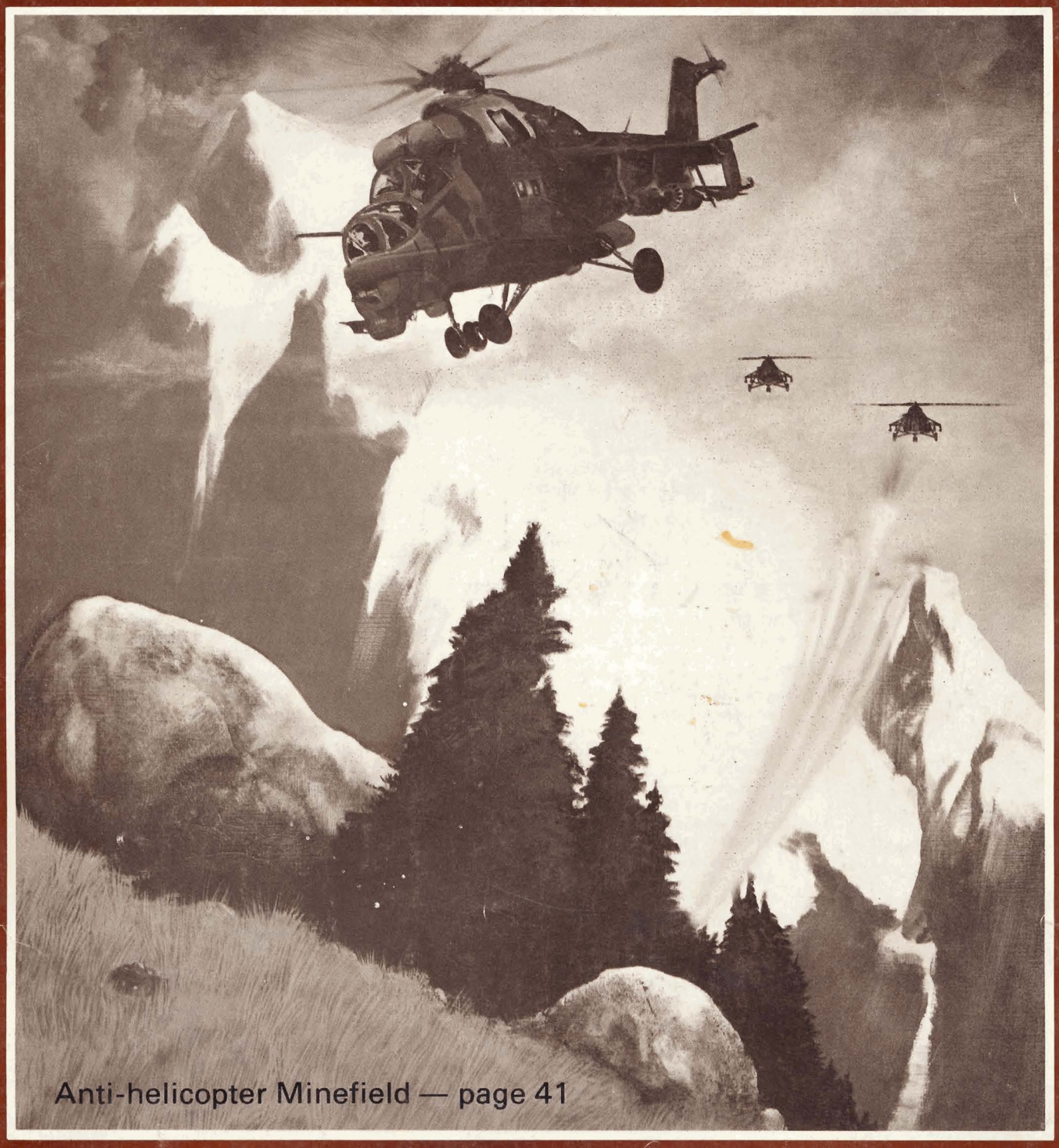
AIR DEFENSE MAGAZINE

OCTOBER-DECEMBER



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Use of funds for printing of this publication was approved by Headquarters, Department of the Army, 25 April 1980, in accordance with AR 310-1.

SUBSCRIPTIONS: Subscriptions may be obtained through the Custodian, U.S. Army AIR DEFENSE Magazine Fund, USAADS, ATTN: ATSA-TDL-S, Fort Bliss, Texas 79916. **Domestic:** $13.00 one year, $25.00 two years. **Foreign:** $14.00 one year, $27.00 two years. **Single Copy:** $3.50. Make checks payable to: **TREASURY OF THE UNITED STATES.**

CORRESPONDENCE: Address articles and letters to: The Editor, AIR DEFENSE Magazine, USAADS, ATTN: ATSA-TLD-S, Fort Bliss, Texas 79916. Telephone 915-568-5603 (AUTOVON 978-5603).

POSTMASTER: Controlled Circulation postage paid at El Paso, Texas 79916, Department of the Army (DOD 314) AIR DEFENSE Magazine (USPS 307-010). **This publication contains no advertising.**

About the Cover

Texas Instruments artist Chris Gilbert's cover design depicts a Hind-D helicopter about to trigger an anti-helicopter mine and set off a detonation similar to the ones shown destroying Threat helicopters in the background. The anti-helicopter minefield is a new industry concept not yet adopted by the Army.

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New Column Makes Debut

"On Track," a new column by CSM Frederick T. Stafford Jr. makes its debut on page 3 in this issue of AIR DEFENSE Magazine. Stafford, originally from Savannah, Ga., became the U.S. Army Air Defense Center and Fort Bliss sergeant major, Mar. 1, 1979, after having served as CSM of the Army Air Defense School for one year. His column will address current topical issues of particular interest to air defense enlisted personnel and senior NCOs.

Stafford is a graduate of the Artillery Mechanics School, Skysweeper and Nike Hercules Maintenance Courses, OCS Leadership Course, Sixth Army NCO Academy, Senior NCO Advanced Leadership Course, CBR School and Human Factor Characteristics Research and Development Course.

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INTERCEPT POINT

Among Rudyard Kipling's *Barrack-Room Ballads* is a poem titled "The Young British Soldier" which sums up the plight of recruits newly assigned to a regiment of British infantry.

When the half-made recruit goes out to the East
He acts like a babe and drinks like a beast
And he wonders because he is frequently deceased
Ere he's fit to serve as a soldier.

The life of a replacement has never been easy. In combat, it's often been short. Veterans of every war have treated replacements with a mixture of pity, disdain, contempt and sometimes out-right callousness.

Novelist James Jones, in his remembrance of the global struggle titled *World War II,* recorded the following conversation with an American sergeant at Anzio:

One day we got eight new replacements into my platoon. We were supposed to make a little feeling attack that same day. Well, by next day, all eight of the replacements were dead. But none of us old guys were. We weren't going to send our own guys out on point in a damnfool situation like that. We knew nothing would happen. We were sewed up tight. And we had been together through Africa, and Sicily and Salerno. We sent the replacements out ahead.

Commanders sent replacements into battle with reluctance and agonized over their brutal casualty rate. As a result, the Army today invests as heavily in training as it does in the acquisition of new weaponry, and training programs of unprecedented sophistication have evolved. The entry-level soldiers produced today by TRADOC training centers are the best-trained replacements the Army has ever known, but sometimes they still meet unrealistic expectations.

Major General James P. Maloney

Analysis of feedback solicited by the U.S. Army Air Defense School (USAADS), Fort Bliss, Texas, from unit-level trainers and training managers reveals that approximately half expect to receive an entry-level soldier who possesses a higher level of training than service schools are designed to provide. They expect the skill of a journeyman crewmember or maintenance man when, in fact, USAADS trains to the apprentice level.

Clearly, many trainers and training managers are laboring under a misconception. The entry-level soldier will not be proficient in all tasks. He or she cannot be expected to step in and take the place of a recently departed, highly skilled crewmember or maintenance man. He or she still has a lot in common with Kipling's "half-made recruit." The apprentice soldier still has a lot to learn.

The expectation that rookies should perform like veterans is as unrealistic today as ever. It is the responsibility of commanders and subordinate trainers to develop the apprentice soldier into a fully trained soldier, but it is a responsibility that seems to be often ignored.

The usual excuse is that units have no time for individual training. There is an obvious fallacy in the notion we have time to train battalions but not soldiers. Individual training is the foundation of unit effectiveness. When COL Merritt (Red Mike) Edson was asked what lesson Guadalcanal taught him, he answered: "If I had to train my regiment over again, I would stress small group training and the training of the individual even more than we did. . . . In your training put time and emphasis on the squad and platoon rather than on the company, battalion and regiment."

Units which neglect individual training sometimes have a way of looking good during exercises, but these units are deficient and you can bet the soldiers in the units know it, for it is individual training that gives the soldier his confidence and his self-esteem.

Recent polls reveal that most soldiers leave training centers with high morale and a good impression of the Army only to have their attitudes reversed within a few weeks of joining a unit. The implication is that we have learned how to train brigades and battalions, but have forgotten how to train soldiers. Fortunately, we have the opportunity to correct this deficiency in peacetime rather than wartime.

At USAADS, we are adding blocks to our programs of instruction designed to alter the perception of the entry-level soldier by teaching commanders what they can realistically expect from the entry-level soldier. Commanders, in turn, must remember that the number-one business of a peacetime Army is training and that their most important job is transforming "half-made recruits" into soldiers "fit to serve as soldiers."

ON TRACK

1982 will be remembered by many as a year of significant changes in the military, particularly with regard to the manning of our forces. Due to a variety of reasons, some of which no doubt were related to economic factors, the Army experienced a sharp increase in both enlistments and reenlistments. By spring, the handwriting was already on the wall. Unlike past years when quotas often had to be met through extra efforts on the part of recruiters and commanders who were responsible for enlistments and reenlistments, the Army had a different kind of problem. Preliminary data gathered last March indicated that the Army would exceed end-strength if enlistments and reenlistments continued at the pace set during the first five months of the fiscal year. In other words, to remain within end-strength figures for fiscal year 1982, the Army would have to make drastic changes.

The solution seemed simple enough. The Recruiting Command would be required to slow down enlistments, and the number of reenlistments in the active Army would have to be curtailed. To accomplish this goal and still meet end-strength requirements, the Army modified its reenlistment policies and began to take a closer look at the quality of soldiers reenlisting.

Prior to force competency, a program to insure the quality of soldiers in the Army, a soldier who required a waiver of reenlistment criteria was normally granted approval if his commander thought he could meet the standard of a professional soldier. Now, however, only quality soldiers are being allowed to reenlist. Waivers are no longer being approved on a wholesale basis and commanders are using the bar to reenlistment to identify those soldiers who don't measure up.

What does all this mean to the average, hard-working soldier and the career NCO? Simply stated, good soldiers will be afforded the privilege of reenlisting. Marginal or bad soldiers will be identified, barred and eliminated wherever possible. Those soldiers who demonstrate potential for future service through their performance and conduct have nothing to fear. Those who are unwilling or unable to meet the standards can start packing their bags.

CSM Frederick T. Stafford Jr.

During the American Revolutionary War, Thomas Paine condemned "the summer soldier and the sunshine patriot" as one who shrinks from his duty when the going gets tough. Times have changed, but what Paine wrote then still holds true today. Today's Army is no place for the sunshine patriot, the soldier who is only putting in his time until retirement. Today we are looking for a professional, all-round, capable, ready-for-war soldier who is prepared to fight and win. We are looking for the ultimate deterrent, the disciplined soldier, the soldier who knows what it's like to succeed. In brief, we are looking for winners.

It's long been recognized that the Army is a melting pot made up of people from many different walks of life who join for as many different reasons. Some are looking for adventure. Some enlist to discover whether or not the military is for them, while others join with the intention of making the Army their home. Whatever the cause, enlisted personnel should be made aware of one salient fact that is preeminent among all others. The primary function of today's Army is to prepare for war. Its purpose is two-fold: to deter aggression and to deploy and win. To that end we must cultivate quality soldiers and, as it's written in the parable, separate the wheat from the chaff. Those who are lagging behind, beware. The military is not a playground or country club for the summer soldier.

When people ask me what makes a good soldier, I point to a poster in my office that outlines five qualities that, in my opinion, sum it up in a nutshell. Adopt these maxims and you'll be well on your way to being all you can be in today's Army.

- ☐ Get Tough.
- ☐ Be Positive.
- ☐ Exercise Military Discipline.
- ☐ Demonstrate Professional Courage.
- ☐ Be Physically Fit.

Quality soldiers are easily identified. They're the ones who pass their PT tests and SQTs. They do their jobs to the best of their ability and demonstrate potential for the future. They are model soldiers in their units and exemplary citizens in the civilian community. They are the first soldiers who come to mind when promotion, schooling or leadership positions open up. They are an asset to their organizations and contribute to the overall accomplishment of their mission. They are the squad leaders, platoon sergeants and sergeants major of the future.

They are the cutting edge of the Army.

ENGAGEMENT ZONE

letters to the editor

Commandant
U.S. Army Air Defense School
Fort Bliss, TX 79916

Dear Sir:

I wish to take the pleasure of forwarding to you some pictures which I took recently. Enclosed are pictures taken at the site of Headquarters, 2nd Battalion, 71st Air Defense Artillery, which was recently deactivated and its mission and equipment turned over to the Republic of Korea (ROK) Air Defense Artillery.

The significance of the pictures is the label placed on the unit designation sign-board saying "SOLD." The person shown in the picture pointing to the label is myself.

Since the site of the battalion headquarters is colocated in Camp Red Cloud where the Combined Field Army (ROK/U.S.) headquarters is housed, it is not unusual that I walk through the area. Recently, I noticed the sign, and it was so impressive and appealing that I decided to take some pictures of it. I can think of no other word that describes the situation better than the word "SOLD" as opposed to such common words and phrases as DEACTIVATED, TRANSFERRED or TURNED OVER TO A ROK UNIT. Even Shakespeare could not have come out with a better word than this. In addition, I admire the sense of humor implied in the selection of the word.

The battalion was "sold," though its true value is priceless, to the 188th Republic of Korea Air Defense Battalion, and the "transaction" took place on 25 June 1982, a date never to be forgotten by Korean people, for it is the day when the Korean War broke out 31 years ago. The name of the battalion will be long remembered by all of us as we remember the day — the 25th of June. The contribution by the battalion to the defense of the Republic of Korea has been truly invaluable.

I also wish to take this opportunity to pay my special tribute to LTC Frederick P. Weichel, who commanded the battalion until its deactivation, for his extraordinary contribution to the successful accomplishment of the transfer of the unit to the Republic of Korea Air Defense Artillery.

I salute you and all of your Air Defense Artillerymen. It is hoped that the enclosed pictures find some services to the memorabilia of your school.

Wishing you and your school continued success and prosperity.

Sincerely,

LEE MIN YOUNG
Major General, ROKA
Deputy Commanding General

Major General Lee Min Young
Deputy Commanding General
Combined Field Army (ROK/U.S.)
APO San Francisco 96358

Dear General Young:

It was an extreme pleasure for me to receive your very thoughtful letter with the pictures depicting the transfer of the 2nd Battalion, 71st Air Defense Artillery, to the Republic of Korea.

There is no doubt that the 188th Republic of Korea Air Defense Battalion will continue the proud tradition we Air Defenders enjoy. I was delighted to read your description of "sold." Its connotation implies the continuation of the vital mission, never lost, degraded or compromised, but exchanged between friends.

Your letter and pictures will be placed in our museum where all will be able to enjoy that auspicious moment in our histories.

Thank you very much for your thoughtfulness.

Sincerely,

JAMES P. MALONEY
Major General, USA
Commanding

(Originally published in Army Logistician.)

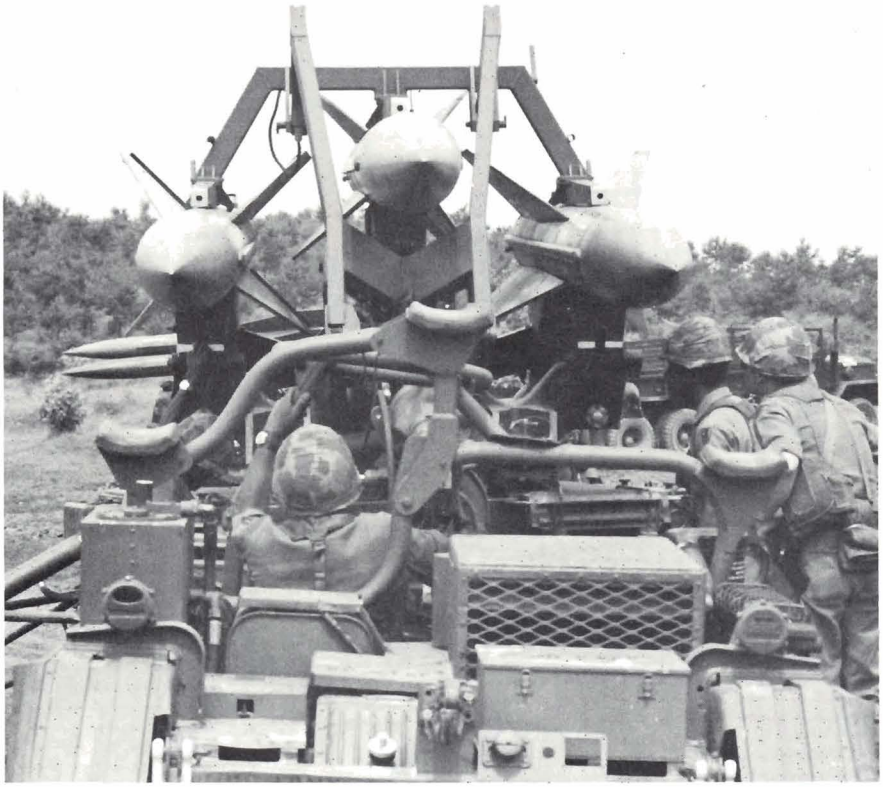
FROM '1' TO '10' IN READINESS

by Colonel John S. Drosdeck Jr. and Ronald W. Harlow

Improved supply and maintenance procedures insure Hawk air defense missile system readiness in Europe.

In 1977 one of the first lines of defense against potential air aggression from the east — the Hawk air defense missile system in Europe — was at its lowest state of readiness in 20 years. On a scale of 1 to 10, the system then rated a mere "1." This vulnerability was caused by a shortage of basic Hawk repair parts.

The problem of insufficient repair parts is not new to Army logisticians or to Army troops in the field, but the way the problem was solved by the Hawk team at the U.S. Army Missile Command (MICOM), Redstone Arsenal, Ala., is new. The team developed a system of controlled supply and maintenance procedures to reduce the number of days that field-damaged, reparable items are in the supply pipeline and to stop the ordering of costly next-higher assemblies when a lower-order part is actually needed.



A tracked loader resupplies the Hawk launcher with missiles.

By 1977 many repair parts for Hawk missile units were not available because of years of short funding. Tight money hampered not only the requisitioning of new repair parts but also the rebuilding or overhauling of reparables returned from the field. In the field, failure of a component part would result in a recurring demand for that part. A replacement would be requisitioned, but many requisitions could not be filled. The problem was compounded by the fact that many units were reluctant to turn in reparables because they knew the parts could be cannibalized to meet future needs.

When a unit did not receive the requisitioned part, it had the authority under normal supply procedures to order the next-higher assembly to maintain system readiness. Eventually there was a shortage of next-higher assemblies since more were being ordered than had been expected. Moreover, these next-higher assemblies often were high-dollar items. As a result, there were large unfunded supply requirements.

To bring the supply system under control, a team of Hawk management specialists was formed to develop and implement an intensive management program, the Hawk Intensified Management System Europe (HIMSEUR) program. The first task of the HIMSEUR program was to isolate the repair parts that were in short supply. Data were collected on those parts responsible for the longest downtimes. Based on logistics downtime statistics, a concept of "top attention items" emerged. Each item was studied to discover a general trend. It was noted that the "top attention items" were for the most part being driven by relatively few repair parts, most of these being printed circuit boards.

The team found that a direct exchange program was needed to supply large volumes of high-demand circuit boards and compo-

nents. To alleviate the problem of runaway demands, a closed-loop supply system was established. This meant that both the retail and wholesale supply systems would agree to a specific stockage level. Initially, the wholesale system would stock the pipeline with the agreed-to stockage. From that time on, no demands would be honored except for specific exceptions or washouts.

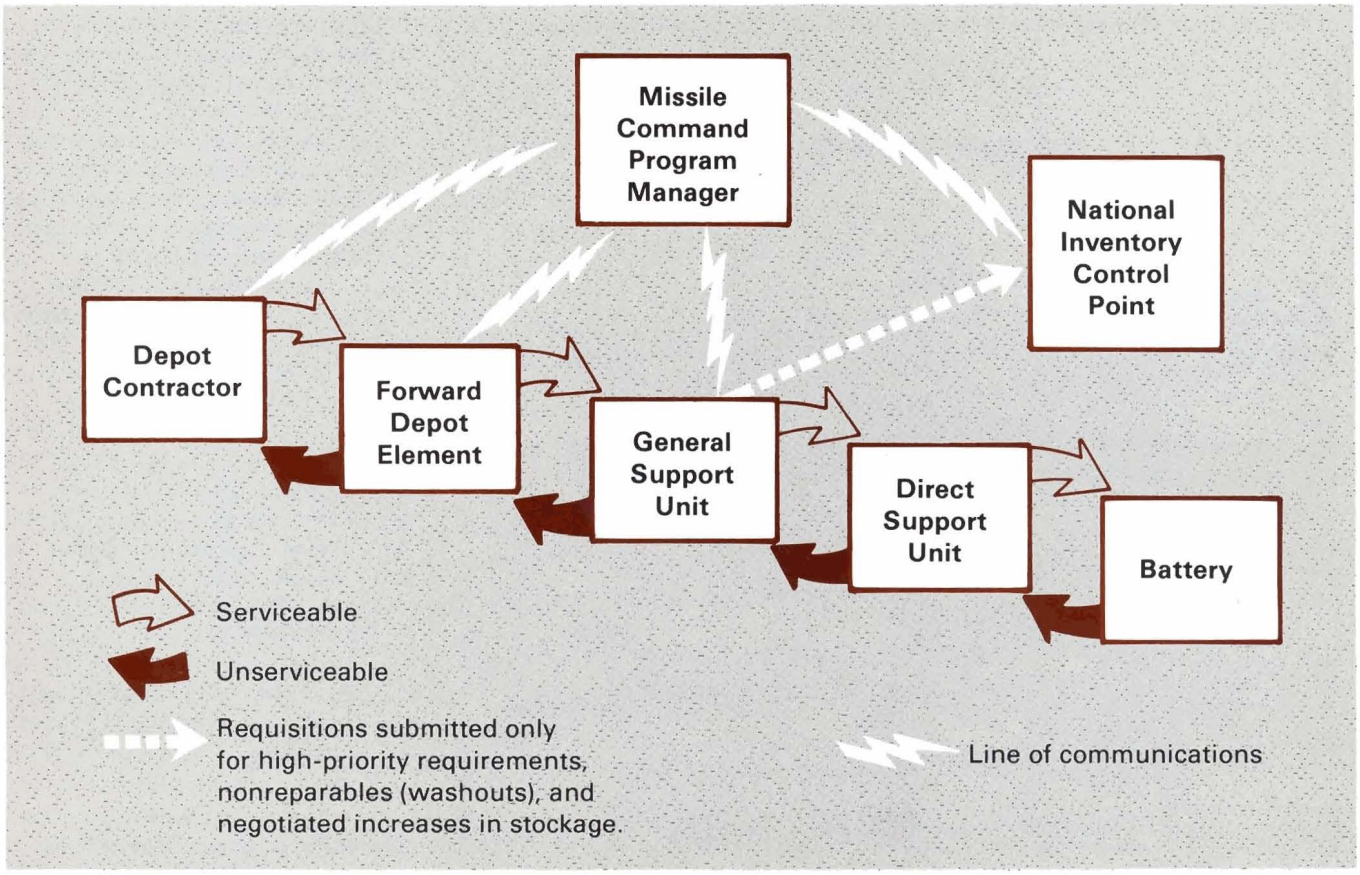
The supply level could not be changed every 30 days by the user, as had been the case under the customary supply system. Under the new system, the supply level could be changed only by semiannual renegotiation conferences with HIMSEUR program managers. If the user wanted a part, he had to surrender an unserviceable one — that is, there had to be a direct exchange of a serviceable part for an unserviceable one. This helped stop the snowballing of demands for repair parts.

Next, the HIMSEUR team addressed the problem of excessive time for reparables in the pipeline. The normal supply pipeline in Europe routes reparables that cannot be repaired at the user level to the appropriate direct support unit. If the direct support unit doesn't have facilities to repair the item, it is sent to the appropriate general support unit. If it likewise cannot be repaired at the general support unit, it is sent to a logistics consolidation point for reparables.

The problem of delay begins at the consolidation point when items in critical supply are shelved alongside items not in critical supply to await shipment to a national inventory control point in CONUS. There is additional delay once items reach the national inventory control point, for there managers must decide whether it is more cost-efficient to send the reparable to a depot or to a contractor. In making this decision, managers must consider such factors as transportation costs and availability as well as depot funding and scheduling.

Under the HIMSEUR program, the user and the direct support unit exchange items directly, as is the case in the normal pipeline. A HIMSEUR exclusive, however, is that the direct support unit also exchanges directly with the general support unit. In the normal supply system, the general support unit does not stock replacement parts. But in the HIMSEUR program, a 30-day supply of parts predetermined to be in critical supply is stocked at the general support unit for direct exchange.

The general support unit is, in fact, the focal point of the HIMSEUR supply system, controlling the flow



Reparables flow and control under the HIMSEUR program.

of reparables in the pipeline (see chart). If the item cannot be repaired at the general support unit, it is exchanged directly with the Pirmasens Missile Repair Activity, MICOM's special repair facility in Europe. Supply is more responsive, since both the logistics consolidation point and the national inventory control point are bypassed.

Repairs are made more quickly and inexpensively by sending damaged items to the Pirmasens activity rather than to a CONUS depot or a contractor's plant. One drawback is the limited number of automatic test equipment and test program sets at Pirmasens. Therefore, only the printed circuit boards needed most urgently are selected for repair at Pirmasens. There is also repair capability for selected depot-reparable items. Although the initial cost of this part of the HIMSEUR program was high, reduced turnaround time and repair costs more than compensate.

When the activity at Pirmasens cannot repair items, it controls their movement to a CONUS depot or to a contractor's plant having programs set up to insure fast repair and return. Under the normal supply system, when order-ship times were added to depot or contractor repair times, turnaround times were averaging from 150 to 225 days. The HIMSEUR program has cut this time to an average of 75 days or less for items in critical demand.

Of course, one of the criteria for items selected for the HIMSEUR pipeline is that they be in critical demand. A useful guide for item selection is that the length of procurement time for a new item necessitates repair of the item already in the system, in spite of higher overall costs. The cost of establishing repair capabilities at forward depot elements must also be considered, especially in this time of budget constraints. Although repair time is cut by adding test equipment at forward units, initial acquisition cost and lengthy leadtime must be considered if such equipment is not already available at the forward element.

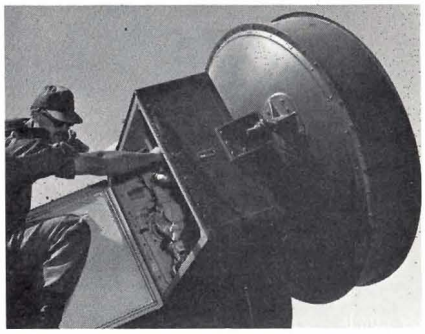
The HIMSEUR pipeline provides built-in visibility and control of problem items. Maximum use is made of existing systems and techniques to prevent confusion and the need for retraining in record management and control. With established lines of communication with each element and adequate means of reporting, program managers have all the information they need to administer the program effectively.

Two indicators are used to measure the performance of the HIMSEUR program. These are the general support unit *zero balance* and the major item *mean logistics downtime.*

In July 1979, the program was managing 304 lines, 95 of which, or 31.2 percent, were at zero balance at the general support level. Of the original 304 lines, 15 lines or five percent, are now at zero balance (statistics as of August 1981).

When wholesale stock quantities improve to the point that the normal supply system can resume control, items are removed from the program. New items are added to accommodate modifications or as items become problems. Presently, 272 lines are being managed and 67, or 24.6 percent, are at zero balance at the general support level (statistics as of August 1981). It should be noted, however, that zero balance at the general support level cannot be compared with a normal supply activity zero balance, since repair parts usually would not be stocked at the general support level. Therefore, a zero balance at the general support level does not mean that the organizational units are at zero balance for an item.

For those major items that have had critical reparables intensively managed, the mean logistics downtime has been reduced for almost every major item. For example, while the mean logistics downtime for the improved launcher was over 85 hours in August 1979, it had been reduced to 16.8 hours in February 1981 after the institution of the HIMSEUR program. The mean logistics downtime for other major items improved nine to 86 percent during the same period.



The HIMSEUR program has dramatically improved maintenance support of the Hawk system.

The reduced zero balance and mean logistics downtime indicate that the HIMSEUR program is working well. Hawk air defense missile system readiness consequently has improved, and with a decrease in pipeline cost. The HIMSEUR program clearly has improved parts availability for the 32nd Army Air Defense Command, and has thus enhanced the Army's readiness in Europe. Today, the Hawk system rates a "10" in readiness.

COLONEL JOHN S. DROSDECK JR. *is project manager for the Hawk missile system at Redstone Arsenal, Ala. He holds bachelor of science and master of science degrees in electrical engineering from Rensselaer Polytechnic Institute, Troy, N. Y., and is also a graduate of the Army War College.*

RONALD W. HARLOW *is a technical writer in the DARCOM intern information and editorial career program at the U.S. Army Missile Command, Redstone Arsenal, Ala. He holds a degree in journalism and English from the University of Southern Mississippi, Hattiesburg, Miss.*

ADA at the NTC

by Major William L. Terrill

Spread over 642,000 acres of tough, ragged, unmerciful terrain in the high country of the Mojave Desert, the National Training Center (NTC) at Fort Irwin, Calif., has been called the Army's biggest training aid. Its sheer size alone, about that of Rhode Island and three times that of Fort Hood, Texas, would be enough to qualify. But it's much more than just so many square miles of vast, desolate wasteland on the brink of Death Valley.

Geographically, it lies near Barstow, Calif., midway between Los Angeles and Las Vegas. Figuratively, it could be anywhere. The Saar basin. The Russian tundra. The Baltic plain. Or the very gates of Hell, as anyone who has been through the course there will tell you.

A joint FORSCOM-TRADOC training facility, the NTC has two purposes. It provides a place where active Army combat mechanized units can undertake those essential battalion and brigade combined arms operations that would be impossible or impractical to conduct at home stations. Second, it enables data to be collected on the performance and effectiveness of combined arms organization, equipment and doctrine under battlefield conditions.

Bridging the gap between peacetime and wartime by providing a realistic combat environment, the NTC creates situations where battalion task forces are challenged to their limits.

The NTC is designed to train units as well as evaluate unit performance. It is not intended to measure the proficiency of unit commanders. By collecting objective measures of effectiveness and incorporating the value judgements of experienced observers/controllers, the program can pinpoint units' strengths and weaknesses.

