AIR DEFENSE MAGAZINE

APRIL-JUNE 1982

Covert/Passive Air Defense Sensors: The Lastest Countermeasure — page 6.

AIR DEFENSE MAGAZINE

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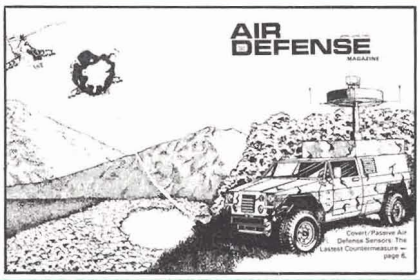
About the Cover

The cover illustration by Texas Instruments artist Brennan Keyworth depicts a covert/passive sensor system not yet in the Army inventory. The original line drawing shows a Texas Instruments sensor and a Westinghouse Corporation radar mounted atop a prototype vehicle designed by General Dynamics Land Systems. The system has just cued a Chaparral battery to the presence of Threat aircraft with spectacular results.



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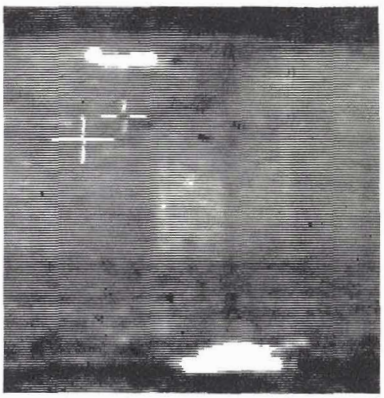

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Looking ahead. . .

The July-September issue of AIR DEFENSE Magazine will contain the second installment of the covert/passive air defense sensors series introduced in this edition of the magazine. The next issue will also chronicle an air defense unit's valiant but futile attempt to defend Clark Field during the disastrous Japanese raid on the Philippines. The raid caught and destroyed most of the US Far Eastern Air Force on the ground 10 hours after Pearl Harbor was attacked.

AIR DEFENSE

"The Bridge over the Chasm of Defeat."

Editor
William Blair Case

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INTERCEPT PO

Major General John B. Oblinger, Jr.

Any army, anywhere in the world, can be only as good as the people who serve in it. That is why good leadership, especially within the noncommissioned officer corps, is so important in our Army today. Soldiers who are led well will fight well, and it is the noncommissioned officer who most often comes into direct contact with the soldiers we will have to depend on in case of war. Inspirational leadership from our NCOs is an imperative in the Army's efforts to build total readiness from the unit level upward. The noncommissioned officer provides the essential link in the chain of command between the officer corps and the enlisted force. An article written for the July-December 1923 issue of *The Infantry Journal*, titled "Backbone of the Army," symbolically described the role of the noncommissioned officer in this manner:

"Modern science tells us that many of the nerve centers are located along the spinal column. They take post between the head and hands and are in sympathetic contact with both. The head decides that a certain job has to be done, and immediately there run out numberless little messages and instructions to units situated by the backbone. There the directions are transmitted into a language the muscles can understand and reissued to the hands and feet. The muscles respond, the work is done by the aid of the middleman, who is in close relations with the working elements and with directing the element. . . ."

We can relate this analogy to the role of the noncommissioned officer throughout history. The origin of the NCO can be traced back to the Roman legions. The success of the Roman soldier in war was due to march formation, camp preparation, and response to order in battle. The training of a Roman soldier was long, detailed, and intense. Roman commanders found the tactical and administrative requirements of drilling and fielding a capable army absorbed much of their time. Necessity caused them to turn to the ranks for assistance. These assistants (called principalis) were required to supervise the individual training, carry out plans, and perform administrative and logistical duties. They were the first "noncommissioned" officers. An indication of their importance can be derived from the English translation of the Roman term used to describe them, which means principal, main, key, chief, or first in rank.

The origin of the noncommissioned officer in the American Army goes back to the formation of the Continental Army in 1775. Early organization was patterned after the British army, which had officers appointed or elected to command or to serve on staffs. Sergeants, in turn, were appointed to serve as subordinates to commanders or to assist staff officers. There was little uniformity in terms of qualifications, duties, responsibilities, authority, and standards until Baron Von Steuben was named by General Washington as the first inspector general in the American Army. Von Stueben's instructions for the commandant of a regiment stated: "The choice of noncommissioned officers is also an object of the greatest importance. The order and discipline of a regiment depend so much upon their behavior that too much care cannot be taken in preferring none to that trust but those who by their merit and conduct are entitled to it. Honesty, sobriety, and a remarkable attention to every point of duty, with neatness to their dress, are indispensable requisites; a spirit to command respect and obedience from the men, an expertness in performing every part of the exercise, and an ability to teach it are also absolutely necessary."

These instructions are as valid today as they were then. In comparing AR 600-20, Army Command Policy, and FM 22-600-20, The Army Noncommissioned Officer Guide, it is interesting to note how closely they parallel.

The selection and training policies instituted by Baron Von Steuben continue to provide the vital link between the officer corps and the enlisted ranks, although Von Steuben's "blue book" has been replaced by the Enlisted Personnel Management System (EPMS) and the

Noncommissioned Officer Education System (NCOES).

NCOs are indeed the backbone of the Army. They are the foundation upon which success or failure rests. NCOs are charged with duties that support commissioned officers in accomplishing the missions of the units of the Army. It's the NCOs' business to train and lead soldiers. NCOs make sure orders are carried out in spirit and in fact. NCOs lead by example; they set high standards and train soldiers to perform to those standards. NCOs must have skill, ability, and leadership qualities to train soldiers for combat and lead them in combat. NCOs are in the first line of Army leadership. They outnumber commissioned officers nearly three to one and supervise more than 80 percent of the soldiers in combat divisions. Sergeants train soldiers to perform individual skills to high standards of excellence. Sergeants also train the Army's small units — fire teams, squads, crews, and sections — to fight together as teams. Teamwork is the NCOs' primary responsibility. NCOs must realize that the performance of every soldier depends on every other soldier. It is through teamwork that a small unit accomplishes the tasks that contribute to successful completion of the overall mission. NCOs must build teamwork that will lead to unit proficiency.

Noncommissioned officer duties and responsibilities are numerous. These duties can be found in Army regulations, SOPs, soldier's manuals, field and technical manuals, and policy letters. NCOs formulate plans and issue and execute orders on their own initiative and judgement in keeping with the authority delegated to them. Additionally, NCOs make recommendations on such matters as assignments, promotions, discipline, training, privileges, troop morale and welfare, and mission accomplishment.

It is a wise officer or commander who solicits inputs from the NCO and uses the NCO to evaluate proposed policy changes. The NCO has practical knowledge and experience from which the officer can benefit. Two-way communication between the officer and NCO is critical. Without communication the mission and troops will suffer. With good communication, both the officer and the NCO are able to perform their duties and lead their unit, or more appropriately their "team," to ultimate success.

A well-trained, dedicated, and professional NCO corps is necessary for the Army to function and meet its mission of national security. As in the past, the Army today selects a special breed of soldiers to become noncommissioned officers. NCOs are promoted from the ranks based upon their demonstrated performance and potential for leadership. The noncommissioned officer executes the duties of his position by exhibiting competency and superior performance. It is this vital role of the noncommissioned officer that is the primary key to readiness within the United States Army today.

John B. Oblinger

When President Reagan announced he will nominate GEN John W. Vessey, Jr., to become chairman of the Joint Chiefs of Staff, effective 1 July 1982, the national news media applauded his selection of a former enlisted man and noncommissioned officer who rose through the ranks by an unusual route.

General Vessey started his military career by enlisting in the Minnesota National Guard in 1939. He was called to active duty in 1941, rose to the rank of sergeant, and won a battlefield commission as a second lieutenant on the Anzio beachhead on 6 May 1944. General Vessey, who will become the first Army general to reach the nation's top military post without having graduated from the US Military Academy at West Point, once called the first sergeant's job "the toughest in the Army."

General Vessey's career is renewed evidence that leadership is a quality that exists in all ranks and a reminder that leadership is a precious commodity that must be recognized and encouraged whether the soldier displaying it wears sergeant's stripes or officer's insignia.

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letters to the editor

"SELLING THE AIR THREAT" APPLAUDED

MG John B. Oblinger, Jr.
Commandant
US Army Air Defense School
Fort Bliss, Texas 79916

Thank you for the advance copy of "Selling The Air Threat" (AIR DEFENSE Magazine, October-December 1981) and indeed 1LT John S. Hudson is correct. Portrayal of the threat, as it truly exists, during command post and maneuver exercises is vitally important if we are to plan for the successful execution of our general defense plans.

Keeping in mind exercise objectives, it is necessary for commanders at all echelons to monitor closely the use of the opposing force (OPFOR), with its capabilities and limitations, to insure that situations are created to exercise those aspects of a particular plan or operational concept. It is under these constraints that one often finds some limited "lack of realism" that can sometimes appear to be lack of knowledge.

My exercise planners and I feel confident that current air threat capabilities and tactics of both fixed-wing and rotary-wing aircraft are being integrated into all exercises in V Corps. Recognizing that there is always room for growth and improvement, we are spending a considerable amount of time training and educating our commanders and staffs to be cognizant of the substantial threat that we must be prepared to encounter and win.

The arrival of your letter was most timely. We took advantage of it by providing copies of the article to attendees at our quarterly intelligence conference. It was helpful in stimulating a valuable discussion.

PAUL S. WILLIAMS, JR.
Lieutenant General, USA
Commanding
Headquarters, V Corps

Dear Sir:

Recently the Davidson College Army ROTC Cadet Corps began to assemble a world map illustrating the location of US Army units worldwide. The location of units will be depicted by their distinctive unit shoulder patches.

The vast majority of units (i.e., corps, divisions, separate brigades, and schools) responded promptly to our request for their unit patch. The 32d Army Air Defense Command responded with their patch and, much to our surprise and delight, a personal letter from MG William Cooper.

General Cooper's kind gesture and consideration have done much to enhance the reputation of Air Defense Artillery among the cadets and my personal pride.

ALBERT G. BRAUER II
CPT, AD
Assistant Professor of
Military Science

Dear Sir:

I read with delight Colonel Floyd James Thompson's inspiring article "America's Commitment to Freedom" in your January-March 1982 issue. I know how he feels when confronted with the "We won OUR war" mentality. My question is: What is the logic behind the too often heard statement that we lost the war in Vietnam? Are there any, but a very few Vietnam vets, who feel they or their unit lost in Vietnam? I doubt it. About all that can be said for sure is we did not achieve our government's political objectives. We were not allowed to win militarily and were ultimately pulled out of the conflict because of mounting pressure at home. The US forces were successfully accomplishing their mission on a daily basis right up to the end.

Does anyone ever say we lost the war in Korea? We didn't achieve our political objectives there either. In Korea we didn't do as well in fact as we did in Vietnam. In Korea we fought to a stalemate, neither side being able to win and hold anything decisive. At least in Vietnam there were very, very few days that went by that we didn't totally dominate the battlefield and have almost total freedom of movement, going anywhere and doing anything we pleased.

WILLIAM F. VOTH
MAJOR, IN
US Army Aviation Center
Fort Rucker, Alabama 36362

COVERT/PASSIVE AIR DEFENSE SENSORS: A NEW APPROACH TO AIR DEFENSE

by Mike Maxfield

This first article in a series on passive sensors covers concepts and technology for three different sensors. The second article will explore the application of passive sensor technology to current and planned air defense systems. The final installment in the series will explain how passive sensor technology will impact on air defense tactics for the future.

Even the Hundred Years War finally ended, after dragging on for 116 years, but the war between the wizards of weaponry goes on forever without pause, or truce, or ceasefire. Each new edge in weapons technology inspires countermeasures which, in turn, spawn counter-countermeasures.

The latest in air defense counter-countermeasures are covert/passive air defense sensors (CPADS) which can track Threat aircraft without alerting Threat pilots. CPADS are designed to limit air defense weapon systems' vulnerability by making them harder to detect. Experts say they could help offset an ominous Threat advantage in electronic warfare (EW) capabilities and an equally ominous growth in Threat aircraft capabilities.

THE CHALLENGE

The threat to NATO air defense from Warsaw Pact air forces is formidable. Soviet-designed aircraft reflect major advances over previous Warsaw Pact equipment. The MiG-27 Flogger D, SH-17/20 Fitter C, SU-24 Fencer, and helicopters such as the Mi-8 Hip C/E and Mi-24 Hind A/D/E have the capability to inflict devastating damage to NATO ground units already outnumbered by the enemy. Future aircraft such as the RAM K/L and Type 58 designs, along with precision-guided munitions and advanced target acquisition techniques, will continue this ominous trend.

MiG-27 Flogger D

Warsaw Pact forces, through combat experience obtained in the Arab-Israeli conflicts of 1967 and 1973, Vietnam, Angola, Ethiopia-Somalia, and Afghanistan, have developed weapons and tactics that enhance their combat capabilities. This experience has yielded great improvements in the quality and training of Soviet air forces. Major advances have been made in air-to-surface munitions which include precision-guided missiles (PGM), cruise missiles, antiradation missiles (ARM), and antitank guided missiles (ATGM). The tactics used to deliver these weapons have also been improved, thanks to nap-of-the-earth (NOE) flying techniques, terrain following and avoidance radars, and nighttime and all-weather performance capabilities.

The Warsaw Pact military planners have placed great emphasis on electronic warfare capabilities. The result has been the world's largest and most capable EW-dedicated force. Special emphasis has been placed on the detection, analysis, targeting, and destruction of NATO weapon systems through covert/passive EW measures. Warsaw Pact doctrine places great emphasis on the denial of the electromagnetic spectrum to NATO forces. Warsaw Pact capabilities include the massive use of all types of electronic countermeasures such as jamming, direction-finding, and deception to counter NATO air defense. Again, Soviet experience in Vietnam and the Middle East against equivalent NATO weapons has been an excellent learning tool in the development of tactics and weapons to overcome NATO defenses.

Perhaps the most overlooked equation in Soviet force structure is the combat experience that frontal aviation and air defense personnel have gained in both air defense and tactical air support operations from participation in client state aggression (Egypt, Syria, Iraq, Libya, Ethiopia, Vietnam, and Afghanistan). NATO air defense forces have little real combat experience in air defense operations except for brief periods in Vietnam and Korea. This Soviet advantage could be an important factor in any NATO/Warsaw Pact conflict. NATO forces must have a superior qualitative advantage in their air defense structure to negate this Warsaw Pact advantage. A covert/passive air defense system provides this technological advantage through its unique passive sensor system designed to limit vulnerability and detection by enemy forces.

Mi-24 Hind E

THE ANSWER

CPADS are a collection of multiple sensors mounted on a common gimbal. This sensor system is comprised of a radar interferometer receiver (fig 1) used for detection of radar emissions from aircraft, a forward looking infrared (FLIR) sensor (fig 2) for visual identification, and an acoustical sensor array (fig 3) for use in the detection of helicopters. Together, these three sensors provide a passive means of detecting enemy aircraft and cueing friendly air defense elements to an incoming enemy target within a few degrees. These three sensors, operating in conjunction with a low power radar or infrared search and track system, present a formidable challenge to any hostile air force.

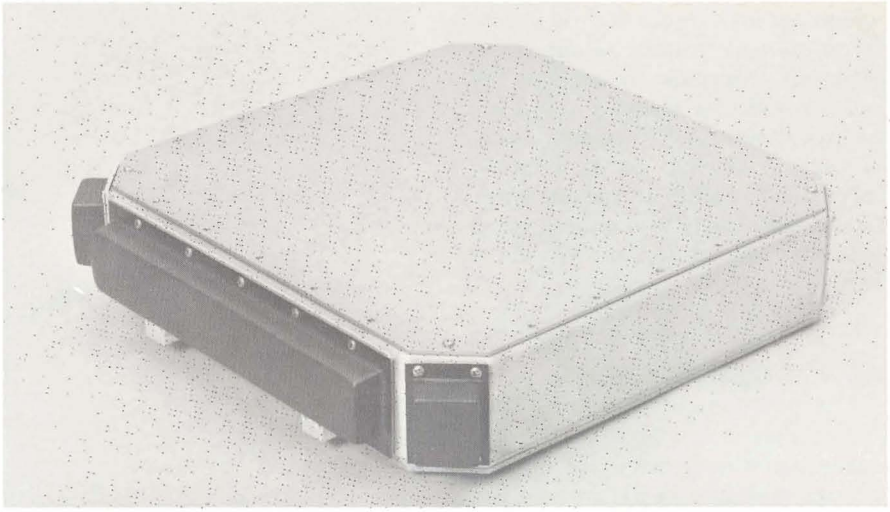


Figure 1. Mast-mounted radar interferometer for detection of RF signals.

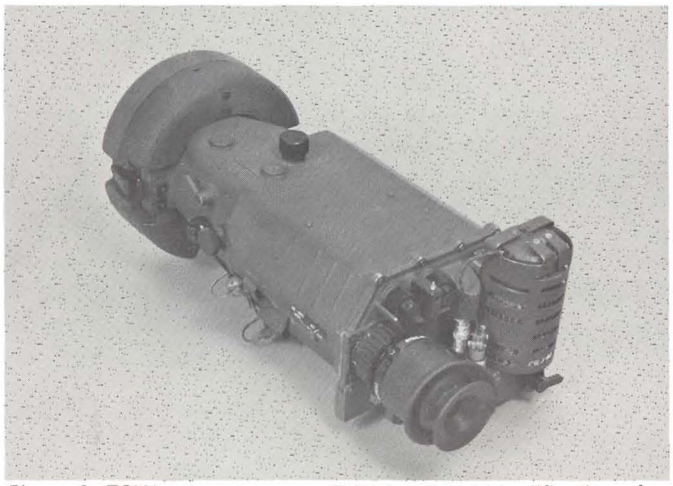


Figure 2. TOW weapon system FLIR for visual identification of targets.

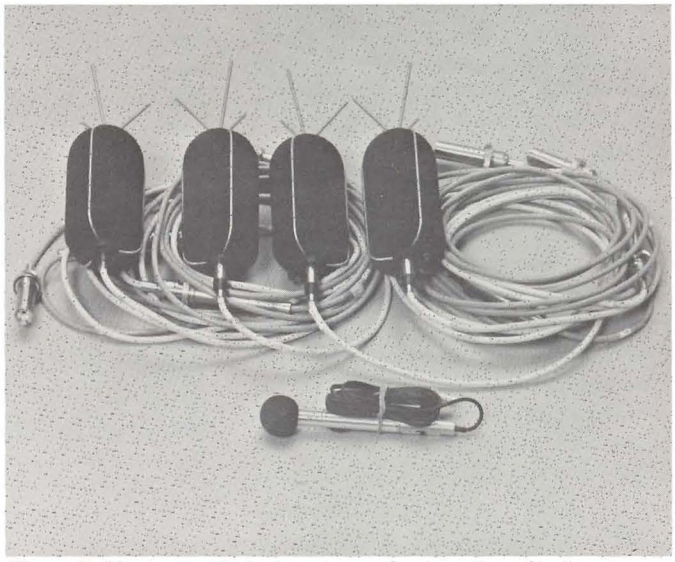


Figure 3. Mast-mounted microphones for detection of helicopters and airborne targets.

RF CUEING

The concept of radar frequency (RF) cueing is based on the detection of aircraft radar emissions. Any aircraft using radar for terrain following and avoidance, navigation, or fire control direction of its weapons can be detected and tracked in azimuth and elevation. Based upon threat conditions or complexity of the system, either two- or four-channel receivers (fig 4 and 5) are used to receive and process radar emissions into usable data. The main difference between the receivers is the speed of data processing.

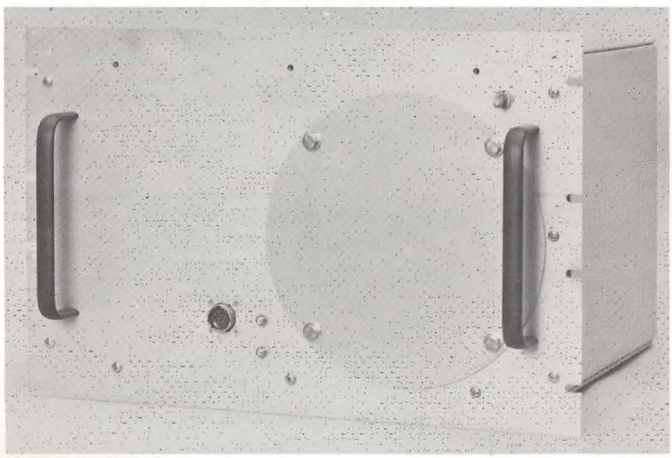


Figure 4. Two-channel receiver.

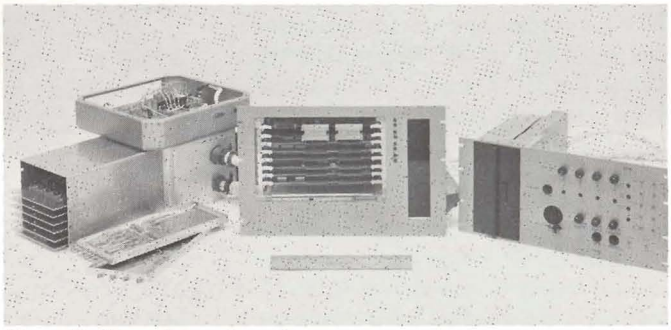


Figure 5. Four-channel receiver.

The radar interferometer (fig 6) contains multiple antennas spaced at different intervals to receive the radar emissions across a broad frequency spectrum. The antenna subsystem is placed on a mast to increase its ability to receive emissions, while the two- or four-channel processor is mounted in a vehicle or van.

(photo courtesy of International Countermeasures Handbook)

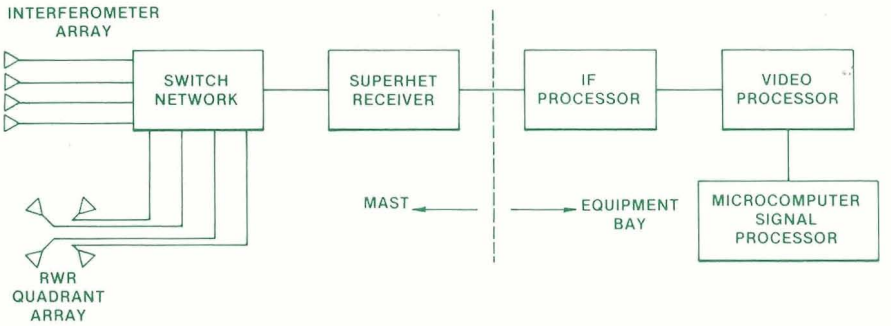
Figure 6. Soviet electronic warfare system, KNIFE REST.

HOW RF CUEING WORKS

The precision direction-finding (DF) receiver is a high-sensitivity, scanning superheterodyne design. Threat emissions of RF are received and mixed with a local oscillator signal to create an intermediate frequency (IF) signal. The IF processor amplifies the signals and measures the relative phase and amplitudes. The video processor digitizes the analog IF signal, provides pulse discrimination based on direction of arrival (DOA), intensity, frequency, and pulse repetition frequency (PRF), and stores the valid data in a buffer. The microprocessor sorts the received data, using the measured DOA and PRF, and provides threat location and identification. In addition, the microprocessor contains logic to tune the receiver through the expected threat RF emission range.

The radar warning receiver (RWR) mode provides coarse DF over a 360-degree azimuth using amplitude monopulse processing techniques. The high-sensitivity receiver design allows threat location and identification from side lobe and back lobe transmissions. The precision DOA mode uses an array of four 1-inch spiral antennas in the forward quadrant to provide plus or minus 0.5 degree accuracy over a plus or minus 45-degree region. The basic system operation provides coarse DOA over 360-degree azimuth using the RWR mode, while precision DOA required for threat-ranging calculations, narrow field-of-view optic systems, or weapon launch parameters is obtained by slewing the forward quadrant of the mast-mounted receiver to point in the direction of the threat and collecting data in the interferometer mode.

BLOCK DIAGRAM OF RF CUEING SYSTEM



The key to the precision DOA mode is the use of phase monopulse processing rather than amplitude monopulse techniques. Theoretical analyses and field test results have verified that phase processing is much less sensitive to multipath, polarization, and intensity variations than amplitude processing. A common analogy in radios is the reduction in interference effects from noise and fading provided by FM receivers over AM receivers.

FLIR

A common module FLIR employed in the TOW and Chaparral weapon systems is used to provide visual identification of targets and, when possible, eliminate any false

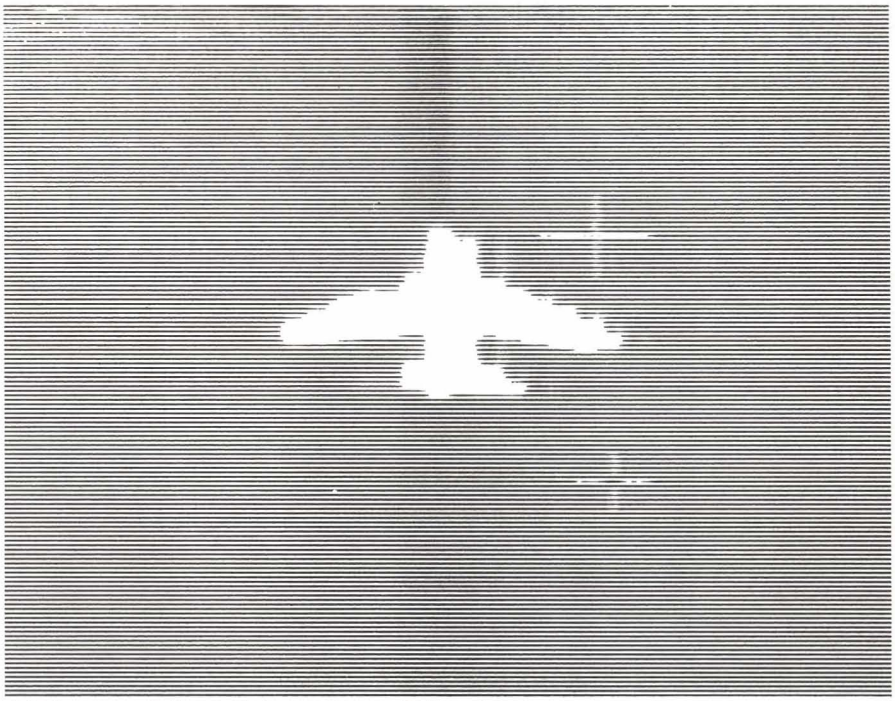
alarms generated by the RF and acoustic sensors. The FLIR is cued to the target by the RF sensor and provides identification beyond visual range, especially during bad weather and darkness. The use of a low cost FLIR provides a 24-hour capability for greatly increased air defense coverage of maneuver elements equipped with Stinger. Stinger elements must be cued to the target if the Stinger gunner is to operate at maximum effectiveness.

HOW FLIR OPERATES

Infrared energy detected by the seeker section is collected by the objective lens in the afocal optical section where it is scanned by a mirror at a 60-Hz rate. The scanner is focused onto a linear detector array and each detector signal is amplified. After this preamplification stage, the detector signals travel from the mast-mounted sensor unit to the video electronics bay where they are further amplified. Each individual channel output is then multiplexed to form the serial raster format of standard TV video. Synchronization and blanking pulses with symbol video are added to the signal within a video composer to form a composite video signal to display.

ACOUSTIC SENSOR

Acoustic sensor technology can be used to detect helicopters at short to medium ranges based on low frequency energy generated by the rotation of the main rotor blade. Processed data from the CPADS Fort Bliss tests revealed that unique helicopter blade noise (below 200-Hz) propagates at low frequencies over obstacles for considerable distances. The distance at which these frequencies can be detected and identified depends on processing technology, battlefield noise, and environmental factors (wind, foliage, temperature, terrain, etc.). One approach is to use off-the-shelf hardware for microphones and amplifiers coupled to special signal processing equipment. These advanced signal-processing techniques allow direction finding of NOE helicopters at 10 kilometers to within a few degrees.



FLIR image or A-7 Corsair II cued by the RF interferometer.

ACOUSTIC SENSOR OPERATION

The main rotor blades of a helicopter produce low frequency sound which is detected by the mast-mounted acoustical array (microphones). This energy produces a voltage which is amplified, filtered, sampled, held, finally digitized, and stored in memory. An array processor converts this data from a time series array into a frequency array by means of fast fourier transformers. The data is then subjected to software tests to determine if a helicopter is present, to estimate azimuth to the target, and to classify the target (AH-1, Mi-24, OH-58, CH-53, etc.). Once these tests are completed, the data is displayed to the operator at his console.

