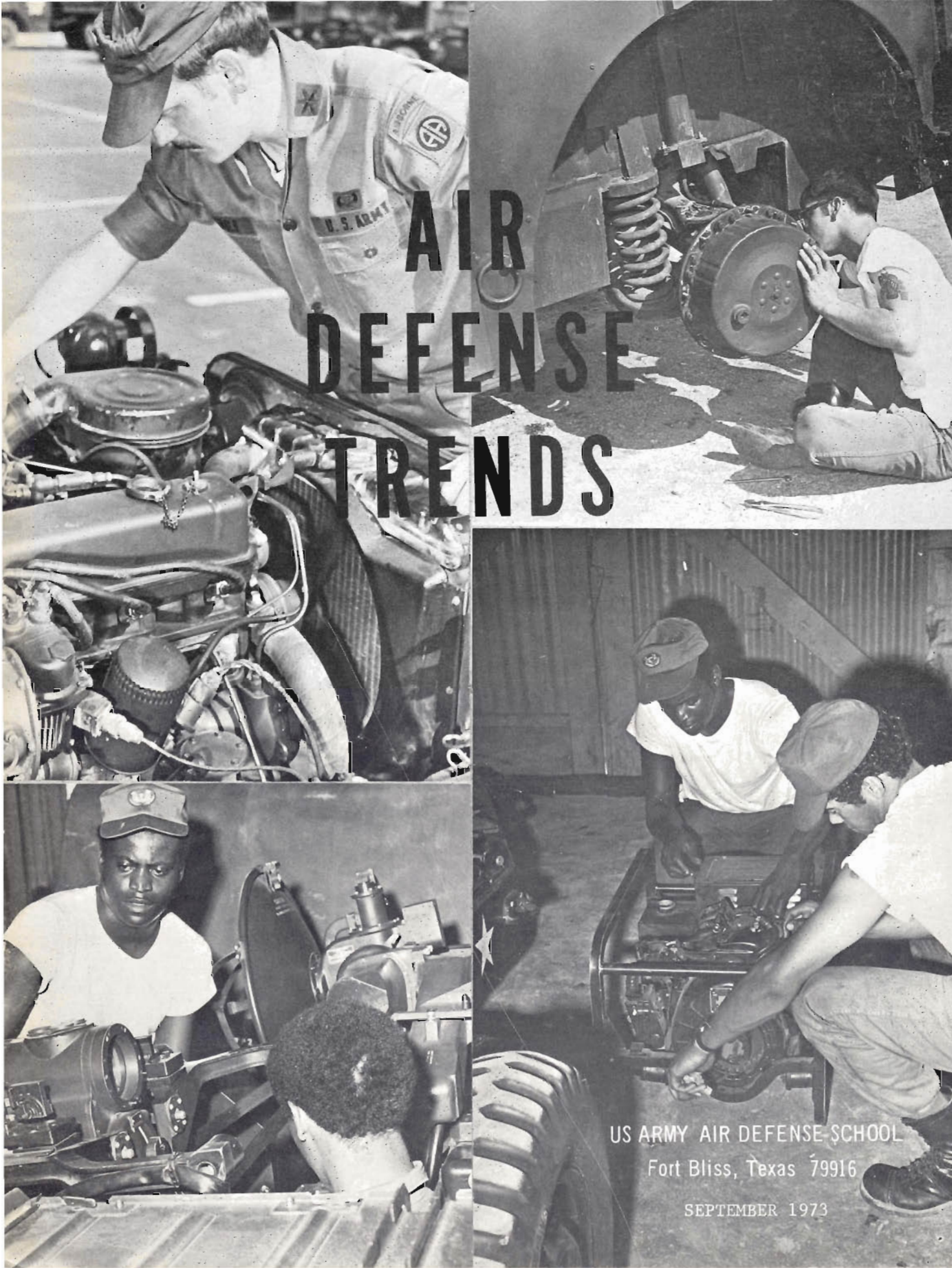

AIR DEFENSE TRENDS

US ARMY AIR DEFENSE SCHOOL
Fort Bliss, Texas 79916

SEPTEMBER 1973

AIR DEFENSE TRENDS
US ARMY AIR DEFENSE SCHOOL
Fort Bliss, Texas 79916

IN THIS ISSUE

The most important constant, confirmed throughout my years as a soldier, is that the Army is an essential institution for America's freedom and greatness. The ideals expressed in the West Point motto, "Duty, Honor, Country," have sustained and inspired American soldiers throughout our history. In peace and in war, the Army has provided the shield and the sword of America's defense, protecting our Nation and allowing our citizens to live as free men.

— General William C. Westmoreland
US Army (Retired)

MAJOR GENERAL LeVAN ASSUMES COMMAND OF FORT BLISS

Major General CJ LeVan became Commanding General, US Army Air Defense Center and Fort Bliss, and Commandant, US Army Air Defense School, 14 June 1973 after 2 years as Commanding General, 32d Army Air Defense Command in Europe

General LeVan entered the Army from Kansas City, Missouri, in 1942 and received a Regular Army commission in 1946. He received a bachelor's degree in mathematics from the University of Omaha in 1958 and in 1965 a master's degree in political science from George Washington University. He attended the Artillery School, US Army Air Defense School, Command and General Staff College, and US Army War College.

He was promoted to brigadier general in September 1968 and to major general in April 1971. He served in Australia and New Guinea during World War II. In May 1963 he became the first military recipient of the Pace Award, which he received for contributions of outstanding significance while serving as Chief of the Nike Zeus Office, then a part of the Office, Chief of Research and Development, Headquarters, Department of the Army.

General LeVan has been awarded the Legion of Merit with four Oak Leaf Clusters, Army Commendation Medal with three Oak Leaf Clusters, Asiatic Pacific Campaign Medal with New Guinea Campaign Cluster, Korean Service Medal, United Nations Service Medal, Republic of Korean Unit Commendation Ribbon, and Republic of Korea National Security Medal Third Class.

COVER Our cover is a montage emphasizing the added dimension in equipment an air defense artillery battalion brings to a parent organization. The unit represented here is the 3d Battalion (Vulcan) Airborne, 4th Air Defense Artillery, 82d Airborne Division. In the case of the 3d of the 4th, the inventory includes 113 jeeps with trailers, 110 Gama Goats, and 48 Vulcan cannons, along with eight forward area alerting radars, five target missile launch rails, twenty-six 3/4-ton tailers, five water trailers, nine 2½-ton trucks, five wreckers, and eight Mules. The variety of maintenance skills demanded to keep this equipment combat ready is great and ranges from personnel trained to cope with the intricacies of the Vulcan air defense gun to the men who man the ever necessary grease guns on the Gama Goats, the prime movers for the Vulcan. It's a tough job to keep all of this equipment functioning, especially under field conditions when delicate components of guns and radar must take pounding and weathering in stride. But the 3d of the 4th boasts that it is ready for deployment to any trouble spot in the world with the 82d Airborne Division.

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AIR DEFENSE TRENDS

An instructional aid of the United States Army Air Defense School, Air Defense Trends is published on the basis of three issues annually. It is designed to keep air defense artillerymen informed of unclassified tactical, technical, and doctrinal developments because it is essential to national defense that all levels of air defense command be kept aware of these developments and their effect on the air defense posture.

Distribution of this publication 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, US Army Air Defense Command, Active Army units, major oversea commands, and military assistance advisory groups and missions.

Qualified individuals may purchase copies of Air Defense Trends at 50 cents a copy from the Book Store, US Army Air Defense School, Fort Bliss, Texas 79916. The form below is printed for convenience in ordering.

When appropriate, names and organizations of authors are furnished to enable readers to contact authors directly when they have questions concerning an article.

Articles appearing in this publication do not necessarily reflect the opinions of the US Army Air Defense School or the Department of the Army.

Use of funds for printing of this publication has been approved by Headquarters, Department of the Army, 1 September 1973.

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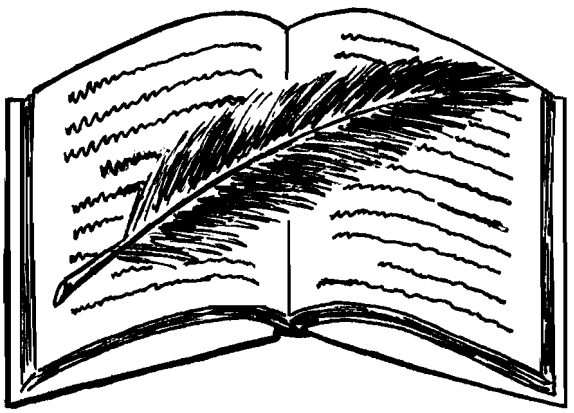

Air Defense Trends seeks your comments on any material published. A different viewpoint or a new line of reasoning may be published to stimulate the exchange of ideas. If you are an authority on a subject, we invite you to write an article and inform our other readers. If circumstances prevent you from writing an article, send in you idea and our editorial staff will assist in developing an acceptable article.

Readers are invited to submit for publication articles and informative notes that are of professional interest to the air defense artilleryman. Articles should be current and forthrightly stated and should relate to some aspect of what air defense units in the field are doing to accomplish their mission, particularly in the technical and tactical areas. Miscellaneous articles expressing either technical or non-technical ideas that may be of value to air defense will also be considered for publication.

Direct communication to the editor is authorized:

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AUTOVON 978-1801

USAADS Notes

Hinman Hall

DEPUTY COMMANDANT FOR COMBAT AND TRAINING DEVELOPMENTS

GOAR Aircraft Recognition Kit

It is planned that the Ground Observer Aircraft Recognition (GOAR) Kit will be available for requisition the first quarter, FY 74. GOAR is a 35-mm slide kit consisting of a general orientation slide and 10 aspect slides of each of 128 aircraft as viewed by the ground observer. The technique to be used in employment of the GOAR kit is provided by DA Training Circular 44-30. All aspects of instruction the instructor needs to know are described. Basis of issue is one kit per maneuver battalion and one per air defense battery, available through audio-visual support for permanent retention. SLARK kits may be exchanged for GOAR kits on a 1 for 1 basis. Check for listing in the Training Aids Catalog.

Radio Controlled Model Airplane Testing

The Air Defense Artillery Training Brigade at Fort Bliss, Texas has begun testing of a radio-controlled model airplane as a tracking training device for Chaparral, Vulcan, and Redeye weapon systems. Objectives of the test include evaluation of effectiveness and realism, optimum methods of employment, radar and infrared augmentation requirements, cost data, and Army-wide basis of issue requirements.

Results of initial testing indicate that the model aircraft may be an excellent training device for forward area weapon gunners — a highly effective, extremely responsive, and realistic target. Tracking courses used in the test varied from straight and level flights easily tracked to in-flight maneuvers that are considered unsafe for drone or manned aircraft.

The aircraft, a 1/10 scale model, was flown in 10-15 mph wind gusts without difficulty. The Vulcan range-only radar received sufficient radar return from the reflective surfaces of the aircraft to achieve radar lock. When the exhaust of the aircraft was presented, sufficient infrared radiation

was present for the Chaparral and Redeye missile seekers to achieve a lock. The model can remain aloft for approximately 20 minutes without refueling and is capable of carrying a payload of 4-8 pounds for additional infrared radiation sources.

Training Films

Twelve air defense artillery training films have been recently completed and are now available in audio-visual support centers. These films should be of significant value to the appropriate unit training program.

TF 44-4203, High-Power Acquisition Radar (HIPAR) Anti-Jam Improvements (AJI) — Part I: Automatic Jamming Avoidance Circuitry (AJAC) (U), explains the operation of the AJAC portion of the AJI modification to the high-power acquisition radar (HIPAR) of the Improved Nile Hercules system. This 16-minute color film opens with a sequence showing the HIPAR in operation. A narrator explains that the antijamming capability of the HIPAR has been improved by four new or improved circuits. This modification is called the antijam improvements. The basic purpose of the automatic jamming avoidance circuitry is stated. Then, by animation, a detailed explanation of the circuit operation is presented. The many steps and modes of operation are explained. The operation of AJAC to assist the operator in overcoming jamming is presented clearly and in detail. This film is directed at the HIPAR mechanic and operator to assist them in maintaining and operating the modified radar.

TF 44-4204, High-Power Acquisition Radar (HIPAR) Anti-Jam Imporvements (AJI) — Part II: Automatic Cancellation of Extended Targets (ACET) (U). This film shows and explains the ECCM improvements to the high-power acquisition radar, (HIPAR) resulting from the addition of the ACET circuit. This 9-minute color film opens with a sequence showing an operational HIPAR. During the sequence a narrator is explaining the ability of the radar to operate through jamming, such as chaff, due to the addition of the ACET circuitry. The basic principle of the circuit operation is explained, using animation. How the circuit eliminates unwanted signals and displays the desired target video is shown and explained. This film should prove a valuable aid to the HIPAR mechanic in maintaining the AJI-modified radar. It will also be an excellent aid to operator training.

TF 44-4205, High-Power Acquisition Radar (HIPAR), Anti-Jam Improvements (AJI) — Part IV: Higher Transmitter Power (U). The film explains the power relationship between a radar signal reflected off an aircraft and a jamming signal transmitted by the aircraft. Demonstrated and explained are the AJI modification feature, that increases the transmit power of the HIPAR. This 7-minute color film opens with a sequence of the HIPAR as the narrator explains the subject of the film, higher transmitter power. Using animation to illustrate, the narrator explains the relationships between the power loss of an echo signal and a transmitted jamming signal. The three innovations that are employed to increase the HIPAR power are explained by the narrator as a maintenance technician demonstrates their use.