The typical NTC training cycle lasts 15 days and consists of two exercises, a battalion-size, live-fire exercise (LFX) and a force-on-force simulation. During these exercises, four scenarios—movements to contact, deliberate attack, defense and delay—are enacted.

The LFX is unique in that direct fire, artillery, anti-tank missiles, attack helicopters, air defense systems and Air Force close support are brought together at the battalion task force level in a realistic scenario using computer-operated, instrumented targets. The battalion task force also avails itself of the usual logistic, administrative, intelligence and electronic warfare support. In this exercise, commanders and troops coordinate firepower and observe its effects against a simulated enemy.

The force-on-force simulation pits a battalion task force against an opposing force (OPFOR) permanently stationed at Fort Irwin, and incorporates Multiple Integrated Laser Engagement System (MILES) devices, position location identifiers and audio and video recording systems.

What is particularly unique about the NTC concept and exercises, however, is the use of observer/controllers thoroughly trained and doctrinally proficient in their specialties and an OPFOR skilled in Soviet tactics and equipped with simulated Soviet vehicles. A control group of permanently assigned personnel coordinates the training of every unit that passes through the NTC and provides professional control, evaluation and critiques. Unlike their counterparts in battalion-size maneuvers at home stations, the NTC controllers conduct LFXs and simulations on a continuing basis throughout the year. As a result, the expertise from repetitive exercises on familiar ground has raised the NTC program to one of the most elite in the military.

Although the terrain at Fort Irwin is hardly like the fertile lands and wooded expanses of Europe, the training scenarios are based on European-type engagements with Warsaw Pact forces. The OPFOR, a combined arms force of armor, infantry and air defense units, bears an uncanny resemblance to the Soviet army. Their tanks, armored personnel carriers and air defense weapons have been modified to give the appearance of Soviet equipment. The men wear distinctive uniforms and are trained in Soviet military tactics. Their mission is to provide the most realistic combat experience yet devised in the Army between modern military forces.

The OPFOR regiment is comprised of two battalions. The armor unit is the 1st Battalion, 73rd Armor, known as the "Bunker Busters" (a nickname bestowed upon the unit in World War II). The mechanized infantry is represented by the 6th Battalion, 31st Infantry, with the unlikely desert nickname of "Polar Bears."

The regiment uses 148 converted M551 Sheridans that resemble 42 Soviet T72 tanks, 100 BMPs and six ZSU 23-4s. It also uses 18 Dodge pickup trucks, (modified mockups of Soviet BRDMs) and 10 motorcycles.

All OPFOR systems are equipped with MILES devices.

From the outset, the odds weigh heavily against units rotating to the NTC. The OPFOR regiment outnumbers our battalion forces because that's the way it's envisioned it will be in the event of an actual conflict.

Under the Army's training format, a brigade of two battalions, brigade headquarters and the brigade's "slice" of divisional assets are sent to Fort Irwin. The units arrive by Air Force transport at Norton AFB, located about 125 miles

Preparing for the NTC

To survive and win in a hostile environment, units rotating to the NTC must eliminate costly mistakes made by their soldiers and leaders under rigorous, albeit simulated, combat conditions. The following composite highlights many of the lessons ADA units learned at the training center and should be used as a guideline for battalions deploying to Fort Irwin.

☐ Chaparral/Vulcan doctrine, as presented in FM 44-3 and FM 71-2, should be stressed in the participating battalions' pre-NTC training program.

☐ Additional training is required by all participating units in map reading and land navigation.

☐ Additional home-station training with the basic MILES equipment is required to fully utilize the MILES devices at the NTC.

☐ Emphatic information and advice pertaining to the tactical employment of air defense must be presented to the task force commander or his S3 in checklist form.

☐ Supporting air defense elements must make every effort to insure advance and continuous coordination with the support brigade.

☐ Forward area alerting radar (FAAR) supervisors, when attached to a battalion task force, must recognize the need to move to their assigned positions well in advance of the movement of the task force. Three FAARs are required for necessary coverage of the brigade area, one for each of the two battalion task force areas and one for the brigade rear area.

☐ An experienced liaison officer is required at the brigade tactical operations center.

☐ Maintenance vehicles used in support of the maneuver element require communications capability. Furthermore, direct support system maintenance personnel should be taken to Fort Irwin to better support the participating air defense units.

☐ Due to the separation of air defense assets in the NTC exercises, one tank recovery vehicle is required to support air defense units with each of the two battalion task forces.

☐ Air defense equipment (less weapon systems and FAARs) available at Fort Irwin should be identified by rotating units in sufficient time to insure that they do not transport the same equipment to the NTC.

MILES—How it Works

If you've ever been to an arcade shooting gallery, dropped your quarter into the slot, sighted down the barrel of the rifle and fired a pencil beam of light at the targets, you may already have a fairly good idea of what MILES is all about. While the basic principle is roughly the same, the actual hardware used in MILES is far more sophisticated.

MILES equipment produced by Xerox Electro-Optical Systems uses low-power, battery-operated lasers to transmit a harmless, coded, invisible beam of light at opposing MILES-equipped targets. Laser detectors attached to the outside of the targets pick up the coded signal and the detectors' electronics package reads it to determine the accuracy of the shot. With every hit, a built-in probability of kill factor for that target is then applied. All of these parameters are than analyzed to determine whether a near miss, a hit or a kill has occurred. If the shot goes wide of the target and no signal is received by the detectors, nothing is recorded.

Air defense artillerymen have only a little while longer to wait before receiving their own MILES devices. The bad news is that OPFOR airmen will also get them.

Earlier this year, the decision was made to go ahead with production of MILES air-ground engagement simulation system devices for Vulcan, Chaparral, Stinger, OH-58 and the UH-1, a step that will greatly enhance air defense capabilities at the NTC. The device for the AH-1 Cobra was approved for production as well, on condition that it demonstrates acceptable performance during a checklist prior to Jan. 1, 1983. Though these MILES devices will not reach divisional units before mid-1984, they are expected to be fielded at Fort Bliss, Texas, and Fort Irwin sometime between June and November 1983.

south of the training center and are bused to Fort Erwin, where the troops are outfitted for combat and draw vehicles and equipment just as they would if they were airlifted to Europe. Currently, Vulcan weapon systems and forward area alerting radars (FAAR) are not prepositioned at Fort Irwin; however, most other equipment (M113s, 2½-ton trucks, etc.) used by air defense units is.

Air defense participation in the maneuvers is limited to two Vulcan platoons, 10 Redeye teams and three FAARs which are equally divided among the two battalions and brigade headquarters. Each Vulcan platoon is issued 20mm target practice tracer ammunition for the LFX and engages a 1/7th-scale MiG-27 hostile expendable aerial target (HEAT) as well as full-scale Hind-D silhouette targets. A modification to the HEAT is currently being tested at Fort Bliss, Texas, that will accommodate a Redeye missile firing.

Although the fielding of MILES for air defense at the NTC is not scheduled until late 1983, air defense weapons do participate in the simulation exercise. Basic MILES APC belts are used with the Vulcan, but only if the unit is familiar with the devices. Redeye gunners wear the basic MILES man-worn harness.

During the two week rotational cycle, the Air Force flies approximately 90 sorties. Arrangements can be made with the NTC to provide mode-4 codes for use by Air Force transponders and identification, friend or foe (IFF), systems. A-7s or F-4s normally represent enemy aircraft in the simulation exercise, while the "the friendlies" usually are F-16s and A-10s. Again, the air defense weapons do not have MILES transmitters, but a controller/observer assigned to air defense assesses casualties and damage with a MILES controller gun as he deems appropriate.

Although significant gains have been made to insure the NTC exercises challenge air defense units, much more is planned. MILES air-ground engagement simulation system devices for the Vulcan, Chaparral, Stinger, OH-58, UH-1 and AH-1 will be fielded in late 1983. The introduction of these devices will enable full participation in the simulation exercises for both air defense and aviation.

The OPFOR will also receive MILES-equipped helicopters which will portray the Hind-D threat. In addition, the OPFOR will be assigned MILES devices to replace the SA7, SA8 and SA9 which will join the ZSU 23-4s presently employed in the exercises.

The Air Force has also begun development of a MILES device for the A-10. Prototypes are scheduled for delivery to the NTC sometime in FY85.

A lot of time, energy and expense have gone into the NTC program in an effort to provide first-class training for participating units. Therefore, it's imperative that ADA units traveling to Fort Irwin are properly prepared before they arrive.

A Sheridan tank disguised as a ZSU 23-4 roars into simulated battle, adding OPFOR realism to NTC exercises.

The following guidelines have been provided. Units must:

—Have completed an external ARTEP evaluation within the past six months.

—Have completed a qualification gunnery program and new equipment training as well as extensive periods of field training on the use of MILES at least to the squad/platoon level.

—Be proficient in the control and support of sustained combat operations (day and night). Proficiency must include integration of all elements of the combined arms team, including combat service support normally associated with the battalion task force.

—Be proficient in both active and passive air defense and in NBC defensive measures.

Past experience with combined arms MILES exercises has clearly demonstrated that units which schedule intensive individual and crew tactical training learn the NTC collective unit tasks much more easily and considerably faster. NTC exercises only frustrate units not familiar with the basics.

Vulcan and Redeye crew drills that should be mastered prior to an NTC rotation are listed in TC 44-5-3 and TC 44-18-1. These training circulars will be published in mid-1983 as part of Phase 1 of the Army Standardization Program. Considerable time should be devoted to marksmanship and land navigation also.

Leaders should familiarize themselves with the tank and mechanized infantry company team (FM 71-1), battalion task force (FM 71-2) and desert operations (FM 90-3) as they will greatly assist the unit in preparation. The NTC observer/controller air defense checklists are prepared from ARTEP 44-325 and ARTEP 71-2 which pertain to Vulcan and the battalion task force, respectively.

Brigade training plans at the NTC are selected from a prescribed "menu" of available activities. The plan is flexible and takes into account the unit's mission, configuration and state of training. All levels, squad through battalion, parti-

cipate in this collective effort; however, each unit-oriented plan must satisfy TRADOC, FORSCOM and DA requirements.

At the conclusion of the two-week cycle, each battalion receives a take-home package, the basic feature of which is a videotape of NTC debriefings. Highlighting the major findings of the live-fire and force-on-force exercises, these tapes are usually comprehensive summaries of the battalion's experiences at Fort Irwin. The package also includes map overlays of the battalion's maneuvers and graphical and numerical data on the various engagements. These diagnostic results can and should be used as a basis for evaluating the battalion's past training program and for future home-station training needs.

The weaknesses that can be corrected at home stations should drive the unit's training program for the next year to 18 months when once again the battalion will rotate through the NTC.

Win or lose, each unit participating in the NTC exercise emerges with an appreciation of its state of readiness for combat, a true grasp of which can only be achieved by going up against the crack OPFOR at the Army's biggest training aid.

The OPFOR's visually modified vehicles leave tracks on the desert pavement as a platoon moves out to Fort Irwin's training areas. (U.S. Army photo by Richard H. Saunders)

Fight Outnumbered and Lose?

The NTC is designed to teach our maneuver units how to "fight outnumbered and win," but most units who go up against the crack NTC OPFOR for the first time get themselves decisively defeated.

"The blue forces were almost always surprised and frequently confused and unprepared for the speed, mass, violence and impact of the 'dirty battlefield' created by the OPFOR," said Red Thrust observer CPT John J. Perry after an early NTC rotation.

This doesn't mean the Army's "fight outnumbered and win" doctrine is based on unsound premises. It merely demonstrates that a rotation through the NTC is, perhaps, the most valuable training experience the Army has to offer. Most units are accustomed to confronting only token OPFORs during local training exercises. When they confront the NTC OPFOR, they learn the easy way what other American units learned the hard way at battlefields like Bull Run or Kaserine Pass.

"The blue forces reported that they had to improve their existing skills and perform them faster with fewer errors. They found that because of the speed, mass and weapon systems of the OPFOR, they required considerable skill in the analysis and use of terrain, cover and concealment and in the occupation of battle positions. They rediscovered that teamwork, within the unit and with the combined arms team, is essential to success. The blue forces reported learning the strengths of the OPFOR, how to anticipate their actions and to recognize their vulnerabilities in time to capitilize on them. They also learned that practice was required to achieve success," Perry observed.

German Field Marshal Erwin Rommel said he had never seen troops as green as the soldiers the U.S. Army threw against his vaunted Afrika Corps during the early days of the North African Campaign, but he also noted that he had never seen troops learn so fast.

Perry said much the same about the unit he watched go through its first NTC rotation. "From the beginning of their exposure at the NTC, the chain of command understood that their NTC training was a 'learning experience' and maintained a positive feeling that with time and proper training they could accomplish their mission to fight outnumbered and win. They tried a variety of tactically sound operations and, in the last observed attack, did achieve a qualified success," Perry wrote in RED THRUST Star, the newsletter of the Fort Hood, Texas, OPFOR training detachment. "The most improved aspect was the ability and willingness of the small unit and individual crew to fight alone and with great tenacity. If this force returns to home station and incorporates an aggressive OPFOR element in their training, they are well on their way to achieving the goal of fighting outnumbered and winning that the NTC is designed for."

MAJOR TERRILL *is the MILES AGES/AD project officer for the Directorate of Training Developments, U.S. Army Air Defense School, Fort Bliss, Texas. He is a graduate of the United States Military Academy with extensive experience in assault helicopter and air cavalry units.*

NEW TRAINING DEVICES AND SIMULATORS MATCH NEW AIR DEFENSE WEAPON SYSTEMS

by Robert Chalmers

Air Defense Artillery was reluctant to abandon the philosophy of using actual systems for individual and collective training. While a strong case can be made to support that philosophy, and while adequate resources in the past permitted that philosophy to reign, the recent dramatic cost increases for these resources with no comparable increase in available money to purchase them had to be recognized and dealt with. Training devices and simulators became a necessity. Initial efforts to develop and field these devices were piecemeal and somewhat uncoordinated. However, with experience and perseverance, a consistent, effective training device and simulator program has emerged.

Today, the air defense community is heavily committed to the use of training devices as a method of replicating force-on-force combat. As technology advances and the understanding of effective training increases, devices continue to be the best method to support realistic combat training.

It is neither practical nor economical for every soldier to fire every weapon system. The Redeye and Stinger systems have trainers that allow gunners to track aircraft images within a moving target simulator. Weapon systems that have signal and data processing equipment, such as Hawk and Patriot, can use simulation equipment to present training targets. Systems which have computers as part of their tactical equipment are prime candidates for development of software embedded training. This kind of training reduces the requirements for separate, costly training devices and permits soldiers to train and be tested on their own combat-ready equipment.

The introduction of Stinger, Patriot, Roland and the SGT York Gun to the air defense arsenal has created a need for new training devices and simulators. Some new training aids have already appeared; others are in various stages of development or have merely been proposed. The following paragraphs describe some of the latest training devices and simulator developments and their importance to the fielding of new air defense weapon systems.

STINGER

Stinger is a manportable, shoulder-fired air defense infrared missile designed to engage low-altitude aircraft in the forward battle area.

A moving target simulator (MTS) is used to simulate tactical air defense engagements for training Stinger gunners. The MTS projects aircraft images against a neutral sky background, along with a superimposed infrared radiation spot. The aircraft image and infrared spot are moved across the screen at a rate and manner that simulate the speed and maneuvers of threat and friendly aircraft.

The tracking head trainer (THT) is used with the MTS as well as with aerial targets and tactical aircraft. The THT is a full-scale model of the Stinger that simulates the operating characteristics of the weapon system from activation to firing (less the actual missile launch and flight). The gunner must operate the THT under the same time constraints as the weapon system.

The field handling trainer consists of a Stinger grip stock assembly and launch tube weighted to match that of a weapon. This trainer has no active parts and is used only for crew reaction drills.

The Stinger launch simulator is a proposed training device which will duplicate the operation of the Stinger throughout the acquisition, identification and tracking phases, and then simulate the noise and weight shift associated with missile launch.

The launch simulator is a proposed device which will be attached to the rear of the THT and will simulate the noise and backblast which gunners must be accustomed to if they are to carry out successful engagements.

PATRIOT

The Patriot air defense missile system is designed for maximum effectiveness against the air threat anticipated in the 1980s and beyond. Specifically, Patriot's fast-reaction capability, high firepower and ability to operate in a severe electronic countermeasure environment are features not available in present Army air defense systems but are features necessary for effective air defense. The mission of Patriot is to provide medium-to-high-altitude air defense of ground combat forces and high-value assets.

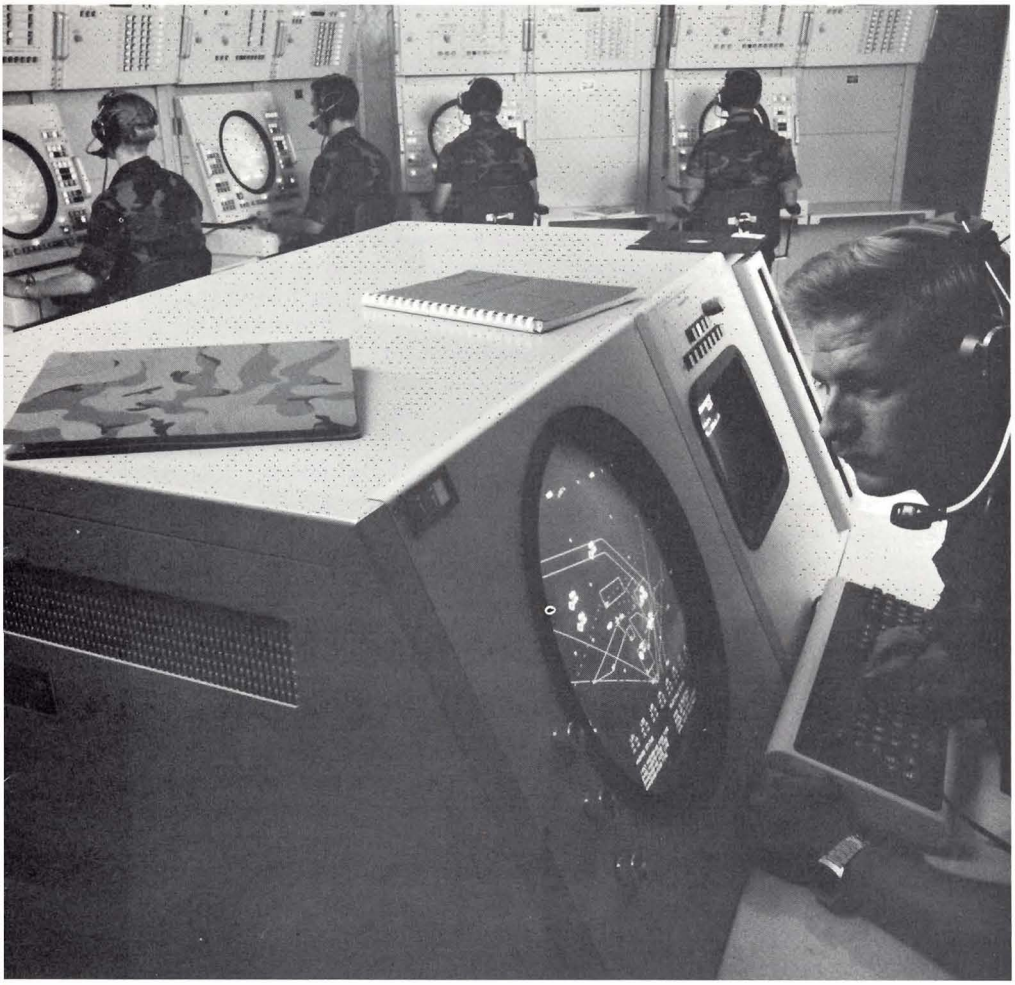
The operator tactics trainer provides simulation of the Patriot system display, controls, communications and data processing system at the operator positions of the engagement control station and command coordination net. The training position consoles allow student operators to perform all actions related to initialization, automatic and semiautomatic operations and monitoring actions. They teach the

proper use and response to system displays, controls, and communications and data processing.

The troop proficiency trainer is a software-driven, embedded proficiency trainer inherent within the engagement control station of every fire unit. It is used to maintain proficiency in the field and will also provide a vehicle for introducing new tactics on threat scenarios in the field. It is also used for conducting skill qualification tests and operational readiness evaluations.

The missile round trainer is a ballasted canister which will duplicate all mechanical and electrical functions. It is used at the U.S. Army Air Defense School, Fort Bliss, Texas, for collective training and at the battery level for unit training.

The Patriot organizational maintenance trainer (POMT) will provide training positions equivalent to dismounted, laboratory-type student stations. Computer-driven scenarios, with simulated system faults, will prompt each student to apply maintenance procedures at the organizational level. The POMT will be used in conjunction with passive devices for initial training of the primary maintenance tasks. Reinforcement training of the primary tasks and all phases of advanced maintenance training will be taught on tactical equipment.



Operator tactics trainer consoles are designed to simulate tasks and conditions operators will experience and observe on Patriot system consoles.

ROLAND

The Roland air defense system is an all-weather, mobile, surface-to-air missile system designed for use against low-altitude, short-range threat aircraft. It is a fully integrated fire control and missile launching system mounted on a self-propelled vehicle.

The Roland maintenance institutional trainer (MIT) will be used at the Air Defense School to train organizational maintenance personnel. The trainer stations provided by the MIT will be installed in a classroom configuration. The instructor will establish the training required, monitor students' progress and directly interface with students when necessary. Computer-driven scenarios, with simulated faults, will prompt students to apply maintenance procedures to the authorized levels. The instructor will have the option of inserting specific faults if required; however, the computer-driven scenario will be the primary means of instruction.

The Roland institutional trainer (RIT) will allow one instructor station to control and monitor the simultaneous training of six training stations (each of which contains both a gunner position and a squad leader position). The trainer will generate targets, provide the necessary input to simulate engagements and perform, with a high degree of accuracy, all weapon system operational functions (including radar and optical tracking modes) and kill assessment. The appearance and apparent function of the trainer consoles or panels and the associated controls, switches, information displays and communication equipment will have no apparent differences from those of the tactical system.

The Roland field proficiency trainer will provide crew proficiency training to field units. It is a modified two-station RIT with an instructor console, van-mounted for mobility.

The Roland firing sequence simulator will electronically duplicate the electrical functions associated with loading (rotation of the ammunition drums and movement of the launcher arms) and electrical response of the tactical items of equipment being simulated, less the actual launch of a missile and the in-flight missile control data.

The Roland training round will be used to train crews and mainte-

nance personnel on the external configuration, weight and handling characteristics of the tactical missile canister with missile inside. The training round will be used in lieu of a tactical round in loading, unloading, transport and resupply training at a fraction of the cost, reducing safety hazards and eliminating the requirement for security measures and explosive storage facilities at the training site.

SGT YORK GUN

The SGT York Gun is designed for maximum effectiveness against the air threat anticipated in the 1980s and beyond. Specifically, the SGT York Gun provides air defense against attack helicopters and high-performance, fixed-wing aircraft and ground defense against lightly armored vehicles and personnel. It is a significant new weapon for integration into the force commander's scheme of maneuver for winning the AirLand Battle. The mission of the SGT York Gun is to provide low-altitude air defense of ground combat forces and high-value assets.

The classroom trainer will be a multicrew station trainer allowing simultaneous, independent training of six two-man crews under the control of one instructor. The classroom trainer will comprehensively train operators and organizational maintenance personnel in the in-turret operational aspects of the SGT York Gun. Additionally, the classroom trainer will provide automatic student evaluation and instructor control.

The organizational maintenance trainer will be a mockup of the fire unit and line replaceable unit to facilitate full task training in the proper procedures for removal and replacement of line replaceable units and in selecting and using appropriate tools and test equipment. It will provide training in the location, removal and substitution of line replaceable units in the turret.

The system maintenance trainer will provide training to organizational and DS/GS personnel in inspection and troubleshooting procedures to identify and isolate faults in the system. This trainer will be an interactive audio-visual station used prior to student exposure to exercises on hardware in the turret maintenance trainer and on the fire unit. It will consist of a slide preparation, audio cassette and computer display terminal.

The fire control trainer will provide training in the names and locations of hand grip controls, developing psychomotor skills for rapid, accurate response to switch cues and developing the rudiments of the fire-control sequence using SGT York Gun teamwork. It will be a stand-alone trainer to prepare students to effectively use classroom trainer time.

The feed system maintenance trainer will be used to train operators in the mechanical aspects of ammunition loading. This trainer will incorporate operational feed system components into a stand which will provide operation of the feeder, safety of students, instructor control and accessibility for training. It will allow hands-on, ammunition-loading training and delineate the nature of faults that can be either simulated or physically inserted into the field system for maintenance training.

The turret maintenance trainer will be used to teach armament system fault isolation and repair, line replaceable unit removal, system boresighting, and turret troubleshooting and maintenance procedures. This will be an operational 40mm gun turret on a stand which will provide hydraulic and electrical power interfaces. It will implement safety controls and provide platforms, stairs and guardrails for student and instructor access and safety.

The troop proficiency trainer will be used to train operators on the system to gain and maintain gunner proficiency and in tactical decision-making involved in the air defense battle. It will interface with the actual fire unit and will simulate battle information to the radars and fire control computer.

The cannon maintenance trainer will be used to train the theory of operation and gun servicing and maintenance. This device will be a 40mm gun system on a stand.

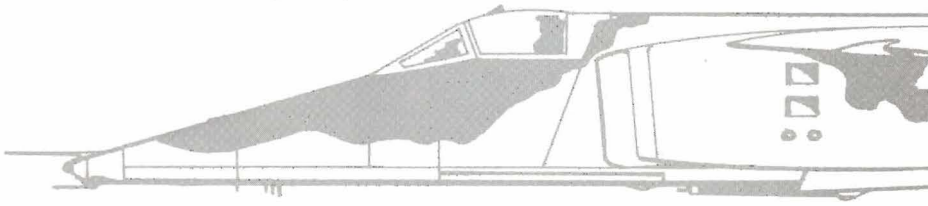
This inventory of training devices and simulators for four major systems within air defense has addressed training device "needs" which have been identified and should not be confused with requirements. Every "need" must undergo a thorough front-end analysis before a legitimate requirement can be substantiated. The inventory is not to be considered an all-inclusive listing of training devices or simulators. As front-end analyses for new combat systems are completed, additional device requirements may be identified and added.

Space age technology has made training devices a vital part of the air defense training strategy. With all the innovative approaches to increased operator proficiency, it is difficult to imagine effective instruction without training devices and simulators. Air defense leaders are dedicated to a program to produce well-trained, competent air defenders. Training devices and simulators are an integral part of this program.

Until recently **ROBERT (Bob) CHALMERS** *was chief of the Targets and Training Devices Section, Directorate of Training Developments, Fort Bliss, Texas. He has served in a wide variety of assignments associated with air defense training and is currently working with air defense targets and training devices for existing and future weapon systems. He recently transferred to Redstone Arsenal, Ala.*

SOVIET AVIATION INCREASES OFFENSIVE THREAT

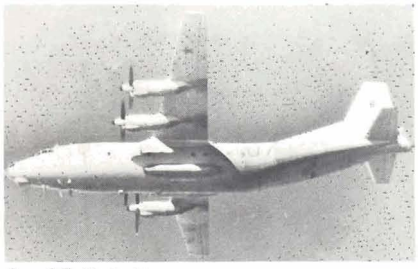
by MAJ Richard J. Armour



During the 1960s, both NATO and Warsaw Pact nations viewed all-out nuclear war as the only possible conflict scenario. However, when NATO adopted the strategy of "flexible response," Warsaw Pact planners began to explore the possibility of a non-nuclear attack against NATO using only conventional and chemical weapons.

In order to accomplish their objectives, the Soviets have divided their aviation assets into several air arms known, until recently, as Military Transport Aviation, Naval Aviation, Long-Range Aviation, Frontal Aviation and PVO Straney (Strategic Air Defense Force employed within the Soviet Union itself). According to an article by Henry S. Brodsher in the July 16, 1981, issue of the *Washington Star,* there was an unannounced change in the Soviet air force structure that combined the forces of PVO Straney with the air defense arm of the ground forces. Since these forces do not pose an offensive threat to NATO, they will not be discussed further. Instead, I will briefly discuss each arm of Soviet aviation and the development of the current generation of Soviet aircraft.

Mi-8 Hip, E military helicopter. This differs from the commercial version in having circular cabin windows, and optional nose gun and weapon-carriers on outriggers.

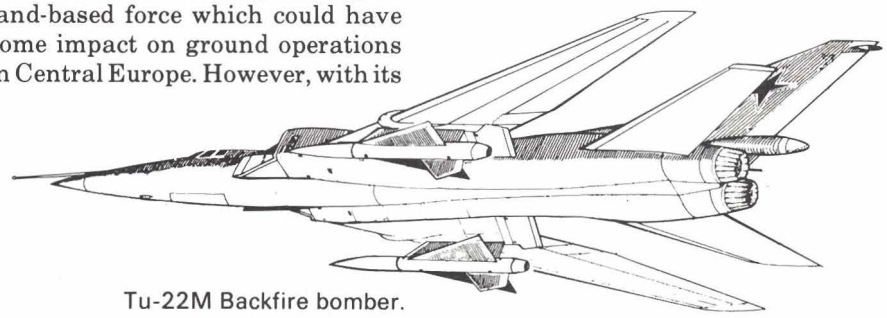


An-12 Cub-B.

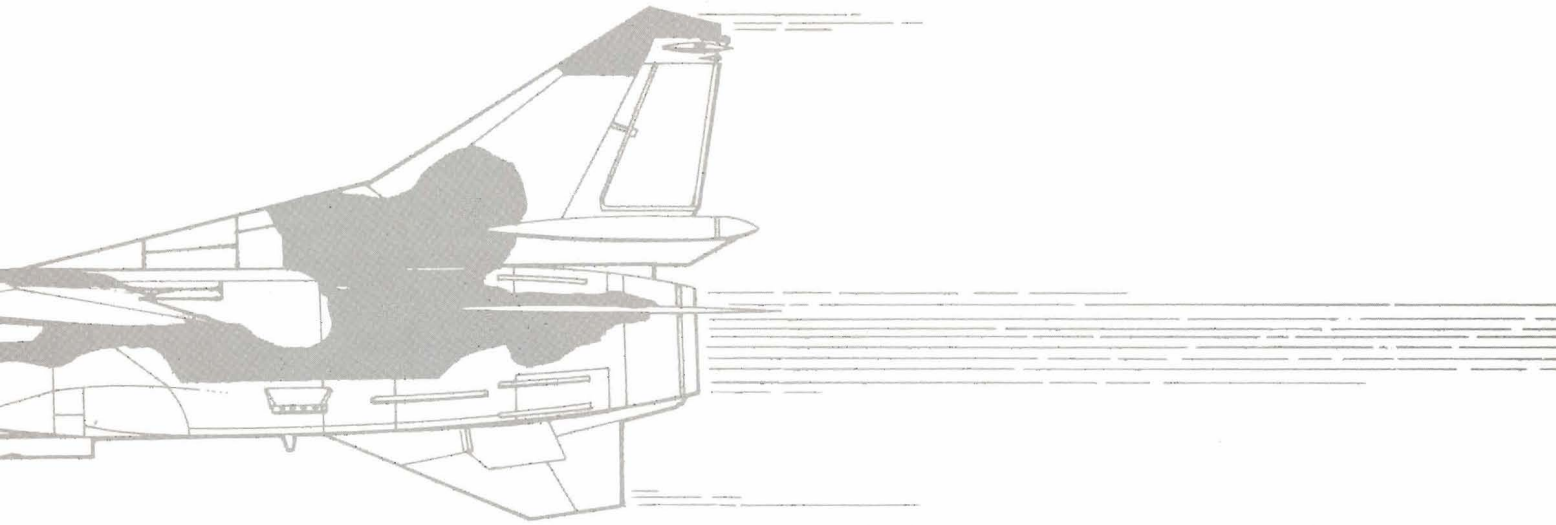
Voyenno-transportnaya Aviatsiya (VTA), the Soviet military transport aviation command, consists of about 1,200 fixed-wing aircraft and helicopters, although some helicopters are assigned to other branches. The majority of the fixed-wing aircraft are An-12 Cubs which have been used extensively during the Soviet invasion of and subsequent operations in Afghanistan. The largest strategic airlift aircraft, the An-22 Cock, has been used to airlift Soviet troops to the Western Hemisphere, Africa and Afghanistan. Of the many helicopters in Transport Aviation, reliance is placed mainly on the Mi-8 Hip. For its heavy lift requirements, VTA uses the Mi-6 Hook which can carry an internal payload of more than 26,000 pounds or up to 65 troops over a distance of more than 1,000 kilometers.