CONCLUSION

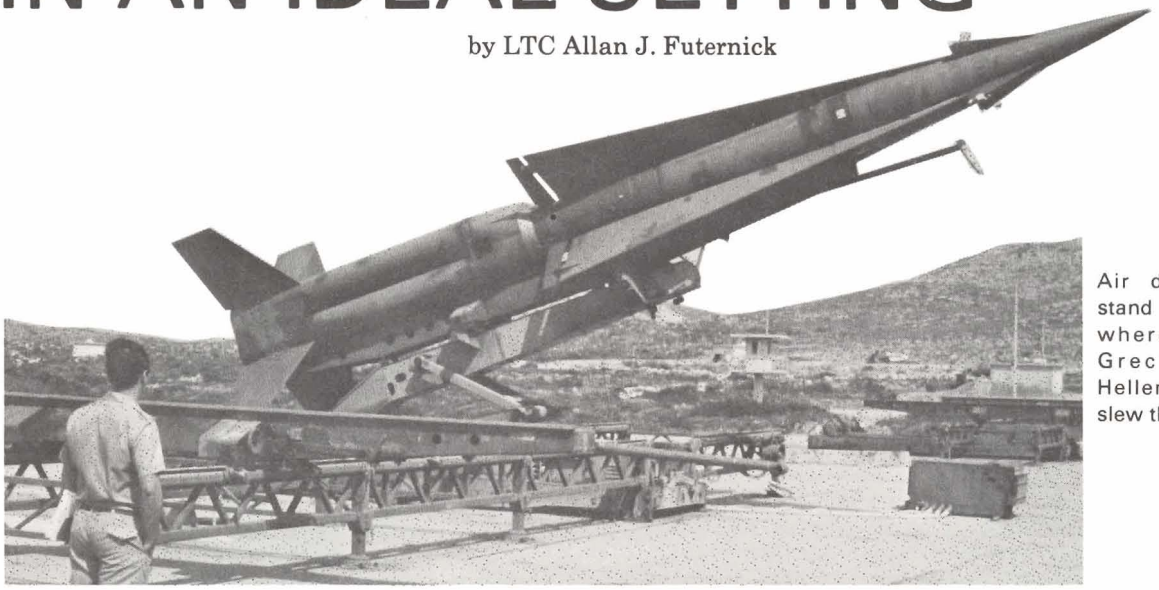
While no one passive sensor covered in this article can replace radar for all air defense operations, a collection of passive sensors (FLIR, RF cueing, and acoustic) could have a significant impact on any enemy air force strategy and tactics. Initial study of passive sensor capabilities shows that radar emitting time can be reduced, especially during periods of darkness and poor weather conditions. Multisensor technology is developing at a rapid pace and can be expected to make a significant impact on air defense systems of the late 1980s.

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.*

NAMFI:

PROFESSIONAL SUPPORT IN AN IDEAL SETTING

by LTC Allan J. Futernick



Air defense weapons stand poised over Crete where, according to Grecian mythology, Hellenic hero Theseus slew the Minotaur.

To students of mythology, Crete is the island where Theseus wandered the murky corridors of the labyrinth in search of the Minotaur, the monster shaped half like a man and half like a bull.

To archaeologists, Crete is the graveyard of the Minoan Empire, the cultural and trading link between ancient Egypt and Greece that gave birth to Western Civilization.

To modern military historians, Crete is the site of history's first large-scale airborne invasion. Hitler's paratroopers succeeded in dislodging a numerically superior but outgunned British force but suffered such shocking casualties that airborne tactics played only a small part in German military planning for the rest of the war.

Today, Crete is still of military importance, thanks in part to its strategic location and in part to the presence of the NATO Missile Firing Installation (NAMFI).

NAMFI provides administrative and logistical support and scoring and evaluation for the annual service practice (ASP) of missile and gun units of "user" nations. The installation is located on Crete's Akrotiri Peninsula.

Crete, the largest of the Greek islands, covers an area of 8,386 square kilometers. It is 252 kilometers long (east to west) and varies in width from 12 to 60 kilometers (north to south). It is surrounded by the Cretan Sea on the north and the Libyan Sea on the south. Mountain ranges, running north to south, rise to a height of almost 2,400 meters. The island's population is approximately 500,000 with the largest cities being Iraklion (pop. 110,000) and Hania (pop. 60,000).

HISTORY

When NATO decided to establish a guided missile range in Europe, the task of selecting the most suitable location was assigned to the NATO Advisory Group for Aeronautical Research and Development. This group, after extensive reconnaissance and studies of all proposed areas, finally selected the Souda Bay area of Crete as the best site for the following reasons:

- The sea space, with a line of fire from west to east, permits the firing of missiles and guns at maximum range without necessitating the removal of the local population from the area.
- Air and naval bases are located nearby at Souda.
- Ideal weather conditions permit operation of the range throughout the year.

Construction of the installation began in 1964 and NAMFI became operational in 1968. NATO funds were used and the cost of the initial construction and improvements to date exceeds $100 million. The annual operating costs are approximately $20 million.

ORGANIZATION

Presently, there are five nations whose units fire at NAMFI: Greece, Belgium, the Federal Republic of Germany, the Netherlands, and the United States. These nations are referred to as "users." Denmark and

Norway withdrew in 1970, as did France in 1971. No units from Norway or France have ever fired at NAMFI. Danish Hawk units fired in 1981 on a test basis.

When NAMFI began operating in 1968, an organization known as the NAMFI Equipment Committee (NEC) was established to make operational, financial, logistical, and personnel decisions. In March 1977 the name of the organization was changed to the Users NAMFI Committee, commonly referred to as UNAC.

The committee membership is composed of representatives from each user nation, as well as US Army, Europe (USAREUR) and Supreme Headquarters, Allied Powers, Europe (SHAPE). The NAMFI commander serves as committee president. Three meetings are held each year, the first in Brussels and the remaining two at NAMFI. Agenda items are proposed by members in advance and then discussed and voted upon at the meetings. It is interesting to note that no item can be put into effect until it has received unanimous approval from the UNAC members.

The NAMFI facilities are manned by more than 900 military and civilian personnel. NAMFI is under the control of SHAPE for training and under the control of the Hellenic National Defense Staff for administration. The present commander is Major General Iaonnis Mastagakis.

The staff sections are manned by Greek personnel of the Hellenic Army, Navy, and Air Force (who make up more than 90 percent of the staff). In addition, there is a liaison section for each of the other users, as well as a scoring and evaluation section manned by personnel from all five user nations. The US Army Liaison Group is a subordinate element of the 7th Army Training Command, Grafoenwehr, Germany.

The liaison sections provide qualified personnel for the SHAPE evaluation teams and insure the smooth arrival and departure of ASP troops.

Each of the five user nations provides personnel to the scoring and evaluation section according to a schedule agreed upon by UNAC. The key positions of chief, firing analyzer, and senior evaluators (Hawk, Nike Hercules, and Lance) are rotated among the nations according to a similar schedule.

The chief of the scoring and evaluation section is a lieutenant colonel or senior major with an extensive background in evaluation of air defense units and who has served as an air defense battalion operations officer. He is at the same staff level as the chiefs of the other NAMFI divisions and reports directly to the NAMFI commander or his deputy.

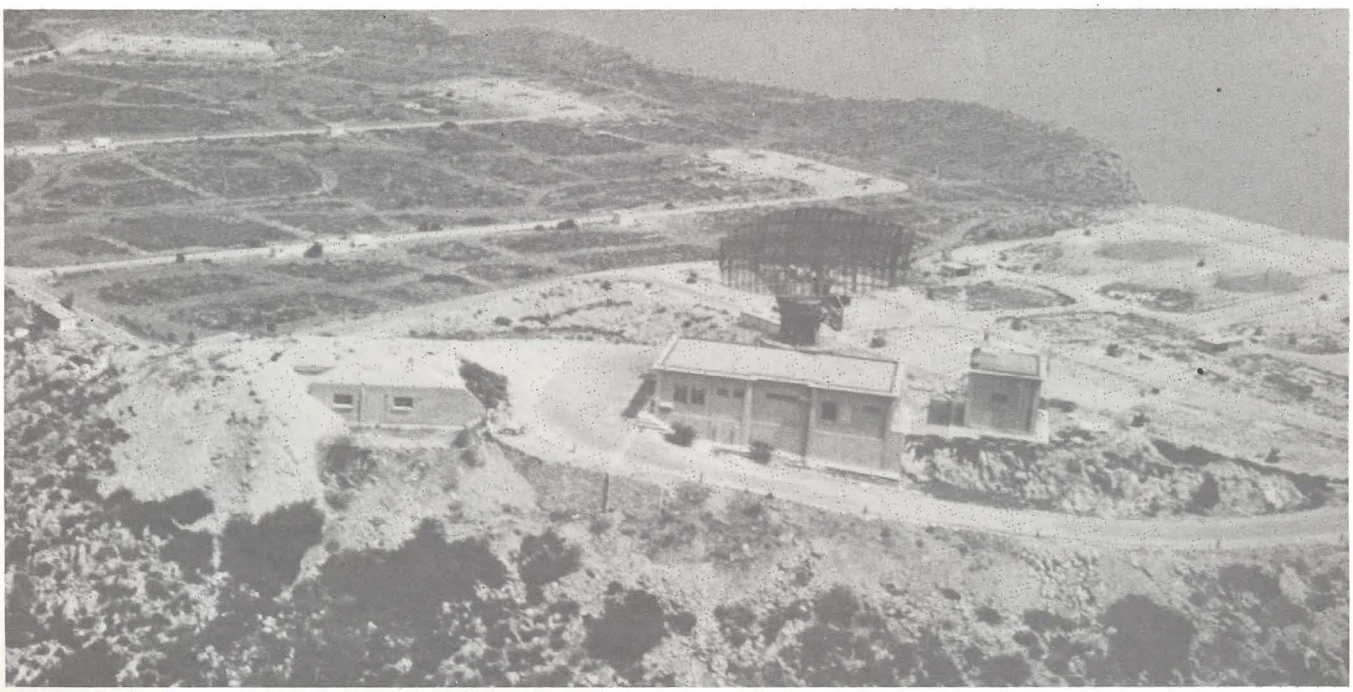
He prepares scoring and evaluation criteria, coordinates with NAMFI for effective use of the range and availability of adequate systems for evaluation, and prepares reports and analyses required by SHAPE.

The firing analyzer is a major or senior captain with experience in at least the Hawk and Nike Hercules systems. He must have been a battery commander for at least 2 years, or have served as the officer in charge of an operational readiness evaluation (ORE) team.

The firing analyzer is responsible to the scoring and evaluation section chief. He helps the chief in the daily conduct of his duties and acts as chief in his absence. He gathers data and prepares summary firing reports. He also analyzes the behavior of missiles during flight, investigates unsuccessful firings, and evaluates target performance.

The senior evaluator (Hawk, Nike Hercules, or Lance) for each team is a major or senior captain with at least 3-years experience as a battery commander or officer in charge of an ORE team.

He is responsible to the scoring and evaluation section chief. The senior evaluator directs a multina-



A network of radars provides sea and air surveillance as well as missile tracking.

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tional team and assists the scoring and evaluation section chief in the revision of scoring, evaluation, training, and safety regulations. He also prepares and reviews firing evaluations and technical reports.

RANGE FACILITIES AND OPERATIONS

ASP equipment is maintained by Greek personnel at NAMFI. Each user nation is responsible for shipping its required number of missiles to NAMFI for the year's ASPs.

A network of radars provides sea and air surveillance as well as missile tracking. Two SRE-M24/megawatt radars provide air surveillance. Three ASR-M3/ST 380-kilowatt radars provide both air and sea surveillance. Finally, two ASR-M/ST radars serve as gap fillers.

The impact area of the range consists of an area on the sea's surface.

Since air traffic flows through national and international air corridors, and the impact area is considered to be in international waters, firings cannot be conducted when aircraft or ships are in the danger zone of a weapon system.

The nerve center of the range operations is located in the range control building. It is here that the NAMFI operations personnel and scoring and evaluation section personnel work in concert to insure that the range is safe for firing and to monitor and record data for each missile and target.

Data from the radar network discussed above are plotted on a manual board to keep track of ships and aircraft which may be approaching the range area. A remote-control TV camera permits the monitoring of activities at any of the sites on the range. Status lights indicate the state of readiness of a particular site for firing, and automatic plotting boards provide a permanent record of each engagement. Telemetry data are also recorded.

Targets used vary with weapon system employed. Hawk is fired against the teleguided drone MOM-74C provided by Northrop. Nike Hercules is fired against a simulated target provided by a T-1 simulator. Lance missiles are fired at a predetermined point on the sea's surface. The 20-mm antiaircraft Rheinmetall gun is fired against Dornier targets towed by aircraft of the Hellenic air force. Chaparral is fired against the ballistic aerial target system (BATS) provided by the US Army. Roland is fired at the teleguided drone P/N 27-96300-553 provided by Northrop.

FIRING SCHEDULE

During CY 1981, 10,000 troops were scheduled to participate in ASP at NAMFI.

The maximum number of firing units which can be accommodated concurrently in a single week is depicted in the table below.

MAX MIX OF FIRE UNITS PER WEEK

System	Max Units
HAWK	2
NIKE HERC	2
CHAP	1
ROLAND	1
20-MM	1
LANCE	1

In addition to the ASP firings, the Hellenic and American navies conduct both gun and missile firings.

TROOP SUPPORT ACTIVITIES

All ASP personnel are billeted in the NAMFI cantonment area. Among the varied services provided are a modern dining facility, PX, snack bar, movie theater, dispensary with medical and dental care, bank, athletic facilities, and bus transportation to and from the city of Hania. Bus transportation is provided to and from Marathi Beach which is under the exclusive control of NAMFI. The NAMFI Officers Club and the NAMFI NCO Club are available for use by permanent party and ASP personnel.

During off-duty time, ASP personnel have the opportunity to take advantage of a wide variety of activities. Among them are shopping for souvenirs, dining at local taverns, swimming at numerous beaches, and touring the island to visit such places as the ancient palaces at Knossos and Phaetos, the national museum at Iraklion, monasteries, and ancient Venetian forts. Personnel can also walk through the breathtaking and world-renowned Samaria Gorge, the largest gorge in Europe. The NAMFI Visitor's Bureau helps ASP personnel plan tours and obtain transportation and hotel reservations.

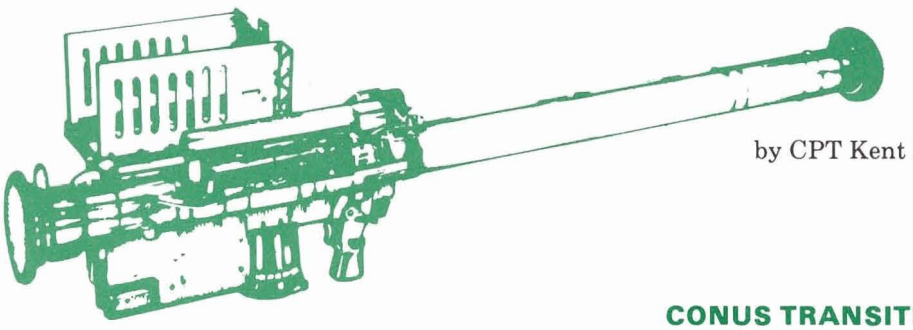
THE FUTURE

Improvements are always being made to the existing facilities and services. Similarly, the scope of operations continues to increase as the family of air defense weapons grows. German Roland ASP was conducted during 1981 and is being incorporated into the firing schedules on a regular basis. The United States will fire Stinger at NAMFI for the first time in the summer of 1982.

It is clear that NAMFI continues to provide professional support in an ideal setting. The present and future importance of NAMFI to the air defense and Lance units of the "user" nations cannot be overstated. In addition, the day-to-day spirit of cooperation among the personnel of NAMFI nations stands as a model for other NATO organizations to emulate.

LIEUTENANT COLONEL FUTERNICK *holds a master of arts and a doctorate in sociology from the University of Alabama and is a graduate of the Command and General Staff College. He has command and staff experience in ADA and PSYOP units and recently served as Chief, US Army Liaison Group, NAMFI. He is presently an assistant professor at the US Military Academy.*

STINGER JOINS CONUS



by CPT Kent L. Morley

The gradual introduction of Stinger to the Army inventory has generated as many questions about Stinger as it has created enthusiasm for the latest addition to air defense artillery's arsenal of manportable weapon systems. This synopsis, which contains a description of Stinger platoon organization excerpted from the still-to-be published FM 44-18, Air Defense Artillery Employment, Stinger, is an attempt to answer some of those questions.

MOS STRUCTURE

As of September 1980, the military occupational specialty (MOS) for manportable air defense (MANPAD) systems is 16S. This MOS applies to Redeye- and Stinger-trained personnel. It provides career progression up to the rank of E-7. Stinger personnel who are promoted to E-8 receive a 16Z50 MOS. Stinger-trained personnel receive a skill qualification identifier of "T," which will be used for 4 to 5 years.

OCONUS TRANSITION TRAINING

The 7th Army Training Command is conducting Stinger new equipment training (NET) at the 7th Army Training Center, Vilseck, Germany. Units from the 11th Armored Cavalry Regiment were the first OCONUS units to receive Stinger equipment and NET. They arrived at the center on 4 August 1980. Since that time, units from the 2d Armored Cavalry Regiment, 1st Armored Division, 3d Infantry Division, and the Berlin Brigade have also received NET and Stinger weapon systems.

CONUS TRANSITION TRAINING

Forces Command (FORSCOM) NET for CONUS units began in February 1982 at Fort Bliss, Texas, with the arrival of soldiers from the 82d Airborne Division. The 3-week NET course is conducted by the 1st Air Defense Artillery (ADA) Training Brigade.

The US Army Air Defense School, Fort Bliss, Texas, has developed two programs of instruction (POI) with course materials for Stinger NET. The 1st ADA Training Brigade will use one POI to train FORSCOM cadre. FORSCOM soldiers who complete Stinger NET will use the second POI to convert their unit's Redeye teams to Stinger teams.

BASIC NCO COURSE

NCO academies now have a 16S basic noncommissioned officers course (BNCOC). Separate Stinger and Redeye tracks are offered. This allows NCOs to enroll in tracks that reflect the particular needs of their units.

SQTs

Individuals serving in 16S Redeye assignments during FY 81 were required to take the 16P skill qualification test (SQT). This practice will be eliminated during the second quarter of FY 84 by the introduction of a new 16S SQT. The 16S SQT will contain Redeye and Stinger tracks which will allow soldiers to be tested only on the weapon system to which they are assigned. In the interim, Redeye and Stinger personnel will take only the common task portions of the SQT.

TRAINING DEVICES

The Stinger M134 guided missile system training set consists of a tracking head trainer; trainer batteries; identification,

friend or foe (IFF), simulator; and a shipping and storage container. The tracking head trainer closely approximates the appearance, operating characteristics, weight, and balance of a Stinger armed with a live round. A performance indicator box attached to the launch tube evaluates gunner performance. A series of indicators identifies successful performance or pinpoints the cause of unsuccessful engagements. The trainer is used in the moving target simulator (MTS) and in the field to train gunners in tracking and firing techniques.

The MTS is an integral and valuable element of MANPAD system training. The MTS provides representative sights and sounds of Threat aircraft that Stinger and Redeye gunners are expected to encounter on the battlefield. Environmental realism is achieved through the use of aircraft images projected on a display screen. Stereophonic sound is provided by recorded sound strips on motion picture film. Aircraft images are equipped with an infrared spot that Redeye and Stinger gunners can track. The MTS provides effective training through realistic simulation of the tactical environment. All MTSs have been converted to handle Stinger.

The M60 field handling trainer consists of a weighted and balanced dummy launch tube, inert separable gripstock assembly, and a shipping and storage container. The field handling trainer is used to provide practice in weapon handling, including weapon round assembly and disassembly, preparation of basic load and ready rounds, reaction drills, sighting, and ranging. Controls and mechanical actions are the same as those of the tactical weapon; however, the trainer has no active internal components or electronics.

PUBLICATIONS

FM 44-18-1, Stinger Team Operations, is currently the only Stinger publication distributed to the field. FM 44-18 is scheduled for DA print in the fourth quarter of FY 82. Stinger SQTs, job books, and trainer's guides are scheduled for distribution during the third quarter of FY 83.

Soldiers from the 82d Airborne Division, the first CONUS unit to receive Stinger new equipment training, track targets in a USAADS moving target simulator.

STINGER ORGANIZATION

The basic Stinger tactical element is the team. Teams are subordinate elements of Stinger air defense sections. Each team is composed of a team chief and a gunner. Both team members are trained to perform all team functions. The team normally acts as a unit with the team chief establishing the identity of the aircraft and authorizing the engagement.

When under heavy attack, both team members may act as gunners to increase firepower. In this case, the team chief should identify the targets, give the gunner an engagement order, and then attempt to engage another target with a second weapon-round.

Each team is normally equipped with a ¼-ton truck and trailer with the exception of those teams assigned to the air assault division. In addition, teams have communications equipment, binoculars, target alert data display sets (TADDS), and two IFF interrogators.

The Stinger air defense section consists of a headquarters element composed of a section chief and a radiotelephone operator/driver, and a varying number of Stinger teams.

STINGER TEAM ALLOCATION

ORGANIZATION	SECTION	TEAM
DIVISION		
ARMORED	16	72
MECHANIZED INFANTRY	16	72
INFANTRY	16	72
AIRBORNE	16	72
AIR ASSAULT	12	72
BRIGADE (SEP)		
ARMORED	5	23
LIGHT INFANTRY	5	23
INFANTRY	5	23
AIR CAVALRY	2	8
ARMORED CAVALRY	4	24

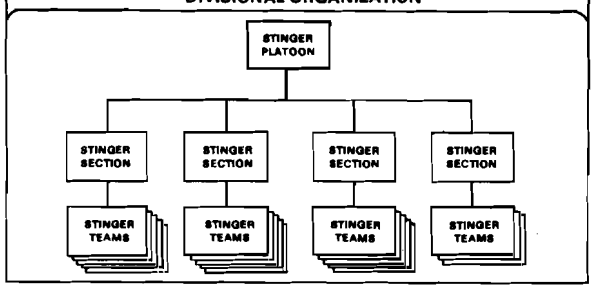
The section headquarters has a ¼-ton truck and trailer, communications equipment, IFF interrogators, an IFF programer/battery charger, and a TADDS to assist in early warning.

The Stinger platoon is organic to the firing batteries of the divisional ADA battalion. The Stinger platoon has its own TOE and is assigned to the headquarters element in separate brigades and headquarters in divisional ADA. The platoon normally is under direct command of the ADA battery commander.

The platoon headquarters is composed of a platoon leader, platoon sergeant, and a radiotelephone operator/driver. The platoon headquarters has a ¼-ton truck and trailer. The element also has communications equipment required to command and control the platoon.

ARMORED, INFANTRY, MECHANIZED (AIM) DIVISION

DIVISIONAL ORGANIZATION



Within the divisional organization, each ADA Stinger platoon consists of a headquarters element and four sections. Three sections have five teams; the fourth section has three teams. A total of 4 platoons and 72 teams are in the division. (For task organization purposes within AIM divisions, each Stinger platoon is designated as the fourth platoon of each Chaparral and Vulcan battery.) Stinger platoons within each division are organized as shown. Stinger organization is the same in airborne divisions as in AIM divisions.

STINGER PLATOON (WITH AIM DIV)

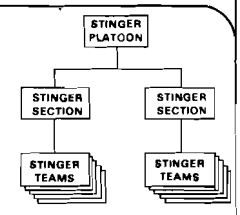
ORGANIZATION	SECTION	TEAM
LT PLATOON LEADER	1	
E-7 PLATOON SERGEANT	1	
E-3 RADIOTELEPHONE OPERATOR/DRIVER	1	
PLATOON HQ	3	3
E-6 SECTION CHIEF	1	
E-3 RADIOTELEPHONE OPERATOR/DRIVER	1	
SECTION HQ (4)	2	8
E-4/5 TEAM CHIEF	1	
E-3/4 GUNNER	1	
TEAM (18)	2	36
PLATOON STRENGTH		47

AIR ASSAULT DIVISION

STINGER PLATOON (AIR ASSAULT DIV)

ORGANIZATION	MEN	PLATOON
PLATOON	3	3
SECTION HQ (2)	2	4
TEAM (12)	2	24
PLATOON STRENGTH		31

2 BATTERIES OF 36 TEAMS EACH

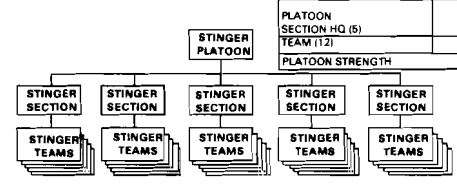


Two Stinger batteries are assigned to the ADA battalion in the division. Each battery consists of three platoons. The platoon has two sections, each consisting of six teams. A total of 6 platoons and 72 teams are in the division. Stinger platoons with each battery are organized as shown.

SEPARATE BRIGADE/REGIMENT

STINGER PLATOON (BRIGADE/REGIMENT)

ORGANIZATION	MEN	PLATOON
PLATOON	3	3
SECTION HQ (5)	2	10
TEAM (12)	2	46
PLATOON STRENGTH		59

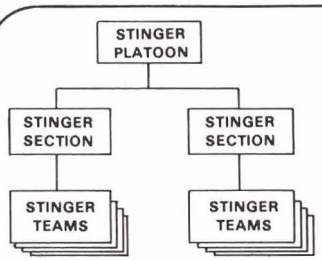


This platoon is organic to the brigade or regimental headquarters element. In separate armored, infantry, and mechanized infantry brigades, the Stinger platoon consists of a headquarters element and five sections. Four sections have five teams and one section has three teams. Total strength of this platoon is 59 personnel.

SEPARATE AIR CAVALRY COMBAT BRIGADE

In the separate air cavalry combat brigade, the Stinger platoon is organized with a headquarters element and two sections. Each section has four teams. Total strength of the platoon is 23 personnel.

STINGER PLATOON (AIR CAV COMBAT BDE)



ORGANIZATION	MEN	PLATOON
PLATOON	3	3
SECTION HQ (2)	2	4
TEAM (8)	2	16
PLATOON STRENGTH		23

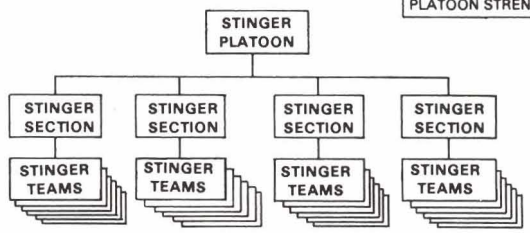
ARMORED CAVALRY REGIMENT

In armored cavalry regiments, the Stinger platoon is organized with a headquarters element and four sections. Each section has six teams. Total platoon strength is 59 personnel.

Command for nondivisional Stinger also follows a simple chain. A Stinger platoon is organic to the headquarters element of separate brigades or regiments. The commander of the nondivisional organization to which Stinger is organic sets the priorities for Stinger employment. He also has the positioning authority for Stinger.

STINGER PLATOON (ARMORED CAV REGIMENT)

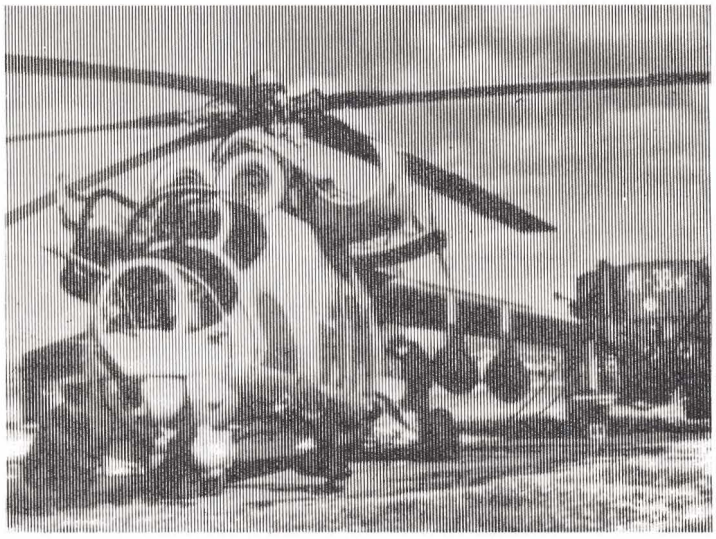
ORGANIZATION	MEN	PLATOON
PLATOON	1	3
SECTION (4)	2	8
TEAM (24)	2	48
PLATOON STRENGTH		59



STINGER POST

ADA commanders struggling to stay abreast of current Stinger development should be forewarned of future Stinger developments. Weapon industry experts are busy improving the Stinger even as it is being fielded. The Stinger Post, equipped with an improved seeker, will be tested during the fourth quarter of FY 82. This modification in the Stinger system will increase its detection range and improve its infrared counter-countermeasure capability. The fielding date for Stinger Post has not been set.

CAPTAIN MORLEY *is presently project officer in charge of the Stinger Section, Short-Range Air Defense Division, Directorate of Training Developments, USAADS. He attended Northwestern University and is a graduate of the Officer Candidate School, Officer Basic Course, and Officer Advanced Course.*



This article was originally published in a recent issue of US Army Aviation Digest. Reprinted with permission.

