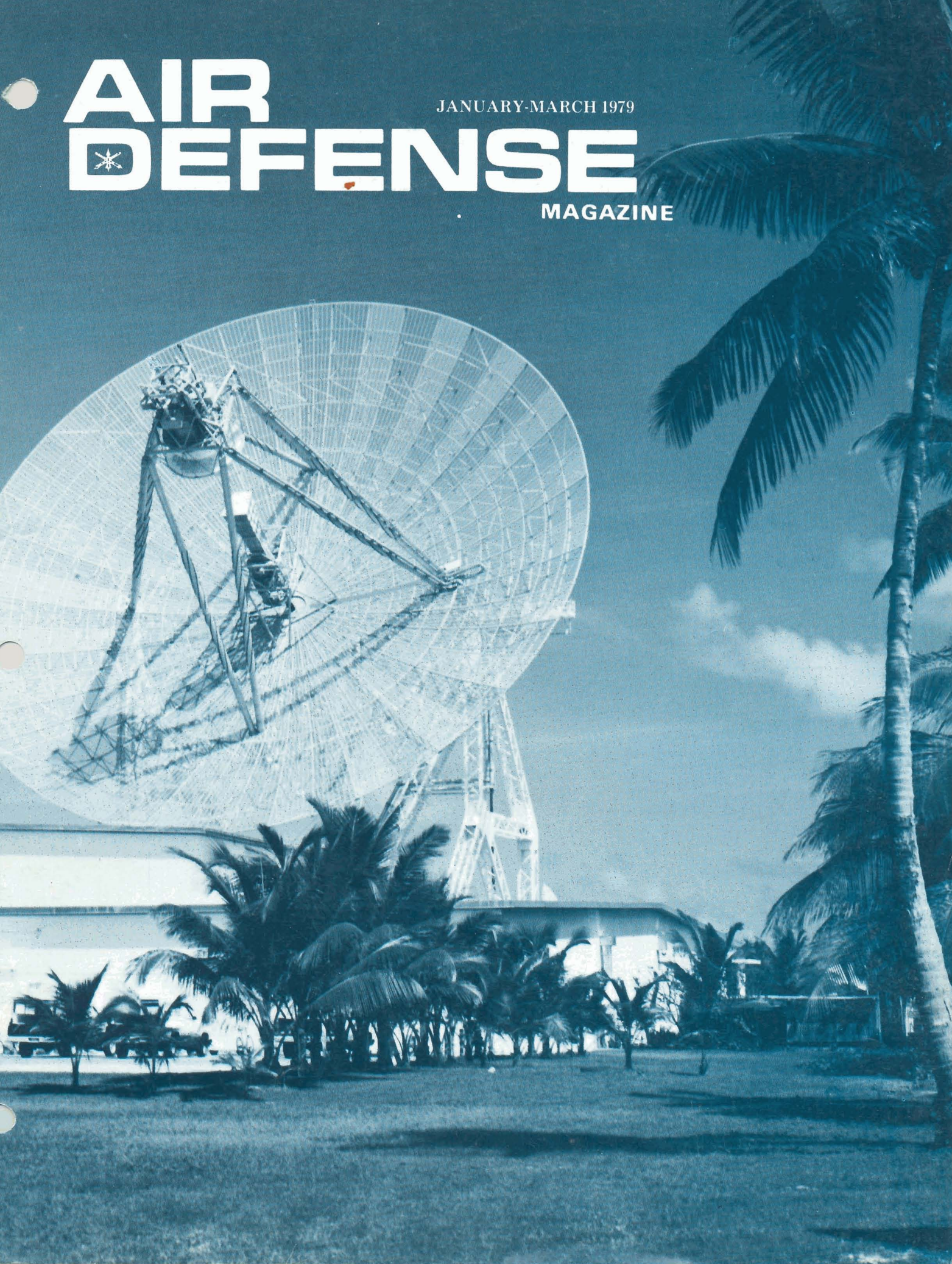
AIR DEFENSE MAGAZINE

JANUARY-MARCH 1979



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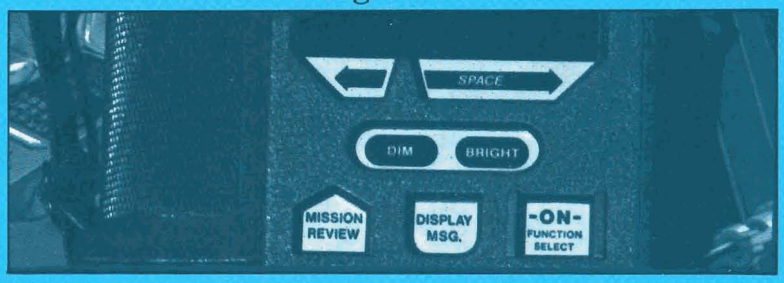

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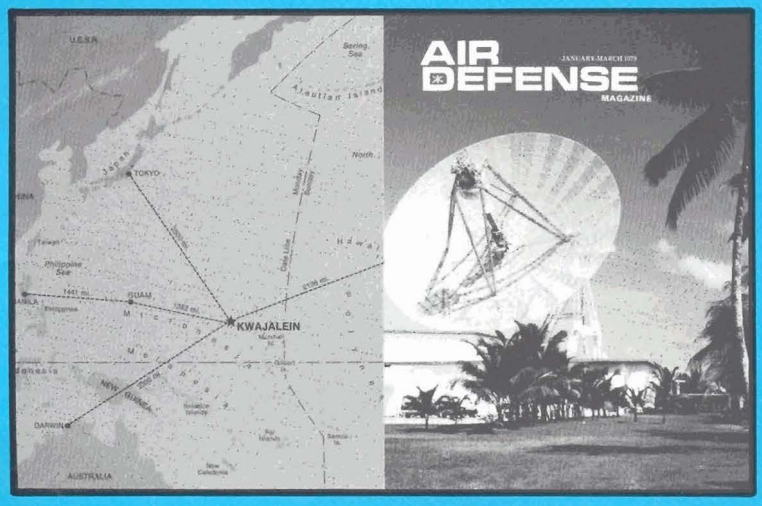

COVER: The picture on the front is of the Long-Range Tracking and Instrumentation Radar (ALTAIR) employed at the Kwajalein Missile Range (see page 6). The system, with its 150-foot diameter antenna, can record digital data simultaneously on as many as 14 targets. The map on the back shows where Kwajalein Island is situated in relation to surrounding islands and land masses.

NSE
MAGAZINE

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

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

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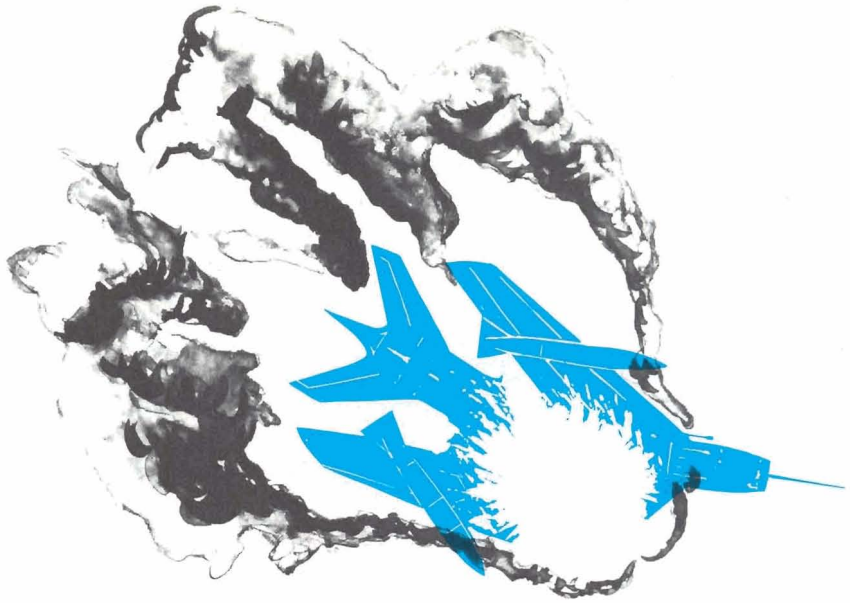
As of 1 Jan 1979.



INTERCEPT P

MAJOR GENERAL JOHN J. KOEHLER, JR.

I want to discuss an area of extreme importance to air defense artillerymen—"The Threat." As stated in earlier articles, air defense must furnish air protection to armor and infantry forces. The accomplishment of these tasks requires that we have the capability to engage the enemy air threat, regardless of its altitudes, speeds, or tactics.

Knowledge of an enemy is critical in defeating him. The most obvious threat facing the US today is the Soviet Union and the allied states of the Warsaw Pact.

Numerical superiority has long been ceded to the Warsaw Pact countries and historically this has been offset by two factors, superior US weapon systems and nuclear weapon superiority. Today, we see these two factors diminishing at an alarming rate. Sophistication of Soviet systems is improving in virtually every field. In fact, Soviet technological achievements in some areas of space science, ship building, and weapon development have actually surpassed that of the Western World. Additionally, nuclear parity has become a reality.

Of utmost concern to air defense has been the trend of air power from short-range, limited payload airframes to medium-/long-range aircraft with sophisticated weapon systems carrying large payloads.

These third generation airframes represent the greatest threat to our air defense forces today and in the future, so let's discuss a few of the aircraft you might have to engage as an air defender.

The most advanced aircraft in the Warsaw Pact inventory is probably the SU-19/FENCER. The FENCER is the first aircraft designed by the Soviet Union specifically for the ground attack role. It is a two-seat, twin-engine, supersonic aircraft capable of a combat radius of about 500 miles with maximum weapon load.

Another highly sophisticated aircraft is the MiG 27/FLOGGER D. This is the ground attack variant of the previously deployed air superiority fighter MiG 23/FLOGGER B. This aircraft carries a 23-mm Gatling-type gun under the fuselage, as well as an ordnance load up to at least 3,000 kg. This single-seat, variable-geometry-wing fighter bomber has a maximum speed of Mach 2.3 at optimum altitude.

The last of the newer ground attack aircraft of concern is the SU-17/FITTER C/D, a variant of an older aircraft, the SU-7/FITTER A. The FITTER C/Ds are characterized by improved avionics, increased range, increased payload, and faster speeds.

The tremendous advances made are seen in a comparison of the payload of the SU-7/FITTER A with the SU-17/FITTER C/D. The latter has an increase from 400 kg to about 4,000 kg, or a tenfold increase.

The Soviet Union has long been cognizant of the airplane's role in combat and, consequently, has invested more effort and resources in development and deployment of military aircraft than any other nation. For example, while the United States was involved in the Vietnam conflict, the Soviets produced 37 prototype aircraft and four new operational types.

One must not assume, however, that these are the only aircraft that can attack our ground forces. Virtually all of the Soviet Union's air interceptor aircraft, bombers, reconnaissance planes, and

trainers have the ability to carry ordnance that could be used to attack ground targets. Further, the Soviet Union discerned from American activities during the Vietnam war that the armed helicopter was an outstanding weapon system. As a result, they began strapping ordnance on their helicopters, as well as developing programs on new helicopter systems.

The result of the Soviet research and development was the MI-24/HIND A helicopter and its deployment to Group of Soviet Forces Germany in 1973. Since that time, the gap between Soviet and Western technology in this field has significantly narrowed. The HIND A has a three-man crew and can be armed with rockets, bombs, machinegun, and antitank guided missiles (ATGM). Further, the HIND A is a well-armored aircraft, which increases its survivability on the battlefield.

A newer variant of the HIND is the MI-24/HIND D. The HIND D has a different nose configuration with a chin pod beneath twin tandem bubble-type canopies. The chin pod has been equipped with a Gatling-type cannon in an effort to increase its offensive potential. Yet another armed helicopter an air defender must be aware of is the MI-8/HIP. Variants of this helicopter are considered to be among the most heavily armed helicopters in the world. An added point: the helicopters discussed have the capability to airlift troops as well as to perform as helicopter gunships.

We cannot overlook the improved capability of Soviet equipment based on improved training scenarios or technical achievements with laser-guided or optically-guided munitions in the battlefield of the future. The need to assess these capabilities to discover both negative and positive imbalances in potential enemy force structure, equipment, and training with an ability to counter these areas has never been more important to this country, the US Army, and Air Defense Artillery.

Clearly, the proposed TRADOC goals of providing for READINESS of the ARMY to fight, FIRE MODERNIZATION, and FORCE SUSTAINABILITY can be accomplished only by MANAGEMENT, including the requirement to know your enemy—The Threat.

It is only with this knowledge as a starting point that we can design and produce the necessary equipment, prepare the tactics and doctrine to employ the equipment and, finally, train the soldier in the employment of ADA materiel to win that all important first battle.

In summary, the last few years have seen the rapid build up by the Warsaw Pact of a huge air threat facing NATO. Not only do they have a massive numerical superiority in combat aircraft, they also have been closing the qualitative gap at an alarming rate. We, as air defenders, must be able to defeat this rapidly increasing air threat. I urge every air defender to expend the time and effort to become and remain knowledgeable of the threat posed by the Warsaw Pact nations.

John J Koehler Jr

ENGAGEMENT ZONE

letters to the editor

SUMMERTIME IN ALASKA

Dear Sir:

The past summer was busy and rewarding for the Nike Hercules missilemen of the 1st Battalion, 43d Air Defense Artillery, Alaskan Command. Preparation for and the performance of air defense exercises require a large amount of effort and extra dedication from the Alaska-based soldier who must contend with adverse weather conditions most of the year but still remain mission-prepared during the pleasant subarctic summers.

The season began with the successful completion of the NORAD Operational Evaluation (NOE), in which all phases of the battalion's combat-related operations were rated. Unofficial scores indicated that outstanding results were achieved in all air defense phases of the exercise.

July saw the 1ST Bn, 43d ADA, perform flawlessly during the Defense Nuclear Agency's Technical Standardization Inspection (TSI). The inspection team spent no less than 7 days grading performance and security procedures associated with the battalion's three firing batteries.

US Army Forces Command's Operational Readiness Evaluation (ORE) was conducted the first week of August and proved to be no less successful than the previous evaluations. All three battery launcher control areas were rated as superior, as were Bravo and Charlie batteries' fire control areas.

"Consistency in Excellence" describes the performances of the officers and men of the 1/43d during the battalion's recent air defense exercises and inspections. Last summer, as in the past, the Alaskan Missilemen could take pride in their mission accomplishment and year-round overall readiness.

DAVID C. KLINGER
CPT, ADA
Adjutant, 1st Bn, 43d ADA

A-10 EXPANSION

Dear Sir:

I am assigned as the Army Ground Liaison Officer to the 81st Tactical Fighter Wing. Presently, we are activating the first of six A-10 squadrons we shall have. Since the A-10 has been designed specifically for close air support of Army units, there is a great deal of interest on the Air Force side of the house in current events and trends in the Army. The aircrews and staff have seen my copy of your magazine and are greatly impressed with the broad range and timeliness of the topics. So much so, that I have been asked to see if I could obtain one copy per squadron.

To this end, I would like to know if it is possible to receive nine copies of each future issue. I would then be able to make distribution as follows:

One copy per squadron
One copy to Wing Headquarters
One copy to Wing Intelligence
One copy for my office.

RONALD G. ZOLA
CPT, GS
Ground Liaison Officer
81 TFW/DOOL
APO NY 09755

We are pleased to report that regulations authorize the distribution you have requested and applaud the team spirit you have displayed. We also appreciate your update on the outlook for the A-10.
— Ed.

FROM AN OLD FRIEND

Dear Sir:

I just got back from one of my frequent TDY trips and found the July-September AIR DE-

FENSE Magazine in my "IN" Box. This reminded me that I was going to write you a short letter after I had read the last edition. Now that I have read this edition, it further supports what I was going to write in the first place.

I think back to when I joined the Office of Doctrine Development, Literature, and Plans (now Directorate of Training Developments) at the US Army Air Defense School in early 1973, just before our STEADFAST reorganization, and what the AIR DEFENSE Magazine was then (Trends). I'm sure you remember our collection effort to get the magazines of the other branches, and when we compared ours with theirs we had an inferior product. Then we were tasked to give our publication the old "Madison Avenue look" (although I didn't have too much to do with it). It was at the same time that we were tasked to put together a new version of the Air Defense Artillery propaganda book, "Aim High," which I had a little more to do with. What is the bottom line of all this reminiscence? You should be extremely proud of what you are putting to press each quarter. Without a doubt we are competitive with anybody and better than most. I'm sure that this succession of a better product with each edition has been a tough chore for you and your staff, but it has been 5 years well spent. My sincere compliments for a job well done.

SIDNEY E. MASON
COL, ADA
USAREUR LO to USAFE

SEEKING LOST SOULS

Pursuing a consciencious paid subscription policy is difficult because of people becoming "lost." We want all subscribers to receive their magazine, and right now we'd like to know the whereabouts of:

H. A. Falk, III	Mike Thomas
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Kevin Gallagher	Robert E. Lee
LTC Poe Collini	SGM Rothenstein

Someone please let us know where these people are so we can send them the magazines we've been saving since they moved.

LET'S HEAR FROM THE REDEYE PEOPLE

We'd like to get an informal "Yes" or "No" from platoon or section leaders, or anyone else involved with Redeye, to this question: Are you getting copies of AIR DEFENSE Magazine regularly? Simply send a note to: The Editor, AIR DEFENSE Magazine, US Army Air Defense School, ATSA-TD-LITS, Fort Bliss, Texas 79916. Your cooperation in this research effort will enable us to take action to get the magazine to our very important Redeye personnel.

THREE NEW ADA GENERALS

Included in the recent announcement of colonels selected for promotion to the rank of brigadier general were the following Air Defense Artillery officers:

■ Colonel James R. DeMoss—Colonel DeMoss is currently Commander of The School Brigade, US Army Air Defense School. Prior to taking command of the Brigade, he was TRADOC System Manager for the DIVAD Gun system under the first charter to be granted.

■ Colonel Johnie Forte, Jr.—Colonel Forte has been Commander of the 108th Air Defense Artillery Group in Kaiserslautern, Germany, since August 1977. His previous assignment was USAREUR and 7th Army Liaison Officer with the US Army Liaison Group in Heidelberg, Germany.

■ Colonel Victor J. Hugo, Jr.—Colonel Hugo has been a member of the Deputy Chief of Staff for Personnel Special Review Board, Office of the Deputy Chief of Staff For Personnel, DA, since November 1978. Formerly, he was Deputy Director of Army Staff, Office of the Chief of Staff, US Army.

LTG DEWITT C. SMITH, JR.

In the October-December 1978 issue of AIR DEFENSE Magazine, we published the article, "Training—A Principal Army Mission," submitted by Lieutenant General Smith while he was Deputy Chief of Staff for Personnel, Headquarters, Department of the Army. We would like to report that by the time the article was printed, he had retired from the Army and accepted active duty in a lower grade in the distinguished position of Commandant of the US Army War College, Carlisle Barracks, Pennsylvania.

CREDITS

We want to credit Ralph Prince, SP5 Joseph Adams, James Millender, Manuel Martinez, and Manuel Onchondo for their contributions to the artwork appearing in this issue of AD Magazine.

Kwajalein is the southernmost island in the Kwajalein Atoll and is the location of the Kwajalein Missile Range Headquarters. With a surface area of 1.2 square miles, it is one of the three largest islands of the nearly 100 islands existing along the reef encircling the Kwajalein Lagoon.

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Lieutenant Colonel M

The US Ballistic Missile Defense (BMD) R&D Program did not end with the deactivation of the Stanley R. Mickelson Safeguard Complex, North Dakota. The deactivation process was marked by the shutdown in February 1976 of the Safeguard missile site radar and remote launch sites followed by the subsequent conversion of the Safeguard perimeter acquisition radar (PAR) from an acquisition radar to an attack characterization radar. Deactivation was completed October 1977 with the transfer to the US Air Force of the Safeguard PAR and its redesignation as the Concrete Early Warning Missile Station. Despite the removal of this prominent BMD activity, this dynamic R&D program is a continuing technological effort to provide a hedge against the strategic uncertainties associated with the ballistic missile threat to the United States and to maintain the US leadership in BMD technology. BMD research and development are being pursued to achieve four specific goals in the fulfillment of these broad objectives.

First, to prevent future BMD technological surprise by the Soviets, aggressive research is being conducted into advanced new technologies that could tip the strategic balance. Second, promising technological advances are being integrated and tested within a BMD system framework in evolutionary system approach. This effort maintains for the US the option to develop and deploy rapidly the most effective BMD system permitted by technology at any future decision point. Third, by maintaining and providing a visible demonstration of BMD technological superiority over the Soviet Union, the US position in Strategic Arms Limitations negotiations is supported. And finally, support of our offensive deterrent forces and intelligence assessments is achieved through the conduct of broad research into BMD technologies so as to provide a basis for understanding and interpreting Soviet BMD R&D activities and capabilities.

The US BMD R&D effort is accomplished jointly by the Army's BMD Systems Command and BMD Advanced Technology Center, both located in Huntsville, Alabama. MG Stewart C. Meyer provides overall program direction as the BMD Program Manager reporting to the Army Chief of Staff. General Meyer has the additional responsibility of National Range Commander, Kwajalein Missile Range and, in this capacity, is responsible for the operation of this national

e ISTIC ILE RESEARCH d PMENT RAM

The TPQ-18 radar, a C-band tracking radar, tracks the beacon on one of the three reentry vehicles reentering the atmosphere at dusk enroute to an impact in the Kwajalein Lagoon. This reentry ends a flight begun with a missile launch from Vandenberg Air Force Base, California, some 4,200 nautical miles away.

artin G. Olson

range—the site of virtually all BMD major field testing. The more than $250 million per year R&D effort is comprised of two complementary program elements—the Advanced Technology Program (ATP) and the Systems Technology Program (STP). The ATP generally is designed to advance BMD-relevant technologies to a level of maturity suitable for integration into a system as well as to explore potentially revolutionary systems concepts. The STP integrates those technologies that are suitable for transition to systems applications into a systems context. It then validates the integrated technologies through high fidelity simulations and/or laboratory and field testing.

More specifically, the BMD Advanced Technology Program is the primary means of maintaining US leadership in BMD technology. This vigorous, broadly based research effort is aimed at advancing the technology of all BMD components, and research is pursued in the six major areas of data processing, discrimination, missile, optics, radar, and technology analysis. The program's research efforts are certainly designed to continue advancements in the capability of traditional BMD technology concerned primarily with the reentry phase of the ICBM's flight. However, of great importance within the ATP is that considerable research actively conducted to identify and investigate new components and techniques that offer a potential for revolutionizing ballistic missile defense. The Soviet threat's increasing quantity and quality are the incentives to seriously pursue advanced and innovative technological BMD solutions that can extend the BMD engagement into the midcourse and boost phases of the ICBM trajectory. To accomplish these objectives, interdependent technologies must advance at an even pace, i.e., data processing techniques must be evolved to keep pace with advanced sensors. Accordingly, several high-thrust areas are being pursued as a complementary cluster of related technologies. Present high-thrust areas are exoatmospheric interceptors, high-frequency radars, nonnuclear kill, and directed energy weapons. The basic character of the ATP is to place a strong emphasis on transferring mature technologies into the Systems Technology Program and to concentrate on the more advanced and innovative technologies.

On the other hand, the Systems Technology Program's primary objectives are to validate technologies developed in the ATP and to reduce the risk of incorporating these technologies into a sys-

tems concept. While the STP, in concert with the ATP, supports the design of offensive forces, the preparation of intelligence estimates, and the US position in Strategic Arms Limitations negotiations, the STP emphasizes technology as a hedge against the strategic uncertainties of the ballistic missile threat facing our offensive retaliatory forces. The STP products of validated technologies and developed systems concepts represent the primary source of a deployment, if required. To accomplish its purposes, the STP develops designs of new BMD systems by analyzing and incorporating the new technologies that have reached maturity in the ATP. The incorporation of new BMD components into a working system, or system integration, is accomplished by defining the required interfaces between components and by deriving the component control, system control, and operating logic and equations. Resolution of critical system issues and proof of systems' feasibilities are accomplished through high-fidelity simulations and field tests.

The primary objective of the STP effort of recent years has been the formulation of an evolutionary system concept for the defense of Minuteman and other high-value military targets. Terminal defense technology forms the base which is progressively upgraded by the integration of technologies emerging from the ATP. This progressive, evolutionary development concept is designed to avoid technological obsolescence, to provide continued reduction of system cost and improvement of system effectiveness by exploiting advancing technology, and to reduce deployment lead time for BMD system options.

A major FY 79 effort is the definition studies on the layered defense system (LDS). The heart of this new concept for Minuteman defense lies in a layered defense coverage. The system employs two tiers of intercepts—an exoatmospheric overlay and an endoatmospheric underlay tier. The basic idea of layering is not entirely new; the Safeguard system use of Spartan missiles for high-altitude, long-range intercepts and Sprint for low-altitude intercepts is an early example of this very concept. However, current technology now permits the use of an overlay, that first "filter" of a truly layered defense featuring missiles reaching out far into the ICBM's mid-course regime. The defense's underlay portion employs Sprint-like, high-acceleration, high-velocity interceptors coupled with high-technology radars and a new sensor. This new system concept is not as brittle (that is, subject to be destroyed by direct attack) as were the Safeguard/Site Defense terminal defenses because it is shielded by the high-altitude overlay and bolstered by new technology.

This layered defense concept has several strong advantages. It can protect Minuteman or silo-based MX missiles against a large number of Soviet reentry vehicles at an estimated cost considerably less than that of a comparable capability Terminal Defense system. It has the potential to combat sophisticated MIRVs and various penetration aids that could have defeated Safeguard and severely stressed Site Defense. And finally, it has the flexibility to defend other high-value military targets, such as command and control facilities or SAC bases.

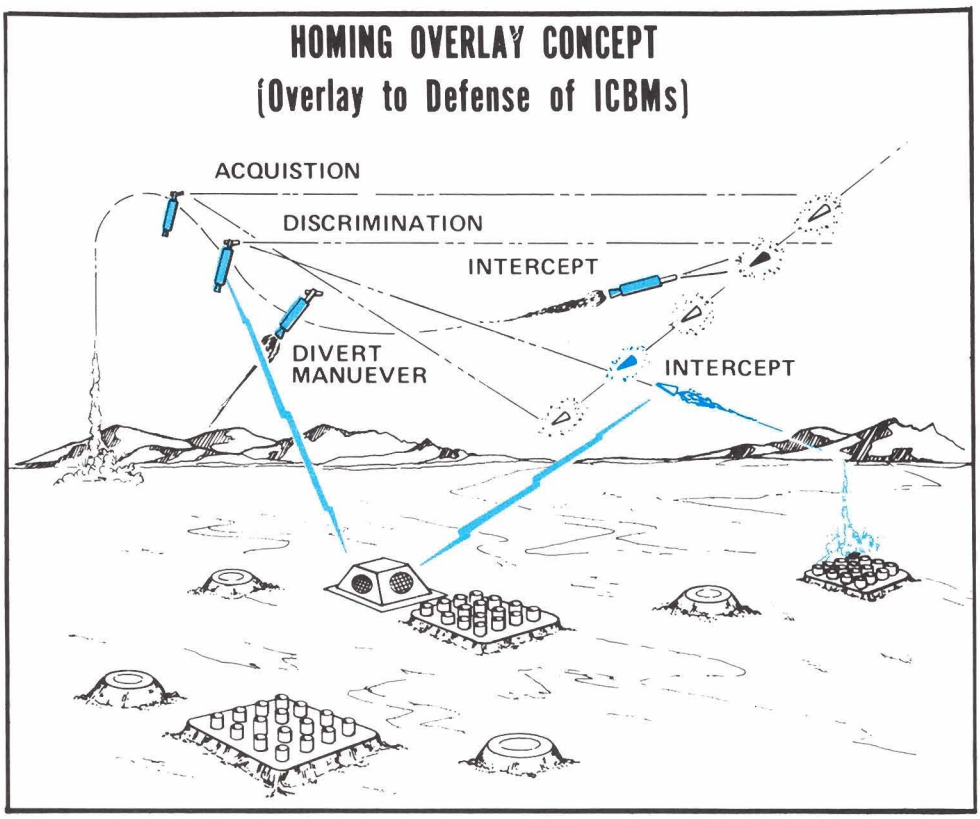
Although the complimentary characteristics of the two portions composing the layered defense concept cooperatively produce a strong defensive capability, it should not be overlooked that, for given tactical situations, acceptable area coverage and resilience to a wide variety of threats may be provided by the overlay system alone. Considerations making this approach feasible include threat type and size, acceptable leakage levels, available deployment time, defended area size, and developed layered system efficiency.

Throughout the STP, technological innovations are emphasized to produce cost-effective system designs responsive to the evolving threats. The real key to the lower cost of LDS and its improved effectiveness is its lower system "leakage." "Leakage" refers to the percentage of the total number of threatening objects that attack the defended area and penetrate the defense. The lower leakage translates directly into substantial reductions with resultant lower system costs in the amount of equipment required to do a given job. The layered defense concept also allows a major reduction in the required number of defensive nuclear warheads (and an associated reduction in critical nuclear materiels requirements, nuclear-effected environment, and security requirements) as a result of employing nonnuclear homing overlay interceptors.

The Layered Defense System not only provides equivalent system effectiveness at lower cost, but it also provides a new resilience against sophisticated MIRVs and penetration aids through its combination of sensors. As the discrimination function is performed on different principles by different sensors, their combined effectiveness is far superior to either the radar or optical sensor operating alone. Penetration aids specifically designed to counter one type of sensor are easily handled by another. The already sizeable design problems for penetration aids are compounded enormously when a potential attacker attempts to develop penetration aids effective against several sensor types simultaneously.