Naval Aviation is primarily a land-based force which could have some impact on ground operations in Central Europe. However, with its new aircraft carriers of the Kiev class, Soviet Naval Aviation now has a mix of carrier-based helicopters and vertical short take-off and landing (V/STOL) aircraft at sea. The Naval Aviation force consists of more than 300 Tu-16 Badger, Tu-22 Blinder, Tu-95 Bear and Tu-22M Backfire bombers. In addition, Naval Aviation is equipped with fighter-bombers such as the Fitter-C and the V/STOL aircraft Yak-36 Forger. These aircraft give the Soviet navy an offensive operational capability.

The Long Range Aviation (LRA) inventory consists of more than 850 aircraft, of which more than half are targeted against NATO. The M-4 Bison and the Tu-95 Bear are the long-range mainstays of LRA. These aircraft have sufficient range to not only strike targets in Europe, but to strike targets within the United States. The Tu-16 Badger and the Tu-22 Blinder, which comprise the medium-range bomber force, have the capability to strike targets deep within the NATO rear area. In order to extend the range of their bomber force, the Soviets have converted some of their Bear and Bison bombers into tankers. Additionally, some Bear bombers have



Tu-22M Backfire bomber.



been configured as reconnaissance and anti-submarine aircraft.

The newest bomber in the Soviet inventory, and the only one currently being produced, is the Tu-22M Backfire. It is a versatile, supersonic, multipurpose aircraft capable of performing nuclear strike, conventional attack, reconnaissance and electronic warfare missions.

LRA bombers can not only carry conventional and nuclear bombs but also air-to-surface missiles such as the AS-2, AS-3, AS-4, AS-5 and AS-6. The AS-3, for example, can be carried and launched by a Tu-95 Bear. It carries a nuclear warhead of about five megatons and has a range of about 650 kilometers. The Tu-22M Backfire can carry the AS-4 Kitchen, with a four- to five-megaton warhead, to a distance of about 270 nautical miles.

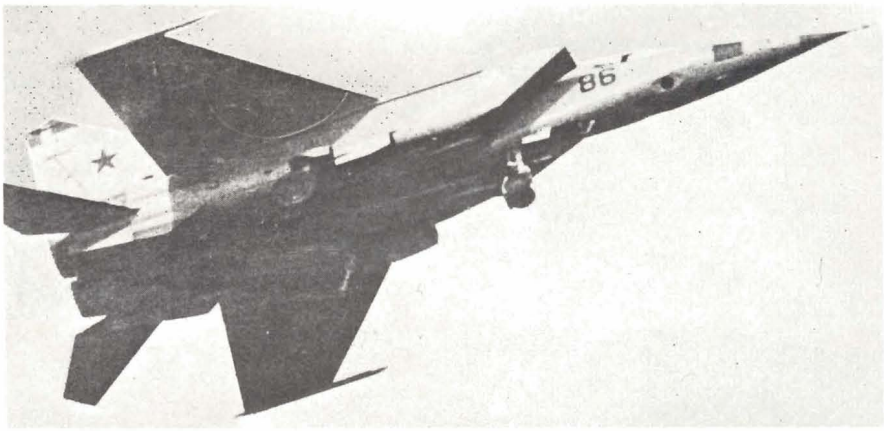
Frontal Aviation or Tactical Aviation, as we refer to it, presents the greatest air threat to NATO's forward divisions. Frontal Aviation consists of those forces that have been given the mission of supporting combat operations of the Soviet ground forces. This support consists of providing protection against NATO air attacks, destroying NATO forces and installations in rear areas and conducting reconnaissance missions. Frontal Aviation, equipped with more than 4,700 fixed-wing tactical aircraft, is the largest of the five Soviet air arms.

Soviet Frontal Aviation of the sixties, using the Su-7 Fitter-A and early models of the MiG-21 Fishbed, was primarily designed for a counter-air role. This trend created a major shortcoming in the Soviet air force's ability to provide support for ground forces and its ability to attack ground targets. In the past decade, there has been a significant increase in both the payload and range capabilities of Frontal Aviation.

While Soviet aviation has traditionally emphasized air defense in its Frontal Aviation, there has been, in recent years, a radical change in functional concepts. The first priority is no longer air defense, but rather air attack in all its forms. Developmental work of the mid-1960s on new and more capable aircraft initially produced new versions of the MiG-21 Fishbed with improved range and payload which could be used for more effective, offensive roles.

Beginning in 1973, the new Su-17 Fitter-C, the MiG-23 Flogger-B and the Su-24 Fencer-A became operational. Compared to earlier Frontal Aviation aircraft, these new aircraft have substantially improved range,

MiG-21 Fishbed-N.

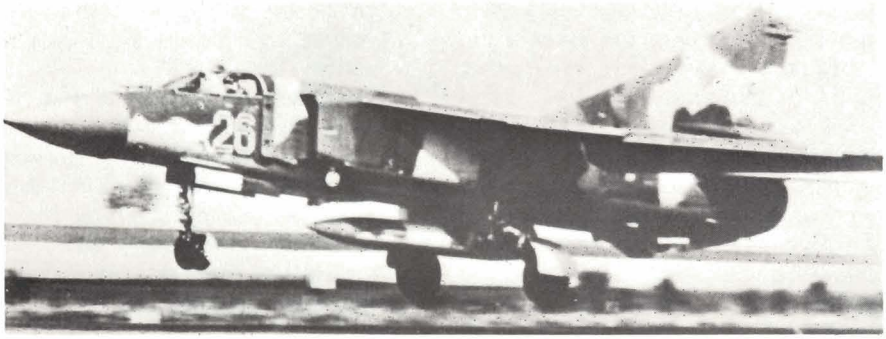


Reconnaissance version of the MiG-25 Foxbat-B.

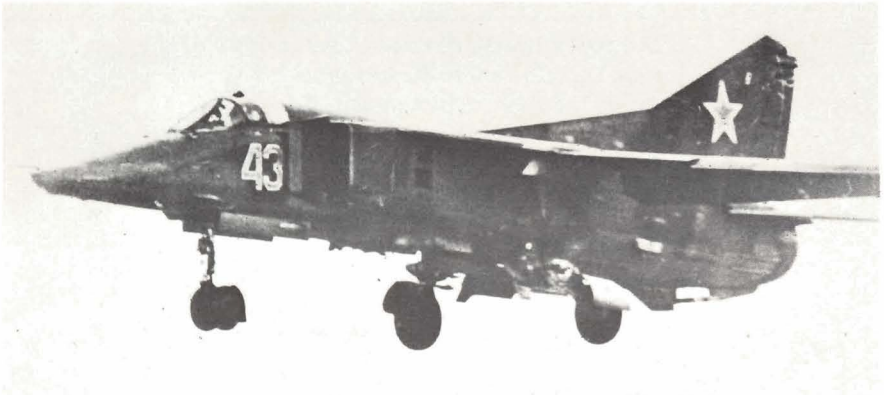
payload, avionics and electronic countermeasure capabilities, thereby providing these aircraft with a multimission capability. The new aircraft comprise a significant portion of the total Soviet force and have been extensively supplied to the Soviet forces opposite NATO's central region.

The new generation of Soviet counter-air fighters, such as the MiG-25 Foxbat-A, has a maximum speed at sea level of at least 800 miles per hour and can carry air-to-air missiles with a range of about 15 nautical miles. The combat radius of these fighters is in excess of 500 nautical miles.

New ground-support aircraft being developed and those actually coming into the Soviet inventory constitute an extension of the changes in Frontal Aviation air doctrine. These new aircraft represent a continuing search for the equipment most capable of performing the necessary tasks required by the doctrine of "air attack in all its forms." The MiG-27 Flogger-D is an example of this continuing search.



MiG-23 Flogger-B.



MiG-27 Flogger-D. Notice the difference in the nose from that of the MiG-23 Flogger-B.

The Flogger-D differs from the Flogger-B in that its nose has been completely redesigned and is now sharply stepped down to provide greater forward and downward visibility consistent with its principal mission of ground attack.

The Flogger-D can carry payloads of about 6,500 pounds over distances of about 500 nautical miles. Over shorter distances, the new Soviet ground-attack aircraft can carry more than 10,000 pounds of bombs, rockets and missiles. These aircraft incorporate upgraded avionics and fire-control systems and can deliver their ordnance very accurately over long distances.

Frontal Aviation's combat effectiveness is being enhanced through a massive modernization program. The entire counter-air forces and almost 75 percent of the ground-attack forces are composed of aircraft introduced during the past decade.

The phasing of these new aircraft has provided the technical capability to diversify ordnance delivery. Instead of thinking just in terms of carrying and delivering nuclear weapons, as in the 1960s, the Soviets have equipped their Frontal Aviation aircraft with a wide variety of ordnance such as bombs, rockets, tactical air-to-surface missiles and guns. Although the Soviets trailed NATO in munitions development for many years, recent evidence indicates a growing Soviet effort to develop new air-to-ground ordnance with which to attack targets in NATO. The precision-guided muni-

tions — similar to the laser-guided or electro-optically guided "smart bombs" used by the U.S. Air Force —being created for use with the new generation of Soviet tactical aircraft are the most significant of these developments.

The Soviets intend to use their helicopters in much the same manner that we did in Vietnam for fire support of ground forces and to attack NATO targets within their range of operations. There is no doubt that Soviet helicopters will present an increasing threat to NATO in the future.

It is becoming increasingly clear that the Soviets believe that when all other elements are equal, the highest prospects for victory in war lie with those forces employing the element of surprise. A Soviet non-nuclear attack would be initiated by a massive air operation.

The air operation would begin with attacks on NATO installations and forces by Soviet aviation using non-nuclear means. A force of several thousand aircraft comprising elements of Soviet Frontal and Long-Range Aviation would be available for participation in the operation.

Soviet aircraft developments have not been limited to fixed-wing aircraft. Because of U.S. helicopter developments in Vietnam, the Soviets recognized a need for helicopter air assault and air attack capabilities. The Soviets have been engaged in an extensive program of growth and modernization of their helicopter force. This force now numbers more than 500 aircraft with special emphasis having been placed on ground-attack helicopters, such as the Mi-24 Hind and the Mi-8 Hip, which are deployed against NATO. These helicopters can carry an extensive array of ordnance such as rockets in pods, bombs and anti-tank guided missiles, as well as machine guns. The Hind-A, for example, is well suited for its gunship/combat assault role. It can carry eight to 10 troops into combat with enough external ordnance to provide ground support once the troops have disembarked. The newest variation of the Hind, the Hind-D, carries the same ordnance as the Hind-A with the exception of a chin-mounted Gatling gun in place of the single-barrel, nose-mounted machine gun on the Hind-A.

In the initial mass strike, Frontal Aviation aircraft would be assigned to attack NATO air defense systems so that follow-on aircraft could conduct a massive attack on rear area NATO airfields. The second mass strike would probably be directed against NATO command and control centers, as well as NATO's nuclear weapon storage sites. In between strikes, Frontal Aviation aircraft would continue to attack and maintain pressure on NATO forces.

While toxic chemical weapons might be used against some NATO targets at the beginning of the operation, it is likely that the Soviets would also hit all other high priority targets with chemical bombs or missiles once attacks with more conventional ordnance have been completed. For example, once NATO airfields have been put out of action by conventional means, the Soviets might possibly try to keep them out of action by the use of chemical weapons.

It is, therefore, apparent that the Soviets have increased their capacity to conduct offensive conventional warfare. It is also evident that they have developed plans for a detailed, maximum-effort air operation to utilize their increased capabilities in an attempt to achieve their objectives.

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MYSTERIOUS MiG-29 CLOSES TECHNOLOGICAL GAP

The technological gap between the Soviet Union and the United States has narrowed considerably over the past 10 years, at times with alarming rapidity. Reconnaissance satellite photographs of the Soviet experimental flight test center at Ramenskoye, southeast of Moscow, indicate several aircraft prototypes.

In referring to a new generation of Soviet combat aircraft expected to enter service within the next few years, U.S. Air Force Secretary Verne Orr recently said, "In comparison with the F-15s and F-16s, these new generation aircraft may give the Soviets advantages in average speed and air-to-ground attack range."

The one awaited with the most interest but yet the most mysterious is a new fighter from the MiG bureau. Dubbed the Ram-L (Ramenskoye type L), the fighter is speculated by some to be the Soviet counterpart to the F-18.

As early as 1977, the *International Defense Review* (IDR) described the Ram-L as "thought to be a Mikoyan product bearing the designation MiG-29. Its appearance has been expected for some time in the West, and it is considered primarily as the Soviet answer to the U.S. F-15, F-16 and F-18 aircraft. However, it is also believed to have an intercept capability against low-flying Western strike aircraft such as the F-111, the Tornado and the cancelled (sic) B-1 bomber, since the characteristics of its radar and its ability to carry air-to-air missiles (AAM) on six hardpoints certainly appear to give it this capability."

The IDR at that time described the Ram-L as having "AAM armament which could include four AA-7 Apexes (range: 32.5 km radar version, 15 km IR version) and two AA-8 Aphids (range: 15 km radar version, 7 km IR version). The MiG-29's thrust-to-weight ratio at combat weight (50 percent internal fuel, four AAMs), which is reported to exceed a ratio of 1-to-1, is comparable to those of the F-16 and F-18. In configuration, the MiG-29 resembles a cross between the MiG-25 Foxbat and the F-15 Eagle. It is rather smaller and lighter than the Su-15 Flagon, has a single-seat cockpit, two engines, twin fins and wings similar to those of the F-15. Its size, avionics and flight performance leave no doubts that it will succeed the aging MiG-21 Fishbed, with its limited avionics, as the USSR's low- and medium-altitude air-superiority fighter."

According to George Panyalev in a December 1981 article for IDR, what was written then, with minor changes, still holds true today. However, he adds: "It should, nevertheless, be pointed out straight away that this craft is not nearly so similar to the F-18 as has widely been assumed, although it does have certain features."

While Panyalev seems confident about the Ram-L's specifications and capabilities, American sources are most cautious in their estimations.

Panyalev claims that the Ram-L most resembles, in its external configuration, a small version of the F-15. But he warns that he doesn't intend to mean that the Ram-L is a scaled-down reproduction of the F-15, but rather that the Soviets have arrived at a similar design to meet the requirements of a similar mission.

Bill Gunston, however, in his recently published "An Illustrated Guide to the Modern Soviet Air Force" (Salamander Books, Ltd., 1982), states that the Ram-L shows a configuration similar to the YF-17 or F-18.

Although data is still speculative, IDR reports that the Ram-L does not possess any design features which unequivocally characterize the aircraft as a close-in dogfighter. The presence of twin fins does imply that the aircraft is capable of flying at high angles of attack, but the type and relatively small size of strake used would seem to indicate an interception rather than a dogfight role.

"One of the most interesting design features is the configuration of the variable-angle, double-ramp air intakes," Panyalev writes. "Not only is this type of intake particularly suitable for flying at high angles of attack but it also shows that the Soviet air force did not feel it could do without a high supersonic speed (more than Mach 1.85). Translated into practical military terms, this means that the Ram-L should be able to fly around an approaching enemy aircraft's envelope in a wide, supersonic sweep. This would appear to indicate that the Ram-L does not represent any attempt to catch up or overtake the Americans in the field of lightweight fighters like the F-16; on the contrary, its speed advantage and the performance of its air-to-air missiles will present something of a challenge to such aircraft."

It is alleged that the MiG-29 has recently been clocked at Mach 2.8 with an instantaneous turn rate of 16.8 degrees per second and a sustained rate of 8.26 degrees per second.

Comparing the Ram-L with the F-18, Panyalev says: "Looking at the thrust-to-weight ratio and wing loading, the two most important parameters for such a combat aircraft, it can be seen that, at maximum thrust and in the clean configuration, the Ram-L has an approximately 10-percent lower wing loading and a thrust-to-weight ratio which is no less than 30 percent higher (about 1.3 as opposed to 1.0). A comparison of the ratios of total wetted area to weight, surface area to drag and useful load of internal fuel reveals the following differences.

"With its approximately 20 percent smaller total surface area, the Ram-L has about 15 percent lower weight and about eight percent lower drag. The payload (fuel plus warload) is 52 percent of the total weight for the F-18, but only 44 percent for the Ram-L. This apparently striking difference should, however, be viewed in light of the fact that the value stated for Western combat aircraft is always the maximum possible payload, whereas, for Warsaw Pact aircraft, a militarily more realistic payload is assumed for maximum takeoff-weight. The fuel fraction, as may be expected, is higher for the F-18 (about 20 percent since in Soviet combat aircraft relatively more space is still taken up by avionics and other equipment).

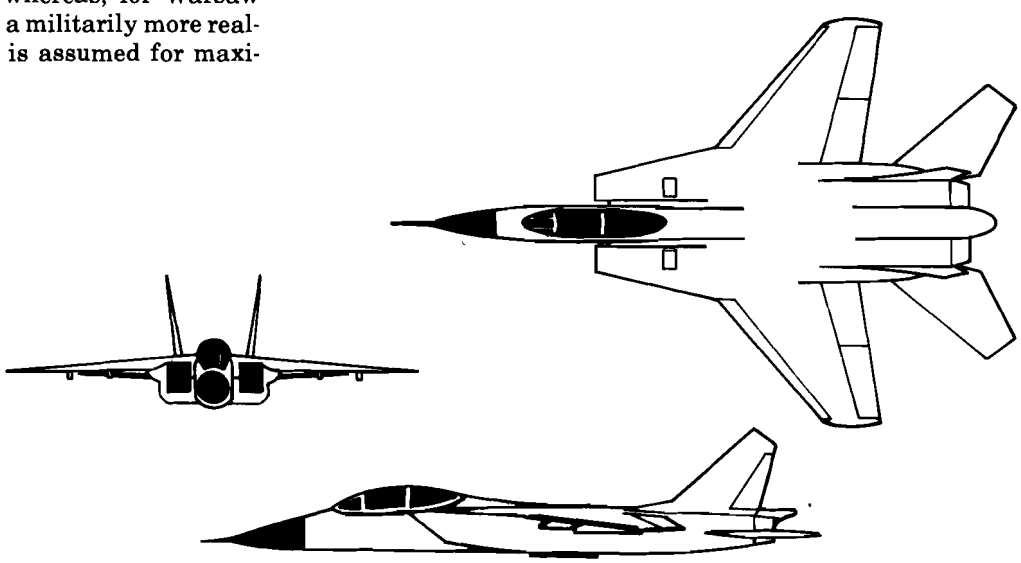
"From the aerodynamic point of view (as far as lift-to-drag ratio, induced drag and supersonic drag are concerned), the two aircraft are virtually identical. A comparison of the combat performance characteristics shows that, at sea level and Mach 0.9, the Ram-L enjoys a more than 30-percent superiority over the F-18 in specific excess power. In the case of turn rates — compared at 3,000 meters and Mach 0.7 — the performance of the Ram-L is 10 percent better than the F-18. On the other hand, the F-18 has a distinct range advantage. Although the specific ranges (distances covered per unit of fuel) for the two aircraft do not differ significantly with the F-18 being slightly more efficient, the F-18's approximately 25-percent larger fuel capacity results in considerably greater differences in mission radii. For a hi-lo-hi mission, the F-18's radius of action is the greater by a factor of about 1.5."

Although there is still no firm information as to the Ram-L's likely date of service entry, Bill Sweetman in "The Presidio Concise Guide to Soviet Military Aircraft" (Hamlyn Publishing Group, Ltd., 1981) says the aircraft will appear by the mid-1980s. Panyalev concurs, estimating the service entry to be in 1985 or so.

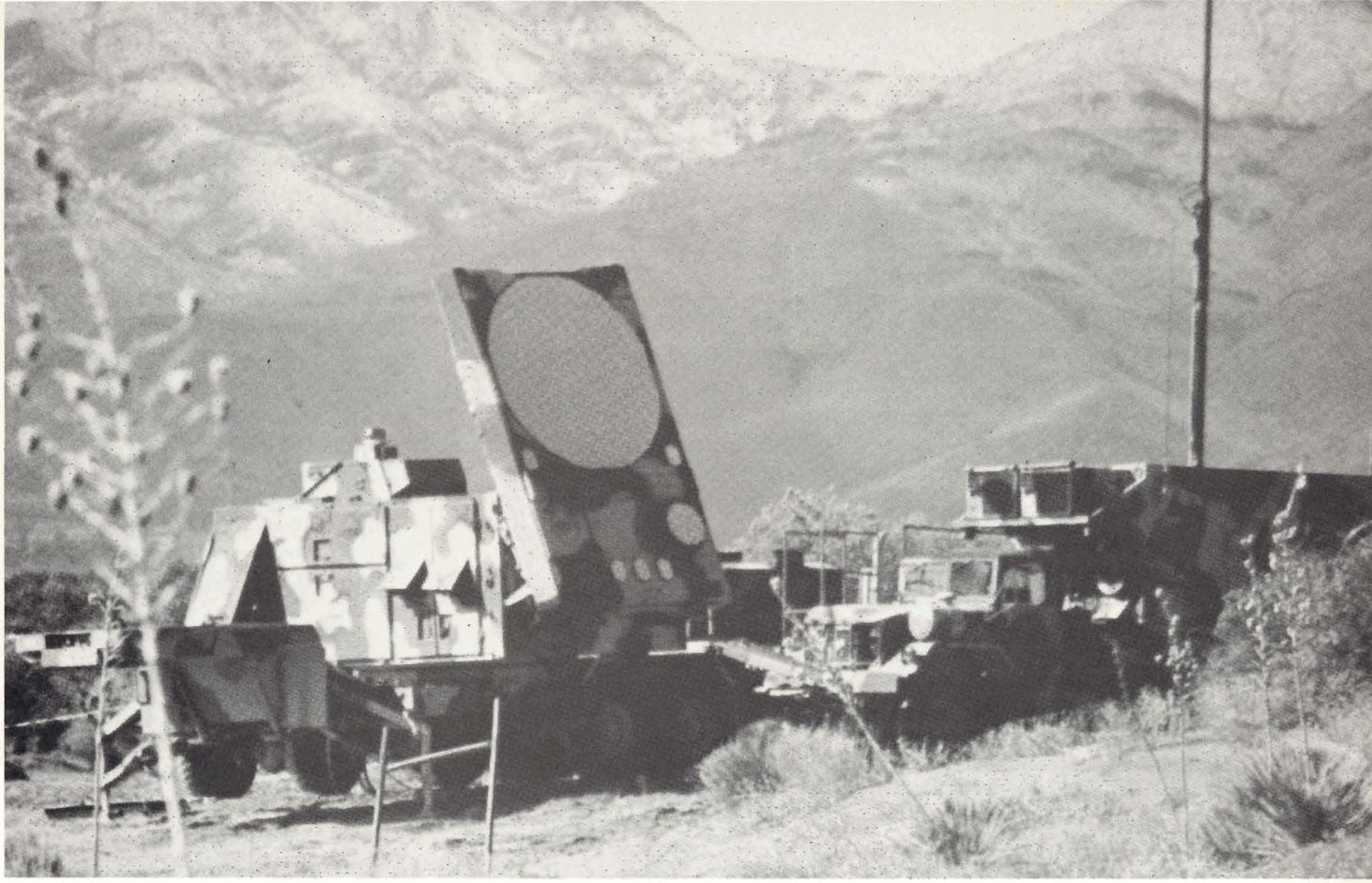
As Panyalev observes, the Soviets appear at last to be drawing level with the West in at least the fighter field. Whereas in the 1960s the difference in quality between Eastern and Western combat aircraft represented a yawning gap equivalent to a whole generation, the gap today is perhaps only five or six years. The era in which Warsaw Pact's quantity could be balanced out by Western quality is rapidly drawing to a close.

Assistant U.S. Air Force Secretary Alton Keel acknowledges that the F-15s and F-16s will probably continue to possess an edge in air-to-air combat range, adding that there is "reason to have concern about how long we can keep our technological edge."

Even though the Ram-L has been a common topic in avionics journals and the quasi-military press, no photographs of the new jet are likely to appear anytime soon in Army air defense recognition manuals.



Several artist's impressions of the Ram-L have been published since it was first seen in 1977. However, this drawing from the *International Defense Review* is believed to be the most accurate. The magazine claims that from the tactical viewpoint, the logical deduction indicated by the Ram-L's design features is that its principal role is a carrier of high-performance, air-to-air missiles for air superiority and interception missions.



INSIDE THE FIRST PATRIOT BATTALION

by PFC Greg Markley

As 1st Battalion (Patriot), 43rd Air Defense Artillery, gets fully functional and combat ready, it will be watched like a debutante on her first night at a society gala. As the first Army unit to field the sophisticated Patriot missile system, the Fort Bliss, Texas, battalion will be closely monitored by Department of the Army and top Department of Defense analysts. They will carefully calculate cost/benefit ratios and overall unit effectiveness.

But what of the "human element?" This story, and part II next issue, will reveal, through the actual voices of the soldiers themselves, what life in the history-making battalion is really like.

Assignment to 1/43 came in different ways for different folks; some

CPT Eugene S. Anderson II, commander of Headquarters Battery, 1/43, leads his troops on an early morning, two-mile PT run. (U.S. Army photo)

Soldiers from the 1/43 learn how to set up a "hot-wire" communications network during a field-training exercise. (U.S. Army photo)

actively pursued it, others had it thrust upon them by the unpredictable lottery they call the military personnel system.

SGT Danny L. White: "I volunteered for it, because it's the wave of the future. Being in a Patriot battalion is being part of the 'jet set'. The Patriot is so much more advanced that it will be easier and better to work with. I'm glad I'm here."

SFC Edward LaTour: "Well over 50 percent of the NCOs are nonvolunteers. Many, like myself, suddenly came down on Department of the Army orders while we were in Germany. I believe it was based on your retainability and overall ADA background. There were some early misgivings, but most NCOs have grown to view the assignment with great optimism."

SSG Michael LeGendre: "I guess it was only natural that I was picked for a Patriot unit. I worked with the system at the Army Research Institute here in 1979-80 and saw eight Patriot missiles launched at White Sands Missile Range. I'm excited to be here because I've seen firsthand just how fantastic this new system is. This is a dream come true for me."

SSG Richard Grimes: "I volunteered for this assignment because it's the Army's first Patriot unit. What man in ADA could resist that? It's the best thing to do if you're going to be in the Army for any length of time. You get to be with a brand new system from the beginning and to watch it grow."

SSG Jessie Everett: "I thought it was a good idea to get involved with Patriot. I've been in Nike Hercules all my life, so I thought it would be different to try something new. Plus, a lot of NCOs, like me, realize that promotions in Nike Hercules are tough and that maybe we can advance once we get the 16T (Patriot missile crew member) MOS. I'm glad to be here and can't wait for school to start."

As of mid-September, 24T (Patriot operator/maintainer) and 14E (Patriot officer) MOS studies were just getting underway. Training for the 16T specialty was scheduled for October-December. Understandably, 1/43 soldiers were anxious for school to start, so they could see whether "this Patriot thing" was as advanced as they had been told.

SP4 Tony Lozano: "It's true that people are getting a little frustrated with all this general training going on. When we get into the actual Patriot training, people will be learning things that are 'closer to home,' that are ADA-related."

SSG LeGendre: "Our troops are getting very impatient about learning how to operate the system. They've only heard about Patriot and want to see how it works."

SSG Grimes: "I volunteered for this assignment because it's the Army's first Patriot unit. What man in ADA could resist that?"

SP4 Joe Stubblefield: "Basically, what we've been doing is infantry stuff. I've been a missile man for four years, so I can't wait until we get our Patriot equipment."

Establishing a battalion means a lot of paperwork and a lot of legwork. When you're an activating unit, you have to order everything from the chair you sit in to the unit insignias you wear on your cap.

1LT Adrian Martinez: "It's really something when you can start from scratch and see a battery take shape. There are so many details that you have to work out, so many SOPs that have to be written, so much equipment that has to be added to your supply inventory."

LTC James Manning: "I've been here since November and it just keeps getting busier. As we get the equipment, begin Patriot training and prepare for the ARTEP, it will get quite busy around here. But that's good. If you keep soldiers occupied, give them a mission and purpose, then you'll have outstanding troops."

SFC Paul Espalin: "In the beginning we spent a lot of time on the AUTOVON lines. We had to order everything from regulations to radars, from distinctive unit insignia to deuce-and-a-halfs. For some reason it seemed easier to get the radars than the paper clips. But that's just the way the red tape is."

SSG Jeffery Stein: "Right now, we're at mid-level on a Rubik's Cube. We've got a lot more work to follow, much of it will be tedious and some might be frustrating, but the struggle itself is exciting."

The caliber of people in 1/43 is generally given high marks by the battalion staff and the troops themselves. Officers and senior NCOs are seen as experienced, capable and dedicated.

LTC Manning: "With very few exceptions, we have good troops. Many NCOs are fine leaders and trainers. Some of the officers, as well as the senior NCOs, are here by choice; therefore, they are very motivated. We have a lot of soldiers straight from AIT, a lot of E-2s and E-3s and they show great potential and spirit."

1SGT William Riley: "It's been a long time since I could hold my head up and be truly proud of a unit. The caliber of NCOs and troops is the highest I've seen in a long time. The battalion has a group of exceptional officers."

SSG Grimes: "We have many fine people here, both officers and enlisted. Most soldiers are here by choice, so they're dedicated, and that's half the battle."

SSG LeGendre: "I think that SQT scores and job proficiency in ADA were two of the reasons certain people were selected. It's never been quite like this in ADA; we need to be more of a computer operator than

anything else. To be in a Patriot unit you need a mechanical aptitude, not just a high GT score. The common sense factor is important, as is listening, learning and doing. From what I've seen, the 1/43 has quality people."

PFC Joseph Leroy: "I came here right after AIT. I never got to work in my old Nike Hercules MOS at all. I'm looking forward to school, though, since everybody says this new system is so good. I can't wait to find out for myself."

Most of the equipment is new, but that doesn't mean that there were not some inconveniences in getting supplies and such. Growing pains, however, are to be expected.