TF 44-4255, Target Engagement Procedures for Hawk Assault Fire Units and Self-Propelled Firing Sections. This 27-minute color film is designed to support training of Hawk battery personnel in the use of the assualt fire command console in conjunction with the assault fire unit. Also discussed are the augmented assault fire unit and trailer-mounted platoon command post. The film opens with a Hawk missile firing sequence. Then, using live shots and animation, the equipment making up the assault fire unit is shown and explained. Emphasis is placed on the information inputs to the assault fire command console. Following this, the narrator explains the action as a crew performs the steps involved in a target engagement sequence. Next, the augmented assault fire unit is treated in the same manner as the assault fire unit. Then the self-propelled firing section is presented with the same detail and attention as the other fire units. Particular emphasis is placed on identifying and explaining firing console indicators throughout the film.

TF 44-4358, Air Defense Artillery Weapon System, Chaparral, Self-Propelled — Part V: Swim Kit Installation and Removal, explains and demonstrates the major factors involved in preparing the self-propelled Chaparral for water crossing operations. This 28-minute film should be a primary teaching aid for Chaparral crew training.

The opening scenes picture a Chaparral squad to which two members have been newly assigned. The squad leader is about to conduct a water crossing training mission. Prior to start of the practical portion of the operation, the two new men have to be briefed on teamwork and safety. As the squad leader directs the operations, the narrator explains the procedure for swim kit installation. This lengthly process is covered step-by-step. When installation of the swim kit is complete, fording procedures are demonstrated. Removal of the swim kit and stowing of the equipment is then

demonstrated. The film emphasizes the importance of teamwork in training and mission accomplishment of the Chaparral squad.

TF 44-4360, Air Defense Artillery Weapon System, Vulcan, Towed — Part I: Emplacement and Preparation for Action. This 26-minute training film will provide valuable training for Vulcan crew members, in emplacement, preparation for action, and engagement procedures. The film demonstrates and describes the step-by-step procedure for preparing and placing the towed Vulcan into action to engage a hostile target.

The film opens with a Vulcan weapon and crew as they leave the road to occupy a new position. This squad is part of an air defense organization whose mission is to provide air defense for a vital area. The squad emplaces the weapon as the narrator briefly describes the system and the duties of the crew members.

The scene shifts back in time and follows the squad leader as he slowly performs each of his tasks involved in emplacement of the weapon. The narrator describes each step of the squad leader's actions and explains the reasons and the results expected. Similar treatment is given each member of the squad. The crew personnel are shown as they improve their position, after the weapon system is ready for action. The film closes as the squad successfully destroys a hostile aircraft.

TF 44-4367, Chaparral/Vulcan Air Defense Artillery Battalion; Organization and Employment. This film is directed at infantry, armor, and field artillery unit commanders at battalion and higher levels. The film is designed to familiarize commanders and their staffs with the organization and employment of forward area air defense artillery weapon battalions.

This 29-minute film opens with a brief sequence of low-level strafing and bombing attacks. Such action emphasizes the need for the type of air defense provided by Chaparral and Vulcan.

The stage is set to observe a Chaparral/Vulcan battalion as its present deployment in a defensive situation is explained. The factors that influence deployment are stated. Employment of the forward area weapon system in the air defense role is explained and illustrated. The specific roles played by Chaparral are shown and explained. This is followed by similar treatment of Vulcan in both air defense and ground fire support roles.

The organization of the Chaparral/Vulcan battalion in the division is illustrated and explained. The difference in the organization of the nondivisional batallion is pointed out. The Chaparral and Vulcan battery organizations are shown and described.

With the foregoing information as background, the film then leads the audience through a planning session to provide defense against the air attack. During this sequence, the narrator points out factors that influence the commander's decisions as he plans to deploy the Chaparral/Vulcan battalion. The film closes with a session devoted to employment of Chaparral and Vulcan in support of offensive operations by the division.

TF 44-4378, Hawk Battery Reconnaissance, Selection, and Occupation of Position — Part I: Reconnaissance and Selection. This 22-minute color film is intended as a teaching aid for personnel of the Hawk battery. Although primarily concerned with reconnaissance and selection of positions, the film emphasizes the mission of Hawk in the forward battle area.

The film opens with a Hawk unit engaging a low-level aerial target, which is destroyed. Narration during this sequence establishes the Hawk's mission. As part of the air defense family of weapons, the mission of a Hawk unit is to provide low-to-medium altitude air defense in its sector. By animation, various method of deployment of both towed and self-propelled systems are described. A key point is that regardless of how a Hawk unit is deployed, it must be able to move quickly, on its own, and be ready to fire in short order.

From this point there follows a step-by-step demonstration of the procedures involved in the movement of a Hawk battery from one tactical location to another. After receiving movement orders the battery commander performs map reconnaissance and begins plans for the move. Battery key personnel are briefed by the commander. The briefing covers the essential points involved in the tactical move and the reconnaissance plan.

The picture continues with a platoon (self-propelled) of the battery performing all the procedures involved in reconnaissance and selection of the new position. The major steps of reconnaissance and selection of position are reviewed and the film ends with the reconnaissance party leader informing the unit that they can move to the new location.

TF 44-4379, Hawk Battery Reconnaissance, Selection, and Occupation of Position — Part II: Movement and Occupation. This 21-minute, color

film depicts the procedures involved in the movement of a self-propelled Hawk firing battery from one tactical position to another.

The film opens with a short sequence depicting vehicles of a Hawk platoon on the move. The narrator explains that reconnaissance and selection of the platoon's new position has been accomplished. Next, a sequence shows the assistant platoon leader and sergeant discussing the move. They review what is know at this time. The route is confirmed as marked on the map. Guides will be waiting at the release point to direct them into the new position. The convoy is shown moving along the selected route. All personnel are alert for aerial attack or ambush during the movement. At the release point, the guides direct each piece of equipment to its preselected location.

The positioning of the platoon's equipment is shown and explained in detail. The continuous-wave acquisition radar (CWAR) is positioned on a site chosen for its commanding position which the narrator explains is so that it can detect low-flying aircraft and also maintain line-of-sight with the IFF antenna. Emplacement of the other major items of platoon equipment is shown and explained in detail.

When the self-propelled platoon is in place and ready for action, the battery commander is informed by radio. Orders are now given to the towed platoon to move to it's location. Movement of the remaining elements of the battery are shown by quick action cuts, emphasizing that the principles used for the self-propelled platoon are applicable for all moves. After touching briefly on the basic principles of camouflage, cover, concealment, and local security, the film ends with the battery engaging an enemy aircraft.

TF 44-4380, Ballistic Aerial Target System (BATS) — Operation and Use. The BATS is a low-cost, realistic aerial target that will support training of Chaparral and Vulcan crewmen and Redeye gunners. BATS is a crew-served system consisting of a rocket target, launcher, launching control system, and ancillary equipment.

This 31-minute motion picture introduces BATS and describes the system's physical and flight characteristics. The film also discusses firing range use to include factors concerning Chaparral, Vulcan, and Redeye weapon systems. Procedures for storage, assembly, emplacement and firing are shown and explained.

The film opens with a sequence of BATS being launched, intercepted, and destroyed. After a general introduction to the system, the film depicts a detailed explanation of major system components. Positioning of the launcher and functions of the fire control slave unit and fire control master unit are shown and explained in detail. Step-by-step procedures for assembly, arming, and placing the target on the launcher are illustrated and explained. After the target is on the launcher, the procedures for installing boosters, flares, and wiring are shown. The film ends with a launching of the target, an engagement, and a successful intercept resulting in the destruction of the target.

TF 44-4415, The Hawk Air Defense Continuous-Wave Acquisition Radar — Emplacement and March Order, describes and demonstrates the procedure for emplacement, march order, and preparation for action of the CWAR. The film should be a valuable training aid for Hawk system crewmen during on-the-job or refresher training.

This 22-minute training film opens with scenes of a towed Hawk battery approaching a new position that it is to occupy. When the vehicle pulling the CWAR approaches the area, it is met by a guide. The unit separates from the convoy and, directed by the guide, proceeds to a preselected position where the CWAR is emplaced. The detailed, step-by-step procedures for emplacing the radar are shown and explained. Safety and proper equipment handling are stressed by the narrator as the crew performs emplacement. Some time later, the unit is ordered to move again and the film shows the CWAR crew as it completes the deenergizing procedure. Following a step-by-step march order procedure, the crew and CWAR join the battery convoy and proceed to a new position. The film closes with a review of the major points of emplacement and march order of the CWAR.

TF 44-4417, The Hawk System, Range-Only Radar — Emplacement and March Order. This 24-minute film demonstrates and describes the procedures for emplacement and march order of the ROR. Although made using the basic Hawk system, the information in this film is applicable to both basic and Improved Hawk systems.

The film opens with a Hawk battery in convoy approaching a new position which it is to occupy. When the vehicle pulling the ROR approaches the new position, it is met by a guide who directs the ROR crew to the emplacement site. Emplacement of the ROR is demonstrated and explained in a deliberately paced step-by-step procedure. When this phase is completed, march order is treated in a similar manner. Safety is stressed throughout the film. The films ends with the ROR joining the battery which is in convoy and again on the move.

DEPUTY COMMANDANT FOR TRAINING AND EDUCATION

Air Defense Artillery Officers Basic Course

(Class 8-73)

DISTINGUISHED GRADUATE — 2LT Robert T. McCroy.

HONOR GRADUATES — 2LT's Walter L. Flanders III, James R. Dickson, Alan L. Larson, and Gary A. Krause.

COMMANDANTS LIST — 1LT Louis G. Omansky; 2 LT's James C. Armstrong, Paul J. Nobles, Jr., Wesley L. Jones, James R. Quinn, Bruce W. Felmy, Frank A. Stoube, Richard B. Ballanfant, David G. Elmore, Paul G. Berheim, Joseph R. Murdock, and William E. Helget.

(Class 9-73)

DISTINGUISHED GRADUATE — 2LT Raymond C. Roan.

HONOR GRADUATES — 1LT John W. Crowley and 2LT's John R. Trouche, Eugene P. Meyer, and Dana C. Reed.

COMMANDANTS LIST — 1LT's Gregory C. Ranieri and Michael T. Morman; 2LT's David G. Smith, Larry G. Pierson, Thomas B. DeBaun, Francis L. Eslinger, Darwin O. Washington, Paul E. Weeks, Michael A. Widman, Nelson W. Bauer, and Paul A. Perkins.

Air Defense NCO Advanced Course 1-AD-C42A

(Class 1-73)

DISTINGUISHED GRADUATE — SFC Bobbing W. Green.

HONOR GRADUATES — SFC's Raymond D. Pate, David L. Keller, L. C. Burnette, and Everett M. Calvin.

(Class 2-73)

DISTINGUISHED GRADUATE — SFC Morris A. Scoles.

HONOR GRADUATES — SFC's Robert Williams, Phillip J. Gragg, George Bradford, and Jerry A. Bradley.

COMMANDANTS LIST — SFC's Kenneth Corbisier, Charles J. Jones, and George R. Altizer.

Notes From US Army Air Defense Center and Fort Bliss

Amphibious Capability

The water-crossing ability of both the Gama Goat and Chaparral self-propelled weapon system was recently put to the test by members of the 5th Battalion, 59th AD Artillery's contigent of in-unit advanced individual training students. The exercise, conducted over a 2-day period, marked the final stage of the student contigent's 11-week training cycle with the 5th of the 59th. The overall objective of the exercise was to provide the trainees with practical experience in proper entry, manuever, and exit techniques with tactical Army vehicles. The swimming exercise was also geared at building the individual student's confidence in the water-crossing capabilities of the vehicles. The swim vehicles were designed to float for extended periods of time.

NATO Air Defense Goes Operational

The $300 million NATO Air Defense Ground Environment (NADGE) computerized air defense system, which stretches from Norway to Eastern Turkey (the biggest project of fixed installations within NATO) is now operational in Western Europe, Norway, Italy, Greece, and Turkey. Eighty-four sites make up the integrated air defense system.

NATO now has the best air defense system in the world, stretching in a 3,000-mile arc from above the Arctic Circle to Asia Minor.

NADGE's continental chain of early-warning radars and air traffic sensors, tied together with a data-communications network and computerized control centers, combines with interceptor bases and ground-to-air missile sites to provide detection-to-destruction protection against hostile aircraft.

NADGECO Ltd., formed solely for the purpose of building NADGE, is a consortium owned by six international electronic firms. The firms and the countries they represent are Hughes Aircraft Company, US; AEG-Telefunken, Federal Republic of Germany; N.V. Hollandse Signaalapparaten, The Netherlands; the Marconi Company Ltd., United Kingdom; Selenia, Italy; and Thomson-CSF, France.

Here is how NADGE works. Long-range radars search out unidentified and potentially hostile aircraft. Electronic sightings are instantly transmitted through electronic data links to command centers. There they are fed into high-speed computers — the heart of the NADGE system — and shown as blips on display consoles. As the targets are tracked automatically, the computer continues to record their speed, altitude, and course.

Preprogrammed with identification codes of friendly aircraft, weather conditions, enemy forces available, and possible methods of attack, the computer in less than one second can determine if a blip is a known or unknown aircraft.

Once a detection is definitely classified as unknown, action taken becomes the responsibility of a military officer, known as the sector controller. He may order an interceptor aircraft, guided by information provided by the computer, to visually inspect the unknown aircraft. In war, the controller may order missiles fired to destroy intruders.

Moving Target Simulator

Current schedules provide for installation of moving target simulators (MTS) M87 at Fort Hood, December 1973; Fort Riley, February 1974; Fort Carson, March 1974; Hawaii, April 1974; Korea, May 1974; and Germany, June 1974. The MTS provides as near a real target as possible for training of Redeye crewmen. It consists of a quadrispherical screen, 40 feet in diameter, upon which aircraft images are projected and a sound track which reproduces binaural aircraft sounds. It simulates those targets that could be expected in the forward battle area. Several hundred different targets with 20 aircraft types will be available. With two students participating in each simulated target projection, approximately 50 student exercises can be completed during each hour of operation. Four M87's at Fort Bliss and one at Fort Bragg are in operation.

Dynamic Training

Members of the 2d Platoon, C Btry, 5th Bn, 59th ADA, found the weather crisp, the snow deep, and the fun plentiful recently as they spent several days on the easter slopes of Mt. Sierra Blanca training under cold-weather conditions.