A flight experiment program is being designed to validate key technological issues associated with the overlay. A 7-month study by three major contractors to define the configuration of an experimental interceptor and the management and technical efforts required to develop it was completed in August 1978. At that time, the Ballistic

Missile Defense Systems Command announced the award of a $118.4 million contract to Lockheed Missiles and Space Company, Inc., Sunnyvale, California, to design and conduct the homing overlay equipment (HOE) for the System Technology Program. This contract calls for Lockheed to resolve key issues involved in developing a ground-launched interceptor missile to locate and "kill" attacking ICBMs above the atmosphere.



The artist's concept on page 9 shows how the experimental interceptor could reduce the stress of an attack for a BMD system designed to function at a lower altitude. This "layered defense" concept shows the interceptor acting as an "overlay" to a hypothetical BMD system designed to defend fixed-base ICBMs. It is launched from the ground to high altitude and uses its own long-wave infrared sensor and computer to locate the group of attacking missiles (acquisition), determine which among them is a real warhead (discrimination), home on its chosen target (divert maneuver) and, using a nonnuclear warhead, destroy it (intercept). The lower altitude system or "underlay" would then have to contend only with those missiles penetrating the overlay. The 5-year program includes four flight tests at Kwajalein Missile Range in the Pacific and an option for two additional flight tests.

Complementary and supportive FY 79 efforts will also be conducted to upgrade elements of the Terminal Defense or underlay system. Key technology issues of real-time bulk filtering and discrimination are rapidly approaching resolution. The primary source of the needed test data is the System Technology Test Facility (STTF) at Kwajalein Missile Range. This facility, comprised of a phased-array radar, data processor, and real-time test software, became operational in June 1977. A very successful system integration test program, including tests employing targets from planned USAF ICBM missions impacting in the KMR area, was completed in September 1977. Additional data relative to real-time bulk filtering and discrimination continue to be collected at the STTF from targets of opportunity.

Experimental efforts are underway in the areas of an advanced digital signal processor (ADSP), which is part of the radar; the data processing subsystem; and an optical adjunct sensor system. These efforts are part of an overall effort to maintain the Terminal Defense system capability to combat the evolving threat and minimize system costs. The ADSP will increase radar efficiency and versatility and is a device initially developed by the ATP. Experiments with ADSP-equipped systems are now being prepared. Several advanced commercial computer systems and several distributed data processor configurations will be investigated; and those selected will be tested in the System Simulation Center at Huntington Beach, California. These data processing-related efforts presently underway will continue through FY 79 and are needed to increase the computer throughput in keeping with the increasing threat. During this same period, planned STP efforts will be pursued that include limited investigation of low-altitude defense, which in turn includes consideration of rapidly deployable interim defenses. This low-altitude defense concept is a concept which employs small interceptors and sensors and, although it is being examined primarily for defense of mobile MX, has application as a possible underlay system. The rapidly deployable, interim defense concepts include a number of unconventional approaches with limited defensive capabilities, attractive because of their potentially low costs and short deployment lead times.

While not funded as a part of the US BMD Research and Development Program nor an asset dedicated solely to support of the BMD program, the Kwajalein Missile Range plays a vital role in

The roof-mounted TRADEX radar can track up to six targets simultaneously. The ALCOR (foreground) is a high-power, narrow-beam, coherent, chirped C-band, monopulse tracking radar with exceptional range resolution of one-half meter.

data collection necessary to investigate key technology issues and field testing required to verify successful system integration and effectiveness. This national range is the major test range for our strategic missile force, both offensive and defensive. Nowhere else in the free world exists such an assemblage of sophisticated, highly accurate sensors producing the ultra-high quality data essential to operational testing of deployed strategic offensive missile systems as well as to the successful development of new generations (e.g., MX and TRIDENT II) of missile systems. Furthermore, since virtually all ICBM's impacting at KMR serve both the offensive and defensive communities for data collection, this national asset provides a unique environment and opportunity for coordination and cooperation between the offensive and defensive technical communities.

Major FY 79 test programs at KMR include:

■ Advanced ballistic reentry systems (ABRES) tests of RV materiel characteristics, penetration aids, arming and fuzing technology, and maneuvering RV design conducted by the USAF Space and Missile Systems Organization (SAMSO).

■ Minuteman development tests also conducted by the USAF Space and Missile Organization (SAMSO) of Special Test Missiles and Production Verification Missiles to evaluate modifications and improvements in the Air Force reentry systems.

■ Strategic Air Command (SAC) tests of Minuteman II and III missiles to provide training for SAC crews and evaluation of weapon system performance. Selected test vehicles have additional data requirements in support of offensive system development objectives.

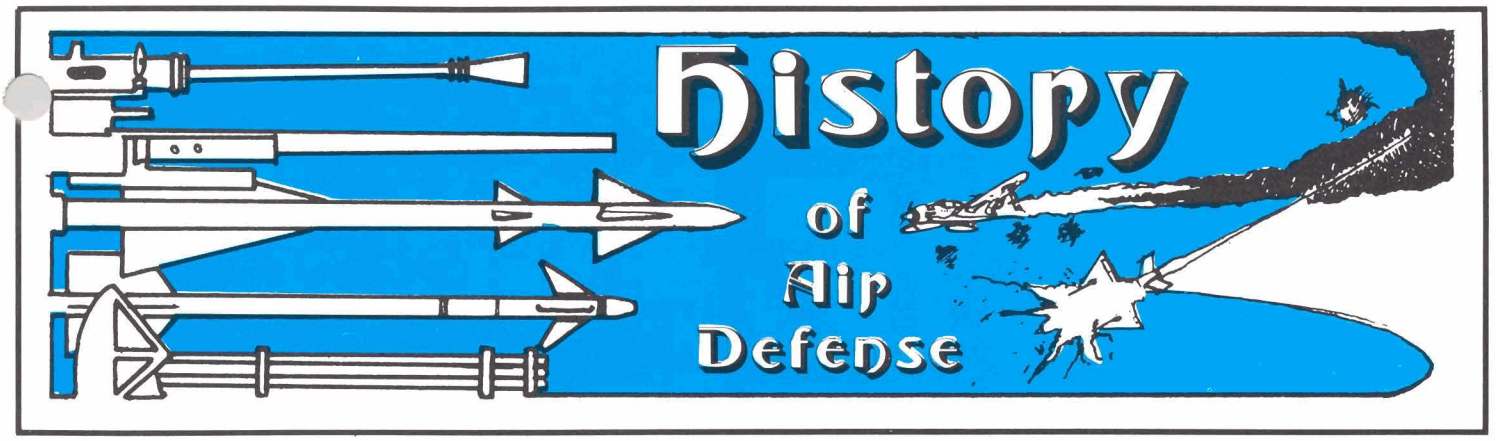
■ Designation and Discrimination Engineering Programs conducted by the BMD Advanced Technology Center using the Kiernan Reentry Measurement Site (KREMS) radars (TRADEX, ALTAIR, and ALCOR) to obtain the primary field data for identification of new discrimination techniques and to verify proposed techniques.

■ System Technology Test Facility operation by the BMD Systems Command to support evaluation of BMD components for potential application to future BMD systems.

In addition to these ongoing test and data collection activities, FY 79 will see the accomplishment of planning for future testing. The planning efforts will include MX development tests (at both components and system testing levels), TRIDENT II development tests, TRIDENT I systems operational testing, and testing to examine the technology required for nonnuclear kill of reentry vehicles.

To even the casual observer, the depth and variety of the BMD research and development efforts underway are formidable. These efforts are as vital to the development and testing of the strategic defensive systems, as well as the strategic offensive systems, as they are to the continued viability of our deterrent forces. Continued enhancement of design concepts and improvement of BMD component capabilities are essential just to keep pace with the evolving threat. The Congress recognizes the criticality of the BMD Research and Development Program and has directed that the ATP and STP FY 79 budgets be no lower than the FY 78 level in real purchasing power. This support by the Congress of this aggressive, comprehensive technological effort assures effective protection to the United States against the strategic uncertainties of ballistic missile threats and the maintenance of the US leadership in BMD technology.

Lieutenant Colonel Olson graduated from the University of North Dakota with a Bachelor's Degree in Electrical Engineering and is also a graduate of the Armed Forces Staff College. Prior to his current assignment as Deputy Commander, Kwajalein Missile Range, he activated and commanded the 1st Basic Combat Training Battalion, ADA BCT Brigade, Fort Bliss, Texas. He also served 39 months at the Stanley R. Mickelson Safeguard Complex, North Dakota, with the Safeguard System Evaluation Agency and 38 months at the US Army Advanced Ballistic Missile Defense Agency, Washington, DC.



Conclusion of Japanese antiaircraft tactics and techniques in World War II.

Some effort was made at the beginning of the war to coordinate the operations of antiaircraft and the fighters by means of restricted areas and altitude control, but this was more a matter of cooperation by commanders in the area than a coordinated effort from above.

Indirect liaison was maintained between the antiaircraft and Air Force at the various area Army information centers, where liaison officers from each service were always on duty. Also directed liaison was maintained at the antiaircraft division operations room (AAOR), where the Air Force units located in the immediate area kept a liaison officer on duty. Direct lines connected the division AAOR with the local airfields. Although flight plans were kept posted in the AAOR, no direct use was made of these in connection with controlling or restricting antiaircraft fire.

Air Force airdrome battalions were equipped with only a small number of antiaircraft machineguns and 20-mm automatic weapons, and coordination with any Army antiaircraft that might be in the area was limited to the selection of gun positions.

Except for the exchange of warning information, there was no coordination and little cooperation between Army and Navy antiaircraft. An example of the lack of cooperation was in the IFF equipment for identifying friendly airplanes, where the two services used different identification frequencies with the result that an Army plane could not be distinguished from an enemy plane by the Navy.

The purpose of the area Army information centers was to collect and evaluate air raid information and to disseminate intelligence. No effort was made to combine operators with intelligence functions in the operations center. The Air Force did not operate these establishments, nor was there any effort to control any of the means of air defense (fighters or antiaircraft) from them.

The area Army commander normally was present in the information center during the period of actual or threatened attacks. Present at all times were liaison officers from the Air Force and antiaircraft division which operated under the respective area army.

The strategic development of naval, shore-based antiaircraft was controlled by the Naval General Staff by making allocations to the various naval sectors. The General Staff established the sector or general priorities and delegated the responsibility for priorities within the sector to the Naval sector commander.

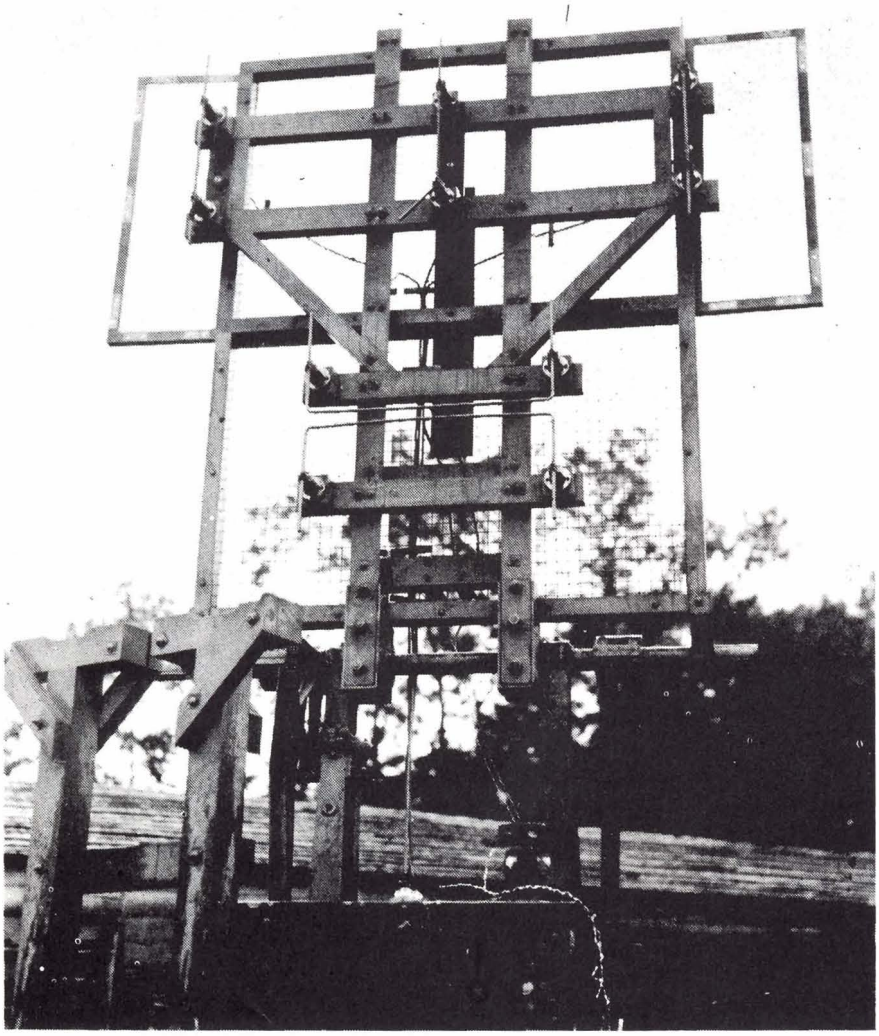
Naval shore-based antiaircraft was deployed to defend a number of small areas where Naval installations were located, rather than large areas of the home islands. The concept of concentration of weapons was used; this included guns, automatic weapons, and searchlights grouped in small units, all under the control of the battery commander. No overall planning agency, uniform doctrine, or centralized supervision over disposition or employment of naval antiaircraft ashore existed.

The major defense areas at the end of the war in order of priority were Kure, Yokosuka, and Sasebo. Within any area, defense priorities were uniform in that arsenals, supply depots, and airfields were given highest priority. In the Yokosuka area, for example, priorities were:

1. Hiratsuka Naval Arsenal.
2. Atsugi Naval Air Field.
3. Yokosuka Naval Yard, which included technical laboratories, supply depots, and a ship construction yard.
4. Oi and Fuji River bridges.

During the closing stages of the war, there were several instances where weapons were removed from harbor-locked ships and redeployed on shore. Three 120-mm rocket guns were removed from a carrier and two triple-turret 155-mm batteries dismounted from cruisers and mounted in the Sasebo and Kure defenses.

Each Naval sector maintained its own organization for local air defense. The organization in-



IFF (interrogator, friend or foe) antenna Tachi 17.

cluded fighter aircraft, antiaircraft, and early warning service, all of which were Naval.

The information center, as such (the fighter control center and the antiaircraft operations room), formed an integral unit. During air raids, the Naval sector commander, the air flotilla commander, and the antiaircraft defense commander were stationed at the center.

Information available to the Naval center was from early warning radars, antiaircraft searchlights, picket boats (to the extent that they were available), patrol aircraft, visual OPs (Naval), and the Army information center. Coverage was ample to afford reasonable warning: units usually had 20 minutes warning.

Radars were for the most part sited along the sea approaches. Locations were assigned by the Military Affairs Department, but terrain accessibility and the desires of the Naval sector commander governed to a large extent the location of Naval radar warning stations. Each station contained two or more radar sets. This facilitated continuity of operation and widened the sector of search. It also enabled following the various subdivisions of a formation which might split to attack different objectives.

Those stations close to the information center used wire communications; distant and island stations used radio. In the Sasebo area, radar stations located on islands some distance from the base had searchlights for identification purposes. Gun battery fire control radars were not integrated into the warning net.

The Ground Naval Force had two fleets of picket boats assigned that were under operational control of the Naval sectors but subject to specification of patrol area by the Ground Naval Force. Each fleet consisted of 60 boats that operated in groups of 20; one group patrolling, one en route, and one outfitting. The boats operated in pairs and maintained a spacing of 30 miles between pairs of boats stationed about 400 miles at sea. One boat in each pair had a Type 13 radar. The boats were gradually driven toward their bases, and many were sunk as the US fleet and air activity increased. Radio communications was maintained on an assigned wavelength with the information center.

No extensive use was made of patrol aircraft except in the Yokosuka and Sasebo areas where a screen extending 500 miles seaward was maintained almost to the close of the war. Radio communication was maintained with the information center.

In each of the largest defended areas, a limited number of Naval visual OPs was established to supplement the information from other sources. The Navy had no visual OPs manned by civilians and, in general, depended on the Army for landward warning. Consideration was given to direct reporting of civilian-manned spotting stations in the Army net to the Navy information center. In some isolated instances, this reporting procedure was established. Each searchlight battery and gun battery maintained air guards at the fire unit.

A complete communications net existed between Naval sector information centers. The primary method of communications was by radio and was

fairly reliable. The maximum daylight range was 600 miles, while at night 1,000 miles was obtainable. Routine traffic between bases used commercial wire lines. Operational wire lines between centers were Navy-installed-and-maintained cables. The reliability of long-distance telephone lines never exceeded 50 percent and was reduced gradually to 30 percent, as repair crews were inadequate to keep up with required maintenance. No telephone secrecy devices were used prior to July 1945 when very few were in operation.

Each Naval information center was linked to its nearest Army information center by radio and wire. There was no direct system of interbattery communications although limited interbattery communications was possible by relay through the information center. Battery fire control communications was primarily by wire and secondarily by voice tube or speaker system. Procedures for communications between sectors and between defended areas in a sector were established by the combined Naval forces. The information center utilized 250 men in 3 watch sections. Civilians were not employed in any Naval information center, although some consideration was given to the replacement of soldiers by women in some positions.

Initially, the Naval air force units in the sectors attempted to exercise operational control over Naval antiaircraft, but communications, with their own planes, was so uncertain that this had to be abandoned and control turned over to the antiaircraft defense commander. The antiaircraft commander decentralized to battery commanders the decision as to when fire should be restricted due to the presence of friendly fighters. Fire was supposed to be discontinued when friendly fighters engaged the hostile planes. The antiaircraft defense commander prescribed various conditions of readiness and alerted the batteries in accordance with the conditions of the moment. He also placed restrictions on ammunition expenditures. Target assignment, firing commands, operating ranges, and rates of fire were the prerogative of the battery commander, subject to standing operating procedures.

Coordination, with respect to the location of sites for Army and Navy early warning installations, was effected through the Military Affairs Department of the Imperial Staff. Hence, there was little coordination. The Army and Navy contested for the best radar locations and frequently established radar stations adjacent to each other.

The relative ineffectiveness of the Japanese antiaircraft defense of their homeland is clearly proven from a study of the results obtained in action against our B-29 raids. These data are from official records of the United States Strategic Air Force and include operations to the end of the war.

Summary of B-29 raids against land targets on the Japanese mainland:

1. Number of raids (less than 50 aircraft)	116
2. Number of raids (50-100 aircraft)	62
3. Number of raids (100-200 aircraft)	78
4. Number of raids (200-300 aircraft)	10
5. Number of raids (300-400 aircraft)	2
6. Number of raids (over 400 aircraft)	9
7. Total number of raids	277
8. Total number of sorties	27,261

9. Our B-29 losses exclusive of known operational losses were:

	Planes lost	Percent lost
a. Due to known antiaircraft action only	48	.176
b. Due to known enemy air action only	58	.213
c. Due to combined antiaircraft and air action	29	.106
d. Due to all known hostile actions a. b. c.	135	.495
e. Due to unknown causes (including operational)	79	.290
f. Due to all enemy action and unknown causes d. e.	214	.785

The above figures do not include planes which returned to base and were too badly damaged to be of further operational value. The percentages are based on total number of sorties.

The failure of the Japanese to provide a strong, efficient, coordinated air defense, including a well-trained, adequate antiaircraft arm equipped with weapons and fire control devices comparable to those used by Allied armies contributed materially to their loss of the war.

Japanese antiaircraft general officers interrogated at the end of the war expressed the belief that the inadequacy of their air defense was one of the chief factors in the early loss of the war. They felt that an effective air defense would have slowed our progress and retarded the deterioration and collapse of their homeland. This feeling is supported by a study of the losses they inflicted in comparison with the capabilities of our own antiaircraft. Our heavy bombers suffered a total loss due to known hostile action of less than 0.5 percent, of which 0.176 percent was due to antiaircraft fire only, 0.106 percent was due to combined fighter and antiaircraft action, and 0.213 percent was due to fighter action alone. A more efficient, antiaircraft fighter defense might well have made our early bombing attacks more difficult and greatly increased the cost to us. The advent of the atomic bomb opened up new fields in bombing operations.

32d AADCOM

31st ADA Brigade

111th ADA Brigade

WOMEN IN ADA

Captain Richard C. Lewis

CURRENT DEPARTMENT OF DE ASSIGNMENT OF WOMEN TO C INCREASING EFFECTS ON ADA U THEIR COMMANDERS,

The van, carrying a few new replacements, rolls into the battery admin area. The launcher crew gathers to welcome the newest member of its crew, PV2 J. Doe. To their surprise, J. Doe is not John Doe, but Jane Doe.

After the baggage is unloaded and PV2 Jane Doe is introduced to her crew; the platoon sergeant informs them that next week they will be getting a new battery commander, CPT S. Smith. PV2 Doe exclaims, "Yeah, I met Captain Smith during in-processing. Her first name's Sue."

This scene is being repeated with greater frequency in the Army, Navy, Marine Corps, and Air Force, and this article is intended to provide some general background regarding the increasing use of women in Air Defense Artillery. A short look at current policy and the methods used to determine what assignments are or should be open to women will be developed. Finally, the current status on opportunities and restrictions and the use of women in Air Defense Artillery will be discussed.

Two factors of US society are largely responsible for increasing employment of women in military occupations. First, women are assuming a greater role in the nation's work force. More than ever before, women constitute a larger and increasing proportion of this force. Secondly, during the early 1960s the birthrate in the US declined somewhat. As a result, fewer qualified males are available now for military service. The number of 18 year-old males in 1979 will be about 2.1 million, decreasing to about 2 million in 1983, and dropping even further to 1.7 million in 1988.[1] That means 10 years from now there will be about 300,000 fewer males entering the market for civilian and military jobs. The answer for civilian and military recruiters is the same. To meet future needs, they must actively recruit and provide more incentives for educated, qualified males or seek qualified females to do the job.

Historically, the composition of women in the military work force has been limited by legislation. The Women's Armed Forces Integration Act of 1948 limited women to 2 percent of the total number in the military force. Opportunities were restricted also. They were barred from advancement beyond lieutenant colonel and could not serve on combat ships or combat aircraft. During the Vietnam conflict, some of the restrictions were relaxed. Women currently make up 5.5 percent of the military force and all branches of the Armed Forces have had women promoted to general officer rank. As a result of a Federal district court decision, women can now voluntarily serve on combat-

Continued on page 42.

38th ADA Brigade

172d Inf Brigade (Alaska)
(Includes ADA)

11th ADA Group

WOMEN WHERE

Captain Susan P. Cheney

FENSE POLICY REGARDING OMBAT DUTIES WILL HAVE NITS AND ORGANIZATIONS, AND THE TROOPS.

Attitudes is defined by the dictionary as "a state of mind or feeling regarding some matter." The success or failure of any innovation depends largely on the attitudes of the people involved in implementation. As interdependent as people in the military community are, positive attitudes are vital components in any new undertaking.

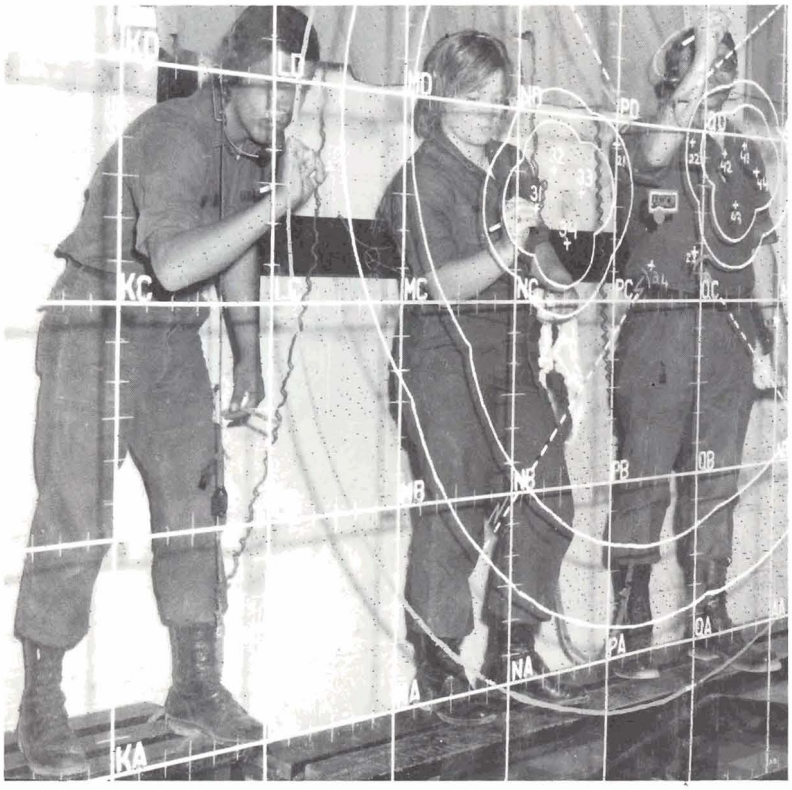
Women serving in the military is not new. There have been females contributing to the success of military campaigns in the United States since the Revolutionary War. However, until 1972, women had to either conceal their sex to serve their country in time of war or expect to be segregated into the traditional skills of nursing or typing. In 1972, the decision was made to integrate women into the combat support and combat service support specialities. In 1977, the Army went one step further; it was announced that women would be integrated into certain Air Defense Artillery and Field Artillery skills.

The 1977 policy change was immediately implemented. All major air defense commands now have women soldiers serving. This is a dramatic change for the air defenders. Only with positive attitudes and an awareness of possible pitfalls will this integration be successful.

This article is not intended for the obviously bigoted male who declares, "I'll get out before I work for or serve with a woman." Fortunately, these individuals are in the minority since the integration of the woman soldier has adequately demonstrated the logic of this action in terms of resources and demonstrated skills on the part of the woman soldier. Army policy supports this action and in time the negative type of opinion will become more obscure. It is hoped that this article will hasten negative opinion to obscurity. Nor is it intended as a forum for the fem libbers system. This article is intended for those concerned, mature soldiers who are sincerely apprehensive about the introduction of women into tactical units. These are the men who are asking, "How," not those who are saying, "Can't."

The cornerstone for building tactical units with male and female soldiers is contained in one sentence — the woman soldier is first a soldier. She must be treated the same as a male soldier in all instances. It is the responsibility of every officer and noncommissioned officer to insure there is equal treatment for all assigned soldiers.

The first pitfall that must be bridged in most units with newly assigned women soldiers is the subtle influence of the myths that have developed concerning regulations for women soldiers. Many



"The cornerstone for building tactical units with male and female soldiers is: . . . the woman soldier is first a soldier."

commands have overreacted to the introduction of women into the Army and their units. Local policies have been implemented that have segregated the women soldiers. These policies have created an uncomfortable atmosphere between the female soldier and her male counterpart.

It is the responsibility of leaders at all levels to investigate local policies, insure that they are fair, and question those that are not implementations of Army regulations.

The housing regulation is an example of these myths. AR 210-16, Bachelor Quarters — Officer, Enlisted, and Civilian Employees, has only two requirements for the quartering of a woman soldier: sleeping areas for women must be separate from the male sleeping areas and enlisted women must have separate latrine facilities. There are no requirements for bathtubs, kitchens, guarded entrances, or bars on windows. There is no need for costly renovations. Lack of funds for upgrading facilities is a poor excuse for not accepting women into a unit. The woman soldier expects no special treatment concerning facilities.

Another example of a myth involves detailing women soldiers to additional duties. There is no Army regulation forbidding the use of the woman soldier in any of the duties assumed by her male counterpart. There is no reason why she cannot be detailed as charge of quarters, assistant charge of quarters, staff duty NCO/officer, duty driver, or guard. Equity in a unit's duty roster is a must for total integration. Lack of equity is detrimental to morale cohesiveness.

The second pitfall that must be avoided is the malassignment of a woman soldier. All too frequently, the woman soldier arrives at her unit and never sees her correct duty section. She is assigned in a traditional skill (such as clerk), leaving her MOS critical slot empty. This practice is unfair to the male soldier, who must perform double duty to make up for this MOS mismatch, and to the female soldier who will never use her Army training and thus "loses face" as well as the skill development needed to pass her SQT in the proper MOS.

The most frequent excuse heard in this area is, "She's not strong enough." Physical strength, admittedly, is a challenge for women. The Army has not yet developed a physical strength test to be given to all recruits, regardless of sex, prior to assignment in a job that requires physical ability. Hopefully, this omission will be corrected in the near future. Until such a test is developed and women are carefully screened for jobs requiring physical strength, it is the responsibility of leaders at all levels to insure that personnel are MOS qualified or are reclassified. Remember, the women are also required to take the skill qualification test in the MOS reflected on personnel records. Leaders are doing the woman and the US Army an injustice by assigning her as a typist when she should be an IHawk continuous-wave radar repairperson. She will not qualify for reenlistment. So money spent for her training will be wasted. Everyone loses.

The third pitfall is the most difficult one to define. I describe it as "paternalism." The male leader feels that all women must be protected from the "beast" in all males. They are also convinced that the physiological and psychological differences between men and women make it impossible for a male leader to cope with the personal problems of the female soldier. This difficulty is one that each leader must address. He must be aware of his own reactions. He must question himself daily, "Am I reacting as a father or as a leader." The bottom line remains: A woman soldier is a soldier first.