CPT Carl Fisher: "We have all new equipment, in terms of TA-50, but we're waiting for the Patriot-peculiar equipment to arrive early next year. We had some hold-ups due to worldwide shortages on steel pots, etc., but that's only natural. The supply system has worked well for us."

1SGT William Riley: "We haven't had too many problems getting equipment. We had to do a lot of maintenance, though, in the barracks. We're in our third building now and we have vastly better conditions. Probably the only thing that would be better would be the Holiday Inn."

The battalion has an active, effective physical training program. The batteries conduct PT Monday through Thursday and, on Friday, there is a battalion run.

SFC LaTour: "In Battery A, we give E-4s an opportunity to give PT. It trains them to become leaders and gives them confidence and NCO skills. After they give PT, we critique them. The system instills a lot of pride."

SSG LeGendre: "The battalion commander is the PT instructor on Fridays. He leads the calisthenics and the run. Seeing the 'old man' out there is inspirational. We think that if he can do it, we can do it too."

Many soldiers assigned to the 1/43 have strong personal feelings about this duty. Many see it as potentially challenging and a definite highlight of their careers.

SGT White: "Most of us expect this assignment to be really worthwhile, really interesting. Once it gets underway, it will really be something, a new adventure."

PFC Michael Walsh: "The Herc system was kind of old; it needed a lot of maintenance and it wasn't always reliable. The training here is extensive. People are pleased to be here for the Patriot training and the thrill of making history."

PFC Leroy: "I'm looking forward to school since everybody says this new system is so good. I can't wait to find out for myself."

SSG LeGendre: "We have a real challenge here. The bottom line is that we will be doing a lot of new and different things for ADA. We're writing our own ticket and that's exciting."

MAJ Johnnie Rankin: "I love this assignment. I sincerely believe it's a high honor to be here. It continually gets busier as we get closer to the ARTEP and get more soldiers on board. But it's just a delight to be here."

Being the first Patriot battalion brings with it a special challenge. This battalion must set the pace for other Patriot units; it must set the standard for successor battalions.

PFC Theodis Trimble: "We know we're being watched. We are the elite battalion in ADA now. We're all aware that we're part of history. I never made history before, so I'll make the best of it."

SSG Charles Daniels: "As a supply sergeant, I can tell you that getting equipment has been a top priority. The battalion had been planned for a long time so there was no problem getting equipment. Most of it is brand new."

SSG Grimes: "We have more emphasis on being good troops because a lot of people are looking at us. Most people want to be here, so they want to excel, they want to shine."

PFC Walsh: "We're always training. It's like they're trying to make sure that we are the best; that we're fully trained. We're supposed to set an example."

LTC Manning: "In my talks to units, I try to stress the importance of setting a good example. It's true that we'll get looked at by top military officials and ADA specialists. So we must put our best foot forward for our sake and that of Patriot as a system."

MAJ Rankin: "Most troops realize that everybody in ADA circles is watching. The battalion commander has repeatedly emphasized the importance of our mission. There's a fantastic future for the 1/43 and Patriot and we should light the way."

SSG Daniels: "When you've got people looking at you, it's human nature to strive to do a good job. If we just work hard and learn how the system operates we'll do fine. I expect we'll set a good track record for Patriot."

With the Patriot equipment not yet available, the battalion has focused on common-skills training. This will adequately prepare the 1/43 troops for the ARTEP next year, and it is in keeping with the battalion emphasis on all-around soldier skills training.

SGT White: "I spent the last two years in Germany. We have a lot more general training than on an actual site. The basic soldiering skills receive great attention there."

PFC Walsh: "Here, we're always training. We spent a whole week on NBC training. By the time we have our equipment and come back from school, we'll be one of the best trained units on post."

CPT Fisher: "This common skills push is not just to 'mark time' until we get our Patriot schooling and equipment. We want to be sure that our troops are absolutely certain of the common tasks they'll need to know for the ARTEP. We're drilling them now so that we'll only need to refresh them later."

LTC Manning: "Waiting for the Patriot-peculiar equipment provides more time for comprehensive basic skills training. But I've always believed in the old military values of discipline, motivation and all-around soldiering. Our mission is to survive in combat, and we can only do that if we're fully trained. You must remember, too, that once the system is emplaced, the 16T's main purpose will be to set up a perimeter defense, and employ the basic skills needed in combat. They might later be Stinger trained, so they need some sound general knowledge, a firm background in all tasks."

SSG Grimes: "We are all looking forward to school, and getting to apply what we learned to field conditions. I believe we've been practicing more common skills than any other unit on post."

2LT Paul Divis: "We're all anxious to test our common skills in the field environment. We can't wait to have a practical application of what we've been teaching and learning in the garrison situation. I predict we'll get high marks on general soldier skills."

Most of the initial 1/43 cadre of officers and NCOs have undergone formal Battalion Training Management System (BTMS) training within the past six months. BTMS was established to counter perceived weaknesses in the Army training system. It was designed to be incorporated with the individual training on common tasks and ARTEP programs to provide a soldier with a weekly indication of his combat readiness and training expertise. This battalion aims to take BTMS seriously, to make it work as best it can.

1SGT Mack Mitchell: "What it (BTMS) does is link all the training together in a flowing pattern, so that you don't have to cram before an ARTEP or SQT. It gives us a status update of what each soldier can do all the time. This unit plans to use BTMS fully and well."

SSG LeGendre: "In May and June, the 1/43 had a big push to get officers and NCOs familiar with BTMS. I think we have almost a 100-percent participation rate among the higher ranking personnel. BTMS enables soldiers to actually touch the equipment as they learn; this is less boring, and probably the best way to learn and remember."

CPT Brian Crotts: "As a battery training officer, I'm required to closely monitor and insert my input into the training plans and classes. The School Brigade's course gave me additional insights into how to best implement BTMS. BTMS is the most effective training system I've yet seen. But, regardless of which training system you use, it's not the system but the people who make a unit combat-ready. The most organized system in the world is not going to work unless you have dynamic leaders who motivate soldiers to excel."

PFC Trimble: "We know we're being watched. We are the elite battalion in ADA now."

SSG Everett: "I thought it was a good idea to get involved with Patriot. I've been in Nike Hercules all my life, so I thought it would be different to try something new."

(NEXT ISSUE: Phase Two: Patriot MOS Training.)

PFC GREG MARKLEY *has been The School Brigade's public information specialist since June 1981. He is editor of FOCUS, the brigade's bi-monthly newspaper, and a frequent contributor to The Monitor, Fort Bliss' unofficial weekly newspaper. A graduate of the Defense Information School, Fort Benjamin Harrison, Ind., he is currently en route to assignment in Turkey. A graduate of Rhode Island College (B.A. Political Science, 1980), he has had free-lance articles published in The Providence (R.I.) Journal-Bulletin and the Pawtucket (R.I) Evening Times.*

COVERT/PASSIVE AIR DEFENSE SENSORS: PART III

by Mike Maxfield

The following unsolicited manuscript is one author's concepts of ways covert/passive air defense sensors could be applied to existing air defense weapon systems. The Army has not approved the concepts or made plans to purchase the covert/passive sensors described in the story.

The article below contains scenarios of covert/passive air defense sensors (CPADS) in action and completes the three-part CPADS series which began in the May-July edition of AIR DEFENSE Magazine.

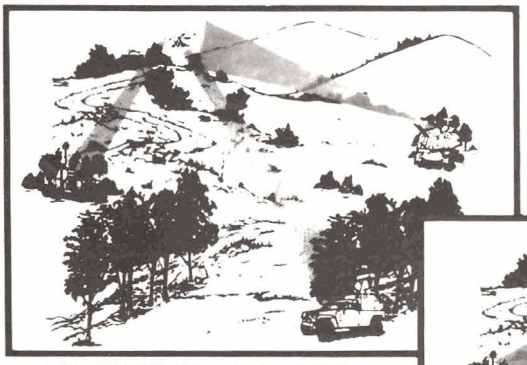
The Army's arsenal of new air defense weapons will mesh with a dramatically improved short-range air defense command and control (SHORAD C^2) system (which may eventually include airborne target acquisition systems) to improve air defense artillery's effectiveness and survivability on the AirLand battlefield.

The continued development and application of covert/passive air defense sensors (CPADS) technology to weapons like Patriot, SGT York Gun, Stinger, Improved Chaparral and the yet-to-be-developed lightweight air defense system (LADS) would help air defenders counter the growing Threat capabilities against primarily active radar sensor systems. CPADS, working in cooperation with active sensors and an improved C^2 system, could make the AirLand battlefield significantly safer for air defenders and significantly more hazardous for hostile aircraft.

Two of the more important air threats air defenders will face on the AirLand battlefield are terrain-following fighter-bombers attacking in successive waves and effective mixes of attack helicopters with close-support, fixed-wing aircraft

PASSIVE/ACTIVE SENSOR COMBINATION

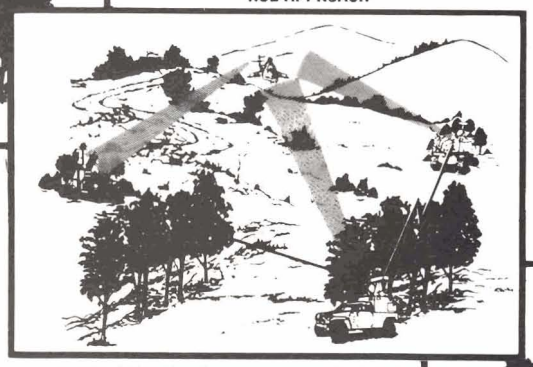
15 KM TO TARGET
Mi-24 LOW-LEVEL APPROACH



- EW THRU ACOUSTIC OR RF DETECTION
- NARROW FOV FLIR CUED TO PREDICTED AZIMUTH AND ELEVATION
- INITIAL TARGET RECOGNITION BY USING ACOUSTIC DATA (# OF BLADES), RF/DF (PRF, PRI, FREQUENCY) OR RADAR

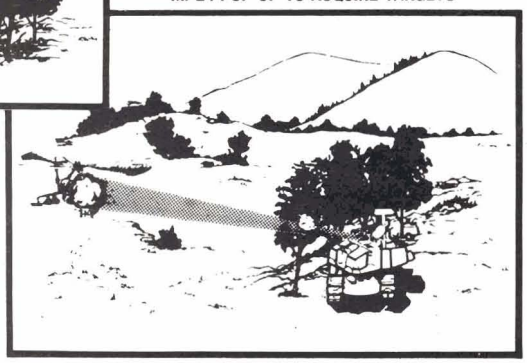
PASSIVE/ACTIVE SYNERGISM . . .

5-10 KM TO TARGET
NOE APPROACH



- RADAR USED IN "BURST" MODE FOR RANGE, SPEED, TARGET CORRELATION

3-5 KM
Mi-24 POP-UP TO ACQUIRE TARGETS



- FLIR USED FOR VERIFICATION AND ALL WEATHER ENGAGEMENT OF TARGET

. . . ENABLES THE AIR DEFENDER TO SHOOT FIRST

employed to defeat armor and mechanized infantry. The two scenarios which follow illustrate how active and passive sensors could work together to counter these two important threats and help win the AirLand battle.

Both scenarios rely heavily on industrial concepts which may or may not be approved or adopted by the Army. The airborne SHORAD target acquisition radar (ASTAR) described in Scenario I, for instance, could evolve into an ASTAR helicopter if the Army decides to develop an ASTAR. The air defense electronic warfare system (ADEWS) in the same scenario is still just a concept. The Army has no current plans to equip Stinger and LADS with a platoon coordination center such as that described in Scenario II. The reader should bear in mind that these are scenarios and many of the systems described in them are purely conceptual.

Scenario I
COUNTERING THE FIGHTER-BOMBER THREAT

Scenario I envisions an attack by terrain-following Su-24 Fencers against a corps-level command, control and communications (C^3) complex. The Fencer and the MiG-27 Flogger are presently the two most common aircraft in the Threat fighter-bomber inventory. The Flogger's smaller size dictates that most of its missions will be launched against division or corps assets while the Fencer's larger size, complexity and runway requirements indicate a primary strike role against corps, army and theater targets.

The longer distances which the Fencer will have to fly to reach its targets will allow early warning of impending attacks to be relayed to SHORAD units by the airborne warning and control system (AWACS) and by high-to-medium air defense (HIMAD) units. SHORAD land-based sensors and a still conceptual ASTAR drone would be able to detect fighter-bombers like the Fencer at 10 to 30 kilometers. These modern active and passive SHORAD sensors would maximize area coverage and minimize their own signatures, while taking advantage of the Fencer's easily detected terrain-avoidance radar emissions to provide accurate target data to SHORAD gunners.

The air defense units in Scenario I are defending critical C^3 assets in the Army or corps area. The air defense assets consist of a SGT York Gun platoon supported by a SHORAD C^2 unit and ADEWS elements. An ASTAR, with its capability of "looking down" into the folds of the earth to detect terrain-hugging aircraft, loiters over the battlefield.

Figure 1 shows the air defense unit's defense plan. Passive and active sensors available for detection and tracking of hostile aircraft include:

☐ The SHORAD C^2 unit's radar and a passive radio-frequency/direction-finding (RF/DF) sensor system.

☐ The ASTAR's passive RF/DF sensor system.

☐ The ADEW's passive RF/DF sensor for detecting and subsequently jamming RF emitters.

☐ The four weapon-mounted radars of the SGT York Gun platoon.

As the scenario unfolds, the ASTAR makes initial detection of the flight of Fencers at 10 to 20 kilometers beyond the forward line of own troops (FLOT) and alerts air defense units defending threatened areas. As the Fencers continue their penetration of the FLOT, SHORAD units positioned at or near the forward edge of the battlefield begin to inflict losses on the encroaching aircraft. Still, some Fencers penetrate through the forward division areas and close to within 15 kilometers of the targeted C^3 complex.

At this point, the SHORAD C^2 unit supporting the SGT York Gun platoon in defense of the C^3 complex has been cued to a small search area by the ASTAR drone and by its own RF/DF sensor. The SHORAD C^2 unit activates its radar in the short-burst mode to prevent a hostile RF/DF system from detecting its emissions and launching an anti-radiation missile. The ADEWS elements, meanwhile, use their highly sensitive receiving equipment to detect Fencer emitters, determine their operating frequencies and begin selective jamming of their navigation systems. The sudden loss of terrain-avoidance radar causes one Fencer to dive into the ground. The remaining Fencer pilots are forced to switch to manual control and climb to gain altitude.

The ADEWS jamming disrupts the Fencers' weapon runs and forces the Threat pilots to spend time countering the electronic countermeasures rather than concentrating on delivering weapons on their assigned target. The result is a poorly coordinated bombing run that favors the defending SGT York Gun platoon.

As the surviving Fencers approach the target, the combination of active and passive sensors of the SHORAD C^2 unit and SGT York Guns provides highly accurate target information and the SGT York Guns respond with an effective barrier of fire that eliminates the attacking aircraft before they release weapons on the target.

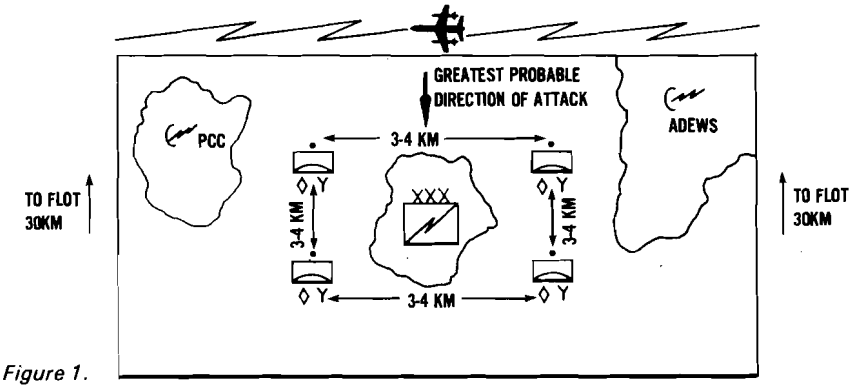


Figure 1.

The probability of 100-percent success for air defense units against an aggressive attack such as that described in Scenario I is, admittedly, low; but it should be pointed out that the sheer variety and numbers of active and passive sensors described in the scenario would pose serious problems in mission planning and execution for Threat commanders planning an attack on a C^3 complex.

Scenario II
COUNTERING THE CLOSE-AIR-SUPPORT TEAM

Threat aircraft which will be used in close-air-support roles include the Mi-24 Hind, Mi-8 Hip and the new Frogfoot ground-attack aircraft. These aircraft are designed to destroy massed columns of armor, isolate and overwhelm NATO strongpoints and support the strike of Threat air assault forces into the enemy rear.

Due to the slow speed, low-altitude flight capabilities and short-operating range of these aircraft, long-range detection by AWACS and HIMAD systems cannot be taken for granted. Medium- and short-range sensors will have to supply early warning, target acquisition and gunner cueing to prevent the Threat close-air-support team from accomplishing its mission.

In Scenario II, an infantry battalion supported by air defense assets has been assigned to defend a mountain pass ideally suited for the movement of armored vehicles through rough terrain (fig 2). The following air defense assets are available:

- ☐ Five Stinger teams.
- ☐ Four LADS.
- ☐ One platoon command center (PCC).
- ☐ The infantry's crew-served and small-arms weapons.

As a prelude to an armored thrust designed to achieve control of the pass and penetrate into the division rear area, the Threat commander has decided to launch an air-assault force supported by Hind-D gunships, Hip assault helicopters and Frogfoot aircraft against the infantry defending the pass.

An artillery barrage begins falling on defensive strongpoints five minutes prior to the arrival of the air assault force, pinning the infantry in their protective emplacements and destroying exposed communications gear. Threat electronic countermeasures disrupt communications between the battalion and its higher headquarters. The combat assault preparation includes special munitions and a mix of high-explosive and chemical rounds directed against air defense sites and infantry positions.

The force of Hinds and Hips, trailed by the faster-moving Frogfoots and moving steadily at low

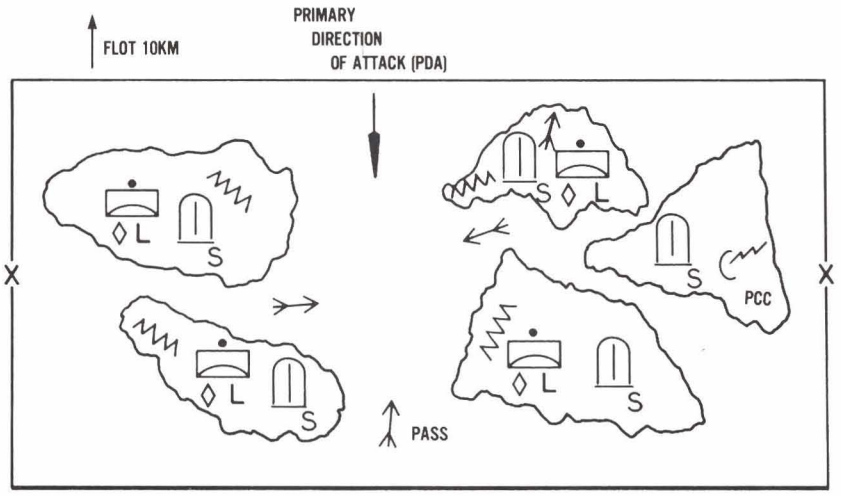
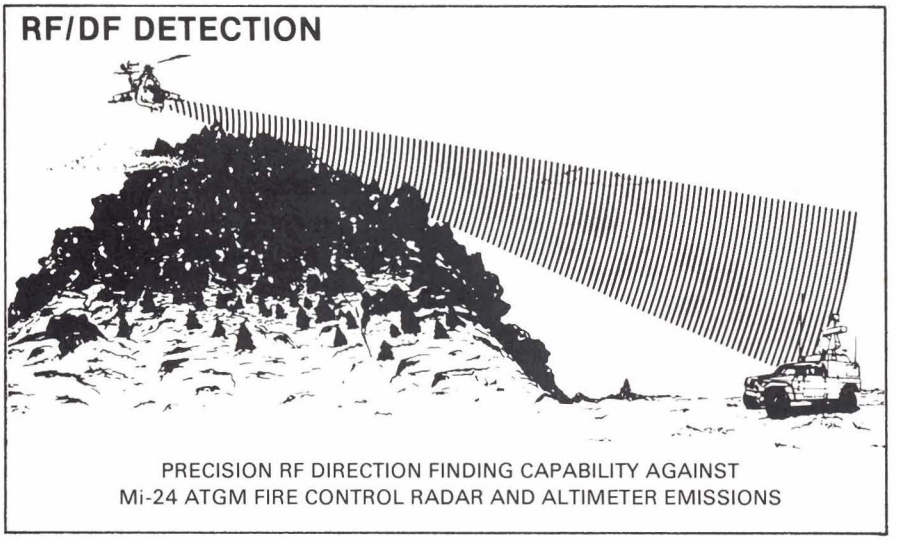


Figure 2.



A hit by an anti-radiation missile demonstrates the vulnerability of active sensors.

altitudes under strict communications silence, has just penetrated NATO air defense forces at the FLOT and is within 10 to 15 kilometers of its objectives.

The PCC located in the pass is equipped with a multiple sensor system composed of radar, forward-looking infrared radar (FLIR), passive RF/DF sensors and laser range-finders. The PCC conducts passive surveillance to prevent disclosing its position, detects the approaching hostile force and uses its laser range-finder for target ranging. The target information is relayed by data link to the Stinger section headquarters where it is displayed on a briefcase command and control terminal. At the same time, individual Stinger teams and LADS units receive data on their own handheld data terminals.

As the assault helicopters begin the final approach, passive acoustic sensor systems on the LADS pick up the main rotor blade's low-frequency sound wave, alert the LADS gunners to the approximate azimuth to the targets and direct the FLIR on each system to search for the target within a narrow field for precise target identification and tracking.* The PCC is also alerted and uses its radar to initiate surveillance and target-tracking within the designated airspace. The PCC radar detects the Frogfoots and cues the Stinger teams to the correct azimuth and elevation of the targets, thus preparing the Stinger gunners to engage the target at maximum range.

As the gunships join the battle, they operate in a standoff mode to provide covering fire for the Frogfoots' weapons delivery runs. However, the LADS gunners, alerted by the acoustic sensors, are able to shoot first. The active and passive sensor combination provides accurate cueing and the LADS and Stinger gunners force the Frogfoots to abort the attack before the troop-carrying Hips can deploy their troops.

*The Army is not convinced that acoustic sensors can reliably discern friend from foe under battlefield conditions. The scenario assumes that the acoustic identification debate will be decided in favor of acoustic sensors.

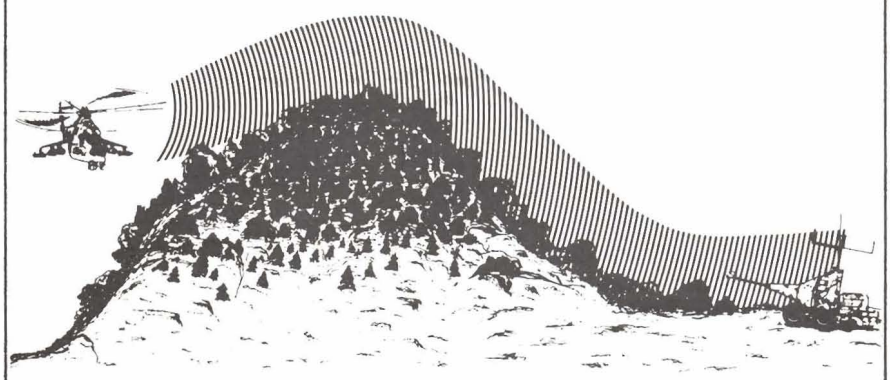
Scenario II ends in an air defense victory made possible by a combination of active and passive sensors. The passive sensor technology described in the two scenarios and in the first two articles of the CPADS series is, however, still largely conceptual. Little has been done in the actual application of covert/passive sensor technology to air defense weapons except for the addition of FLIR to Improved Chaparral and the addition of the tracking adjunct system to Hawk.

The Soviets, in contrast, have moved rapidly ahead in covert/passive sensor technology. The adaptation of covert/passive sensors to Soviet weapon systems demonstrates that Threat planners understand the vulnerability of stand-alone sensors.

Any single sensor system can be degraded and eventually defeated by Threat countermeasures. Multisensor systems, however, present difficult problems to the Threat commander. A multisensor system, combining both active and passive sensors, forces him to devote precious time and resources to overcoming passive/active air defense sensors rather than concentrating on destroying his assigned target. Enemy efforts to detect and defeat multisensor systems will require constant pilot attention and near-perfect mission planning and execution. The adaptation of covert/passive air defense sensors to existing air defense weapons and C^2 systems could help sway the course of the AirLand battle.

The covert/passive sensors described in Scenarios I and II and their application to air defense weapons and strategies are only a few of many covert/passive sensor concepts being studied by industry. The number of concepts and the methods of their implementation are only limited by the imagination.

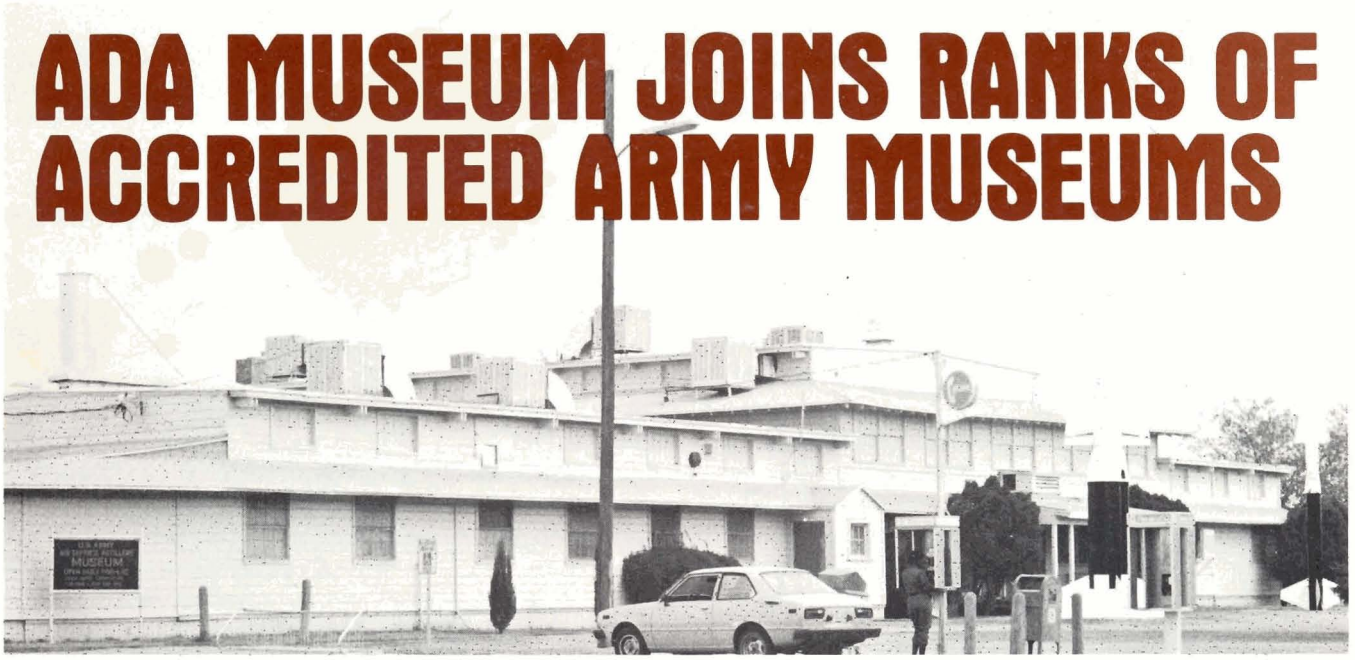
ACOUSTIC DECTECTION



ACOUSTIC DETECTION AND CLASSIFICATION OF THREAT HELICOPTER

MIKE MAXFIELD *is a former air defense officer with assignments to 2d Battalion, 71st ADA (Korea), and the 101st Airborne Division (Air Assault) to his credit. He attended the Airborne, Air Assault, and Jungle Warfare School while on active duty. A native of Indiana, he holds a bachelor of science from Indiana State University and a master of science in systems management from the University of Southern California. He is now employed as a product marketing engineer in the Defense Suppression/HARM Division of Texas Instruments, Incorporated, in Dallas, Texas.*

ADA MUSEUM JOINS RANKS OF ACCREDITED ARMY MUSEUMS



Air Defense Artillery, organized as a separate combined arms branch during the Vietnam Era, is often regarded as a branch without a history, but the Air Defense Artillery Museum, Fort Bliss, Texas, traces ADA's roots back to colonial times. The museum has so superbly done its job as official keeper of the air defense tradition that it recently became one of only five U.S. Army museums to win accreditation by the American Association of Museums.

The ADA Museum opened in 1975 on the 200th anniversary of the founding of the Army. A major development program was begun under the guidance of Museum Director Sam Hoyle. A stroll through the ADA Museum today is proof that the best Army museums have emerged from the dark ages of military museology when most service museums were amateurish collections of dusty relics haphazardly displayed.

An articulated mannequin in a doughboy's uniform explains anti-biplane tactics from the gloom of a 1918 bunker while an artillery barrage rumbles and flashes in the devastated no-man's-land visible through the firing port. Stukas and Messerschmitts flash by the slit windows of a World War II observation post. A 40mm anti-aircraft gun is set beneath jungle camouflage netting in a South Pacific setting so realistic you feel mildewed. Historic vignettes are screened in the museum's mini-theater adjacent to the exhibition area.

Sam Hoyle, museum curator, inspects stored artifacts at the Air Defense Artillery Museum.

The articulated mannequin, the elaborate displays and the collection of air defense weapons are only a small part of the museum's contribution to the air defense community. Members of the museum staff provide a two-hour program of instruction to all soldiers in Air Defense Artillery One Station Unit Training, NCO Advanced Course, Officer Basic Course and the Officer Advanced Course. The training is tailored to the varying educational and experience levels of the audiences.

Furthermore, the staff has assisted in developing and designing displays for other museums such as the Andersonville Civil War Prison Museum and the Fort Frederica Museum in Georgia, the 2nd Armored Division Museum at Fort Hood, Texas, and the John M. Browning Memorial Museum at Rock Island, Ill. Staff members have also provided their services as survey consultants for the American Association of Museums at institutions such as the George Washington Carver Black Her-

itage Museum in Austin, Texas, and Western New Mexico University in Silver City, N.M.

The museum has also provided audio-visual and exhibit instruction to the Texas Historical Commission's semi-annual Winedale Seminar and George Washington University workshops, and courses in curatorial methods to the National Park Service and U.S. Army.