"Victory in present day warfare will go only to the side that has completely mastered its weapons and equipment and the art of waging war, and also possesses high moral and fighting qualities.

LTG A. Dunin of the Soviet Tank Forces

HELICOPTERS - the Soviet View

by CW4 Richard A. Davis

During 1978, the United States became concerned over the rapid buildup of the helicopter fleet in the Union of Soviet Socialist Republics. It was discovered that the Soviets had doubled their force during 1977; expanded their helicopter fleet three-fold as of June 1978; and were expected to continue. By early 1980 they were able to build more helicopters than the US Army will build during the entire span of the AH-64 Apache and UH-60 Black Hawk programs.

In 1978, Anthony R. Battista, head of the House Armed Services Research and Development Subcommittee staff, noted that helicopters represented the last area in tactical weaponry in which the United States held a production lead over the Soviets (figure 1). *They have an annual production capacity of 1,600 helicopters and were expected to increase annual production (however, some sources indicate production has declined some since 1978).*

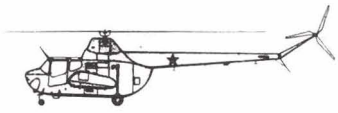
	U.S. 1972-74 Average	U.S.S.R. 1972-74 Average	USSR/US 1972-74 Ratio
Tanks	462*	3,000	6.5:1
APC	860	4,400	5:1
Artillery	170	1,200	7:1
Helicopters	920	710	1:1.3
Fighters	540	930	1.7:1
Transports	0	10	
Submarine Diesel Power	3	5	1.7:1
Surface Ships	11	39	3.5:1
Soviet Submarine Nuclear Power with Ballistic Missile	0	6	

* Includes 475 M60A2 retrofit in 1973-74. Average M60A1 production was 303 per year.

Figure 1. Relative production rate estimates (United States/Soviet Union).

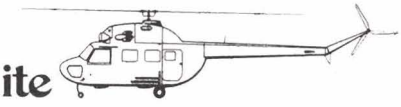
During and just after World War II, the Soviets found that using air power during a combined arms offense brought success. However, it wasn't until successful helicopter operations in Southeast Asia and the Mideast wars that they started to take a long, hard look at helicopters. It is believed that many experiments, tests, and exercises, with many strap-on kits on older aircraft, were tried before the Mi-24 Hind was introduced into operational units (figure 2).

Mi-1 Hare



The first mass produced helicopter designed by the Soviets was the Hare (same as Polish SM-1). It was designed by M. L. Mil (December 1947) and flew its maiden flight in October 1948. By the mid-1950s, it was operational in frontal aviation units.

Mi-2 Hoplite



With the advent of the turbine-powered aircraft, the Soviets saw a need to use this new technology and developed the Hoplite with two 400-shaft-horsepower turbine engines. The Hoplite made its maiden flight during August 1965. It didn't appear to be capable of carrying armament; however, several have been seen with antitank missiles on each side and a cannon mounted on the cockpit's side. In this mode, it could be used independently as a reconnaissance vehicle. The Hoplite can carry 8 to 10 combat troops or can be used as a medevac to carry four wounded on stretchers, one medical corpsman (with equipment) and the crew.

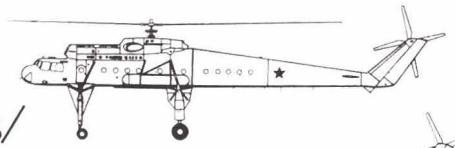
Mi-4 Hound

The Mi-4 Hound was the first medium-size helicopter to enter the inventory. It was designed in 1951 to lift between 1,200 and 1,600 kilograms of cargo or 8 to 12 armed soldiers. There is also an armored version with strap-on pods containing a 12.7-mm machine gun.

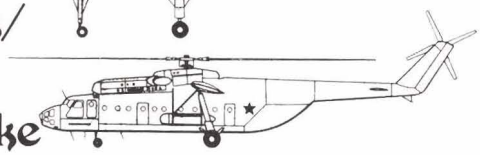
Mi-8 Hip

The next helicopter to appear in frontal aviation was the Hip. It was designed to replace the Mi-Hound and entered service with *Aeroflot* in great numbers. Since it is equipped with large rear doors, this helicopter is capable of transporting at least three Soviet rifle squads and small vehicles. The Hip is further proof that general-purpose aircraft can be armed. Variants have been observed with 12.7-mm machine guns, four 57-mm rocket pods, and antitank guided missiles (ATGM). Moreover, each window in the cargo section is equipped with a support to hold an infantry weapon.

Mi-6 Hook/

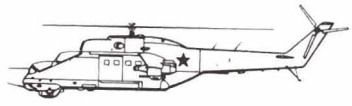


Mi-10 Harke



It was a surprise to western observers when great numbers of the Hook and Harke began to appear in frontal aviation during the late 1960s. The Hook's performance was impressive with a world circuit speed record of 211.4 mph and a cargo load capacity of 26,500 pounds (with one-third fuel load).

Mi-24 Hind



The star of the show was the Hind, introduced in 1974. In the cockpit of the Hind-A, the pilot and copilot sit back, with the weapon-system operator up front. In Hinds D and E, the pilot sits behind and above the gunner. The cargo area can carry 8 to 14 fully armed troops. The speed of an operationally configured Hind-A is still to be verified, but on 18 July 1975 a helicopter of the same type set a speed record of 334.461 kilometers per hour. Prime variants now in service are the Hind-D and Hind-E.

The *Hind-A* has a 12.7-mm machine gun in the nose and a less sophisticated aiming system. Hinds A and D mount four 32-shot, 57-mm unguided rocket pods and four AT-2 SWATTER ATGM rails. Air-to-ground missiles and bombs up to 250 kg can also be carried. The range of the 57-mm rockets is approximately 1,200 meters, and the SWATTER has a range of approximately 3,500 meters. Both can penetrate armor.

The *Hind-D* mounts a large caliber, four-barrel, Gatling-type machine gun; an all-weather sighting system; low light TV; and a laser rangefinder.

The *Hind-E* is similar to Hind-D except SPIRAL ATGMs replace SWATTERS. It is assumed that the Soviets feel a multirole capability helicopter fits better into their battle plans than the single-role type; for example, the AH-1 Cobra built by the US.

DESIG-NATION	NATO CODE NAME	EXCL ROTORS LENGTH (FEET)	HEIGHT (FEET)	MAX SPEED LEVEL FLIGHT (MPH)	MAX RANGE FULL LOAD (MILES)	SERVICE CEILING (FEET)	CARGO CAPACITY (POUND)	PASSENGER ACCOMMO-DATIONS	ARMAMENT	REMARKS
Mi-1	Hare	39.5	12.5	106	147	5,000	2-3	NA		Older aircraft counterpart to OH-58A
Mi-2	Hoplite	39.1	12.3	136	105	13,755	1,543	8	Can carry up to 2,600 pounds of chemicals	Replacing Mi-1
Mi-4	Hound	55	14.4	130	265	11,800	3,650	16	Machine gun in nose	Older, widely exported, utility helicopter
Mi-6	Hook	108.7	32.3	186	404	14,750	26,450	65	Two machine guns in nose	Troop carrier and heavy transport
Mi-8	Hip	60	18.5	161	264	14,760	8,820	24	Up to six external rocket pods, ATGMs, MG in nose, bombs	Widely exported troop carrier
Mi-10	Harke	107.8	32.2	124	155	9,843	33,075	28	None	Flying crane also troop carrier version
Mi-12	Homer*	122	41	163	310	11,500	66,000	200	None	World's largest helicopter; carries troops and cargo together
**Never entered series production*										
Mi-24	Hind	57	14	190	240+	14,500	6,380	8-10	Machine gun in nose, antitank guided missiles, air-to-surface missiles and/or bombs	Soviet attack helicopter

Figure 2. Soviet helicopters.

Helicopter usage has become a widespread phenomenon in the Soviet army. As early as 1953, they were using helicopters to land troops in exercises. In 1959, Soviet tacticians described how they used helicopters to adjust artillery fire at night. Since 1976, the Soviet air force has steadily received increased attention due to the expanding role of the helicopter. This is evidenced by force structure changes and equipment modernization efforts. Due to increased use of the helicopter, commanders at all levels have become aware of how helicopters and their tactics can be used against them. Until 1976, most of the Soviet's helicopter fleet was used in observation or rear area cargo roles. Now, we find that many new tasks are assigned and new tactics developed.

CORPS LEVEL MANEUVERS

Kavkaz-76. In January 1976, the USSR Ministry of Defense announced that corps level maneuvers, code named Kavkaz-76, would be carried out in the Trans-Caucasus Military District from 25 January to 6 February. It was said to involve nearly 25,000 soldiers. The maneuver featured conventional Soviet operations with emphasis on mountain operations and employment of several relatively new items of equipment, most notably the Hind gunship. The exercise wasn't, by Soviet standards, particularly remarkable if you're looking at number of troops. Previous exercises used as many as 100,000 troops.

Sever-76. Less than 4 months following completion of Kavkaz-76, the USSR announced its intention to hold another exercise — code named Sever-76. This exercise was conducted opposite the NATO northern region and included nearly 25,000 soldiers. It emphasized operations in marshy, rugged terrain typical of the northern regions. Air assault operations occupied a prominent place in the exercise. Armed Hind gunships and Hip transport helicopters conducted at least two tactical assault landings. An assault crossing of the Vuoksi River was carried out with heavy heliborne and artillery support, and part of Sever-76 was carried out in a simulated nuclear environment.

Shield-76. From 9 to 16 September 1976, the Warsaw Pact held its first widely publicized maneuvers, code named Shield-76, in 4 years. It took place in Western Poland and involved Soviet, Polish, East German, and Czechoslovakian forces. The exercise's troop strength was about 35,000. Tactical play in the exercise featured heliborne operations in conjunction with the Pact's tank and motorized infantry operations. One source noted that, "Those rotary wing aircraft are acquiring an increasingly broad range of combat employment."

The Soviet 1976 training year saw what they described as three large-scale exercises. As *Krasnya Zvezda (Red Star)* put it, "The emphasis in the current training year is a campaign to achieve further improvement in combat readiness to improve the quality of combat performance as well as persistent mastering of new equipment and weapons. Through the entire period of training, considerable attention was focused on problems of tactics." This statement was reflected in the above exercises. All involved continued exercising and testing of new equipment and concepts (including armed helicopters and heliborne assault operations) but were no more than tactical in scope.

Karpaty-77. The first publicized exercise of 1977 was Karpaty-77 (27,000 troops) held in the L'vov-Lutsk-Rovno area of the Carpathian Military District from 11 to 16 July. Again, operations by Hind attack helicopters in an antitank role were noteworthy. The exercise scenario saw southern units — said to be somewhat superior in forces and means — attack northern troops who (despite heavy resistance) had their defenses penetrated, failed to halt a southern river crossing, and withdrew in the face of unsuccessful counterattacks. Pursuing southern units, after a chase of several hundred kilometers, overtook northern forces and engaged northern march security elements and hastily brought up reserves in a meeting engagement. Southern superiority and combat initiative ultimately won the war.

JOINT MANEUVERS

There is no way to estimate accurately the number of maneuvers on the basis of press reports; however, we believe that the *Soviets and their allies* have conducted far more joint maneuvers than those reported in the Warsaw Pact press or coming to the attention of the West European press.

HELICOPTER OPERATIONS (SOVIET)

The Soviets seem to be very serious about helicopter operations and have found what they believe to be the best tactics to employ them. In mid-1978, according to the *International Defense Review,* the Soviets employed more than 5,000 helicopters (3,800 in the military fleet and 1,200 used by *Aeroflot* and the *KGB* (Soviet secret police and intelligence agency)). This is a threefold increase in 4 years, and it points out the fact that the Soviets recognize that the helicopter is critical to Soviet mobility. *The Soviets have built great numbers of helicopters, and theirs are some of the best in the world.*

OFFENSIVE OPERATIONS

Analyzing the experience of the 1973 Mideast War and Vietnam, the Soviets concluded that the defense based on new armament systems, particularly antitank and antiaircraft missiles, has obtained great superiority over the offense. Soviet tactical planners could also foresee the use of other new weapons not yet tested in a combat situation; e.g., missile artillery, remote mining, and nuclear mine obstacles. It is believed that, with missile artillery bombardments of given areas with small but highly destructive antitank and antipersonnel mines, the whole tactical situation in these areas can be immobilized and forces crossing this area will sustain considerable losses. These factors make success of offensive operations of the ground forces doubtful unless mass use is made of the helicopter to promote neutralization of the new obstacles.

MASS EMPLOYMENT OPERATIONS

Consequently, mass employment of helicopters is becoming a necessity in tactics of ground forces. After overcoming obstacles and landing troops, helicopters can return to rear bases to be used over and over. However, if helicopters do not return to the rear they can be used to support frontline troops continuously. The Soviets feel this is most promising!

TACTICAL OPERATIONS

Airmobile raids have become one in a variety of new Soviet tactical operations. This type operation is used to penetrate quickly into enemy positions, destroy objectives, take prisoners, capture documents and weapons, and return immediately to friendly positions. The same principle can be used to move artillery close to enemy lines, open fire suddenly, destroy enemy positions, and return to the rear safely.

CARGO HELICOPTER OPERATIONS

Helicopters are also used to deploy troops rapidly after a nuclear attack. Soviet troops may be landed in 15 to 20 minutes after a nuclear strike. The troop helicopter is being used to provide rapid crossing of water barriers and to secure the opposite side so that bridging operations can be undertaken. They deliver and spread antitank and antipersonnel mines. The Soviets are ever expanding their use of cargo helicopters in new roles. The influence of the US airmobile concept is very apparent in Soviet writings on the subject. Colonel Belov, a writer on Soviet military affairs, stated, "Airborne units are organized in new combined arms entities with combined reconnaissance and antitank sections. Landing forces can land with a high degree of combat readiness. All this makes assault operations a mass means of armed conflict." Many Soviet writings about air assault presuppose the possession of air superiority or supremacy.

HELIBORNE OPERATIONS

In all operations (including heliborne), Soviet ground forces are responsible for their own defense. That's why they arm most of their aircraft or have provisions for troops onboard to provide fire from the aircraft.

TACTICAL AIRLIFT OPERATIONS

It is estimated that each helicopter regiment in the Soviet air force has sufficient assets to conduct a tactical lift of a motorized rifle battalion, relying mainly on helicopters such as the Hook, Hip, and Hind. This is the most likely unit to use in any type air assault because of its assigned weapons and equipment. This type unit could fight in a behind-the-lines situation.

AIRMOBILE OPERATIONS

Let's examine a typical airmobile operation in detail. The Soviets feel that a tactical heliborne operation can be planned and launched in a matter of hours. During early stages, the unit will increase its reconnaissance of the objective. Then the size of the assault force would be determined based on the type operation. Chosen elements would be issued special equipment needed. Once the force has been briefed thoroughly, they board helicopters in dispersed areas. En route to the objective and escorted by helicopter gunships, they will use areas held by friendly troops and then enter enemy territory at the last possible time under the cover of tactical air (tacair) support, if available. Tacair stays with them through the initial landing. Hopefully, the enemy territory flown over has been suppressed or neutralized.

After landing, the force would deploy; lift helicopters would return to their bases; and the bulk of the ground force would attack its objective. Other elements of the attack force would engage other security forces used in protecting the objective; another element would attack enemy transportation and communications and surveillance sites; and one element would attempt to cut off withdrawal routes and intercept any possible reinforcements.

SPECIAL HELICOPTER MISSIONS

Once the operation is complete, the force would attempt to return to friendly lines or wait until friendly troops advance to link up. Deployment of the Hind has increased immeasurably the Soviet's ability to conduct such operations and any other type mission. Other types of special missions for helicopters include:

- Communications relay.
- ESM/ECM (electronic warfare support measures/electronic countermeasures).
- Psychological operations.
- NBC (nuclear, biological, and chemical) reconnaissance.

SURVIVABILITY IN COMBAT (HELICOPTER)

Despite armament and flexibility, the Soviets are aware that helicopter survivability in combat is vital and cannot be ignored because of rapid development of air defense weapons. Accordingly, Soviet helicopters can be expected to avoid heavy troop and weapons concentrations to the maximum extent unless sufficient tactical air and artillery suppressive fires are available to reduce effectiveness significantly.

RUSSIA'S DRIVE TOWARD SUPREMACY

In March 1977, then outgoing Defense Research and Engineering Director, Dr. Malcolm R. Curry, admitted to Congress that the Hind-D was a surprise to western intelligence officials. He noted that Russia's "determined drive toward supremacy in deployed military technology has not abated." He also confirmed indirectly that the Soviets had already tested a new long-range, fire-and-forget missile. He then told Congress that the Army's new advanced attack helicopter (AAH), "when deployed would only match currently (1977) developed Soviet systems in attack capability." Dr. Curry added, "The Hind-D is the most heavily armed assault helicopter in the world and carries sophisticated weapons delivery and fire control equipment."

Even though Soviet helicopter production has increased sharply in recent years, NATO's output exceeded the Warsaw Pact by 40 percent in 1974 and

1975. But that changed in 1976, as a result of a dramatic change in Warsaw Pact helicopter production, which was twice the United States output.

UNITED STATES VERSUS SOVIET ATTACK HELICOPTERS

The Hind differs from US attack helicopters in many respects. It's bigger than the Cobra, carries more armament, and serves as a combination scout-attack-transport helicopter. The Soviets feel that having three different aircraft perform these roles would cause an air traffic control problem especially at night or in marginal weather conditions. One reason the Soviets want long-range missiles is that their doctrine requires attack helicopters to stay as far as possible from units being attacked even though contour and nap-of-the-earth flying is emphasized.

COCKPIT INSTRUMENTATION ON HIND

The Hind's instrumentation is said to be about the same as US helicopters with some advantages in a few areas. These include:

- Automatic direction finder navigation on at least three stations with continuous readout for X and Y coordinates and a map display so they can be plotted very quickly.
- A stability augmentation system.
- Three generators.
- Two electrical systems that use 800 cycles to reduce the size and weight of wiring harnesses and generators and permit electric rotor blade deicing on all blades.
- Bulletproof, flat antiglare cockpit windows.
- Twin turbine engines.

PRIMARY ROLE OF HIND

One of the primary roles of the Hind is that of an antitank weapon. General Reznichenko, a respected Soviet author, wrote, "They are superior to other antitank weapons in terms of field of vision, maneuverability, and firepower. They are capable of hitting armored enemy targets while remaining out of reach of antiaircraft weapons. The correlation between tank and helicopter losses is 12:1 or even 19:1 in the helicopter's favor, according to practical experiments." General Reznichenko also feels that modern warfare has acquired an exceptionally strong antitank weapon in the helicopter. He said, "Let the tanks aim their machine guns at them. Helicopters will be able to strike first from afar. The crew has everything required to destroy the tanks; the most accurate sights, missiles, plus combat skills."

BASIC ANTITANK HELICOPTER FORMATION

This formation is apparently a flight of four with the flight commander bearing a large portion of the responsibility for the mission's success. The commander gives the command for the turn into the final approach to the target and ensures that each of the crew has mastered the various aspects of the mission before the aircraft take off. There is extensive use of simulators to practice aiming ATGMs. Everything is coordinated and practiced on the ground. The firing approach is carefully calculated ahead of time so that there is no requirement for position-keeping. During the attack, all attention must be on the target with the helicopter kept as stable as possible.

SPECIAL OPTICAL DEVICES

The helicopters are painted camouflage green on top and blue underneath. They are equipped with special optical devices that enable the weapons operator to see tanks even though they are camouflaged and hidden among trees. The requirement for the weapons operator to keep his eyes pressed against the viewing device during the attack is so intense that after the mission is completed, the impression of the rubber protector is clearly visible on the operator's face.

HIND'S NEW ANTITANK SYSTEM

The Soviets envision that the helicopters will approach targets at a height of 5 to 10 meters, then pop up from 20 to 100 meters to fire at targets from ranges

Hind-D

between 2,000 to 3,000 meters. This process should take between 20 to 30 seconds. It has been reported, in *Jane's All the World's Aircraft,* that a new antitank system is under development for the Hind with a fire-and-forget guided missile and an optical-contrast TV seeker which has a range of about 5 miles.

FIRE SUPPORT/ANTITANK ROLES

Soviet combined arms commanders must know the capabilities of fire support helicopters as well as they know those of artillery. They should know the characteristics of armament installed on helicopters and when it is used against different targets. These commanders must work out methods of calling helicopters forward, guiding them to the targets, and maintaining uninterrupted communications.

Colonel Savkin (Soviet) writes in *Principles of Operational Art and Tactics,* "Armed helicopters can operate as accompanying fire for tanks and for infantry in personnel carriers. Moreover, they can attack as part of the forward detachment and advance guards, cover the rear and flanks of friendly forces, disrupt the movement of enemy reserves, and destroy small enemy reconnaissance units."

RUSSIA'S FOLLOW-ON ATTACK HELICOPTER

In January 1978, US Representative William L. Dickinson (R-AL), after talking about the Hind-D, told a meeting of the American Helicopter Society in Washington, "The Russians have a follow-on attack helicopter which is thought to be equal to or better than the Hughes AH-64."

The first Hind was not spotted until 1974. If it is true that five variants of it now exist, as some people seem to think is the case, the Soviets have turned out a new model of attack helicopter about every 10 months. Between 1974 and 1977, more than 450 Hinds became operational. At that rate, *an average of 15 per month is being produced with no indication of slowing down.*

ARMED HELICOPTER'S ROLE

In a book published in 1972, Colonel Savkin begrudgingly admitted, "The armed helicopter may turn out to be a means of fundamental change in the nature of ground combat. Although the helicopter is not ideally suited to this role, it nevertheless possesses those characteristics which most ensure superiority in mobility."

Helicopters, paticularly armed ones, have become very much an integral part of Soviet combined arms operations. It appears that, after a thorough analysis of helicopter operations in Vietnam and the Mideast wars, the Soviets have developed a unique approach to helicopter employment. They have adopted and modified numerous other aspects of foreign concepts, rejected others, and added their own war fighting philosophy. In so doing, they have created a formidable force of helicopters.

LIMITED LIFE OF SOVIET HELICOPTERS

The biggest weakness of Soviet helicopter designs, as most US rotary wing experts see it, is their limited life of operational durability. If Soviet helicopters fly 100 to 500 combat hours, they are satisfactory. They don't feel that a war will last that long. And to emphasize the folly of fine tuning their helicopters for multithousand hour reliability, which characterized US military design standards, the Soviets point to the massive number of US helicopters lost in Southeast Asia (most after short lives in the field). According to *Armed Forces Journal* (December 1976), 4,869 helicopters were lost in the Vietnam War (2,281 due to hostile action and the rest due to operational causes).

Although flown by Soviet air force pilots, Soviet helicopters, with their variety of cargo and attack capabilities, are not air force weapons. They form an integral and important part of the combined arms doctrine, whose employment in battle will be dictated by the Soviet ground commander of tactical forces, and have adapted surprisingly well to the new Soviet theory of war.

SOVIETS ADAPTATION TO HELICOPTERS

It is clear that adaptation by the Soviet forces, in the use of helicopters since the end of World War II, has been successful. This gives them increased mobility, maneuverability, striking power, surprise, and fire power. Large units and operational formations are able to deal with tactical and operational tasks on their own.

The Soviets appreciate the effectiveness of modern antitank defense and realize the necessity of achieving such total surprise and maintaining such a high rate of advance that the enemy would never have time to establish its antitank strongpoints or forces in the first place.

One of the main threats to the ability of a mobile unit to survive was considered air power; therefore, measures for improving antiaircraft systems, at the expense of updating other ground support equipment, were undertaken in the 1960s.

INADEQUATE TACTICS AND EQUIPMENT (SOVIET)

Forced to meet political requirements in the 1970s, the Soviets found it necessary, not only to be able to win the next war, but to do it very quickly! Along with this realization, they decided that both tactics and equipment were not adequate to the task. Equipment was nonexistent or in short supply and often was unsuitable for its intended use.

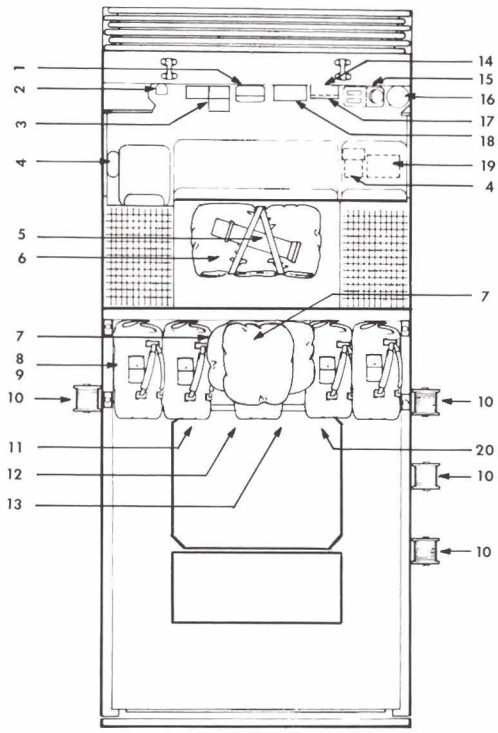
SUMMARY

The sum of the above efforts demonstrates how the Soviets plan to win a war quickly. Their plans are not unique or original, and they recognize that there are enormous problems which will hinder execution of their plans.

However, if the Soviets are successful in *achieving surprise or shock, or disrupting political stability prior to the outbreak of war and catching an enemy half mobilized, undeployed, or ill prepared, then their troops (with only a mediocre level of training) will achieve desired results during an offense!*

Standardization of Combat Vehicle Load Plans

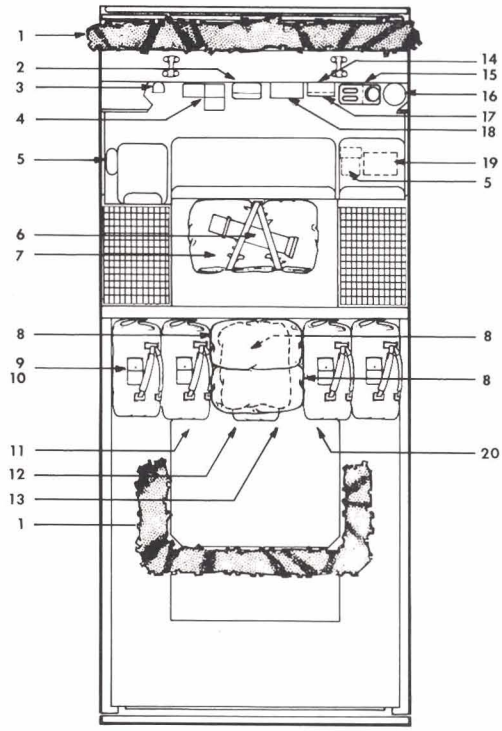
CHAPARRAL
External/Internal



NO	LOAD PLAN ITEM
1	TADDS
2	COMPASS
3	TELEPHONE SET, TA-312 PT (3)
4	BINOCULARS
5	MAP CANNISTER
6	CARGO COVER
7	BAG, CAMOUFLAGE NETTING *
8	DUFFEL BAG
9	CHEMICAL OVERGARMENTS W/BOOTS & GLOVES, TOP ITEM IN DUFFEL BAG
10	DR-8 W/WD-1
11	LEFT CREW EQUIPMENT COMPARTMENT (OUTSIDE) • COOK SET • SQUAD STOVE
12	LEFT CREW EQUIPMENT COMPARTMENT (INSIDE) • OIL, 10 WT (1 CASE OF 24 QT CANS)
13	RIGHT CREW EQUIPMENT COMPARTMENT (INSIDE) • OIL, 30 WT (1 CASE OF 24 QT CANS)
14	PANEL MARKER
15	WATER, 5 GAL
16	M-11 DECONTAMINATING APPARATUS
17	REFLECTOR KIT
18	AN/GRA-39
19	EXHAUST EXTENSION KIT
20	RIGHT CREW EQUIPMENT COMPARTMENT (OUTSIDE) • MEALS, COMBAT, INDIVIDUAL

*NOTE: CAMOUFLAGE NETTING STORED

CHAPARRAL
External/Internal



NO	LOAD PLAN ITEM
1	CAMOUFLAGE NETTING *
2	TADDS
3	COMPASS
4	TELEPHONE SET, TA-312 PT (3)
5	BINOCULARS
6	MAP CANNISTER
7	CARGO COVER
8	BAG, CAMOUFLAGE NETTING
9	DUFFEL BAG
10	CHEMICAL OVERGARMENTS W/BOOTS & GLOVES, TOP ITEM IN DUFFEL BAG
11	LEFT CREW EQUIPMENT COMPARTMENT (OUTSIDE) • COOK SET • SQUAD STOVE
12	LEFT CREW EQUIPMENT COMPARTMENT (INSIDE) • OIL, 10 WT (1 CASE OF 24 QT CANS)
13	RIGHT CREW EQUIPMENT COMPARTMENT (INSIDE) • OIL, 30 WT (1 CASE OF 24 QT CANS)
14	PANEL MARKER
15	WATER, 5 GAL
16	M-11 DECONTAMINATING APPARATUS
17	REFLECTOR KIT
18	AN/GRA-39
19	EXHAUST EXTENSION KIT
20	RIGHT CREW EQUIPMENT COMPARTMENT (OUTSIDE) • MEALS, COMBAT, INDIVIDUAL

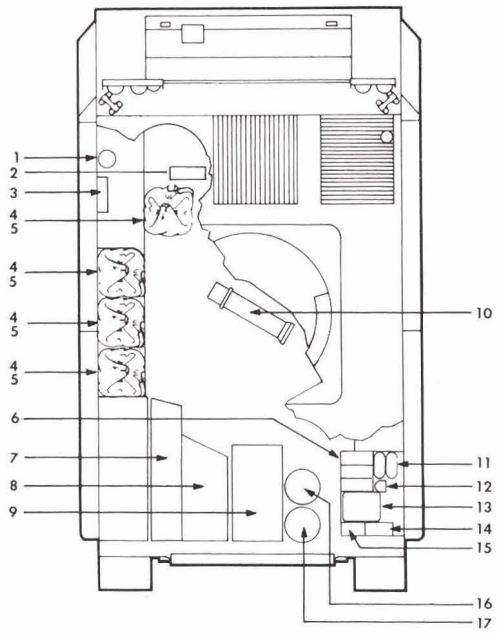
*NOTE: CAMOUFLAGE NETTING ROLLED

The development of standardized combat vehicle load plans is a small but important part of the Armywide Standardization Program which was officially launched by GEN E. C. Meyers, Army Chief of Staff, on 10 June 1980.