From my own experiences, the male and female soldier are human beings with basically the same drives, needs, and problems. You will soon discover that coping with the problems of the female E-2 is not much different from coping with the problems of the male E-2.

There are two areas that are unique to the female soldier — pregnancy and rape. Consider these chal-

"Physical strength is a challenge for women."

lenges before the first woman is assigned, decide upon the procedures to be followed, and if either occurs you will be prepared.

The Army regulation is specific as to the options for a pregnant female soldier. Familiarize yourself with this regulation so you can correctly advise the woman soldier. Coordinate with the local medical authorities to ascertain what limitations will be placed on the woman. And be prepared to counsel the female soldier firmly that she is required to meet her military obligations as long as she remains on active duty.

Rape is not a problem just in the military community. This heinous crime is increasing in frequency in all stratas of our society. The leader can not be 100 percent certain that a rape will not occur involving one of his soldiers. However, there are preventive steps that can be taken. There are after-the-fact aids that should be in the leader's repertoire. A rape education program can be developed to expose all soldiers to the various facets of rape. Contact the local medical facility to determine that a rape clinic operation is available to insure prompt help or to initiate action to have one established.

After the program is developed and implemented, do not allow the fear of rape to influence the assignment of a woman soldier to duties.

Fraternization is another area that is causing grave concern to the male leaders. Everyone is aware that there is a natural biological and social attraction between males and females. There are many sincere beliefs that this attraction will impede the Army mission. It is the responsibility of the leaders to insure that a unit's mission is not impaired. Firm policies need to be established and all members of a unit must be made aware of them. When developing these policies, it is important to remember that the problem with fraternization is not only a male-female problem. In recent years many junior officers and noncommissioned officers have questioned the strict "no mingling" of ranks. There are lieutenants and captains who ignore the tradition of no fraternization; who form friendships with enlisted women based on common interests, not considering rank. When formulating policies, it is important to remember that the concern is the ability of a unit to perform the mission; it is not the personal life of the soldier. Do not strictly address the male-female "problem" but the entire question of friendship among different ranks.

The challenges and pitfalls discussed here are certainly not the only considerations for leaders. During my 5 years of serving in predominantly male air defense units, these areas are most frequently introduced as objections to women serving in the Air Defense Artillery. As discussed in this article, none of these objections is valid. The decision has been made that women will serve in tactical units. The male soldier has no choice but to accept the ruling. The only question that remains is, will the integration of women into Air Defense Artillery be accomplished in a professional manner or will the majority allow an uninformed minority to complicate this undertaking? The challenge is there — make women vital, contributing members of your unit.

Captain Cheney entered on active duty in April 1973, attended the ADA Officer Basic Course, and became the first woman officer to be assigned to ADA Branch. She transferred to the Ordnance Corps in 1974 when DA policy forced women out of ADA, then transferred back to ADA in March 1978 when the policy was reversed. The only woman captain presently in ADA, she has served as XO, B Btry, 1st Bn, 61st ADA (Nike Hercules), 13th ADA Group; Commander, HQ Btry/MP Company, US Army Safeguard Command, North Dakota; Commander, Direct Support Platoon, 1st Bn, 44th ADA, Korea; and Commander, Direct Support Platoon, 5th Bn, 57th ADA. She is presently attending the ADA Officer Advanced Course and, upon graduation, will be assigned to the 32d AADCOM where she hopes to command in IHawk battery.

Learning

COLLEGE-THE NONTRADITIONAL WAY

Colin R. Doan

Many soldiers want more in the way of education. It helps them do their job better, it teaches them more about their world and, last but not least, it looks awfully good on their Form 2-1. Commanders like it also. The statistics are quite clear that better-educated soldiers are better soldiers in lots of other ways. But a Bachelor's Degree or even an Associate Degree is a long way away for a lot of people. A Bachelor's Degree is 120 semester hours, or 4 years of going to school full time; while an Associate Degree is 60 semester hours, 2 years full time. Soldiers are only able to go to school on a part-time basis, which just about doubles these figures, and TDY and PCS moves wreak havoc even with this schedule. It looks so hopeless that some soldiers don't even start.

Luckily for soldiers, there are several ways of speeding up this process, which not only save time but help the pocketbook, too. They come under the heading of what education specialists call "nontraditional education." Briefly, these are ways of getting college credit without sitting through college courses.

One of the best ways of getting college credit is by testing. Some soldiers know this program as the CLEP tests (College Level Examination Program) although Subject Standardized Tests are also available. Over 125 tests are currently available in about that many different subjects. There is everything from freshman English to calculus, mostly freshman and sophomore level subjects. The tests are free and they are available on demand at any Army education center that operates a Defense Activity For Nontraditional Support Testing Section. Most colleges accept a satisfactory test score as equivalent to having taken and passed a course in the same subject. For information on what any specific college accepts, consult the nearest Army education center. The Army awards promotion points for testing credit also. The tests are generally worth 3 or 6 semester hours credit, and the Army awards one promotion point for each semester hour of credit earned, the same as if the course was taken in a classroom. You should be reasonably sure you can pass a test before you take it, but if you bust the test, it's no big deal; you just can't take that particular test again for 6 months, although you can take any of the other tests during that period.

A soldier's test score is kept in the data bank of the Educational Testing Service (ETS) at Princeton, New Jersey, where it will stay indefinitely. The soldier gets a Military Test Report showing his test score, and a copy is sent to his personnel records to show testing credit for promotion point computations. Currently, it takes about 6 weeks to get a test score back from ETS. To get test scores sent to a college, there is a form furnished by ETS and available at Army education centers. ETS charges $2.00 for this service, and for the old soldiers who took courses or tests from USAFI, these scores are also available, and the test report is free.

Another way of getting college credit is through military service schools soldiers have attended or MOS they have held and been tested in. The American Council on Education has prepared a guide to the evaluation of military service experience. Lest you think this is a small undertaking, the current guide runs to three volumes and over 1,300 pages. To put it together involved sending a team of educators over the years to all the military service schools to examine the program of instruction, sit in on classes, interview soldiers actually working in the MOS, etc. Schools of all the Armed Services are listed: Army, Navy, Air force, Marine Corps, Coast Guard, and Department of Defense. The guide also lists Army enlisted and warrant MOS.

The American Council on Education has come up with credit recommendations for each of these schools and MOS. Sometimes, as for most 8-week AIT programs, no credit is recommended. Sometimes, as for some of the longer electronic maintenance courses or Defense Language Institute courses, considerable credit is recommended. The Command and General Staff College course, and the Army War College curriculum even carry recommendations for graduate school credit. Note that these are recommendations only, and colleges aren't bound to accept them. Many colleges do, some don't. Also, colleges close to a military service school may come up with their own credit list-

ings instead of following the American Council on Education. There are a lot of other little quirks in this business of military credit, and for guidance around any problems that may be presented it's best to consult an education counselor at an Army education center.

Evidence of military experience and military schooling that might be worth credit is, of course, found in a soldier's 201 file. It's not too practical to ship the whole file to a college for evaluation, so a DD Form 295, Application for the Evaluation of Education Experiences during Military Service, is used to show what the soldier may have that would be of college interest. The soldier initiates the DD Form 295, and the custodian of his personnel records extracts the required information and authenticates that it is correct. The form then goes to the Army education center for review and transmittal to the college.

Even though a soldier can build up quite a list of credits from military training and from testing, it's generally not possible to get a degree using these credits alone. Colleges usually require certain specified courses be taken before they grant a degree. Often some of these requirements are set by state law. This list of requirements is called a degree plan. For instance, a school will want a student to have a specified series of courses in education before they will grant a degree in teaching, even though he may have lots of military credit in electronics and maintenance management. Colleges also have residency requirements which are the number of courses you have to take from that college before they will give you a degree. Some colleges have eliminated the residency requirement and offer what are termed external degrees. These are of great interest to soldiers, since a student doesn't have to attend the school to get his degree, but can pick up the degree requirements from military service, testing, and by taking courses from whatever colleges are available where the soldier happens to be stationed in the course of a military career. Again, there is a tremendous amount of detailed information that a soldier should know while planning an educational program to avoid a lot of wasted effort. The best way to find this out is to consult one of the educational counselors at an Army education center to plan how to get from where you are to where you want to be.

Earning A JOBREC DIPLOMA

Paul P. Barbour

That's what you might call the Certificate of Apprenticeship Completion the Department of Labor awards soldiers upon the completion of one of the Army's 70 apprenticeship programs currently available to over 150 MOS. That's right! The Department of Labor will award a Certificate of Apprenticeship Completion — identical to those awarded in civilian life — to any soldier who completes the requirements to make him a journeyman in his field.

The Apprenticeship Program, one of four programs under the heading of JOBREC (Job Recognition) has one main goal in sight — to provide the separating soldier with civilian recognition of the skills he learned or practiced in the service. How does it work? Let's take a look at the details.

Eligibility. If you hold as primary or secondary one of the 150 MOS for which the 70 apprenticeship programs were designed, you're eligible to register in the programs designed for your MOS. This means that an electronic technician is ineligible to register in an apprenticeship program for plumbers or vice versa. The reason is that you must complete the required amount of hands-on training and, as an electronic technician, you could spend your whole Army career in the program and still not have enough hands-on training to be a plumber. Is everyone eligible for an apprenticeship program? No. The apprenticeship programs are pretty well restricted to those with technical MOS but stick around until I get to the Industry Recognition Program designed for those ineligible for the apprenticeship programs.

Program Requirements. Before I tell you what is

required, let me tell you what isn't required. You're not required to change jobs, MOS, duties, or locations. You're not required to attend classes or pull additional on- or off-duty work. You are required to keep a daily record of your work experience and have your supervisor initial or sign that you actually did the work recorded. As an electronic technician you may have spent 4 hours troubleshooting, 2 hours repairing equipment, and 2 hours requisitioning supplies during one working day. Your big contribution to the apprenticeship program would be to list 4, 2, and 2 in the correct boxes on your Daily Work Sheet. When you have sufficient hours in the required work categories, you will receive your Certificate of Apprenticeship Completion from the Department of Labor.

What Else is Required? The apprenticeship programs require (depending upon the program) from 6,000 to 8,000 hours of hands-on training and from 432 to 576 hours of "related instruction" — schooling, to you in the service. Where does the schooling come from? From your attendance at Advanced Individual Training (AIT) to qualify for the MOS which made you eligible for the apprenticeship program. As an example, an Air Defense Improved Hawk Fire Control Mechanic (24E) needs 576 hours of related instruction but already has 860 hours to his credit when he finishes AIT. Anyone whose AIT instruction amounts to less than program requirements can complete them by taking Army correspondence courses — and gain promotion points in the bargain.

How About Past Experience? Right on! Those of you who have worked in your MOS for some years may already have completed half of the apprenticeship program; however, you must be able to document this past experience. "Documenting it" means that you must send a form letter to the person who supervised you during the period for which you are claiming credit. If he certifies the number of hours you claim, you have an excellent chance of receiving credit for them. We know that you'd like to complete the program as quickly as possible but please don't bring in a claim that shows you worked 32.8 hours per day, 7 days a week for 7 years. We didn't believe the last person who made the claim and we won't believe the next.

Where to go for Details? Your nearest Army education center can furnish a list of all available programs and eligible MOS. A counselor will answer all of your questions, register you in the program, and furnish any needed forms. To earn credit toward the program you'll have to furnish one or more of the following:

Diploma from AIT or a note from the personnel officer certifying that you completed the course upon which your MOS is based — this gives you credit for related instruction.

Letter authenticating prior experience. This is a form letter available at your education center. Fill it out and have your supervisor (for the period covered) sign it. This can gain you credit for up to one-half of the required hands-on training hours.

Daily work experience sheets. Your counselor will furnish these. Fill them out on a daily basis and have your supervisor sign them. Every 3 months return your sheets to the education center to have them made an official part of your apprenticeship record. Incidentally, the diploma(s) and/or prior experience sheets may be brought in at any time during your apprenticeship.

The Other Three Programs

Industry recognition is the second of the four JOBREC programs and is under development right now. It's designed for those who are ineligible for the apprenticeship program because their duties do not sufficiently resemble civilian trades, and for those whose experience level is well beyond the apprenticeship stage. The Industry Recognition Program will assist the soldier in documenting those skills which are civilian related and in obtaining industry recognition of those skills.

Certification and licensing is a program intended for those who have developed knowledge and skills that will permit them to apply for licensing or certification while still in the service. Examples would be an FAA or FCC license or a state electrician's or plumber's license. An Army education center can furnish information on license requirements and costs, dates, and locations for testing.

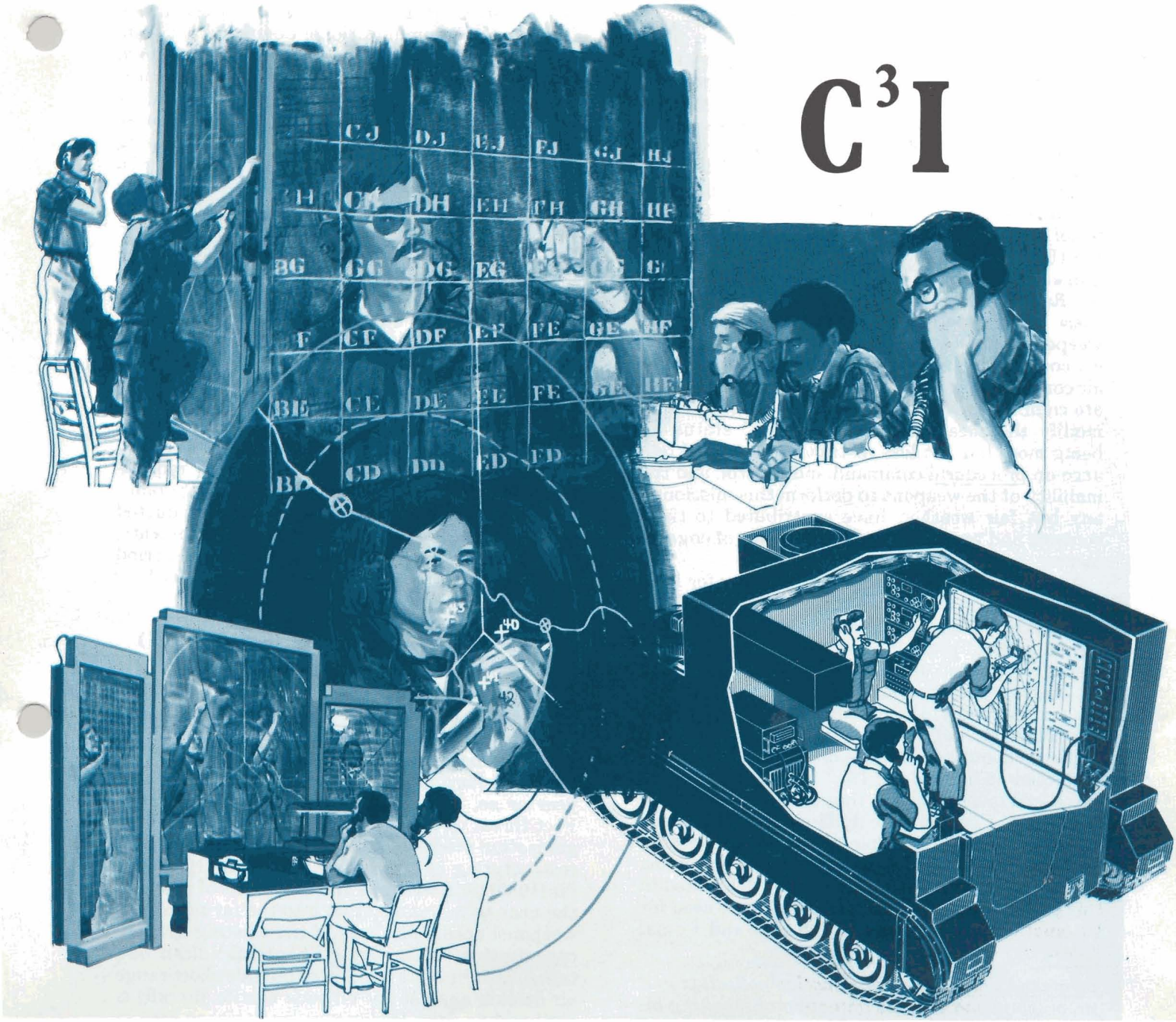
Personal services include help in preparation of resumes, furnishing of job information, and sponsoring job fairs, etc.

For Commanders and Supervisors. Don't confuse the JOBREC (JR) programs with the defunct Project Transition (PT). PT took your personnel away from duty to learn a skill — JR keeps them right in their present jobs. PT required changing rosters and assigning other unit personnel to trainee's duties — JR requires no such change. PT was accused of encouraging soldiers to get out of the Army by teaching them civilian skills — JR encourages them to become better at the job they're doing. And don't forget that the apprentice needs his supervisor's signature on his Daily Work Sheet — that just might encourage him to give you a better day's work.

Note. This article is based on information found in AR 621-40, 41. Details on specific apprenticeship programs are found in the 621-series DA Pamphlets.

The US Army Air Defense School currently sponsors three apprenticeship programs for its technicians in the 24- and 25-series MOS. These include Electronic Technician-Radar, Electronic Technician-Radio/TV, and Electro-Mechanical Technician — Weapon Systems.

C^3I



ALEX DUMBRIGUE

A paper on continuing issues, problems, and requirements involving division air defense command, control, communications, and intelligence (C^3I)[1].

INTRODUCTION AND BACKGROUND

Growing interest in division air defense over the past decade follows the two earlier decades of pre-

[1]*Note. To those who wonder why Intelligence (which I also equate with air defense information flow) is being associated with command, control, and communications: Many are recognizing that*

occupation with high- and medium-altitude missile air defense and, unfortunately, the absence of air defense from the division combined arms team. The early years of the 1960s witnessed a growing concern for the lack of air defense capability in the division and resulted in SHORAD missiles (Chaparral) and an air defense gun (Vulcan) becoming organic to the division along with an "all arms" manportable weapon, Redeye. As tactical operational procedures evolved for these weapons, the usual control statuses in USAREUR, Korea, and USREDICOM are WEAPONS TIGHT[2] for the gun and missile fire units and WEAPONS HOLD[3] for Redeye. Aggravating these restrictions upon these very reactive weapons is the fact that weapons control status is promulgated at the highest command level of air defense, usually a tactical air control center (TACC) or equivalent. Intermediate commanders in the operational chain can only modify the theater-announced control status by being more but not less restrictive. The total reliance on procedural command and control, and the inability of the weapons to perform this mission in any but fair weather, have contributed to tight controls and to equally restrictive rules of engagement.

As the replacement weapons — Stinger for Redeye, Roland for Chaparral (at corps level), and the new DIVAD Gun for Vulcan — approach fielding, the fallacies of procedural control and reliance on visual recognition are acutely manifest. First, the replacement weapons shoot further than man can see and, secondly, the dynamics of air defense in the division defy procedural accommodation. These inadequacies and the need for better friend protection in light of the 1973 Arab-Israeli experiences lead to a realization that near-term C^3I structures cannot support the dynamics of division air defense (DIVAD). Further, the need to conserve manpower is the additional incentive for a systems approach to the issues and problems delineated in this paper. Both the trend toward and the need for automation are supported by events and formal study. Dr. G. P. Dineen, Assistant Secretary of Defense for Communications, Command and Control, and Intelligence, in an interview with Gerald Green of Military Electronics/Countermeasures notes, ". . . We've come to depend on computers because in our new weapon systems, the response times are so rapid and so short that a human being has difficulty in just operating without the aid of a computer. . ."[4] The need for computer assist is one aspect. From a cost viewpoint and in light of the fact that people are now "the" high-cost center on the battlefield, reduction in operation and maintenance cost is a paramount consideration. It thus becomes a key issue in the improvement of division air defense command and control. The human element in a real-time environment involving a highly maneuvering, all pervasive threat (and equally reactive weaponry) is intolerable. Typical reaction time for most existing and candidate SHORAD weaponry in the world's armed forces runs from 6 to 25 seconds.

In defining the issues and apparent requirements for discussion, I rely on my vantage point as a principal investigator in a study conducted for the Directorate of Combat Developments, US Army Air Defense School, during the period 10 November 1976 through 31 January 1977.[5]

DIVAD C^3I ISSUES (ORGANIZATION, MISSION, AND ORGANIZATION FOR COMBAT)

Organization

The point of departure for system definition is the table of organization and equipment (TOE), which defines the unit's mission and provides the resources for mission accomplishment. In the past year or so, and in consideration of the Warsaw Pact threat to US forces in NATO, a division reorganization study is in being. As a result, DIVAD restructuring is addressing both near (1980) and far (1985) term weapons and the means of evolving the near term organization into the far term (new weapons) needs. Analysis of the existing division organization (i.e., a single Chaparral/Vulcan battalion, in light of its mission to provide short-range air defense against low-altitude hostile aircraft) is the baseline case. Preliminary analysis, as seen in the Division Air Defense Artillery (DIVADA) Concept Paper[6], indicates serious shortcomings of the

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command and control, information collection and processing, and the dissemination of resulting intelligence through survivable, reliable communications are integrally bound elements. They influence both the engagement control (i.e., fire unit) and combat management functions, tending to enhance engagements. See later discussion of air defense functions.

[2]*WEAPONS TIGHT: a weapons control status permitting an air defense fire unit to engage only those targets positively identified as hostile, self-defense excepted.*

[3]*WEAPONS HOLD: essentially a self-defense mode permitting engagement only when defended assets are attacked.*

[4]*Interview. "View from the Top," Dr. G. P. Dineen, interviewed by G. Green, Military Electronics/Countermeasures, November 1977.*

[5]*Litton Data Systems Division. Division Restructuring Study Air Defense Command and Control — 1980 (DRS-ADC²(80)). Final Report, 31 January 1977.*

[6]*USAADS, Directorate of Combat Developments. DIVADA Concept Paper. 9 November 1976.*

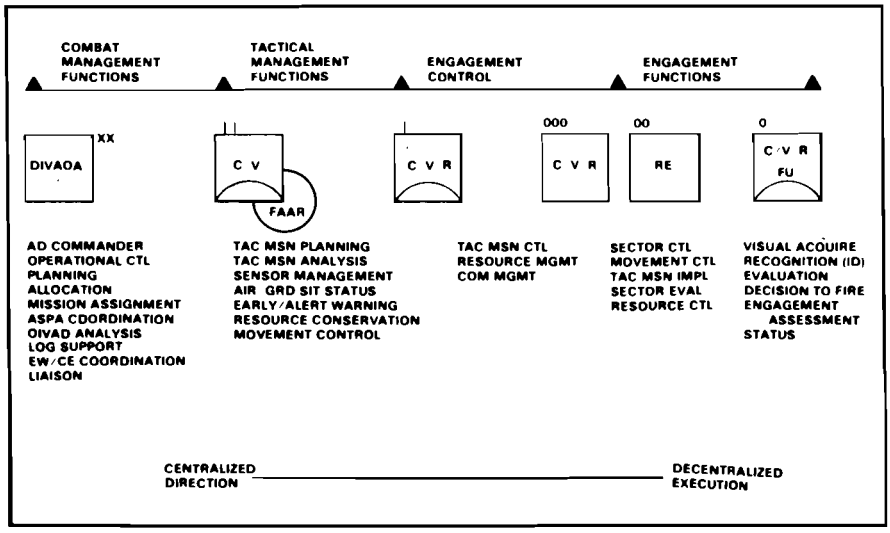

Figure 1. Functional/organizational/doctrinal continuum.

C/V battalion in a NATO scenario. Some of these are summarized.

Firepower, Battlefield Dynamics, and Span of Control

The current C/V organization, considering a typical European scenario, lacks the firepower to defend the division air defense priority list. The air defense priority list, consisting of command centers, logistical complexes, and nuclear delivery means, along with defense of massed troops in rendezvous, road march, and maneuver support, is prioritized and allocated resources in the context of the commander's air defense objectives.[7] Lacking sufficient resources, the principle of defending well the most critical assets leaves other assets with only small arms air defense means. The dynamics of ground maneuver support are time sensitive and complicate maintenance of an air defense objective. For example, in an attack scenario, the highest priority tomorrow morning may be the brigade in rendezvous; by noon, the bridge over a river crossing; and by evening, the objective area as friendly forces dig in for an expected counterattack. Air defense must be able to support each in changing priority while continuing to defend high-priority division rear assets. "The overall divisional air defense plan must maintain the full perspective of freedom of movement; i.e., forward, rearward and laterally, for both the maneuver elements and their supporting fire power."[8]

The DIVADA Division Restructuring Study (DRS) is constrained at this time in considering additional firepower in terms of fire units, as was done in reorganization of the Artillery, Armor, and Infantry combined arms elements. A lesser effect, however, is somewhat achieved in both the near and far term by regrouping manportable air defense (MANPAD) weapons into a supporting battery and by providing additional MANPAD weapons less crews to gun fire units. The centralization of MANPAD assets permits the reorganized DIVADA commander better flexibility and potential in extending defense of his priority list, while achieving increased fire power through an ability to concentrate MANPAD as necessary. MANPAD of committed combat arms elements remains essentially as it was prior to reorganization. This will be seen under discussion of span of control. Improvements in firepower or the force multiplication effect is a sought-after result of effective C^3I and is attainable as a product of enhanced resource conservation or improved single-shot kill probability.

Functions and Span of Control

In the course of the Litton DRS supporting study, it is necessary as a prelude to mission analysis to allocate top-level functions. Figure 1 utilizes the DIVADA Concept Paper, existing manuals, doctrine, and weapon systems limitations, and allocates these on a functional/organizational/doctrinal continuum. Functions follow traditional air defense allocation. Engagement functions are detect, identify, intercept, and destroy. For the current family, the weapons are visually dependent and the fire/no fire decision remains at the weapon site. Engagement control in the sense of override on a target/fire unit pairing is not foreseeably possible. However, limited fire distribution through weapon control status and tactical mission control can be done at a level above the fire unit. Presently, it is believed that the optimum span of engagement control is at the platoon level for the gun/missile and at the section level for MANPAD. Combat management functions are performed at the DIVADA and/or battalion levels and involve those that support the engagement functions tactically, logistically, and through coordination with other combat and combat support activities. The battery can best support tactical mission implementation and support unit liaison. Coordination of the airspace seems best accomplished at the Division Airspace Management Element (DAME), a TOC facility at DIVMAIN. See airspace management below.

[7] *Air defense objectives are in themselves variables, changing as resources are expended. Objectives vary from a severe state such as denial of penetration to price of entry extraction, attrition, the simplest case of self-defense reaction.*

[8] *Amply articulated by the DIVADS Study Director, COL D. Infante.*

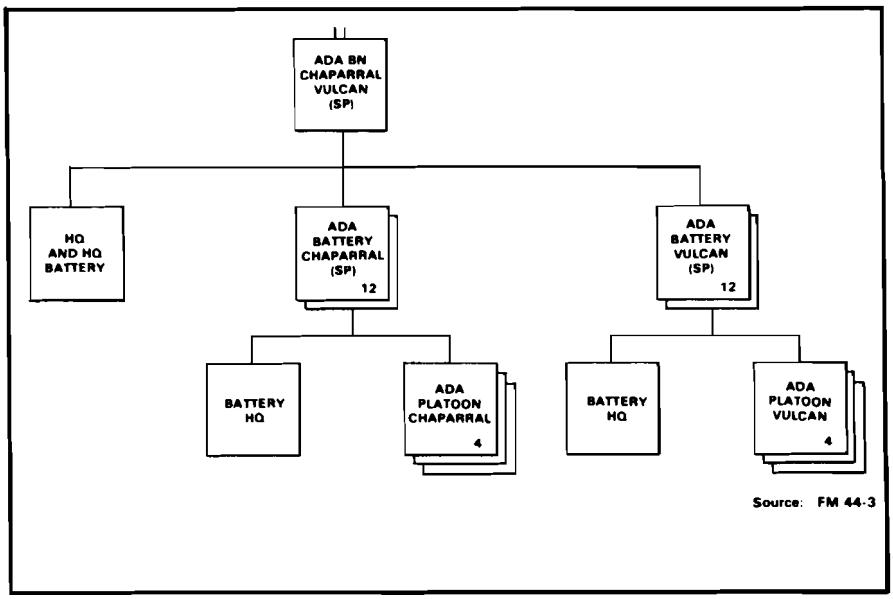

Figure 2. PRE-DRS division air defense artillery battalion. Chaparral/Vulcan (Self-Propelled)

The existing C/V battalion is incapable, or only marginally so, of performing effective command and special staff functions for division air defense. Among these shortfalls are:

- Long-range divisional air defense planning in support of the division operations plan and order and also for contingency missions.
- Coordination with:
  - other air defense elements.
  - corps when an ADA group is present.
  - Hawk battalion when supporting division operations.
  - USAF when an ADA group is not present.
  - other Army combat and combat support activities at DIVMAIN or at the Mobile Tactical Command Post, DIVTAC.
- Airspace management
  This is perhaps the single most important coordination function in air defense mission accomplishment. Although interservice discussions on the mechanics of implementation still exist, there is agreement as to the operational milieu and the definitions per se.[9]
  DAME is the focal point for airspace management in the division. The AME is under the staff supervision of the G-3 but is staffed by personnel from DIVADA and division aviation. While a corps AME is treated perfunctorily in the recently published FM 1-60, it does not adequately treat the manning and procedures required in a division AME.
- Liaison
  - With: Group ADA, Hawk.
  - Maneuver elements, supported.
- Allocation and reallocation of resources.
- Render an air defense estimate of the situation.
- Fight the air defense battle on a day-to-day, minute-by-minute basis. Operational control for the ADA elements in the brigade area and those defending division rear assets is difficult at best within a single manual C/V battalion without extensive augmentation. If the C/V battalion commander and staff concentrate on the minute-by-minute air battle tasks, the combat management tasks go begging. Selective automation, distributive processing, and enhanced communications can alleviate some of the existing time, load, and communications stresses. People augmentation is a more costly solution with little appreciable increase in effectiveness.
- Poor utilization of the chain of command. Currently, the ability of command elements (battery and platoon, especially) is limited by communications, ability to perceive, and reaction potential.
- Sensor management. The ability to plan and

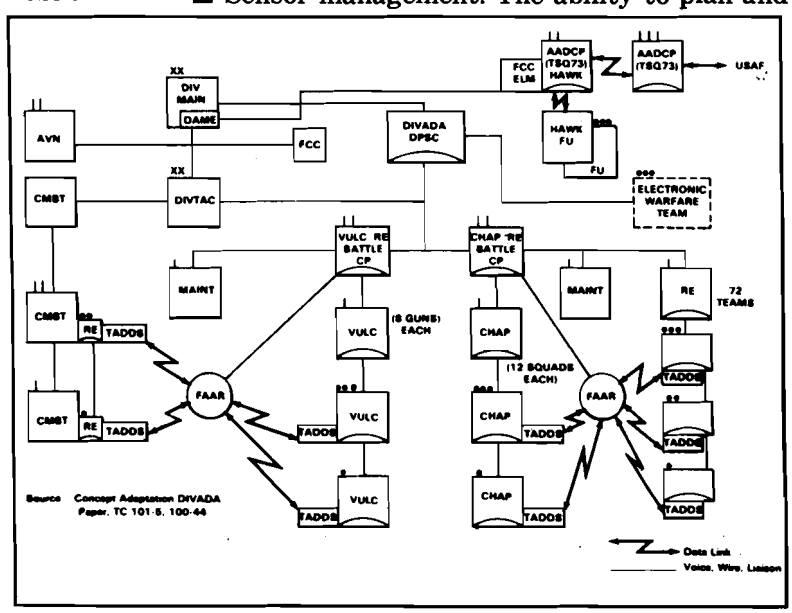

Figure 3. DIVADA baseline near team.