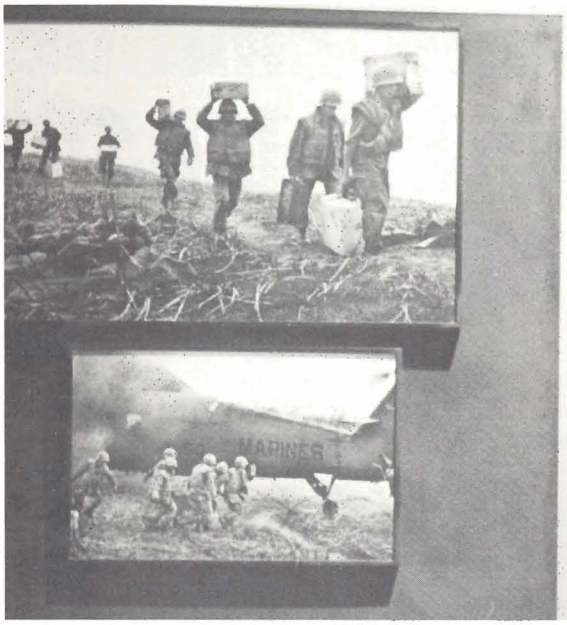
The ADA Museum was recently honored by its selection as the site for October 1982's Annual U.S. Army Museum Conference, a symposium sponsored by the U.S. Army Center of Military History and attended by more than 150 curators from both the federal and private sector.

A significant factor in the success of the museum has been the staff's belief that a museum is not a dusty collection of relics and artifacts, but a vital educational tool. Hoyle credits his hard-working staff members and the support of Fort Bliss organizations like the Air Defense Artillery Association.

The association, in conjunction with the museum, sponsors educational outreach programs, an oral history project and plans to open a museum gift shop. The association is also working to establish a corporate building fund for the museum. Individuals interested in joining the museum association, taking part in its volunteer programs, or just learning more about the ADA Museum can write to the Air Defense Artillery Museum, Building 5000, Pleasanton Road, Fort Bliss, Texas, 79916, or call (915) 568-5412 or AV 978-5412.

The accreditation process which landed the ADA Museum among the top five Army museums included an on-site inspection of all facets of museum work. American Association of Museums officials studied staff qualifications, museum programs, preservation

Willie, the articulated mannequin, speaks to visitors from his World War I trench "home" about the developments of air defense during that war in Europe. (Photo by Harry Dudek)

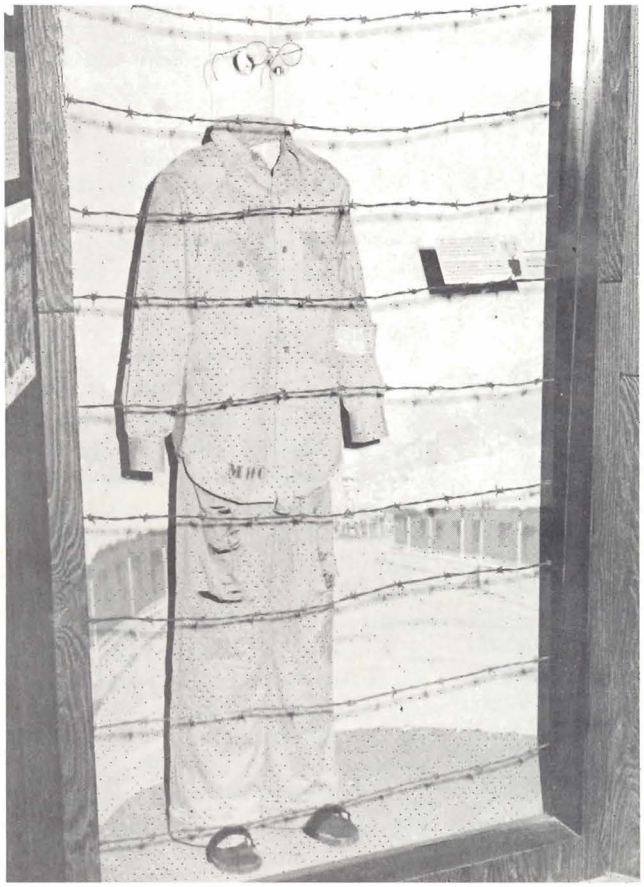


The David Douglas Duncan Exhibit is one of many exhibits that have been presented at the ADA Museum. Duncan was a photographer during the Korean and Vietnam conflicts.

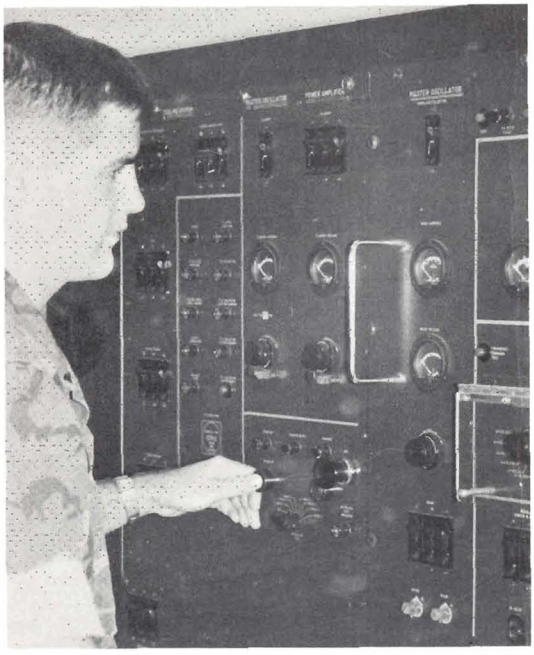
techniques, acquisition procedures, exhibit practices, related associations and museum security.

Despite the accreditation pressures, museum staffers worked through the summer to create this fall's special exhibit. "Who Shot the Red Baron" will allow museum visitors to make up their own minds about who deserves credit for downing Baron Manfred von Richthofen — Canadian pilot Arthur Brown in his Sopwith Camel or an unknown and uncelebrated machine-gun crew mired in the unglamourous muck of the Somme battlefield.

More than 52,000 people visited the museum during the first seven months of 1982 to view exhibits like "Herman Goering: The Eagle Corrupted." An ever-changing program of exhibits and audio-visual presentations will bring many back for repeat visits and will insure a steady stream of first-time visitors through the doors of the ADA Museum into the history of Air Defense Artillery.



This prisoner of war uniform is a composite of garments donated by veterans of the 200th Coast Artillery Regiment (New Mexico National Guard). Survivors of Bataan, they were liberated after 3½ years of incarceration in Japanese POW camps. The glasses were manufactured in the camp.



ADA MAINTENANCE TRAINING TURNS TO SIMULATION

System-unique training modules, such as the simulated radar transmitter assembly above, make AMTESS different from other maintenance training devices. They allow a highly flexible, versatile, true-to-life, hands-on approach to maintenance training.

The traditional methods of training Army maintenance personnel in MOS courses and at the unit level may be on the threshold of significant change if current evaluation of a new application of simulation technology is successful. The thrust of this change will be a shift away from using operational equipment as training vehicles to the use of simulated maintenance trainers for maintenance training.

In 1979 the U.S. Army Program Manager for Training Devices, Orlando, Fla., inaugurated the Army Maintenance Training and Evaluation Simulation System (AMTESS) program. The aim of the AMTESS program is systematic exploration of approaches to improving training effectiveness through application and effective employment of advanced simulator technology to Army maintenance training. One such approach being explored in the AMTESS program is the development of a series of combined "hands-on" and "heads-on" maintenance trainers to cover a broad spectrum of functional maintenance areas for both institutional and unit training.

PHASING IN

The AMTESS program is being conducted in phases. Phase I, now completed, involved a Task Commonality Analysis, a Training Requirements Analysis and a Fidelity Analysis of specific MOS courses and equipment. It culminated in a preliminary systems engineering design for an AMTESS simulator concept.

Phase II of AMTESS, currently in its final evaluation stage, involved the development of the preliminary systems engineering design into a breadboard model to allow demonstration of the simulation concept and its evaluation under operational training conditions. The Army's evaluation will demonstrate the training effectiveness of this simulation concept and, assuming its success, should result in a general purpose specification for use in continuing design and procurement of Army AMTESS devices to support training for various items of operational equipment. Under this specification, AMTESS maintenance simulators could be designed and developed for many different Army training applications. These devices would comprise a family of devices having common instructor, student and certain software operating modules, as well as having maintenance system-unique modules.

Seville Research Corporation of Pensacola, Fla., in association with Burtek, Inc. of Tulsa, Okla., has designed and developed such an AMTESS device. The Seville-Burtek AMTESS equipment was delivered to the Army in March 1982, and the Army evaluation of the AMTESS system is now in progress.

During the earlier AMTESS effort, 63- and 24-series MOSs were selected as those whose training programs the AMTESS systems would address. Not only do these MOSs represent distinctly different areas of maintenance training — vehicular and radar maintenance — but they represent areas in which there is high utilization of actual equipment for maintenance training. As a result of the Phase I analyses, two items of equipment were selected for simulation: the Cummins NHC-250 Diesel Engine that is installed in the M809 series five-ton trucks; and the Radar Transmitter Assembly of the Improved High Power Illuminator Radar Set, AN/MPQ-46, part of the Hawk air defense guided-missile system.

MODULE SYSTEM

The Seville-Burtek AMTESS system is comprised of two major modules — a *core module* consisting of an instructor console and a student console, and a *training module* which is a three-dimensional replica of the actual equipment. The core module is a common family element and can be used with any training module. The training module is unique to the operational equipment simulated and is designed to meet training requirements specific to that system.

The instructor console houses a microcomputer, a display terminal, a hard-copy printer, a power supply, and the instructor's control panel. The design of the instructor's control panel keeps system operation as simple as possible. From his panel, the instructor can specifically select

any training exercise, can insert simulated equipment malfunctions (either manually or automatically through the exercises selected) and can obtain various types of information including a computer-generated record of the student's performance. Also, by plugging in a typewriter-style keyboard, the instructor can easily update individual exercises to accommodate revisions in maintenance procedures using a guided editing program.

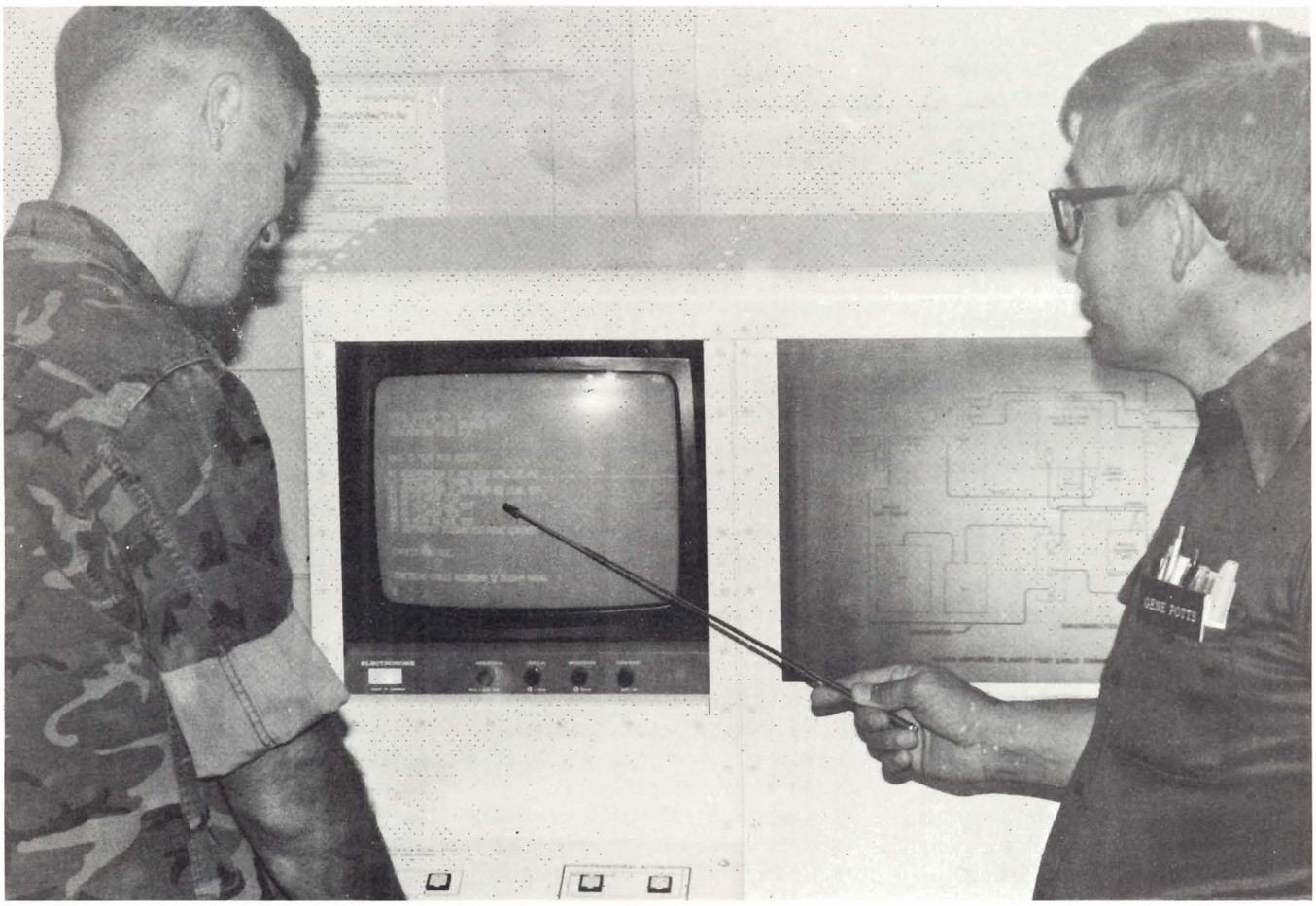
The student console is a roll-around desk which holds a video display terminal, a visual projection unit and a student responder panel. The student responder panel contains a series of procedural action pushbutton switches which allow the student to tell the computer what maintenance action he is performing or to answer questions posed by the computer. The video display terminal allows the computer to present cues and information to the student and to ask specific questions to which the student must respond by using the responder panel. The content of the messages and questions is part of an individual exercise scenario. These scenario messages and questions can be changed easily, using the editing program previously mentioned.

The visual projection unit enhances student training by providing visual scenes under computer control to accompany maintenance instructions and procedures provided in technical manuals, student handouts or on the student's video display. The scenes can be drawings, photographs, charts or text, as desired. The projected material can easily be changed or modified since the projection unit is under the control of the computer whose training software can be changed via the exercise editing program.

MONITORED INTERACTION

Student interactions with the equipment are automatically monitored by the computer through sensors on the training module. However, some actions, such as visual inspection of components or changing oil, cannot be checked by the computer. The student tells the computer that he is performing these actions by using the pushbutton switches on the student responder panel. In addition, he can identify failed components for removal and replacement, or transfer work to a higher maintenance level. There is also a pushbutton for the student to call the instructor for assistance.

The other major module is the system-unique training module. As noted, two training modules, one diesel and one radar, have been delivered and are undergoing evaluation. It is the system-unique training module, and the concepts embodied therein, that makes AMTESS



USAADS instructor Gene Potts uses an AMTESS student console visual projection unit to explain Hawk maintenance procedures.

different from other maintenance training devices. It allows a highly flexible and versatile, true-to-life heads-on/hands-on approach to maintenance training. The student not only can perform most routine checks and preventive maintenance, he can follow fault diagnosis through to correction by actual adjust and remove/replace maintenance actions. Thus, he is able to execute fully integrated maintenance actions, many of which could not be taught previously with real equipment, flat-panel devices and other approaches. Another significant aspect of the Seville-Burtek AMTESS concept is that these heads-on/hands-on maintenance procedures are carried out using Army technical manuals in their execution. Thus, the functional context within which maintenance training is conducted closely approximates that in which the maintenance technician will actually work on the job.

The NHC-250 Diesel Engine module is a full-scale mock-up of the actual engine including the radiator, batteries, instrument panel and many engine-mounted accessories used on the NHC-250 Cummins engine. Thirty-eight diesel maintenance tasks can be taught with the module, including inspection, troubleshooting, removal and replacement of components, performance testing and adjustment or combinations thereof (i.e., troubleshoot, remove and replace failed component and test after replacement). These tasks are incorporated in 50 automatic instructor-selectable exercises. Additionally, there is a program which randomly selects a malfunction, generates all the symptoms and indications, then monitors the fault isolation procedures.

The computer in the core module monitors the student's step-by-step progress through each of the tasks. This is done primarily through sensors embedded in the engine module and the system's electric circuits. The embedded sensors look for such things as proper installation of components (e.g., the oil pump, fuel pump and starter), proper electrical and hose connections and belt tension. The computer can sense if a particular task is done correctly or incorrectly, and can alert the student when he or she deviates from standard maintenance procedures. Information obtained from these sensors is compiled into a computer-generated student performance report.

Engine operation dynamics are simulated, including sound and instrument readings, but the hazards of high voltages or moving parts have been eliminated. The sensors mentioned above assist in the simulation of the engine. For example, if the engine is started with an oil line not connected, there will be no oil pressure, and if the engine is allowed to run, it will eventually overheat, seize and stall.

RADAR SIMULATOR

The training module for the transmitter assembly of the AN/MPQ-46 radar set simulates a complex item of electronic equipment. Sophisticated and lengthy radar troubleshooting procedures may be taught with it. For example, one procedure — a transmitter high-voltage test — contains more than 200 steps with a large number of branching steps.

The design approach for the radar training module is similar to that of the diesel engine trainer. Removable components are similar in appearance to the actual equipment and sensors are used to detect correct or incorrect procedures. The transmitter's functional operation is simulated quite completely so that execution of correct procedures will result in proper indications on control panel instruments and indicators. A significant feature of the radar transmitter trainer is that rate response is included in the simulation software program. Training realism is enhanced in those instances where technical manuals specify that the true rate of indicator response is essential to verification of proper system operation.

There are 38 tasks in 50 automatic exercises which can be performed on the AMTESS radar transmitter unit. Additionally, the transmitter includes random malfunction selection. Like those for the engine, these tasks encompass a full range of maintenance procedures, including inspection, troubleshooting, adjustment, removal and replacement of components and performance testing.

In both training modules, student performance is measured rigidly against the specified maintenance procedures where they exist. The student performance report indicates in a step-by-step sequence what the student did and highlights deviations from the established procedure. Where no published procedure exists, or where the procedure is optional, the report consists of a step-by-step listing of actions performed by the student. The instructor can use the report to evaluate the performance of the student. The system will provide a printout of the report if requested. The hard copy report can be used for student critique and debriefing, and it can become a part of the student's permanent record if so desired by the instructor.

TRAINING MILESTONE

The Seville-Burtek AMTESS equipment now under evaluation by the Army represents a milestone in efforts to improve the knowledge and skill of future Army maintenance specialists. It retains the advantages related to use of real equipment in training, while avoiding many of the disadvantages. Further, it allows for a considerable expansion of the scope of training beyond that now possible.

The potential impact of improved maintenance training goes far beyond the service school and unit training environment. Improved skills and knowledge, better retention of the practical aspects of maintenance procedures and increased confidence in the mechanic's ability to correctly perform procedures are major human factors in reducing maintenance down time and increasing equipment readiness. These aspects of readiness determine a unit's ability to shoot, move and communicate successfully in combat.

SHORAD COMMAND AND CONTROL 'THE FORCE MULTIPLIER'

by Major Miles G. Bramblett, Jr.

The Army is developing an automated command and control (C^2) system to make its new family of short-range air defense (SHORAD) weapons — SGT York Gun, Improved Chaparral, Stinger and Roland — even more effective on the AirLand battlefield.

The same weapons are also being tailored to fit the deployability and airlift requirements of light, air-assault and airborne divisions. To suit these units, a Lightweight Air Defense (gun) System (LADS) will replace the SGT York Gun. A towed version of the Chaparral is being developed. Stinger needs no modification. The fielding of these weapons will give ADA quicker reaction times, greater range and lethality and the ability to operate day or night even in adverse weather. The new C^2 system will give SHORAD gunners target information fast enough for them to take full advantage of the new weapons' capabilities which include organic identification, friend or foe (IFF), and forward aspect engagement.

The C^2 system, which uses state of the art communications equipment coupled to data processors for rapid transmission and receipt of SHORAD C^2 information, is in the final stage of definition. Since competing designs for the system will be sought, the following description of the C^2 system is general rather than specific.

The Air Defense Center and USAADS' Directorate of Combat Developments and the Project Manager, Air Defense Command and Control Systems presented the detailed system description to a general officer review in September. Following that review, industry will be invited to submit designs. Once a design is selected, an incremental process will be used to expedite the fielding of SHORAD C^2. In other words, various components of the system will be fielded over several years as they become available, with 1990 being the general target date for the objective, full-up system fielding. The major differences between the first increment and the objective system are shown in figure 1.

THE SHORAD SENSOR AND C^2

SHORAD gunners manning the new weapon systems will have greater potential to destroy an attacking air threat. To efficiently do this job, a sensor that can operate in a heavy electronic-countermeasures environment and can alert and cue SHORAD crews is essential to the SHORAD C^2 system. Today's forward area alerting radar will be replaced or upgraded to automatically extract data on detected targets. The future radars will be netted so that targets can be correlated (one target or a group of targets will be reported from this net as one image — not as separate images).

The radars for the SGT York Gun or LADS will also be netted and will receive information from the SHORAD sensor to provide an alert of what is coming, its azimuth of approach and its exact location. Front-line Stinger teams will also be alerted and cued by this combined data. This process will allow the gun systems to remain passive until the air battle is about to begin, thus improving their survivability.

The SGT York Gun or LADS will also serve as a "picket line" for the rear SHORAD weapons. As the Threat approaches and becomes engaged by the forward guns and Stingers, the C^2 system will flash the information to the rearward SHORAD elements, alerting them with specific details about the approaching attack. If the Threat attacks from the flank, the C^2 system will also exchange data with the SHORAD units on its flanks.

The interim system SHORAD radar will "grow" into a SHORAD sensor for the objective system by preplanned product improvement which will add passive capabilities and the ability to "look down" and detect low-flying, Threat helicopters and close-air-support, fixed-wing aircraft.

THE SHORAD C^2 CONCEPT

The C^2 system will be used by SHORAD units worldwide to assist in protecting the force and defeating the Threat. It will provide the means for collecting, routing, sorting, processing, disseminating and displaying the air battle management operations data necessary to effectively perform the SHORAD mission. It will replace the manual SHORAD control system and will automatically distribute C^2 information.

The requirements of the new SHORAD C^2 system are:

- ☐ to alert SHORAD elements of pending air attack.
- ☐ to alert the defending force of pending air attack.

Interim	Objective
Improved SHORAD radar	Objective sensor
Single channel ground-to-air radio system (SINCGARS) communications	Position location and reporting system/joint tactical information distribution system hybrid communications (PJH)
Limited airspace management	Airspace management

Figure 1.

□ to cue SHORAD gunners to Threat aircraft.

□ to provide for the rapid dissemination and acknowledgement of ADA weapons control orders.

□ to rapidly exchange, process and display ADA command information.

□ to disseminate airspace management information to the appropriate users.

□ to integrate SHORAD with the other battlefield functional areas, such as fire support, intelligence, electronic warfare, maneuver control and combat service support.

ever, the role and importance of the man-in-the-loop will not be reduced. All elements of SHORAD will be integrated by the system.

As stated earlier, the SHORAD C^2 system will evolve from an interim to an objective system through an integrated process designed to eliminate "throw-away" equipment. Processors and display devices will remain the same throughout the fielding of the system.

Additionally, the concern of overloading SHORAD gunners with too much information is being specifically addressed during the design process of the new system. To prevent overloading, the air battle picture required at any particular level is all that will be provided. A Stinger gunner, for instance, will use a small, hand-held display (fig. 2) that will indicate only the targets in his immediate engagement area. He will be given an alert indication, in clock position, warning him of aircraft beyond his engagement range but closing in on his area. This same information will be presented on the SGT York Gun or LADS displays and the integrated weapon displays of the Improved Chaparral. Air defense warning and weapons control status for the weapon system operating area will also be displayed. At the opposite end of the scale, however, the battalion operations center will see a display presenting the total air battle situation which SHORAD is facing — where the units are located, significant boundaries (forward edge of the battle area, coordination points, etc.) and the composite array of detected aircraft. Thus, the SHORAD C^2 system is being designed to provide the right information, at the right time, to the man who needs that information. Every attempt is being made to reduce manual functions and to present a real-time, accurate "picture" of hostile targets to our air defense gunners. By doing so, forward aspect engagements can occur.

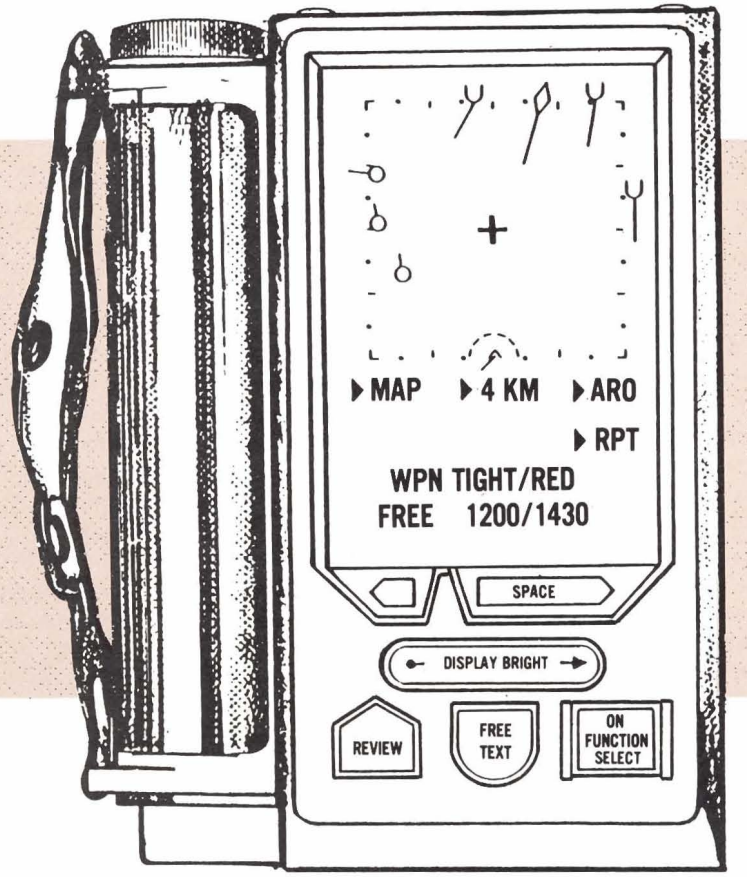


Figure 2. Hand-held Display/Processor.

Elements of the SHORAD C^2 system which will be employed at each level of SHORAD units, from the battalion tactical operations center to section leaders, may consist of displays, processors, interface equipment, communications equipment and sensors. The system will use automation to meet information accuracy, timeliness and bookkeeping requirements; how-

SHORAD C² AND THE ENGAGEMENT PROCESS

Figures 3, 4 and 5 depict what SHORAD C² is all about — allowing the gunner the advantage of his weapon system's capability to defeat the Threat as far away as possible.

Figure 3 is a summation of many studies that provided quantifiable information on what many SHORAD air defenders have intuitively known for some time — alerted SHORAD gunners perform better than non-alerted gunners. The illustration shows that an observer who is aware of an approaching target and its general direction can detect that target considerably farther out than an observer who is not aware of aircraft or their locations.

Figure 4, also a result of the same studies, indicates the effect of alerting and cueing given to a Stinger gunner. In this case, with alerting and cueing, and assuming a 50-percent chance that the terrain and weather allow the gunner to see the target, the Stinger gunner can complete the engagement process, launch his missile and intercept the target at approximately five to six kilometers from his position. If this same gunner under the same conditions is not alerted and cued, he will probably start the engagement process (detection) at approximately two kilometers.

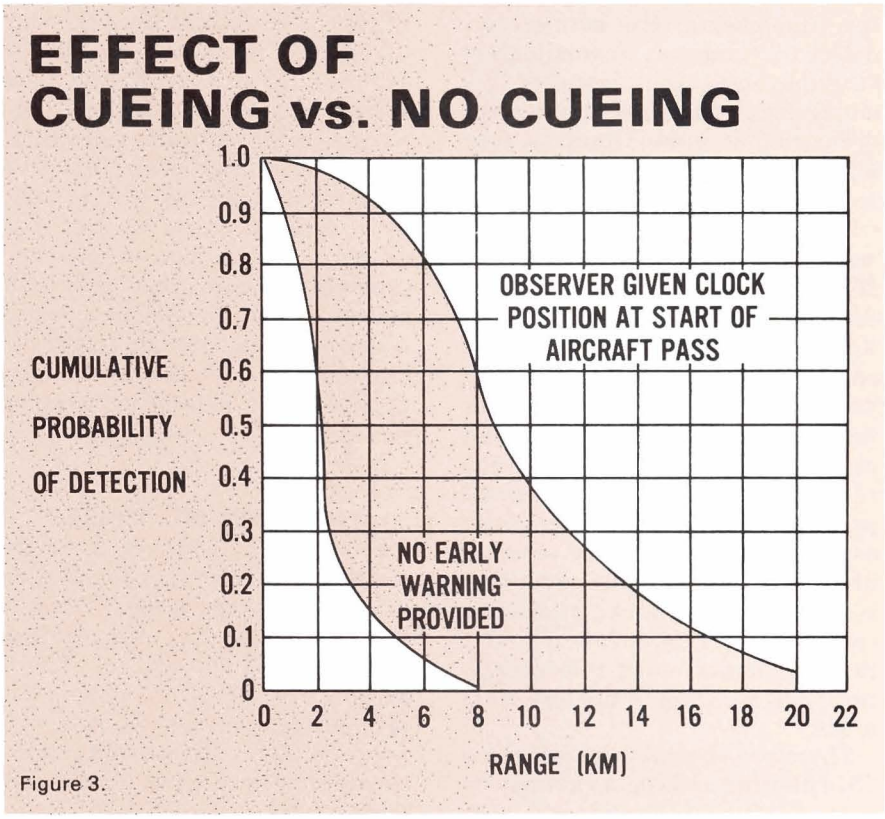


Figure 3.