The exercise, conducted under the Army Adventure Training Program, provided a change for the platoon from the past weeks of desert training preparing for a battalion operational readiness training Test.

Eighteen members of the platoon travel 143 miles north of Fort Bliss to the base of Mt. Sierra Blanca in the Lincoln National Forest. After establishing camp, the platoon participated in a concentrated training program of cold weather operations, cold weather survival, and skiing.

The exercise provided the platoon personnel with valuable cross training which they would have been unable to receive under usual conditions. It further helped provide the broad base of expertise from which the modern Army must now function to accomplish its many missions.

Troop Movies

Here is a list of interesting movies available from the US Army Command Information Unit, Washington, D.C. that can be profitably employed by any unit to broaden the knowledge of its troops.

"The History of Aviation" — Man's attempts to fly from before the Wright brothers time to the present.

"Chopper Pilot" — The training and day-to-day life of helicopter crews in the Army.

"About Addiction" — Facts about this burning topic.

"Nine in One" — Nine different kinds of drug abuse.

"Crash" — A factual view of addicts in a rehabilitation program, describing their bout with the habit and attempts to kick it.

"Hooks" — A "With-it" looks at drugs. Winner of a top award at the Baltimore Film Festival.

"The Black Soldier" — Dealing with black history.

"Heritage is Black" — Afro-American history in the Army and in American society in general.

"Black and White Uptight" — An account in straight terms about race relations.

"Ranger"— The story of the Army's Ranger School at Fort Benning, Georgia.

"Recondo" — The training of special reconnaissance troops in the Rocky Mountains.

In addition there are films on:

- Famous battles.
- The life of General MacArthur narrated by Walter Kronkite and Walter Mathau.
- A story of General "Vinegar Joe" Stillwell, narrated by Walter Mathau.
- The life of General George S. Patton, narrated by Ronald Reagan.
- General Dwight D. Eisenhower.
- General John D. Pershing.
- Unit histories.

Unit commanders may acquire films by completing DA Form 11-44 (Audio-Visual Loan Order) at their nearest audio-visual support center.

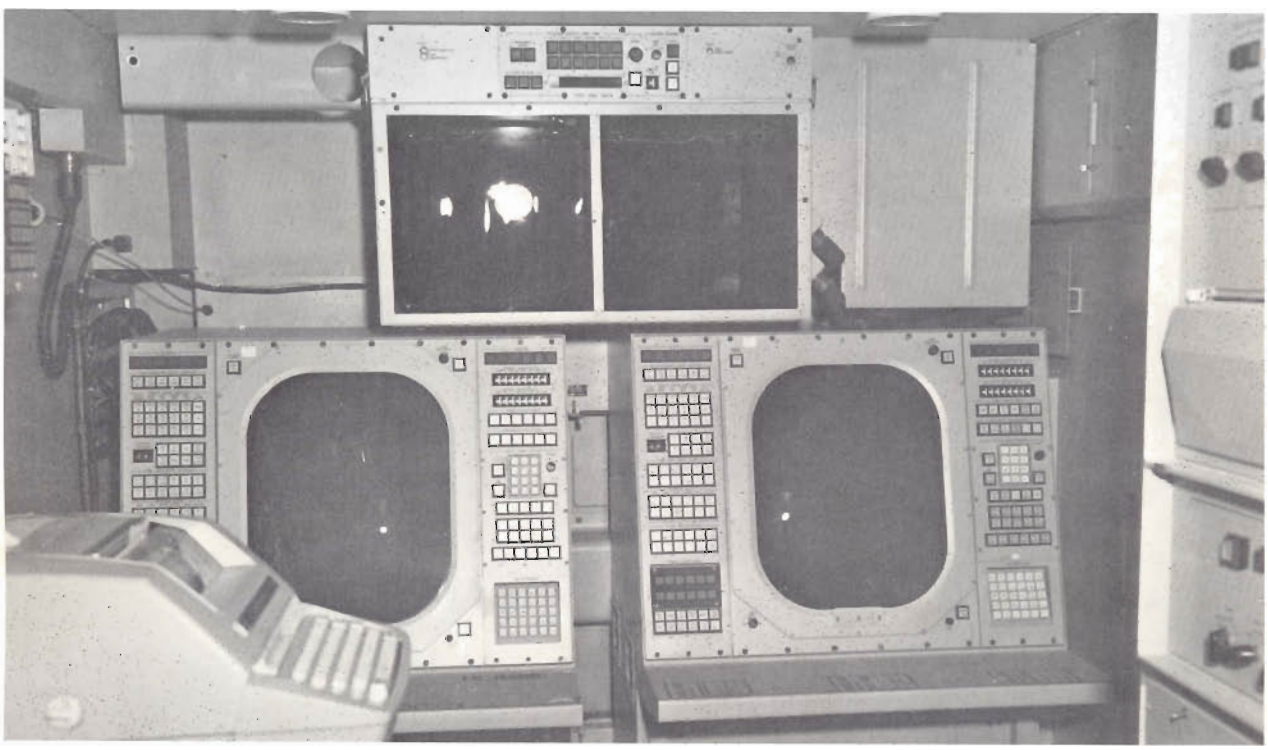
Notes From the US Army Air Defense Board

Tropic Testing-Improved Hawk

Two Improved Hawk tests are being conducted this summer at the US Army Tropic Test Center, Panama Canal Zone, by the US Army Air Defense Board. The Service Test (Tropic Phase) of the Improved Hawk Battery is a 9-month test consisting of 3 months of open storage and 6 months of active testing. The Developmental Test II (Tropic Phase) of the Improved Platoon Command Post is a 5-month test consisting of 4 months of testing and 1-month storage period. The objective of both of these tests is to determine what effect, if any, the tropic environment has on the operational capabilities of the systems. Testing of the Improved Hawk will culminate in missile firings in December. The US Army Air Defense Center is supporting both of these tests with personnel from the 11th Air Defense Artillery Group.

AN/TSQ-73

AN/TSQ-73 System No. 2 arrived last spring and was emplaced at Site Monitor to undergo engineer design testing. Duration of the test was approximately 1 month, after which the system was returned to the factory. The in-field research and development acceptance test was recently completed using systems No. 1 and No. 2.



This is an inside view of part of the AN/TSQ-73 van showing the status panel above the two operator consoles. The object resembling a typewriter is the keyboard printer unit that produces a readout of data for the maintenance man when the self-diagnosing system says there is trouble.

Notes From the Human Resources Research Organization

The most recent innovation at Fort Bliss is an attempt to install quality-assured peer instruction for two MOS's in the Air Defense Artillery Training Brigade. This method of instruction was developed by the HUMRRO Division at Fort Ord, California, as part of its research program for the Office of the Special Assistant for the Modern Volunteer Army. The instruction is performance oriented and emphasizes learning in a job context in which the tasks required of an MOS holder are mastered sequentially. Instruction is individualized in a manner similar to on-the-job training. After a student demonstrates mastery in performing a group of the functionally related tasks involved in an MOS, he is assigned a trainee, who first observes his peer instructor perform a set of tasks and then receives intensive personalized instruction from the peer instructor. Each student must demonstrate hands-on mastery of each set of MOS tasks before he is qualified as a peer instructor.

Each student progresses through several cycles of observer, learner, and peer instructor as he masters each of the several consecutive blocks of instruction in the training program.

This method of instruction has several advantages. First, is releases regular instructor personnel to serve as resource persons during training because they are relieved of regular instructional duties. Second, it permits instructors to serve as quality control agents because they must pass on the performance of each trainee before that trainee can become a peer instructor. Finally, the method achieves the ideal of a one-to-one relationship between instructor and student, permitting maximum interaction. More information on peer instruction can be obtained by contacting the Director, HUMRRO Division No. 5, or the Chief, Air Defense Human Research Unit (ADHRU), Fort Bliss, Texas 79916. Both can be reached by telephone at 568-4491 or 568-5297.

A new report summarizing a decade of research on the problems facing the forward area weapons crewman was published recently, written by Dr. Robert D. Baldwin, HUMRRO Division No. 5. It is titled, *Capabilities of Ground Observers to Locate, Recognize, and Estimate Distance of Low-Flying Aircraft.* Copies of this report are available on request from HUMRRO or ADHRU.

Mutual Balanced Forces Reduction In Europe

A speech recently presented at Fort Bliss by the Honorable Reginald John de Warren, Consul General of France in Houston for Texas, Oklahoma, and New Mexico.

The subject you have kindly suggested to me is undoubtedly a vital as well as an actual one, but also a difficult one. To my mind, it is a little like speaking on a project which is still on the drafting board, and therefore subject to many modifications.

This said, I believe we may start by a concise setting of the background of this project of a Mutual Balanced Forces Reduction in Europe, or more simply, MBFR. We can, in a second stage, study how such a reduction could be envisaged, seen from the American, Soviet, and European angle. I will end my expose by giving you the French position on this crucial problem and the reasons of our position.

* * *

Lord Gladwyn, former British Ambassador in Paris, recently asserted in an article published in your review "Foreign Affairs" that "in our nuclear age, questions of defense planning have now passed into a surrealistic sphere of bluff, counter bluff, nightmare, and potential extinction of the human race. Reassuringly, neither of the superpowers has, so far, been willing to use, or to threaten the use of the superweapon in pursuit of political aims. Indeed, its possession has so far simply resulted in a perpetuation of the political status quo. Any negotiated arrangement between the superpowers on limitation or reduction of their nuclear hardware will also, most likely, only be possible on such a basis."

In other words, during the two past decades peace has been maintained in Europe through this "balance of terror" between NATO and its allies in the West and the Warsaw Pact in the East. However, on the European side the credibility of NATO and allies, as a mechanism capable of resisting aggression, has been based on the hundreds of thousands of American GI's stretched across Central Europe. Nevertheless, in spite of statements to the contrary, we Europeans feel that there may be, at some time in the future, a progressive withdrawal of American troops, and this will unavoidably weaken the "credibility" of the major deterrent.

Have we to conclude from this, that there would be no means of successfully *countering* any aggressive or threatening move on the part of the East, or, even failing that, preventing the assumption by the Soviet Union of the political leadership of the European continent, and make arrangements accordingly?

On the other hand, and this is the positive side of the problem, since 1970 there has been a significant degree of progress toward resolving the persistent issues between East and West in Europe. I mean by this: Germany, Berlin, East-West trade, and political relations. This is due as you know, to what may be called a forward movement in Western diplomacy, but also to Soviet willingness to enter a Berlin agreement and negotiate the central issues of European security. There is no doubt that Europe has moved decisively into an era of negotations, and a conference on security and cooperation in Europe has lost its primary hypothetical character. After the preparatory meetings in Helsinki up to now, the conference could start as early as this summer. Many European countries, and France among them, feel this proposed European Conference will result in a new political order capable of maintaining peace on the Continent for the coming decades. This is the consideration that brought representatives of 19 countries, headed by the United States, initiator of the idea, to meet in Vienna and explore the possibilities of force reductions.

Essentially, the idea is to find a formula, acceptable to all parties concerned, under which the two military blocks, NATO plus allies and the Warsaw Pact partners, would reduce the size of their respective forces in a way that leaves the actual military balance fundamentally unchanged. In fact, it would mean, primarily, a partial pullback of American and Soviet Forces, but in such a way, that theoretically, the security of both parties would remain intact.

Your leaders make no secret of their wish to get real negotiations going, considering that it would be the only way to prevent your Congress from eventually voting a one-sided cut in the US forces.

The Soviet Union has come in because this was part of the price it had to pay for the United States agreement to the European Security Conference initiated by the USSR. Moscow, furthermore, is very keen on a happy end to this negotiation for several reasons, one of which is the concentration, in the minds of the Russian leaders, by the free world, of her "Protectorate" on the communist central European countries: Poland, Hungary, Czechoslovakia, East Germany, Rumania, and Bulgaria. The conference on security, or CSCE, and the conference on MBFR will be discussed in separate forums for very good reasons. First, the nonmilitary issues, as a whole, may prove easier to solve and agree upon than the military ones. Then, much progress has already been made bilaterally between the countries of East and West on some points linked to a certain extent with CSCE — such as freedom of movement of persons, ideas and information, freedom of communication (I mean by that, press, broadcasting, the question of Radio Free Europe and Radio Liberty, and also East European broadcasts), acceptance of the post war status quo in Europe, national sovereignty and nonintervention, renunciation of force, cooperation in science and technology, East-West trade, etc.

Now, what about MBFR?

In May 1970 in Rome the countries participating in NATO's integrated defense structure — this means all of NATO allies except France — issued a declaration of principle which is supposed to guide exploratory talks with the Warsaw Pact countries.

It summed up as follows:

1. Mutual force reductions should be compatible with the vital interests of the alliance and should not operate to the military disadvantage of either side having regard for the differences arising from geographical and other considerations.

2. Reductions should be on a basis of reciprocity, and phased and balanced as to their scope and timing.

3. Reductions should include stationed and indigenous forces and their weapon systems in the area concerned.

4. There must be adequate verification and controls to insure the observance of agreements on mutual and balanced force reductions.

For those in favor of MBFR, which includes the United States, such talks are necessary in order to maintain essential equilibrium in a European security system, in conjunction with detente diplomacy, and in order to test whether the changes that may occur in this system are real or illusory. Moreover, these countries, with yours, think that in the case of success, MBFR will give the West at least a droit de regard on the use of forces in Eastern Europe.

On the Warsaw Pact side nothing much has been said, which leaves place for speculation on the communist reaction to the Rome declaration. The Soviet-American joint communique of May 29, 1972 refers to "a reciprocal reduction of armed forces and armaments first of all in Central Europe," which is, after all, nothing very different from the old Rapacski plan put forward in 1955 in Geneva by Mr. Molotov, and brushed aside by the Western Allies. The Soviets, who claim to approach the question of Central European reductions from the position of the principle of party reduction agree, however, that at the present time it is very difficult to make an appraisal of the overall correlation of all types of armament mainly because there are still no objective coefficients for comparing various types of armament.