[9] *Joint TRADOC/FORSCOM/TT 100-42 and USAF TACM 2-1 (Test), 16 August 1974 and FM 1-60. Airspace Management and Army Air Traffic in a Combat Zone, 30 September 1977.*

position FAAR radars is hampered by the inability to do preliminary analysis using available digiterrain techniques. Further, survivability of FAAR without continual movement when in range of enemy artillery is a serious cause for concern. The ability to blink the radars while maintaining coverage is needed to attenuate the ARM threat.

The DIVADA DRS approach provides a DIVADA staff and two battalions with geographically oriented operational spans of control. The gun battalion with quick-firing, short-range weapons can support the maneuver elements in the forward division area, to include on the move. Tactical mission tailoring can better respond to the changing priorities as illustrated earlier. The missile battalion in defense of rear assets such as CPs, nuclear delivery means, and logistics (because of its greater range) can complement the short range of forward Vulcan elements. Each of the battalions controls its own alert radars (FAAR).

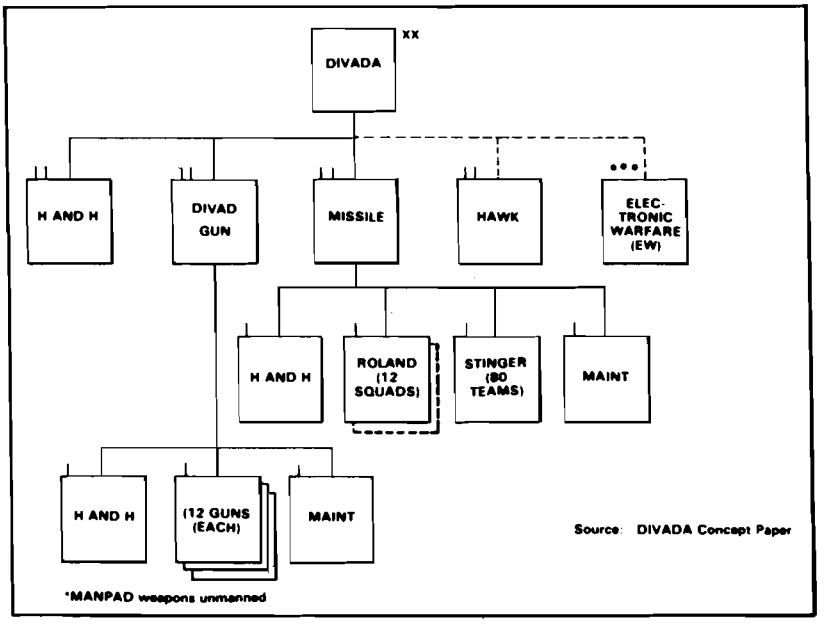

Figure 4. Far term DIVADA organization.

Consideration of Hawk operating in the division area and plans for integrating these supporting fires into the overall defense scheme are big steps in realizing the doctrinal principles of integrated air defense. But the main current shortcoming remains — trying to integrate the automatic LOMAD supporting system into the DIVADA scheme of operation — and therein lies a responsibility of division air defense. Still another weak link in the "DS Hawk" concept involves reliance upon Hawk, a corps entity, wherein insufficient Hawk assets are available for both the corps and division air defense priorities. Yet, doctrine clearly provides for a force structure that allocates a DS Hawk battalion to each committed division. Organic or division mission attachment is a much preferred solution. In this regard, dedication of a Hawk platoon or battery for committed divisions would close the LOMAD gap and provide reinforcements to DIVADS.

At first glance, usual tactical mission assignment is probably as follows:

- Guns — DS to brigades.
- Missiles — GS to division.
  GSR to brigades.
- MANPAD — Attached to DS gun unit for deployment in support of committed combat arms elements.
  — Attached to missile unit for extension of division air defense priority list.
- Hawk — GSR division air defense.

Interoperability among divisional elements is one end of the INTEROPS spectrum. Interoperability and indeed data integration with LOMAD are other important considerations. Inter- and intraservice interoperability poses still another critical parameter. Also, finally, the issue of NATO interoperability must be kept ever in mind as C^2 evolves in an orderly fashion. The need to do data flow, enroute decision analysis, and buffering technique analysis (i.e., hardware or software) homework as part of the background in evolving a divisional air defense system is clearly evident in required documentation.

Finally, the reorganization addresses another serious shortfall, that of electronic warfare. The attachment of a direct support electronic warfare platoon (from the CEWI battalion), which again emphasizes the idea of integrated C^3I, adds considerably to a more effective DIVADS. The ability to conduct real-time operations in a high-density electronic warfare and electronic emitter environment requires specialized expertise in detecting, analyzing, reporting, and conducting effective ECCM. The emergence of a full-flow intelligence from an all sources network and timely dissemination improves the air defense situation and its ability to survive on the electronic battlefield.

Figures 2 and 3 show the existing C/V battalion and the organization for combat in the restructured division. Figure 4 shows the organization of the far term battalion which can evolve from the reorganized DIVADA battalions.

A quick look at emerging technology seems to assert that the ability to solve the problem syndrome leads problem definition. In the main, a technology explosion in the minimicro computer areas, which permits evolvement of a low-cost, dis-

tributive processing system (DPS), is a real potential. That is, distributive processing in the sense that both functions and hardware are distributed and with due consideration that the resulting lower costs permit both routing and processor redundancy to ensure the sought-after effect of graceful degradation. Manpower savings and higher selective automation permit man-in-the-loop effectiveness in the fast-moving air battle supporting the ground scheme of maneuver and ensuring freedom of movement for the ground gaining arms. This attention to the vertical battlefield dimension accents air defense as a full member of the combined arms team.

Another exploding technology is found in displays. Improvements provide a range of displays applicable to all command levels from individual to platoon elements, to battery, battalion, and higher. Selective display of information that aids the man in making decisions or advising decision makers, transmitted in real time, is a desired capability and a current potential. Communications remains a critical factor in the C^3I architecture, but exploitation of low-cost redundant routing via automatic switching and emerging time-division, multiple-access techniques is promising. Integrating the ability to both process and display in the same device or system with man interacting in processes requiring reasoning ability permits an optimal man/machine interactivity. The ability to transfer resulting information and/or decisions in a reliable manner closes the C^3I loop.

On the horizon is an incipient evolvement of the long-sought-after identification foe capability which is a big step in air defense effectiveness. As we fully exploit the computer-on-a-chip phenomenon, and move from large-scale integration to very-large-scale integration and beyond, the ability to receive myriad inputs, analyze, and determine not only foe characteristics but what's on board and thus through the resulting logic sequence determine what is the hostile airborne object's intent, sets the stage for an omega threat evaluation, weapon assignment (TEWA). This, in turn, foresees selective shoot-down and critical resource conservation. Such an ability to passively detect, identify, and track will permit the luxury of determining not only when but where and how the destruction phase of engagement shall occur.

The preceding begins to sound like a Buck Rogers scenario and is evoked only to emphasize the magnitude of potential solutions. The first step is to do our homework further by refining our understanding of the problem. Functional definitions, analysis of these, and allocation of candidate functions for automation are wearisome steps toward requirements definitions. At this writing, several on-going activities are in progress. In May 1978, the US Marine Corps at Camp Pendleton, California, in concert with the US Army Air Defense Center, demonstrated the feasibility of sending digital early warning from either a USMC tactical air operations center or an AN/TSQ-73 to a MANPADS gunner team equipped with a hand held "smart terminal" called an interactive display terminal. More than a demonstration of early warning potential, it portends an application of technology to a serious, current shortfall.

During this same period, elements of the 9th Infantry Division at Fort Lewis, Washington, demonstrated Yankee ingenuity in improving the air defense capability of "Old Reliable." They used LOMAD radar inputs, converting this data in a technique called Swift Target Identification Notification Grid (STING), and transmitted the resulting early warning over an HF net, automatically retransmitting the data over the end game FM-VHF communications down to fire units and other elements of the division. Awareness of the need for better early warning is indeed evident as command support for improved division air defense accelerates.

Continuation of the study process by the USAADS Combat Developments Directorate, under the urgency and support of the Commandant, MG John J. Koehler, Jr., portends the needed requirements documentation being available. If this ambitious but plausible plan continues—concurrent fielding of a division airspace C^3I with new DIVADS weapons—initial operational capability beginning in late 1982 is a possibility. All the ingredients for a successful C^3I are evident—technology, potentially lower cost (i.e., commercial development, reduced manpower, maintenance, training, and spares) and, most importantly, command interest. All that remains is to finalize the minutiae of need, good homework in the resulting needs document, and some thoughtful, daring applications engineering.

Alex Dumbrigue is a retired Army officer who, because of related military experience and his profession as a civilian, is probably one of the best informed people in the country on command and control. For the past several years, he has been Manager of Military Requirements, Southwest Region, for Litton Industries and has been thus involved in development and fielding of the AN/TSQ-73 (Missile Minder) system.

USAADS TECH LIBRARY

By Norma Kudiesy and Dorothy Eads

Editor's Note: We asked our librarians to research the topic of what available reading and study materials are used most by personnel at Fort Bliss and give us a report based on that research. Information in this resulting article can be very helpful to commanders establishing unit libraries who must decide what materials to acquire. The article is also of value to the thousands of airdefensemen who will attend courses and/or be assigned to duty at Fort Bliss.

"A BOOK MAY BE AS GREAT A THING AS A BATTLE"

— Benjamin Disraeli

The US Army Air Defense School Library has varied reading materials numbering more than 75,000 volumes that are available to the students and staff and faculty at the School as well as to all other personnel assigned to Fort Bliss. Because most users are NCOs attending the NCOES courses or officers attending the Basic or Advanced courses, and are studying or training in combat areas, Military Arts and Science subjects are read most often. Books about guns, tanks, and aircraft are popular. Of interest to officers is the subject of management, which is covered quite thoroughly in the library's holdings. Among the other interests to officers and enlisted personnel are the following: World War II history, military campaigns in general, US and Russian foreign policy, college level entrance practice tests in many subject areas and test taking, computers and computer programing, lasers, counseling, electronics and electronic circuits, radiation and radiation protection, statistics, and all of the Arab-Israeli conflicts. Also included are general history, education, and social and political science.

Besides the book material checked for reading purposes, there are other areas of interest such as volunteer Army, human relations, and personal finances that are researched in the many periodicals in the library collection. Heavily used publications include the military periodicals (a few of which are Army, Field Artillery Journal, Armor, Signal, Military Engineer, Soviet Military Review, Soldiers, and Marine Corps Gazette) along with civilian publications (such as Business Week, Newsweek, Time, US News and World Report, NATO's Fifteen Nations, Interavia, RUSI, Aviation Week and Space Technology, National Review, etc.) And, of course, our Documents Section in the downstairs portion of the library has subject areas from A to Z available. The Documents Section maintains materials relating to air defense, academic interests, curricula, weapons development, and research. They are in the form of studies, reports, and research papers, both classified and unclassified, conducted by the military establishments and other agencies. The document collection numbers over 55,000 items and represents a vital part of the library's resources. The Documents Section is in a specially constructed area containing reading/study rooms with microfiche readers and stacks for paper copies and reference material. A reader-printer is available on a self-help basis. Research is enhanced by bibliography service available through the Defense Documentation Center. The Documents Section provides a valuable reference and research tool for the students at the Air Defense School.

If one's area of interest is not represented in the library's holdings, or one needs to obtain books not in the USAADS collection, an interlibrary loan can be requested from other Government or civilian libraries. The USAADS collection is constantly being updated to insure that the latest titles are ready for research, class studies, or professional reading for all users.

Efforts are underway to develop an Air Defense archives within the library, which will make Fort Bliss the central repository for all air defense-related material. Air defense personnel worldwide will be requested to contribute to this effort and asked to donate manuscripts, documents, and memorabilia to form a research base available to personnel of all military services.

The library staff welcomes your comments and suggestions. If there are books that you feel the library should have in the collection, please provide suggestions to the Librarian. Each suggestion will be considered by the Acquisitions Committee.

Recent discussions of military honor have dealt almost exclusively with the specific problems of the honor systems of one institution or another. As important as the questions that arose might be, they miss the essential problems of honor and morality today. The system approach to honor is itself wholly inadequate. An honor system is a negative inducement with a limited ability to identify and prosecute specific acts of wrongdoing (lying, cheating, stealing), those acts considered dishonorable by the members of the system. Honor systems have their uses, particularly in the education of young people. In addition, they serve to eliminate from the system some dishonorable people. However, as a guide for the life and career of the young Army officer, the system approach to honor fails in a number of ways.

The greatest single fault of the honor systems I have lived under, or have known of, is that they tend to develop in many individuals a false sense of right and wrong. Honor codes list certain actions that are considered dishonorable and describe just what it takes to be found in violation of the code. Therefore, when many individuals take time to judge their actions, the question they ask themselves is, "Is this thing I do in violation of the code?" That isn't the same as asking, "Is this thing I do morally and ethically right?" There are too many dishonorable acts, acts of omission for instance, that no honor system can include. Yet, the inference is that whatever is not in violation of the code is a right and honorable thing to do.

It is easy to see how someone with this sort of perception of honor might develop a standard of conduct based on staying out of trouble without really coming to terms with the real consequences of his actions. Honor systems tend to affect those who lie badly and have no effect on those who lie well. It might be said that honor systems help to create good liars, good cheaters, and good thieves. Honor systems deal with acts and have little or no control over those who might be capable of using the truth, in the literal sense, to deceive in a real sense. A good liar can manipulate the truth to create misunderstanding and use that misunderstanding to his advantage. Not only is the honor system unable to control this sort of dishonesty; it also, by inferring that the system is the check on dishonesty, lends some credibility to these actions.

There is no question in my mind that it is the motive and the goal behind a statement rather than the words that make a statement true or false, honorable or dishonorable. Any system that says to someone, "if you do not do this thing or that thing, then you are an honorable man," is creating in the mind of that individual an incomplete picture of what honesty is. At best the system has created someone who does not know the full meaning of honor, and at worst, it has helped to create an individual who uses his understanding of the system and the truth to create falsehood and manipulate his fellow man.

"HE BECAME AN OFFICER AND A GENTLEMAN WHICH IS AN ENVIABLE THING."

— Rudyard Kipling

The second point I want to make is closely related to the first and will, I hope, bring home to the young officer the essence of honor. Doing right, doing the honorable thing, is active not passive. The goal of an honorable man must be beyond staying out of trouble and avoiding individual acts of wrongdoing. The officer and gentleman, because of his position as leader, has the power and therefore the responsibility to affect a change where less than the right thing is being done. That is the essence of honor and the essence of leadership. We probably won't get into trouble because of the wrongdoing of another, particularly if he is not under our direct responsibility, but it is our moral responsibility as officers and gentlemen, as human beings, to make right what wrongs are within our ability to correct. It is this quality of active honesty that marks us as officers, gentlemen, and leaders. No act of Congress can do it. No honor code can do it.

The man of honor is so because of a couple of decisions he made for himself. The first of these was the decision that every future judgment would be made not solely on the basis of expediency but also on the basis of the moral and ethical implications of the decision. That is the basis of ethics.

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Every decision must be made not only on the basis of its utility but also on the basis of its ultimate rightness or wrongness. There are very few men who lack the ability to make this sort of judgment, however, there are many who simply don't make it. I wonder how many decisions made in the name of the Third Reich or those made by members of the Committee to Reelect the President were made with the moral implications taken into consideration. Most everyday decisions require very little of this sort of judgment, but it is the awareness that there are considerations beyond expediency to be dealt with that makes for the truly honest individual.

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ant Kerry D. Scott

Another decision, perhaps the most demanding, is the decision that apathy is not honorable. Failing to express one's convictions when they might be needed or when they could make a difference is inconsistent with the philosophy that the truth must be actively sought. The honest man is a man of conviction. Our service has become a home for "Yes-Men" and accomplished game players. It is all too easy for integrity to be overshadowed by the instinct for survival. We officers are paid to lead, to make decisions, and to make judgments practical and moral. There is no place for apathy here. Too many incidents, such as My Lai, have been allowed to hurt the Army and the American image abroad because junior and senior officers didn't have the courage to rock the boat. No honor system I have ever heard of is designed to encourage active honesty. They only encourage survival by staying out of trouble.

I have already mentioned the special position of the leader in the active pursuit of truth. The importance of being absolutely honorable is especially apparent in the concept of transfer of responsibility, as outlined by Stanley Millgram in his book, Obedience To Authority. The essence of this concept is that if an individual can assume that another is taking responsibility for his action, then some of the accompanying moral responsibilities might also be assumed to be transferred. Put more simply, if someone else will take responsibility for my actions, then I need not be concerned with the consequences. How often have we heard the excuse, "I was just following orders?"

This is a particularly important problem in a military environment. Here the subordinate is encouraged and expected to follow orders. The individual soldier tends to transfer responsibility for his actions to his superiors. The soldier comes to accept commands or even simple statements, as declarations of what is right. He has therefore transferred the responsibility for making the moral decision to someone else. In addition, individuals tend to act on the basis of their impression of what their superior wants without an order ever being issued. This phenomenon imposes additional responsibilities on the Army officer, for he is the professional leader. His word is law.

In particular he has these responsibilities: First, he must be certain that he is right so that his men will be right when they follow his orders or act upon their impression of his will. Second, the commander must be certain that his will, his instructions, and his orders are explicit and clear, leaving as little as possible to conjecture. Finally, the leader must take care in his role as subordinate that he not be one who transfers responsibility. Transfer of responsibility is not consistent with the ethic of making decisions based on their ultimate rightness as well as their utility.

History provides us with numerous examples of leaders who used the truth to manipulate, leaders who failed to recognize their effect on their subordinates, and leaders who had little or no knowledge or concern for the real meaning of honor. An honor system is not enough. It cannot produce honorable men any more than Congress can create officers and gentlemen. They can help. They can provide the system, but the decision must come from within the individual. This is the ultimate reality of honor.

Lieutenant Scott holds a degree in Politics from Washington and Lee University and is a graduate of the ADA Officer's Basic and the Chaparral/Vulcan Officer's Qualification Course. He has commanded both Chaparral and Vulcan platoons and is currently serving as Executive Officer of Battery C, 6th Battalion, 56th Air Defense Artillery in Germany.

U.S. ARMY AIR D

CORPORATE MISSIO

COMMANDANT

MG John J. Koehler, Jr.
CSM Johnny L. Jones

The Commandant of the US Army Air Defense School has overall responsibility for the operation of the School consisting of five directorates, four academic departments, and two brigades. The position of School Commandant is inclusive in the position of Commanding General, US Army Air Defense Center, the largest air defense training center in the free world.

ASSISTANT C

BG John B. O
CSM F. T. St

The Assistant Commandan of the US Army Air Defens the duties and responsibilit during his absence. The oversees the School's va thousands of military st foreign. Basic combat t individual training are als

DIRECTORATE OF TRAINING DEVELOPMENTS

COL James A. Kilgore
SGM Thomas Barrett

The Director is Program Manager for training development processes in areas of training analysis, design, and development. Individual training plans, soldier's manuals, skill qualification tests, collective training plans, and ARTEPs are produced. He also manages the Army training literature program and civilian contract support of training developments and publishes AIR DEFENSE Magazine. He insures continuous coordination with the Directors of Combat Developments, Training, and Evaluation in developing and improving training literature and other materials. He is responsible for developing training for 104 resident courses and extension training in various forms, including TEC lessons, correspondence courses, TV tapes, and training films.

DIRECTORATE OF COMBAT DEVELOPMENTS

COL Anthony J. Adessa
CSM (D) Carleton L. Bell

The Director serves as the School point of contact and Program Manager for actions involving development, analysis, test, and evaluation of air defense weapons, command and control systems, force structure, and doctrine. He develops and analyzes hostile aircraft, missile, and air defense threat, and also develops techniques to simulate that threat.

DIRECTORATE OF TRAINING

COL J. D. Frydendall
SGM Henry S. Korb

The Director of the Directorate of Training is responsible for conducting and administering the institutional training. A major portion of his responsibilities is conducting instruction for resident courses in air defense artillery equipment maintenance and professional development of ADA personnel. This responsibility is accomplished within the Directorate's four academic departments (Tactics, Direct Support Materiel, General Support Materiel, and Missile Science and Electronics) as well as the Noncommissioned Officers Academy.

DI TOR SUPP

LTC Joseph
SGM William

The Director is the admin the School. He provide logistical support to The ADA Training Brigade, and US Army Sergeants Major point of contact of the activities, TRADOC, and in for administrative services awards program, main academic records, logistic management, which in career development, and codes, is also a function

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is the operating head School and assumes es of the Commandant ssistant Commandant training program for dents, both US and ining and advanced under his supervision.

DEPUTY ASSISTANT COMMANDANT

COL Billy J. Mendheim
SSG Robert L. Buschman

The Deputy Assistant Commandant assists in the supervision of the operation of the US Army Air Defense School and stands in for the Assistant Commandant in his absence. He directs and coordinates the efforts of the Air Defense School directorate staffs. The Deputy Assistant Commandant also serves as the Assistant Commandant's primary adviser in matters pertaining to the evolution and application of air defense doctrine, training, combat developments, maintenance concepts, and related School budgetary and instructional responsibilities for all US Army air defense weapon systems and devices.

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DIRECTORATE OF EVALUATION

COL James R. Gober
SFC Ronald L. Burton

The head of the Directorate of Evaluation collects, analyzes, and reports the effectiveness of the US Army Air Defense School's training to the Commandant. Data from the field are fed back to the Directorate, which in turn determines ways to do the job more effectively. In essence, this office exercises quality control through collection and analysis of training effectiveness data.

THE SCHOOL BRIGADE

COL James R. De Moss
CSM Charlie Bolling

The Brigade Commander commands all units and personnel assigned or attached to The School Brigade. Prepares attached FORSCOM units for accomplishment of assigned US Strategic Army Forces missions. Provides administrative and logistical support and intelligence security for US Army Air Defense Staff and Faculty and US and Allied military students. Provides installation support as required. Provides nonacademic training for the School Staff and Faculty and US Students. Coordinates the development and execution of The School Brigade's emergency deployment and other assigned plans.

1ST ADA TRAINING BRIGADE

COL Russell W. Parker
CSM Charles Toynes

Among the missions of the 1st ADA Training Brigade for which the Commander is responsible are the conduct of basic training for active Army, Reserve, and National Guard personnel, as well as the conduct of advanced individual training in nine ADA operators' MOS. The Brigade also conducts training for Nike warhead custodial units, forward area alerting radar (FAAR) operator and packages, US Marine Corps Hawk and Redeye personnel, National Guard Duster and Redeye personnel, and Allied ADA operators. Finally, the Brigade conducts ADA NCO transition training and supports the School as directed by the Commandant.

The time is fast approaching when Stinger will replace Redeye as our MANPADS weapon system. The time to develop employment concepts which take advantage of Stinger's capabilities is now.

Stinger is very similar to Redeye in appearance, and it is there that the similarity ends. The guidance system of Stinger is far advanced compared to Redeye's. As a result, acquisition range has been significantly increased and, for the first time, we have a weapon with an impressive capability against aircraft flying in a head-on aspect. The days of the revenge shoot are, hopefully, gone forever.

Additionally, Stinger has an identification, friend or foe (IFF), interrogation capability. Previously, this capability was associated only with radar-directed weapons.

Along with the improved capabilities Stinger brings to the battlefield, there is another factor that must be considered. This is Redeye doctrine, organization, and training and its suitability for adoption to Stinger employment. Especially critical is the training aspect. The results of training analyses conducted to determine the proficiency of Redeye gunners in the field were disheartening. In many cases, gunner proficiency was far from the desired level.

These two factors bring several questions to mind:

■ Is the organizational concept for Redeye applicable to Stinger? Will it take advantage of all of Stinger's capabilities?

■ How can Stinger be best employed in support of maneuver elements? Is the equipment currently authorized Redeye sections and teams sufficient?

■ How can Stinger's IFF capability be best used? Does the requirement for visual identification unduly restrict Stinger's range?

■ Is our current command and control system sufficient?

This article will attempt to answer these questions and provide possible solutions to problems based on the considerations of mass, mix, mobility, and integration. The degree to which these principles may be applied when designing defenses for any family of air defense weapons is, of course, dependent on the characteristics of the weapon systems involved. Therefore, it follows that the improved characteristics of the new weapon systems should allow us to do a better job of applying these principles in developing employment doctrine.

Organization.

Redeye is organized under the all-arms concept. This concept is based on the principle that every combat unit should have a simple, reliable, organic means of air defense in addition to its small arms air defense capability. Redeye seems to fill the bill perfectly. It is manportable, mechanically simple to operate, and reliable. With its infrared guidance system, it adds not only mass to the defense of combat units but mix as well.

Because of the mechanical simplicity of the weapon and force structure considerations, it was not thought necessary to create a new MOS for Redeye personnel. Soldiers from various MOS could easily be trained to fire the weapon in a short period of time and maintaining proficiency would be a simple matter. This should have worked out fine, but it didn't.

Although it is mechanically simple to operate, Redeye is still an air defense weapon. As is the case with all these weapons, the actual firing is only a small part of the total task. Redeye personnel also have to be proficient in visually identifying aircraft, determining whether or not an aircraft is in range based on range ring profiles, and air defense command and control procedures. This complicates matters considerably.

Based on the original perception of the simplicity of the weapon system, the organization, in all fairness, is not a bad one. Redeye sections, with from three to five teams, depending on the number of companies, are organic to battalions within the division. The premise of simplicity on which this organizational concept was based, however, is incorrect. Because of this, numerous problems have been encountered.

■ Many combat unit commanders do not realize how much training Redeye personnel require or how this training should be supported. Faced with the usual problem of too few personnel to accomplish all the priority tasks in the unit, commanders use Redeye personnel to perform more and more tasks unrelated to Redeye operations. In some in-

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A NEW DIMENSION

stances, more time has been spent performing these other tasks than performing primary duties.

■ The section's organic vehicles and radios are frequently reassigned to other elements in the unit because of deadline rates and routine needs of the unit.

■ The Redeye section leader often does not carry much weight with the combat unit commander. Until the value of the Redeye section to support the unit's primary mission is discovered, the section leader often is assigned another primary duty. Duty as Redeye section leader thus becomes a low-priority, secondary function which reflects little understanding of air defense by the unit commander being supported by the Redeye units.

■ When given the time to train, the Redeye section often does not have access to the resources, terrain, aircraft, moving target simulators, and qualified evaluators necessary for effective training.

Low morale and loss of tactical and technical proficiency among Redeye personnel result from these problems. Human factors greatly reduce the effectiveness of the Redeye weapon system. Efforts should be made to avoid reducing the effectiveness of the Stinger system in this same manner. The improvements incorporated in the Stinger system have made it a much more versatile weapon system. The chart below summarizes these improvements. Being unclassified, it is necessarily general.

STINGER IMPROVEMENTS OVER REDEYE

■ Enhanced head-on capability.

■ Increased missile speed allows engagement of faster targets.

■ Enhanced IRCCM capability.

■ IFF/SIF.

■ Increased range.

Stinger's improved characteristics make continuous training even more essential than it has been with Redeye. To take advantage of its increased range and head-on capability, Stinger personnel must be able to identify aircraft more quickly than their Redeye predecessors. Hesitation during any of the steps necessary to identify and engage an enemy aircraft could negate the advantages Stinger enjoys over Redeye. This means that both training and the desired level of proficiency will have to increase.