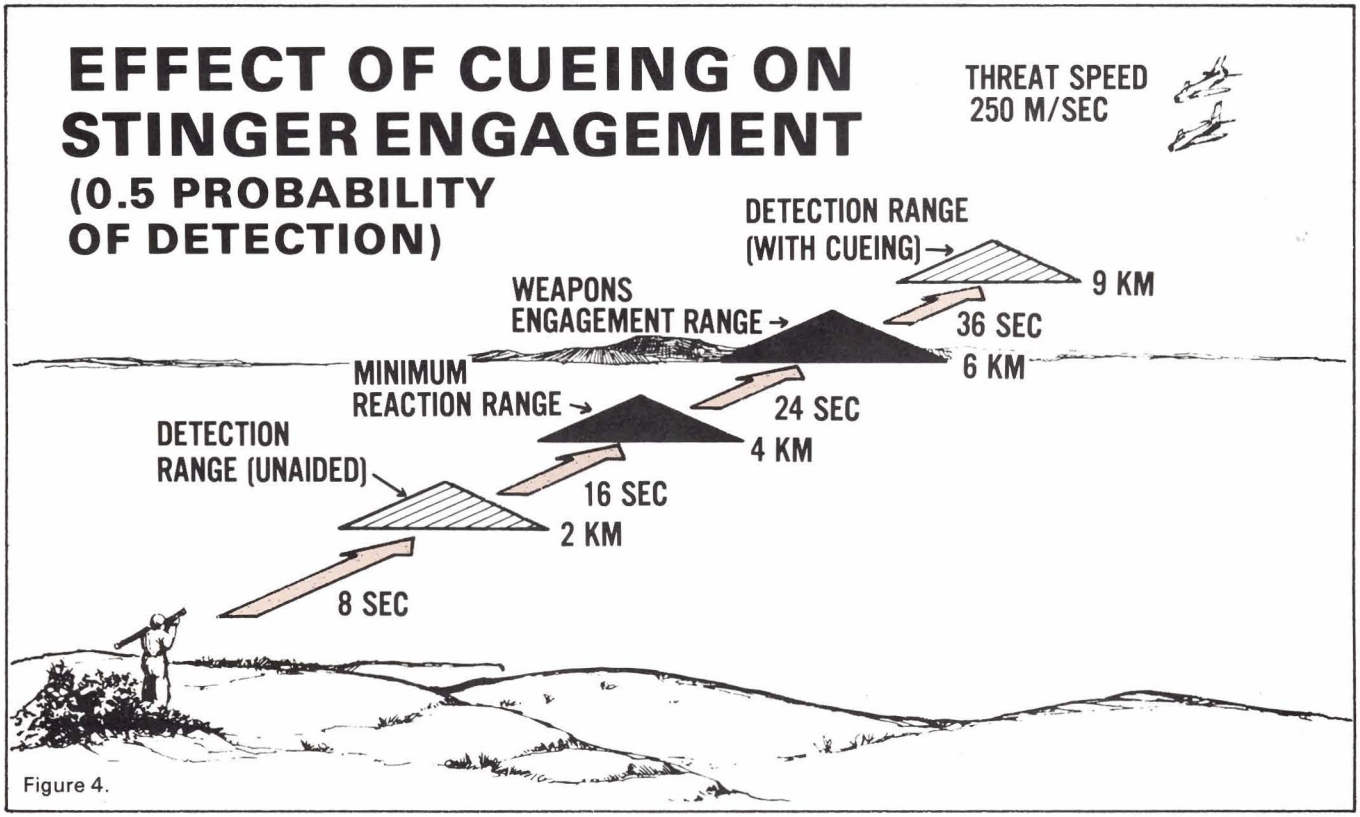


Figure 4.

Figure 5 includes the same data but adds the time required for reaction and engagement of the Threat. This chart indicates that with alerting and cueing, the gunner can detect the target at approximately 10 kilometers and complete his engagement process with intercept occurring at approximately four kilometers. This same gunner, cued to the approaching Threat aircraft (top line), but restricted by terrain or weather from detecting the target at five kilometers, will still achieve an intercept at approximately one kilometer (middle line). The key words are alert and cue. Refer to figure 3 and note that the probability of detection at five kilometers by an observer with no early warning is nine percent versus a 90-percent probability of detection when given early warning. With the average detection range of an observer who is not alerted being two kilometers (bottom line), it is apparent that a Stinger gunner under these conditions will be firing in the tail-chase mode.

Therefore, the value of SHORAD C^2 in alerting and cueing gunners is obvious. With C^2, the gunner can use the forward aspect capabilities of his weapon system and destroy Threat aircraft at the earliest possible engagement window. Without C^2, the probabilities are high that the gunner may not be able to engage a Threat aircraft until it has overflown him. Also, if the Threat aircraft is offset from the gunner and never comes closer than two kilometers, the gunner will probably never detect it unless alerted. With alerting, the radius of detection expands to approximately 10 kilometers — a significant improvement when one considers that Threat aircraft will not always directly approach and overfly our weapon systems.

THE FORCE MULTIPLIER

By using automation to implement the concept previously outlined, SHORAD C^2 will become a force multiplier. The end result of this system is, and will continue to be, to allow SHORAD gunners to take full advantage of their new weapons' capabilities to destroy the enemy in a hostile battlefield environment. By alerting SHORAD and friendly troops, by cueing gunners to hostile aircraft, by rapid dissemination of ADA command information, by changing weapons control status when needed, SHORAD C^2 represents a tangible element of combat power against the Threat.

Coupled with the fielding of the new family of SHORAD weapons, the SHORAD C^2 system will allow the exploitation of new capabilities and will give field commanders an air defense system that will protect our soldiers from the Threat.

MAJ BRAMBLETT *is assigned to Directorate of Combat Developments, USAADS, Fort Bliss, Texas, where he is ADA Command and Control branch chief. He is the action officer heading up the USAADS effort to develop the SHORAD C^2 system. Prior to this assignment in June 1982, MAJ Bramblett was the Air Battle Management Operation officer for the 9th DIVADA, 9th Infantry Division, Fort Lewis, Wash.*

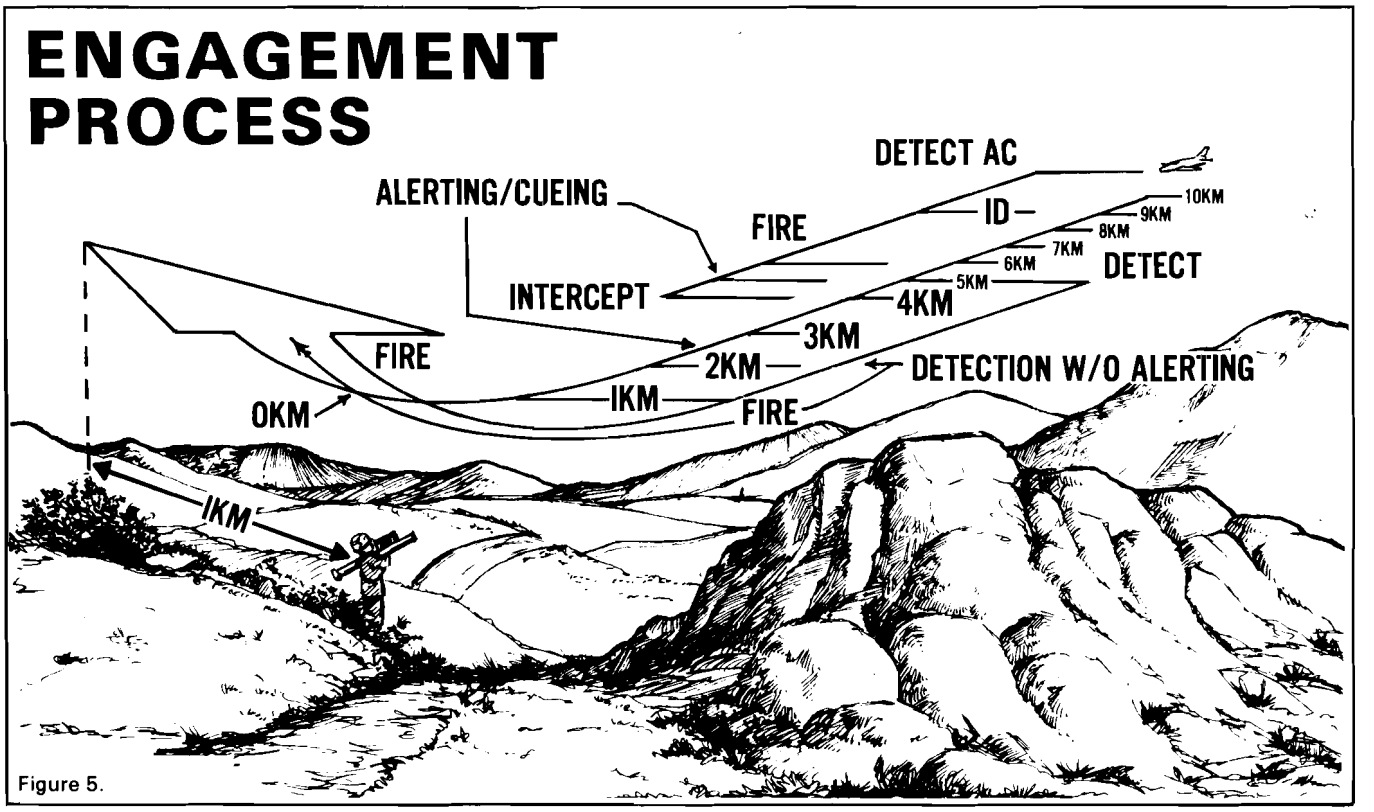
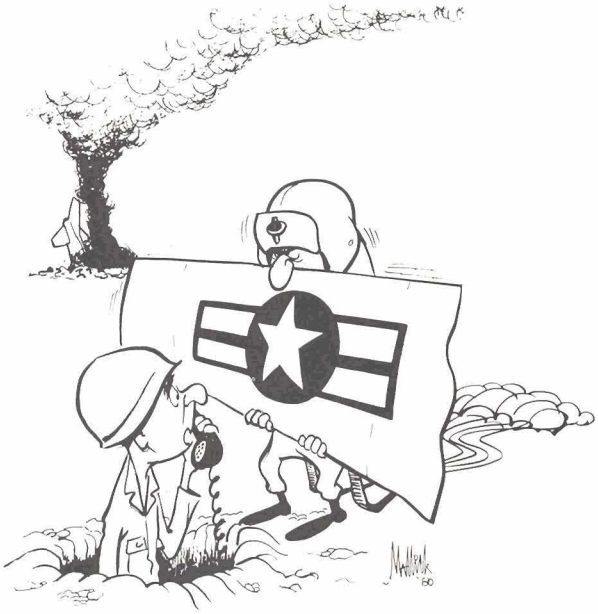


Figure 5.

ARMY WAGES 'WAR' WITH AIR FORCE

by SP4 Betty Bell



"I'D LIKE TO MAKE A CORRECTION ON MY LAST AIRCRAFT IDENTIFICATION."

Staging a ground attack during a general's visit may seem like an unfriendly way of saying "welcome," but that's exactly what happened recently when MG John W. Woodmansee Jr., 2nd Armored Division commander at Fort Hood, Texas, traveled to Dyess Air Force Base, Abilene, Texas.

The general was on hand to review a joint Army-Air Force field exercise being conducted by Battery D, 2nd Battalion, 5th ADA, 2nd Armored Division, and the 96th Combat Support Group Security Police Squadron, Military Airlift Command.

Within moments of the general's arrival, the battle began.

"I was monitoring the radio when I heard some firing," said PFC John W. Stajar, armored personnel carrier driver from the air defense unit's 3rd Platoon, Battery D. "I looked through the hatch and saw the enemy coming at us."

Stajar explained how 1SG Fred P. Washington and PFC Ronald E. Neeley dashed toward the APC and began throwing off the camouflage. "We took off. When we got to the perimeter at the edge of the woods, and they were still coming, we all started firing. I saw a few of them drop here and there. All the rest started running back."

As for the general, "We hid him in

Soldiers from the 2nd Armored Division and airmen from Dyess Air Force Base familiarize themselves with a Chaparral missile system which was deployed from Fort Hood to Dyess AFB during a joint Army-Air Force exercise. (U.S. Army photo)

the command post to preserve his life. Then we joined the commander," said CPT L.E. Robinson, who was leading his "Dogs of War" through the skirmish.

"The attack really surprised me," said SFC Leo A. Manning, 1st Platoon sergeant. "I just drove in from feeding my troops on the perimeter when all of a sudden there was smoke and men entering the area with weapons. I took up a position behind the nearest cactus and started firing. I could see people falling and the rest were getting out of Dodge."

SGT Frank E. Pounds, a squad leader from the 3rd Platoon, was at his rear observation post when he noticed an air drop and other aircraft coming toward his position. "We were under Red Alert when the various air strikes started. We got eight kills with eight tries. We brought down a MiG-27 fighter, two Farmer bombers, two Fresco bombers and three Cub troop carriers."

When the smoke cleared, the enemy had disappeared. The men moved out, sweeping the area to look for wounded or enemy soldiers left behind.

"They must have thought they could overrun us," said the first sergeant. "But with the weapon systems we have and the troops in this unit, there was no way."

Winning the battle was a friendly way for the 2/5 ADA soldiers to "welcome" their new commander.

The concept of the exercise came about, according to Air Force CPT William T. Ison Jr., 463rd Tactical Airlift Wing liaison officer, when senior Army and Air Force officers agreed that both services could conserve resources, improve training and mutually benefit from drills that require airlift support.

"The main mission of the tactical C-130 fleet is to support ground force commanders in intratheater moves," Ison said. The big airplanes, the 141s and C-5s, move units to the theater.

"Once inside the theater, units depend on C-130s to move them from place to place, if they move by air," he explained.

The deployment from Fort Hood added variety and reality to the training and permitted aircrews to fly in areas where actual ground vehicles are located, thus giving pilots practice in identifying what's beneath them. Air Defense Artillery soldiers got practice tracking actual aircraft in order to better respond to air threats.

CPT William T. Ison, the Air Force officer who played a big part in the recent Army-Air Force war games at Dyess Air Force Base, Texas, received the Army Commendation Medal for his participation with the 2nd Armored Division during the exercise.

Ison, who is assigned to the 463rd Tactical Airlift Wing at Dyess AFB, Abilene, Texas, is attached to the 2nd Armored Division, Fort Hood, Texas, as the division's tactical airlift liaison officer. He received the unusual recognition for his efforts in coordinating the movement of soldiers and equipment of the 2nd Battalion, 5th ADA, from Fort Hood to Dyess.

Ison's close association with the "Hell on Wheels" division has had quite an impact on him. "If war broke out tomorrow," he said, "I would be honored to deploy with the 2nd Armored Division and proud to wear the division patch on my fatigues."

His coordination of the recent deployment exercise, which consisted of 38 separate flights of C-130 Hercules, made the deployment "extremely fluid," according to a spokesman for the air defense battalion.

Crucial to the exercise was the resupply of fuel, C-rations and additional equipment to the 2/5 ADA while the unit was at Dyess. Ison approached that part of his responsibilities matter-of-factly. "It's necessary for an airlift wing to practice air drops like these. Training hard now, makes it easier in combat."

The Air Force officer respected the rigorous training the air defense unit underwent and the way it performed during the exercise. "From the standpoint of airlift preparedness," he said, "I believe this battalion could easily be among the most-prepared air defense units in the Army today."

At least part of the 2/5 ADA's preparedness is due to Ison, and he has an Army Commendation Medal to prove it.

CPT William T. Ison, the Air Force officer who recently was awarded the Army Commendation Medal for his efforts during an Army-Air Force exercise, chats with soldiers from the 2/5 ADA at Fort Hood, Texas. (U.S. Army photo)

SP4 BETTY BELL *has been a public information specialist with the Fort Hood, Texas, Public Affairs Office since last February.*

Anti-helicopter Minefield

A NEW INDUSTRY CONCEPT

Minefields have been used extensively to block avenues of approach and sea-lanes in every war since World War I, but they were designed to stop warships, tanks and infantry. Thanks to newly developed sensor technology, aircraft may no longer be immune to minefields on the AirLand battlefield of the future.

Texas Instruments, Inc., of Dallas, Texas, has developed an anti-helicopter minefield concept in response to a future need for barrier defense defined by the Army's High Technology Light Division (9th Infantry Division) headquartered at Fort Lewis, Wash.

The concept involves a dual-mode sensor using an acoustic sensor for early warning, aircraft recognition and cueing of an electro-optical sensor which is used for target tracking and warhead detonation. The anti-helicopter minefield (depicted on this issue's front cover is designed to destroy helicopters operating between an altitude of 15 and 100 meters and at speeds up to 140 knots. This operating concept envisions the seeding of potential low-level, nap-of-the-earth flight routes used by assault helicopters with mines emplanted 100 to 200 meters apart.

The acoustic sensor operates at a very low power consumption level with a lithium battery as the primary power source. When a helicopter is initially detected at a range of less than 1,000 meters, the acoustic sensor begins classification of the target based on the number of rotor blades and engine modulation to determine what type of helicopter — friend or foe — is present. It compares collected data with Threat parameters stored in a high-speed microprocessor.

A Threat Hind-D gunship, flying at low altitude to avoid ADA radar detction, is about to trigger an anti-helicopter mine (lower right) seeded along an obvious flight route. A second anti-helicopter mine (left) has already destroyed one of the lethal gunships. The illustration is an artist's conception of an anti-helicopter minefield in action.

As the microprocessor rapidly updates target information, the acoustic sensor alerts the electro-optical device to "look" in the right direction. Once the target fills a constant portion of the electro-optical device's field of vision — and once the microprocessor has identified the target as hostile — the electro-optical device activates the mine, sending a self-forging fragment and/or fragmentation grenades at the target.

The anti-helicopter minefield is still only a concept. The Army has yet to test industry claims that acoustic sensors can reliably identify friend from foe under battlefield conditions and has made no decision to develop the anti-helicopter mine. The anti-helicopter minefield concept would also have to contend with various other anti-helicopter concepts. A second concept, not currently being pursued by the Army, is reminiscent of the barrage balloons which towered over London during the blitz. This concept envisions anti-helicopter mines being carried aloft by balloons. An infantry company, about to come under attack by assault helicopters, would release the lethal balloons, attached to cables, over their positions. Helicopters lucky enough to escape becoming ensnared in the cables would be destroyed by the proximity-fuzed mines held aloft by the balloons.

If the anti-helicopter minefield successfully makes the transition from drawing board to battlefield, however, it could have the potential to stop terrain-hugging Hind and Hip assault helicopters and plug a worrisome leak in the air defense umbrella.

NAME THE SECTION CONTEST

These two pages mark the debut of a new feature section dedicated to the exploits of Air Defense Artillery soldiers and civilians during both duty and non-duty hours. AIR DEFENSE Magazine readers are invited to name the new section by mailing their suggested title or titles to: Editor, AIR DEFENSE Magazine, USAADS, ATTN: ATSA-TDL-S, Fort Bliss, TX 79916. The winning entrant will receive a free two-year magazine subscription worth $26. Entries must be received by Dec. 31. In case more than one reader submits the winning title, the free subscription will go to the earliest entry.

Command Sergeant Major Charles Toynes was named by a Department of the Army selection board as one of the elite few allowed to serve beyond the normal 30-year cutoff. Toynes, a native of Austin, Texas, has worked in his current position as command sergeant major of the U.S. Army Air Defense School at Fort Bliss, Texas, since March 1979. He is the senior enlisted man at the school.

One of 12 command sergeants major approved for the extension, Toynes is a graduate of Class 2 of the U.S. Army Sergeants Major Academy where he later served as an instructor. He entered the Army in 1953 and served with the 65th Anti-aircraft Group at Fort Banks, Winthrop, Mass. His air defense assignments have taken him to Alaska, Vietnam, Germany and several stateside installations.

"I consider myself extremely fortunate," said Toynes when notified of the decision. "It will mean I can retire when I'm 55." Asked what he planned to do after his Army career, he replied, "Just that. Retire. I'd like to go back to school for a degree in sociology."

He and his wife, Josie, have bought a small farm in El Paso's Lower Valley where they will eventually settle.

It was only natural that ***SFC Paul A. Espalin*** became the first enlisted man assigned to the 1st Battalion, 43rd Air Defense Artillery, the first Patriot battalion in the Army. A 16-year Army veteran, Espalin has been associated with Patriot since July 1974. He was among the privileged few to see some of the earliest test firings and was impressed. He's spent the past seven and a half years working to turn the bold plans into reality.

"It's very rewarding to have a part in formulating a new battalion, the first of its kind in American history," said Espalin. "It's twice as thrilling for me because I've been involved with Patriot since its developmental stages, from 'breadboard' to fielded version."

Espalin, of Headquarters Battery, is currently attending 24T (Patriot operator/maintainer) school at the U.S. Army Air Defense School. After graduation he will help oversee the battalion's Patriot training and eventual ARTEP.

This year's 32nd AADCOM Soldier/NCO of the Year Board brought great honor to the 69th Air Defense Artillery Brigade (Prov) which had winners in two of the three categories.

The competition ended with ***SP4 Lucas Tuning*** of Headquarters Battery, 69th ADA Bde, as Soldier of the Year; ***SSG Alan Jugar,*** Battery B, 3rd Battalion, 59th Air Defense Artillery, as NCO of the Year and ***SFC John Niccum*** of Headquarters Battery, 6th Battalion, 52nd Air Defense Artillery, as Senior NCO of the Year.

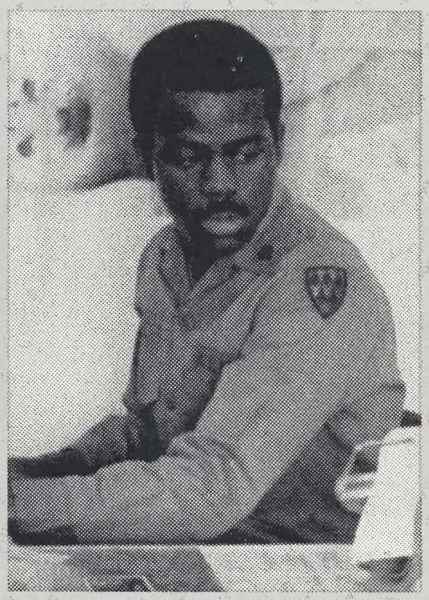
First and second runners-up to Soldier of the Year were ***SP4 Susan Willis,*** Direct Support Unit, 2nd Battalion, 2nd Air Defense Artillery, and ***SP5 Abdul Malik Rasheed*** of Company C, 11th Air Defense Signal Battalion.

Runners-up for NCO of the Year were ***SGT Daniel Clayton,*** Battery C, 6th Battalion, 56th Air Defense Artillery, and ***SGT Michael Bartelle*** of Company B, 11th Air Defense Signal Battalion.

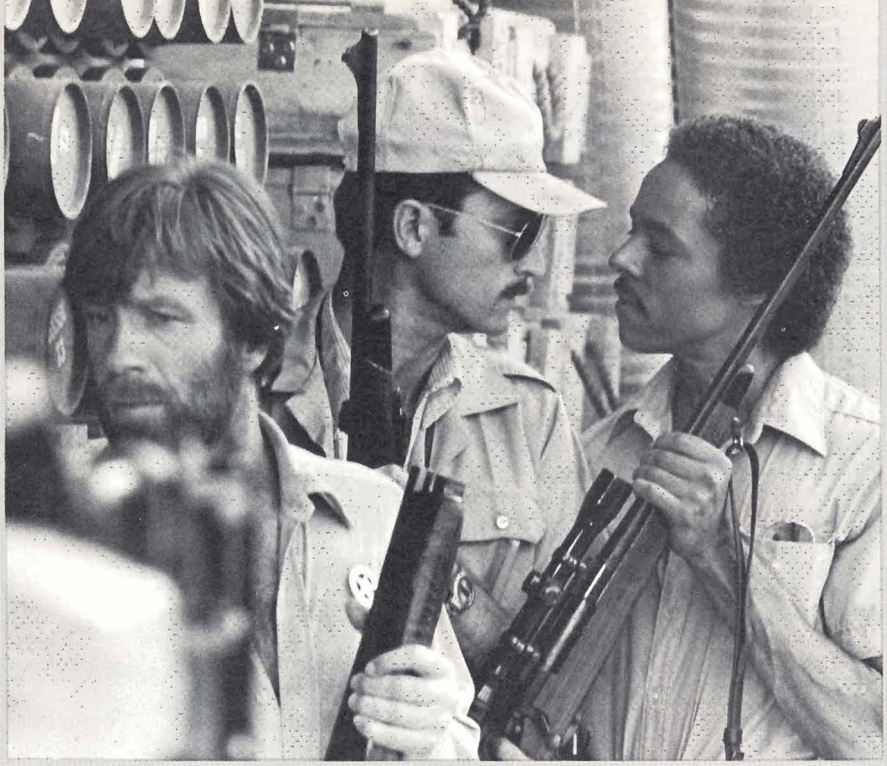
In Category Three, ***SFC Frank Borowsky*** of Battery C, 3rd Battalion, 59th Air Defense Artillery, took first place runner-up. ***SFC Ernest Chaney,*** Company B, 11th Air Defense Signal Battalion, was second place runner-up.

Winners in all three categories received a $100 savings bond and an Army Commendation Medal. First place runners-up received a $50 savings bond and an Army Achievement Medal, while second place runners-up received 32nd AADCOM certificates of achievement.

Areas covered by the board included appearance and military bearing, general military knowledge, current events, military education and the soldier's overall presentation to the board.



32nd AADCOM's SOLDIER OF THE YEAR — SP4 Lucas Tuning of Headquarters Battery, 69th Air Defense Artillery Brigade. (U.S. Army photo)



CPT John Anderson (center) with Chuck Norris (left) and Leon Issac Kennedy in a scene from *Lone Wolf*. (El Paso Times photo by Gene Partain)

CPT John E. Anderson landed a supporting role in the latest Chuck Norris film shot on location in El Paso, Texas, this past summer. A veteran of numerous community theater productions since his high school days, it was Anderson's first time before the cameras. "Exciting" was how he described the experience.

"It gave me some insight into the other side of this business. You've probably heard it said before that the stage is an actor's medium; that is, once the dress rehearsals are over, the director is out of it. It's up to the actors to carry the production. But in films, it's the director's show all the way, even in the final editing."

Lone Wolf is yet another in the series of Chuck Norris films which has gained an almost cult status in recent years.

"In it I play FBI Special Agent Burnside," Anderson said. "The character is a desk jockey who needs experience in the field before he can be considered for promotion. But he's a diehard whose incompetence is obvious when he takes charge of the operation. As a result, he gets himself and two others killed."

During filming of the scenes in which he was involved, Anderson took two weeks leave from the U.S. Army Air Defense School, Fort Bliss, Texas, where he is a liaison officer from Redstone Arsenal's Missile Command.

"I had an ego problem because of the role. I played a very convincing hard-nosed personality, which was completely out of character for me. Even the crew was ribbing me about it."

Others in the film include David Carradine, remembered best for his Kung Fu series on television, and Leon Isaac Kennedy.

Chaplain (CPT) Joanne Campbell is one of only 11 women chaplains in the entire U.S. Army, and one of two at the U.S. Army Air Defense School, Fort Bliss, Texas. The other is ***CPT Diana McNeill-James*** of the Life Enrichment Center.

Campbell was an Air Force communications-electronics officer before she changed services and career.

"I really didn't like what I was doing before," she said. "I admired the chaplains and the work they do. I am a people person, not a machine person. I couldn't switch fields. So I resigned my commission and entered Union Theological Seminary in New York.

"I was always very religious, even as a child, more so than my parents. My father was Jewish and my mother Protestant. I chose my own religion, the United Church of Christ."

Most of Campbell's work entails counseling basic trainees, whose ages average 19, most of whom are homesick or having family problems. She holds chapel and field services every other week, preaching a general Protestant service.

McNeill-James worked for the Army and Air Force many years and attended school at night, receiving a Bachelor of Arts in business administration. After an all-night prayer meeting at her church, she received the call to the ministry.

New Mexico's ***Governor Bruce King*** took time out for a lunch of C-rations in the field during his visit to Fort Bliss, Texas, to observe training of New Mexico National Guard personnel. Members of the Guard were training at Dona Ana Range where they spent one week of their annual training in practical maneuvers and the second week conducting live-fire exercises with the M-42 Duster tracked air defense weapon. King also observed training at the 1st Air Defense Artillery Brigade where more than 300 New Mexico guardsmen were conducting their basic and advanced training.

COMMANDER-IN-CHIEF — New Mexico's Governor Bruce King. (U.S. Army photo)

And finally, a different kind of "air defense" story. An elderly man, tired of the noise of low-flying crop dusters, opened fire on two of the airplanes last summer, wounding a pilot spraying fields near his Northeast Louisiana community. ***Harold Butler,*** 74, admitted shooting at the two biplanes and was arrested by Morehouse Parish Sheriff Wendell Coody.

SCIENTISTS, ENGINEERS WANTED

New positions for senior-level scientists, engineers (electronic, mechanical and general), engineering psychologists and operations research analysts are opening at U.S. Army Air Defense activities, Fort Bliss, Texas.

Most positions are with the newly established Ballistic Missile Defense (BMD) Department, Directorate of Combat Developments with the U.S. Army Air Defense School, but there are also demands for scientific and engineering personnel in other areas. Salaries range from $23,566 to $51,596 depending on experience and position.

Some examples of the openings in Ballistic Missile Defense are:

OPERATIONS RESEARCH SYSTEMS ANALYST — salary $39,698 to $51,596. Duties include serving as senior expert advisor to the director, BMD; commandant of the U.S. Army Air Defense School; and commanding general of Fort Bliss, with responsibility for performing a broad range of operations research systems analysis and management science functions pertaining to strategic aerospace defense matters. Based on extensive ballistic missile defense expertise, reconciles threat capabilities with survivable strategic forces in light of national defense requirements to establish or develop BMD system performance requirements and objectives.

Criteria to be used for determining those individuals who are highly qualified include skills in research and systems management, knowledge of missile defense systems, ability to direct original research, skill in interchange of scientific knowledge and skill in communicating.

Positions are open in this field for both supervisory and non-supervisory personnel.

GENERAL ENGINEER — salary $33,586 to $43,666. Duties include serving as the senior project engineer and technical authority, expert and consultant on the BMD interceptors. Monitors and reviews the efforts of contractors and supportive government agencies engaged in research, design, testing and development engineering for changes and modifications to interceptor subsystems.

Criteria for determining highly qualified individuals includes ability to provide senior engineering skill, ability to plan and coordinate BMD interceptor projects, ability to develop tests and test analysis and ability to coordinate with government agencies and contractors.

Positions are open in this field for supervisory and non-supervisory personnel.

ELECTRONICS ENGINEER — salary $33,586 to $43,666. Duties include serving as the senior project engineer and technical authority, expert advisor and consultant on the sensor engagement controller, a combined phase array radar and distributed data processor. Develops technical requirements, scopes of work, technical directives, specifications and regulations; manages the implementation of assigned programs.

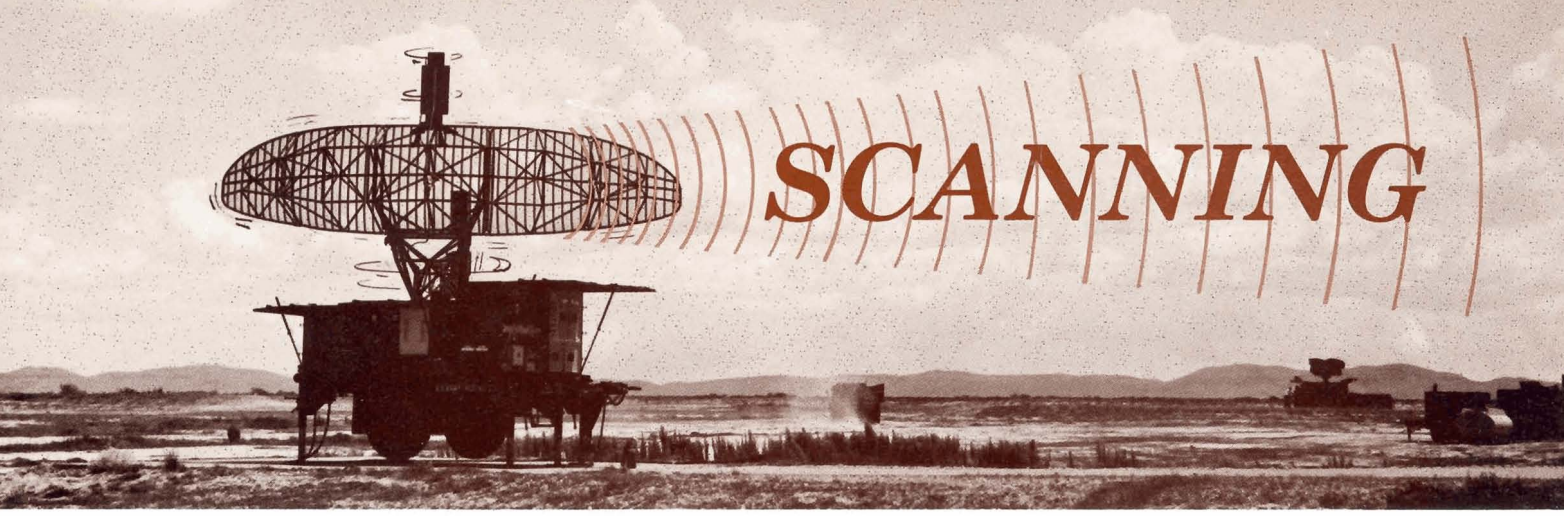
The criteria used for determining those individuals who are highly qualified include ability to evaluate projects, ability to provide input in design, development and testing and ability to develop technical requirements.