The thrust of the Armywide Standardization Program is focused on combat arms branches and the way they train and fight. It makes good sense to standardize the way things are done, especially in units that share similar missions and tables of organization and equipment. Standardization eliminates the necessity of having to retrain soldiers who transfer to like units. It saves training time and helps alleviate individual frustration if certain procedures are standardized and followed by all units.

Late in 1979, the chief of operations and training at the Department of the Army expressed his concerns on training the force through the 1980s to the Army Chief of Staff. His paper outlined the need to standardize the way things are done and then train soldiers to the stand-

VULCAN
Internal



LOAD PLAN	
NO	ITEM
1	M-11 DECONTAMINATING APPARATUS
2	MEALS, COMBAT, INDIVIDUAL
3	REFLECTOR KIT
4	DUFFEL BAG
5	CHEMICAL OVERGARMENTS W/BOOTS & GLOVES, TOP ITEM IN DUFFEL BAG
6	TELEPHONE SET, TA-312 PT (3)
7	AMMO STORAGE
8	AMMO CAN W/DUMMY ROUNDS AND LINKS (OPTIONAL)
9	FOOT LOCKER, NBC EQUIPMENT AND MISC. ITEMS
10	MAP CANNISTER
11	BINOCULARS
12	COMPASS
13	TADDS
14	SQUAD STOVE
15	COOK SET
16	OIL, 30 WT, 5 GAL
17	OIL, 10 WT, 5 GAL

ardized procedures. Essentially, his outline became Phase I of the Armywide Standardization Program which includes the standardization of combat-oriented items such as weapon crew drills, combat vehicle markings, and combat vehicle load plans.

Standardized combat vehicle load plans were refined by US Army Europe service schools and the TRADOC Army Training Support Center. On 9 October 1980, TRADOC tasked all service schools to prepare standardized combat vehicle load plans pamphlets and distribute them to the field, reserve units, and major commands. The proponency for air defense artillery load plans was assigned to the US Army Air Defense School, Fort Bliss, Texas.

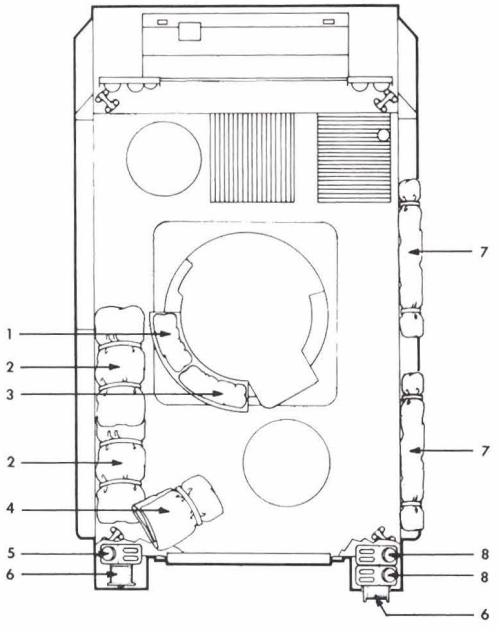
The load plans which accompany this story are designed to supplement appendices B and D of the Chaparral and self-propelled Vulcan operator manuals. The graphics and format are improved and should readily clarify what goes where. The illustrations are drawn to scale to facilitate changes, additions, or improvements which may be made to the plans at a later date.

The plans contain selected items of personnel and unit equipment issued to most Army units which have Chaparral or self-propelled Vulcan weapon systems. They do not include items shown in the basic weapon system technical manual. Equipment not shown in these plans or the basic technical manuals may be loaded in accordance with local command policy.

What does all this mean and how does it interface with the Armywide Standardization Program?

Quite simply, it means that the storage locations for the items of equipment listed in the standardized load plans and technical manuals must be the same regardless of unit location. This is a direct mandate from the Army Chief of Staff. The standardized load plans will be format standardized by the US Army Materiel Development and Readiness Command (DARCOM) for inclusion in the appropriate technical manuals at their next scheduled update.

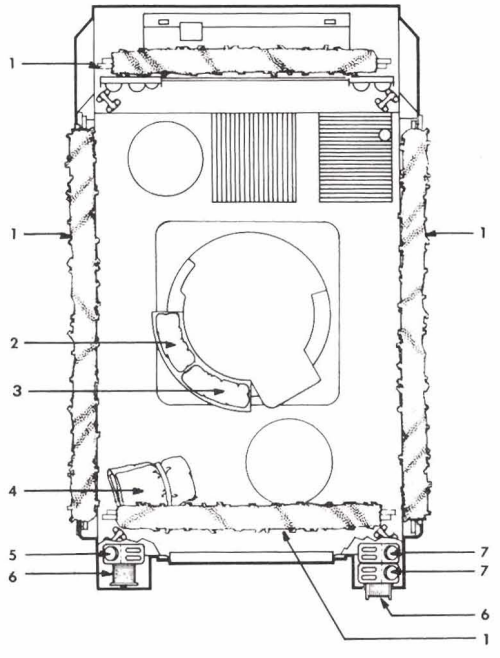
VULCAN
External



LOAD PLAN	
NO	ITEM
1	TURRET COVER
2	CAMOUFLAGE SCREEN
3	RADAR ANTENNA COVER *
4	TARPAULIN
5	FUEL, 5 GAL.
6	DR-8 W/WD-1
7	CAMOUFLAGE SUPPORT SYSTEM
8	WATER, 5 GAL

*NOTE: CAMOUFLAGE NETTING STORED

VULCAN
External



LOAD PLAN	
NO	ITEM
1	CAMOUFLAGE NETTING *
2	TURRET COVER
3	RADAR ANTENNA COVER
4	TARPAULIN
5	FUEL, 5 GAL.
6	DR-8 W/WD-1
7	WATER, 5 GAL

*NOTE: CAMOUFLAGE NETTING ROLLED

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ADA CARTOONIST: A soldier's lighthearted look at the history of air defense

by Linda Pirino Ross

Beginning with this issue, AIR DEFENSE Magazine will run LTC Robert Matlick's cartoon series on the history of Air Defense. The following biographical sketch is an introduction to the series and the soldier who created it.

His style is instantly recognizable — the clean, crisp lines, the squat figures, and the pointed humor. The bold signature clinches identification of the artist, who is obviously gifted and has a remarkable talent for making people laugh. However, cartooning is only a hobby for this artist. First and foremost in his life are his duties as an air defense artillery soldier.

LTC Robert R. Matlick, deputy commander of The School Brigade, Fort Bliss, Texas, is probably more widely known for his cartoons than for his military accomplishments, which are by no means insignificant. He has, for instance, survived two tours as an armed helicopter pilot in Vietnam with 1,200 combat missions to his credit. He has been awarded the Distinguished Flying Cross, the Soldier's Medal, the Bronze Star, and the Air Medal with V device and 32 clusters, to name a few. He has been a flight instructor, served on the Army General Staff with the Office of the Deputy Chief of Staff for Military Operations in Washington, DC, and commanded both the Instructor Group of the 1st ADA Training Brigade and the Staff and Faculty Battalion of The School Brigade at Fort Bliss.

However, while these achievements remain tucked away in LTC Matlick's personnel file, his cartoons have appeared in numerous military publications and on countless bulletin boards since the early part of his career.

After viewing LTC Matlick's work, one cannot help feeling a great admiration for his talent. When talking to him about his artwork and his Army career, he becomes as animated as his cartoons. He speaks of the many colorful memories that shaped his life and drove him to strive for high ideals.

"As a child during the Second World War, my father was always my hero. He was my hero because he was a soldier, and soldiers were doing some pretty heroic things then." He smiles as he continues. "Talk about colorful memories, I remember the day my father's unit went to war. It was early morning. They marched out of the fog to the train station singing 'Old Soldiers Never Die.' There was no band; they had their own accompaniment."

To the 7-year-old Matlick the scene was rich in camaraderie, patriotism, and heroics. And these were the characteristics that eventually led him to choose an Army career.

The choice was not without some reservation, though, because in addition to his love and admiration for his father, Matlick was also gifted with an extraordinary talent for art, a talent he says he inherited from his mother.

"My mother was a self-taught artist. She was a very creative person and worked in all types of mediums." Encouraged by his mother, Matlick began drawing his first cartoons while a youngster. He was heavily influenced by the Walt Disney artists and frequently drew animal characters a la Disney as an exercise in mastering his own technique. He made no attempt, however, at humor. That facet of his talent developed later.

After high school, Matlick studied commercial art for 3 years. He had always been torn between a career in art and a career as a soldier. But in 1955, he made his decision and joined the Army as a private.

"I had no choice really. I was born and raised a soldier. Art was a spin-off: something in me I didn't understand but had developed a need for. Art fed my soul, but the Army fed my other needs."

It was in the Army that cartooning became Matlick's hobby. At first he started cartooning in his spare time to satisfy his urge to draw; but as he began to inject humor into his work, he discovered that he was causing people to react. And the fact that he could do something and somebody would look at it and laugh gave him tremendous satisfaction.

In 1960, Matlick attended Officer Candidate School. While there, he found that cartooning helped him through the rigors of officer training. Although he kept his artistic activity clandestine, one of his cartoons did come to the attention of the commandant of the school. It seems Matlick couldn't resist depicting a very short tac officer assessing a very tall officer candidate demerits for having dust on top of his cap. When called out of formation because of the cartoon, Matlick feared the worst. As it turned out, though, the commandant actually liked the cartoon, and Matlick's punishment was to draw a new one every week for the remainder of the course.

Years later, while a student at the Command and General Staff College, LTC Matlick added another dimension to his hobby. He developed a series of cartoons about the frustrations of attending the college and had them bound into a book.

"At Leavenworth, cartooning came to me in a rush to vent the frustrations one usually feels on the academic scene. And I realized that my frustrations were the same ones felt by the other students as well; the situations I attacked applied to every class."

The book was an immediate success, and because the hallmark of good humor is its universal appeal, Matlick's book of cartoons remains a popular item at Fort Leavenworth today.

Throughout his Army career, LTC Matlick's cartoons have reflected his experiences. Something of him is in every one he draws. Sometimes he is one of the characters. Other times he depicts a personal frustration in which he has been on one end or the other. "Either I have been the cause of the frustration," he chuckles, "or I have been the recipient of it."

In a troop environment, he likes to draw cartoons that a soldier, regardless of his rank, can look at and say, "Yeah, I can identify with that." He often makes current issues the subject of his cartoons. The new fatigue uniform, for example, has been one of his recent favorites. In fact, no military topic escapes the Matlick

IN THE BEGINNING. . .necessity drove man to develop a defense against aerial predators. This defense was called. . .*"SHARP ROCKS."*

"ABOUT TO ENGAGE . . . THREE. . .TWO. . .ONE. . ."

brand of humor. That includes his own branch, Air Defense.

"My book at Leavenworth was so successful, I wondered what I could do as a follow-on," LTC Matlick explains. "Then I thought, why not do a history of Air Defense in cartoon fashion. After all, I felt that my branch was not particularly marked by humor, and unlike the Infantry and other branches that were resplendent with history, Air Defense was so new, it had no real history unless you could tie it to some other branch of which it was no longer a part." Recently Matlick's concept became a reality when he developed his wacky, somewhat fractured history of Air Defense.

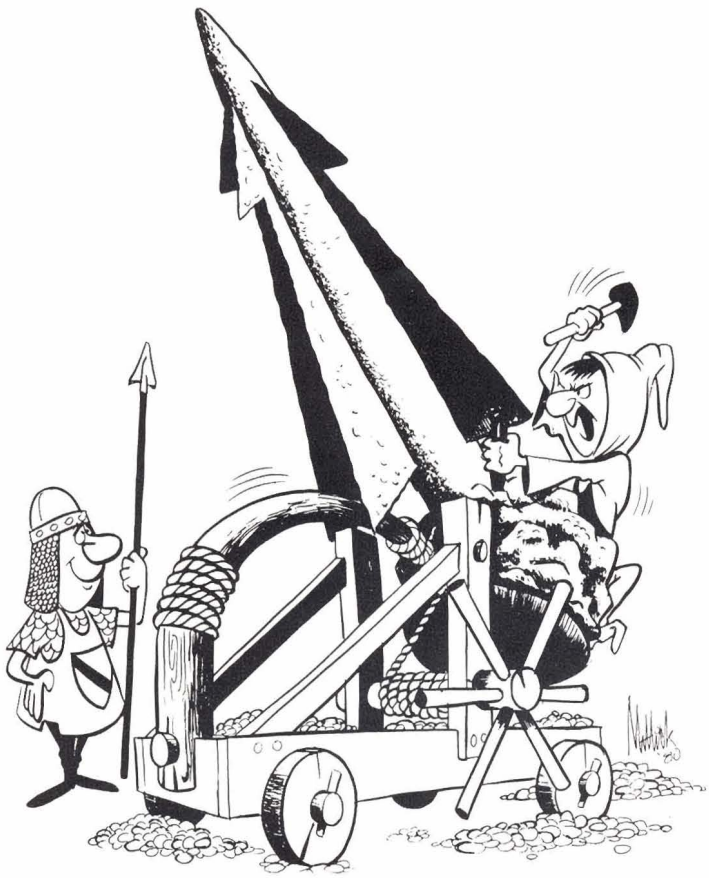
Throughout his career, cartooning has brought him a great deal of satisfaction and recognition. However, LTC Matlick remains a career soldier, and he has made every effort to stay on top of his profession. He studied at the University of Nebraska at Omaha, and received his bachelor's degree in business administration. Currently, he is hard at work taking the US Army War College Course by correspondence.

After hours, Matlick is a family man. He is married and the father of three daughters. While at home he can usually be found engrossed in some creative venture. He enjoys carpentry, woodcarving and, of course, cartooning. Being creative in some form, Matlick believes, keeps the rough edges off career soldiers; it mellows and soothes them.

LTC Matlick is assertive about his future in the Army. "When I can't grow anymore in the military, when I find that there is nothing more demanding or rewarding, then I'll think about doing something else. But if that doesn't happen, I could log as many as 35 years in the Army, and I probably will as long as I am still enjoying it."

After retirement, he says that his avocation of creating will become his vocation. He whimsically talks of becoming a simple man. "My life will become uncluttered. Ideally, I would like to have an old farm in the hills where I could spend the whole winter making all kinds of things. Then in the summer I'd pack them all in a trailer and peddle them to the tourists." With a playful twinkle in his eye he adds, "I think that would be a lot of fun!"

As man developed greater technology he began to experiment by modifying existing launchers to shoot higher and further. . . *and the rocks got bigger.*



"DAMNIT EARL, WHY CAN'T YOU USE ORDINARY ROCKS LIKE EVERYONE ELSE?"

LINDA ROSS, *former assistant editor of AIR DEFENSE Magazine, is an Army technical writer at Picatinny Arsenal, Dover, New Jersey. She received her BA degree from Marywood College, Scranton, Pennsylvania, and served as a lieutenant in the US Army.*

SP5 J. Smith, under the supervision of SP6 L. Wright, tests a superheterodyne receiver on the NIDA unit. This type of training is characteristic of the hands-on portion of basic electronics.

MISSILE ELECTRONICS: A Training Update

by Frank Egner

The US Army Air Defense School, Fort Bliss, Texas, has responded to field critiques of missile electronics maintenance course graduates by restructuring its missile electronic programs of instructions. Some training improvements have been implemented and others are being planned.

We instructors in the Missile Electronics Branch (basic electronics, if you prefer) realize that we have not always provided adequate fundamental electronic training for our students in some MOS courses. This article is an update on the training currently being provided and the new emphasis on increasing the technical knowledge and basic skills of future graduates.

All missile electronics courses have been converted to practical application exercises on the NIDA trainer, which was fully described in the January-March 1981 issue of AIR DEFENSE Magazine. The trainer permits individual application of classroom theory and is referred to as the test console.

Additionally, students in all MOS courses are now receiving "lock-step" instruction. We call it teaching-lab concept and it has proven a practical and effective training method for basic electronics training. Using conference techniques, the instructor employs photographic slides, a chalkboard, and other training aids to explain a particular phase of the lesson. Immediately after the discussion, the student moves to his lab station in the same room and, using the appropriate circuit card and test instruments, performs a "hands-on" lab experiment on the test console that is designed to reinforce the instruction just received.

The lab work is then critiqued and any questions are answered. The next theory phase follows

and another lab experiment reinforces new concepts. The hands-on application of circuit testing and proving the theory allows maximum learning to occur. Besides reinforcing theory, the lab exercises permit students to gain proficiency in using test instruments and interpreting test indications.

The content of all courses offered has been increased in scope and standards. Examinations, one written, multiple-choice quiz and one practical application test, are administered at short intervals of about 10 days. This enables both student and instructor to evaluate student progress. If either test result falls below 70 percent, extra instruction is mandatory each day after class until a passing average is attained.

Some courses have been lengthened and additional time has been recommended for others. The goal at this time is a minimum of 312 hours of basic electronic instruction in all courses.

Lab conversion to the NIDA trainer combined with lock-step instruction has resulted in a number of training advantages. Some of these advantages are described below.

All training circuits, from fundamental DC circuits through vacuum tube, transistor, integrated circuits, and circuit combinations, are on printed circuit cards that plug into the trainer. The circuits are designed with ample test points so circuit operation can be tested and monitored. More than 100 individual circuits are currently in use. Circuits are tested and analyzed to the component level, providing the in-depth knowledge considered essential for technicians.

Previous lab training equipment forced the student to locate and plug-in each component of the circuit. Although that method had some advantages in teaching component recognition and resistor color codes, it required considerable time to assemble the test circuits. After each lab experiment, all parts had to be removed and returned to their proper place. The time needed for assembly and disassembly subtracted from more profitable training activities.

Since military electronic technicians do not usually construct circuits part by part, this practice had no job-related value. Modern technology has most circuits on circuit cards or modules, so training on circuit cards is more realistic and in line with current industry and military trends.

How are we using time formerly spent in circuit assembly and disassembly? That time is being used to advantage for troubleshooting training and practice. The student learns to test each circuit to determine normal operating conditions, then he learns to troubleshoot the circuit to defective component level. The three-position toggle switches on the NIDA trainer make circuit troubles easy to simulate.

Troubleshooting training begins with the first series DC circuit about 10 hours into the course and continues for nearly every circuit the student studies until the end of the course.

Testing, analysis, troubleshooting, and repair or replacement is what electronic training is all about. By incorporating this training throughout all courses, students are required to apply their knowledge of circuitry and test instruments continuously. This type training, with its emphasis on maximum hands-on application, is certain to produce a more knowledgeable and more capable beginning technician for field units. Everyone realizes that proficient journeyman technicians must have adequate training in the fundamentals, followed by on-the-job-training and experience.

We believe the Missile Electronics Branch has taken a giant step in that direction. We hope that future feedback from the field will provide verification.

One station unit training (OSUT) at Fort Bliss provides each student with an operator MOS before entering our courses. In those few cases where the electronic training is too fast or cannot be absorbed by the student, he reverts to his operator MOS for assignment and is not lost to Air Defense. The vast majority of our students are making it, but most of them have to work pretty hard. We try to encourage them by pointing out the opportunities available to them in the electronics field, both in and out of the military service.

We are proud and enthusiastic about our advances in fundamental electronics training. There is always room for improvement and we will continue to work in that direction. As future graduates join the units in the field, we welcome your feedback, and we will do our utmost to make you proud of them.

MR. EGNER *has been an instructor in missile electronics for the past 14 years. He is retired from the Army and has more than 40 years of federal service. He is a certified electronics technician (CET) and a CET test administrator. Mr. Egner holds an FCC second-class commercial license with radar endorsement.*

MANEUVER TRAINING AREAS — An Endangered Species?

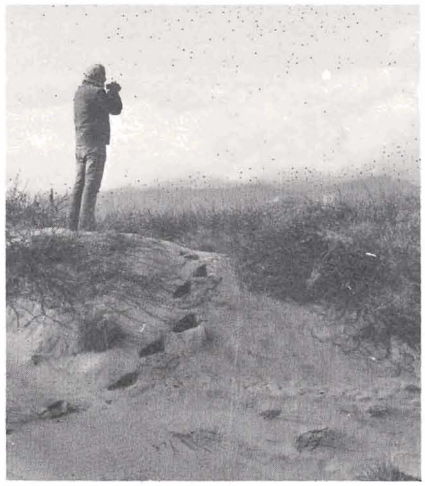
by Blair Case

In the horse cavalry days of Fort Bliss, range management meant keeping the mounts off loco weed and finding prairies a trooper could charge across without worrying about his steed breaking a leg in a prairie dog hole. The grassland prairies, losers in a centuries-old war of attrition against the encroaching Chihuahuan Desert, have vanished along with the cavalry mount and range management has grown considerably more complex.

It's not enough that today's military commanders worry about missile trajectories, impact zones, and the scheduling of division-size maneuver elements; they must also worry about the impact of each of the above on the environment. Fort Bliss range personnel, as a result, have joined forces with post ecologists and archaeologists, members of the Fort Bliss Environmental Office, in a new type of range management program aimed at keeping the desert intact and usable for desert wildlife as well as combat vehicles.

When General Phil Sheridan visited Fort Bliss during a tour of Texas forts, he brushed the Texas dust from his cavalryman's uniform and declared: "If I owned both Hell and Texas, I would rent out Texas and live in Hell." The remark did little to endear the general to Reconstruction Era Texans, but it's true that Fort Bliss' corner of the Chihuahuan Desert in the summertime bears a closer resemblance to descriptions of the infernal regions than it does to the lush Shenandoah Valley, even after Sheridan's blue-clad troopers had applied their scorched-earth policy to its fertile fields.

Army personnel new to the desert, therefore, are understandably stunned at the notion anything would have much of a negative environmental impact on the Chi-



huahuan Desert. The Army's own ecologists warn, however, that the desert is more fragile than it seems and that Fort Bliss maneuver areas could wind up on the endangered species list if the effects of training's wear and tear on the environment are ignored.

"It may seem as though there's nothing to protect, but Fort Bliss maneuver training areas represent some of the best desert maneuver training acreage in the Army inventory," explained Fort Bliss ecologist Kevin von Finger. "If we allow these ranges to deteriorate through abuse or neglect, then we will have lost one of our most valuable training assets."

Most Army posts have to contend with mud and rain and their familiar effects on soil erosion and gullying. Some posts rotate ranges the way farmers rotate crops. Training ranges, crisscrossed too many times by battle tanks and armored personnel carriers, are placed off limits to track vehicles until nature has time to heal the wounds left by churning treads. Range rotation doesn't seem likely to work at desert posts like Fort Bliss where the problem is sand and wind rather than rain and mud. The scars that track vehicles leave in the desert sand are transient but the damage is not. Damaged vegetation is slow to recover; the accumulative effects of training may result in permanent damage to the maneuver area.

Explained von Finger: "The Chihuahuan Desert, or more accurately, the arid climate which created this desert, has literally just arrived at Fort Bliss. About 5,000 years ago, maybe only 3,000 years ago, rainfall in this area was sufficient and dependable enough to keep the desert at bay down south in what is now Mexico. The Fort Bliss maneuver areas were covered by short grass prairie. As the climate began to dry out, the frequency and intensity of droughts increased and the prairies were spotted with bare areas where the grass had succumbed from lack of moisture. Mesquite invaded the prairies, was able to withstand droughts, and spread at the expense of the grasses. The sandy soil, bare of grass, was eroded by wind action, was trapped by mesquite plants, and piled up into dunes. Desertification had begun."

"While man had no hand in the desert's creation, he has hastened its full expression by perhaps hundreds of years. In the 1880s, when settlers first settled in what are now the Fort Bliss maneuver areas, half of the land was still covered by prairie. Overgrazing by cattle, acting synergistically with recurring droughts, virtually eliminated the grasslands by the 1920s. Only a few relict patches of prairie — which comprise only about 1 percent of their original extent —remain," von Finger said.

The sea of grass has been replaced by small weeds and low-lying sand dunes encrusted with mesquite trees. Mesquite is the glue that holds the sand dunes together and plays a dominant role in the functioning of the desert ecosystem. The desert offers a surprising amount of cover and concealment. Sidewinders lurk

in the mesquite and chaparral cocks dart in and out of the sand dunes. Even an M1 tank can hide, provided its driver's eye for defilade is as sharp as a coyote's. To a tanker, the dunes look like made-to-order, hull-down firing positions. The problem is that — to tankers who come to Fort Bliss for annual service practice from the dense pine forests of Fort Lewis or the ancient oaks and blackgum stands of Fort Knox — mesquite trees don't look like trees.

"Tankers aren't necessarily going to steer around a 6-foot high mesquite when they could just as easily run over it, and tanks continually cut the corners off sand dunes. This exposes the roots of mesquite trees. Root exposure certainly stresses the plant and ultimately could result in the death of the plant. This is how permanent damage may occur; with the exception of a few seedling mesquites observed in the remnants of the grasslands, no mesquite reproduction whatsoever seems to be occurring out in the sand dune areas. The reasons for this are presently unknown. While mesquite can produce offshoots from main stems, these die if the parent dies," von Finger said.

"Therefore, mesquite trees which die on Fort Bliss ranges are apparently not likely to be replaced by new mesquite trees. When the mesquite dies and disintegrates, sand trapped within the dunes is no longer protected from wind action and begins to move," he added.

In a worst possible scenario the mesquite is eliminated by a combination of environmental factors (old age, absense of reproduction, etc.) and steady attrition by track vehicle traffic. Winds howling out of the west during spring months could blow the loosened sand, no longer trapped in mesquite-sheltered dunes and sand hummocks, into larger, nomadic dunes such as barchan dunes. Crescent-shaped barchan dunes, like the gypsum dunes which cover White Sands National Monument north of Fort Bliss, render track-vehicle maneuver difficult if not impossible. Barchan dunes in the Sahara's Qattara Depression stopped Rommel's panzers as effectively as did Montgomery's mine fields.

"A vegetation change back to the prairies of several thousand years ago would probably require another ice age," von Finger said. "Meanwhile, if the climate continues to dry out, there's no way we can stop the desert from expanding or even slow it down except in areas where economic incentive and water exist for extensive irrigation. We can, however, make sure we don't speed things up."

The surest way of speeding things up, according to ecologists like von Finger, is scheduling maneuver training at a rate more intense than the desert environment can withstand, but they admit they have no idea what that threshold of intensity is. The reason, von Finger says, is that the concept of training area management — using the principles of ecology to identify and reverse range deterioration — is in its infancy. Virtually no data are available concerning maneuver impacts upon which to base long-term predictions. In fact, few installations have begun to give training area management as much emphasis as, say, game and fish management.

In a worst possible scenario, the small sand dunes which dot Fort Bliss maneuver ranges could grow into migratory barchan dunes like the ones shown encroaching on grasslands above.

"The problem is getting people to recognize there may be a problem," von Finger said. "The extirpation of the local prairies is an example of the problem. It took only about 40 years of overgrazing to forever alter the plant, soil, and topographic elements of an ecosystem, substituting mesquite and dunes for the smooth expanse of the prairie of the 1880s. Apparently, no one recognized that changes were occurring out there until they were irreversible; the reduction in grass cover, the growth of sand under mesquite bushes were subtle changes, almost imperceptible visually if observed only from one season to the next. If someone had bothered to monitor the trends in these ecosystem parameters, however, they would have quickly identified an ecological disaster in the making."