One does not know, on the West side, what level land scope of force reductions would be contemplated by the Warsaw Pact partners. I would say, furthermore, that nobody today even knows if Moscow will accept as guidelines governing the future discussions, all or some of the basic principles enunciated in Rome. On the other hand, one may guess rather accurately some of the other reasons which can explain the Russian wish to negotiate the MBFR. Moscow definitely wants to pinpoint its efforts on other fronts. In the military field, Asia is USSR's main actual problem. On the common border with China (several thousand miles) the Soviet government is massing an important number of division and Air Force units, as well as, supposedly, a large amount of nuclear equipment-all this at great cost. This is why Europe must become a very secondary problem.

In the economic field, the Russians are feeling more and more the tremendous military charges they carry in the Warsaw Pact, and which are much heavier than the financial responsibilities indorsed by the United States in NATO. Moscow wants to liberate itself of part of this because the Soviet public opinion is getting more and more conscious of it at the expense of improvement in the standard of life.

On the European side, there is little doubt, quite frankly, that the general feeling is one of anxiety at the thought of an eventual demilitarized zone at

the center of this continent. In the minds of most European leaders, accepting a demilitarized zone would mean signing the death sentence of a European unification. Even Chancellor Willy Brandt is beginning to understand this and is increasingly more responsive to the arguments put forward by France.

You must understand that for Europe the presence of American service men and ratings has a reassuring effect that goes far beyond the adequacy of the existing capabilities of NATO, because they are the symbol of America's deterrence and defense guarantee. Reducing significantly the American presence, without adequate compensatory measures, such as Soviet reductions or US measures to reassure their Allies credibly would diminish West European confidence in the American security guarantee. As one West German cabinet member put it recently, "The transformation of the current European atmosphere of detente into an atmosphere of appeasement would see every capital city from Oslo to Lisbon trying to strike the best bargain it can with the Soviet." Lord Carrington, British Minister for Defence, also said a time ago that MBFR means more battalions for Russia. Having given a quick apercu of the various viewpoints, except the French one, which I will state in a short while, the best we can do, at this point, is to identify the issues and elucidate problems inherent in them concerning MBFR by going from the more simple questions to the more complex ones.

Who will take part in the negotiations?

The USA, after wanting a reduced participation, has enlarged the number after pressure from their NATO allies to 12 countries, including observers. The Soviets wish to leave the negotiations open to all states desiring to participalte.

In which area will the forces be reduced?

For NATO it would essentially include Federal Germany; for RDA, Czechoslovakia, and Hungary. The Soviets seem to have the same conception, except for Hungary which they would like to include at a later stage. The Allies gave in however, since their idea is to enlarge the conference. The area of reduction would include all Europe, in successive stages, but starting with Germany.

Will the national forces of each country be included, or only the forces stationed in Europe?

In the latter case, it means primarily American and Sovietic forces facing one another in Europe. It seems that President Nixon thinks essentially of the forces stationed in Europe and it could be that the Russians would follow your President in his way of thinking. The Germans, on the contrary, think also of the national forces, with the hope of reducing their military budget.

Can there be a balanced reduction of forces?

This is a very difficult notion to define and remain as objective as possible in the matter. I have taken the following information from American, NATO, and French sources.

For instance the United States keeps upwards of 7,000 tactical nuclear weapons of varying size, yield, and delivery modes in NATO Europe. There is no evidence that the Soviet Union maintains any nuclear stockpiles in any country in Eastern Europe, but both USSR and the East European forces have and operate nuclear capable delivery systems and could furnish them with nuclear warheads within a few hours. There is probably more nuclear megatonnage stockpiled in NATO Europe (not counting France) than along the Strategic ICBM belt in the US.

There is no public information about the tactical nuclear arsenal which the Soviet Union could introduce into the Warsaw Pact to support an attack against NATO. This aspect of the military balance is, therefore, imponderable. There is no delivery system in NATO's central region except aircraft, which could carry nuclear weapons to targets inside the Soviet Union. On the other hand, USSR maintains in western Russia some 700 medium and intermediate range missiles with a cumulative megatonnage sufficient to devastate the entire European NATO plus France.

Let us now compare conventional armament. The Soviets and their allies have about 37 armored divisions and 58 infantry divisions with a total of about 21,700 tanks. NATO has 15 armored divisions, 46 infantry divisions, and 8,000 tanks. To these figures one must add six French armored and airborne divisions stationed partly in Germany and partly in France which would cooperate with NATO in certain circumstances. The advantage is

definitely in favor of the Soviet bloc, though one must keep in mind that a Russian division represents only 10,000 men, against 15,000 on the Western side. The same unfavorable balance on our side appears in the Air Force, 2,850 NATO tactical fighter planes against 5,400 communist ones. However, the NATO fighter-bombers have longer combat range and large ordnance capacity. Now the West has superiority in antitank forces, but the East has superiority in air defense (both in radar detection and interception). But technological quality NATO's defensive emphasis looks better on the ground and NATO's offensive emphasis looks better in the air.

As for the Navy, USSR can boast now of having as many nuclear submarines as the Western allies, and more classical ones. NATO has still more surface units but Russia is catching up pretty fast. Communist ships are on every sea.

To sum up the situation in Central Europe, the communist bloc's forces have a superiority of 1.7 soldiers for every one on the NATO side. They have another advantage, in the air as well as on the ground, in the fact that virtually all their equipment is standardized, while on the Western side, the aircraft alone come from several national sources.

If we take into account the geographical situation, there again the communist bloc has a serious advantage. An American unit evacuated from Europe will have to cross the Atlantic, while a Soviet unit repatriated will only have to roll back a few hundred miles, thus remaining much closer to an eventual battlefield. The Warsaw Pact benefits also from a greater and denser range of airfields.

It seems from this short study that the only reasonable solution would be to stand for a reduction of a certain percentage of the US and Soviet Forces in Central Europe. The result would practically mean a stronger reduction on the Eastern side, the Soviet Forces being more numerous. But Moscow knows that and will certainly not give in without some compensation.

How can the problem of armament be envisaged?

Several solutions can be put forward. Negotiating one definite type of armament, such as tank against tank or plane against plane. Negotiating on the coupling of attack and defense, such as reduction of Soviet tanks coupled with a reduction of Western antitank, armament, negotiating on a certain amount of very different armaments, following the well-known trade off formula. As an example, let us imagine 100 US planes evacuated from Germany against 100 Soviet tanks as it would take as much time for both to come back to their starting points.

Will nuclear arms be mentioned?

The two superpowers are naturally inclined to consider this subject as one they want to negotiate directly for the limitation of their strategic hardware (SALT). But the Allies want to be associated to any decision concerning the American advanced systems (tactical nuclear bombs stored in Germany or on board units of the 6th US fleet in the Miditerranean), because, rightly or wrongly, the Allies consider that their security depends primarily on these advanced systems, and I believe your country is well aware of this preoccupation.

I would just like to mention a psychological factor linked with a material one, the training and preparation of the service men on both sides. In the Soviet bloc, military service lasts from 2 to 3 years, allowing in principle sufficient time for training of specialists. Furthermore, maneuvers take place regularly to maintain the technique of these specialists (now in the reserve but recalled for these maneuvers) and also to improve the efficiency of the system of mobilization. On the Western side, the staffs have tried, without great success, I am afraid, a system of mobilization which is not as efficient as on the Communist side. The French are perhaps an exception in so far as they are trying a completly different system, but it has been only very recently implemented and it needs a little time to see how it works. Then military service is no longer compulsory in some Western countries, and when in existence, it has been shortened to 1 year or less

One can but have the feeling that on the NATO side, the principle seems to be the hypothesis of a short war between professionals, preceding or not a nuclear apocalypse, after a series of graduated riposts. On the Communist side, it seems that the Warsaw Pact has given itself the means of a more supple strategy.

After hearing what I have said, you may gather the impression that I am over pessimistic. Please remember that I am not only a European with, if I may say so, an hereditary experience of wars, invasions, occupations, and battlefields and consequently, have and instinctive distrust for a demilitarized zone in the center of Europe when we in Europe are working hard to make a unififed one in the full sense of the word, but I am also a

Frenchman, educated in the respect and defense of certain political guidelines. This brings me to speak to you about the French position, vis-a-vis the MBFR.

France's Position

My country agreed from the start on the principle of a conference on European security in order to destroy the old notion of bloc against bloc and also to pursue, enlarge, and strengthen the East-West relations, a policy started by General de Gaulle in 1945 and steadily pursued by him since 1958, with the results acknowledged by every one today.

But MBFR for us in another matter.

During the past years there has been undoubtedly a march towards detente, strategic arms limitations, agreement to end the frictions generated by Berlin, and reconciliation of Federal Germany with its enemies in Eastern Europe. Nevertheless, we remain convinced that the stage has not been reached when the West can relax its military defenses — and that the actual detente is in fact greatly due because the Free World has dealt from a position of relative strength, and this strength must remain the same for the foreseeable future. To use a fencing term, we do not want to see Europe and our own country lower their guard.

Though France, which was one of NATO's biggest military powers, with an army of over 500,000 men, has left in 1966 the defense structures of NATO (whilst remaining in the Alliance), she is firmly of the opinion that the wholesale removal of American troops from Europe would tip an already precarious military balance in Moscow's favor. Therefore, she flatly refuses, up to this day, to have anything to do with force reductions, and will maintain her defense budget and her divisions in Germany.

Furthermore, and quoting Mr. Debre, former French Minister of Defense, "my country considers that Soviet Russia would see with satisfaction force reductions by other countries. Indeed, Moscow is willing to pay to see Europe lower its guard, but just pay a small price. The Soviets need their military power because a powerful Soviet army is essential to insure unity in the Socialist Camp.

Now the Conference on European Security, once it is held, will allow France to judge if and how to participate in what may follow. We feel it would be unwise to put the cart before the horse by deciding on a reduction, most probably at our expense, before fully appraising the seriousness of the overall trend on the Continent. Our goal is to foster detente and strengthen it under favorable circumstance. It would be taking a great risk to alter it by upsetting the balance." (Unquote)

Even if France did not feel it necessary in 1966 to have American troops on French soil, because she felt she did not need American troops to understand her realities, she is, as I already said, firmly in favor of these troops to be maintained in Germany for reasons well known to everyone. One of these reasons I would like to stress is the psychological factor of what the European civilian people would think about the reliability of the US commitment if American servicemen were not physically on the Continent. The suspicion would persist that the United States might hesitate to hurry an army across 3,000 miles of water in an emergency.

Finally, France considers that it is in the American interest as a country, that MBFR should be approached with great care. For us, the security imperatives of the United States require that she remain decisively involved in Europe, militarily, politically, and economically. It is an essential safeguard and deterrence against creating opportunities that might nourish Soviet objectives achieveable through political initiatives backed by military pressures or outright aggression. It is also an element of advanced protection of the American soil. Many people here ignore or wish to ignore that their country is no more immune from enemy attacks. Your Deputy Secretary for Defense, Mr. Clements, said 2 weeks ago at a meeting in Houston that the east and west coasts of the United States were under constant watch by Soviet nuclear submarines, with nuclear missiles easily targeted on your main centers. Just imagine how dramatically more serious would be the threat to your nation if hundreds of long-range nuclear missiles were spread along the Atlantic coast from Brest to Lisbon.

FORTUNE magazine, in its February issue, published an article by Robert Ball called, "Rethinking the Defense of Europe," in which he underlines that the vital interest of the United States, no matter what interpretations may be given to the intentions of the Kremlin, is to help Europe avoid any dependence from the good will of the Soviets." On January 22d 1973, granting an interview to German television, Mr. Georges Pompidou, President of the French Republic, described the prospect of a neutralised Germany that might emerge from negotiations on the MBFR and he said, "As far as we are concerned, we feel that the Ostpolitik initiated by Chancellor Willy Brandt presupposes, as he himself has said, very close

association with the West. Consequently, the idea of making Central Europe neutral and the idea of a neutral Germany would not only perhaps be dangerous for European security, but might lead, among other things, to a complete breakdown in the efforts we are making for a Europe unification.

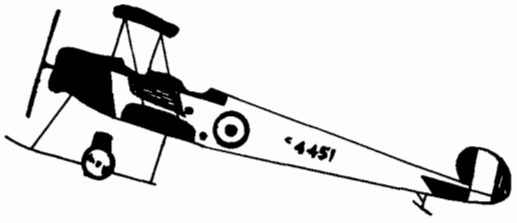
Last January, during Mr. Pompidou's visit to USSR, Mr. Brejnev took great pain to try and modify France's position on MBFR, and this is when he proposed to open the negotiations to all countries interested, in order to answer to France's argument about bloc-to-bloc conversation. On the American side, your Secretary of State, Mr. William Rogers, quite recently stated that Washington was trying "to encourage France in getting more interested on the question of reduction of forces."

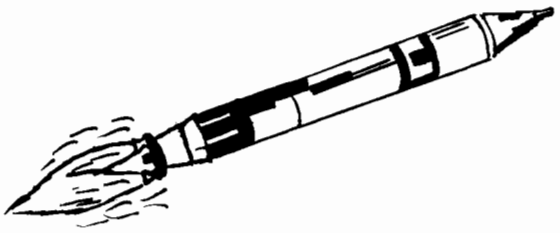
Up till now, France remains adamant in associating herself with the actual negotiations. The only sign of a less rigid French attitude on the general idea is a few very recent remarks in the French press, but not denied officially, that perhaps France would eventually associate in some way or an other with the negotiations on MBFR, but at a later stage. However, this is not the result of an official declaration.

My conclusion will be that France hopes that in the future negotiation on MBFR, the United States will show prudence and a firm decision to remain linked to the destiny of Europe. I know, as Mr. Joseph Luns, Secretary General of NATO, so aptly put it "that the United States find their primary position in the World, as well as their power, a heavy burden to carry," but this modesty, which is one of your Nation's main attractions to her allies, this modesty, in the actual conjuncture, leaves Europe a little anxious.