ENGINEERING PSYCHOLOGIST — salary $23,566 to $30,640. Duties include serving as a project leader or member/consultant of the Logistics, Organization and Training Division. Conducts cost and training effectiveness analysis (TEA), screening TEA, weapon system TEA, training development studies, total system evaluation and other training studies. Applies professional knowledge in the areas of human capabilities and limitations in operation and control of man/machine systems; human learning theory and principles; training principles; individual and team work performance theory and principles; job and task analyses; physiological psychology; attitude assessment; human stress; human motivation and morale; organization effectiveness theory and assessment; and personnel selection and placement assessment, theory and methodology.

Criteria for determining highly qualified individuals include ability to assign human factor engineering studies, knowledge for conduct of cost and training effectiveness, ability to perform human factor engineering analysis and ability to communicate both orally and in writing.

Any qualified person may apply for these positions. Prior civil service is not a requirement.

Anyone interested in a job with challenges, professional rewards and an opportunity to be in on a dynamic new program should contact the Civilian Personnel Office, ATTN: Mr. Jesus Porras, ATZC-DCP-R, Fort Bliss, Texas 79916. The telephone number is 915-568-6955 or Autovon 978-6955.



DoD SEEKS MULTIYEAR CONTRACTS

The Defense Department wants the 1983 Defense Appropriations Act to allow more flexibility for planners to analyze potential multiyear contracts on a case-by-case basis.

The current law, adopted by Congress last year, limits defense in its ability to execute additional multiyear contracts. Congress agreed only to projects which were specifically targeted.

Recently, the Defense Department's comptroller appeared before the House Appropriations Subcommittee on Defense to explain how funding will be accomplished on some newly proposed multiyear agreements. These contracts would include a major component of the Black Hawk helicopter, the T-700 engine, and the Multiple-launch Rocket System. Multiyear contracts for the two systems could save an estimated $95 million.

In 1982, the Army's multiyear contracts were limited to the air frame of the Black Hawk helicopter and the fire control system on the Abrams tank.

ARMY TESTS NEW VEHICLES

Testing has just been completed at Yuma Proving Ground, Ariz., on three versions of a new lightweight vehicle which includes its own defenses. A Source Selection Evaluation Board is currently reviewing test data and will make recommendations to the selection authority. The production contract for the vehicle is expected to be awarded in December.

The lightweight vehicle is the high-mobility, multipurpose wheeled vehicle (HMMWV). Models from three potential contractors are going through their paces at Yuma with the results yet unknown.

When a selection is made, the HMMWV (pronounced Humvee), with its TOW anti-tank missiles, will probably replace the current M151 jeep, M561 Gama Goat, M274 Mule and M880 commercial truck now in service.

Meanwhile, testing is also beginning on a fire-support vehicle at the Proving Ground to see how well it performs in finding enemy positions, transmitting enemy locations and coordinating fires without being detected. The vehicle is being viewed as a protector of armor and a potential aid to forward observers.

NEW FIELD TRANSCEIVER ADOPTED

After extensive testing under tactical field conditions, the AN/GXC-7A Tactical Facsimile has been selected for use by the Army and Marine Corps.

The only unit of its type, the transceiver combines the speed of radio with the accuracy of a courier, virtually eliminating errors by direct transmission without the operator retyping or formatting. A commander can quickly transmit lengthy coordinate lists, operation orders, maps and handwritten data on his AN/GXC-7A.

The portable or jeep-mounted unit can print on any paper or transparency material, can reproduce in eight shades of gray and can produce up to five carbon sets. It is operable on all types of communications systems, including secure radio, fieldwire net, tactical satellite and multiple channel radio.

The AN/GXC-7A Tactical Fascimile meets the demand for faster, more accurate data transmission in tactical field situations. (Courtesy of Magnavox Advanced Products and Systems Co.)

1/55 SETTLES IN AT FT POLK

The 1st Battalion (Chaparral/Vulcan), 55th ADA, accomplished their move from Fort Bliss, Texas, to Fort Polk, La., with a minimum of problems, according to MAJ Frederick Jones, battalion executive officer.

"DA published the movement directive on June 9, and we had people down here by the end of the month," he said. "I think everyone involved deserves a pat on the back for showing a great deal of flexibility in preparing to relocate."

Both Jones and battalion commander, LTC David Bell, maintained that the success and ease of the move were due in large part to the support offered by various Fort Polk units and agencies.

Bell looks forward to the new opportunities the move will provide his unit.

"This move to Fort Polk will do more for our combat readiness and this unit's support of the 5th Infantry Division than any other single action which could have been taken," he said. "We are eagerly looking forward to being an integral part of the 5th Division and its activities."

At Fort Bliss, the 1/55 ADA had the dual mission of providing low-altitude air defense for the 5th Infantry Division at Fort Polk and supporting resident instruction to the U.S. Army Air Defense School. This dual mission made training for the combat role of the unit difficult because of the time constraints of the school's support mission.

The battalion is settling into facilities at North Fort Polk. The process of becoming fully integrated with division activities has already begun and the unit is preparing for a November field exercise and support of a division exercise at the National Training Center at Fort Irwin, Calif., in February.

SSG Gary Frane shows SP4 Jeff Darley the control panel of the Chaparral at Fort Polk, La. (U.S. Army photo by SP5 Vicki Ohmacht)

ARMY ACCEPTS AIR CUSHION CRAFT

The Army has accepted the first production model of the Lighter, Air Cushion Vehicle-30 (LACV-30).

This high-speed amphibious craft, developed by the U.S. Army Mobility Equipment Research Development Command, is the first of 12 being procured under a $70 million contract with Bell Aerospace Textron.

The LACV-30 can carry two 20-foot Milvan containers with a combined weight of up to 30 tons. It can also hold wheeled and track vehicles, engineer equipment, pallets and other cargo.

Since it rides on a cushion of air, the LACV-30 can operate on water, marshlands, beaches and over ice and snow.

The craft will be used for combat service support in logistical over-the-shore missions, and for search and rescue and medical emergency missions.

ARMY STUDIES PARTS SURVIVABILITY

The Army is studying the combat vulnerability of its major weapon systems. The studies, known as sustainability predictions for Army spare component requirements for combat (SPARC), have been completed for the Black Hawk and Cobra helicopters, M1 and M60 tanks, M113 armored personnel carrier, M109 howitzer and M163 Vulcan missile carrier.

The SPARC analysis is designed to identify those weapon system components that are most vulnerable to damage in combat. The data will be used to guide stockage requirements and develop battlefield repair procedures and product improvement programs.

Previous provisioning studies were based primarily on peacetime reliability and wear-out rates and are not considered accurate for battlefield conditions.

ENLISTED CAREER NEWS

REENLISTMENT POLICY CLARIFIED

For many years it was believed that soldiers with more than 18 years of service could automatically reenlist or extend their enlistment to remain on active duty until they reach their 20-year retirement mark.

A clarification of policy outlined in Interim Change 16 to AR 601-280 now states that major field commanders may deny this opportunity to soldiers who have DA-imposed or DA-approved bars to reenlistment, refuse to take required action to comply with DA assignment instructions, or do not meet height and weight standards of AR 600-9.

Changes which went into effect this year are:

- Deny reenlistment to soldiers who do not make corporal or specialist 4 during their first three years of service.
- Extend privates first class on overseas orders long enough to complete a tour.
- Grant an extension to soldiers who need additional time to satisfy a DA-imposed service-remaining obligation.

PROMOTIONS TO SFC COMING

The Army is expected to select about 11,500 staff sergeants and specialists 6 for promotion to sergeant first class.

A selection/promotion board will convene in November to consider 54,000 E-6s for promotion. In addition, the board will select soldiers to attend advanced non-commissioned officer courses, and will identify unsatisfactory performers for possible elimination under the qualitative management program.

The primary zone of consideration for the upcoming promotions will include those soldiers with dates of rank of Jan. 31, 1980, and earlier. The secondary zone extends from Feb. 1, 1980, through Sept. 30, 1981. Potential selectees must have a high school diploma (or GED), must not have an approved retirement before the board convenes, and must be free of any personnel actions that may restrict promotion to the next grade.

SQT PROGRAM REVAMPED

Based on a comprehensive review of the Skill Qualification Test (SQT) program, the Army Chief of Staff announced in June a major revamp of the program. Included in the changes are the commander's year-round activities, the Army-wide written proficiency test and the annual common task SQT for all soldiers.

Soldier's manuals will be designed to provide commanders and trainers with the capability to informally evaluate hands-on performance on a year-round basis. In addition, a formal, objective, written SQT will be developed to evaluate critical tasks representative of the soldier's military occupational specialties and skill levels. A common task SQT, consisting of hands-on tests with back-up written tests, also will be administered annually to all skill level 1-4 soldiers.

DRILL SERGEANT SCHOOL NOW TDY TOUR

Non-commissioned officers may now attend Drill Sergeant School (DSS) in a TDY status rather than the current PCS status. CONUS-based candidates will attend in a TDY-return status while overseas-based candidates will attend in a TDY-en route status. It's estimated that the first orders will be issued during November-December 1982 with the first students reporting for DSS in February or March 1983.

CID/CLUB SYSTEM LOOKING FOR TRAINEES

The U.S. Army Criminal Investigation Command (CIC) is looking for ambitious soldiers interested in criminal investigation, career progression, specialized schooling, worldwide travel and job satisfaction.

Any qualified service member on active duty may apply for the CIC program. The basic requirements are that the applicant must be a citizen of the United States, be at least an E-4 and be 21 years old.

In addition, prospective agents should have 60 semester hours of college or equivalent (waiverable to 30 credit hours), have a GT score of 110 and a passing score on the physical fitness tests.

To apply, call the administrative NCO at your local Criminal Investigation Division office.

The Army is also looking for sergeants in grades E-5, E-6 and E-7 to fill openings in its club management career program.

Applicants must have less than 16 years of service and previous experience in food service, business administration or financial management.

For more information, call your local personnel office or the Club Management Section, MILPERCEN, AUTOVON 221-0232, Commercial (703) 325-0232.

NEW MEXICO GUARD ENDS ANNUAL TRAINING

Members of the 3rd Battalion, 200th ADA, of the New Mexico National Guard, recently completed their two weeks of annual training at Dona Ana Range Camp near Fort Bliss, Texas.

The battalion practiced live firing with the M-42 Automatic Weapon System (Duster) which is organic to the four ADA battalions located in that state. Designed to improve proficiency, the exercise entailed firing at enemy aircraft from a stationary position, then moving to a new location and firing again.

Members of the 3rd Battalion, 200th ADA, New Mexico National Guard, practice shooting at stationary targets and remote controlled aerial targets during their annual two-weeks training near Fort Bliss, Texas. (National Guard photo by SP4 Charles Trujillo)

BULLETIN BOARD

General Information

AAFES EXPLAINS ALTERATIONS POLICY

The Army and Air Force Exchange Service (AAFES) provides minor uniform alterations at no additional charge to all its patrons. These include adjustments to hems, sleeves and waistlines on coats, overcoats and mess dress uniforms. This policy applies to uniform items purchased from AAFES only.

Enlisted soldiers may have shoulder loops removed, buttons aligned and rank insignia (provided by them) sewn on uniforms for free. The rank insignia will be sewn on mess dress uniforms, coats, blouses and overcoats.

AAFES also provides enlisted soldiers with free alterations on certain issue items purchased from the Defense Personnel Supply Center. These alterations will be made on collars, sleeves, seams and hemlines of coats, skirts and trousers.

To have alterations done to issue items, the soldier must bring an alteration certificate from the clothing sales store. Warrant and commissioned officers must pay for alterations on issue items.

BDU EXCHANGE POLICY CLARIFIED

Army clothing officials from the Office of the Deputy Chief of Staff for Logistics have clarified certain policies regarding the Army's battle dress uniform (BDU).

If your BDU, or any part of it — such as the sleeves or trouser legs — shrinks to the point where it can't be worn, you may exchange the uniform for one that fits. However, if you have had the uniform tailored, you probably will not be authorized an exchange.

If your uniform doesn't meet Army specifications for reasons out of your control — bursting seams, wrong number of button holes, pockets improperly placed, etc. — you may also exchange that uniform.

All soldiers wishing to exchange BDUs should take them to the nearest clothing sales store. The manager will be the final authority in cases not clearly covered by the policy. Shrunken uniforms will be sold at half price to those soldiers who can fit into them properly.

WEARING THE RIGHT T-SHIRT?

The white T-shirt will no longer be authorized for wear with fatigues or the battle dress uniform (BDU) after December 1982, but will remain part of the Class A uniform.

In August 1980, the Army chief of staff approved brown undergarments and towels to be issued in the clothing bag to enlisted soldiers and to be sold in military clothing sales stores. Green undershirts, which are no longer available through procurement channels, are still authorized for wear with the BDU at the commander's discretion.

Deliveries of brown T-shirts are now being made, but full supply support did not begin until November. A wear-out date for the green undergarments will be announced later.

DA PUBLISHES 'IDEAS' CATALOG

The first edition of a "catalog" of proven money-saving ideas from the field is being distributed to major Army commands, installations and staff agencies.

The publication, part of the Army's "Idea Interchange Program," was designed to publicize and give background information on achievements made in saving tax dollars in various operational and managerial areas. Too often, someone has a good money-saving idea, but it gets no further than the shop or installation. The "catalog" will disseminate these ideas and allow others to use them. Names and phone numbers will be included so that others who might be thinking about using an idea can speak directly to its originator.

Future plans include a possible direct-dial data bank, which will allow installations immediate

input of achievements and ideas into the program. Until that happens, DA officials hope the ideas continue to come through regular channels.

HOTLINE FOR WASTE ONLY

The DoD Hotline is a means for reporting crimes against the Department of Defense and the military services involving fraud, waste and the abuse of authority for personal gain.

The Hotline is NOT to be used for reporting

- ☐ people who are mean.
- ☐ people who are overweight.
- ☐ a supervisor who gave you an unfair evaluation.
- ☐ poor plumbing in the barracks.

Those who have legitimate complaints about sexual harassment, discrimination or other wrongful practices not related to fraud or waste should report them through appropriate command channels.

If, however, you do become aware of a crime involving fraud or waste of DoD property or resources, report it promptly to the DoD Hotline.

DoD Hotline numbers are:

800-424-9098 (toll free)
223-5080 (Autovon)

Or write: Defense Hotline, The Pentagon, Washington, D.C. 20301.

The identities of writers and callers are fully protected.

PRODUCTIVITY CONCERNS DoD

The Department of Defense, concerned about lagging industrial productivity and the state of the defense industrial base, has established its own Office of Industrial Productivity. It will be a focal point for industry and government agencies, including the individual military departments, to pool information and ideas on how to improve national productivity efforts.

Richard De Lauer, undersecretary of defense for research and engineering, says a healthy, competitive and viable industrial sector is vital to the defense posture of the country.

Although the new office will look into long-range planning for industrial improvement, initial work is expected to focus on government contracting status, acquisition policies and strategies.

NEW RULE MAY AFFECT DISABILITY PAY

According to a recent decision by the U.S. comptroller general, servicemembers who suffer a physical disability while on excess leave will not receive disability retirement pay. Excess leave status is when a soldier takes more leave than accrued, but does not have enough time remaining in the current term of service to earn extra leave credit.

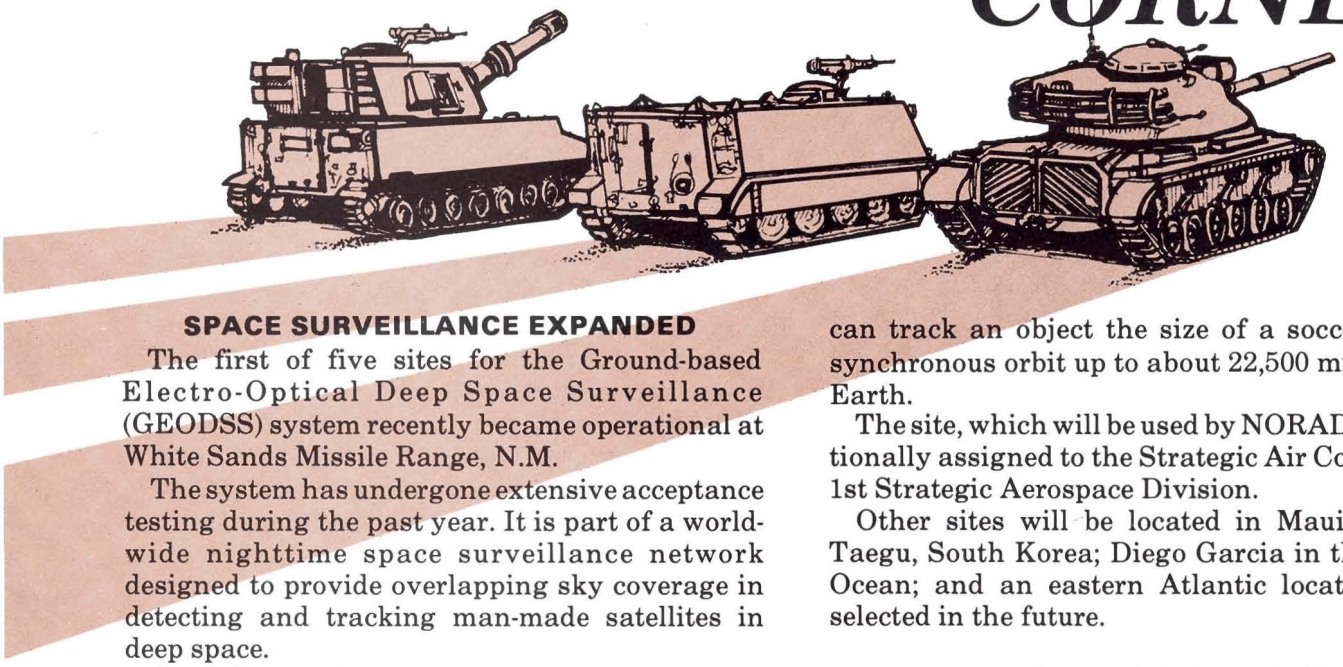
The disability ruling was made on the basis that soldiers are not entitled to pay and allowances while on excess leave and must, therefore, forfeit disability entitlement as well.

SPACE-A ON THE SPACE SHUTTLE

The Government Printing Office has recently published "Aboard the Space Shuttle." While Space-A travel on the shuttle may be a long way off, this full-color booklet describes the clothes people would wear, how the launch would feel, what the various compartments would look like (including a double fold-out illustration of the flight deck), how it would feel to be weightless, what people would eat and so on. For a copy of "Aboard the Space Shuttle," write to: Superintendent of Documents; U.S. Government Printing Office; Attn: Sales Media, Dept. 50; Washington, D.C. 20402. Be sure to include the stock number (033-000-008606-6) and enclose a check or money order for $2.75 payable to the Supt. of Documents.

During the Civil War advancements in manned flight spawned a period of experimentation to deflate this ballooning threat. This period of air defense was called "unsuccessful."

COMBINED ARMS CORNER



SPACE SURVEILLANCE EXPANDED

The first of five sites for the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system recently became operational at White Sands Missile Range, N.M.

The system has undergone extensive acceptance testing during the past year. It is part of a worldwide nighttime space surveillance network designed to provide overlapping sky coverage in detecting and tracking man-made satellites in deep space.

According to Air Force and industry officials, GEODSS tracks and catalogs objects orbiting Earth at between 3,000 and 20,000 nautical miles.

The system combines sophisticated telescopes equipped with electro-optics, television cameras, a digital computer and communications equipment to provide the North American Aerospace Defense (NORAD) Command satellite-tracking data in near real time. So sophisticated is the system, it can track an object the size of a soccer ball in synchronous orbit up to about 22,500 miles above Earth.

Air Force Major Paul Nelson, commander of the GEODSS facility, sends instructions to one of the three telescope systems. The site, located at White Sands Missile Range's Stallion Range Center, N.M., became operational July 30. It will be operated by seven Air Force and 60 contractor personnel. (U.S. Army photo by R. Halferty)

The site, which will be used by NORAD, is operationally assigned to the Strategic Air Command's 1st Strategic Aerospace Division.

Other sites will be located in Maui, Hawaii; Taegu, South Korea; Diego Garcia in the Indian Ocean; and an eastern Atlantic location to be selected in the future.

B-1B DIFFERS FROM PREDECESSOR

Named the Long Range Combat Aircraft, the B-1B can do more jobs than a conventional bomber. Although the B-1 and B-1B are much smaller than the B-52, each can carry more weapons than the B-52. The B-52 has 100 times the radar cross-section of the B-1, and the B-1 has 10 times the radar cross-section of the B-1B.

Other major changes of the B-1B include alterations to carry cruise missiles internally and increased fuel capacity to fly halfway around the world without refueling.

The B-1B has the advantage of "safe escape capability." From the time an enemy submarine intermediate range ballistic missile launch is detected off shore, the B-1B can be manned, started up, taken off and flown far enough to survive a nuclear detonation over the runway. And its electronics can survive the electromagnetic pulse from the blast.

Though the B-1 was designed to cruise supersonically at an altitude of 200 feet, sources say the B-1B will remain subsonic at that height. Supersonic speed at low altitude caused more problems than it solved. For example, heating of its skin made the B-1 easily detectable by infrared sensors.

Subsonic low-altitude speed allows the B-1B skin and much of the structure, including wing leading edges, to be made of aluminum. Titanium is used only in the wing pivot joints and structural cross

members between the wings and the body. The aircraft fuselage is built over a main structural beam of graphite/epoxy composite.

Procurement of seven B-1Bs was included in the FY83 budget with the first delivery expected in December 1984.

— *Astronautics & Aeronautics*

NAVY, AIR FORCE TEST TOMAHAWK

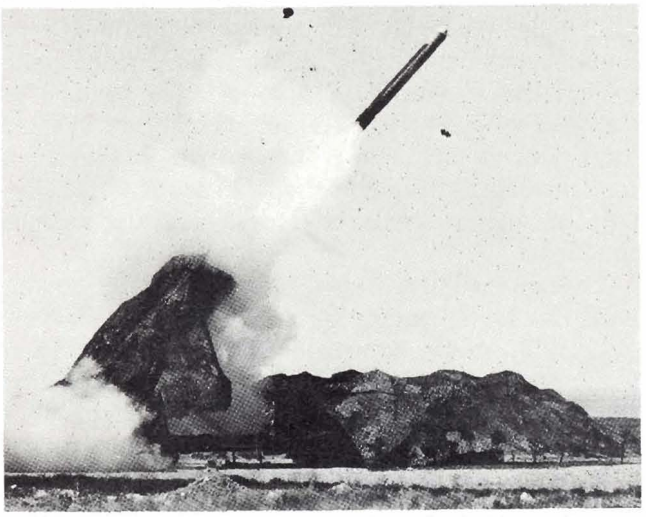
Two Tomahawk cruise missile launches — one from beneath the sea and another from a mobile ground launcher — signaled the start of Navy and Air Force operational testing.

The Navy launched a conventional land-attack Tomahawk from a nuclear-attack submarine cruising off the California coast. Two days earlier at the Dugway Proving Ground in Utah, the Air Force conducted the first in a series of eight operational test and evaluation flight demonstrations of the ground-launched cruise missile (GLCM).

The sea-launched cruise missile (SLCM), launched from a torpedo tube of the USS *Guitarro,* broached the surface of the water and made the transition to cruise flight as planned. Powered by its air-breathing turbofan engine, the missile navigated a complex route over water, made landfall and flew a fully guided land-attack mission to the target area on the Tonapah Test Range in Nevada.

The *Guitarro* launch was in support of the operational evaluation of the submarine-launched Tomahawk conventional land-attack cruise missile weapons system. Tomahawk SLCMs (conventional land-attack and anti-ship variants) will enter the operational inventory later this year.

The Air Force GLCM was successfully launched from a camouflaged transporter erector launcher (TEL) on the Dugway range in western Utah.



A Tomahawk ground-launched cruise missile blasts from its camouflaged transporter erector launcher, signalling the start of U.S. Air Force operational testing of the system.

After launch, the GLCM cruised over an intricate course on the Utah Test and Training Range and, using its terrain-following capabilities, made two passes over a simulated ground target on the range.

Upon completion of the nearly two-hour, 800-mile test, a parachute recovery system on the missile was activated to bring it safely to the ground. Test crews recovered the missile which will be refurbished for future use in the GLCM test program.

IMPROVED PHOENIX MISSILE DELIVERED

The first production model of an improved Phoenix air-to-air missile has been delivered to the Navy to meet air threats through the 1990s. The new version of the long-range, radar-guided weapon, called the AIM-54C, includes a new digital electronics unit, inertial navigation reference system and solid-state transmitter. The improvements give the weapon greater range, accuracy, flexibility and reliability.

NEW BLACK HAWK SUPPORT SYSTEM TESTED

Testing is underway at West Palm Beach Fla., on the Army's new External Stores Support System (ESSS) for the UH-60A Black Hawk helicopter. The ESSS consists of wings mounted on each side of the aircraft which can carry four auxiliary fuel tanks or a variety of other externally mounted tactical equipment. The testing is scheduled to be completed by March 1983.

LTC Donald F. Matson, Black Hawk assistant project manager at the U.S. Army Troop Support and Aviation Materiel Readiness Command, said that the ESSS will greatly expand the tactical capability of the Black Hawk.

The External Stores Support System being developed for the UH-60A Black Hawk helicopter will provide the aircraft with two 450-gallon and two 230-gallon fuel tanks.

Under the current development program, the Army will qualify the ESSS and the external fuel system which consists of two 450-gallon tanks located on the inboard wing stations and two 230-gallon tanks outboard.

The testing will include a demonstration of two weapon systems, the Hellfire missile and the M56 mine dispenser; however, these will not be qualified during the current program.

The Army plans to modify all Black Hawk helicopters to accept the ESSS which will be provided in kit form on an as-needed basis. Current planning calls for receipt of initial ESSS kits in 1984.

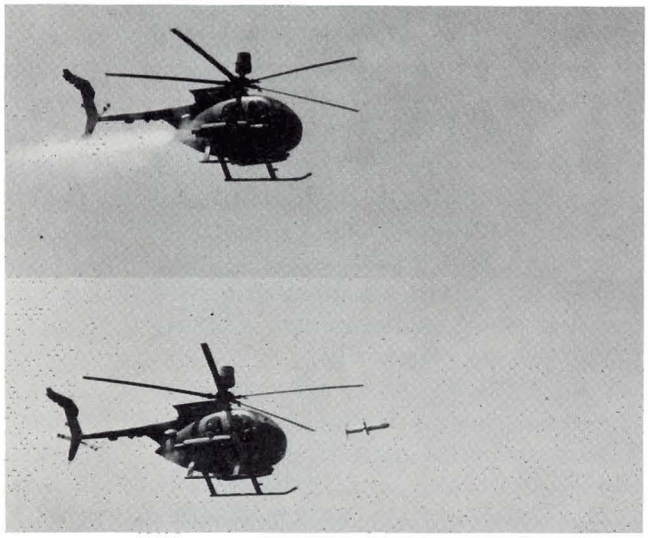
HELICOPTER "PEEK" DEVICE TESTED

A U.S. Marine helicopter accurately fired TOW anti-tank missiles while "peeking" over barriers in recent tests at El Segundo, Calif.

Equipped with a new mast-mounted sight version of the airborne TOW system, the helicopter can hide behind hills and trees to scout for targets. Once the target is spotted, the gunner can fire a TOW missile, exposing only the sight to enemy detection during the entire operation. The missile climbs into the sight's line of vision following launch, while the helicopter remains hidden.

By flying behind cover while scouting and firing on targets, the helicopter can better avoid enemy fire and is masked from radar detection by terrain clutter.

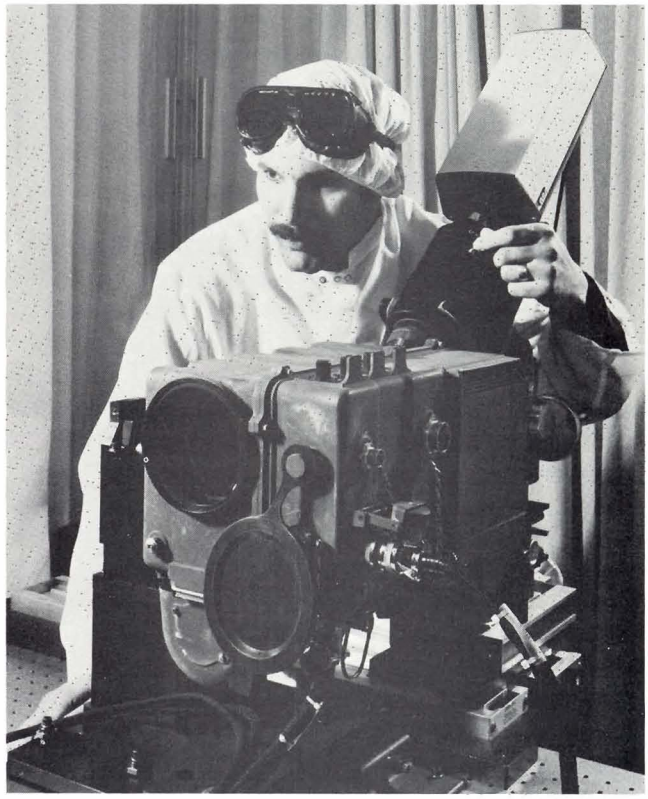
The sight is stabilized to compensate for aircraft movement and the vibration of the rotor blades. The design allows for future installation of a laser rangefinder, an automatic target tracker and a forward-looking, infrared night-vision system.



An anti-tank missile streaks from its launch tube during qualification tests of a mast-mounted sight version of the airborne TOW missile system. Successful firing tests have been conducted recently in the U.S. and Sweden.

The airborne TOW system is the anti-tank system for the AH-1 Cobra series helicopters used by the U.S. Army and Marine Corps as well as other nations. The TOW missile has been deployed with the air and ground forces of 33 countries.

LASER DEVICE RECEIVES CHECKOUT



Hughes Aircraft Company engineer Steven Berlant adjusts a TV camera to the eyepiece of a laser device that lights up targets for laser-homing and conventional weapons. The camera aligns the optics of the device known as a Ground/Vehicular Laser Locator Designator (G/VLLD). Designed for use by forward observers, the combination laser designator and rangefinder can be mounted on tripods or armored vehicles. By relaying a target's location and bearing for conventional artillery, the G/VLLD cuts firing time in half and saves ammunition. Current U.S. Army Missile Command contracts call for the delivery of more than 500 G/VLLDs. (Courtesy of Hughes Aircraft Company)

EUROPE GETS ABRAMS TANK

The M1 Abrams main battle tank, which can pinpoint targets through darkness, smoke or haze, has been deployed for the first time in Europe where it will be used to train U.S. forces. Two of the tanks are also being evaluated by the Swiss army.