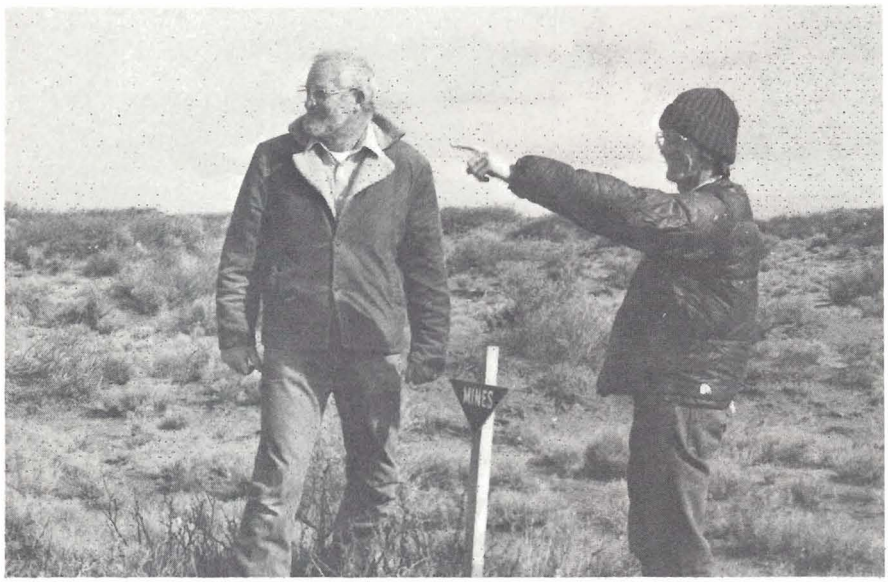
"We know that a mesquite tree can survive being run over by a track vehicle once or maybe even twice, but we're not sure about the third or fourth time. We haven't yet been able to establish what correlation exists between maneuver training and range deterioration," von Finger said. "In fact, we don't know how much desertification is due to natural causes and how much is caused by the operation of track vehicles."

To find out, von Finger bisects sand dunes in search of ecological clues. Radar chaff buried 6 feet under the surface of a dune tells him that the dune has grown 6 feet in the short time chaff has been in use to foil radar — only about 40 years. Chances are, however, that the chaff could have been dropped on Fort Bliss after WW II and the dune could be growing even faster. Soils buried within dune fields, once exhumed and radiocarbon dated, reveal several periods of short but extreme droughts during the last 3,000 years that may have been even more intense than those recorded historically.

He haunts archives of universities in search of yellowing township survey documents from the 1850s, comparing their description of what are now the Fort Bliss maneuver areas with the same tracts as they exist today. He studies satellite pho-

tographs and faded panoramas of frontier days to document the rapidity of ecological changes.

Ecological control plots, however, are von Finger's most valuable management tools. These control areas are taboo to track vehicles and, therefore, permit the desert vegetation and wildlife to thrive or decline without the additional stresses of maneuver training. By comparing control stations to adjacent areas exposed to maneuver training, he hopes to understand the relationship between track vehicle traffic and range degradation.



Dr. Glen D. DeGarmo and Robert Hard, Fort Bliss archaeologists, check mine field signs used to mark protected areas.

"The study could reveal the rate of maneuver training on Fort Bliss ranges is already too intense, but it could just as easily indicate the ecosystem could withstand two or three times the current intensity," von Finger said. "It may be that the study will show the desert environment we have within the existing maneuver areas at Fort Bliss can withstand higher training intensity than most Army training centers."

"It is important we know for sure because training intensity is almost certain to multiply. New combat vehicles like the M1 tank or the infantry fighting vehicle can travel nearly twice as fast as the old M60 or M113 armored personnel carrier. That means units equipped with new vehicles may log nearly twice as many miles as units equipped with older vehicles, in effect, doubling the training intensity without increasing the training schedule," von Finger said.

The ecological control stations are protected by mine field signs and antitank obstacles. These also guard archaeological areas watched over by post archaeologist Dr. Glen D. DeGarmo. One 7-mile-long antitank berm, for example, protects several villages and camps occupied 700 to 900 years ago. These sites are part of an estimated 30,000 archaeological sites scattered across Fort Bliss, representative of 10,000 years of prehistoric human occupation and use of the area.

The prehistoric people who inhabited the Fort Bliss-El Paso region were quite modern in physical appearance although somewhat shorter than most of today's population. Give one of them a shave and a business suit and put him aboard the morning commuter train and he would probably attract little attention. Archaeologists equate those who would destroy sites left by such ancient people with those who would, given the chance, burn libraries.

The sites are not protected by ancient curses like the ones which supposedly guard the tombs of the pharaohs but by federal laws and regulations which probably are more effective. Conserving the sites may seem unimportant to some tank platoon leaders accustomed to being concerned only with immediate combat objectives and training effectiveness, but DeGarmo insists archaeological sites are an "irreplaceable resource whose study can help explain the similarities and differences in the evolutionary development of human societies."

"Archaeological sites on Fort Bliss represent human populations with 10,000 years of successful adaptation," Dr. DeGarmo said. "For thousands of years these people had a relatively stable hunting and gathering adaptation, with an extensive technology using bone, wood, stone, and plant fibers. Later they developed effective farming techniques, a complex mythology as indicated by the multitude of rock carvings and paintings found in the area, and they were part of a complex trade network as shown by numerous artifacts brought from other parts of the Southwest, including ornaments of marine shell. As scientists, archaeologists are developing and testing explanations concerned with how and why populations like those in the Fort Bliss-El Paso region adapted successfully for so long."

"The prehistoric sites at McGregor Range are a nonrenewable scientific resource that documents how and why human society in this part of the world developed as it did. Their communities were small enough that things still were probably done on a person-to-person basis. We see human society here evolving from hunters and gatherers to complex farmers but not to the level requiring a highly complex bureaucracy and social hierarchy. We see some aspects of their society developing more slowly than in other parts of the Southwest and others developing more rapidly. By studying this development, archaeologists can contribute to an understanding of why some, like the Maya and the Aztec, evolved into complex societies and why many others did not," DeGarmo said.

"Archaeologists can develop and

test scientific explanations that identify the processes that caused (and still cause) human societies to evolve in the ways they did. Understanding such processes becomes increasingly important as world population and societal conflict increase," he added.

Recognizing the importance of the ecological and archaeological programs, Range Command sends patrols to guard von Finger's control stations and Dr. DeGarmo's archaeological sites. Tracks caught using fake mine fields as convenient hiding places during the recent Border Star 81 maneuvers were, for instance, declared administratively dead.

"It's impossible for track vehicles to maneuver on Fort Bliss ranges without running over a few cactus and crushing a few mesquite trees, but it's true some units seem determined to see how much they can demolish," said one range control officer.

"They steer tracks over the tops of sand dunes rather than around because it's fun. They pivot steer when pivot steering isn't necessary, because it's fun. They travel cross country over the dunes when they could just as easily follow a tank trail. All this tears up the range. It also wastes fuel and training time, two items which are very much at a premium.

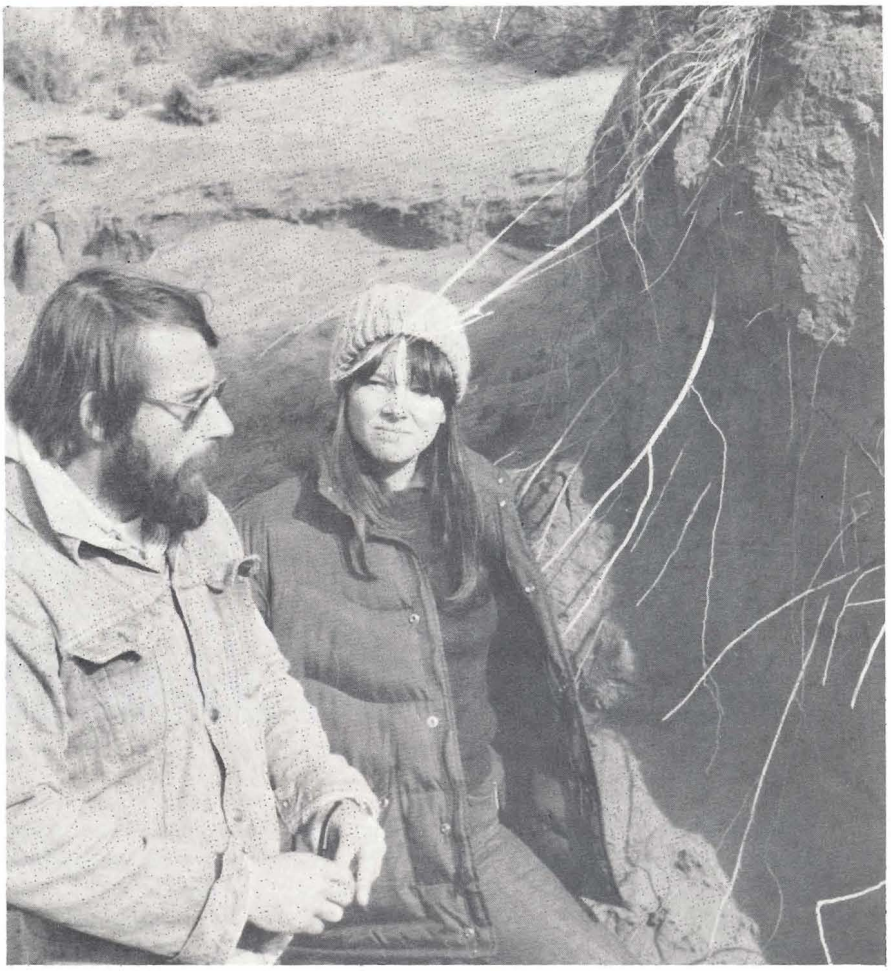
"The officers of units that train at Fort Bliss can't prevent damage to the range environment, but they can help keep it to a minimum. We tell them it's not an ecological problem but a leadership problem," he said.

Fort Bliss archaeologists and ecologists have other additions to the worst possible scenario of maneuver ranges and the archaeological treasures they contain being buried by migratory barchan dunes. Installations which ignore the legal mandate to locate and protect significant archaeological sites risk considerable public protest as well as court action, DeGarmo pointed out. Commanders who are oblivious to the stress training places on the environment endanger the training mission itself, von Finger warned. "Imagine building a $2.5 million tank like the M1, and then having no place to train," he said. Such worst possible scenarios, however, seem less likely to occur as range management programs like the one at Fort Bliss mature.

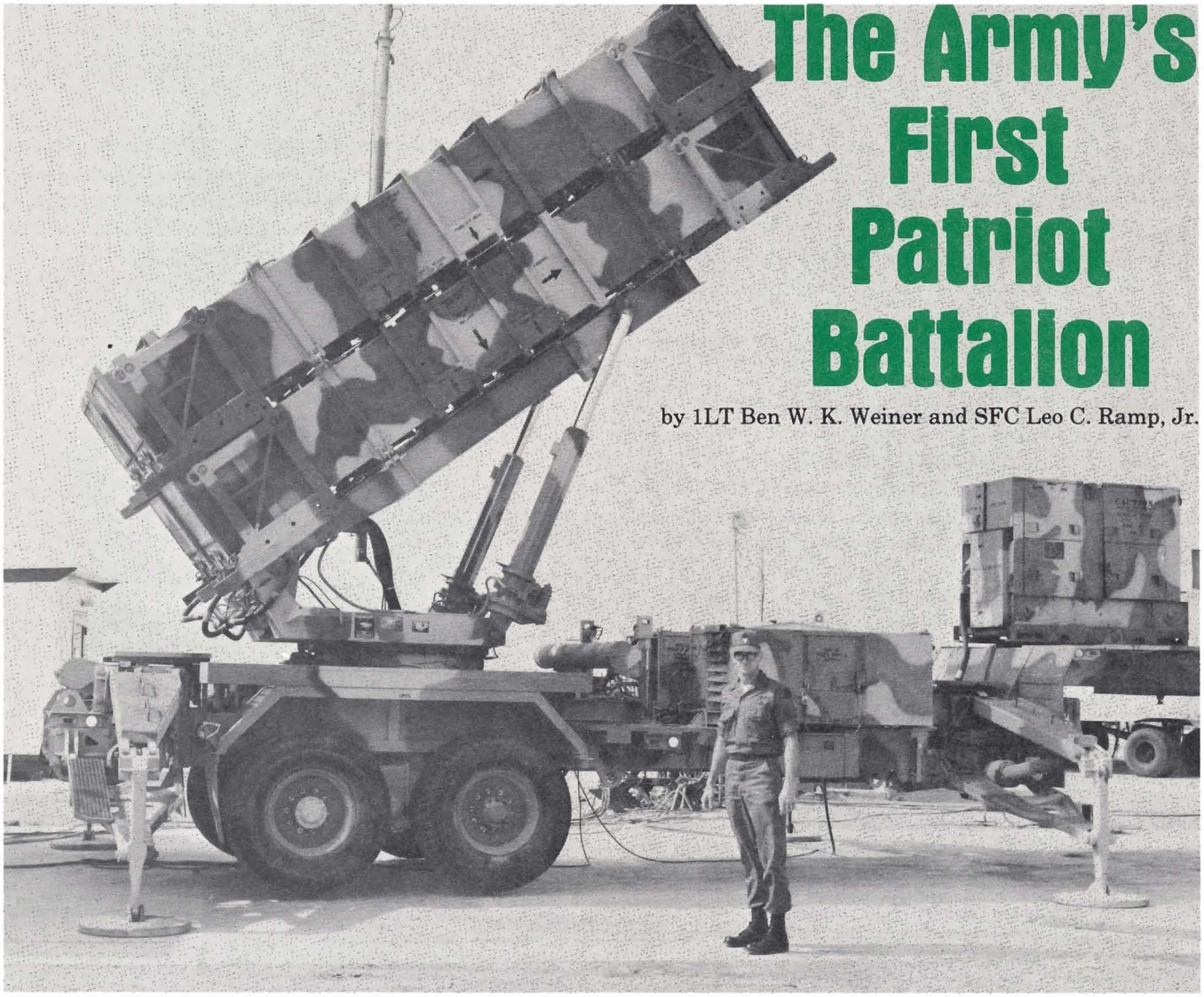
The inclusion of ecology and archaeology into the traditional family of planning concerns is a new experience for most Army personnel. Archaeologists talk of centuries; while ecologists speak of eons; but military commanders think in terms of brief, violent wars that may erupt tomorrow morning. As a result, they are often much more concerned with unit survivability in combat than the durability of mesquite or the scientific value of archaeological sites.

"The endangered species I'm most interested in protecting is Americans" or "We worry too much about dead Indians and not enough about live Americans" are sentiments often expressed when military men and environmentalists meet. Still, such consultations produce more compromises than confrontations.

"When range control plans a tank trail through an archaeologically sensitive area, we work with them to reroute it to avoid the area," Dr. DeGarmo said. "This way, the military gets its tank trail without causing unnecessary damage to archaeology. There have been times when archaeology and training missions seemed impossible to reconcile. However, we haven't yet had a case where it was impossible to find a solution that permitted the training to occur and provided protection to threatened sites."



Kevin von Finger and Melinda Gebel, members of Fort Bliss's environmental staff, study a dune cut which conceals radar chaff buried deep within the dune's surface — a clue to the dune's rate of growth.



The Army's First Patriot Battalion

by 1LT Ben W. K. Weiner and SFC Leo C. Ramp, Jr.

In the spring of 1978, the 1st Battalion (Hercules), 43d Air Defense Artillery (ADA), received the order to stand down. The battalion, a unit with a much decorated and illustrious history, was inactivated and its colors retired. An era in air defense had come to a close.

On 21 May 1982, the 1st Battalion, 43d ADA, will be reactivated as the 1st Battalion (Patriot), 43d ADA, becoming the Army's first Patriot battalion. Its activation will signal the beginning of a new era in air defense.

Air defense studies which resulted in the development of the Patriot air defense system began in the 1960s when it was observed that growth in Threat aircraft capabilities was beginning to outdistance the capabilities of our high-to-medium air defense (HIMAD) systems. It was determined that Nike Hercules and Hawk needed to be replaced by a new technology HIMAD system. The new system would have to possess the following qualities:

- High firepower.
- Resisistance to electronic countermeasures.
- High kill capability against maneuvering aircraft and aircraft in formation.
- Low manning requirements.
- Minimum logistics burden.
- High mobility and speedy emplacement.
- Growth potential to encounter increasing Threat capabilities.

Patriot possesses all of these qualities and is destined to become the HIMAD system for the 1980s. The sophistication of Patriot equipment should, in fact, create new and diverse air defense concepts. Patriot automation reduces the manpower required for operation considerably. Nike Hercules air defenders will be surprised at the speed and ease with which the Patriot system can be emplaced. The ease with which the system's multifunction phased array radar can be emplaced

and the reduced amount of cable required by the system subtract hours from emplacement and march order times.

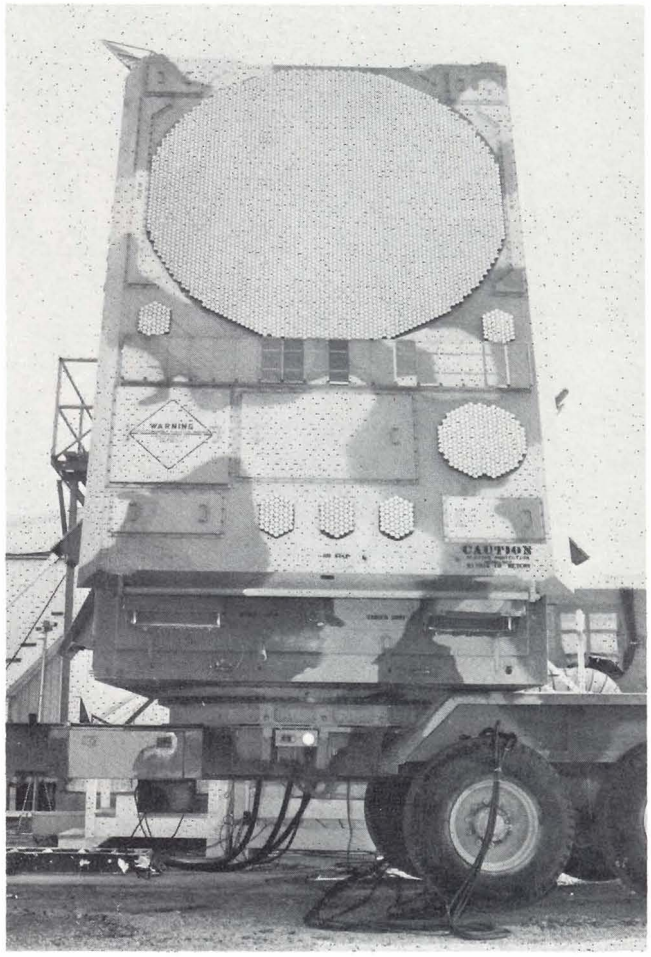
The School Brigade, US Army Air Defense School (USAADS), Fort Bliss, Texas, was given the mission to activate, field, and provide collective training for the first Patriot battalion in 1981. Brigade Commander COL Travis N. Dyer was determined to make the battalion a showplace for Patriot expertise that future Patriot battalions could use as an example.

The brigade staff actions required to activate a new battalion were complex and numerous. Equipment was requisitioned. Facilities, including billet space, dining hall, a tactical motor pool, maneuver area, and battalion headquarters had to be identified and prepared. Personnel actions were also an important key to the successful activation of the unit. Highly qualified personnel were identified and requisitioned against the new table of organization and equipment. Patriot tactics were formulated and evaluated. USAADS writers and editors stayed busy producing new Patriot field manuals and how-to-fight manuals. The brigade operations section acted as a facilitator for all other staff actions, insuring a well-coordinated activation.

The 1st Battalion, 43d ADA, will undergo intensive training administered by the Patriot system contractor, Raytheon, and military instructors at Fort Bliss and White Sands Missile Range, New Mexico. Officers will receive orientation and basic courses taught by USAADS Hercules-Patriot instructors. Warrant officers and enlisted men (MOSC 222C, 24T, and 16T) will be trained by Raytheon and Army instructors. Once the courses have been completed, the battalion will unite and begin collective training. Collective training is scheduled to begin in January 1983.

"We have our work cut out for us," said LTC James G. Manning, selected to command the new battalion. "Collective training is the process by which we must demonstrate we can train to the standards of the Army Training and Evaluation Program. In other words, we'll have to prove we can work as a team in a simulated combat environment and fulfill our mission of medium and high altitude air defense."

"It's a challenge, but we look at it as more than a challenge. It's our chance to establish measurable and attainable standards for Patriot battalions. We intend to set the pace for future Patriot battalions," he said.



Patriot's AN/MPQ-53 radar set can vary its operating parameters to suit the tactical situation, monitoring the surrounding airspace from treetop height to more than 80,000 feet.

SERGEANT FIRST CLASS RAMP, *a native of Alabama, joined the Army in 1968. He holds a master of arts from the University of Oklahoma. He served in the Republic of Vietnam where he received the Bronze Star with Oak Leaf Cluster and the Purple Heart with Oak Leaf Cluster. SFC Ramp is currently taking the Component Design Configuration Course for the Patriot system.*

LIEUTENANT WEINER *is an assistant S3 with The School Brigade, United States Army Air Defense School. He has a bachelor of science degree in management. He has served with a custodial unit as executive/technical officer and as security officer. He is a graduate of the Air Defense Officer Basic Course and the Air Force Electronic Warfare Course.*

FALL WEISS: The First Blitzkrieg

by First Lieutenant Stanley T. Grip, Jr.

The defiant stance of the Polish labor union, Solidarity, against Communist Party bosses and Kremlin intimidation during the tense winter of 1981-1982 kept observers wondering if the Poles were doomed to relive an old nightmare — a nightmare of armored spearheads thrust across fragile Polish frontiers.

The symbols that adorned the battle tanks in the old nightmare were Nazi swastikas, not the red star of Soviet armies. The clomp, clomp of storm trooper boots on Warsaw pavements, however, should haunt the memories of students of the combined arms philosophy of military tactics, just as it does the nightmares of Polish citizens lucky enough to have survived the holocaust of World War II.

Students of the combined arms philosophy of military tactics necessarily include air defense artillery (ADA) leaders. Historical discussions and wargaming of successful combined arms operations are built into the curriculum of the ADA Officer Advanced Course. During a recent course critique, the officer students rated this portion of instruction the most valuable they had received and suggested that the time alloted for it be expanded.

One of the most successful of combined arms operations was the German invasion of Poland in 1939. Given the code name FALL WEISS, it proved to be a model to both contemporary and future military planners of the combined arms blitzkrieg (lightning war).

TOPOGRAPHY OF POLAND

Poland had no good, natural defense lines on its 1939 borders; this is an important fact, considering the length of the Polish-German border (more than 400 miles, excluding East Prussia).

The southern frontier was girded by the Carpathian Mountains. There were few passes, but the several roads and rail lines that did exist gave direct access to the industrial region of southwestern Poland.

North of the Carpathians, the Carpathian Plain merges into the southern upland area of Poland. This area reaches an elevation of 2,000 feet in some places, but its average elevation is much lower.

North of this upland area is the Central Polish Plain, extending from Poznan east to Warsaw and merging with the Pripyat Marshes. The Central Plain is the largest area of the country, and its flat, rolling terrain offered great opportunities for military operations of the type the Wehrmacht (German army) planned to unleash.

To the north of the Central Polish Plain is a second belt of uplands, extending from German Pomerania to East Prussia, Lithuania, and White Russia. These uplands reach up 600 to 700 feet but do not form a natural boundary with East Prussia. In the Polish Corridor the low hills west of the port of Gdynia form little obstacle to north-south or east-west movement.

The weather of Poland is highly variable. Abundant rainfall causes flooding in level areas of the country. These conditions formed potential military handicaps.

Since rivers formed the best (and about the only) internal defensive barriers, a detailed look at them is in order. The chief river is the Vistula, which rises just inside the Polish frontier southwest of Cracow and winds its way through Poland, bisecting Warsaw and emptying into the Baltic Sea at Danzig. Other major rivers (all of which flow into the Vistula) are the Bug, Narew, and San. In the west, the Wartha flows into Germany. In the east, the Dniester flows into Romania, and a number of smaller rivers flow into the Pripyat Marshes. The Nieman flows from east to west into Lithuania, and the Dzisna across the frontier into Russia.

The Polish Field Army

The Polish peacetime army, at a strength of 280,000 men, was as large as the French and not much smaller than the German army. It comprised 30 infantry divisions and several smaller mountain infantry brigades, 11 horse cavalry brigades, 1 mechanized cavalry brigade (light tanks), and 2 air divisions (the Polish air force was an integral part of the army). However, because of the personnel ceiling set for the army, many of these formations existed at a reduced strength. The capacity to mobilize 10 divisions as a reserve also existed.

The quality of Polish equipment left much to be desired. For example, the air force had only a few hundred modern aircraft and even those were inferior to their German counterparts. The number of antitank guns assigned to Polish units was particularly low, and it has already been noted that only one armored unit existed. These deficits in equipment were reflections of the army's belief that their preponderance in horse cavalry was an important asset and they could take the offensive against the German mechanized forces.

This nonretreat attitude was particularly visible in the Polish unit dispositions for the war. Virtually all forces were "up-front" on the exposed, jagged western border. A glance at the map on page 38 will indicate these exposed positions. The forward concentration of the field armies in general forfeited any chance of fighting a series of delaying actions, since the footmarching Poles were to oppose an army using mechanized tactics. In the wide central plain, the nonmechanized state of the Polish forces would prove to be even more of a handicap than being

caught by surprise before all the reserves had been called up.

The noncommissioned and regular officer corps was of generally good quality. However, as has already been noted, there was a lack of training in modern weapons and techniques.

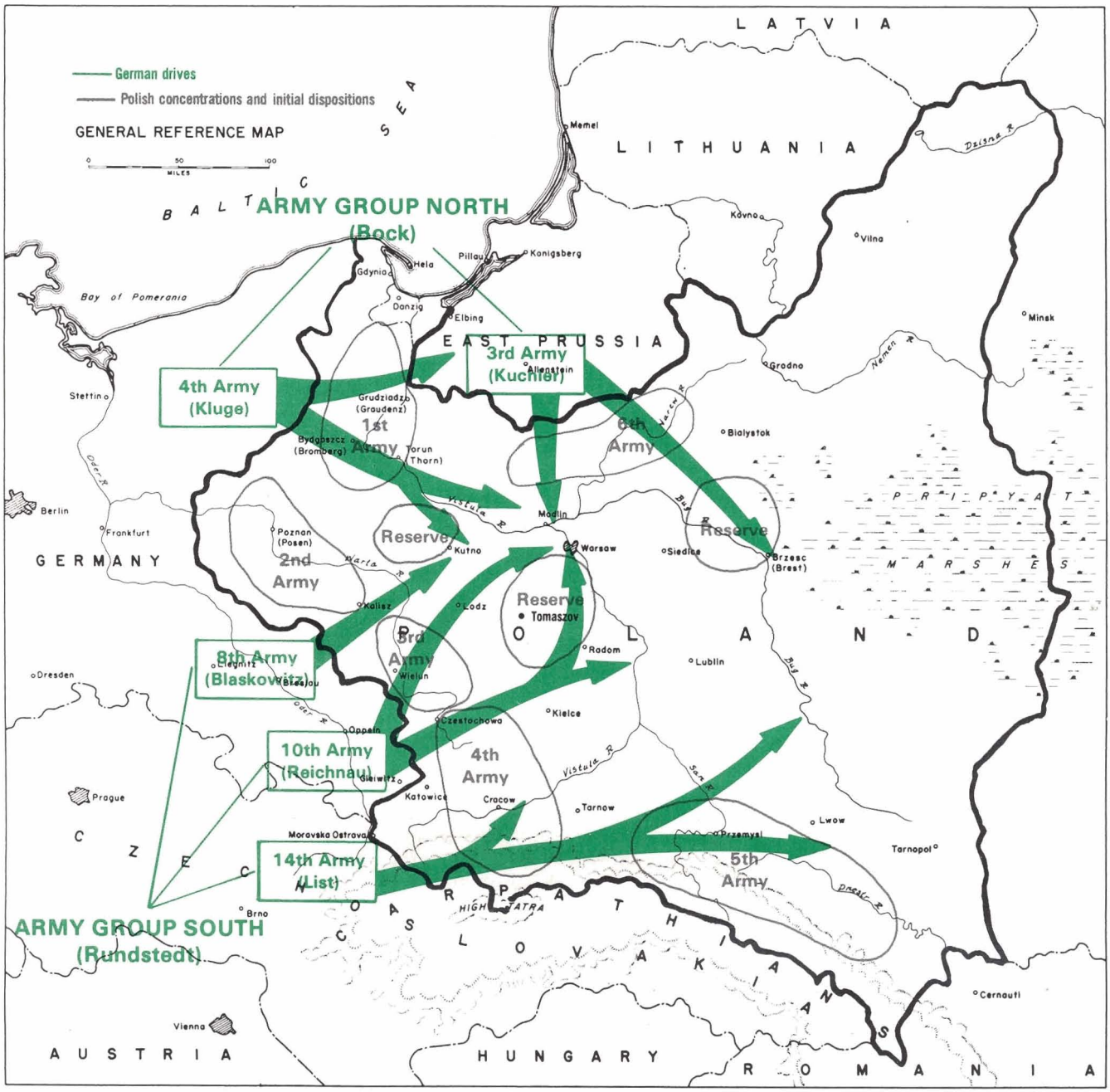
PREWAR GERMANY

A detailed discussion of prewar Germany is unnecessary: however, two topics will be examined. The first will be the revival of German claims against Poland from October 1938 to March 1939. The second will be a study of the German army on the eve of the war, touching upon the new tactics and techniques that it was about to employ.