Personally, I do not condemn MBFR systematically, and I am ready to believe that after years of negotiation, because it will take years to break down distrust, selfish interest, and political ambition, there may appear a positive effort to adapt the confrontations in Europe to a new atmosphere of East-West relations. It may be a strengthening of the detente and undoubtedly there is a necessity to organize a new balance of security at a level of forces that your country can more easily support in the political, military, and economic fields. But it will take time, as I have just said, to create the necessary climate without which MBFR cannot turn into a self-generating process of arms control and confidence-building leading to lasting peace.

History of Air Defense





Radar and Radar Countermeasures

The development of radar with its eventual application to early warning, searchlight control, heavy antiaircraft gun laying, and fighter intercept control was one of the outstanding developments of World War II. During the period between World I and World War II, radar had its inception and elementary development at essentially the same time in the United Kingdom, Germany, and the United States. However, as refinements of the development proceeded and its adoption to air defense was formulated, we find considerable difference between the three great powers. We look first at the efforts of the United Kingdom.

British interest in radar had its start in the 1920's from observations concerning the interruption of radio signals and the measurement by radio of the height of the ionized atmosphere. But it was not until Sir Robert Watson-Watt submitted a paper in 1932 that development began. In February 1935 another paper was submitted to the Air Ministry, and a demonstration that same month showed the feasibility of the use of radio for determining the location of aerial objects. The term "radio direction finding" was given to the new science to insure the security of development. (It remained for the US Navy to coin the word "radar" from Radio Detection And Ranging.)

Work proceeded swiftly, and on 13 March 1936 the first operational radar detected an airplane at a range of over 62 miles flying at an altitude of 15,000 feet. A radar school was started by the RAF in February 1937, and, by May of that year, the RAF took over the first radar to become part of a chain of 20 which went on 24-hour operation in the spring of 1939.

The first radars were intended for early warning and had fixed antennas mounted on towers as high as 350 feet. The 20-station chain of radars led to the designation of Chain Home, or CH, given to the type radar used. Low-altitude coverage was inadequate, so the research which had been devoted to development of gun laying and coastal defense radars was applied to early warning. The Chain Home Low, or CHL, radar resulted. This was a higher frequency radar with a rotating antenna and a higher power output. CHL production began in the fall of 1939, and the combined CH and CHL chain was in operation by the time the Battle of Britain began.

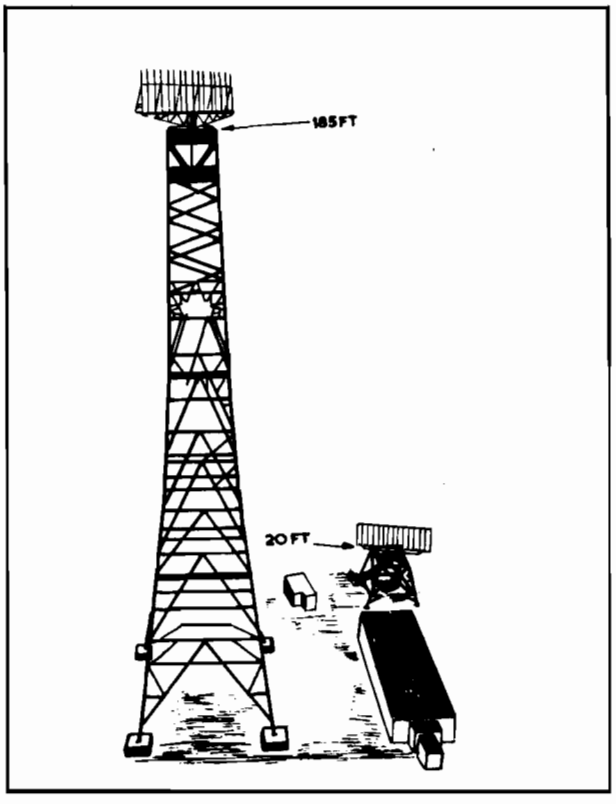


Figure 1. Chain Home Low station.

Concurrent with the work on radar itself, two other important developments took place. Identification, friend or foe (IFF), was invented in 1939, was tested, and some 25,000 airborne transponders were ordered. In 1938 work was begun to design and produce machines that could make radar operation difficult. The first radar countermeasures set was made and installed in an airplane; it successfully

jammed radar to the extent that operations had great difficulty in distinguishing target returns from the blossoming lights on the radar scope. The first counter-countermeasure employed with success against German jamming efforts was the use of colored filters over the face of the scope.

Eventually, a Chain Home Extra Low, or CHEL, joined the chain, to provide radar coverage down to 50 feet altitude. To provide coverage over land areas, as opposed to early warning chains which looked outward, Chain Home Beam, or CHB, stations were established. These had a radar with a rotating antenna for surveillance, with radar information displayed on a plan position indicator (PPI) which was invented and designed for use with this type of radar. A height-finder radar, to provide target altitude, completed the CHB. The CHB station, with a height-finder added, became a GCI station. The operators' cabin rotated with the antenna; a speed of some 6 rpm was about the maximum that would permit optimum performance of the radar and still not disorient the operators.

Mobile GCI accompanied the Allies in the field. The combination of GCI and the newly designed airborne intercept radar (AI) provided an adequate tool for guidance (from the ground) of a night fighter to such a position that his AI could then guide him to within firing range of the target. IFF and use of the new very high frequency (VHF) air-ground radio links completed a GCI system which all but eliminated night attacks on the United Kingdom by 1944.

The development of antiaircraft radars came at the time when increasing aircraft speeds and altitudes were negating the usefulness of the sound locator. As a consequence of that development and experience in World War I, it is normal that the British at first looked to radar primarily as a means of early warning. The first gun-laying radar, the GL-1, was tested in 1938, and the results showed a range accuracy of ±28 yards and an azimuth of about 1°. In 1939 the radar was tested withn an antiaircraft gun battery and it was found that the radar could pick up the target quicker than by the use of optical units of the fire control system. Because of the Munich crisis, it was decided to order production of a limited number of these radar sets.

The GL-1 provided a maximum detection range of 30,000 yards with an accuracy of ±500 yards; for radar range data transmitted to the director the maximum was 14,000 yards. With respect to azimuth, it could provide data at 60-second intervals to accuracy of ±1½°. This was ample to assure a rapid pickup of a target by the optical instruments in the fire control system. It did not supply angles of elevation. By the end of 1939, 59 sets had been produced, and in 1940 the production was increased to some 425 sets. These sets operated in the 3½-5½ meter band, or 85-55 megahertz of frequency.

The years 1940-43 were particularly important in the field of radar development. A matter which was to have far-reaching effects for the Allies was the visit in September 1940 of a Bristish mission to the United States, during which there was a free exchange of radar knowledge and developments by the two countries. Information acquired was of inestimable value to both countries, because time was not wasted investigating and developing areas which had been covered. In addition the developments of each country were made available to the other.

In 1940 a major modification to the GL-1 was the addition of the E/F (elevation) finding attachment. This attachment was simply a device which permitted following the target, not only in range and azimuth, but also in angle of elevation. It did so with a fair degree of accuracy at elevation angles of about 15° to 45°. A total of 410 of these attachments were made for existing radars.

When the night bombing raids on the United Kingdom began in 1940, the GL-1 radar had to be used for gun laying. In that connection, slant range and azimuth were provided by the radar and elevation was taken from a sound locator. This was better than barrage shooting. The advent of the E/F attachment further refined this makeshift equipment. Though poor from an accuracy viewpoint, the modified GL-1 did permit continuous laying and firing by the AA guns. A measure of the effectiveness is indicated by the reduction of rounds per kill from 18,500 to 4,100.

When the Germans overran the Continent, all radar sets but one were demolished. The one set fell intact into German hands. No account was found to show whether the Germans benefited technically from this captured radar.

A new radar incorporating all existing changes plus some new thoughts was designed and cleared for production. This radar, the GL-2, was perfected in January 1941, and by August 1943 a total of 1,679 sets had been produced. This set was expressly designed for the fire control of AA guns rather than early warning and search. It could produce accurate fire control data out to 14,000 yards and had

a maximum detection range of 50,000 yards. At a range of 14,000 yards, its accuracy was ±50 yards and its elevation and azimuth accuracy within normal operational limits was ±½°. Its effectiveness is best described by the rounds per kill which dropped from 4,100 rounds to 2,750 rounds.

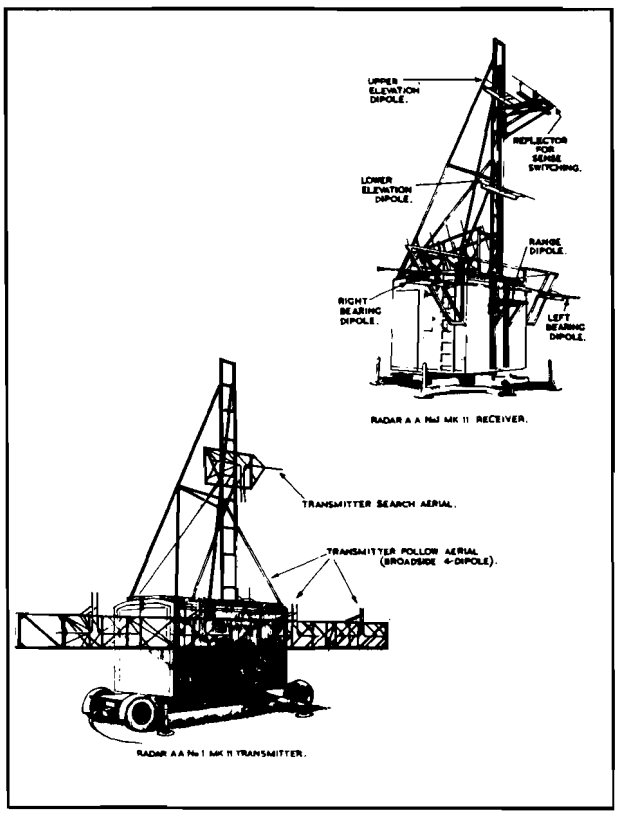


Figure 2. GL-2 ratler, with separate receiver and transmitter.

British scientist had indicated the necessity of going to very short wavelengths in the operational frequencies of their radars. However, there was no vacuum tube available which would oscillate at those high frequencies and still produce the large amounts of power obviously needed. The scientists began working with an American invention, the cavity magnetron, resulting in the development of a magnetron with a high-power capability. This vital development gave effectiveness to the radar program. The new magnetron was given to the United States and figured heavily in subsequent radar developments.

In 1940 the War Office made the decision to produce an accurate gun-laying radar in the 10-cm (higher frequency) class because it was believed that the improvement of the magnetron would make this development feasible. By April 1941, a prototype proved satisfactory. Controversy over the development of the service type raged for some time. After a delay of 1 year, two sets came off the production line in December 1942, and by April 1945 a total of 876 sets had been produced.

This radar system, the GL-3B, operated on 3,000 MHz with a peak power output of 5 kw, later increased to 100. Range accuracy was ±25 yards out to 35,000 yards. Bearing and elevation accuracy was ±10 feet, and the average detection range was 35,000 yards. In operation, the GL-2 was used as a "putter on," or acquisition, part of the GL-3B for the detection of targets. The AA No. 3 Mark 2 tracking radar then would provide target position data to the predictor.

The Canadian microwave radar system, the GL-3C, made its appearance a month before the British GL-3B. The systems were very similar, and this was an example of the early lack of coordination between the United Kingdom and Canada. The main differences between the two radars lay in the more compact "putter on" of the Canadian set, and in the aided tracking used for positioning the tracking antenna, thus providing much smoother data output to the predictor. Six hundred of the GL-3C sets were produced for the British between November 1942 and the end of the war. They were a material contribution to the antiaircraft defense of the United Kingdom at a time when the British GL-3C's were required for operations in Italy and France. The warning and "putter on" sets used with the GL-2 and GL-3 also were used separately as local early warning sets in operations on the Continent and in Africa. Some special mobile local warning sets were produced for use by the Army and the RAF in the field.

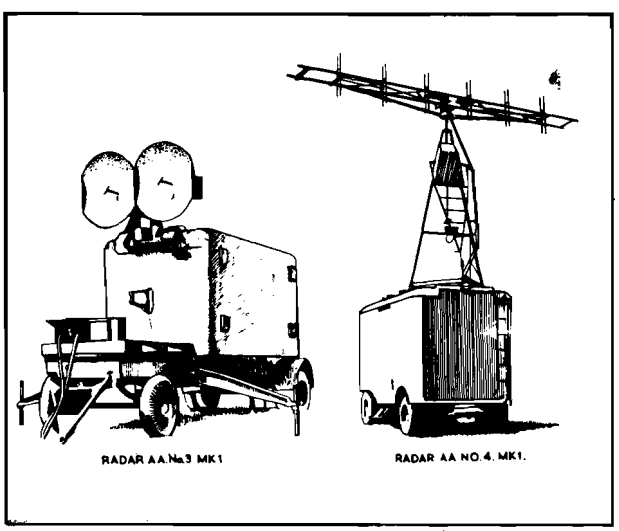


Figure 3. GL-3C radar, with tracking radar on the left and the "putter on" acquisition radar on the right.

By the time the GL-3's, British and Canadian, were under production, another radar breakthrough had occurred in the United States. In August, 1936, in the US Naval Research Laboratory, a duplexer was developed and incorporated into a 200-MHz radar in the laboratory, whereby one antenna was used for both transmission and reception. In 1937 this radar was installed aboard ship on a 5-inch gun mount.

In 1942, automatic tracking, a logical development ensuing from the duplexer, became known to the United Kingdom and active work followed, with the objective of developing an automatic tracking radar. Also considered was the modification of the GL-3B to include automatic tracking. The problem contained many facets, and no good solution could be found without causing major delay to vitally needed production of the GL-3B. Consequently, the British were unable to incorporate automatic tracking in centimetric (wave length) radars for some time.