Two important elements of the M1 are the thermal-imaging, night-vision system and the laser rangefinder. The thermal-imaging system senses heat to create TV-like pictures of a scene. The rangefinder determines the distance to a target based on the time it takes for a laser burst to reach the object and bounce back.

NEW FIRE-FIGHTING TECHNOLOGY

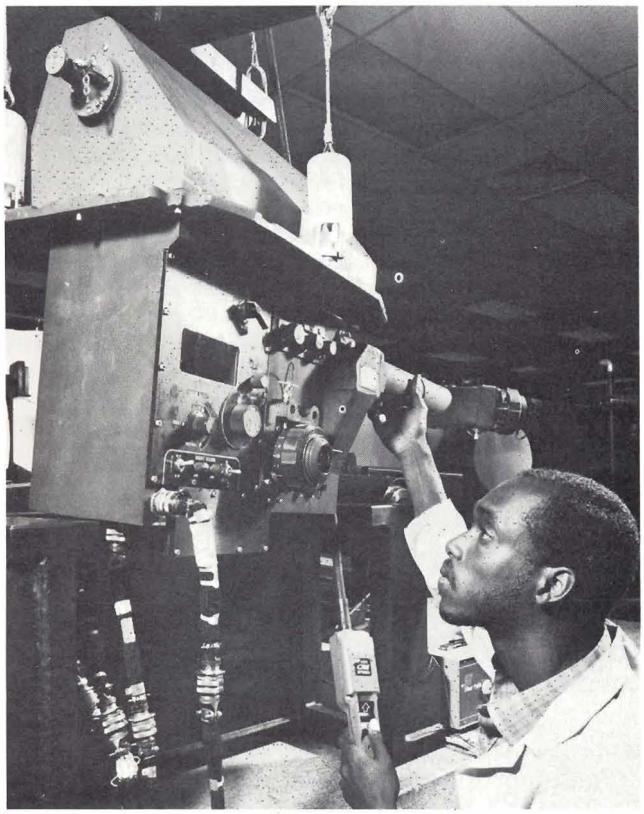
Researchers at Yuma Proving Ground, Ariz., are testing an automatic fire suppression system for armored vehicles that can detect and smother a fire in less than a second.

The system, designed for the M60 tank, uses halon gas, Freon and nitrogen in a pressurized dispenser. It is activated by automatic light-sensitive detectors. In one test, a gasoline fire was started in the crew compartment of a vehicle. The flame, which was ignited with a remote, electric match, was detected and suppressed within a few thousandths of a second.

TOW SUBSYSTEM TESTS CONTINUE

A gunner's sight that can "see" targets shrouded in darkness, smoke or haze is still being tested at Hughes Aircraft Company. The day/night sight unit is part of a subsystem that directs TOW anti-tank missiles, cannon and machine gun fire for the Bradley M2 Infantry and M3 Cavalry Fighting Vehicles.

The 100th TOW weapon subsystem, which includes the sight unit, was recently delivered, completing the initial production contract. Another 1,000 subsystems, with total production potential expected to reach 6,882, have been contracted.



Hughes Technician Donald Morris prepares the day/night sight unit for tests. (Courtesy Hughes Aircraft Company)

ARMY ACCEPTS FIRST MLRS DELIVERY

The Multiple Launch Rocket System (MLRS) made its debut recently in a formal rollout ceremony commemorating the delivery of the first of more than 300 MLRS launch vehicles the Army expects to buy as part of the $4 billion program.

The MLRS is a mobile, automatic rocket system that permits its crew of three, with a minimum amount of training, to accurately shoot a complete 12-rocket load, quickly reload and fire again. Its surface-to-surface unguided rockets have a range of more than 18 miles and can deliver a massive amount of defensive firepower against enemy forces. The 25-ton MLRS launch vehicle has a sophisticated fire control computer and a position-determining system.

Also known as the "the soldier's system," the MLRS has been developed as a joint effort of the United States, France, Germany and the United Kingdom, with Italy recently joining the partnership. The intent is that the MLRS will one day become a standard weapon throughout NATO.

Plans call for the first MLRS battery of nine launch vehicles to enter service with the 1st Infantry Division at Fort Riley, Kan., in early 1983. The other MLRS nations will deploy their first units shortly afterward.

FIRST MLRS BATTERY UNDERGOES TRAINING

The first battery for the Multiple Launch Rocket System (MLRS), activated at Fort Sill, Okla., recently moved to Fort Bliss, Texas, to take part in a 3-month operational test of the MLRS.

Members of Battery D, 3rd Battalion, 6th Field Artillery, are taking part in collective training for the new weapon system. The training includes instruction at the battery, platoon and section levels.

Upon completion of the test phase, which will include the Army Training and Evaluation Program and live firings, Battery D will return to Fort Sill for assignment to the 1st Infantry Division at Fort Riley, Kan. Junior enlisted personnel, NCOs and officers have trained together and will remain together in all assignments, allowing the unit to function more effectively.

Future MLRS units will undergo basic and advanced training at the U.S. Army Field Artillery Training Center at Fort Sill. Future collective training will take place at the unit's home station, if in CONUS. If the unit is assigned overseas, training will be at Fort Sill.

In addition to training U.S. soldiers, the MLRS instructors also train crews from West Germany and the United Kingdom.

INTELLIGENCEWATCH

PATRIOT INTERESTS OTHER NATIONS

The Army's new non-nuclear missile system, Patriot, is drawing attention from other nations.

The United Kingdom, France and Japan are examining Patriot as a possible successor to air defense systems that were designed to defend against the strategy and technology of an earlier era.

The United Kingdom Operational Requirements Group has been interested in Patriot since early this year. Visits to the U.S. Army Missile Command and the U.S. Army Materiel Development and Readiness Command followed a series of inquiries addressed to the U.S. Government. During a separate visit to the Raytheon Company, several U.K. representatives gathered data for further actions.

In March 1982, the French Ministry of Defense sent a team headed by the commander of its Technical Service for Tactical Missiles to visit Raytheon Company, producers of the missile's guidance section. The French general and his staff toured the Patriot system production areas and received technical briefings.

In April 1982, Raytheon welcomed Japanese representatives attending technical briefings, discussions and a tour of the fabrication and assembly areas.

Currently, the Japanese Ground Self-Defense Force operates the Hawk system while their Air Self-Defense Force operates the Nike Hercules system. The Japanese Defense Agency is examining Patriot as a successor to both systems.

The Japanese Diet approved funds for a joint U.S.-Japan Patriot study to begin later this year in Huntsville, Ala.

BAHRAIN TO GET COMBAT EQUIPMENT

Air International, England, recently reported that the U.S. Defense Department has notified Congress of its intention to provide the Flying Wing of the Bahrain Public Security Force with its first combat equipment in the form of four F-5E Tiger II fighters and two F-5F two-seat conversion trainers, together with support equipment and spares.

Included in the reportedly $114 million package will be 60 AIM-9P-3 Sidewinder air-to-air missiles. The Flying Wing is currently equipped with three BO 105 and two Hughes 500D helicopters. The provision of this "modest air defense capability" will require the services of 13 U.S. personnel for two years.

INDIA INTERESTED IN U.S. ARMS

A renewal of Indian governmental interest in the possible purchase of U.S. arms as part of the Indian procurement diversification program has been reported from New Delhi. Preliminary talks have allegedly been held concerning possible purchase of the F-5G Tigershark and such items as TOW missiles.

—*Air International*

SWISS TEST TV-MAVERICK MISSILE SYSTEM

Swiss Air Force pilots have acquired targets and simulated missile launches with the U.S. Air Force TV-guided Maverick missile system, despite the poor visibility typical of European winters and rugged Alpine terrain.

The tests lasted more than a year as the Swiss Air Force studied the possibility of increasing its attack capability by equipping its Hawker Hunter ground-support aircraft with the air-to-ground missile. The missile seeker was evaluated on a helicopter and has also logged 500 hours on a Hunter aircraft.

The TV-Maverick has scored 86-percent direct hits in more than 1,200 launches.

LASER SYSTEM ENHANCES TORNADO

The radar and weapon systems on the Tornado multirole combat aircraft are now being lined up by laser. Scientific Cook Ltd. claims its laser alignment system makes Tornado weapon systems the most accurate on any combat aircraft.

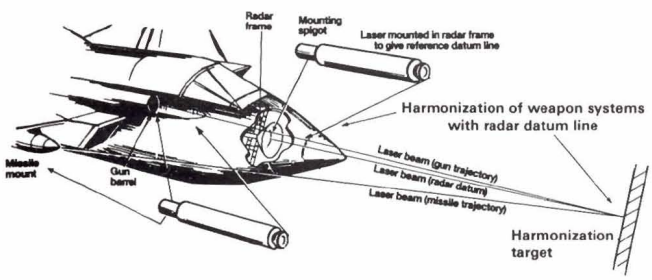
The newly developed Laser Harmonization System gives accurate coordination of the systems and eliminates the conventional visual harmonization method, a process far more susceptible to human error and misjudgement. Designed to interface with the harmonization sites of the aircraft, the electronically controlled laser heads provide the user with greater speed, higher accuracy and electronic data recording of alignment.

All the Tornado's weapon and guidance systems, radar frame, missile mountings, gun barrels and bomb sights have sites on which lasers are attached temporarily during the alignment process. The individual components are then adjusted so that the laser beams from the weapons hit exactly the same spot on a target as those from the radar and guidance systems.

The London-based laser company developed the alignment system with the United Kingdom's Royal Air Force and Panavia, the British-West German-Italian consortium which is manufacturing the Tornado. Paul Cook, managing director, believes his firm is the first in the world to adapt lasers for alignment purpose.

Modified versions of the Tornado Laser Harmonization System can be incorporated into other types of combat aircraft currently in use, as well as in future aircraft projects. Ground weapon systems are also suitable for the new technique.

Typical application of Scientifica LM-10 Laser System as used in military aircraft



GERMANS TEST DUAL-FUNCTION RADAR

Installation and power hookup of the first of four Hughes Air Defense Radar (HADR) systems for West Germany will become operational in October if tests are successful. All four systems are expected to be operational by early 1984.

In addition to Germany's four systems, three systems will be installed in Norway and one in Malaysia.

HADR is a long-range, three-dimensional radar that can perform civilian air traffic control and military air defense functions.

The system has several built-in features that allow it to provide target detection in heavy clutter and under intense electronic countermeasures while maintaining an acceptable constant false-alarm rate. It also provides accurate map position location and height measurements of aircraft, eliminating the need for a separate height-finding system.

HADR is a minimally attended system with extensive built-in automated fault detection and fault isolation features that reduce the number and overall skill level of maintenance personnel needed to keep it operational.

Antenna for the first air defense radar system to be installed in the Federal Republic of Germany is lifted into place.

GERMANY EXPANDS TESTING CAPABILITY

West German army troops will soon be able to test the electronic components of their weapon systems with a new family of automatic test stations called REMUS. These REMUS stations can test and isolate faults in electronic subsystems of such weapons as the Roland air defense system.

Each station is installed in a semi-trailer so various combinations can be taken into the field, depending on the nature of the required tests. There are four types of REMUS stations for testing digital, low-frequency, high-frequency and ultra high-frequency equipment.

GERMANY RECEIVES HAWK BATTERIES

A Luftwaffe air defense battalion took delivery in June of the first four Hawk surface-to-air missile batteries embodying the modifications introduced as a result of a product improvement program (PIP). Production and installation were carried out on schedule under the management of a consortium set up in November 1979 to implement the PIP, a $200 million program. Participants are Belgium, Denmark, France, West Germany, Greece, Holland and Italy.

— *International Defense Review*

SOVIETS DEVELOPING NEW THREAT

The Soviet Union is thought to be developing so-called "laser damage weapons" for anti-tank and other battlefield applications. The development is believed to be a direct result of intense Soviet research into high-energy lasers and charged-particle beams. The first such weapons are not expected to be deployed for several years, but some sources say they anticipate full-scale deployment by at least the mid-1990s, possibly earlier.

MOSCOW GENERATES NEW AIRCRAFT

Moscow's rapid development of new aircraft increases Soviet potential to carry out a strike against this country without warning, or to conduct unchallenged reconnaissance and postattack strikes following a missile exchange.

Here are some of the new generation Soviet aircraft expected to enter service in the near future.

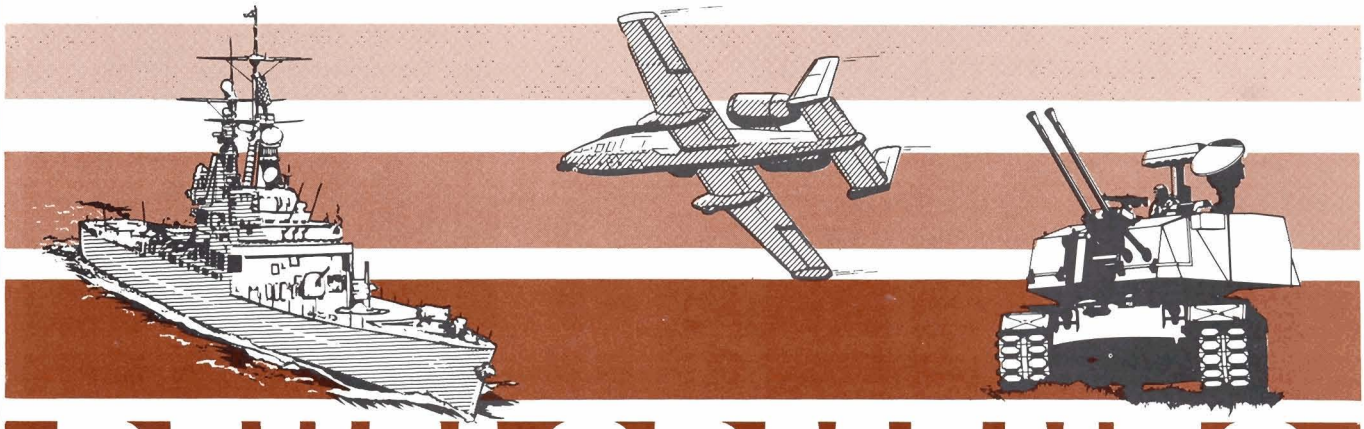
- The Soviet Union is now testing at its Ramenskoye air test center a new high-altitude reconnaissance aircraft, referred to as the Ram-M. According to an *Air International* report, the Ram-M possesses an overall configuration similar to the Lockheed U-2, but has twin vertical tail surfaces interconnected by a cross member.
- The Soviets are testing a new swing-wing, long-range bomber, the Ram-P. It is considered to be the Soviet equivalent of the B-1B but is slightly larger than its U.S. counterpart. The Ram-P, which is said to have a dash speed of Mach 2.3 and unrefuelled range of 4,000 miles, is reported to have a 1986 operational capability.
- The advanced two-seat interceptor derivative of the MiG-25, now assigned the name Foxhound, is equipped with new lookdown-shootdown radar and six AA-X-9 long-range, radar-guided air-to-air missiles. This new aircraft is expected to be somewhat larger than the U.S. F-15. The aircraft was under testing in late 1978 at Vladimirovka, scoring massive kills against drones simulating low-flying U.S. cruise missiles at altitudes below 200 feet, the launch aircraft acquiring the target from an altitude of 20,000 feet.
- The ground attack aircraft Su-25 is considered comparable to the A-10A Thunderbolt II and is thought to be active in Afghanistan where it is being used to perfect the integration of low-level tactics of fixed-wing aircraft and Mi-24 Hind helicopters.
- Another fighter, the Su-27, is reportedly the Soviet answer to the F-15 and the F-14. The Su-27 will also be armed with the improved lookdown-shootdown radar and an improved weapon system.
- The IL-76, the Soviet Union's first airborne warning and control (AWAC) aircraft, is now in its final testing stage and will be deployed in 1983.
- The already operational Su-24 has been deployed to forward air bases in East Germany from which it could hit targets as far west as Great Britain. It is replacing the Yak-28 whose range was limited to West Germany.

SOVIET INTERCEPTIONS INCREASED

The Japanese Air Self-Defense Force (ASDF) reported it mounted 939 fighter sorties to intercept Soviet aircraft approaching, entering or flying within Japanese airspace from April 1981 to March 1982, an increase of 19.9 percent over the previous 12 months.

The ASDF attributes the increase to a higher frequency of Soviet flights to Vietnam via Vladivostok, the monitoring of Japanese missile tests in the Sea of Japan and reconnaissance loitering over the western part of the Sea of Japan during the joint U.S.-Korean *Team Spirit* exercise. According to the ASDF, the Soviet Tu-16 Badger, carrying the AS-6 Kingfish missile, reappeared for the first time since 1977.

—*Air International*



DEVELOPMENTS

NEW ALERTING SYSTEM BEING DESIGNED

The Night Vision and Electro-Optics Laboratory, U.S. Army Research and Development Command, Fort Belvoir, Va., is developing a passive alerting system known as the Passive Wide Area Alerting System (PWAAS).

A low-cost, lightweight infrared search and tracking device, the PWAAS is fashioned for various air defense applications during daylight, darkness and/or adverse weather conditions. Its basic function will be to augment radar and allow quiet (passive) detection using the emitted thermal energy of aircraft as the detection mechanism.

Designed to operate against high-performance and rotary-wing aircraft, the PWAAS may be organic to a particular air defense system or integrated into SHORAD C^2. The PWAAS will be able to establish a target track in minimal time and simultaneously track multiple targets. Capable of providing self-orientation to reference the relative position of targets, PWAAS will use two separate display modes. The visual display will indicate the number and position of targets and target tracks, while the audio (speech) mode will provide the same information using an alphanumeric display.

The PWAAS will be designed for minimum weight, maximum modularity and interchangeability of parts. Each system will consist of three subsystems: receiver, output display, and processing and electronics. Ease and simplicity of maintenance and operation capability in night and/or a nuclear, biological and chemical environment will also be taken into account in the design.

MULTIPLE LAUNCHER FOR STINGER TESTED

Recent tests of a Multiple Stinger Launcher (MUSL) could dramatically increase Stinger's capabilities.

The experimental system, demonstrated at Fort Bliss, Texas, successfully destroyed two helicopter drones. The MUSL uses an optical sight and an infrared tracking device that provides Stinger with a night and inclement weather capability for the first time.

Because of its light weight, the tactical version of the MUSL is adaptable to different types of towed, wheel or track vehicles. During the tests, the Stinger missiles were launched from an M55 towed trailer.

This new application of the Stinger system uses two launchers, each capable of firing four Stinger missiles against either jet or propeller-driven, fixed-wing aircraft or helicopters.

The shoulder-launched version of Stinger, the newest heat-seeking, anti-aircraft weapon, is replacing the Redeye which was deployed in the 1960s.

RADAR SYMBOLOGY STANDARDS COMING

In an effort to reduce the proliferation of air defense system display symbols, the Army is recommending to civilian system developers and contractors that they accept proposed military standards for radar symbology.

The selection of the recommended symbols which provide air defenders with air track, mis-

sion and status information on electronically and optically generated displays is based on symbologies evolved through research and past system development. The symbology currently used in Army air defense systems and interface equipment is not uniform and therefore cannot be interchanged. The requested standards would make display symbols compatible with all air defense systems.

The proposed standardization will include a basic set of symbols, modifiers and their applications in displays used in all Army air defense systems and their training simulators.

PIP TO PROTECT FLIR AGAINST LASER

Continuation of the product improvement program (PIP) for hardening the Chaparral forward looking infrared radar (FLIR) against expected laser threat was recently announced.

The improvement will provide counter-countermeasures to the FLIR subsystem, an infrared device that enables the gunner to engage targets at night and in inclement weather. The major benefit of this PIP is it will protect the FLIR from enemy countermeasures such as laser.

Government agencies are currently conducting a susceptibility and vulnerability analysis. If these studies determine that FLIR hardening is a necessity, the Night Vision and Electro-Optical Laboratory, Fort Belvoir, Va., will begin development.

AWACS/ARMY ADA INTERFACE A REALITY

A priority air defense initiative for the 1980s is to achieve true integration among all elements of the joint Tactical Air Control System and Tactical Air Defense System, primarily including Army and Air Force tactical air defense systems. A major breakthrough is USAAD's recently approved plan to provide a direct, automated interface capability between the Air Force Airborne Warning and Control System (AWACS) and Army High-to-Medium Air Defense (HIMAD) elements. This plan would allow Army HIMAD elements to receive the vast air picture available directly from the highly sophisticated surveillance radar onboard the AWACS.

USAAD's plan supported the Army's acquisition of a Joint Tactical Information Distribution System (JTIDS) Adaptable Surface Interface Terminal (ASIT). The ASIT was developed by the Air Force to provide a secure, jam-resistant data link between AWACS aircraft and Air Force ground command and control facilities. The ASIT demonstrated a capability to provide this same secure, jam-resistant data link to Army ADA when fielded with the Hawk brigade and battalion AN/TSQ-73 Missile Minder system.

Following integration demonstrations during Bold Eagle '82 (a joint-service operational training exercise) at Eglin AFB, the U.S. Army Signal Center conducted a comparative analysis of the ASIT and other candidate systems with potential to effect the interface. The analysis determined that the ASIT was the most effective means to satisfy the AWACS/Army ADA interface requirement and the only means available in the near term. Based on the USAAD's plan and guidance from the Army's vice chief of staff, resources have been reprogrammed to allow the Army to join the Air Force ASIT production and receive delivery concurrently with the Air Force in the fourth quarter of FY84.

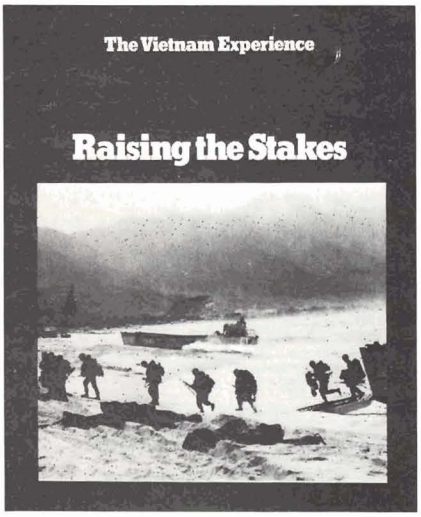
Total ADA procurement will be 10 Army versions of the ASIT. This will give JTIDS capability to each European brigade fire direction center (FDC), the Rapid Deployment Joint Task Force (RDJTF) ADA brigade FDC and each RDJTF Hawk battalion FDC, with a training base of two ASITs to be located at Fort Bliss, Texas.

The deployment of the ASIT to Army AN/TSQ-73 elements will provide viewing of the AWACS air picture on a real-time basis, thereby increasing their effectiveness and survivability. The introduction of JTIDS also marks a key milestone in advanced joint service integration.

A USAF Sentry AWACS.

In October, the U.S. Congress approved the reprogramming action required to support the ASIT procurement. The funding allows the Army ASIT to become a reality in the near future.

THE VIETNAM EXPERIENCE
Vol. I, Setting the Stage, 1981. 191 pages.
Vol. II, Passing the Torch, 1981. 208 pages.
Vol. III, Raising the Stakes, 1982. 192 pages.
by editors of Boston Publishing Company, $14.95 each.



The Vietnam Experience is more than a sequence of events that drew America into the quagmire called Southeast Asia. It is the story of those who fought or opposed the war, and of those who directed it in the field and in distant capitals.

Compiled largely from personal accounts and written by editors of Boston Publishing, Volume I, Setting the Stage, traces the birth of Vietnam's revolution and shows how the country became an unwilling pawn of the world's powers during World War II.

Volume II, Passing the Torch, recounts the events in Vietnam and around the world between 1945 and 1961 that would ultimately lead the U.S. to replace France in a distant war in Southeast Asia.

Volume III, Raising the Stakes, seeks to tell how and why America's role in Vietnam turned from an advisory one to overt combat between 1961 and 1965. The reader joins the American advisors on the ground, in the air and off the shores of Vietnam as they do their best to carry out U.S. foreign policy.

The latter volume is the pivotal one as it concludes the answer to "How did we become involved in Vietnam?" and begins to explore "What was it like once we were there?"

Boston Publishing provides, in these first three volumes, the beginnings of a comprehensive written and pictorial history of what many consider to be America's most unpopular war. It is highly recommended reading.

C.B.S.

LIVING IN TROUBLED LANDS
by Patrick Collins
Paladin Press, Boulder, Colo., 1981. 178 pages, $12.95.

Predicated on the premise that an ounce of prevention is worth a pound of cure, *Living in Troubled Lands* is a "how to" book aimed mainly at the corporate executive representing his company in countries where terrorism is either a real or potential threat.

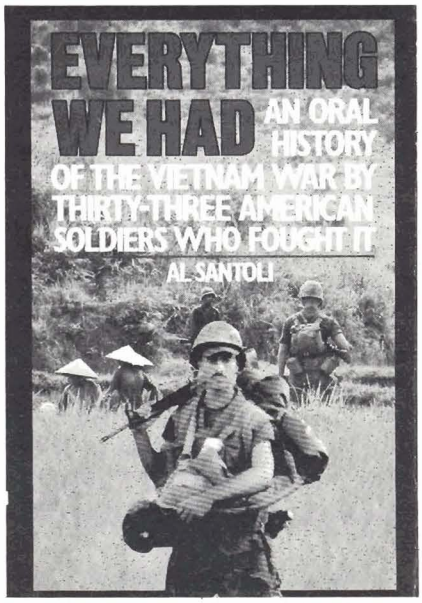
Collins, an ex-CIA official who spent his career planning and implementing personal security programs for Americans stationed abroad, admits that much of his advice is undiluted common sense. Nevertheless, the long list of do's and don't's is compelling in that it generates an awareness of areas often overlooked by even the most alert individual.

Understandably, much of the book emphasizes residential security and the dangers of commuting between home and office. As the author points out, ". . .80 percent of all kidnappings and assassination attempts in recent years have taken place while the target was either in his car or going to or from his car."

With terrorism on the rise again in Europe, and in the wake of BG James Dozier's abduction in Italy, this book should be required reading for high-profile officers in particular and recommended in general to all servicemen assigned to oversea commands where terrorist factions are known to exist.

B.R.K.

EVERYTHING WE HAD
by Al Santoli
Random House, New York, N.Y., 1981. 265 pages, $12.95.



This book is about voices; some that echo tragedy, some that testify to raw courage, some that scream

about the horror, and some that berate the boredom. Al Santoli has captured 33 voices on tape and transferred the story of the Vietnam War to paper. From the brass to the troops, personal views of the war unfold.

Santoli talked to veterans of the early years and to veterans with repeat tours. He doesn't editorialize, but rather lets the story (or stories) emerge from the minds of those who were there. This isn't a work that searches for an answer to "why we were there" but lets the readers share the agonized soliloquies of those who simply say "we were there."

This is not the war the newspapers reported; it is seldom the war that television covered; and it is not the war historians will write about. It is the war as actually lived — whether it was in Saigon, Lang Co, the Tonkin Gulf, Dalat, or a now forgotten firebase. It is the story of a cross section of Americans. Some are career soldiers; some were draftees; some volunteered; but all are veterans.

The stories cover the period from December 1962 to April 1975.

As Santoli states, "It must always be remembered that the Vietnam War was a human ordeal and not an abstract heroic adventure as might be understood by Hollywood or a politician's speechwriter."

Santoli served with the 25th Infantry Division in Vietnam. He received three Purple Hearts and a Bronze Star.

E.C.S.

THE 13TH VALLEY
by John M. Del Vecchio
Bantam Books, Inc., New York, N.Y. 606 pages, $15.95.

The 13th Valley is the story of a 101st Airborne Division Infantry company inserted into a secluded South Vietnamese valley with orders to seek out and destroy a North Vietnamese army regimental headquarters. Alpha Company, 7th Battalion, 402nd Infantry, is a ficticious unit, but the Khe Ta Laou Valley is a real place where American soldiers fought and died in August 1970. Veterans of that war's combat air assaults will have no trouble recognizing the "boonierats" who populate combat correspondent John M. Del Vecchio's first novel.

The Khe Ta Laou operation was part of a larger campaign, codenamed TEXAS STAR, which included the bloody defense of beseiged Firebase Ripcord. The action takes place high in the wartorn mountains of South Vietnam's northern I Corps region.

The "boonierats" of Alpha Company are, in many ways, cliches — we've seen them before in other war novels — but they are cliches that ring true. Some are caught up in the war's kinetic energy and turned into "action junkies," but for most, Vietnam is depression, despair, a valley of terror where their only hope is to survive until their DEROS rolls around. 1LT Rufus Brooks, Alpha's company commander, is a philosopher who searches for the cause of war amid the carnage of battle and concludes: "We think ourselves into war. The antecedents are in our minds."

W.B.C.

THE YOM KIPPUR WAR: The Politics, Tactics, and Individual Actions by Which Israel Repelled the Arab Invasions of 1973
by Peter Allen
Scribners, 1982. 310 pages, $17.95.

Chronological battle accounts normally don't make fascinating reading. However, Peter Allen manages to give a gripping hour-by-hour description of the 1973 Arab invasion of the Golan Heights and the Sinai. He skillfully transports the reader back and forth from the raging, brutal desert battles to behind policymakers' doors in Tel Aviv, Damascus, and Cairo where strategies were discussed and petty rivalries intensified.

The massive use by the Arabs of Soviet SA-6 mobile tracked missiles and SA-7 shoulder-fired missiles took Israel and the entire West by surprise. For the first time in 20 years, doubts were expressed about the Israeli air force's ability to play a decisive role. Conventional battlefield tactics were radically redesigned after the two superpowers watched what amounted to a dress rehearsal of dazzling electronic and missile warfare under real battlefield conditions. Allen contends that the Yom Kippur War became a tryout for possibly a much bigger and infinitely more disastrous conflict.

The most alarming aspect of the war, as Allen sees it, was the risk of confrontation between the U.S. and the Soviets, a fear that almost became reality as teleprinters around the world clacked out the message: Assume Defense Condition Three.

That night in October 1973, two weeks after the war had erupted, the US prepared for nuclear war:

> The B-52s stood loaded, pilots ready to go, while in the eerie light of the underground silos stood the men who had trained unendingly for the signal that would never come. Perhaps now it had. They knew by heart and by system the routine that preceded the launching of the ICBMs; now they took it as far as it could go short of the final switch being pushed into place at the ultimate command.

Again, the final signal never came. Allen defends Nixon's actions, saying: "Certainly, Nixon was criticized soon after for what many saw as an action designed to distract people from the latest Watergate scandals; but perhaps they were being unfair, for had he not acted, they conceivably would have had something even more devastating to worry about."

This book should be priority reading for air defenders. As Allen unwittingly points out, outmoded battle tactics can still be effective against sophisticated weapon systems, but innovative antitank and antiaircraft weapons dictated strategy during Yom Kippur of 1973.

C.B.S.

May you have the
Spirit of Christmas
which is Peace,

the Gladness of Christmas
which is Hope,

the Heart of Christmas
which is Love.

the Staff