The Revival of German Claims Against Poland

Adolf Hitler rose to power in Germany in 1933, when he was asked by the aging President Von Hindenburg to form a coalition government. By late 1934, at the death of Hindenburg, Hitler was in full power. From then on, it was only a matter of time until his east-European expansionist policies would come to a head with Poland.

Marshal Pilsudski had once cautioned his countrymen that the German attitude toward Danzig would be the true indicator of Germany's feeling toward Poland. So it was that when the Reich foreign minister, in October 1938, requested the return of Danzig to Germany in return for a guarantee of the Polish-German frontiers and extension of a 1934 nonaggression pact for 25 years, the proposal was firmly rejected.



By March 1939 the situation had darkened considerably. On 15 March the German army crossed the Czech border and on the next day proclaimed a German protectorate over the Czech regions of Bohemia and Moravia. Slovakia was to become an independent German satellite.

The fearful world could find no rationale for this action. There were no German nationals to liberate as there had been in Sudeten Czechoslovakia.

Finally, the Western Powers began to wake up to the danger that was facing them. On 31 March 1939, Great Britain promised Poland all possible support in the event it was attacked.

The German Army on the Eve of War

Two years after Hitler's rise to power, an extensive program was initiated to enlarge the German army and to break the confines of the Versailles Treaty. By October 1937, the active army had surpassed the size of the Polish peacetime army, the former containing 500,000-600,000 men. The Wehrmacht now consisted of 39 divisions of which 4 were motorized infantry and 3 were panzer (armored) divisions.

By 1939 the strength of the army had risen to 102 divisions, 51 active and 51 reserve. The total personnel strength was about 1,100,000. Among the 51 active divisions were 6 panzer divisions, 4 motorized infantry divisions, and 4 light mechanized divisions (motorized infantry with a small armor unit attached).

Meanwhile, the German air force (or Luftwaffe) had also grown rapidly. From its genesis as a "covert air force" in the period between the wars under the guise of the national civilian airline, it had grown to a strength of some 1,300 first-line aircraft including bombers, dive-bombers, and fighters.

With the advent of the motorized army, the Wehrmacht had a new and potent weapon. How was it to be used?

The new tactical concepts that fostered this newfound mobility and flexibility were called "blitzkrieg" or "lightning war". The objective of these new concepts was to encircle and destroy enemy forces through the use of a two-stage plan with the aid of air support at the tactical and strategic levels. These two stages were the *einbruch,* or initial penetration of the enemy's lines on narrow assault fronts; and the *durchbruch,* or breakthrough and exploitation phase. It was during this *durchbruch* stage that fast-advancing armored prongs would encircle and trap enemy forces.

The dispositions of the Wehrmacht on the eve of the war, like those of the Polish army, reflected its tactical doctrine (see map 1). Poised all along the jagged Polish western frontier and with the added advantage of the East Prussian bulge, the German army stood ready to test its new concepts.

Events Leading to the Outbreak of Hostilities

Once it became apparent to the Germans that the Poles would not accept a change in the status of the corridor and particularly Danzig, Hitler's thoughts on the subject began to solidify. By 3 April 1939, a plan for possible hostilities had been circulated to higher army headquarters. In May, Nazi agitators became active in Danzig.

Hitler's attention, however, was centered on Russia. A reapproachment with the eastern giant was a necessary prerequisite to an invasion of Poland, particularly since France and Britain had by now pledged their support to Poland in the event of an attack on that nation.

An approach was already open because in April of the preceding year the Russians had already indicated a desire to improve relations. Hitler seized the opportunity and on 23 August 1939 the Soviet Union and Germany signed a mutual nonaggression pact with secret clauses on the partition of Poland.

Meanwhile, the situation had become increasingly bleak in Danzig. The police and city government there were openly anti-Polish and assisted in the organization of pro-German groups within the city. The Danzig city senate decreed that the Polish customs inspectors, who had previously carried out their duties in respect to goods traveling across the Polish-Danzig frontier, no longer had authority. "Incidents" began to occur on the Polish-German frontier. Bands of Germans, armed with rifles and machine guns, attacked customs houses and Polish government buildings almost every night, killing and wounding. The German propaganda machine used these occurrences to justify the coming invasion as a liberation of oppressed German nationals in the Polish corridor and Danzig.

In late August the German demand for the return of Danzig was renewed — this time with the addition that a plebiscite be held in the corridor on whether it should be returned to the Reich. The Poles did not respond to the ultimatum and, after another large scale incident (organized by the German SS) in Gleiwitz, Hitler felt he had enough "justification." One day later, on 1 September 1939, German troops crossed the border into Poland.

BATTLE

In the north, the invasion was carried out by General Bock's Army Group, which comprised the 3d Army under General Kuchler and the 4th Army under General Kluge. The former drove southward from its flanking position in East Prussia while the latter pushed eastward across the corridor to join in enveloping the Polish right flank.

The main role was given to General von Rundstedt's Army Group in the south, which enjoyed an even greater advantage in armor. Under him was General Blaskowitz's 8th Army, General Reichenau's 10th Army, and General List's 14th Army. The 8th Army, on the left wing, was to push to the great manufacturing center of Lodz, helping to isolate the Polish forces in the Poznan salient while covering Reichenau's flank. On the right wing, List's 14th Army was to push for Cracow and simultaneously turn the Polish Carpathian flank, using an armored corps to drive through the restricted mountain passes.

Reichenau, in the center, was allotted the decisive midstroke and for that reason he was given the bulk of the armored forces. The two army groups were connected by only light containing forces facing toward Posen and covering the main road to Berlin. On a strategic scale, then, each of the army groups served as an enveloping wing.

Visibility was limited by a heavy mist on the morning of 1 September, but rapid progress was soon made on all the German attack fronts. By 3 September, when Britain and France "entered" the war, General Kluge's advance had cut the Polish corridor and reached the lower Vistula, while General Kuchler was advancing toward the Narev River.

In the south, Reichenau's armored forces had penetrated to the Warta and gained crossings; by the 4th, spearheads had crossed the Pilicia and by 6 September were beyond Tomaszow. Meanwhile, General List's 14th Army was converging from both flanks on Cracow.

It was during this period of the fighting that the Polish *Pomorska* Cavalry made its ill-fated charge against elements of the 3d Panzer Division. With that charge, the age of horse cavalry took its last tortured breath, and the dream world of Polish military doctrine suffered a bloody awakening.

The Commander-in-Chief of the German army, General Brauchitsch, ordered the Wehrmacht's drive to continue straight on over the Vistula. However, Rundstedt took the initiative in varying the plan when it was learned that the main Polish armies were west of the Vistula and might still be trapped there. Accordingly, General Reichenau's left wing, led by an armored corps, swung northward into the rear of the Polish forces in the area of Lodz, thereby cutting off retreat routes east and to Warsaw. The swerve met little opposition, since it was unexpected. As a result, large Polish forces were cut off before they could retreat over the Vistula. The forward placement of the Polish units on the western border had indeed been a costly mistake.

The Germans gained a great advantage by their deep strategic thrust. To complete their victory now, they had only to hold the ground they had taken against the hurried assaults of an army which was fighting in reverse. Polish units were cut off from their bases and pounded from the air (the Polish air forces had all but been destroyed on the ground). Supplies were running low and pressure increased from the flank and from behind as the eastward advances of Blaskowitz's 8th Army and Kluge's 4th Army converged. Although the Polish units fought with a bravery that greatly impressed the Germans, only a small proportion finally managed to break out of the trap and reach the garrison at Warsaw.

On 10 September, Marshall Smigly-Rydz ordered his remaining forces to make a general retreat into southeastern Poland, in an effort to set up a relatively narrow front for prolonged resistance (possibly in the hope that Britain and/or France would soon physically intervene, even if only to tie down more troops on Germany's western front). However, Smigly-Rydz's plan was thwarted; the Germans arrived there first.

At the beginning of the invasion, Guderian's armored corps of Kluge's army had thrust northwest across the corridor to East Prussia. It moved on through this German territory and came out on the east flank of Kuchler's 3d Army, facing south. Crossing the Narev on 9 September, the corps drove southward and reached Brest-Litovsk on the Bug by the 14th. In the final phase of operations, elements of Guderian's corps advanced a further 40 miles to Vlodava to meet the approaching southern pincer formed by General Kleist's corps of General List's 14th Army. With the meeting of the two pincers, the remnants of the Polish field army were cut off. For all intents and purposes, the Polish Campaign of 1939 was over; it only remained for the victor to eliminate the remaining isolated pockets of resistance. In this light, the Soviet advance across the eastern border on 17 September can only be seen as an anticlimax.

Polish losses for the campaign were staggering. Out of some 800,000 who had served, the Germans claimed 694,000 prisoners-of-war; the rest were killed, captured by the subsequent Soviet advance, or had fled into Romania, Hungary, or isolated portions of Poland. Enormous quantities of ordnance were also lost to the Germans.

The German army suffered a total of 8,082 men killed; 27,278 wounded; and 5,029 missing. Also, 217 tanks were lost.

The Campaign of 1939 was fought by the Poles against a background of obsolescent military thinking and refusal to break with the past. This situation greatly simplified the strategic and tactical problems facing the German commanders at every level. It does not, however, detract from the historical importance of the campaign as the precursor of modern military operations.

DEPARTMENT OF THE ARMY

Lineage and Honors

43d AIR DEFENSE ARTILLERY

Constituted 29 June 1918 in the Regular Army as the 43d Artillery (Coast Artillery Corps)

Organized 7 August 1918 at Haussimont, France

Inactivated 17 August 1921 at Camp Eustis, Virginia

Redesignated 1 July 1924 as the 43d Coast Artillery

Disbanded 14 June 1944

Reconstituted 28 June 1950 in the Regular Army; regiment concurrently broken up and its elements consolidated and/or redesignated as follows:

Headquarters and Headquarters Battery as Headquarters and Headquarters Battery, 43d Field Artillery Group

1st Battalion consolidated with the 43d Field Artillery Battalion (see ANNEX 1) and consolidated unit designated as the 43d Field Artillery Battalion, an element of the 8th Infantry Division

2d Battalion consolidated with the 61st Field Artillery Battalion (active) (see ANNEX 2) and consolidated unit designated as the 61st Field Artillery Battalion, an element of the 1st Cavalry Division

3d Battalion consolidated with the 64th Field Artillery Battalion (active) (see ANNEX 3) and consolidated unit designated as the 64th Field Artillery Battalion, an element of the 25th Infantry Division

After 28 June 1950, the above units underwent changes as follows:

43d Field Artillery Battalion activated 17 August 1950 at Fort Jackson, South Carolina
Inactivated 1 August 1957 in Germany and relieved from assignment to the 8th Infantry Division

61st Field Artillery Battalion inactivated 15 October 1957 in Japan and relieved from assignment to the 1st Cavalry Division

43d AIR DEFENSE ARTILLERY

64th Field Artillery Battalion inactivated 1 February 1957 in Hawaii and relieved from assignment to the 25th Infantry Division

Headquarters and Headquarters Battery, 43d Field Artillery Group, and the 43d, 61st and 64th Field Artillery Battalions consolidated, reorganized, and redesignated August 1958-July 1959 as the 43d Artillery, a parent regiment under the Combat Arms Regimental System

Redesignated 1 September 1971 as the 43d Air Defense Artillery

* * *

ANNEX 1

Constituted 1 October 1933 in the Regular Army as the 43d Field Artillery

Redesignated 13 January 1941 as the 43d Field Artillery Battalion

Assigned 1 June 1941 to the 8th Division (subsequently the 8th Infantry Division) and activated at Fort Jackson, South Carolina

Inactivated 20 October 1945 at Fort Leonard Wood, Missouri

ANNEX 2

Constituted 16 December 1940 in the Regular Army as the 61st Field Artillery Battalion

Assigned 3 January 1941 to the 1st Cavalry Division and activated at Fort Bliss, Texas

ANNEX 3

Constituted 26 August 1941 in the Regular Army as the 64th Field Artillery Battalion and assigned to the 25th Infantry Division

Activated 1 October 1941 in Hawaii

* * *

43d AIR DEFENSE ARTILLERY

CAMPAIGN PARTICIPATION CREDIT

World War I
St. Mihiel
Meuse-Argonne
Lorraine 1918

World War II
Normandy
Northern France
Rhineland
Central Europe
Central Pacific
Guadalcanal
Northern Solomons
New Guinea
Bismarck Archipelago
Leyte (with arrowhead)
Luzon

Korean War
UN defensive
UN offensive
CCF intervention
First UN counteroffensive
CCF spring offensive
UN summer-fall offensive
Second Korean winter
Korea, summer-fall 1952
Third Korean winter
Korea, summer 1953

DECORATIONS

Presidential Unit Citation (Army), Streamer embroidered GUADALCANAL

Presidential Unit Citation (Army), Streamer embroidered NAM RIVER

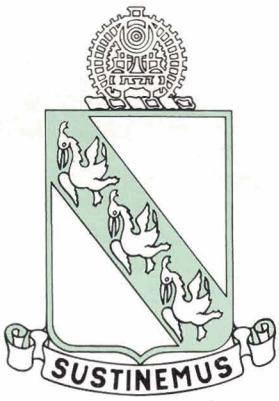
Presidential Unit Citation (Army), Streamer embroidered PAKCHON, KOREA

Presidential Unit Citation (Navy), Streamer embroidered WONJU-HWACHON

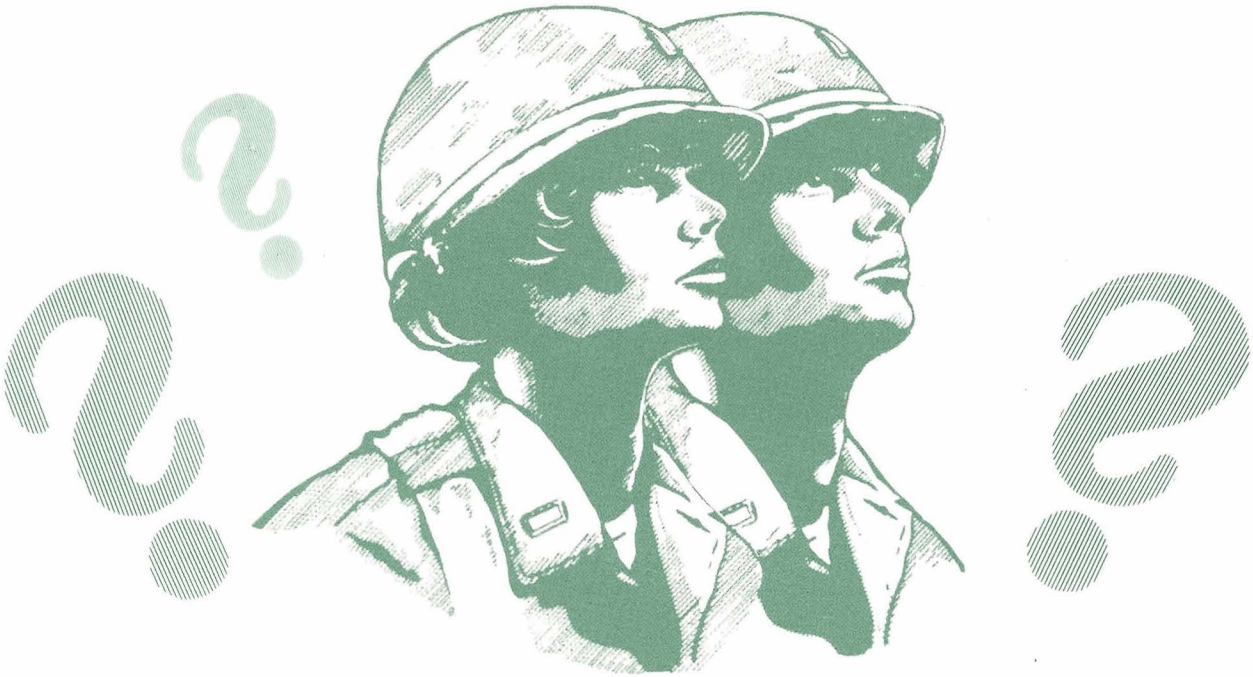
Navy Unit Commendation, Streamer embroidered PANMUNJOM

BY ORDER OF THE SECRETARY OF THE ARMY:

VERNE L. BOWERS
Major General, USA
The Adjutant General



WHAT DO YOU DO NOW,



LIEUTENANT?

SITUATION:

First Lieutenant Smith is Assistant Operations Officer of a Chaparral/Vulcan battalion assigned to an active US division. The division G3 has become concerned about the status of Redeye team proficiency within the division and has directed the organic Chaparral/Vulcan battalion to develop a plan to test Redeye team operational readiness. This task has been assigned to Lieutenant Smith with guidance that the test focus on the team's ability to "move, shoot, and communicate."

SOLUTION:

Lieutenant Smith analyzed the requirement. He knew the test must be realistic, easily administered, and not excessively long. It would have to have a maneuver phase and a classroom phase covering the following skills:

- Aircraft recognition.
- Aircraft engagement.
- Individual soldier skills.
- Command and control procedures.
- Position selection.
- Defense design.

The test must place the Redeye section in a realistic environment requiring actions to be executed that would exist during the team's mission in a battle. Such realism should be used whenever possible to evaluate the team's performance.

The test must emphasize use of a minimum of resources. The resources used for administration, evaluation, and analysis will come from the C/V battalion. Since the battalion has its own training to conduct, the personnel and equipment must be used for short periods of time and must be readily available for battalion/battery exercises when required.

The test must be flexible because it will be used for all of the division's Redeye teams. These teams differ in size, equipment, and mission; therefore, the test must be adjusted for the tested unit. In addition, different evaluations will be used at different times so the test must be easily adapted to each set of particular factors. This flexibility will allow a uniform analysis of Redeye sections giving the G3 a picture of overall division SHORAD readiness status.

After analysis of the test requirements, Lieutenant Smith decided that a two-phase test was required. The first phase would be a classroom test followed by a 1-day field training exercise (FTX) at a local training area. The two-phase test enhanced the program substantially and allowed a better analysis of team status.

The classroom test would be administered on a 4-hour notification. This portion of the test would include the moving target simulator (MTS) to provide analysis in the following areas:

Aircraft recognition. The required aircraft would be established by the G2/G3 based on the division mission. The test standards would be based on the current SQT standards for Redeye crewmen established by the individual soldier's manual. Both soldiers in each team must achieve a passing score for the team to receive a satisfactory rating. Analysis will be by team with GO or NO GO ratings.

Aircraft engagement. The evaluation would use the MTS or aircraft in the field environment. The MTS is favored due to the ability to control the aircraft and provide varying target representations, and because of the lower cost. Both team members would be required to engage three targets and score two hits to achieve a satisfactory team rating. Again, the final analysis would be reported by team to give an overall division status.

The classroom phase is designed to analyze and report the status of visual aircraft recognition and engagement on a GO or NO GO basis for each Redeye team in every Redeye section. This would provide a good base to determine the number of teams/fire units that should be able to accomplish their missions.

The field test would test the overall section in an FTX environment. The field test would be on the day after the classroom test. This delay would facilitate the exercise by allowing the section to load, brief, and prepare as it would in an actual buildup. The delay would not degrade the "no notice" aspect because less than 36 hours prior notice would be given. Each test scenario would use the task requirements in the evaluated battalion's ARTEP manual for the Redeye section. For example, the task requirements for an infantry battalion Redeye section would be developed from within the requirements of the ARTEP for that infantry battalion. Thus each scenario would be designed around the requirements in the parent organization's ARTEP. The section would be analyzed as a section with mission accomplishment serving as the primary evaluation standard. The evaluation would specifically aim at the following skills:

Individual soldier skills required in the current SQT for MOS 16P. By concentrating on these tasks, the soldier's training and perception of what is important to retain are reinforced. In addition, the soldier is provided an additional tool to analyze his procedures.

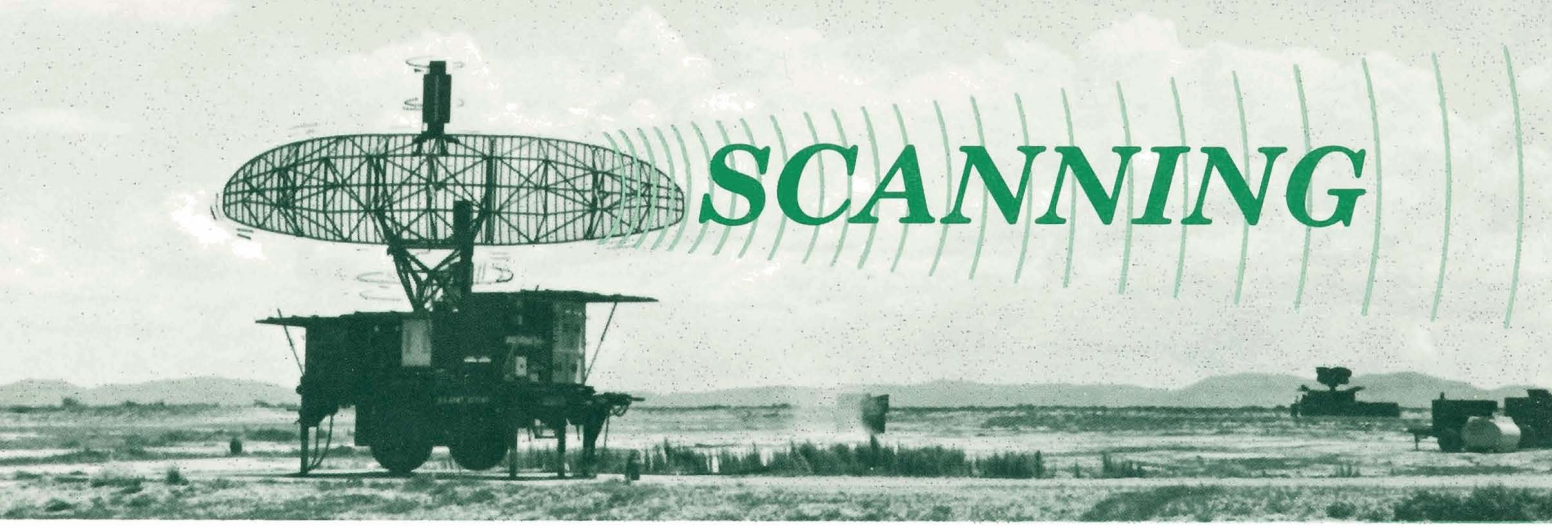
Command and control procedures. The Redeye section headquarters must be able to assert control to assure adequate command during various events. This command and control element must analyze, interpret, transmit, and execute instructions according to all applicable SOPs. Changes in missions, new events, changing threat, and any factor that affects the section must be handled in a manner that assures accomplishment of the mission.

Position selection. Each section will receive an overall rating. The requirement for site selection will maximize the importance of mission accomplishment.

Defense design. The section headquarters will be evaluated on whether the design will defend the asset. The principles of defense design must also be observed.

Lieutenant Smith has developed a program for roughly evaluating each Redeye section within the division. The program will require an officer in charge (OIC) to develop scenarios, coordinate the required facilities, and put together an evaluation team for each section. The evaluation teams should consist of an OIC and two evaluators, each with a driver, radio, and ¼-ton truck. With a developed scenario and planned inputs, this relatively small team could effectively evaluate a Redeye section in a 1-day FTX. The classroom phase would require only one person to administer and evaluate. The evaluations should be short, based on team or section action, and evaluators should be readily available to facilitate retraining and improvements.

This training program uses the available resources: SQT training goals and material, local training areas (which can be small), and existing duty positions to administer a timely and highly effective evaluation of the division's Redeye sections. In considering the growing criticality of air defense assets and training, this program will enhance the combat capability of the division. When coordinated and used to complement the maneuver battalion's ARTEP, this type of evaluation program becomes even more important. It guides, prepares, and evaluates the Redeye section prior to integration into the combined arms team. The Redeye section is a valuable asset. The attention paid to its training will be quickly justified in the face of battle.



USAADS HOTLINE

Since the inception of a US Army Air Defense School (USAADS) Hotline in December 1980, calls have been coming in from military personnel all over the US and overseas. The most frequent request is for assistance in the preparation of air defense artillery briefings.

The 24-hour telephone Hotline was established so that units anywhere in the world could call USAADS about air defense-related questions or problems for which they desired information or answers. The Hotline was also intended to be used as a medium for suggesting solutions to problems.

Located in the Directorate of Evaluation and Standardization, the Hotline is answered by Branch Training Team personnel during duty hours. After normal duty hours, the calls are taken by the USAADS Staff Duty NCO and referred to the proper agency the next duty day. All inquiries are acted upon without delay and responses made as soon as possible.

The USAADS Hotline number is AUTOVON 978-3159 or commercial 1-915-568-3159. Collect calls cannot be accepted. Units or individuals unable to call can write to Commandant, US Army Air Defense School, ATTN: ATSA-EV, Fort Bliss, Texas 79916.

PATRIOT TECHNICIANS PROCURED

Patriot Missile System Technician MOS 222C is the latest specialty in the air defense missile warrant officer field. The goal for procurement in fiscal year 1982 is 18 officers. Initially, all procurement will be done by reclassifying warrant officers in MOSs that are currently being phased out.

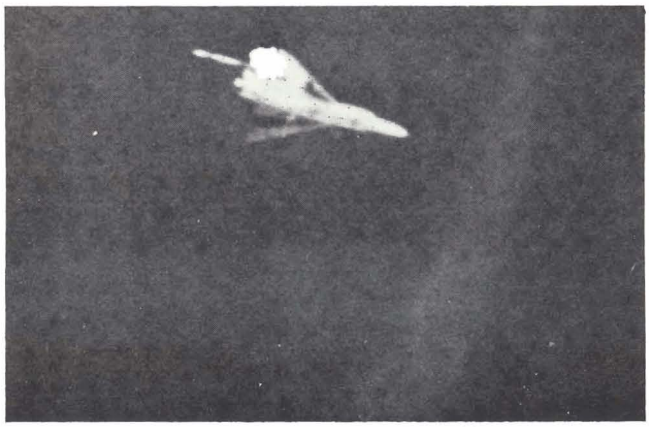
PATRIOT CONFIRMATION TESTING COMPLETED

The development confirmation test series of the Patriot missile system concluded recently with the successful intercept of a target aircraft at White Sands Missile Range, New Mexico. The firing was the final flight test using engineering development missiles.

Overall, Patriot achieved an 82 percent success rate during the confirmation tests with 52 successes out of 63 scorable flights.

The confirmation test flights were conducted in electronic countermeasures conditions against target drones flying at a variety of altitudes and ranges. The tests were part of a confirmation test program mandated by the Secretary of Defense to demonstrate capabilities not thoroughly shown in earlier development and operational tests.

Patriot is currently in production at Raytheon Company's Missile System Division, prime contractor for the new air defense weapon.



Target aircraft intercepted by a Patriot missile over White Sands Missile Range, NM.

ENLISTED CAREER NEWS

TEMPORARY PROMOTION FOR AIRBORNE SOLDIERS

Special promotion procedures for E-4s and E-5s, who are in certain specialties and assigned to airborne units, will be in effect until 1 August.

Under the temporary procedure, promotion authorities will deduct 50 points for promotion to E-5 and 25 points for promotion to E-6 from monthly Armywide promotion cutoff scores. This procedure pertains only to those soldiers assigned to authorized positions calling for special qualification identifiers "P" (parachutist), "S" (special forces), and "V" (ranger). The procedure will increase hike possibilities for several specialties in airborne units that now face limited promotion opportunity because of Armywide MOS overstrengths. These specialties are primarily in the combat support and combat service support fields. The specialties included are the following:

- (For promotion to E-5) Radio Operator (05B); Fixed Station Radio Specialist (32H); Dial/Manual Central Office Repairer (36H); Tactical Wire Operations Specialist (36K); General Construction Equipment Operator (62J); Finance Specialist (73C); Personnel Actions Specialist (75E); and Medical Specialist (91B).
- (For promotion to E-6) Radio/Teletype Operator (05C); Tactical Communications Systems Operator/Mechanic (31V); Fixed Station Radio Specialist (32H); Parachute Rigger (43E); Finance Specialist (73C); Unit Supply Specialist (76Y); Medical Specialist (91B); and Food Service Specialist (94B).