During September 1943 the British obtained an SCR-584 for test and evaluation and were enthusiastic over the results because they had nothing comparable for automatic tracking. Soon afterwards 165 of these radars were loaned the British for use in the air defense against the V-1 attacks; an additional 135 were furnished the British under Lend-Lease.

In the fall of 1943 the British completed tests on an experimental automatic radar known as the AF 1, and ordered 50 sets to be delivered by December 1944. Manufacturing design and production problems intervened, and only two sets were received by August 1945. These prototypes resulted in the production of 24 of the AA No. 3 Mark IV radar in early 1946, which, in turn, was modified into the full production model, the AA No. 3 Mark VII. With the shortfall in production of the AF 1, effort was expended in the design of automatic following modifications to the GL-3B and GL-3C, but technical difficulties prevented this.

Figure 4. AA radar No. 3 Mark VII.

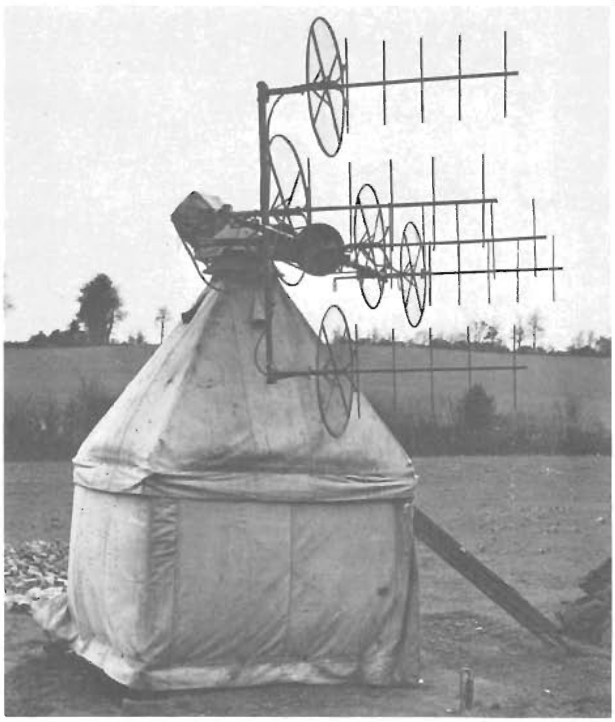


Figure 5. Searchlight control radar (SLC, or Elsie). Some models were mounted on the searchlight chassis.

By the end of 1940, 50 of the British Searchlight Control (SLC) radars, known as Elsie, were on hand and more were on order. This was a specially designed radar, initially incorporated on the searchlight, which was to give the searchlight a very rapid target pickup. The inability to put a gun-laying radar into rapid production, coupled with a lack of realization of the unseen firing capability of the radar-director combination, led to this searchlight radar. It was eminently successful where optical use of a director was requaired. Its other main value was in the improved capabiality of continuous illumination of targets for interception by fighter planes. It had a track-on-jam capability.

Elsie gave birth to Maggie, the SLC mounted on a sound locator frame and modified to proved tracking data to a predictor for use with AA guns. Out to its effective range of about 15,000 yards, Maggie could produce data which were as accurate as the GL-2 product. While Maggie was being used as an emergency fire control radar at sites which had no GL-1 or GL-2, the British redesigned it for use as a fire control radar in the initial stages of amphibious operations. The AA No. 3 Mark III, known as Baby Maggie, was the result, and some 172 sets were producted by March 1945.

Ten Rules in Commanding a Battery

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Enlisted Personnel Directorate
Military Personnel Center
Headquarters, Department of the Army

The goal of any young artillery officer should be to command a battery. With that in mind, the aim of this paper is to outline a few lessons learned, through trial and error, by an old head who has passed through that wonderful experience.

The first rule to remember is to be a commander! You are the boss; you are on your own; you have the final responsibility. Ask for advice from your subordinates and consider their recommendations, but make your own decisions. In this connection, to state the decision is only the beginning. To require that it be carried out to completion is the real task.

The second rule is to delegate your authority. You can not run a one man show and have a sound unit. Use your executive officer; 1st sergeant; supply, mess, and maintenance chiefs. Allow them to use their initiative after telling them what you want accomplished. Make them responsible. But insure that the responsibilities, authority, and command prerogatives of your section chiefs are respected by battery officers and senior noncommissioned officers. Keep yourself free of details by delegating all but those duties you have to do personally because of regulations. And remember, a good unit runs itself — you just provide the guidance and set the standard.

The third rule is that batteries tend to seek a level of performance-as do people. If poorly led and supervised, the trend is to drop to the level of the weakest link. But if good leadership is provided, the opposite is true. Let each of your subordinates know what is expected of him and then make sure he produces. Counsel your subordinates periodically so there is no misdunderstanding of where they stand in your evaluation. Take action against those who do not produce for they are a drag on the battery.

Rule four, the most important, is that your principal task is to accomplish the mission of your battery. Everything must lead to that end. Stick to the fundamentals and never lose sight of your mission to create a combat ready unit. Seek quality, not quantity. Get the most effort from your men during duty hours and never work your men unnecessarily.

Rule five is that you cannot command, and you cannot create an effective battery, without disciplined men. Discipline can become your most serious problem. You are the most important element. Set standards and allow no deviations. Insist upon military courtesy and demand a neat, uniform appearance. Deal quickly with offenders because to allow offenses to go uncorrected creates and invitation for repetition — and is an insult to the good soldiers of your battery. Try to get the men to enforce discipline themselves because peer pressure is most effective with today's young men. And remember, discipline and morale are closely related. Have you ever known an undisciplined unit with high morale and espirit de corps?

Rule six is that all successful commanders take good care of their men. Areas of prime interest are mess, mail, pay, promotion, praise, recognition, neat and well-organized facilities, and correct duty rosters. Insure that NCO's take care of their men and listen to their complaints. Visit your unit often during nonduty hours and talk to your men. It will pay rich dividends. Taking care of your men also means disciplining them when necessary. You must be firm, fair, just and consistent. The loyalty, respect, and affection of your soldiers can be gained if you show that you really care about them and their problems and welfare.

Rule seven is to inspect your unit informally and frequently. Get out and see for yourself. Go through your area and point out shortcomings to your subordinates. Seeing a problem results in a better solution than in hearing of it. Conduct inspections in ranks with full equipment periodically. Inspect for supply economy to prevent waste and to conserve property. Try to have your unit always ready for inspection. Instill a pride and confidence which welcomes inspections.

Rule eight is that superior training is a must! If you have discipline and good morale, superior training will complete the-picture. Consider yourself the chief instructor and keep in mind that you must teach things that your men must know and that you must not waste their time.

Instructors must prepare thoroughly and rehearse so that they can present good meaty

classes. The techniques are laid out in the military occupational information field manual. It is important to schedule only the amount of time needed for each subject — and most subjects can be effectively taught in 25 to 30 minutes. Inspect your classes and do not tolerate poor instruction.

Training of sections and batteries is best conducted in the field under simulated combat conditions. Plan your field exercise to be interesting and demanding, both physically and mentally. Stress the fundamentals and insist upon professional standards. Allow time for independent training conducted by chiefs of the section and the executive officer of the firing battery, then give the whole battery a good work out and a good critique.

Rule nine is to have a good maintenance program. The battery must have effective maintenance and there is only one way to achieve it. You must give it priority and personal attention, for good maintenance stems from the commander. Maintenance problems are problems of leadership and training. Through good leadership, motivate your men and work toward building a good attitude toward maintenance. Then train everyone, from officers down, how to maintain equipment. The maintenance experts say that factors affecting maintenance are: command, personnel, time, repair parts, tools and equipment, publications, and facilities. You influence all of these factors. Also, don't forget to practice maintenance during field training exercises.

The tenth rule concerns loyalty. Obviously, you must be loyal to your subordinates but you must also be loyal to your battalion commander, for loyalty must extend upward as well as downward. If you disagree with your boss tell him so, but once he makes a decision, carry it out as if it were your own.

You are the commander but the battery does not belong to you; you belong to it! You hold the title of commander to serve it. So serve the best interest of the battery and the Army, not yourself.

The experience of battery command is a foundation stone in the professional development of an artillery officer. And to command a battery in today's Army is probably the most challenging and difficult task for a young officer in the service. It can also be the most satisfying if you can meet the test and meet it well.

Potpourri of Information

Improved Hawk

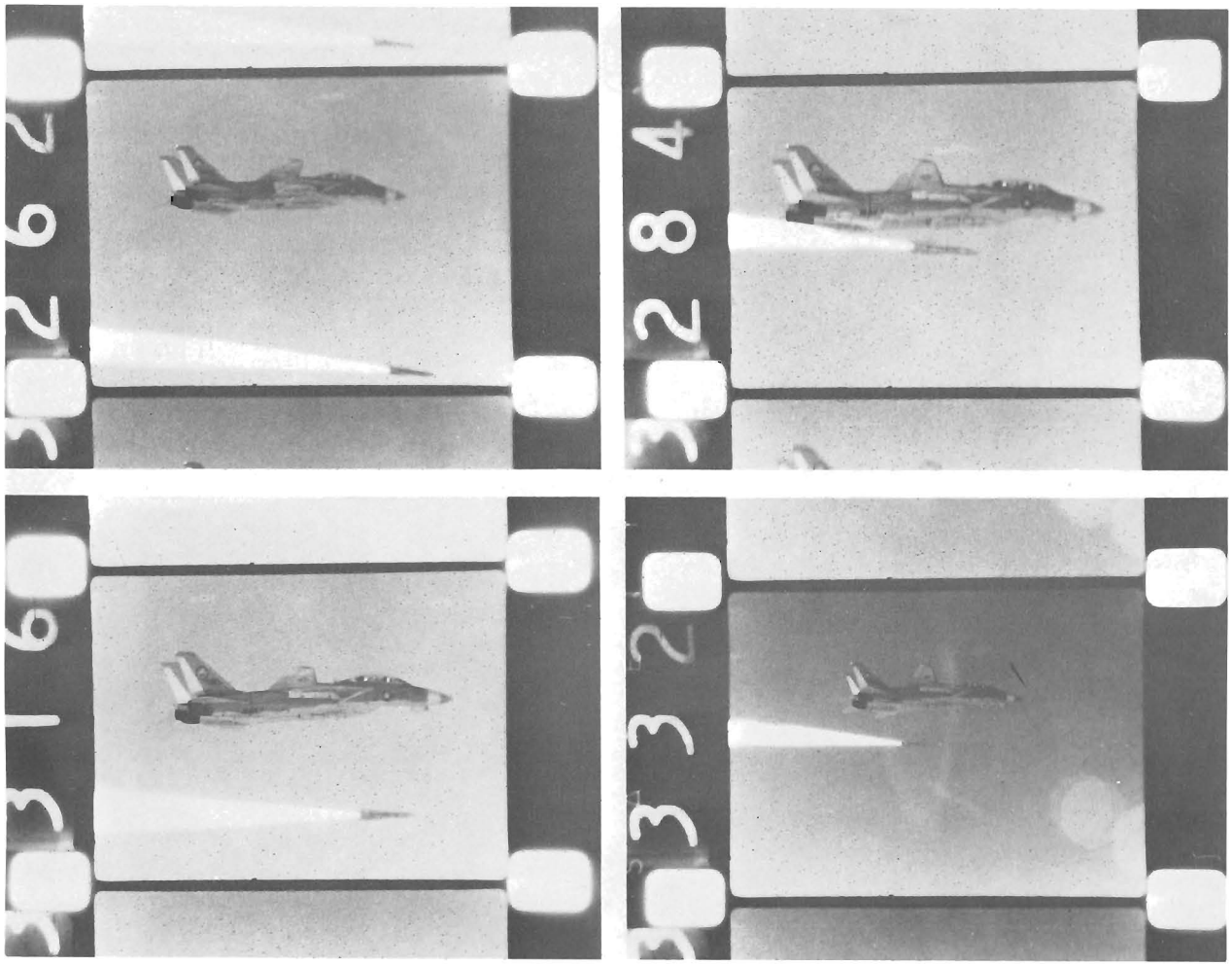
A $120.7 million contract for production of the Improved Hawk air defense system has been awarded to Raytheon Company by the US Army Missile Command, Redstone Arsenal, Alabama.

The majority of the work on the contract will be done at the company's plant in Andover, Massachusetts. The contract includes $57.1 million for missiles and $63.6 million for ground support equipment.

The Improved Hawk, featuring advances in electronic technology, is a more reliable and accurate air defense system than its predecessor, Basic Hawk. The Improved Hawk missile contains a new guidance package, larger warhead, and an improved motor propellant. In field use no maintenance is required because missiles go directly from production lines to launchers as certified rounds.

Ground support equipment has also been updated with portions automated. A new electronic data processor, for example, will assist in the target engagment function. For easy maintenance the new equipment features built-in troubleshooting capabilities. Improved Hawk, like its predecessor, will be deployed worldwide.

