built up a very impressive combat record, which included the destruction of 2,140 enemy aircraft in air combat.

After World War II, the Corsair remained on active duty with both the Navy and Marine Corps. Improvement continued, with the resulting development and production of an improved night fighter and a new photo-reconnaissance version.

Both of these aircraft, along with other versions of the Corsair, saw service in the Korean War. Corsairs were used successfully in many roles during the Korean conflict including close air support, interdiction, night intruder missions, and attacks on enemy airfields. Also, as recounted in the book, the Korean War saw the first time that a Russian Mig-15 was shot down by a propeller-driven fighter. The Navy and Marine Corps used the Corsair to conduct air strikes against enemy targets right up to the last day of the Korean War.

For those interested in aviation history, this book is exciting and informative reading. Through the extensive use of photographs, personal accounts of the men who flew the Corsairs, and historical air operations memoranda, the author has created an exciting and colorful account of one of the greatest fighter planes in American military history.

Major Armour is a graduate of New York University. He has served as a Battery Commander, S2, Assistant S3, and Chief of the Operations and Training Division and the Command Operations Center, 32d AADCOM. He is currently a Project Officer with the Directorate of Training, Resident Training Management Division, US Army Air Defense School, Fort Bliss, Texas.

Encyclopedia of Aviation. *Reference International, Charles Scribner's Sons, New York, 1977. 218 pages, $14.95.*

The book contains over 700 concise, factual entries written by leading aviation writers and is liberally illustrated with more than 250 photographs and drawings. It brings together every important aspect of the subject: airplane types, manufacturers, instruments, navigation, aeronautical design, civil aviation, airlines, military aviation, combat aces, pioneer pilots, famous designers, technical concepts and terms, and significant events in the development of aviation.

The Encyclopedia of Aviation has all the details about performance, models, and design features that the aviation amateur and the specialist will want to know. The weapon systems and air battles of military flying are here, along with aviation records, racing pilots, epoch-making flights, and famous individual aircraft. In major articles on fundamental subjects such as aerodynamics, jet engines, navigation, radar, radio, sailplanes, supersonic flight, and wings the encyclopedia provides the necessary background for any nonspecialist who wants to know what the technical side of aviation is all about. The material is arranged alphabetically with extensive cross-references, and there is a comprehensive index.

The short but remarkable history of aviation has generated scores of books about specific aspects of aviation, and the popularity of these books testifies not only to the sustained interest in the field, but equally well to the need for a true Encyclopedia of Aviation.

BROTHERS IN BLOOD: THE INTERNATIONAL TERRORIST NETWORK, *by Ovid Demaris, Charles Scribner's Sons, New York, 1977. 425 pages, $12.95.*

In this book, Demaris has authored a well-written, thoroughly researched study on terrorism in our time. We get a close-up of the Black September terrorist group and its responsibility for the Olympic massacre of 1972. Demaris ties this group in with the Russian KGB, the Soviet Chief Intelligence Agency.

The author does not isolate the work of terrorists to any one geographic location, but explains that it is a worldwide movement with political backing and financing. He tells of the seige of the Hague, the bombing of Le Drugstore in Paris, and numerous examples of international hijackings and kidnappings. Demaris names sympathetic European diplomats who provided safe passage for traveling terrorists, as well as key figures within the terrorist network.

The dramatic tale of the kidnapped OPEC oil ministers in Vienna led by Carlos, the glamorous playboy, is revealed. He vividly describes the terrorist activities of Fusaka Sheyenobu [the queen of the Japanese United Red Army] and the mild-mannered Ruaui O. Bradaigh [a school teacher who became Chief of Staff of the IRA] and his part in the terrorist network. The part Yasir Arafat plays as a terrorist playmaker is described, along with the explosive situations in the Middle East and in Ireland.

Ovid Demaris warns that modern terrorists are not beyond gaining accessibility to nuclear weapons, with the threat to detonate an atom bomb as part of their ultimate world blackmail.