Additionally, Stinger is a valuable weapon for the defense of critical assets. This is not one of Redeye's stronger points. The current Redeye organization does not allow the division commander sufficient control and flexibility to take advantage of this capability.

It appears that many of the training and employment problems mentioned can be solved by the centralization of all Stinger assets into a battery at division level. The battery would, of course, be commanded by an Air Defense Artillery officer. This type of organization would have many advantages:

■ The air defense officer would be familiar with the training needed by Stinger personnel and know how to conduct it.

■ More time would be available to devote to training.

■ Stinger personnel would benefit from interaction. Sections would be able to exchange accounts of their experiences, problems encountered, and problem solutions.

■ Much more time would be devoted to improving employment concepts and the execution of these concepts.

■ Stinger weapon systems could be concentrated at critical times and places rather than being dispersed over the whole division area. This would make achieving required mass and mix much easier and would allow Stinger to be used in defending critical assets.

■ Coordinating operations with other weapon systems would be much easier and much more effective.

■ Organic vehicles would not be devoted to other purposes.

■ Maximum use could be made of available training facilities.

GER

FOR AIR DEFENSE

By Captain Douglas E. Warren

The battery organization concept offers the combat unit commander the best of all possible worlds, so to speak. He gets the air defense he needs when he requires it without having the responsibility to train personnel in an area in which he is not familiar. Beyond that, it also increases his chances of getting the correct air defense weapon system for the type of mission he has been assigned. Stinger, because of its organic ¼-ton truck and its inability to shoot on the move, is not the ideal weapon system to support maneuvering units, especially in the offensive. The DIVAD gun is being designed to fulfill this need. The battery organization concept would allow the use of each weapon system in the environment best suited to its performance characteristics and organic equipment.

Support of Maneuver Units.

The next question which needs to be addressed is how best to support a maneuver battalion, particularly one in the offense or in a mobile defense. Redeye doctrine calls for a section with from three to five teams, depending on the number of maneuver companies, to support a battalion. In the offense, coverage would be weighed forward by placing Redeye teams in direct support of a maneuver company. If the teams could not keep up with the company in their organic ¼-ton truck, they would "share-a-ride" in one of the maneuver companies' APCs. The same is true for the mobile defense when units are moving to concentrate in the MBA.

The employment concept was, perhaps, the best that could be managed, given the fact that Redeye could only effectively defend a unit if sitting on top of it. The concept does pose some ancillary problems. While the ¼-ton truck can keep up with APCs and tanks in most training situations, its ability to do so on the battlefield is questionable, especially after the battlefield is subjected to enemy artillery fire, tank fire, and air-delivered ordnance. If the team does keep up, it then has to face the fact that it has the only unarmored vehicle in the battle formation. This makes the team extremely vulnerable to enemy fire, both direct and indirect. The current feasible alternative is to have the MANPADS gunner share a ride with an APC in the formation, which reduces its vulnerability but imposes some problems of its own. The Stinger basic load (six missiles) requires the entire bay of the APC. Very little room is left on top, or especially on the sides, of the basic load. Exiting the APC becomes extremely difficult, which kills the quick reaction capability of the team. Additionally, maneuver companies and battalions do not have extra APCs that they can lend to Stinger teams to carry the basic load. This means that if Stinger teams do "share-a-ride," they must do so with a reduced combat load, a fact that is not mentioned at all in our Redeye "How-To-Fight" manual. So we trade off firepower for mobility. If the team does share an APC ride, the mobility problem is solved but at the cost of decreased firepower and a degraded communications capability. The radio in the APC is needed by the company personnel for command and control. While the receiver/transmitter from the AN/GRC-160 radio can be removed from the team's vehicle and carried along, a buttoned up APC reduces wave propagation and radio range.

The first suggestion offered to solve these problems is to drop the "share-the-ride" concept. The second is to drop the concept of teams traveling directly with maneuver companies as the primary method of employment. The "share-the-ride" concept, at best, would allow the team to take two weapon rounds. Resupply would be required because of the lack of space in the APC for the basic load. This limits the team's effectiveness drastically. New equipment is being studied that would solve these problems. However, budget constraints have kept us from getting APCs authorized as the organic vehicle for teams in support of mechanized and armored combat maneuver units in the past. It is likely that the financial constraint will get worse instead of better in the future. New equipment, if it comes, will certainly be too far in the future to solve the immediate problem.

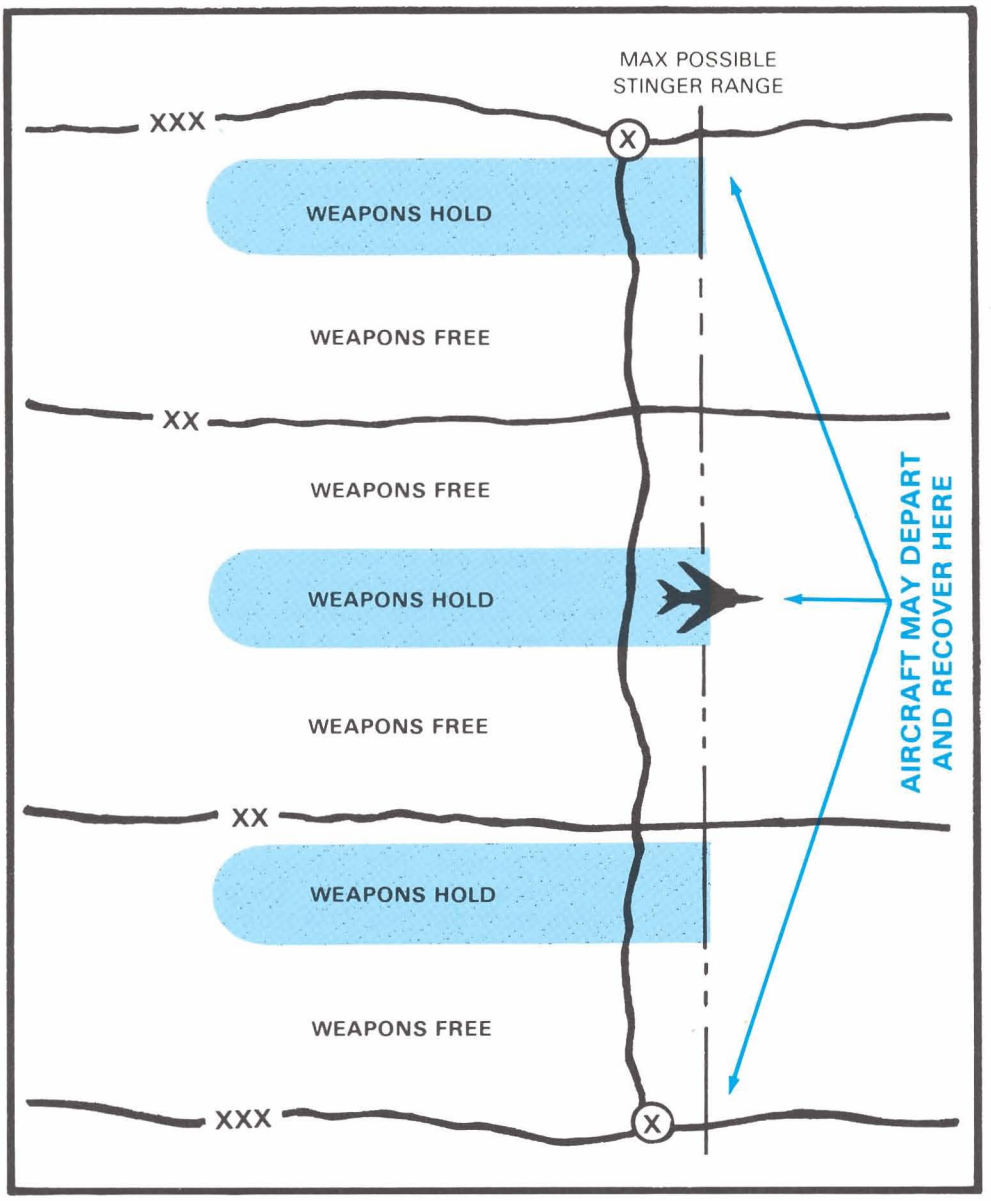
With Stinger's forward engagement capability and improved range, it is no longer necessary to be a company-size maneuver element to defend it. Other options for employment with a maneuver element are available.

Based on the known employment characteristics and limitations of Stinger, the section leader should retain complete control over his teams. Teams would be positioned approximately 500 meters behind advancing maneuver companies, taking advantage of Stinger's forward engagement capability. This type of employment should solve the problem of vulnerability to enemy fire. The relative freedom the team would have to select routes between positions would also help the mobility problem, but it would not completely solve it. A mobility problem still would exist. Only a change in equipment could solve that. I believe, however, that the suggested method of employment would maximize the use of our old equipment until new equipment comes on board.

The Identification Question.

In past years there has always been a definite distinction between radar-directed weapons, such as Nike Hercules and Hawk, and weapons such as Chaparral, Vulcan, and Redeye. With the introduction of new weapon systems, Stinger, Roland, and the DIVAD gun, the boundary between the two types of system is disappearing.

SHORAD/MANPAD systems traditionally have relied on visual identification to determine whether to engage an aircraft. The range of the older weapon systems was not unduly restricted by this requirement. The newer systems, however, have increased range capabilities. Reliance on visual identification greatly restricts their useful range. In essence, what we end up with is a new, improved, multimillion dollar system which can-



not fire much farther than its predecessor because of the visual identification requirement. This is not meant to imply that the only improvement in new systems is the range. Many other improvements have been made. Range, however, is an important consideration. Additionally, how do we use Stinger's new IFF capability? These problems will become increasingly important as the range of Stinger increases with product improvements.

It seems apparent that we will somehow have to eliminate the requirement for visual identification if we are to use the new systems to their maximum capabilities. Declaring open season on all aircraft would be nice from the air defender's point of view and would provide the ground units maximum protection. But this has a tendency to frighten the staunchest of our pilots. For Roland and the DIVAD gun, both of which have radars, the best solution would probably be to identify targets in the same way that the Hercules and Hawk systems do. They would, of course, maintain the ability to visually identify targets if the need arose. This would mean, however, modifications to the planned systems. Altitude and speed readouts would have to be incorporated into each fire unit and the command and control systems, ideally, should be integrated with an AADCP or an Air Force facility. This system, of course, does Stinger no good.

One possible solution for Stinger would be to reinvent an old idea—blinking. The theater of operations could be divided into sectors as small or as large as deemed appropriate. All of the Stinger sections in some sectors could be given WEAPONS HOLD to allow friendly aircraft to depart and recover while the remaining sections would be given WEAPONS FREE. The sectors would be changed at given intervals. The danger in this, of course, is that enemy aircraft could slip in behind friendly aircraft without being engaged. An additional precaution that might help preclude this danger is to predicate the WEAPONS HOLD command on the bearing of the aircraft. This system would allow Stinger teams in WEAPONS FREE sectors to engage aircraft based on an unknown IFF response. Visual identification would have to be made only for those aircraft where a positive Mode 3 IFF response was received.

Failing a system such as this, the IFF unit would only relieve the Stinger team of the necessity for visually identifying aircraft responding in Mode 4 IFF under WEAPONS TIGHT, our normal weapons control status. This may or may not assist the team in meeting the air threat, depending on the tactical situation.

Command and Control.

Redeye currently receives early warning and command and control information from two pri-

mary sources: the Chaparral/Vulcan (C/V) battalion headquarters and the forward area alerting radar (FAAR). Two problems are inherent in this system:

■ This type of information is extremely perishable. Currently, command and control information has to be transmitted to the C/V battalion headquarters and then retransmitted to Redeye section. This delays the information.

■ Early warning information is difficult to correlate with actual targets. Thus, the team leader is never quite sure whether the target he is observing is the target on which he received early warning.

A lot of work is currently being done in this area. Replacements for the TADDS receiver are under development which will improve the correlation of actual targets to early warning information. Studies are also being conducted to determine the most effective means of getting information from an AADCP to the Stinger section.

One of the most promising systems involves providing each Stinger section with an AN/URR-69 radio receiver. With this receiver, the section can monitor early warning and command and control information broadcast by the C/V coordination officer located at an AADCP or other control facility. This eliminates the need to go through the C/V battalion headquarters for this type information. The link to the C/V battalion would thus become a backup should the primary system fail.

Conclusion.

The air threat against our forces increases each year. To counter this it is not sufficient to just develop new equipment. Our organization and employment concepts must be changed to make the maximum use of both old and new equipment. Numerous studies have been or are being conducted along these lines. Studies are necessary to clarify and refine capabilities and limitations, but the time for critical decisions rapidly approaches.

The questions posed in the beginning of this article will be the basis for some of these decisions. In my opinion, the Redeye organizational concept does not take full advantage of Stinger's capabilities and should be abandoned. I believe that the battery concept offers a much improved application of the principles of mass and mix. It also improves mobility from the standpoint that weapon systems would not be employed in situations where their mobility capability would be severely taxed or inadequate.

In those situations in which Stinger must be employed in support of maneuvering combat units, my conclusion is that the currently authorized vehicle is not sufficient, but it's the best we're going to get for a long while. By defending maneuver units from overwatch positions immediately behind advancing forces, we can maintain effective coverage while reducing the vulnerability of the Stinger team. By planning positions at the section level so that teams are not isolated and capable of defending only one maneuvering company element, mass will be increased.

The identification problem will remain a key issue for a long time to come. The blinking system, which would allow teams to engage aircraft based on an unknown IFF response, has merit. It also has several drawbacks. If we do not come up with a method of limiting our dependence on visual identification, however, we will not fully use our new systems. There appears to be no easy answer to this problem.

The use of the AN/URR-69 receiver would greatly increase our command and control and early warning capabilities. The problem of correlation of early warning data with actual targets will remain until new equipment is designed to counter it. This equipment is being designed now and will significantly increase our capabilities when it arrives.

This article has pointed out a few of the problems which must be solved to insure effective employment of our SHORAD/MANPAD systems. The proposed solutions are by no means the only ones. Whatever the solutions, the problems must be solved and solved quickly. To uphold the proud traditions of Air Defense Artillery, we must employ this new, improved system in such a way as to maximize its inherent capabilities.

Captain Warren graduated from West Point in 1973 and was subsequently assigned to a Nike Hercules battery in Rhode Island; a Hawk battery in Key West, Florida; and to Headquarters, 38th ADA Brigade in Korea (as assistant S1 for administration). He then attended the Officers Advanced Course at Fort Bliss and is currently assigned to the Directorate of Training Developments, US Army Air Defense School, writing a Stinger How-To-Fight Manual.

PSYOP

The Need To Communicate

MAJOR ALLAN J. FUTERNICK

Psychological operations (PSYOP) are a means by which we attempt to either change or maintain the thinking, feelings, or actions of members of a target audience (enemy, friendly, or neutral groups) to support the achievement of our national objectives. Psychological warfare (PSYWAR) is one form of PSYOP and is only directed toward enemy forces or enemy populations. Most Americans who served in Vietnam have some knowledge of this aspect of PSYOP.

Some nations, including both Communist and non-Communist governments, include their own armed forces as part of the PSYOP target audience. For example, the Soviet Union, the People's Republic of China (PRC), and the Republic of China (ROC) have a Political Warfare (POLWAR) organization as part of their armed forces that deals not only with the target audiences above but also the morale, discipline, and loyalty of the troops themselves. The Political Warfare Officer has greater influence over the commander in the Communist system than in non-Communist systems. In Vietnam, both North Vietnamese and South Vietnamese armed forces employed POLWAR organizations, with the latter following the ROC model.

The United States, on the other hand, refrains from conducting PSYOP campaigns against its own armed forces. Efforts to maintain and strengthen the morale, discipline, and loyalty of our own troops are directed through command information programs and the chain of command.

PSYOP accomplishes its objectives through the process of communication. That is what PSYOP is all about. Unfortunately, too many commanders have placed more emphasis on the "gadgetry" used to deliver the PSYOP message (i.e. leaflets, loudspeakers, radio broadcasts) than they have on the communication process itself.

The specific type of communication required for PSYOP is propaganda, a term that typically brings about a negative reaction for most Americans and has somehow become synonymous with "lies" and "dirty tricks." Actually, propaganda is simply

> . . . any form of communication in support of national objectives designed to influence the opinions, emotions, attitudes, or behavior of any group to benefit the sponsor, either directly or indirectly.

Propaganda, therefore, is not merely the presentation of objective information, since not all information is credible, nor does it necessarily have any propaganda value. Indeed, there are times when truths may have little credibility with a target audience, while untruths may be readily accepted as truths. The following example noted by William E. Daugherty in his work, A Psychological Warfare Casebook, should serve to illustrate this dichotomy.

> During the Korean conflict the UN forces printed and distributed among Chinese Communist troops a leaflet containing a photograph of the bodies of Chinese Communist troops lying on a hillside. The accompanying caption stated that these troops had died needlessly resisting UN Turkish forces.

Although the caption stated the truth, a panel of Chinese Communist POWs, who were used to review UN propaganda materials, stated that the caption was indeed a lie. The panel members believed that the Turks had been driven out of Korea following a battle a year earlier in which (according to Chinese Communist propaganda) the Turkish Regimental Combat Team had been wiped out.

Daugherty concludes that had the leaflet stated that the Chinese had been killed by UN French forces (although it would have been an untruth), it probably would have had more credibility and a greater effect on a larger number of the enemy troops, since there was no reason to doubt the fact that the French still possessd an effective fighting force.

The psyoperator must, therefore, have a thorough understanding of the social psychological and cultural makeup of the intended target audience if the communication is to have any effective propaganda value.

PSYOP is tied to our national policy and direction begins at the presidential level. Coordination takes place at the highest levels among such agencies as the Department of Defense, Department of

State, and United States Information Agency. Under the Department of Defense, the Joint Chiefs of Staff (JCS) Special Branch, J3, is responsible for PSYOP within the JCS, while within the Department of the Army it is the Special Operations (CSOPS) Branch.

During peacetime, the chiefs of diplomatic missions are responsible for the direction, coordination, and supervision of PSYOP in their respective countries. Department of Defense provides the military forces for PSYOP missions, with the Army having the primary role among the services.

During wartime, coordination still takes place at the national level (where guidelines are issued) but development and conduct of PSYOP are now the responsibility of the military commander in the theater of operations.

Psyoperators do not operate in a vacuum. They must receive support from commanders of tactical units (as well as staff officers) in operations in each of the three categories of PSYOP — tactical, strategic, and consolidation.

One of the biggest problems for gaining support for PSYOP from commanders in the field is the difficulty in establishing a cause-and-effect relationship between a PSYOP campaign and tactical success on the battlefield. Tactical PSYOP are designed to exploit vulnerabilities in foreign military forces and populations in support of tactical military operations.

The indicator most widely used to measure success is the number of enemy troops who surrender. Tactical PSYOP campaigns conducted in the absence of conventional military operations, however, tend to yield meager results, as do military campaigns without PSYOP support with respect to the number of enemy soldiers surrendering. Successful appeals in tactical PSYOP have tended to be those that have appealed to the enemy to surrender in the face of a vastly superior force, rather than those which have called upon him to reject his homeland or change his ideological beliefs. The tactical commander and the psyoperator, therefore, must work hand in hand.

Strategic PSYOP are designed to further broad or long-term objectives. Guidance for such operations usually emanates from high levels of authority and is directed at forces, people, or areas in their entirety.

These operations focus on the weaknesses in the enemy's military, political, social, and economic systems and bring them to the attention of the enemy military and civilian population. The results of such campaigns are not readily apparent in the short run, and cause and effect relationship between PSYOP efforts and the deterioration of the enemy's national will is often difficult to establish. As a result, many tactical commanders in the past have given only lip service to supporting long-term strategic PSYOP campaigns. However, it is these PSYOP efforts that must be successful in the final analysis if an enemy is to be defeated.

Consolidation PSYOP are directed toward the population in friendly areas or territories occupied by friendly military forces to promote maximum cooperation among the civilian population. Failure to obtain this cooperation will tend to make the achievement of both military and political victory extremely difficult (if not impossible), a lesson the United States learned in Vietnam. In this aspect of PSYOP, every military action has some psychological impact, as does the individual behavior of each soldier when in contact with the local populace.

What does the future hold for PSYOP? It should be clear to the reader from the foregoing discussion that the effective employment of PSYOP in any future conflict will require effective communication between the psyoperator and the target audience and among the psyoperator and the field commanders and their staffs. It is this flow of communication that must be established today if we expect to win the first battle tomorrow.

Major Futernick holds an M.A. and PhD in Sociology from the University of Alabama, graduated from C&GSC, and is a member of the Foreign Area Officer Program. He has command and staff experiences in PSYOP units. Formerly an Assistant Professor at the US Military Academy, he is now Executive Officer, 4th Bn (FAW), 1st ADA Training Brigade.

WHAT DO YOU DO NOW,

LIEUTENANT?

Prepared by Tactics Department, USAADS

Major Charles C. Walden

SITUATION:

In anticipation of his assignment to the 2d Battalion, 444th Air Defense Artillery (Hawk) (Triad), First Lieutenant Jones had written to the battalion commander to provide information about his background and to request information about the unit. With justifiable pride, Lieutenant Jones noted he was the top student in the Hawk officer's course he was completing at the US Army Air Defense School (USAADS).

Lieutenant Colonel Thomas, the battalion commander, eagerly awaited Jones' arrival in the battalion because after receipt of his letter, Colonel Thomas had been advised that his battalion was being designated the direct support (DS) Hawk battalion for the 52d Mechanized Infantry Division. Only a few of the battalion's officers had received any formal training in a Hawk battalion's DS role. Colonel Thomas, however, remembered that such a course is part of the Hawk officer's course.

Shortly after his arrival and assignment as assistant S3, Lieutenant Jones was tasked to prepare a lesson on Hawk in DS of a division for presentation during a battalion officers' call. To add special emphasis to the importance of the training, Colonel Thomas personally conferred with Lieutenant Jones. "Joe, while I was in the precommand course at Fort Bliss, some mention was made of this role for Hawk; however, at that time I bypassed the elective course to further my knowledge in other areas. Fortunately, I now have an officer of your caliber to help in this most important training for my other officers. Your background as a former platoon leader in a divisional Chaparral/Vulcan battalion and as the best student in Hawk at Fort Bliss should aid you in preparing the training. See what you can put together so we can get the whole battalion rolling on this DS mission. I'd like to hear your rehearsal in 2 days."

"Can do, Sir. I'll set up a rehearsal time with Major Payne, the XO."

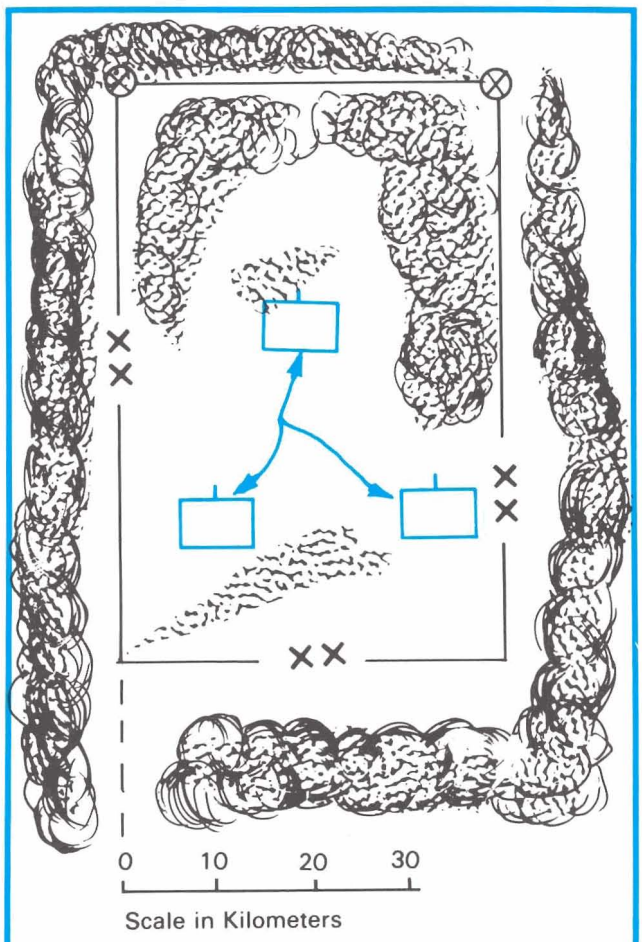
"Fine, Joe. I'm counting on you."

SOLUTION:

Lieutenant Jones organized his notes, based on his instruction at the Air Defense School. He decided to highlit the information from that instruction and FM 44-1:

- Reasons for the DS mission.
- The Hawk battalion liaison officer's function.
- Chaparral/Vulcan (C/V) battalion liaison requirements.
- Employment guidelines for an organization defense.
- Position requirements.
- Movement of the Hawk battalion within the division.

He then noted that after highlighting these



HAWK (TRIAD) in Support of division (Composite Coverage of 3 batteries in a triangular battalion)

points he would later have to address the following additional important considerations for the DS role:

- The integration of fires of other ADA units.
- How batteries move to support the scheme of maneuver.
- Detailed DAME functions by the Hawk liaison officer.
- Coordination with the Hawk battalion in the adjacent divisions.
- Logistics, including the DS platoon, and missile resupply.

He remembered that his instruction at USAADS was a 3-period block, so he decided to request an additional 2 hours at a later time to complete his training mission by covering the foregoing points. He also made a note to order Training Film 44-6007, "Improved Hawk in Support of the Division." The 22-minute color film would be an excellent supplement to graphically portray the battalion's role.

The day prior to the rehearsal for Colonel Thomas, Lieutenant Jones briefed Major Axelrod, the S3, and Major Payne, the XO, on his proposed presentation.

a. Reasons for the DS Mission:

(1) This mission requires the Hawk battalion to establish liaison and communications with the division.

(2) It allows the Hawk battalion commander to deploy his own units and to assume the division's area as his primary responsibility for air defense protection.

(3) Although not normally done, the DS mission permits the Hawk battalion commander to further assign his batteries a DS mission.

b. The Hawk Battalion Liaison Officer:

(1) As part of establishing liaison and communications with the supported division, the Hawk battalion sends a liaison officer to the division tactical operation center (DTOC) to work closely with C/V and aviation personnel in the division airspace management element (DAME) of the DTOC.

(2) Coordinates with the DAME and other DTOC elements:

(a) Enemy air activity and threat data received through ADA channels.

(b) Air defense rules and procedures from the air defense region commander and corps ADA officer.

(c) Plans, activities, and status of the Hawk battalion.

(d) Battalion requests for route and position approval.

(3) Keeps Hawk battalion informed on:

(a) Division priorities for protection.

(b) Plans and activities of the division.

(c) Army and Air Force use of division airspace.

(d) Action on battalion requests for route and position approval.

c. C/V Battalion Liaison:

(1) Hawk complements the divisional C/V battalion's coverage by providing area coverage, giving increased medium altitude air defense protection to forward maneuver elements and other battlefield assets. Additionally, Hawk further complements the defense by providing an all-weather capability and increasing weapons mix which compounds the enemy's electronic countermeasure problem.

(2) The DS Hawk battalion becomes integrated into the division's AD plan through Hawk and C/V commander-to-commander coordination in support of the division's scheme of maneuver and priorities for protection. The C/V commander remains the division AD officer and principal adviser to the division commander on AD matters.

(3) The C/V battalion will effect liaison by placing personnel in the Hawk battalion Army air defense command post (AADCP) to gather Hawk AADCP time-sensitive information such as early warning and changes in AD rules of engagement for use in the C/V AADCP and DAME.

d. Employment Guidelines for an Organization Defense: The DS Hawk battalion uses situation-dependent employment guidelines that are applicable to defense of an organization. Firing batteries must be positioned to obtain:

(1) Weighted coverage: weighted toward the forward edge of the battle area (FEBA) or line of contact (LC) and any exposed (having little or no coverage from an adjacent ADA unit) unit boundaries.

(2) Early engagement: to insure coverage of low-altitude routes of approach to engage aircraft before they penetrate the FEBA or LC.

(3) Defense in depth: so as to subject attacking aircraft to an ever-increasing volume of fire until the threat is destroyed or aborts its mission.

(4) Mutual support or overlapping fires: enables one Hawk unit to deliver effective fire into the dead zone of an adjacent Hawk unit by placing adjacent Hawk firing platoons no farther apart than 20 kilometers. Overlapping fires enable one Hawk unit to overlap the engagement capability of an adjacent Hawk unit to prevent gaps in the defense by placing firing platoons no farther apart than 40 kilometers.

e. Position Requirements: Hawk equipment needs high, open terrain. Special position requirements include:

(1) Radar masking: position batteries to reduce masking along their primary target lines.

(2) Security: position batteries to reduce vulnerability to enemy artillery and ground action. If possible, position batteries no closer than 20 kilometers from the FEBA or LC.

(3) Accessibility: allow for relatively rapid entrance and exit.

(4) Communications: line of sight is necessary between the battalion and the batteries and between the batteries and platoons.

(5) Availability: terrain to be occupied must be unoccupied by other units. If conflicts develop with other units for use of specific terrain, justification may have to be provided the division G3 (operations officer).

(6) Cover and concealment: necessary to enhance survivability.

(7) Technical considerations: Hawk batteries have specific technical requirements including cable length, equipment line of sight, fairly level terrain, and safe distances between radars.

f. Movement of the Battalion Within the Division:

(1) The DS Hawk battalion will move to support the division's scheme of maneuver. As the division maneuvers, the Hawk batteries will move by echelon to provide continuous coverage over the division area of responsibility.

(2) Moves will also be made to enhance survivability.

(a) After an engagement.

(b) After being reconnoitered by air.

(c) When the unit's position is threatened by enemy ground action or artillery fire.