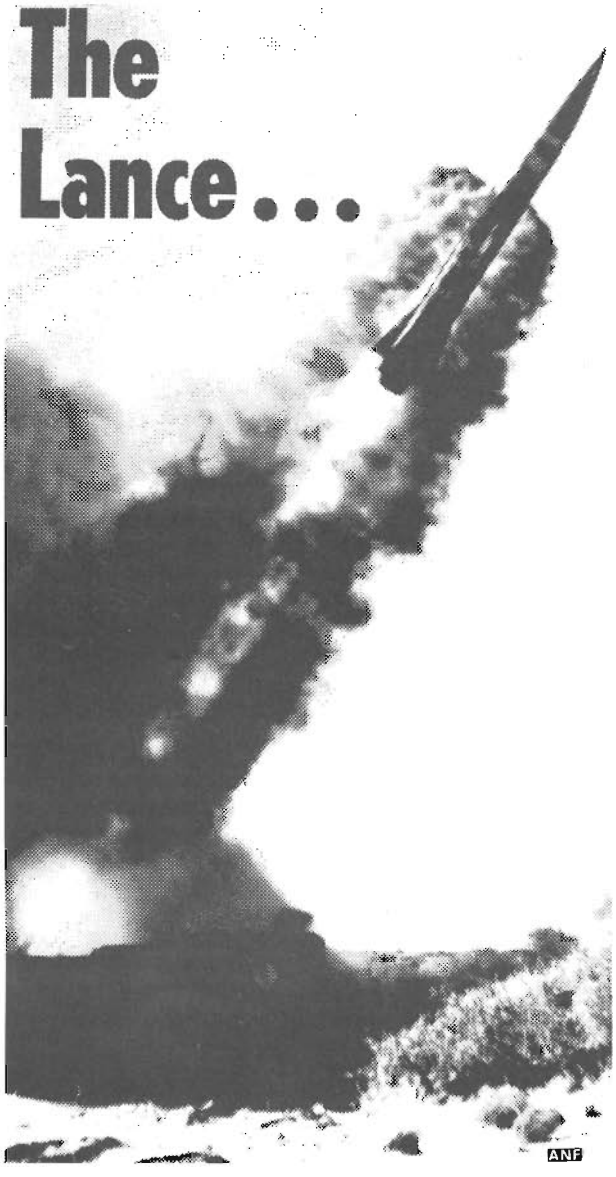
Four-For-Four



First photos released of a US Navy test firing show four Phoenix missiles launched within 44 seconds from an F-14 Tomcat fighter. The missiles scored four hits against four widely-separated jet drone targets in the first four-missile firing attempted anywhere. The test was designed to

prove the capability of Hughes Aircraft Company's AWG-9 weapon control system to multiple-launch Phoenix missiles and guide them separately against multiple targets. The photographs were taken from frames of motion picture film made from Navy chase planes. Frames were selected to conform accurately with the real time firing of each missile. Edge numbers indicate film footage, not time. The hits could not be photographed because targets were 30 miles away from the F-14 and the chase planes.

Army's New Missile



ON TARGET — All six of the Lance missiles fired during the first annual service practice at White Sands Missile Range, New Mexico, landed on target. Lance is designed to provide fire support beyond the forward edge of the battle area.

The Army's newest battlefield missile, the Lance, recently passed its first annual service practice with flying colors. All tests were highly successful. They verified Lance's accuracy, reliability, and soundness of missile maintenace procedures.

The Lance (less warhead) is constructed of thick aluminum. Its monocoque construction and sealed modular design provide ruggedness, simplicity, ease of maintenance, and a high degree of reliability.

Lance is a highly mobile weapon system that is scheduled to replace both the Sergeant and Honest John missiles.

It has nuclear and nonnuclear capabilities and provides more rapid fire than the older systems. It also provides nonnuclear fire support beyond the forward edge of the battle area that cannot be provided by other artillery.

Aboard its own self-propelled vehicle, the Lance and its eight-man crew can travel across almost any terrain. It can be transported by planes or helicopters, swim deep inland waterways, and operate under all weather and terrain conditions.

Firepower can be directed against such targets as enemy troop concentrations, supply depots, and transportation routes. After the Lance missile is fixed, the crew can jump into the missile's self-propelled vehicle and drive off.

Every piece of the Lance hardware, except the nuclear warhead, was thoroughly tested at the annual service practice at White Sands Missile Range, New Mexico. During the practice, Fort Sill's 1st Battalion, 12th Field Artillery, manned the Lance system for several days deep in the rugged New Mexico desert wilderness. The battalion fired half a dozen of the 20-foot-long missiles. All of them landed on target. The battalion, the first to be equipped with Lance, now has the mission of providing troops and equipment for Lance training at the Field Artillery School at Fort Sill.

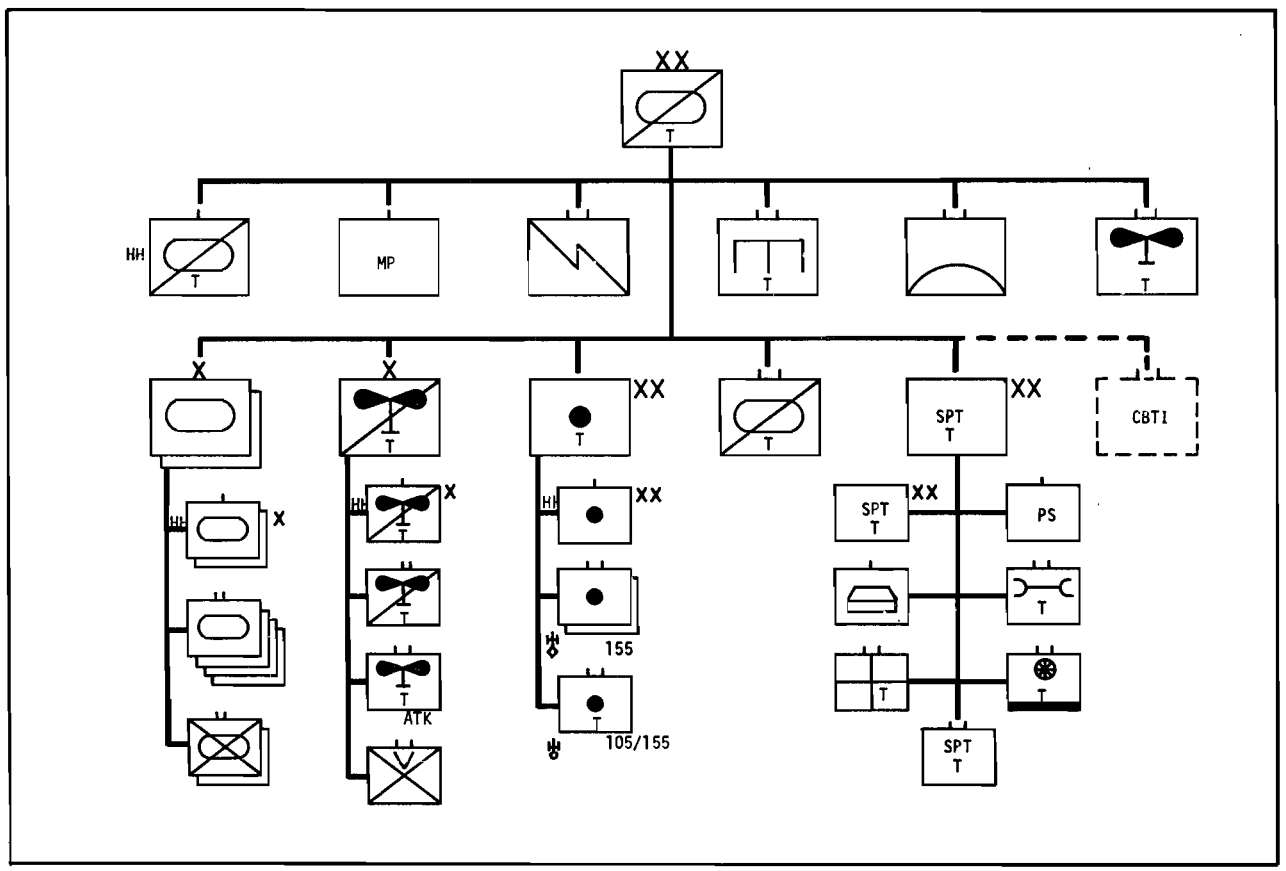
USAF Drone Control Program

Hughes Aircraft Company has teamed with Teledyne Ryan Aeronautical to complete for the US Air Force's planned program to develop a control data retrieval system for present and future drones and remotely piloted vehicles. The program, announced in July by the Air Force, includes software development design and hardware design specifications for separate ground and airborne

systems capable of simultaneously monitoring and controlling up to 20 drones. The teaming of the two companies (Teledyne Ryan with years of experience in drone development and Hughes with expertise in tactical command and control) provides a unique blend of technologies to meet the requirements of the new program.

Reconfigured Triple Capability Divison

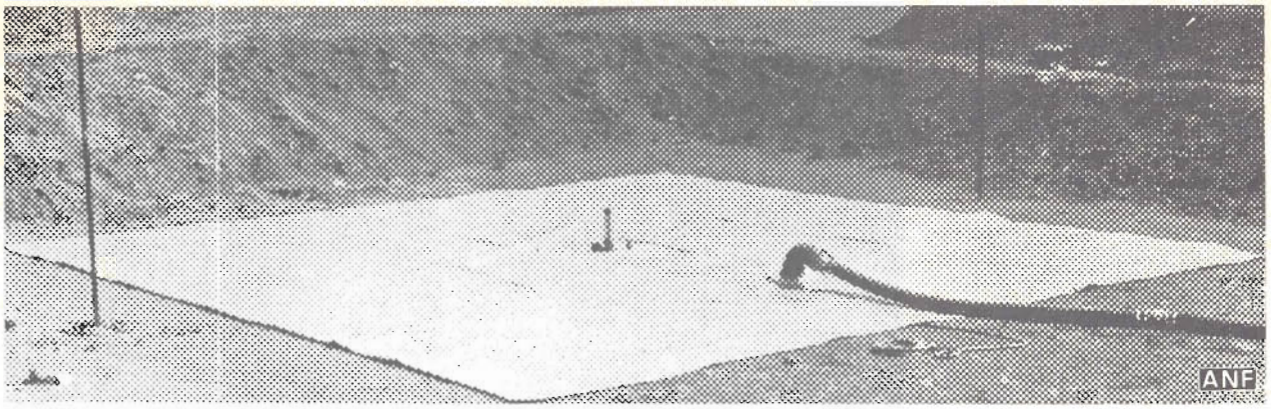
As a result of studies and tests addressing the Triple Capability Division (TRICAP) and the air cavalry combat brigade (ACCB), General Palmer (former Deputy Chief of Staff of the Army) directed that the TRICAP organization be studied within given parameters and that US Army Combat Developments Command provide recommendations to DA in December 1972. This action was the result of concern over maintaining TRICAP as a "test bed" while maximizing the division's capabilities to be employed as a viable force to meet specified contingencies. As a related part of this action, the organization of the divisional ACCB and separate ACCB was also addressed. Specifically, DA indicated that, rather than include a separate ACCB in the force structure, greater flexibility at less cost in terms of manpower and equipment may be achieved. This end could be accomplished by tailoring the TRICAP division so that an ACCB task force capable of independent operations can be rapidly formed from TRICAP resources with minimum turbulence to the remainder of the division. This is the essence of the problem which faced the developers of the reconfigured TRICAP division and is the basis used in developing the recommended organization currently awaiting approval at DA.



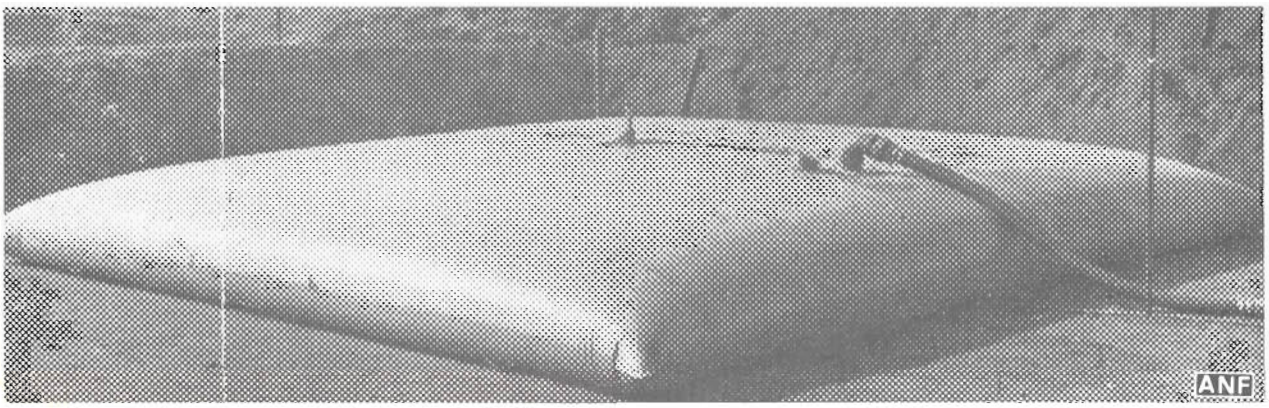
The reconfigured TRICAP division operates under 72 tables of organization and equipment of which 14 are recapitualated tables. An analysis shows that at least 24 new tables must be developed of which nine are recapitulation tables. This analysis is based on the assumption that Modern Army Selected System Test, Evaluation, and Review (MASSTER) will agree to modify existing tables through modification table of organization and equipment action where such modification will not constitute a major reorganization/revision effort.

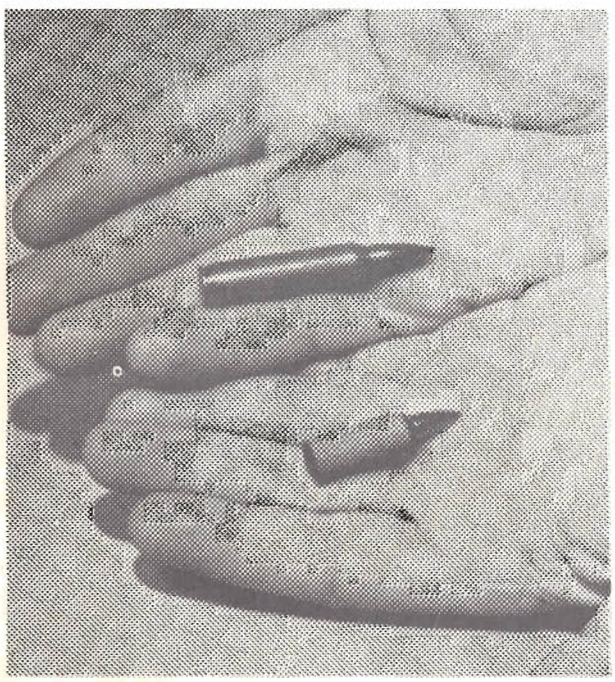
A suspense date of 21 October 1973 for completion of new table of organization and equipment has been informally established with DA.