The list of MOSs included under the special procedures may vary on a month-to-month basis, so soldiers should check with their local personnel offices for up-to-date information.

Soldiers promoted under the temporary program will not be allowed to move to a nonjump status assignment until after completing a normal tour. Those soldiers voluntarily removed from those assignments within 1 year of promotion will be involuntarily reclassified into a shortage MOS.

Army officials hope that soldiers in overstrength MOSs will be aware of the enhanced promotion opportunities associated with airborne/special forces duty and will take advantage of the liberalized promotion policy.

REENLISTMENT CHANGES

For many years, it has been believed that soldiers with more than 18 years of service could automatically reenlist or extend their enlistment to remain on active duty until their 20-year retirement mark. A clarification of policy, outlined in Interim Change 16 to AR 601-280, now states that such an extension is not assured. 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 may be denied reenlistment by major field commanders.

The change also denies reenlistment to soldiers who do not make corporal or specialist four during their first 3 years of service. However, it allows privates first class to be extended on oversea orders long enough to complete tours.

In addition, soldiers who need additional time to satisfy Department of the Army imposed service remaining obligations will be granted extensions.

PARENTHOOD CAN LEAD TO INVOLUNTARY SEPARATION

In recent years the number of sole parents and married service couples has increased. Accordingly, a corresponding increase in problems relating to parenthood is to be expected. However, when these problems interfere with a soldier's ability to perform his military duties, he may find himself being discharged from the Army.

The following provisions are used to deal with soldier parent problems:

- Paragraph 5-35, AR 635-200, Enlisted Personnel Separations, provides for involuntary separation of enlisted members for inability to perform prescribed duties due to parenthood. Additionally, this provision may be used to separate soldiers who are repetitively absent or unavailable for worldwide assignment because of parenthood.
- General court-martial convening authorities or members of their staff who have been delegated approval authority may order discharge or transfer to the Individual Ready Reserve if soldiers have not completed their mandatory service obligation. Persons separated under this provision will be awarded an Honorable or General Discharge Under Honorable Conditions as appropriate.

These provisions allow commanders to separate soldiers who are unable to respond effectively to both parenthood and the rigors of military life or who use parenthood as a means of avoiding their military responsibilities.

FORCE ALIGNMENT PLAN

Two years ago, the Army was short 16,000 E-5s through E-9s. Today that figure has been reduced to 2,650, and in 2 years the shortage will be eliminated. However, that progress is partially offset by a continuing imbalance in certain MOSs. While some are overstrength in noncommissioned officers, others are short, particularly the combat arms skills, which were 7,000 short at the end of fiscal year 1981.

As a result of this situation, a Force Alignment Plan has been designed to improve skill match, eliminate poor performers, retain good performers, and support modernization of the Army.

The policy changes and the soldiers affected are listed below:

- Reenlistment objectives to major commands specified by MOS as well as quantity; affects all soldiers.
- Letters to soldiers in "overage" MOSs to encourage them to voluntarily reclassify into shortage MOSs; affects soldiers in overage MOSs.
- Reclassification permitted to shortage skill only (subject to medical standards); affects all soldiers.
- Reenlistments allowed only in present skill or to shortage skill; affects all soldiers.
- Must be E-4 or above to reenlist (except for 2-year enlistees); affects all soldiers.
- Must have at least three area aptitude scores of 95 or greater on Armed Services Vocational Aptitude Battery (ASVAB) given before 1 Oct 80 or three scores of 85 on current ASVAB to be eligible to reenlist; affects all initial term soldiers except E-4s on E-5 list and E-5s.
- E-7 promotion board selects by MOS within career management field; affects all E-6s being considered for promotion.
- E-5/E-6 promotions to fill MOS needs; affects E-4s and E-5s in overage MOSs.
- Prior service enlistments allowed in only critical skills; affects all prior service soldiers.
- Meet weight and PT standards for reenlistment; affects all soldiers.
- Publication of promotion opportunity by MOS to encourage voluntary reclassification; affects all soldiers.
- Adjustment of selective reenlistment bonus; affects soldiers in certain MOSs.

BARS to STARS

OPMD UPDATE

ACTIVE/RESERVE OFFICERS RATE EACH OTHER

A recent change in the officer evaluation reporting system eliminated the requirement for an Active Army officer serving with a Reserve unit to be rated by another Active Army officer. Now the officer will be rated by his supervisor regardless of whether the supervisor is an Active Army or Army Reserve officer.

The change also has made it possible for Reserve officers on active duty to be rated by their immediate supervisor rather than by another Reserve officer.

The new policy became effective on 20 October 1981. It allows commanders more flexibility in setting up a rating chain to correspond to the actual chain of command.

—Army Information Radio Service

CGSC WRITING REQUIREMENT DOUBLED

Officers who are now beginning their Command and General Staff College (CGSC) education through correspondence studies or through US Army Reserve schools will find their writing requirements doubled.

Before the 1981-82 school year, officers were required to write one 750- to 1,000-word paper on a military subject. In line with the Army's renewed emphasis on writing skills, this requirement has been expanded to include a 500-to 750-word argumentative paper plus a 1,000- to 1,500-word staff paper. This change parallels a revision in the resident CGSC course.

Exempt from the new requirement are students who are already enrolled in Phases III and V of the CGSC with USAR schools and those who have already passed the writing requirements through correspondence courses.

Phase I students must submit the argumentative paper by 31 May 1982. However, because about one student in five fails the first effort, students actually have until 1 October 1982 to pass the requirement.

For students enrolling now, the second paper — the staff paper — will have to be successfully completed by 1 October 1983 so that they can continue into Phase V of the course.

CAS^3 NOT EQUIVALENT TO CGSC

Reserve officers will no longer receive Command and General Staff College (CGSC) equivalent credit for education and promotion purposes by completing the Combined Arms and Services Staff School (CAS^3) Course.

Headquarters, Department of the Army, is preparing a change to AR 135-155 which rescinds the recently established Army policy that the CAS^3 be considered the full educational equivalent of the CGSC.

The change will have limited impact upon the Reserve officer education system. Those Reserve officers who have already completed CAS^3 will be granted CGSC equivalency for promotion purposes.

For most Reserve officers, completion of CGSC is still required for promotion to colonel and completion of 50 percent of CGSC for promotion to lieutenant colonel.

BULLETIN BOARD

General Information

BDU EXCHANGE

Soldiers who have camouflage battle dress uniforms (BDU) that have been rendered unusable because of excessive shrinkage may have them replaced on an item-for-item basis without charge to the individual.

The exchange will be accomplished in accordance with procedures outlined in paragraph 5-14C of Interim Change 101, AR 700-84. Cash refunds will not be given for returned defective items. Upon depletion of on-shelf stocks, troops will be requested to retain the shrunken uniforms in their possession pending receipt of new stock.

Complaints about excessive shrinkage of the camouflage BDU after washing prompted Army logistics officials to issue guidelines for its care and maintenance, along with the exchange procedures.

Officials in the Troop Support Division at Department of the Army say reports of shrinkage began to surface shortly after the initial issue of the new uniforms in October.

Efforts are underway to identify the cause of the shrinkage so corrective action can be taken. In the meantime, excess shrinkage can be prevented by using the lowest possible temperature settings during the washing, drying, and finishing cycles. At no time should the garment be exposed to temperatures greater than 130 degrees Fahrenheit.

When buying the new uniform item, soldiers should ensure the uniform fits loosely to allow for some shrinkage without rendering the garment unusable. Current sizes are designed to allow a loose fit.

RETIREMENT APPLICATION CHANGE

Presently, retirement-eligible servicemembers are permitted to request retirement in lieu of complying with PCS assignment instructions. Soldiers have 30 days after notification of assignment to submit a request for retirement to be effective within 12 months of submission. In effect, it allows a 13-month window for retirement in lieu of compliance with assignment instructions. When this happens, the assignment process must be repeated to provide a replacement. A considerable amount of turbulence results.

Effective 1 June, the 13-month application period will be reduced to 6 months. The 30-day decision period will be reduced to 10 days from receipt of alert notification. Thus under the new policy, a servicemember who receives a PCS alert on 1 June and has less than 19 years and 6 months of active federal service on 10 June will not be eligible to apply for retirement in lieu of PCS.

The change applies to both officer and enlisted members who receive PCS assignment instructions on or after 1 June.

SEARCH STILL ON FOR NEW COMBAT BOOT

The search for a new Army boot continues. The Army is looking for a boot that has increased durability, increased water resistant properties, and infrared reflective qualities using state-of-the-art technology.

A prototype rough-leather brown boot had been considered as a possible choice to provide the desired improvements. However, that boot is no longer being considered because of structural deficiencies causing poor durability and foot support. Specifically, a combined development and operational test of the rough-leather boot pointed to excessive wear on the soles of the prototype, thus showing the service life of the boot too short to meet Army needs. Ankle and arch supports were also less than soldiers require.

The Army is exploring a number of alternatives in search of a replacement for the present black leather combat boot. One of these is to develop a new boot based on what was learned during testing. Another alternative is to consider commercially available boots.

RESERVISTS CAN REVIEW OMPF

All Army Reserve soldiers living in or visiting the Washington, DC, area may now review their Official Military Personnel File (OMPF) at the US Army Military Personnel Center (MILPERCEN).

In order to request a records review, call the MILPERCEN Reserve Affairs Advisor's office at AUTOVON 221-8835, commercial (202) 325-8835, or write to HQ, MILPERCEN, ATTN: DAPC-PO-RA, 200 Stovall Street, Alexandria, VA 22332.

Thirty days notice is required because the records must be requested by MILPERCEN from the Reserve Components Personnel and Administration Center (RCPAC) in St. Louis, MO. Minimum information needed to obtain records includes:

- Full name.
- Rank.
- Social Security Number.
- Requested date of review.
- Business or home phone where individual can be reached during normal duty hours (8 am - 4:30 pm EST), Monday through Friday.

RULES FOR RETIREMENT PAY CHANGED

Soldiers retiring from military service will find their retirement pay computed differently than in the past. The fiscal year 1982 Defense Department Acquisition Act, signed into law by the President last December, directs that service credit be computed based on the nearest month actually completed for any period in excess of 6 months. Before the new law was effective, soldiers received retirement pay credit rounded up to the next year if they had served more than 6 months during the retirement year. Any portion of a year under 6 months will continue to be rounded down to the last whole year of completed service.

The change affects all soldiers retiring on or after January 1982, except those who prior to that date:

- Applied for retirement.
- Were being processed for disability retirement.
- Were on the temporary disability retirement list and were later retired.

The chart below shows examples of how retired pay will be computed under the new law.

SERVICE COMPLETED	RETIRED PAY BASED ON
21 years, 7 months	21 years, 7 months
21 years, 4 months	21 years
24 years, 9 months, and 25 days	24 years, 9 months
22 years, 5 months and 4 days	22 years

MAKING NEAT CUFFS ON THE BDU

When the sleeves of the new battle dress uniform are rolled up, a "pea green" look results because the wrong side of the fabric is showing.

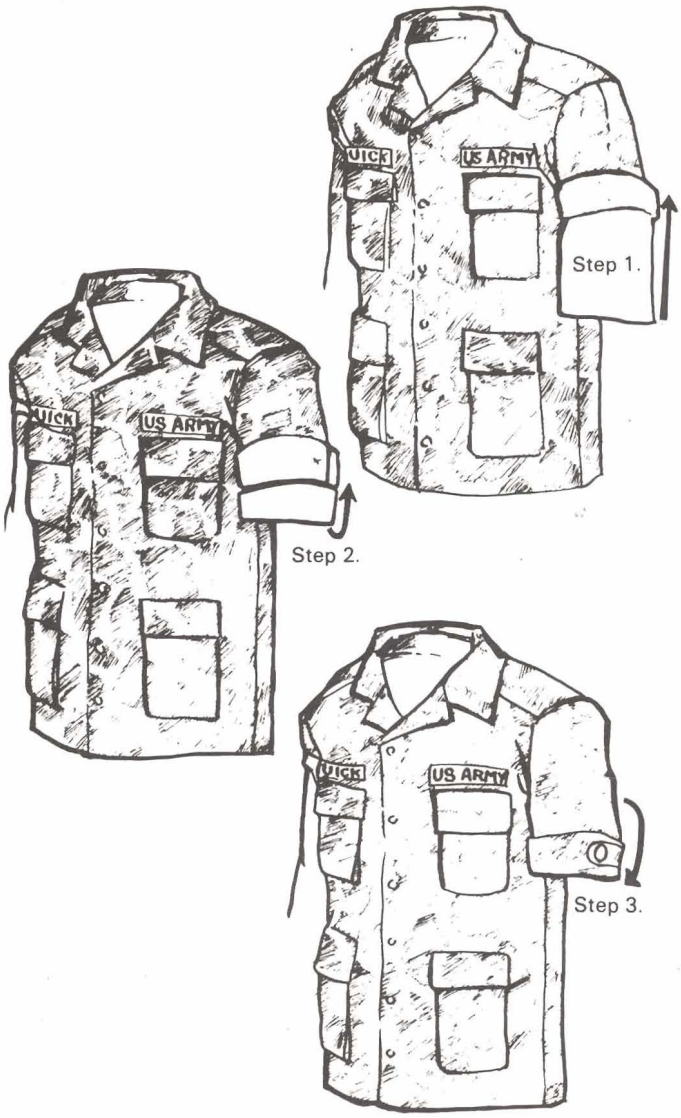
The following idea is a solution to that problem. It was suggested by Captain Gregory J. Premo of the Command, Tactics, and Doctrine Department, US Army Infantry School, Fort Benning, Georgia.

Step 1: Pull the cuff of the sleeve all the way up to the armpit so that the sleeve is folded over on itself with the inside showing.

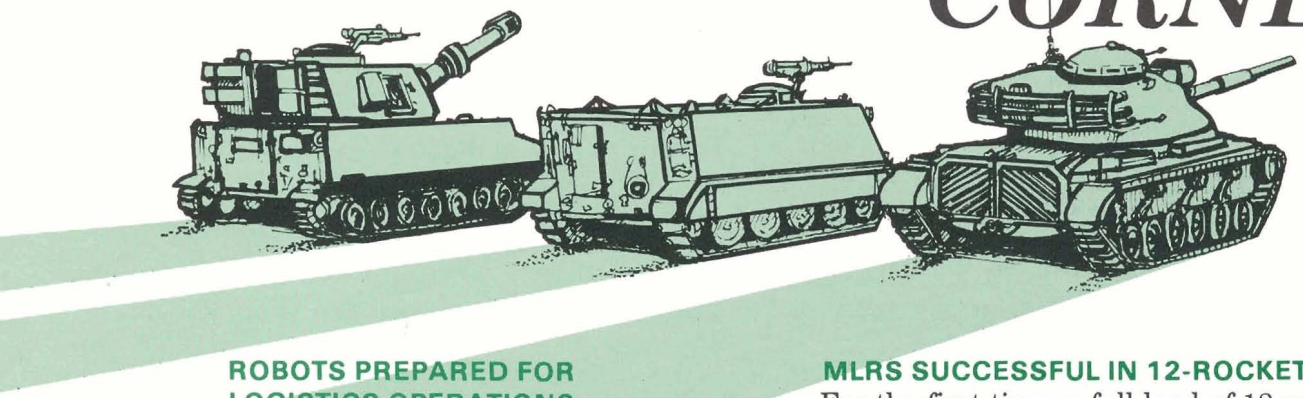
Step 2: Make two folds upward toward the armpit.

Step 3: Fold the cuff down over the folds you just made. The buttons and cuff flap should be showing.

With this type of fold, the rolled sleeve is covered and the camouflage pattern is exposed at all times. It presents a neat appearance and allows you to unroll the sleeve quickly by simply pulling down the cuff.



COMBINED ARMS CORNER

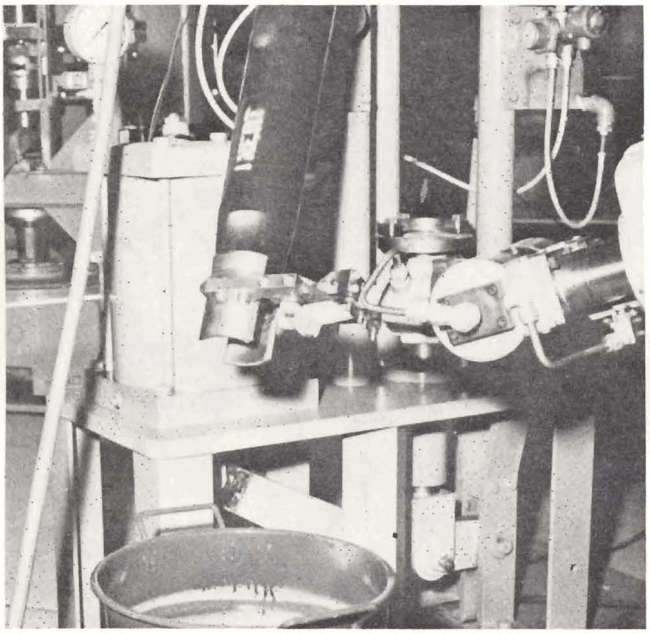


ROBOTS PREPARED FOR LOGISTICS OPERATIONS

For the past 5 years, Tooele Army Depot, Utah, has been using industrial robots to defuse live 40-mm shells. Now the Army Human Engineering Laboratory, Aberdeen Proving Ground, Maryland, is considering ways in which robots may be used to replace soldiers in performing other tedious or dangerous jobs.

Some of the functions proposed to be performed by robots include handling stocks in ammunition and supply depots, welding tank hulls, automating ammunition supply points, clearing mine fields, loading artillery ammunition, and fueling weapon systems and support vehicles.

Approximately 5,000 robots are now being used successfully in civilian factories throughout the United States.



A robot at Tooele Army Depot dumps propellant into a collection container.

MLRS SUCCESSFUL IN 12-ROCKET FIRING

For the first time, a full load of 12 rockets was fired from the Multiple Launch Rocket System (MLRS) at White Sands Missile Range, New Mexico. The new artillery system is being developed for the US Army.

Launched in less than a minute, the 12 MLRS rockets hurled thousands of live submunitions — each similar to a grenade — onto the target area 16 kilometers (9.6 miles) away. The firing was conducted as part of the extensive development testing of the new weapon system, which is set to begin service with the Army in 1983.

The rockets were fired with intervals of a few seconds between each shot to demonstrate the system's designed capability of delivering a massive volume of defensive firepower. Armed with MLRS' standard XM-77 warhead for use against enemy troops and material, the rockets destroyed or disabled trucks, guns, and equipment set up in the target area.

This first firing of a full load of 12 rounds capped several previous flight tests of single-, double-, six-, and eight-round firings.

The MLRS consists of a tracked, mobile launcher with a simple-to-operate weapon system. With a minimal amount of training, its crew of three persons can fire up to 12 rockets against targets at ranges exceeding 30 kilometers (18 miles), then quickly reload and fire again.

The new rocket system is also being developed for the French, West German, and British armies. The prime contractor for MLRS is Vought Corporation, the aerospace subsidiary of LTV Corporation.

COOLING SYSTEM FOR COMBAT VEHICLE CREWMEN

A microclimate personnel liquid cooling system

developed jointly by the Army's Mobility Equipment Research and Development Command and Natick Laboratories is being field tested at Fort Sill, Oklahoma.

The system transports cool liquid into a vest worn under the clothing of the vehicle crewmen. The vest provides relief from heat stress even when heavy protective overgarments are worn, such as those required for chemical and biological warfare conditions.

Each vest is connected to supply and return manifolds inside the vehicle with two relatively short, flexible, insulated liquid lines. Quick connections are available at several stations within the crew compartment so that the soldier can connect and disconnect if he has to move around or exit the vehicle.

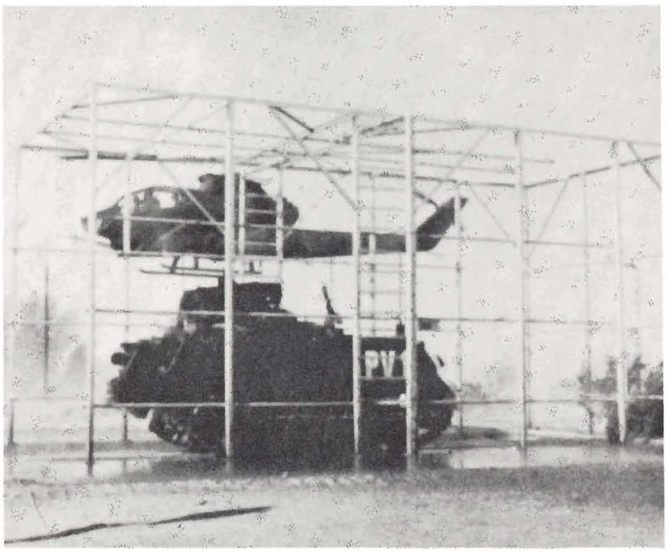
The system is designed to protect crewmen from heat exhaustion even when temperatures inside the vehicle reach as high as 140 degrees Fahrenheit. The system is also capable of circulating warm liquid to protect crewmen from cold temperatures.

The main advantages of the liquid system are its small size and low power requirements.

FISTV UNDERGOES RAIN TEST

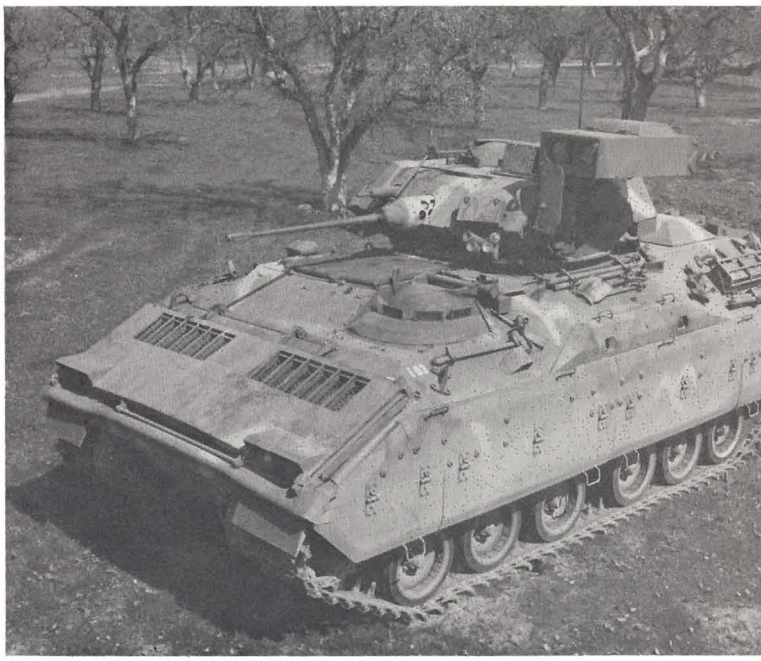
Less than 3 inches of annual rainfall at the US Army Yuma Proving Ground in the Sonora Desert of Arizona did not stop test engineers from giving the XM981 fire support team vehicle (FISTV) a thorough drenching. Using an AH-1S Cobra helicopter as a wind machine and the artificial rainmaking facility, engineers checked for possible leaks in the hull during a "thunderstorm."

The FISTV is undergoing developmental testing for possible use by forward observers assigned to infantry and armor units. The M113A1 chassis mounts a laser target designator and houses a communications system to make the job of directing artillery fire more accurate and faster on the battlefield of the future.



BRADLEY INFANTRY FIGHTING VEHICLE UPDATE

The Bradley Infantry Fighting Vehicle (BIFV) is now entering the Active Army's inventory. Highly mobile and highly sophisticated, the BIFV can tear along at speeds up to 42 miles per hour, deliver unprecedented firepower, and even swim rivers. In 18 months of tests, it has proved to be the most formidable fighting machine of its type ever built. It will be joining the new Abrams main battle tank to form the backbone of the Army's combined arms team.



The Bradley Infantry Fighting Vehicle.

One hundred BIFVs will be coming off the assembly line under a $206 million 1-year contract that will help the Army begin to close a critical combat vehicle gap.

The BIFV carries a driver, commander, gunner, and six additional infantrymen. The Bradley Cavalry Fighting Vehicle, designed for use as a scout vehicle, has a driver, commander, gunner, and two cavalrymen, and carries extra ammunition.

When the BIFV is fielded, there will be one-for-one exchange for the armored personnel carriers now found in the Army's mechanized infantry units.

INTELLIGENCEWATCH

EAST GERMANY USES SOVIET SA-4

The East German Army is equipped with the Soviet SA-4/GANEF surface-to-air missile system. The photograph shows a launcher at a live practice firing. The trails of the four solid booster rockets are clearly visible.

The missile itself has a ramjet engine and can be deployed against aerial targets up to an altitude of 28 kilometers and a slant range of 70 kilometers. The missile has a length of 8.80 meters, and a diameter of 0.90 meters. The span of the stabilizer fins is 2.60 meters. The control fins behind the warhead section measure 2.30 meters.

The missile is controlled by command guidance combined with a semiactive radar target-acquisition head. The missile is launched from a double launcher on a tracked vehicle.

— *Soldat und Technik*

AUSTRALIA SELECTS HORNET

Australia has selected the F-18 Hornet as its new tactical fighter and plans to purchase a total of 75 aircraft for use by the Royal Australian Air Force (RAAF). The aircraft is made by McDonnell Douglas.

The RAAF expects to receive the first Hornet before the end of 1984, with operational training to begin the second half of 1985. The Australian Hornets will be assembled and tested in Australia at government aircraft factories at Avalon. These factories are scheduled to turn out three F-18s every 2 months by the middle of 1986. Deliveries should be completed in 1990. The engines will be assembled at the Commonwealth Aircraft Corporation, Melbourne, Australia.

FRANCE INTRODUCES SATCP

The armament show last year at Satory, France, saw the introduction of a French shoulder-fired weapon that will be used against helicopters and low-flying targets. Known as SATCP (Sol-Air Tres Courte Porte), it is a short-range shoulder-fired antiaircraft missile intended for use in the French air force and army. The SATCP program consists of five missile versions which can also be fired from tripod-mounted launchers, armored vehicles, helicopters, and ships. It was developed by the MATRA Company.

The missile is 1.84 meters long and 9 centimeters in diameter. The system weighs 17 kilograms and is operational from -45°C to +70°C at crosswinds of

up to 70 kilometers per hour. The missile has a range of 4 kilometers and is optimized for use against helicopters and low-flying aircraft. It has a highly sensitive infrared search head which can identify a helicopter at 4 kilometers. The 3-kilogram warhead is detonated by proximity fuze, and the booster and rocket motors have a solid fuel supply that burns for 6 seconds.

Target acquisition and designation are provided by the TRS 2600 radar, developed by Thomson-CSF. It is a pulse-doppler radar operating in the S-band and optimized for the detection of low-flying aircraft. The radar can identify hovering helicopters and track four targets simultaneously.

— *Soldat und Technik*

NEW AA SYSTEM PROTOTYPE

A prototype of the West German antiaircraft (AA) system WILDCAT is the result of years of experience gained in the development and production of the battle tank LEOPARD and the AA tank GEPARD. WILDCAT, an autonomous, mobile antiaircraft system based on the chassis of the transport tank FOX, was developed by the following companies under the direction of Krauss-Maffai: Hollandse Signaal Apparaten B.V., Siemens AG, Daimler-Benz AG, Mauser Werke Oberndorf GmbH, and AEG-Telefunken.

The AA system WILDCAT is designed for the protection of mobile or stationary mechanized units, powerplants, airfields, and oilfields. The fire control system is built in modular form to permit all-weather, day and night operation. The prototype has an optical-electronic fire control system consisting of a TV camera with a laser-ranging tracking sensor and an acquisition radar with acquisition capabilities while the vehicle is in motion.

Typical reaction time of the WILDCAT system is 6 seconds to complete the following steps:

- Target acquisition and identification.
- Target designation by the operator.
- Target lock-on by TV tracker and laser.
- Automatic target tracking.
- Calculation of azimuth and clear-to-fire information by fire control computer.

A crew of three (commander, radar operator, and driver) operates the WILDCAT. Automatic target tracking can be monitored on the TV and through the slaved periscope.