(d) Every 8-12 hours.

(e) Other measures that enhance survivability are:

1. Concealment and camouflage.
2. Cover.
3. Electronic deception.
4. Dummy and decoy positions.
5. Local defense.

Majors Payne and Axelrod felt the briefing was outstanding and both expressed feelings of enlightenment about the DS mission for the battalion. They concurred in approving the briefing for rehearsal before the battalion commander.

Following the rehearsal the next day, Colonel Thomas was so elated that he told Lieutenant Jones, "Joe, I'm going to forego my normal messages presented at the battalion officers' call in deference to your highly informative briefing. I'll insure that you get priority at TASC for preparation of your training aids. Be ready to brief the battalion officers 10 days from now at 1700. I'll also insure that you get another 2 hours to address your other points within a week following the initial briefing. Great job and thanks much."

Major Walden is a graduate of Ripon College, holds a Master of Arts degree in Psychology from the University of Texas at El Paso, and is an honor graduate of the Command and General Staff College. He has commanded a Hawk battery on Okinawa, served as S4 of an infantry brigade in Vietnam, and taught ROTC at New Mexico Military Institute. He is presently a senior instructor in the Tactics Branch, Tactics Department, US Army Air Defense School.

Continued from page 14.
related ships.

Both the law and Army policy have change substantially. Women are an integral part of the Army's mission. Army Chief of Staff, General Bernard W. Rogers, recently stated in an interview, "In the last 5 years the number of women in the active Army has more than tripled. . . Today women are successfully performing a wide variety of duties, many of which were considered solely in the male domain just a few years ago. . . Those of us in authority must reaffirm our conviction that women are an integral part of the Army. With this in mind, we must insure that women are provided an equitable opportunity for assignment in their specialty, are given adequate training, and are held responsible for the full range of duties prescribed for their assigned positions."[2]

The current policy regarding employment of women in Air Defense Artillery specialties and units results in increasing numbers of women soldiers of many MOS being assigned. The extent that these organizations will be successful in integrating women into their duty positions as replacements will, to a large extent, be influenced by attitudes and perceptions held by soldiers and leaders in the unit regarding women as soldiers. Problems associated with these attitudes and perceptions is the topic of an accompanying article on women soldiers.

On 20 December 1977, the Secretary of the Army announced the official policy of the Army regarding employment of women in combat. This policy opened many duty assignments to women soldiers that never existed before. Basically, it permits women to serve in any officer or enlisted specialty (except those listed in table 1)[3] at any organizational level, in any combat arm except Infantry, Armor, cannon Field Artillery, Combat Engineers, and low-altitude ADA (Chaparral, Vulcan, Redeye) units of battalion/squadron or smaller size.[4] This policy is usually called the Combat Exclusive Definition (CED).[5]

TABLE 1. OFFICER/ENLISTED SPECIALTIES EXCLUDED

OFFICER

Specialty Code

11 Infantry
12 Armor

Specialty Skill Identifier

13A Common Field Artillery
14B SHORAD Officer
15B Combat Aviation Officer [a]
21A Combat Engineer
48E Unconventional Warfare Officer

Additional Skill Identifier

1R Aerial Scout

WARRANT OFFICER

MOS

100E Attack Helicopter Pilot
224B Short-Range ADA System Technician

ENLISTED

11B Infantry
11C Indirect Fire Infantryman
11H Heavy Antiarmor Weapons Crewman
12B Combat Engineer
12C Bridge Crewman
12E Atomic Demolitions Munitions Crewman
12Z Combat Engineering Senior Sergeant
13B Cannon Crewman
13E Cannon Fire Direction Specialist
13F Fire Support Specialist (Forward Observer)
16F Light ADA Crewman (Reserve Forces)
16P ADA Short-Range Missile Crewman
16R ADA Short-Range Gunner Crewman
17K Ground Surveillance Radar Crewman
19D Cavalry Scout
19E M48/M60 A1/A3 Armor Crewman
19F Tank Driver
19G Armor Reconnaissance Vehicle Crewman
19H Armor Reconnaissance Vehicle Driver
19J M60A2 Armor Crewman
19Z Armor Senior Sergeant

[a] Women may hold this specialty but may not pilot a helicopter in the attack role.

Prior to announcement of the CED, a special group was formed to study enlisted MOS and officer specialties and units to determine which MOS specialties should be open to women. This group is called the Evaluation of Women in the Army

TABLE 2

EVALUATION OF

CURRENTLY: OPEN ☐ CLOSED ☐ **RECOMMENDATION:** OPEN ☐ CLOSE ☐

SOURCE OF MOS REQUIREMENTS	DISCRIMINATING FACTORS A COMBAT EXCLUSION DEFINITION	B CAREER PROGRESSION	C PHYSICAL CAPABILITIES/ LIMITATIONS	D ATTITUDES/ PERCEPTIONS
1. AR 611-101 AR 611-112 AR 611-201				
2. CRITICAL TASK				
3. PHYSICAL REQUIREMENTS				
4. FIELD SURVEY OPINIONS				
5. OTHER SOURCES				

DISCUSSION:

RECOMMENDATION:

(EWITA) Study Group. The EWITA group identified MOS requirements, career progression, physical capabilities and limitations, attitudes, and perceptions as discriminating factors in guiding recommendations for opening or closing MOS, officer specialties, and units (or parts of units) to women soldiers.

MOS or specialty requirements were researched in AR 611-201 (enlisted MOS), AR 611-112 (warrant officer specialties), and AR 611-101 (officer specialties). Critical tasks for performers in each MOS/specialty were gathered from soldier's manuals, MOS data bank surveys, ARTEPs, and technical manuals.

Physical tasks for specialties and MOS were extracted from a TRADOC list of physical tasks. Each TRADOC school furnished a list of physical tasks as part of the Baseline and MOS/SQT Physical Training Program development project. The physical task list described weights to be lifted, distance objects were to be carried, and frequency of repetition for each critical physical action performed by soldiers in various MOS. The physical tasks were matched with physical performance data collected on women in other studies. Go/no-go decisions of physical qualifications of women soldiers to perform in an MOS were based on this analysis.[6]

Field opinion surveys and other sources rounded out the documentation consulted to identify and list discriminating factors to aid in the formulation of a decision for or against opening an MOS or specialty to women.

The overall picture of go/no-go recommendations for opening of a specific MOS to women was summarized on a data sheet, which is shown in Table 2. This data sheet was prepared for each MOS and specialty in the Army.

Following analysis of each MOS, the EWITA team studied TOE units to form recommendations to open or close entire units or portions of units to women soldiers. A two-step procedure was used to determine which TOE organizations should be opened or closed to women. First, the MOS in the TOE were examined. If one MOS in the unit was open to women, then the unit was opened to assignment of women soldiers. If all MOS were closed to women, then the entire unit was closed to women.

TOEs were also examined in light of the Combat Exclusion Definition. TOE mission and capabilities statements were examined for key phases indicating offensive and defensive activities. Basic knowledge of weaponry used by each TOE/branch was important to proper analysis of the mission statements. This expertise was furnished by combat arms officers and senior NCOs assigned to the EWITA group. If the mission and capabilities of the unit placed it in an offensive posture and the primary weaponry was fired in direct line of sight with visual observation on the target, then the TOE was closed to women soldiers. If the TOE mission and capabilities resulted in an offensive posture, and the principal weaponry was fired in a non-line-of-sight (mechanically aimed) mode, the TOE was opened to women.

ADA warrant officer specialties open to women are 221B (Missile Assembly Technician, Nike), 222B (Missile Fire Control Technician, Nike), and 223B (Missile Systems Technician, Improved Hawk).

ADA commissioned officer specialties open to women for assignment are 14A (Air Defense Artillery Officer, General), 14C (Nike Hercules Missile Air Defense Artillery Officer), 14D (Hawk Missile Air Defense Artillery Officer), 14F (Guided Missile Systems Officer), and 14G (Air Defense Artillery Command and Control Officer).

FOOTNOTES

[1]"Women May Yet Save the Army, Time, October 30, 1978, p. 42.

[2]"Women are an Integral Part of the Army," "Recruiting and Reenlisting Journal," June 1978, p. 26.

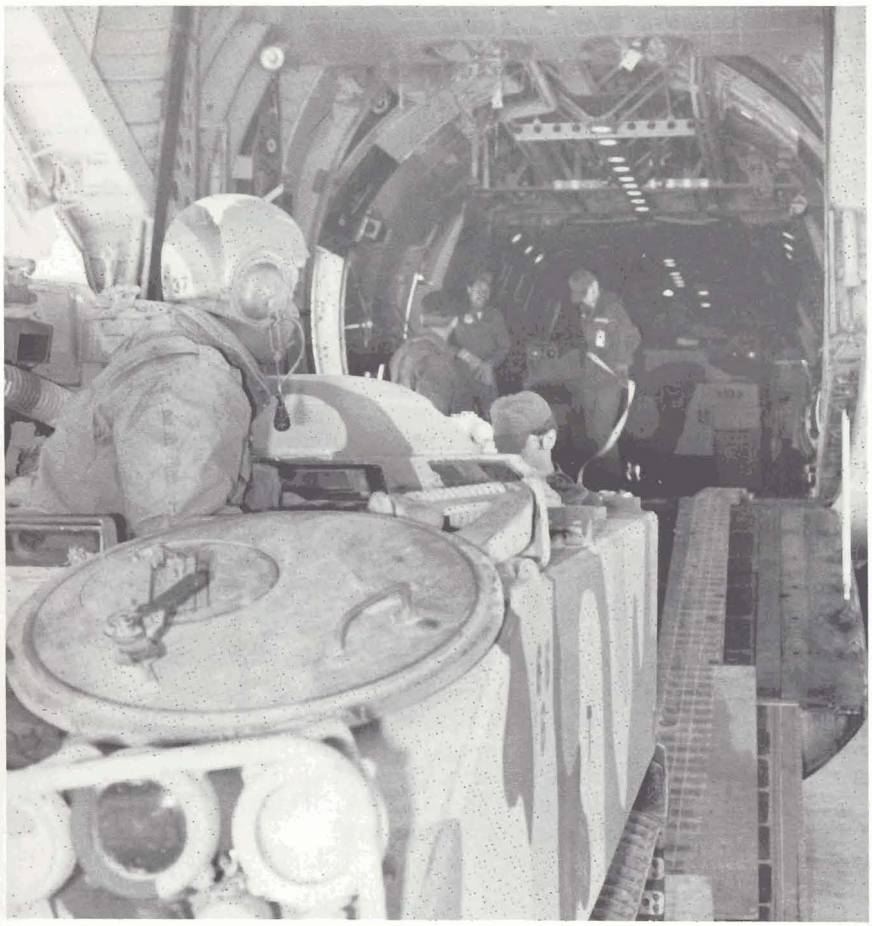
[3]Fact Sheet, DAPE-MPE, August 14, 1978, Subject: DA Combat Exclusion Policy.

[4]Ibid.

[5]Specifically stated, the CED states "women will be excluded from positions which have as their primary function the crewing or operation of direct and indirect fire weapons." The Evaluation of Women in the Army Study Group excluded indirect fire weapon mechanically/electrically aimed and fired.

[6]The physical task list and actions described were subjected to extremely close examination by EWITA to insure physical requirements were not injected with intent to close MOS to women.

Captain Lewis is a graduate of Pennsylvania State University, with a degree in Business Logistics. Also a graduate of the Air Defense Artillery Officer Advanced Course, he has served as a Hercules training battery commander, a Vulcan gun battery commander, and a battalion S4. He was an SQT developer for Chaparral/Vulcan operators and mechanics and task analyst at USAADS when this article was written. He was recently assigned to the 38th ADA Brigade.



VIEW from

E. C. S

FTX BO

Elements of Fort Bliss' 11th Air Defense Artillery Group, The School Brigade, and the 3d Armored Cavalry Regiment recently participated with the Air Force in a training exercise called Bold Move.

Twelve Air Force C5A Galaxies and 15 C141 Starlifters were used to transport men and equipment from Fort Bliss to Fort Carson, Colorado. The Fort Bliss units then participated in a field training exercise at Fort Carson before returning to Fort Bliss.

At the same time soldiers from the 4th Infantry Division (Mechanized) from Fort Carson deployed to Fort Bliss and "attacked" an aggressor force from the 3d Armored Cavalry Regiment.

Fort Bliss units participating in the exercise were B Battery, 2d Battalion, 55th Air Defense Artillery, 11th Air Defense Artillery Group; A

Photos by E. St

the FIELD

ARNS

D MOVE

Battery, 1st Battalion, 55th Air Defense Artillery, The School Brigade; and I Troop, 3d Squadron, 3d Armored Cavalry Regiment.

The purpose of the exercise was deployment training for the individual Fort Bliss units and to give Fort Bliss staff personnel an opportunity to test liaison procedures between the Air Force's Military Airlift Command and the US Army Air Defense Center and Fort Bliss.

The 2d Battalion, 55th ADA personnel fielded an Improved Hawk battery, while the 1st Battalion, 55th ADA deployed a self-propelled Vulcan platoon. I Troop personnel involved in the exercise included armor and infantry soldiers.

A severe winter storm in Colorado delayed the initial phases of the exercise; nevertheless, units were soon actively participating from both Army installations.

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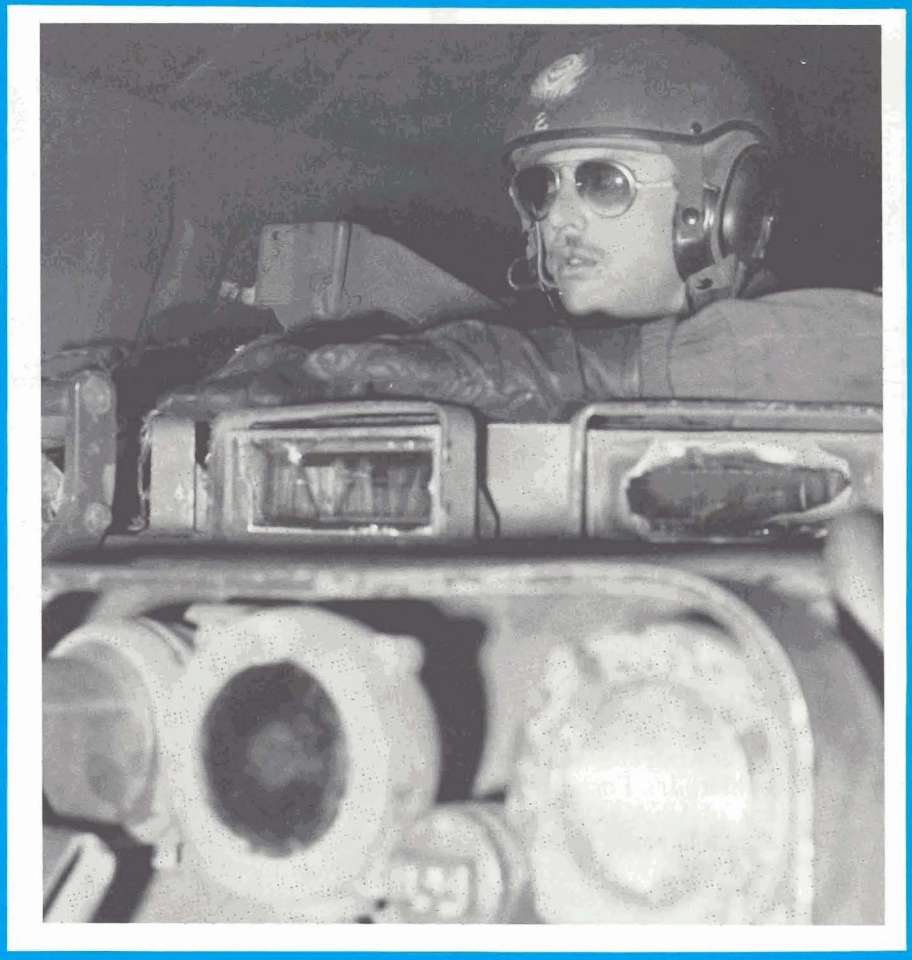
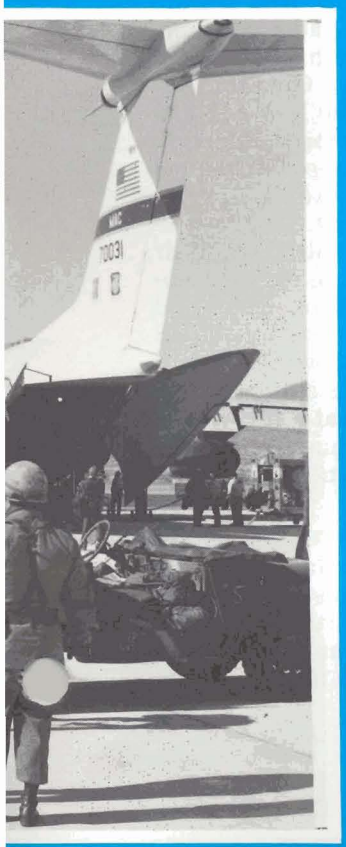
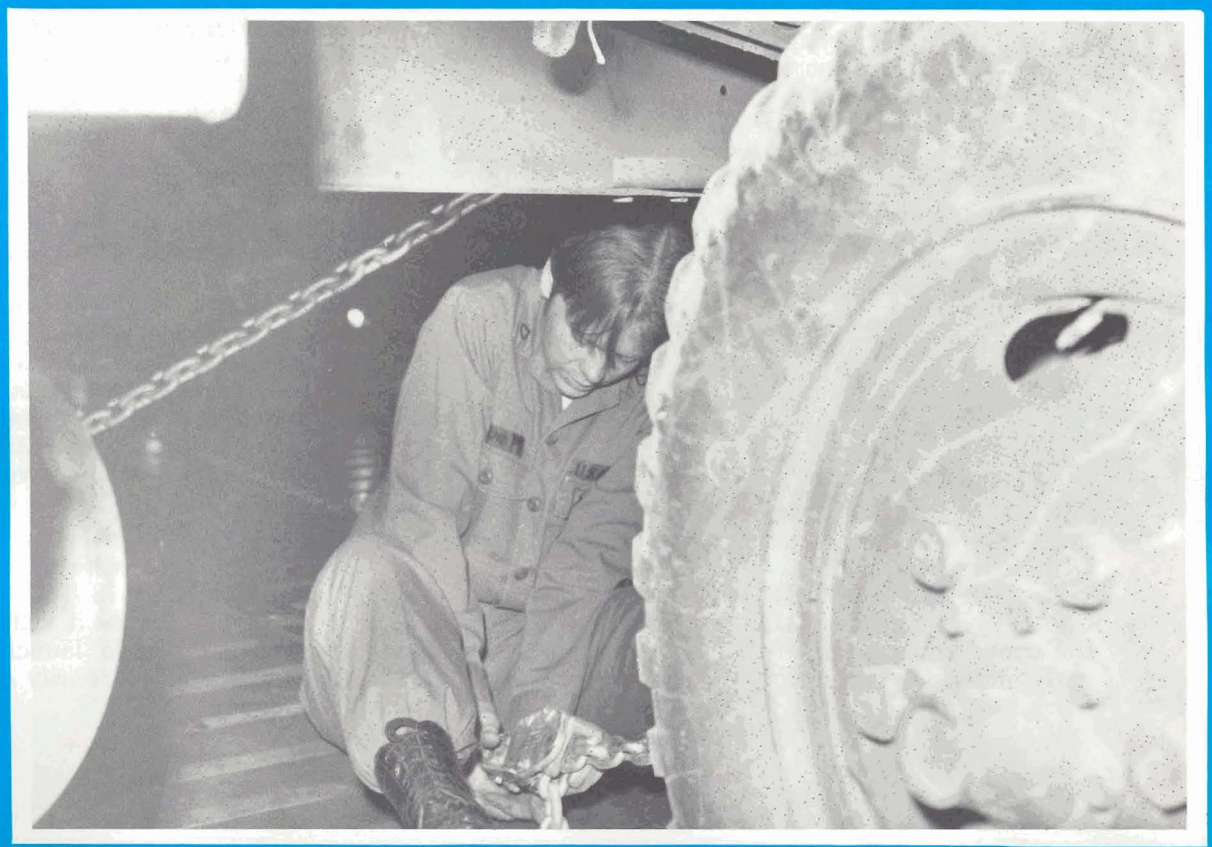
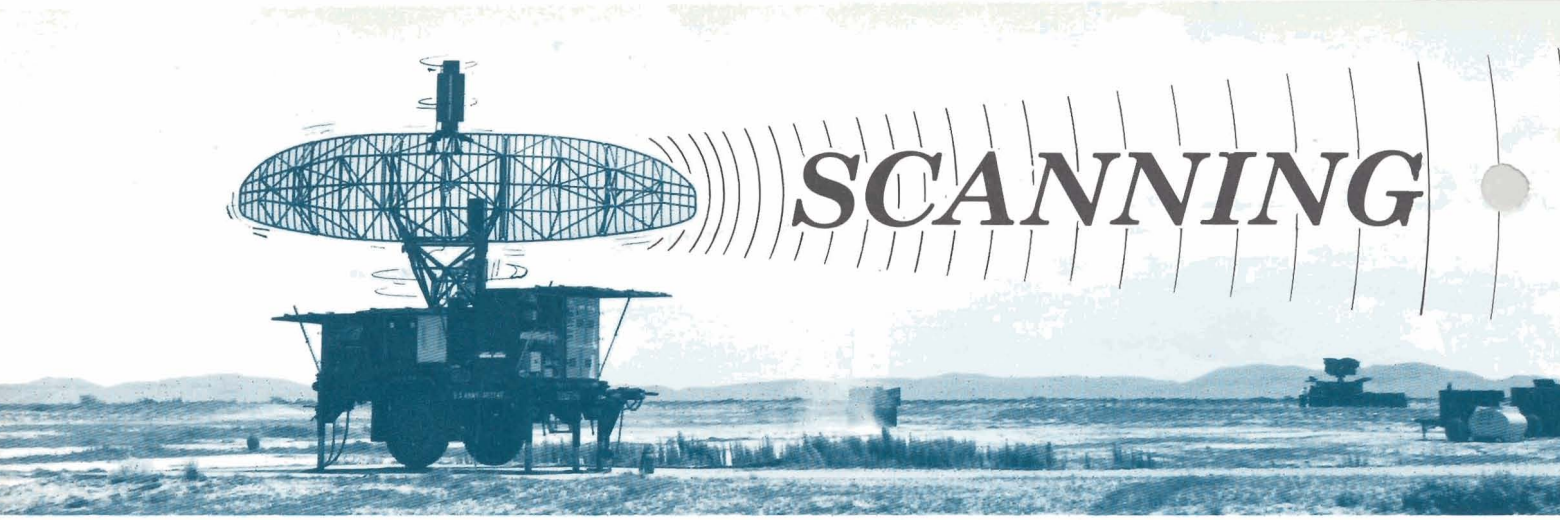








ADA CONFERENCE

This is a report on a 3-day conference that was held at the US Army Air Defense School (USAADS) last October for ADA instructors in conjunction with a 2-day conference for Continental United States and Fort Bliss battalion commanders.

Following the welcoming remarks by MG John J Koehler, Jr., Fort Bliss Commander and Commandant of USAADS, conferees were brought up to date on the new weapon systems that are entering the Army inventory for air defense. New methods of training currently being studied by USAADS and those now in use were explained and demonstrated.

Dramatic displays representing the new ADA weapon systems were on exhibit: the division air defense (DIVAD) gun and Patriot, Roland, and Stinger missile systems. Also on display was a training deployment exhibit by the Directorate of Training Developments, USAADS.

The 11th ADA Group, Fort Bliss, presented a concept demonstration on swift target identification notification grid (STING). A FAAR/TAADDS Redeye demonstration was conducted by the 1st ADA Training Brigade.

Beginning the afternoon of the 2d day of the conference, the battalion commanders held separate meetings and were briefed on subjects of particular interest and importance to battalion level commanders.

Highlighted among the many subjects discussed at the conference were ADA training philosophy, threat and weapons development, NATO fire support requirements study, and a presentation by Air Force representatives for the ADA instructors.

In addition to the joint conference, 1 day was designated as ADA Day and all ADA commanders and senior NCOs at Fort Bliss were invited to participate in the activities.

The following briefs are extracts from information presented at the ADA instructors portion of the conference dealing with ADA systems presently under development.

DIVAD GUN

The engineering development phase of the divisional air defense gun program began in January of last year. Following the 29-month engineering development phase, two contractors will deliver two prototypes each for a 3-month competitive "shoot-off" during the summer of 1980. The results of the "shoot-off" and the contractor's proposal for initial production will be the key elements in the Government's choice of a contractor for initial production. A total of 618 DIVAD gun systems is currently programed, 200 during initial production and 418 for follow-on production.

Both contractors will feature mature components and use NATO standard guns and ammunition. General Dynamics will integrate 35-mm Oerlikon guns, like those on the German GEPARD air defense gun system and the Navy's Phalanx fire control system. Ford will feature 40-mm BOFORS guns and the F16 radar and computer built by Westinghouse. Both contractors will mount their systems on Government-furnished M48A5 tank chassis. The DIVAD gun will replace Vulcan in the 14 US armored, infantry, and mechanized divisions. The proposed divisional air defense battalion will consist of three DIVAD gun batteries and one missile battery. This organization will provide a 36-gun/12-missile mix for air defense of divisional assets, including forward maneuver elements. To meet the operational need and still be affordable, the contractors were given 12 firm design requirements and a prioritized list of 43 cost/performance trade-offs. This approach will result in fielding a new gun system at a reasonable price in approximately 5 years, while the normal acquisition cycle requires more than 10 years.

PATRIOT

Two Patriot fight tests were conducted during the last quarter of FY 78. The first test was considered "no test" because it self-destructed. In the second test the missile, launched in an ECM environment, had an extremely close miss distance

from a target flying at minimum range and minimum altitude. Of the 33 Patriot flight tests conducted to date, 27 have been classified complete successes, 2 partial successes, 1 unsuccessful, and 3 no test. Nine successful search/track tests were performed. These tests were significant in the achievement of probability of detection requirements.

The initial production facilities (IPF) to procure the tooling, test equipment, and facilities necessary for production were received on 19 July 1978. Negotiations began 10 October 1978, with an anticipated contract award in January 1979.

The production readiness review plan had a finalization date of October 1978 in preparation for conducting a preliminary production awareness review in December 1978.

Last summer, the NATO project group met in Brussels, Belgium to prepare for the NATO Patriot Program established 31 October 1978. The NATO Patriot Program provides for a full-time, 2-year effort of planning for the acquisition of Patriot by the participating European nations (Denmark, France, Germany, Greece, and The Netherlands) and the United States. Since last September, the 32d AADCOM Team has been engaged in planning for the siting requirements of future Patriot deployment.

US ROLAND

US Roland has successfully passed the principal part of its test program, demonstrating that this country can benefit from weapons technology developed by its Allies. The system has completed a series of stringent tests. The latest tests highlighted a program to transfer the French-German Roland design to the US, build 4 fire units, build more than 100 missiles, and test the equipment against Army specifications and for compatibility with the European hardware. The Army expects to save about $500 million to $700 million and 4 to 5 years in development time by using the European technology.

In the tests at White Sands Missile Range, New Mexico, the supersonic missiles were fired against computer-simulated targets, drones, and unmanned F-86 and F-102 fighters. American missiles were fired from US and European fire units, and American equipment fired both US and European missiles.

Of the 45 firings from American fire units, 34 were complete successes, with 5 partial successes, and 6 unsuccessful. In some flights the target was maneuvered and took evasive action. In one test, a single fire unit scored successes against two targets in only 7 seconds. One day, Five Roland missiles knocked down two unmanned fighters, one drone, and came within lethal distance of two more drones. In the later tests, Army crews conducted the firings, including several under "no-warning" simulated combat conditions.

One of the advantages of the Roland missile system is its ability to operate day or night and in any weather. The White Sands test were successful even when the gunner could not see the target, relying entirely on radar to track it. Another Roland advantage is the ability of its surveillance radar to detect and identify aircraft while the fire units is on the move. Tests also were conducted on the Army's XM-975 tracked vehicle when carrying the Roland system. These tests included maneuverability, braking, noise level, safety, and infrared signature. The system suffered no major problems during 1,200 miles (1,931 kilometers) of road tests, and when subjected to the impact of railroad switching.

In another Aberdeen test, the fire unit was moved by helicopter to check its transportability. Three carries totalled 20 miles (32 kilometers), with helicopter speeds reaching 85 knots (98 mph/158 kilomters).

Test fire units have been moved to Vandenberg Air Force Base, California, for nonfiring tactical and logistics studies. Additional tests are also scheduled, including evaluations in arctic and tropical environments. Further firing tests will be conducted at White Sands with the German and French fire units, using supersonic and maneuvering targets.

The American program is directed by the US Army Missile Research and Development Command, Huntsville, Alabama.

STINGER

The Stinger weapon system is currently being developed for the US Army and the US Marine Corps. It will replace the Redeye weapon system. Stinger is a shoulder-fired weapon whose mission is to provide low-altitude air defense for forward area combat and combat support units. The gunner can take Stinger wherever he himself can go, whether on foot, in ground vehicles, by air transport, or by air drop.

To meet the air threat, the performance of Stinger is improved over that of Redeye in the ability to engage targets at all aspect angles, although the general principles of firing the weapon system remain the same. The addition of an IFF capability is a significant change from the basic Redeye configuration.

Transition training for qualified Redeye personnel in USAREUR is scheduled to begin in the latter part of FY 80. USAADS will begin Stinger replacement training during the early part of FY 81.

Presently, representatives from the Stinger Project Office, its counterpart TRADOC System Manager's Office, and USAADS are involved in preparations for the introduction of the Stinger weapon system. A training/logistics meeting and a follow-up meeting have been held at USAADS. Issues addressed at these meetings included MOS for Stinger, dedicated versus detailed gunner study, training development activities, and equipment/facilities requirements.

ENLISTED CAREER NEWS

WHY DIDN'T I GET PROMOTED?

SFC Douglas E. Allen

It happens every time a promotion list is published. Letters by the score arrive at MILPERCEN, DCSPER, SMA and at a dozen other addresses. They read alike. Only the names and social security numbers are different. Each seeks an answer to the growing, imponderable question: Why didn't I get promoted?

The letters are written by good soldiers who believe they are doing their best. Take this one from an old soldier in a FORSCOM unit in CONUS:

"Upon completion of the last E-9 promotion board, I found it hard to believe my name did not appear. I know my records should be clear. I would appreciate a complete records audit and any help or advice you could give towards bettering myself. Being a troubleshooting first sergeant, it's hard to get away to take care of personal business, especially so far away. . ."

Or this one from an E-6 stationed in Germany:

"I've checked the last promotion list for E-7s and it seems my name is not on it. I've tried to find out what I needed through my chain of command and I feel I received an unsatisfactory answer. . ."

An E-8 in the Midwest put his question pointblank: "Who on God's green earth can tell me why I wasn't selected for promotion?"

Each soldier is career motivated; each perceives himself as having "done the job" and more. All perceive themselves as having given the Army their best.

Possible Indicators.

Let's examine the Official Military Personnel File (OMPF) of each of these NCOs and see what may have been the reason for nonselection. Keep in mind we are looking at possible indicators in the file. We do not know what discussions went on among promotion board members as they voted on the merits of each soldier in the zone of consideration.

First, the busy first sergeant—He's 45 years old and has 27 years of service. His file dates back to 1947. He served first in the Navy then joined the Army. With the exception of minor breaks in service, he has been Regular Army all the way. His file contains MOS evaluations dating to 1960 and efficiency reports from 1964. The most recent MOS test score reads 126 for his primary (67Z50) and 94 for his secondary (71L50). His file contains several letters of recommendation and appreciation. Frankly, the file looks good. But—for some reason—he was not selected. Possible reasons are:

- Low secondary MOS score.
- Enlisted evaluation report weighted average (EERWA) was below the Army-wide average for his grade and MOS at the time the board convened.
- Minimal effort to attend any military schools and no effort to strengthen his civilian education since his 1953 GED equivalency.
- In 3 more years, the Qualitative Management Program (QMP) will require him to retire. What is his real potential for contribution as an E-9?

These factors, plus a 15 to 25 percent selection rate, may have influenced nonselection.

Next, the staff sergeant stationed in Germany—Possible reasons for his nonselection to E-7:

- Average and below average PMOS evaluation test scores.
- Neither qualified for nor been awarded a secondary MOS as required by current directives. (It's a must for E-6 and above.)
- A recent Article 15 (for a serious offense).
- A Senior Enlisted Evaluation Report (SEER) for July to January that boasted three excellent ratings and three above average. The rater marked him in the middle of "promote ahead of" and "promote with" contemporaries.
- The file shows attendance at an NCO acad-

emy in 1970 and a leadership course in 1973.

■ DA Form 2-1 says high school GED equivalency in 1969 but nothing in the OMPF to back it up. The file does show he tried and failed a GED test in 1962.

■ No effort to further civilian education despite close proximity to education centers in the last 5 years.

These factors should not be considered decisive, but when only 20 to 35 percent can be selected from an outstanding field, everything in the file assumes added significance.

Now, let's examine the OMPF of the E-8 in the Midwest. He faced tough competition. Only the top 20 percent could be selected when his records came before the E-9 promotion board.

Weak areas in his file include:

■ The Enlisted Efficiency Reporting Weighted Average (EERWA) was 12 points below the average for his grade.

■ The last SEER considered by the board had a "4" in item E, Part II, and another "4" in item F, Part II. The other scores in items E and F were all fives. Earlier SEER had all been max. Performance has been slipping since November 1976.

■ PMOS score was 105 when the board looked at his file. That's barely average for his grade, skill level, and MOS. Since then his MOS score dropped to 95. He won't even be considered by the Sergeants Major Academy board when it meets.

■ PMOS scores have been dropping since 1971; SMOS score of 84 is well below average.

The chief of his division in the career management field pointed these factors out in a letter and added, "I am telling you as gently as I can that you are currently noncompetitive for promotion, in my personal view. Past laurels will not get you to E-9. If you really want it, then get to work. No one else is going to do it for you."

Analysis of these three files points up reasons why a noncom may not have been selected for promotion:

■ Low EERs.

■ Low MOS scores.

■ Lack of an SMOS and a good score to go with it.

■ Failure to improve both military and civilian education.

■ Failure to ensure all awards and citations get into the OMPF.

Each of these areas can be corrected by the soldier—if the soldier really wants to get promoted.

As an eager E-5 wrote recently:

"I enjoy my job, I relish the pressure, and the hours are only a challenge, but can you explain to me why I'm still an E-5? I could have been promoted three times in the last 8 months in my SMOS. Explain this to me. I still have a positive mental attitude, yet I'm positive that I am being screwed to the wall. Have no fear, for as I walk deeper into the valley of death, I will not quit. No demon will drive me to my knees. My next year will be more productive than my first. But what is my reward?"

He got it.

He's been E-6 for sometime now. And—he's driving hard for E-7.

SFC Allen is an aviation career adviser at the US Army Military Personnel Center. His article was previously printed in US Army Aviation Digest.

— Commanders Call, Nov-Dec 1978

ROTC SCHOLARSHIPS

Application period for the Two-Year Army ROTC Scholarship Program for active duty Army enlisted personnel opened 15 January. Winners for the 1979-80 school year will be announced in June.

These scholarships provide Army enlisted men and women an opportunity to obtain both a college degree and commission as an Army officer through participation in the ROTC program.

The awards will pay full tuition, books, and educational fees, plus a living allowance of up to $1,000 a year each year the scholarship is in effect. In addition, winners will be paid for attending the Advanced Camp, normally held during the summer between the junior and senior years of college. Winners may also take advantage of the Veterans Administration benefits to which they would be entitled.

Competition for scholarships is limited to enlisted personnel who have served at least 1 year on active duty, will be under 25 years of age on 30 June of the year they are eligible for commissioning, and have received credit for at least 2, but not more than 2½ years of college. Also, applicants must have been accepted by a college for next fall's enrollment, have earned a GT score of 115 or higher, and be United States citizens.

Winners may attend any of the 4-year colleges and universities hosting Army ROTC or one of the more than 500 nonhost colleges which has a cross-enrollment agreement with a nearby host school.

Scholarship winners will receive an early discharge so they can arrive on campus in time to enroll in the 1979-80 fall term. Winners will also be required to enlist in the US Army Reserve prior to enrollment in the Army ROTC Advanced Course. Applications must be requested by 15 April 1979. For further information and applications, write Army ROTC Scholarships, Fort Monroe, VA 23651.

BARS to STARS

OPMD UPDATE

FOREIGN AREA OFFICER SPECIALTY

Air defense officers who have had Foreign Area Officer (FAO), Specialty Code 48, designated as their alternate specialty are participating in a specialty whose emphasis is on political-military affairs. Foreign Area Officers receive assignments throughout the world in security assistance, psychological operations, attache affairs, civil affairs, and political-military affairs.

Developmental training includes the 6-month FAO course at Fort Bragg and functional courses in psychological operations, civil affairs, and security assistance.

Many FAO positions, but not all, require specific regional expertise. Selected officers are provided the opportunity to participate in a graduate program in area studies, in language training at the Defense Language Institute, and in an in-country training program under the supervision of the attache in the geographic region of study.

Selection for these programs is competitive and normally is limited to captains and junior majors. Officers who desire to compete for regional specialist training programs need to apply early for this training. They also must plan for professional development needs for their primary specialty to insure that the developmental goals of both specialties are fully integrated. Because some of the training programs are long, officers are encouraged to consider self-study language programs or degree completion, either full time or through off-duty education.

Graduate disciplines supporting the FAO specialty include:

Anthropology
*Area Studies
Economics
Foreign Affairs
Geopolitics
Civil Government
Military Government
Social Science
Sociology
History
International Relations
Language/Literature
**Military Arts and Sciences
Political Science
Psychology
Social Psychology
Public Administration

**Shortage discipline. Only subject available for fully-funded civil schooling.*

***Degree confered by CGSC in a political affairs concentration.*

Officers designated as FAOs should:

■ Take the Defense Language Aptitude Battery Test (DLAB) if they have not already done so. Generally, 73 is the minimum standard score. For more difficult languages such as Russian, Chinese, Korean, or Japanese, a higher score is desired.

■ Outline a self-study program in consultation with their career managers at OPMD.

For additional information, officers may consult DA Pamphlet 600-3, Officer Professional Development and Utilization, Chapter 28, and contact their respective career management divisions:

LTC Division: 221-9799.
MAJ Division: 221-9765.
Combat Arms Division: 221-7817.

THE PRECOMMAND COURSE

Class 1 of the Combat Arms Precommand Course (PCC) was initiated at Fort Bliss on 23 October 1978. The PCC replaced the F-25, AD Command Refresher Course. The objective of the course is to prepare senior officers (05 and 06) for combat arms command. The PCC consists of the following four phases:

Phase I, where the selected command designee receives a diagnostic examination to determine his short-fall areas and a self-study packet on combined arms tactics, logistics/maintenance, and personnel matters.

Phase II is conducted at the US Army Air Defense School and the senior officer is provided an update and amplification of information, knowledge, and skills in air defense tactics, air defense

weapon systems, logistics, and other selected professional development subjects.

Phases III and IV of the PCC are presented at Fort Leavenworth, Kansas. In Phase III the future commander will receive instructions on organization effectiveness, personnel, and legal aspects of command and management of human resources. In Phase IV he will receive the battle captains' course on combined arms, threat, capabilities, and tactics.

Class 1 graduated at Fort Leavenworth in November 1978.

CIVIL SCHOOLING

Air defense officers must first establish a firm air defense specialty experience from which to build their future careers prior to being considered for full-time civil schooling. Although civil education supports professional development, it does not make a career. Past promotion and military schooling selection board results reveal that the level of civil education has not been a significant selection criterion. Outstanding manner of performance in all assignments always has been and will continue to be the key to success.

In some cases, officers appear to give civil schooling priority over other assignment or professional development needs. While civil education is an important and desirable goal, it is far from being the most important element of an officer's career. Therefore, it is essential to recognize the role civil education should play in military professional development and fully understand the purpose and objectives of the various programs for full-time schooling.

NEW RATING SYSTEM

A new evaluation report system is on its way for Army officers. The new system has the potential for doing a more credible job than the current 67-7 (report). Officers would get a final report under the current system prior to going to the new system. The final report would insure fairness that was lacking when we changed systems in the past.

The procedure is expected to incorporate a number of new features as follows:

■ The current system of having a rater, indorser, and reviewer will be changed. The new system will involve a rater, an optional intermediate rater, and a senior rater. It is expected that most officers will be rated by only two individuals, the rater and the senior rater. The senior rater will play a very important role in the evaluation system.

■ DA will maintain a senior rater profile, which will permit comparison of a specific rating and the normal tendency of the senior rater. The senior rater's rating history will be tracked and made available to boards and managers.

■ The new procedures will emphasize increased communication, development of subordinates, and the setting of objectives and will vigorously support Army personnel management programs. DA expects a greater focus on open channels of communication and constructive problem solving.

■ The new report system will also increase administrative accuracy by simplifying such items as the accountability of rating periods. The rated officer will review and authenticate administrative data.

Under the new system, three forms will be used:

■ A rating form, DA Form 67-8, essentially a revision of the current form. However, the new form will not use a numerical score.

■ A support form, DA Form 67-8-1, which will provide input from the rated officer and provide for discussion between the rater and rated officer.

■ A tracking form, DA Form 67-8-2, which will clock the rating history of senior raters.

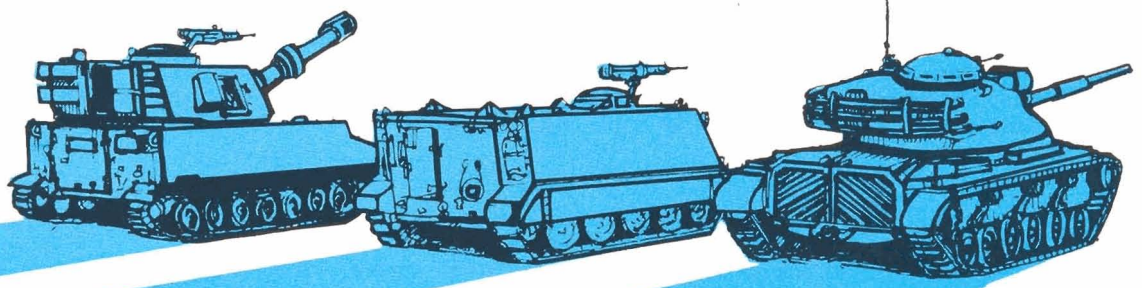
The new rating system is set to go into effect 1 October 1979.

OAC ADVANCED ASSIGNMENTS

As part of an overall objective to improve the assignment of the officer corps, the Officer Personnel Management Directorate (OPMD) will soon forecast advanced assignments for Officer Advanced Course (OAC) selectees. Implementation of this program will begin in May 1979 with Military Intelligence OAC Class 3-79, followed by all other branch OACs with a start date of 1 June 1979 or later.

The Officer Advanced Course Advanced Assignments (OACAA) concept was developed in June 1977 when the Office of the Deputy Chief of Staff, Personnel tasked OPMD to design a test program. The test was conducted in early 1978 with one OAC class from each branch. As anticipated, the objective and subjective results were extremely favorable from the point of view of both OPMD and the individual officers involved in the program. Test results showed there was an 85 percent success rate of unchanged assignments, and of the more than 1,100 student officers involved, 90 percent favored continuation of the OACAA program.

COMBINED ARMS CORNER



3D ACR SUPPORTS XM-1 TESTS

The 2d Squadron, 3d ACR, has been supporting tests of the XM-1 since April 1978 and the tests are expected to continue until the tank goes into initial limited production sometime in 1979.

In addition to having troops in the field nonstop since April 1978, the squadron provides more than 30 tracked vehicles and 25 wheeled vehicles each day. Additionally, it provides radios, power generators, and numerous other items for the tests. To date, and related to the test program, the squadron's wheeled vehicles have tallied more than 170,000 miles and the tests have put another 15,000 miles on the tracks. More than 4,500 rounds of main gun ammunition have been issued during the tests so far. Also, 165,000 rounds of small arms ammo and another 6,000 assorted pyrotechnics and other munitions have been spent. The five XM-1s and the five baseline M-60 tanks being used in the tests have consumed nearly 50,000 gallons of diesel fuel.

As the primary support and test unit for the XM-1 project, soldiers of the 2d Squadron perform many and varied tasks. Troopers may command M-551s as part of the opposing force in actual testing procedures or may even be drivers. They may spend time just guarding ammunition. Such problem areas as transportation, communications, maintenance, range control, and supply are read into the tests. For the tests, opposing forces are made up of US M-113 and 114 vehicles and M-551 Sheridans. Soviet tank tactics are employed.

To make the tests worthwhile, four of the five XM-1s must be operational at all times. Mechanics must work around the clock on many occasions to keep the number of deadlined tanks at a minimum. Additionally, stock personnel must maintain a supply depot that keeps track of 2,200 line items for the XM-1 and another 500 items for the M-60s. Also, 1,700 line items must be supplied at the second echelon level in addition to a supply depot maintained at the range by Chrysler engineers.

Since testing began, more than 86 refinements have been made to the XM-1 tank. Many of these were the result of suggestions of military test and support personnel. Before the tank goes in for initial production and once a few have been produced, it will undergo still more intensive testing at Fort Hood, Texas. Once all testing has ended successfully and the XM-1 is placed in the Active Army inventory, we will have one of the most effective of all main battle tanks. The troops at Fort Bliss are making a tremendous contribution toward this goal.

WOMEN AS ARTILLERY CREWMEN

Do women have what it takes to become US Army artillery crewmen? Can they maintain the strength and endurance necessary for loading and firing howitzers in a series of rapid-fire situations?

These were the questions posed in a recently concluded study by the US Army Human Engineering Laboratory at Aberdeen Proving Ground (APG), MD.

The 6-week experiment, which involved 13 enlisted women who normally hold administrative type Army jobs, specifically examined the ability of women to load and fire the 105 and 155 millimeter howitzers.

Participants were required to complete a comprehensive 3-week physical training program that preceded the test. The special training program was developed by CPT Theresa Nemmers, a physical therapist with the Kirk Army Health Clinic at APG.

The first phase of the three-phase physical training program dealt with the woman's aerobic capacity or the body's ability to use oxygen and per-

form. It consisted of a daily 12-minute run in combat boots and fatigues. Two women averaged distances exceeding 1½ miles.

Phase two incorporated strength building activities such as the deadlift, leg squates, arm curls, and forearm lifts. On the whole, the women were able to increase their weightlifting capacity throughout the course.

Phase three addressed endurance training and was comprised of exercises such as leg presses, bench presses, situps, and back extensions. Vast improvements in all categories were reported.

Captain Nemmers said she felt the women's success in the actual firing exercises was definitely a result of the interrelationship of their physical conditioning and their individual and group motivation.

The primary purpose of the pilot study, according to Test Director Frank R. Paragallo, was to determine whether women working as teams could meet the prescribed rate-of-fire of the two howitzers.

The rate is four rounds per minute for the first 3 minutes, then one per minute thereafter for the 155-mm M114A1 Towed Howitzer. The rate for the 105-mm M101A1 is 10 rounds per minute for the first 3 minutes and three rounds per minute thereafter.

The initial goal was simply to see whether the women could meet the rate of fire, depending on the caliber of the weapon. The women achieved this with no problem and their proficiency was phenomenal.

LTC Robert A. Phillabaum, R&D coordinator, noted that the female study was initiated as an offshoot of a more encompassing study involving the 105-mm and the 155-mm and the Soviet 122-mm howitzers. The female portion of that study was eventually limited to the 105 and 155.

Also, the female study was purposely limited in nature and did not encompass all tasks required of a regular artillery crewman. The test did not involve gunnery techniques, fire direction procedures, emplacing the weapon or taking it down, or real manual tasks of unloading ammunition from the trucks.

The test also had numerous built-in safety controls and checks and balances. For example, the projectiles were inert, the fuzes were dummies, and a safety officer was present at all times.

In general, the responses of Phillabaum and Paragallo regarding the women's capabilities were most favorable: "they were as professional as any male crew I've seen . . . they performed outstandingly . . . I couldn't tell whether they were male or female, that's how good they were."

However, the reactions of the women themselves were somewhat mixed. Eleven of the 13 said they could handle the job, but only 5 of the 13 said they would want to. The five said they would definitely trade their present jobs to become artillery crewmen.

Typical comments from the participants, all of whom had to meet a minimum 110-pound weight requirement, were as follows: "I think we proved we could do it . . . it was hard, a woman shouldn't be put in that MOS . . . women couldn't handle it in a real situation . . . a good adventure, a good experience . . . there was a lot of bickering, a lot of complaining . . . a lot of work, but it was worth it."

— Army R. D&E

RADAR TRACKER

The US Army and Marine Corps will buttress their arsenals with 106 "Firefinder" radar tracking systems that can pinpoint the location of enemy mortars, short-range artillery, and rocket launchers by scanning the horizon with a pencil-thin electronic beam.

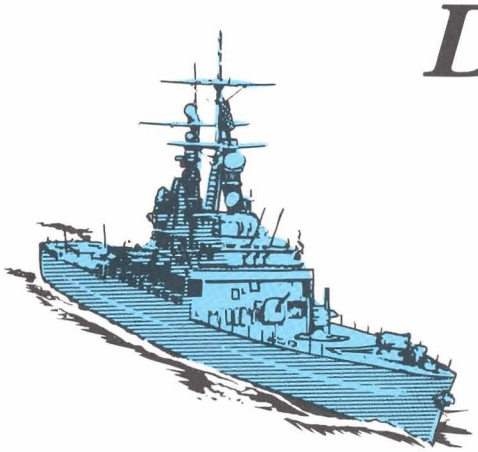
Hughes Aircraft Company has been awarded a 3-year, $166-million production contract by the Army's Electronic Research and Development Command, Adelphi, Maryland, to build the 106 Firefinder systems, designated the AN/TPQ-36. Under the initial 3-year contract, 84 radar trackers will go to the Army and 22 to the Marines. Options for fourth and fifth-year production provide for 82 additional systems for a total of 188.

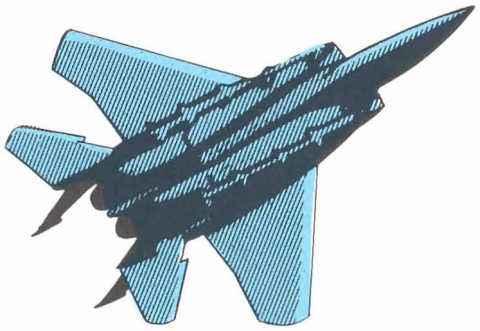
The Firefinder radar systems are designed to be deployed a few miles behind a battle area to detect locations of enemy short-range weapons, frequently before incoming first rounds can strike the ground. The radar scrutinizes the hostile landscape with a beam that scans so rapidly that it effectively forms a sensitive "curtain" across the area, detecting any projectile rising through the sector and tracking its distance, direction, and height. The radar plots the incoming weapon's trajectory, then the small Hughes 3637A computer back-plots the track to the firing weapon and the weapon location is relayed automatically to friendly firing units that can direct counterfire against the hostile firing point, all within seconds.

The system simultaneously tracks projectiles from multiple sources, proved during a long test program in which tens of thousands of rounds were fired. The radar uses new clutter-rejection techniques in its signal processor to filter out ground noise, enemy jamming, and adverse weather conditions.

Three TPQ-36 systems will be deployed with each Army and Marine Corps division to track mortars and close-in artillery. In addition, each division is scheduled to have two of the larger more powerful AN/TPQ-37 systems, produced by Hughes since 1976, to detect enemy long-range artillery. Together, the two radars complete a total firefinder system.

DEVELOPMENTS





DUST TESTS

More than 3 tons of TNT and 148 rounds of 155-mm artillery were exploded in a unique series of tests completed recently at White Sands Missile Range, New Mexico.

The 2-week program, known as the Dust Infrared Test, or DIRT-1, was conducted by the Atmospheric Sciences Laboratory at the range and was primarily a technology development program aimed at learning the proper methods of evaluating the results of this type of test for use in similar future programs.

Th DIRT-1 series, the first of its kind, will serve as a model for other tests studying the effects of battlefield smoke and dust on the Army's electro-optical sensors such as night vision devices and lasers.

The tests were conducted by detonating various sized charges of TNT and both static and live firings of artillery rounds. The resultant smoke and dust clouds were then measured to determine the size of the dust particles generated and their density per cubic centimeter in the air. Various types of electro-optical sensors were tested to see how they were affected by the smoke and dust.

Measurements during the tests were taken by both ground and airborne instruments. Adding to the uniqueness of the tests was the fact that airborne instruments were mounted in the fuselage of a stripped Beaver aircraft. The Beaver was suspended on a 500-foot cable and flown through the blast clouds by a CH-54 Skycrane helicopter.

MAVERICK TESTS

The laser-guided Maverick missile, designed to provide precise and potent close air support for combat troops, recently completed the first phase of development and evaluation testing with an outstanding success rate that surpassed the 92 percent direct hit mission reliability record established by all Maverick missiles.

The AGM-65C Laser Maverick, which shares many components with Hughes' battle-proved air-to-surface TV-guided Maverick, AGM-65A/B, was fired 15 times. Targets included moving and stationary tanks, armored personnel carriers, and simulated fortified bunkers. The 17-month series of contractor tests evaluated this new version of the Maverick against a wide spectrum of tactical situations including day and night missions, high and low attack altitudes, and at various ranges and aircraft speeds from slow to supersonic.

The key to Laser Maverick's specialized capabilities in the close air support role is that aircraft can safely launch the powerful Maverick warhead against enemy targets located close to friendly troops. A forward ground observer with a laser designator can pinpoint an enemy tank or bunker in a battlefield situation where opposing troops are in close proximity. The air-launched Laser Maverick automatically homes in on the target with a minimum of danger to friendly forces.

The nose of the Laser Maverick houses a tri-service laser seeker. Day or night, it can sense a small spot of reflected laser energy bounded off a target by a pencil-thin, invisible laser beam emitted from either ground or airborne target designators. As a Laser Maverick-armed aircraft approaches the battle area, the missile's seeker searches for reflected laser beams that have been transmitted in a particular series of pulses. When the beam is spotted, the missile automatically "locks on" and tracks the signal. At the same instant, the missile generates a synthetic TV image on the aircraft cockpit console indicating the target being tracked and its location relative to the aircraft's heading. As soon as the pilot fires the missile, he is free to take evasive action or to immediately attack another target.

The seeker is integrated with the basic Air Force AGM-65 Maverick autopilot, warhead, and propulsion sections through an electronics assembly that provides guidance and control information. The Laser Maverick can be used on any aircraft

equipped to launch the TV Maverick, such as the F-4, A-7, F-111, and A-10 without any modification to the weapon or the airplane.

During the tests conducted at Eglin AFB, Florida, and White Sands Missile Range, New Mexico, targets were illuminated 12 times by ground designators and three times by laser target designators flown on tactical aircraft.

In the test against a moving tank, a ground observer used a ground laser location designator (GLLD) developed for the US Army. At a distance of 1½ miles, the operator held the beam on the tank's turret. The missile, launched from an Air Force F-4, hit the turret.

Laser Maverick is being developed under the direction of the US Air Force AGM-65 System Program Office, located at Wright Patterson AFB, Ohio, for use by the Marine Corps.

Following completion of the contractor-conducted tests, the Air Force will perform the next phase of evaluation and initial operational tests. Hughes will supply the Air Force with 30 Laser Mavericks for this series of tests, which is scheduled to be completed prior to the pilot production decision.

AUTOMATED EARLY WARNING

During the past four months, the United States Army Air Defense Board has been involved in a concept evaluation of a device called the Interactive Display Terminal (IDT), which was designed and developed by Litton Data Systems, Van Nuys, California. The IDT, a hand-held device designed to interface with tactical radios and field wire equipment, can be used to compose, transmit, receive, and display messages. Originally designed with the field artillery forward observer in mind, the IDT presently uses a TACFIRE message format.

A primary concern to air defense units of both the United States Marine Corps and United States Army is the increasing speed of attack aircraft, which reduces reaction time available to SHORAD weapon systems using the present voice early warning (EW) system. Both services realized the potential of the IDT as a digital display device to reduce EW time and enhance engagement effectiveness. The USMC purchased several IDTs to conduct further testing in the area of EW and cuing information for their Forward Area Air Defense (FAAD) teams. The US Army Air Defense Center at Fort Bliss, Texas, made arrangements with the USMC to participate in their testing.

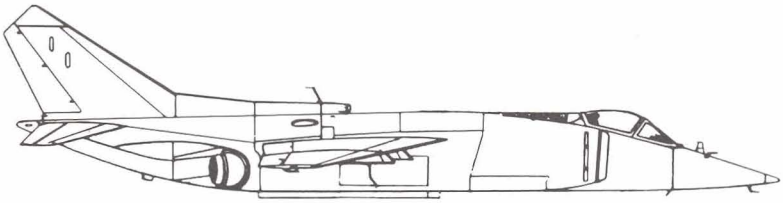
To interface the IDT with a data communications link that provides digital early warning to the IDT, the design and development of an interface and transmission format device was necessary. This device, also designed and developed by Litton, is called the transmission scheme translator (TST). The TST, as presently configured, is capable of interfacing with systems that have a tactical digital information link (TADIL-B) capability, such as the AN/TSQ-73 Command and Control System. The TST essentially takes the TADIL-B message format, converts it to a TACFIRE format that is compatible with the IDT, and burst transmits the message to the IDT over a standard voice band military radio. The EW information is displayed on the IDT in the form of symbology associated with the category of target, friend, unknown, or hostile. Other information, such as range, bearing, height, is displayed as alphanumerics.

Interactive Display Terminal.

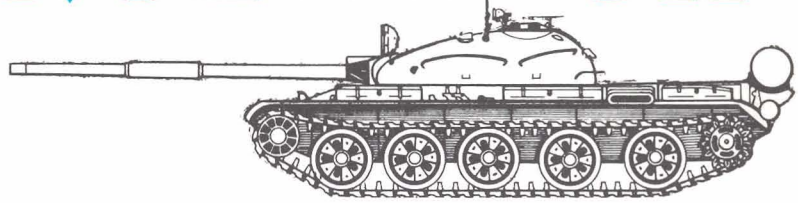
Initially, the USMC and the Air Defense Board conducted a concept evaluation of the IDT at Camp Pendleton and Litton Data Systems in California in May last year. In August the IDT and TST were brought to Fort Bliss to be demonstrated to the Commandant and to be tested for an additional 30 days.

During the period 21 August to 1 September 1978, the Board conducted a short test to compare the IDT with voice-tell EW. Aircraft were flown against short-range air defense (SHORAD) weapons defending a point, and data were collected to evaluate the advantages and disadvantages of the IDT over the voice-tell method. EW for voice-tell was passed directly from the console in the AN/TSQ-73 to a Chaparral weapon system. The second method of EW was by means of the IDT interfaced by AN/PRC-77 radios through the TST to the AN/TSQ-73.