Important characteristics of the system are:

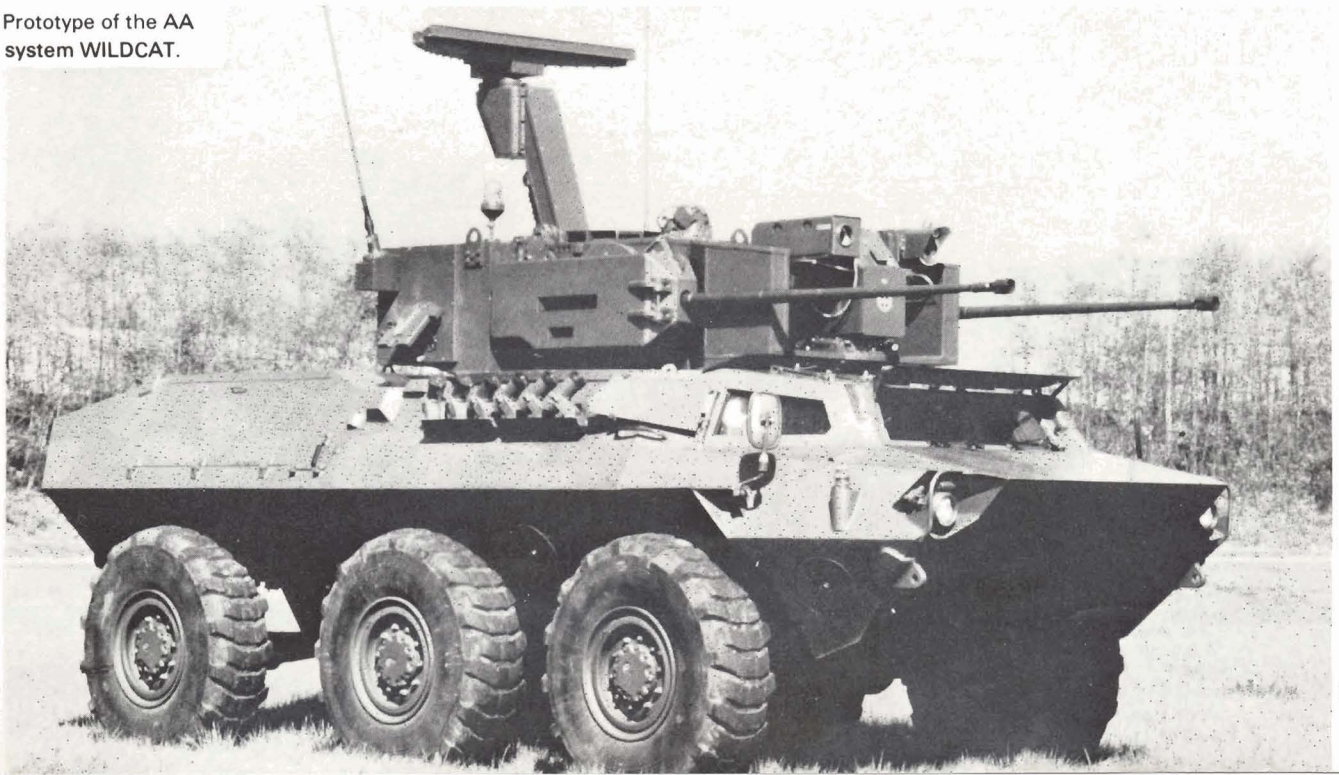
- Effectiveness against low-flying targets and helicopters.
- Ease of operation and maintenance.
- Automatic target tracking.
- Short reaction time.
- High hit and destruct probability.
- Highly mobile operation.
- Air transportability.

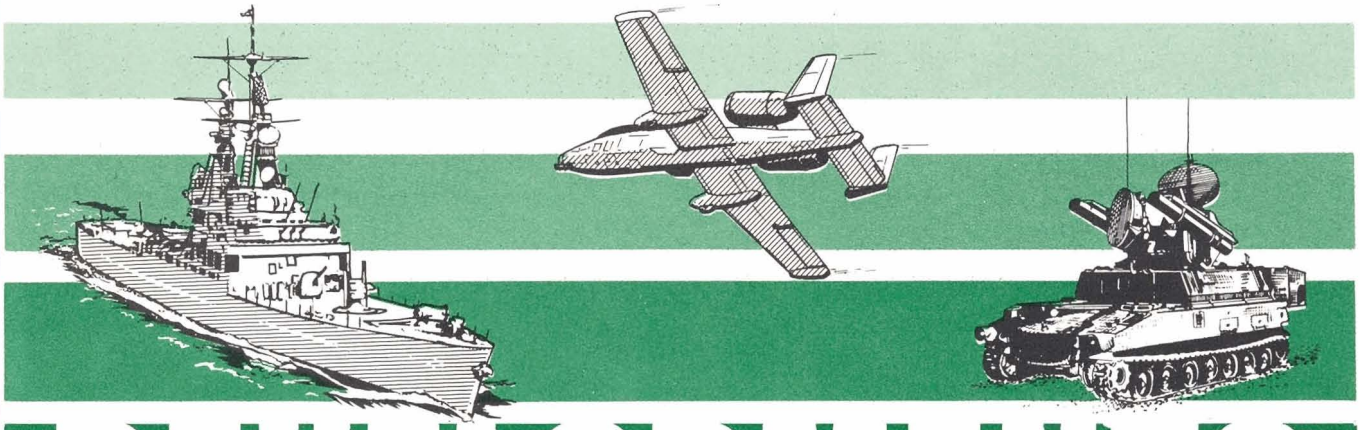
The first-hit capabilities of the system are good because of the high technology fire control components. The wheeled chassis is cost effective to operate and gives high mobility. Two outside mounted, 30-mm automatic guns have a rate of fire of 800 rounds per minute and are similar to the guns of the French AA tank AMX 13 DCA 30 and the Czechoslovakian AA tank M-1953. The rate of fire of the WILDCAT, however, is considerably higher.

The WILDCAT system is primarily intended for export.

— *Soldat und Technik*

Prototype of the AA system WILDCAT.





DEVELOPMENTS

HARRIER II DEBUT

The first vertical/short takeoff and landing AV8B Harrier II light-attack aircraft was recently unveiled by the McDonnell Douglas Corporation. The AV8B is an advanced version of the AV8A Harrier now in service with the US Marine Corps.

The new aircraft is a joint project between McDonnell Douglas and British Aerospace. The United States and Britain agreed, in a recent memorandum of understanding, to a coproduction program for the Harrier II. The British version of the aircraft is designated the GR Mark 5.

The Marine Corps will receive the first pilot production Harrier II in 1983 and proceed toward a 1985 initial operational capability. The Marine Corps plans to acquire 340 AV8Bs. The new aircraft will replace five squadrons of A4 Skyhawks and three squadrons of AV8A Harriers.

The GR Mark 5 Harriers are expected to be operational with the Royal Air Force by 1986.

Harrier II aircraft delivered to the Marine Corps will include improved engine inlets and redesigned nozzles, lift improvement devices, a new all-graphite composite supercritical wing, forward fuselage, horizontal stabilator and rudder, a new GAU12 25-mm gun, and leading-edge root extensions designed to increase the instantaneous turn rate by 4 degrees per second.

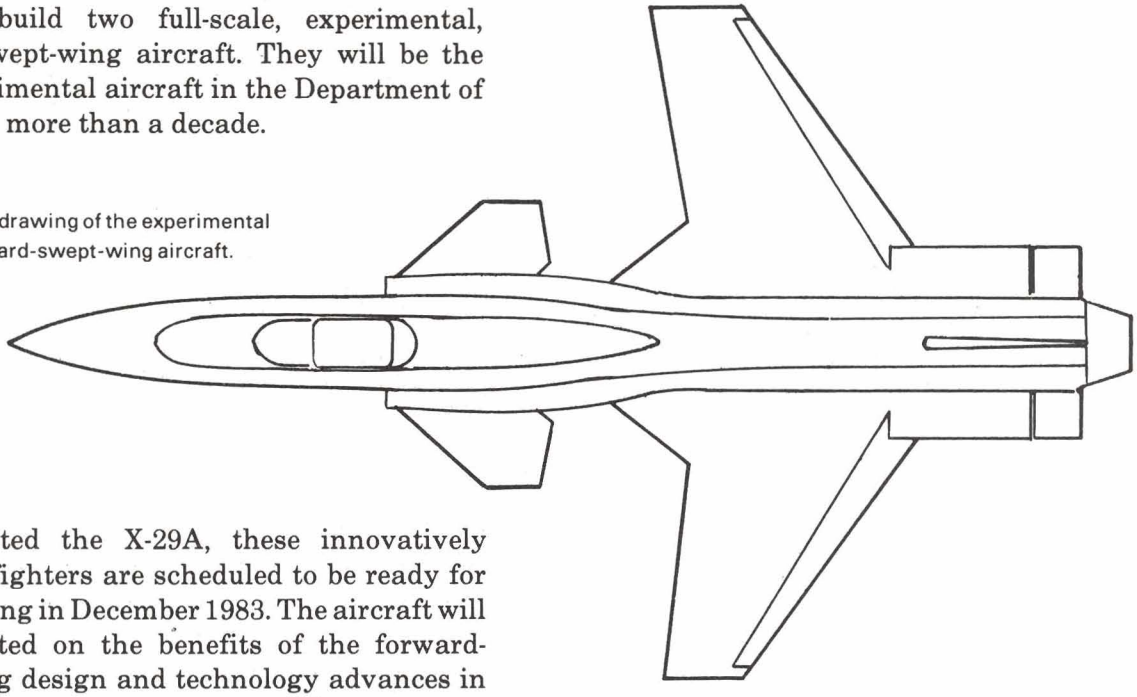
The GR Mark 5 will be equipped with a Martin-Baker ejection seat rather than the Marine Corps' Stencel ejection seat, a moving map display (in addition to the Marine's electronic display of data on a cathode ray tube), a thicker windscreen and inlet strengthening against bird strikes, a panoramic camera, and a British-built electronic countermeasures suite.

CONTRACT AWARDED FOR FORWARD-SWEPT-WING FIGHTER

Grumman Aerospace Corporation of New York was recently awarded a $71.3 million con-

Harrier II

tract to build two full-scale, experimental, forward-swept-wing aircraft. They will be the first experimental aircraft in the Department of Defense in more than a decade.



Line drawing of the experimental forward-swept-wing aircraft.

Designated the X-29A, these innovatively designed fighters are scheduled to be ready for flight testing in December 1983. The aircraft will be evaluated on the benefits of the forward-swept-wing design and technology advances in aerodynamics, structures, and flight controls. The flight test program will be conducted at Edwards Air Force Base, California, by NASA's Dryden Flight Research Facility.

Air Force officials say engineers have long known the advantages of forward-swept wings. They allow greater maneuverability at high speeds, improved slow-speed handling, and lower stall speeds.

The wings of the X-29A will have a span of 27 feet and sweep forward at a 30-degree angle to the fuselage. The wing skin will be of lightweight graphite epoxy composite materials, while the interior structure will be of conventional aluminum and titanium alloys.

Other X-29A features include two-dimensional exhaust nozzles, weapons carriage, an advanced cockpit, and a digital fly-by-wire flight control system. The variable camber trailing edge changes the wing shape to match flight conditions.

HUGHES DEVELOPS ANTITANK MISSILE

Hughes Aircraft Company is developing a new antitank missile system for the infantry that will have day and night operating capabilities and, once fired, will guide itself to the target.

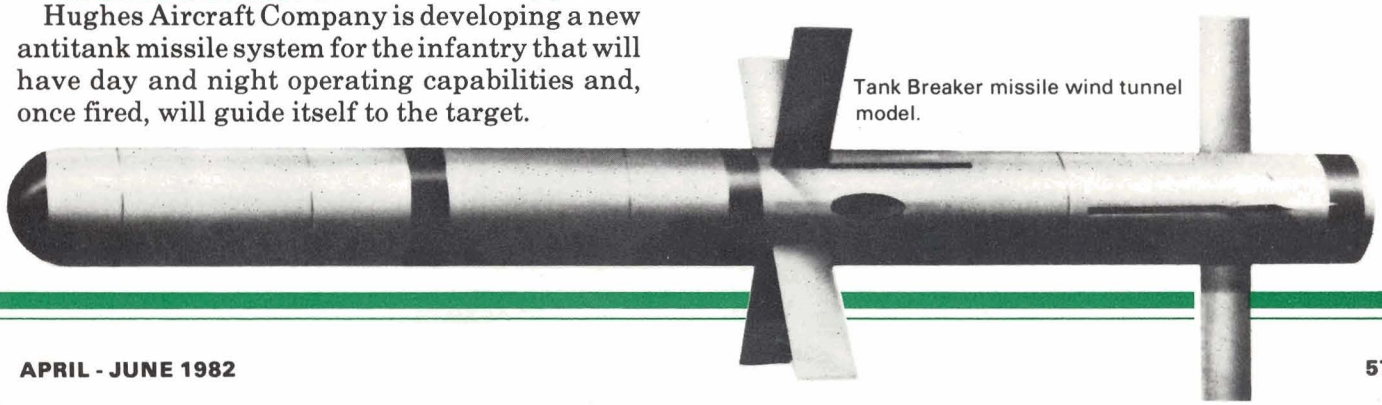
Called Tank Breaker, the new missile system is a manportable weapon that consists of a missile and launcher. It will be the first weapon system to use a focal plane array, an advanced infrared imaging sensor that offers significant reduction in size, cost, and complexity for tactical missile applications.

The focal plane array seeker will allow the gunner to acquire and lock onto a target and fire a missile in daylight or darkness and in fair or adverse weather.

Once the seeker is locked on the target and the missile is launched, the gunner will be able to seek safety immediately or to engage other targets, relying on the missile's "fire-and-forget" performance to guide the missile automatically to the target.

The Hughes missile will be 4 inches in diameter and 43 inches long. The complete system will weigh less than 35 pounds.

The missile's shaped-charge warhead will be capable of destroying the newest enemy armor, helicopters, low-performance airplanes, and field



Tank Breaker missile wind tunnel model.

fortifications. The guidance system will allow the gunner to choose whether to fly the missile along a line-of-sight trajectory or on a trajectory that will make a top-hit against the more vulnerable portions of a tank.

The missile will be packaged in a throwaway launcher. The reusable sighting and control assembly will be mated with the missile launcher prior to firing and then removed by the gunner after launch. No field testing or direct support will be required for battlefield employment.

NEW TRUCKS TO EXPAND ARMY'S TACTICAL FLEET

The Army's new 4X4 commercial utility cargo vehicle (CUCV) will expand the mobility of the tactical vehicle fleet and help ease a current truck shortage.

Planned for introduction late this year, the CUCVs will replace about 20 percent of the M151 ¼-ton trucks and all M880-series 1¼-ton commercial trucks. The CUCV family of vehicles includes a ¾-ton utility truck and a 1¼-ton vehicle that can be used as a cargo truck or an ambulance.

The CUCV features a diesel engine, automatic transmission, and power steering. Payload capacity will range from 1,200 to 2,900 pounds with a cruising range of 250 miles. Various kits will allow soldiers to adapt the new vehicles for specific military applications.

LOCKHEED DESIGNS HYPERVELOCITY MISSILE

The Air Force recently awarded Lockheed Missiles and Space Company one of two contracts to demonstrate technology for hypervelocity missiles (HVM) capable of destroying any tank likely to be developed during the next 20 years.

The new technology will allow a fighter aircraft to launch multiple laser-guided missiles at separate targets. Up to 40 HVMs will be mounted in two carriers aboard tactical aircraft such as A-10s or F-16s. Each missile will be approximately 80 inches long, 3.52 inches in diameter, and less than 50 pounds in weight.

The $13,976,240 contract was awarded by the Air Force Armament Division at Eglin Air Force Base, Florida. Lockheed plans to manufacture 25 missiles for ground-launch demonstrations.

LASER VISOR

Potentially blinding laser beams can be reflected by an experimental laser eye protection visor developed by Hughes Aircraft Company. Specialized diffraction optics techniques enable the visor to deflect wavelengths of light used in lasers without significantly reducing visibility.

The growing use of lasers in applications such as communications, range finding, target identification, and aircraft piloting has increased demand for eye protection without loss of natural vision.

The experimental visor was developed under a contract from the US Navy's Air Development Center. The visor is designed to replace current devices which use colored dyes to absorb laser beams, much as dark glasses reduce the intensity of bright sunlight. Dyes, however, reduce visibility and can cause distracting discoloration.

The experimental visor, shown in the photograph on a mannequin, is produced in separate segments. Production units would be constructed in one piece for mounting on an aircrewman's helmet. The visor also could be produced as an eye protection goggle for ground personnel.

Experimental protective visor deflects laser beams.

THE EAGLES OF MITSUBISHI,
by Jiro Horikoshi,
University of Washington Press, Seattle, Washington, 1981. 176 pages, $18.95.

The birth of the Zero fighter marked the beginning of a new era in naval aviation. Because of its extraordinary maneuverability and range, the Zero quickly established itself as the world's finest carrier-based fighter. It led the attack on Pearl Harbor and dominated the Pacific in the early days of World War II. For a time it seemed invincible, and to many it symbolized Japan's conduct of the war.

This book is the complete story of the Zero as told by its chief designer, Dr. Jiro Horikoshi. It begins with a brief account of his early life and training as an aeronautical engineer. As war grew closer, Dr. Horikoshi and the Mitsubishi design staff were challenged to develop a "wonder" fighter — an aircraft with performance far exceeding that of any fighter previously built. He describes the joy of the first successful flight, the tragic deaths of two test pilots on subsequent flights, and the constant intense efforts of the design team to improve the aircraft.

When the Zero finally entered combat over China in August 1940, it blasted all opposition from the skies. Because US authorities discounted early reports on the Zero, its appearance over Pearl Harbor came as a complete surprise.

One reason the success of the Zero in Mandarin skies was discounted was because Westerners of the era deemed the Japanese incapable of producing anything but shoddy imitations of Western products, a bias that continued long after the war and left Americans shocked at Japan's post-war dominance of the electronics and automobile industries. Dr. Horikoshi, however, discredits attempts to brand the Zero a superior imitation of Western designs rather than the unique aircraft it really was by detailing the creation of the many improvisations that gave the warplane its range and maneuverability.

In the later stages of the war, the Zero was forced into a defensive posture for which it was not suited. New US fighters were introduced into combat and Japanese resources were badly depleted. Dr. Horikoshi tells of his initial opposition to the war, his complete dedication to his homeland's struggle during the war, and of the painful surrender that followed the bombing of Hiroshima.

The book is both the saga of the development and performance of a warplane and a personal account of how a famous aircraft designer went about his task. For Americans, especially those old enough to remember when the rising sun emblazoned on the fuselage of Zeros symbolized the sweep of Japanese forces across the South Pacific, the early chapters of the book make painful reading. Thanks to the Zero's superior design, most of the early fighter aces were Japanese. The temptation to skip to succeeding chapters, which tell of the turn of the tide at the Battle of Midway, should be withstood, for *The Eagles of Mitsubishi* is a compelling tale told through the eyes of a former enemy.

MILITARY AIRCRAFT OF THE WORLD,
by Chris Chant,
Presidio Press, Novato, California, 1981. 224 pages, $17.95.

Do you know what a Fighting Falcon is? How about a Pucara? Or if you're really into aerospace esoterica, what modern aircraft are powered by twin Ishikawajima-Harima afterburning turbofans? These questions are readily handled by *Military Aircraft of the World.*

This book is cloth bound and contains 40 large 3-view color plates, 150 color profiles, 40 color photographs, and 110 diagrams. These illustrations are of extremely good quality, fine detail, and true to camouflage and national markings. *Military Aircraft of the World* covers some 180 of the major military aircraft in service with the air forces of today. The major powers have introduced several new combat aircraft of great potential and brought older types up to the latest standards with new variants of increased weapon lethality and electronic sophistication.

The text details the origins, history, and variants, followed by a full technical specification of each aircraft. The reader is provided with a readily understood guide to aircraft which play a decisive part in the affairs that shape the world.

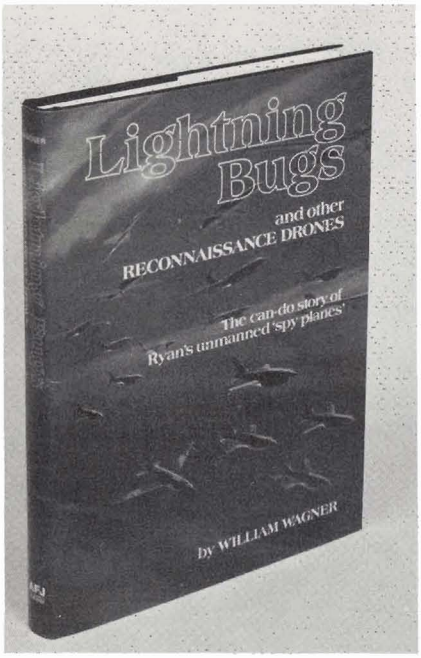
SOVIET MILITARY AIRCRAFT,
by Bill Sweetman,
Presidio Press, Novato, California, 1981. 207 pages, $17.95.

The same fine quality of graphics and informative text is exhibited in *Soviet Military Aircraft* as in *Military Aircraft of the World* by the same publisher (see above). This aircraft guide is cloth bound and contains 15 large 3-view color plates, 55 color profiles, 200 diagrams, 5 highly detailed cutaways, and 110 photographs. *Soviet Mil-*

itary Aircraft covers every major development of the Antonov, Ilyushin, Mikoyan-Gurevich, Mil, Sukhoi, Tupolev, and Yakovlev organizations plus the export variants and those models manufactured in other nations.

This book is unique because it successfully attempts to break through the thick fog of secrecy normally surrounding descriptions of Soviet aircraft. This is done through the use of rare and specially prepared photographs and illustrations from Eastern and Western sources. Of particular interest is the coverage of early developments, conducted by the Ramenskoye test establishment, of the RAM-J, -K and -L aircraft.

LIGHTNING BUGS AND OTHER RECONNAISSANCE DRONES,
by William Wagner,
Aero Publishers, Inc., Fallbrook, California, 1982. 240 pages, $18.95.



This book is the story of the men who spawned remotely piloted vehicle (RPV) technology and who overcame bureaucratic inertia and scores of skeptics to turn a controversial concept into an operational reality. Their idea was simple: to take the cockpit out of the airplane so the plane could fly an unmanned, intelligence-gathering mission whose flight path could either be preprogramed or varied by remote control. The result was reconnaissance drones which could fly missions at far less risk of life, cost, and political repercussion than manned overflight of heavily defended hostile territory.

The story begins in 1959, 3½ years after the US began overflying Russia in high-altitude U-2 spy planes but only 8 months before Francis Gary Powers was shot down during a photographic reconnaissance mission. The incident spurred RPV development which reached its zenith during the Vietnam conflict when drones flew 3,000 missions over North Vietnam, China, Laos, and Cambodia. In addition, RPVs were used to collect targeting data for the ROLLING THUNDER bombing campaign over North Vietnam, to help locate prisoner of war camps so American planes would not bomb our own airmen (it was an RPV photo that confirmed the existence and location of Son Tay prison 21 miles west of Hanoi), and to provide bomb damage assessments after attacks on heavily defended targets.

Drones were also used to ferret out electronic intelligence on Soviet air defense systems protecting North Vietnam. The typical RPV flew 10 such missions before it was finally shot down or failed. Air defense artillerymen will find other examples of ways RPVs can be used against air defense systems instructive. In one photographic sequence, a drone unleashes a Maverick electro-optical seeking missile that destroys an obsolete radar control van meant to simulate a Soviet surface-to-air missile site.

The book's publication is especially timely since US drone production has virtually ground to a halt. The contractor that manufactured the drones Wagner writes about has only its original target drone in production.

"Sheer institutional bias is another reason that RPVs have been in a state of operational limbo since the Vietnam War wound down," complains Armed Forces Journal editor Benjamin F. Schemmer in the book's preface. "During a decade when stunning technical advances in microelectronics, jam-resistant and secure data links, miniaturized sensors, and all-weather guidance, control and recovery systems have removed the major technological barriers to exploiting unmanned vehicles for what otherwise would be high-risk missions by piloted aircraft — at a time when similar advances in air defense technology have increased the risk of overflying hostile terrain — the Pentagon's enthusiam for RPVs has languished."

The 240-page hardcover edition of *Lightning Bugs* contains design drawings, maps, and 265 photographs, many of which were taken during missions that produced air-to-air encounters with MiGs, SAMs, and antiaircraft fire. In one sequence, photos taken by a drone show a SAM which had been launched against the RPV passing through the full sweep of the camera, then blowing up in front of the RPV's flight path. The drone survived.

Lightning Bugs contains human as well as technological triumphs. One American PW recounts how the appearance of drones brought hope to a prisoner of war camp presided over by a calloused guard named "Boris." "The last flight we saw was about January 1972, and it was indeed impressive as it virtually duplicated one we had seen in May," PW Cdr Edward H. Martin recalled. "This drone flew directly over the camp at an unusually low altitude. It split the prison compound right down the center and flew off to the southwest. We believe it did a 180-degree turn, because shortly afterward a drone returned from that direction and came back over, again splitting the camp right down the middle. We were waving and shouting to it as was customary because we always did what we could to let our presence there be known.

"We'd soon be going home and the guards knew it. By then we knew just how far we could push them. It

was then we told Boris that he was on candid camera and had better smile the next time so we'd know what he looks like for future reference."

MILITARY AIRCRAFT OF THE WORLD,
by Gordon Swanborough,
Charles Scribner's Sons, New York, 1982. 226 pages, $16.95.

The new edition of *Military Aircraft of the World* has been thoroughly revised to encompass changes within the inventories of the world's air forces. Not one major new type of aircraft has emerged since the 1979 edition was published and a number of older aircraft have been phased out of front-line service. However, a number of new models — like the Nimrod AEW3 and MR2 — have made their first flights. Others have entered service or taken on a new significance in the changing face of tactical or strategic necessities and development programs continue to stimulate interest and change in already firmly established front-line aircraft.

New photographs illustrate the increasing diversity of the roles played by each aircraft. The section on second-line aircraft has been expanded, especially in reference to civil types operated in a military guise. These changes make this edition a compact, up-to-date reference book which should prove an asset to air defense artillerymen.

VIETNAM ORDER OF BATTLE,
by Shelby L. Stanton,
U.S. News Books, Washington, DC, 1981. 416 pages, $49.95.

Vietnam Order of Battle is a complete, illustrated reference to US Army and Allied ground forces in Vietnam that GEN William C. Westmoreland called a "work of rare commemorative and historical value." This 416-page compendium covers the entire organization, structure, and operations of friendly ground forces in Vietnam from 1961 to 1973. A logbook of the movement of over 3.5 million fighting men, it documents every major army unit stationed in Vietnam and provides all the critical data about their tour of service, including official unit designation, unit function, arrival and departure dates, unit locations, authorized strength, previous station, and distinctive insignia.

Several topics not normally found in orders of battle have been included because of their relationship to the overall theme of this work. A US Army organization section has been added to familiarize the reader with the Army's structure and general mode of combat in Vietnam. A listing of selected major operations has been included within that section to place unit terms of service in historical perspective. Photographs of Army weapons, aircraft, vessels, vehicles, and transport and engineer equipment have been included to familiarize the reader with these items as they were used by their respective units. A section on Army Medal of Honor recipients has been included to illustrate the critical role of individual heroism in a war fought mainly at the small-unit level.

"The encyclopedic detail that the author has assembled is unequaled for any war in which the United States Army has engaged," writes General Westmoreland in the volume's foreword. "For example, although the Army has published a prodigious multivolume official history of World War II, there is no comparable order of battle. To find the kind of material on World War II that the author has put together in convenient and visually exciting form on Vietnam, a researcher would have to turn to a multitude of yellowing documents in various depositories, if indeed he could ever locate the material at all."

Vietnam Order of Battle includes more than two dozen strategic maps, a synopsis of major operations that begins with STARLIGHT in 1965 and ends with LAM SON in 1971, a breakdown of US casualties by states, and details you would never expect to find in official histories. For example, the full-color collection of more than 400 distinctive insignia includes unauthorized emblems such as the skull, serpent, and parachute insignia worn by Recon Team Anaconda and the dragon patch of Battery A, 4th Battalion, 77th Artillery, as well as authorized insignia. There's also an appendix of military terms, abbreviations, and troop slang used in Vietnam. "Rock 'n' roll" meant fully automatic fire and a "turtle" was one's replacement, so named because it seemed like forever until he arrived.

Author Stanton served 6 years as an infantry officer during the Vietnam conflict with the 3d Brigade of the 82d Airborne Division, the 5th Special Forces Group, the 20th Combat Engineer Group, and as an Airborne Ranger Special Forces advisor. He is chief Vietnam editor for the *International Military Encyclopedia* and contributing editor to the military periodicals *Fire and Movement* and *Grenadier*. He has published articles in *Strategy and Tactics, Soldier of Fortune,* and *AFV-G2*. He has award-winning research credits in several military simulation designs, notably GDW's *White Death,* (The Russian Battle of Velikiye Luki, 1943), and *Road to the Rhine* (the 1944 Allied thrust into Germany).

Vietnam Order of Battle is an indispensable research tool that provides a complete and factual record of a unique war for veterans, military enthusiasts, researchers, modelers, teachers, and historians.

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