The test results are presently being analyzed to evaluate the potential of the IDT as a SHORAD early warning and cuing device. The test report will be released the latter part of October.



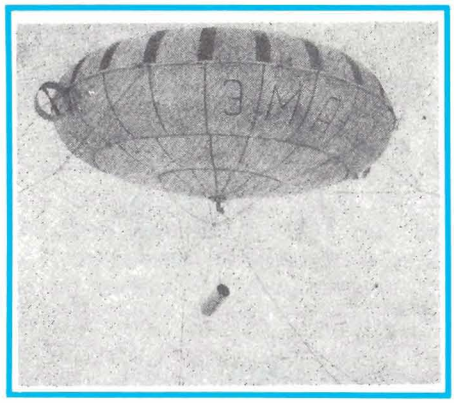
INTELLIGENCEWATCH



SOVIET BALLOON CRANES

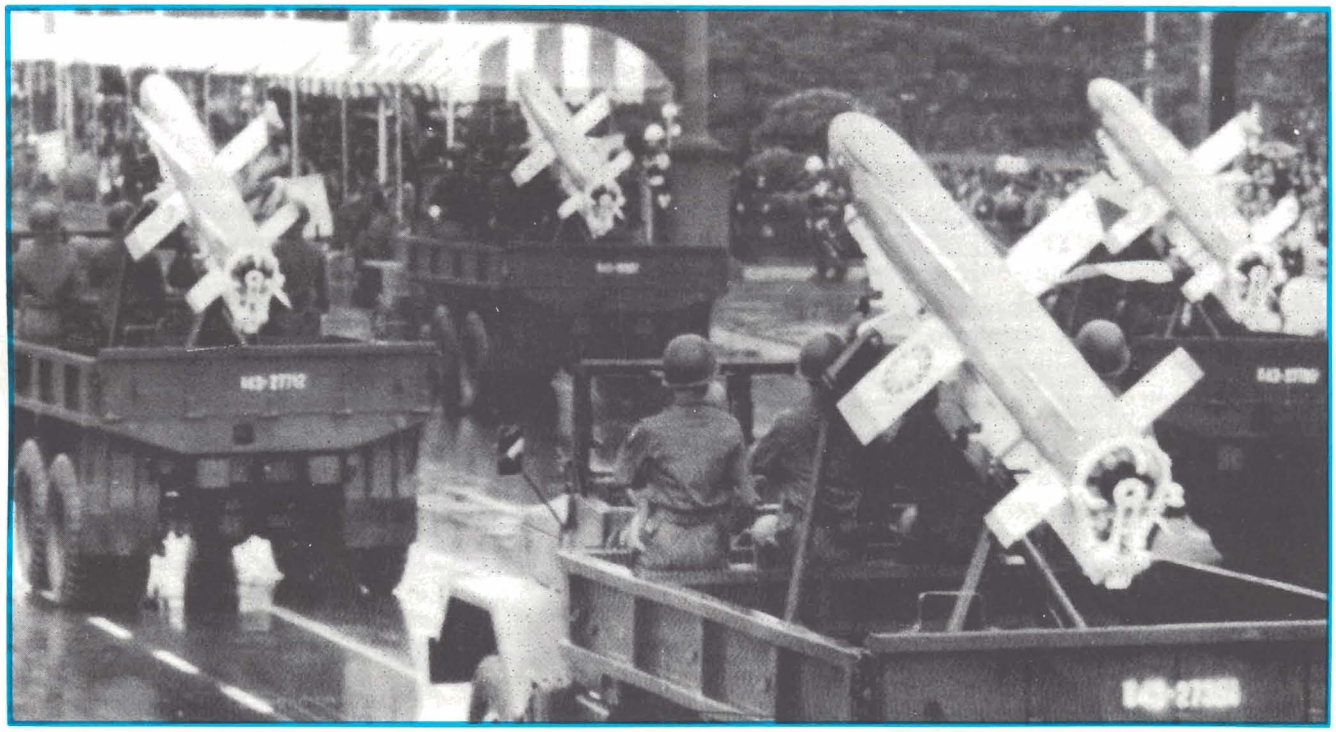
The Soviets have been experimenting with "balloon cranes" (right) for some time. Photo shows 10m model of a gas-filled lifting crane. The prototype is to have a diameter of 50m and lift capability of 15 tons. A pneumatic stabilizing system, which is a valve-controlled jet device, gives accurate placement of the load to the inch. Propulsion of the balloon is achieved by ducted propellers driven by electric motors. Deployment of reconnaissance sensors with the help of the balloon could be possible.

— *Soldat und Technik*



TAIWANESE MISSILES

A surface-to-surface missile designated Hsiung Feng (male bee) was shown for the first time recently by the Nationalist Chinese Army in Taipei. The tactical missile is the first to be designed and built in Taiwan. The new missile has rectangular cruciform wings and tail surfaces. Nationalist Chinese Army units also operate Israel Aircraft Industries' Gabriel and US Nike Hercules, Hawk, Honest John, and Chaparral missiles.



CHINA BOUND?

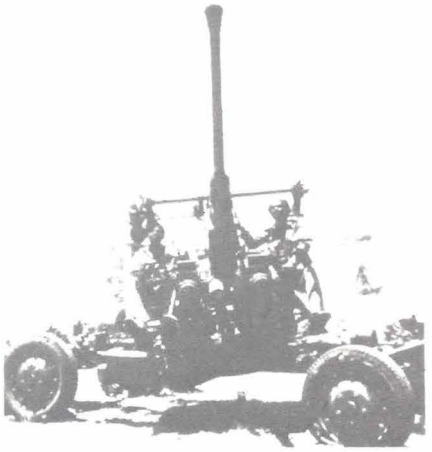
VIETNAM: Chinese refugees from Vietnam report that Soviet experts have installed three radar stations in Vietnam along the border with China's Yunan province and that Vietnamese troop reinforcements have been moved into the area. The Soviets are known to have requested permission to establish a naval base at the American-built facility at Cam Ranh Bay, and one refugee reported the former US base equipped with long-range missiles pointed toward China.

— *Military Electronics*

SOVIET 37mm GUN

The obsolete Soviet AA-gun 37mm M-1939 has been supplied to the Ethiopian armed forces. Photo shows a soviet 37mm gun captured by Somalian forces in the Ogadan region. The gun has a combat weight of 2100 kg, 80 rounds/min rate of fire, and a maximum range of 950m. Effective range against aircraft is 3000m. The gun is also suitable for ground combat and its effective armor-piercing capability is 46mm.

— *Soldat und Technik*



COSMOS 1009

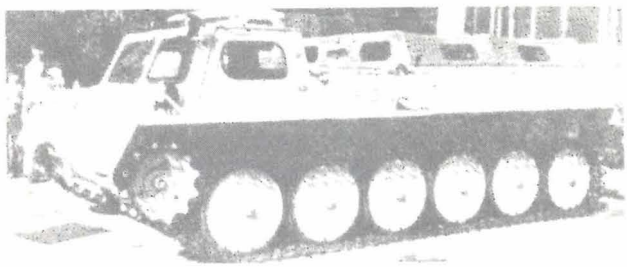
On 19 May 1978, the Soviet Union launched its 15th killer satellite, Cosmos 1009 (RESERVE, May-June 1978). The target was Cosmos 967, which was launched on 13 December 1977. The latest test took place less than 1 month before the scheduled start of antisatellite limitation talks between the United States and the USSR in Helsinki, Finland.

— *RESERVE, Jul-Aug 1978*

SOVIET GAS-71 VEHICLE

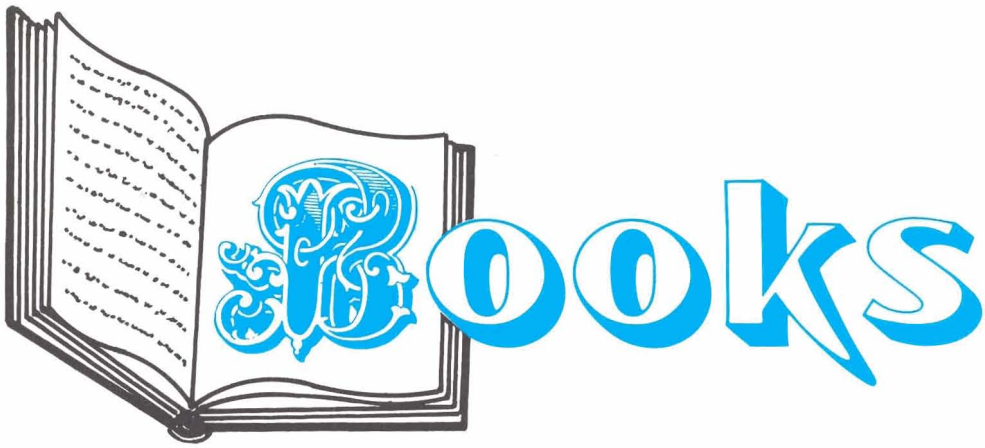
A full-tracked amphibious vehicle, GAS-71, has been developed by the Soviet automobile company, Gorki for use in inaccessible terrain. The vehicle has a 84.5 kw(115 hp) engine with a maximum speed of 50 km/h on the road and 5 km/h in water. The GAS-71 has a fully enclosed drivers compartment and open, canvas-covered cargo area to accommodate ten persons or one ton of cargo. The engine is installed between the drivers compartment and cargo area for a more favorable center of gravity on land and in water. The tracks have a flat, wide area to facilitate driving on swampy ground.

— *Soldat und Technik*



A Soviet Personnel Carrier BMD with the GRAIL AA missile. The GRAIL operator is located in the rear hatch of the APC. The GRAIL missile corresponds to the US Redeye.

— *Soldat und Technik*



MODERN CHINA, FROM MANDARIN TO COMMISSAR, *by Dun J. Li, Charles Scribner's Sons, New York, 1978. 491 pages.*

Reviewed by
Lieutenant Colonel Joe S. Falkner, Jr.

While it is not easy to trace the social, economic, or political history of a people very far into the past, the nature of the Chinese system of government for the past 3,000 to 4,000 years has made it much simpler for those who wish to study these aspects of China. The Mandarins of the central government educated their own replacements and required that the neophytes pass a rigid series of examinations prior to final certification, somewhat similar to our legal and medical profession today. This group of "intellects" in the system, although ruled by many different emperors and warlords, was maintained as the traditional executives for much of what transpired around them and thus preserved, in a large measure, the history of China. Modern China is a collection of translations of various sources including writings of Sun Yat-sen, Chiang Kai-shek, and Mao Tse-tung; official statements of the Kuomintang and the Chinese Communist Party (CCP); and articles from the "Peking Peoples Daily." The collection provides a picture of Chinese culture and internal developments during the transition period "from Mandarin to Commissar" during the 19th and 20th centuries.

The demographic history of China is characterized by rapid growth caused by the cellular, immobile family group that produces large numbers of children as a method of social security. This resulted in constant growth until pressure was relieved by the inevitable uprising or rebellion that would eliminate millions of people. The "White Lotus" rebellion, which ended in 1802, devastated almost one-third of China and took the lives of nearly 10 percent of the population, which was almost 400 million. In the "Taiping Rebellion" of 1850-64, 30 to 50 million people perished, and some areas were almost totally depopulated. The struggle between the Kuomintang and the CCP during the period 1922-49, exacerbated by the Japanese invasion, resulted in more than 50 million dead.

The system of feudal warlords under the Manchurian Ch'ing Dynasty (1644-1912), combined with the traditional insistance by the Chinese that they were civilized and the rest of the world was barbaric, prevented China from industrializing with the rest of the world. While many Chinese scholars realized this and attempted to effect change, the resistance was too great to overcome and, by the mid-1800s, Western nations, with support of modern technology, began to force themselves on China and gained trade and property concessions to various portions of the nation through many "unequal treaties" that left China with virtually no control over its foreign policy and trade.

In light of these circumstances, it is easy to understand how the Soviet Union gained such a strong influence with both the Kuomintang and CCP when, after the Russian Revolution in 1917, they renounced all previous claims the Czarist's had made on Chinese territory. The Chinese then welcomed Russian advisers to assist in the political rebuilding.

Sun Yat-sen (1866-1925) was the prime mover in the Chinese overthrow of the Manchu Ch'ing rule in 1912. He founded the Kuomintang Party with two goals, to eliminate warlords and to unite China. He achieved the first goal, and Chiang Kai-shek (1887-1975), who succeeded Sun, picked up the second goal as his life task. When the CCP split from the Kuomintang in 1927, Chiang's plan for unification of China centered on one goal, elimination of the CCP and its Red Army.

While the Chinese were engaged in this civil conflict, Japan acted and took Manchuria in 1931. Chiang Kai-shek, stating the philosophy that one must "cure the disease of the heart before attacking the disease of the skin," chose to continue to battle the CCP and ignore the Japanese aggression. The Kuomintang army enjoyed a slow but measured success against the Red Army and by 1936 had surrounded their stronghold and was systematically reducing their numbers. Japan had not been idle though, and by 1933 had moved into

northern China. In 1937, Japan attacked Peking and, in what is known as the "Rape of Nanking," murdered 300,000 men, women, and children in 10 days after the city had surrendered. Chiang could no longer ignore the "disease of the skin" and announced to the Nation that the entire forces of China must concentrate against the Japanese invaders. In a meeting between Mao Tse-tung and some Japanese leaders following the CCP victory in 1949, Mao thanked them for their intervention in China in the 1930s, without which the CCP would have perished.

From 1937 to 1941, a medieval China fought for survival against a major world power. Chinese strategy traded space for time in the hope that something would happen. The Japanese attack on the United States provided the salvation that China required.

When the war ended in 1945, Stalin refused to turn over the Japanese arms captured from storage depots in Manchuria to Chiang's decimated forces as the treaty decreed. Instead, he shipped all that he captured to the Red Army under Chu Tey and Mao Tse-tung, and the civil war began again. By 1949, the CCP's Red Army, growing stronger each day with Soviet support, had pushed the Kuomintang forces to the Southeast coast of China. Chiang decided that a last stand could be made on Taiwan since the Kuomintang controlled the Navy. He sent out a call for all who so desired to evacuate to the islands. The US had avoided any involvement in the "civil war" to this point but in 1950, when the threat of Red Army invasion of Taiwan was at a peak, President Truman sent the US Seventh Fleet to patrol the Taiwan Straits and thus terminated further hostilities.

The first 10 years of the Peoples Republic of China (1949-58), with Soviet assistance and guidance, stressed the development of heavy industry that would be the economic base for agriculture and light industry. Progress was easy to measure since the comparison base (1949) was so low that any gain would look enormous. Somewhat overambitious, CCP leaders launched the "Great Leap Forward" in 1961. In fact, what resulted was a great leap backward and a year of disaster. Food and clothing were in short supply, and even outside aid was unable to stem the tide of hunger and deprivation. The lesson was well learned though, and economic progress since 1961 has been steady. Emphasis was moved from heavy industry to agriculture to meet the basic needs. Industry continued to be developed, but at a much slower rate. While economic progress has been slow and had its setbacks, political progress has been steady and unwavering. The development of the selfless society is almost total. Those who deviate are expelled from society until "reeducated." While there are no longer mass executions that characterized the early CCP take-over days, the threat of elimination for failing to readjust thinking through reeducation still exists.

In contrast, economically, the 16 million people of Taiwan operate in a free enterprise society and have progressed at a steady rate with per capita income that is the highest among the developing nations. Politically, the Taiwanese are free to pursue any affiliation as long as they do not advocate the CCP.

The author has provided a chronological selection of writings that presents insiders' views on the social, economic, and political events that produced Modern China. He points out the good and the bad in each situation in his introductory remarks and gives equal space to comments made by both sides in several conflicts. The book provides an excellent reference text for the student of Chinese history and politics and is interesting reading for those who wish only to broaden their understanding of the roots of Modern China.

Lieutenant Colonel Falkner holds a Masters Degree in East Asia Studies from the University of Arizona and is a graduate of the State Department's Foreign Service Institute. Currently with the Air Defense School, he has served previously in Germany, Vietnam, and Korea.

F-111, *by Bill Gunston. Charles Scribner's Sons, New York, 1978. 112 pages, $9.95.*

Reviewed by
Lieutenant Colonel Melvin M. Adams

In this book, Gunston has authored a well-written, thoroughly researched, "blow-by-blow" description of what it takes to produce a modern-day fighter aircraft. The author recounts the beginnings of the Tactical Fighter Experimental (TFX) Program from 1961 to the awarding of the contract to General Dynamics. The author reviews the development of what was to become our modern day's most controversial weapon system, detailing problems in design, engine failure, and the reluctance of the Air Force and Navy to agree on a dual purpose aircraft, plus the Navy's decision to drop the F-111 and develop the F14 Tomcat.

The F-111 was used in combat for the first time in 1967. Gunston recalls firsthand accounts of the introduction of this most advanced fighter aircraft into Southeast Asia, and how it became known as "Whispering Death." After only 55 combat missions, the unexplained loss of three aircraft caused the surviving three F-111's to be withdrawn.

Reentry of the F-111 into Southeast Asia was directed in 1972 after appearance of the Soviet-supplied U-750 series SAM system (SA-2 Guideline) with its sheer volume of fire, which caused heavy casualties to American aircraft. A similar number was lost each week to the intense flack.

The author tells the story of the F-111's combat missions through the words of the men who flew these aircraft. In addition, he has included excerpts from official US Air Force operations memoranda. Through the inclusion of these memoranda and first person accounts, the author provides a living account of the F-111's outstanding success.

Use of the F-111 was not limited to US Forces. In his book, the author recounts and chronicles the F-111's acceptance and its performance with the British Royal Air Force and the Australian Air Force.

President Carter's cancellation of the B-1 project caused the Air Force to reevaluate the need for the F-111. The author then discusses the various modifications and efforts by the Air Force to field the "FB-111."

For those interested in aviation history, this book will place you in the cockpit with the pilot. The use of photographs illustrates the many modifications to the TFX before it became the respectable F-111. The personal accounts of the men who flew and maintained the F-111 through the development stages and its combat success have created a special respect for the personnel who labored to get it into the air. The author has written a very readable book that tells the story of a modern weapon system's transformation from near disaster to an outstanding success.

Lieutenant Colonel Adams, Air Defense, is a graduate of South Carolina State College. He has served as a battery commander, battalion executive officer, and as executive officer of a field artillery command. He is currently assigned as Commander of the Student Battalion, The School Brigade, at Fort Bliss, Texas.

NUCLEAR WAR FILMS, *edited by Jack G. Shaheen, Southern Illinois University Press, Carbondale, Illinois, 1978. 193 pages, $4.95.*

Reviewed by
First Lieutenant(P) Dennis W. Pate

This book is a collection of essays and reviews of motion pictures, television documentaries, and educational films dealing with the steps leading up to a nuclear war and the aftermath. As Mr. Shaheen states, however, it was meant to be more than a mere collection of essays. He attempts to treat the nuclear war film as a separate creative entity to be appreciated for its own intrinsic value.

Nuclear War Films is divided into two sections, the first entitled, "Feature Films." This first section deals with 11 motion pictures based on some aspect of nuclear war. In each essay, the author analyzes the plausibility of the plot and the technical accuracy of the scenes. Film directors are discussed as to their particular style of directing and how it relates to the development of the film discussed. Even the credibility of the actors is examined. Since the majority of the films in this section were popular motion pictures, such as Stanley Kubrick's Dr. Strangelove and Sidney Lumet's Failsafe, the reader is able to follow the treatment of the film with a fair amount of understanding.

Probably the most substantial contributions of this section of the book are the discussions of these films pertaining to their social impact on American society and their additions to the development of nuclear war films as a whole.

The second section of Nuclear War Films is a treatment of documentaries and educational short films on the subject. Although this area is dealt with as expertly and meticulously as the preceding essays, many of the films discussed have had very limited screening. Therefore, in all probability, the reader has seen very few of them and much is lost in the interpretation. As they say, "You had to be there," to get the full meaning of the in-depth discussions of each film.

As in the previous section, the chief value of this section is its commentary on the impact of these documentaries and educational films on nuclear power, nuclear awareness, and nuclear responsibility.

On the whole, in his treatment of the nuclear war film as a separate genre, Mr. Shaheen has been successful. The reader comes away with an understanding of the development of the nuclear war film as an art form, a social commentary, and perhaps even an expression of concern for humanity. Nuclear War Films is "must" reading for film and movie buffs or those with a keen interest in the subject of nuclear war.

Lieutenance Pate has recently returned from the 2d Infantry Division, Korea, where he was a Redeye section leader. Currently attending the Air Defense Officers Advanced Course, he will be assigned to 1st Battalion, 67th ADA (CV/SP), 9th Infantry Division, Fort Lewis, Washington, upon graduation.

ADDITIONAL SELECTION: New, fully illustrated book covers tanks being used in the world today.

In the 60 years since the first primitive tanks lumbered across the battlefields of WWI, fighting vehicles have become increasingly sophisticated and have played crucial roles in modern military history. B. T. White, an author whose name is a by-word in the field of armored fighting vehicles, has written the new book TANKS AND OTHER TRACKED VEHICLES IN SERVICE (distributed by Sterling, Two Park Ave., NY 10016, $8.95) that describes and illustrates the most important and interesting tracked military vehicles in service today.

Senior Air Defense Artillery Commanders

MG Charles F. Means
32d US Army Air Defense Command

COL Joseph Ryan
10th Air Defense Artillery Group

LTC Edward Langston
1st Bn, 1st ADA (Hawk)

LTC James Sprouse
2d Bn, 2d ADA (Hawk)

LTC James Petty
2d Bn, 62d ADA (Hawk)

LTC Frank Smith
3d Bn, 59th ADA (Hawk)

COL Stanislaus Hoey
69th Air Defense Artillery Group

LTC James Jellett
3d Bn, 7th ADA (Hawk)

LTC Robert Martin
2d Bn, 57th ADA (Hawk)

LTC John Berinato
6th Bn, 52d ADA (Hawk)
LTC Carl Moser
3d Bn, 60th ADA (Hawk)

COL Thomas Forburger
94th Air Defense Artillery Group

LTC John Holley
2d Bn, 1st ADA (Herc)

LTC George Reed
5th Bn, 6th ADA (Herc)

LTC Wayne Herr
2d Bn, 56th ADA (Herc)

LTC James Webb
3d Bn, 71st ADA (Herc)

COL Johnie Forte
108th Air Defense Artillery Group

LTC Tommie Smith
2d Bn, 67th ADA (C/V)

LTC Donald Lionetti
2d Bn, 60th ADA (C/V)

LTC Wayne Gillespie
6th Bn, 56th ADA (C/V)

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

LTC John Williamson
1st Bn, 65th ADA (Hawk)

LTC Robert Drolet
3d Bn, 68th ADA (Hawk)

LTC Charles Hutek
2d Bn, 52d ADA (Herc)

LTC Donald Carlsen
2d Bn, 52d ADA Elem (Herc)

BG Walter Mehl
38th Air Defense Artillery Brigade

LTC Lewis Johnson
1st Bn, 2d ADA (Hawk)

LTC Frank Braden
2d Bn, 71st ADA (Hawk)

LTC Michael Stupka
1st Bn, 44th ADA (Hawk)

LTC Frank Demarco
2d Bn 61st ADA (C/V)

COL James DeMoss
The School Brigade

LTC Richard Miks
1st Bn, 55th ADA (C/V)

LTC James Chatfield
5th Bn, 57th ADA (Hawk)

LTC John O'Reilly
4th Bn, 62d ADA (Herc)

LTC Melvin Adams
Student Bn

LTC James Bendele
Staff and Faculty Bn

LTC Gustave Villaret
Allied Student Bn

COL Russell Parker
1st Air Defense Artillery Training Brigade

LTC Jay Garner
1st BCT Bn

LTC Joseph Heinlein
2d BCT Bn

LTC Andrea Sarzanini
3d ADA Tng Bn

LTC William Driscoll
4th ADA Tng Bn

As of 1 January 1979

COL Phillip Mason
11th ADA Group

LTC John Fanning
4th Bn, 1st ADA (C/V)

LTC Lewis McFarland
2d Bn, 55th ADA (Hawk)

LTC John Higgins
1st Bn, 7th ADA (Hawk)

LTC Richard Emmert
2d Bn, 59th ADA (C/V)

LTC Richard Supinski
3d Bn, 61st ADA (C/V)

LTC Gerald Putman
3d Bn, 67th ADA (C/V)

LTC Claude Ellis
1st Bn, 59th ADA (C/V)

LTC Louis Cancienne
1st Bn, 68th ADA (C/V)

LTC John Little
2d Bn, 5th ADA (C/V)

LTC Domenic Rocco
4th Bn, 61st ADA (C/V)

LTC Larry Butterworth
1st Bn, 51st ADA (C/V)

LTC James McCoy
1st Bn, 67th ADA (C/V)

LTC Donald Ingram
5th Bn, 52d ADA (C/V)

LTC James McKnight
3d Bn, 4th ADA (C/V)

LTC Michael Howe
1st Bn, 3d ADA (C/V)

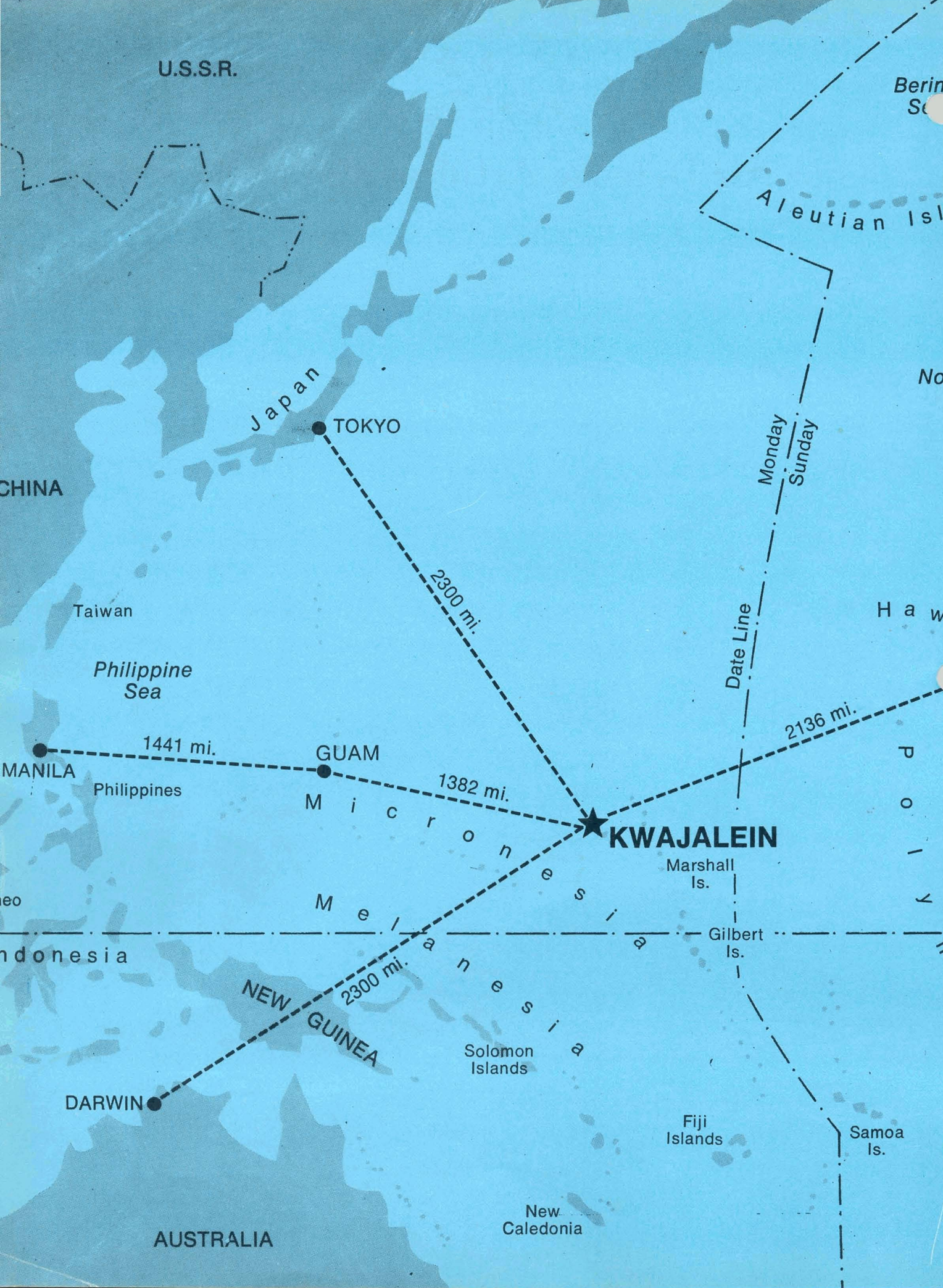
LTC Don Summers
2d Bn, 51st ADA (Hawk)

LTC John Rogers
1st Bn, 43d ADA (Herc)

LTC Daryl Matthews
1st Bn, 62d ADA (C/V)

COL Larry Honsinger
559th USA Artillery Group

LTC Charles Harmon
5th USA Artillery Group


U.S.S.R.
Bering Sea
Aleutian Isl
Japan
TOKYO
CHINA
Monday
Sunday
Date Line
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1441 mi.
MANILA
Philippines
GUAM
1382 mi.
Micronesia
KWAJALEIN
Marshall Is.
Melanesia
Gilbert Is.
Indonesia
NEW GUINEA
2300 mi.
Solomon Islands
DARWIN
Fiji Islands
Samoa Is.
New Caledonia
AUSTRALIA