Collapsible Tank



EMPTY AND FULL — This 10,000 gallon collapsible petroleum storage tank was tested at the US Army Tropic Test Center, Atlantic Test Branch, at Coco Solo, Canal Zone. The tank was checked for leakage, signs of wear, general deterioration, fungus growth, and other environmental effects.





Army Develops Special Cartridge

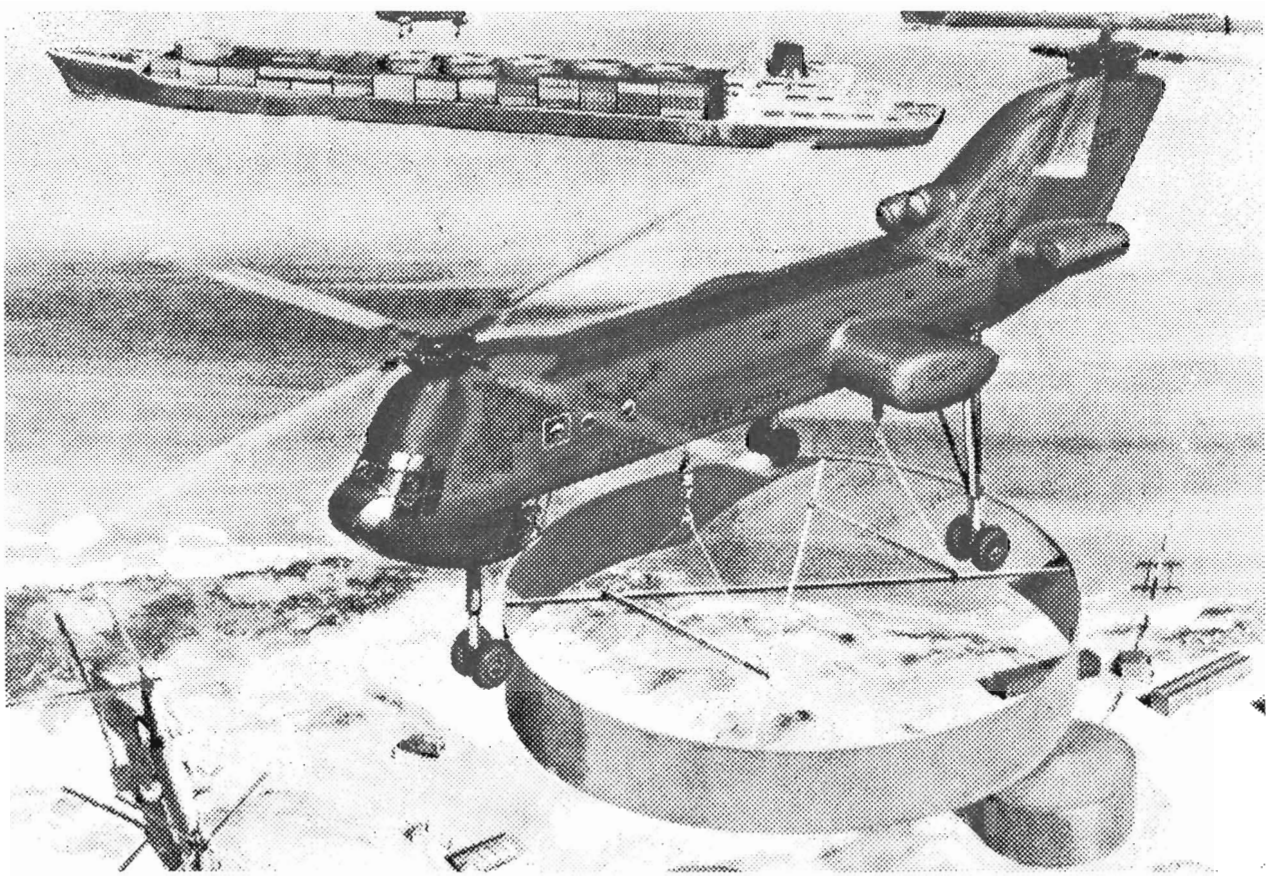
A small arms cartridge case that is consumed when the round is fired is being developed by the Army. The consumable case, smaller and lighter than rounds now is use, can reduce appreciably the weight of a soldier's ammunition load. Also eliminated is the need for brass — a significant advance and one long sought by the Army. Brass is expensive and, because of its many uses in every phase of warfare, is almost invariably in short supply at the most critical times. The US Army Small Systems Agency conceived the idea for a consumable case.

The smaller cartridge was designed for the M16 rifle. It is consumed when the round is fired, therefore no brass is needed. The larger round is the present 5.56 brass cartridge. The new cartridge will endure the soldier's ammunition load and eliminate the need for brass.

Army Orders New Heavy Lift Copter

The US Army Aviation Systems Command has authorized the design, development, and flight evaluation of a heavy lift helicopter prototype aircraft. With a payload capability up to 22½ tons, the heavy lift helicopter will be able to transport all logistical containers forecasted for military use as well as a majority of the equipment items in Army airborne and airmobile divisions.

The helicopter authorization is in the form of a $56.5 million modification awarded to the Boeing Vertol Company's existing heavy lift helicopter advanced technology component contract. This authorization is a logical extension of our air traffic control contract in that the aircraft will demonstrate, in flight, the integration and performance of air traffic control components.



Artsit's concept shows a Boeing heavy lift helicopter carrying a fuel storage tank section from ship to construction site. The section is 50 feet in diameter, 8 feet high, and weight between 18 and 20 tons, which is well within the payload capacity.

Field fuel tanks consist of three sections, with a pyramid top, holding 10,000 barrels of fuel, and can be constructed in approximately 8 to 10 hours when using the helicopter for transporting sections ship-to-shore.

The gross weight of the heavy lift helicopter is more than two-and-one half times that of Boeing's current production helicopter the CH-47C Chinook.

The new engine, the XT 701, will produce 8,000 horsepower. It will be the most powerful flightweight turboshaft engine in development or production in the free world.

Under the authorization the first flight of the helicopter will take place in the summer of 1975, approximately 18 months earlier than Boeing and the Army had originally planned.

Once the first flight is completed the aircraft will undergo a flight test program conducted by Boeing. This will lead to a formal flight evaluation by the Army.

Navy Gets New Data Terminal

The US Navy has received a unique new data terminal display console that allows an operator literally to converse with the Naval Tactical Data System (NTDS) computer and change necessary functions programmed into it.

To be employed on the new nuclear powered destroyers, the Monitor Control Console (MCC), developed by Hughes Aircraft Company's ground system group, allows the operator, using an input typewriter, to request specific functions from the NTDS. When a page of text appears, he edits or adds to the text through his console keyboard. The cathode-ray tube monitor is large enough to display 25 rows of words with 80 characters per row. The console will be employed in conjunction with standard NTDS displays.

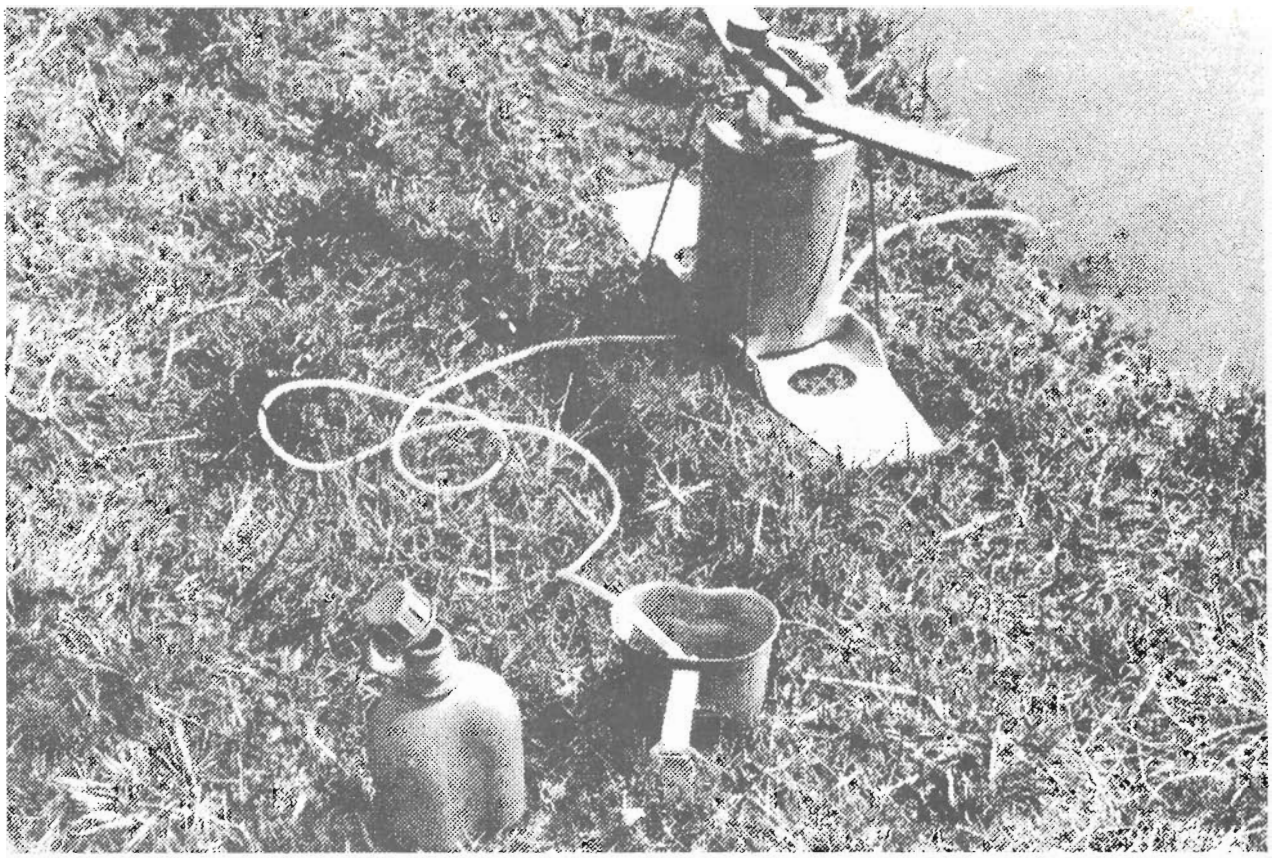
NTDS is a system that can provide one ship or a fleet of ships with up-to-the-minute data on both friendly and enemy air, surface, and underwater craft within or near the fleet's perimeters. It has three major subsystems made up of computer, displays, and communications. These interphase with the ships' sensors and weapon systems.

The computer receives all data from displays, breaks it down into the simplest terms and feeds it back to command personnel. These data are all that is needed to implement proper action against a threat. The new monitor console provides an even greater ability for NTDS to react quickly to varying weapon systems configuration and status.

Bridging Minefields

Steppingstone pads of foamed plastic that provide a safe path through minefields were recently demonstrated at the US Army Mobility Equipment Research and Development Center (MERDC), Fort Belvoir, Virginia. Using a portable backpack unit (in far right background), the steppingstone pads are formed by foamed plastic sprayed on the ground ahead of the operator. The special plastic forms and hardens almost instantly, allowing the operator to cross the minefield safely as he sprays the path ahead. The experimental minefield bridging concept was developed and demonstrated by Martin Marietta Aerospace under contract to MERDC.

Portable Water Purifier Coming



The Army has awarded a contract to the Philco-Ford Corp to develop a lightweight, hand-operated water purifier that can be used by soldiers in the field. The contract, with the US Army Land Warfare Laboratory at Aberdeen Proving Ground, calls for design, fabrication, and tests of the lightweight system which will operate through the reverse osmosis process, turning contaminated water into potable water. In the process, polluted water is forced under pressure through a membrane to achieve purity. The unit will be roughly one-quarter cubic foot in size and will weight about 11 pounds. Delivery of the first test units is expected this year.

Air Defense in Soviet Union

Major Tyrus W. Cobb

Editor's Note: This is part II of "Air Defense in the Soviet Union." A summary of the work will be published in the January 1974 issue. Comments should be addressed to the author at 840 West 12 Street, Reno, Nevada 89503.

— The Antiballistic Missile System — (ABM)

In the Khrushchevian era Soviet military strategy initially emphasized the overwhelming role that offensive rocket forces would play in deterring a potential aggressor from attacking the Soviet Union. An anti-ICBM defense was denied a supporting role in this deterrence concept since it was regarded as both unnecessary and technically unfeasible. But in the early 1960's Soviet writers suddenly began to claim that an effective antiballistic missile (ABM) defense was both desirable and possible.[32] Marshall Sokolovskii, for one, wrote in 1963 that:

> *In our country, Soviet science and technology have successfully solved the problem of destroying missiles in flight. Thus, there is a realistic possibility of creating an insurmountable antimissile defense.*[33]

In the political sense, the advantages accruing to the possessor of an effective ABM defense have already been enumerated. In brief, it could deter the enemy from considering a preemptive strike or, at the very least, in combination with an effective civil defense program, provide damage and casualty limitation. A viable ABM defense could also nullify an enemy's offensive threat, i.e., the USA's deterrence package. Taken together this would mean that the Soviets could pursure a much less constrained and more adventuristic foreign policy.

Antimissile defense in the Soviet Union falls within the general responsibility of the PVO Strany but is thought of as a separate and distinct subfield. More precisely, the ABM program is a part of the PVO's antirocket defense (PRO). But PRO includes defense against all rockets and missiles, tactical and strategic. The Soviets, in reference to the former, have evidenced considerable interest in our antitactical rocket exercises, devoting considerable comment to our Hawk versus Honest John series of tests, for example. Marshall Batitskii, PVO CINC, has overall responsibility for the entire spectrum of antirocket and antimissile defense.

Despite the seemingly insurmountable technical obstacles presented in trying to construct a viable ABM system, the Soviets accelerated their research and development in this field, especially after the overthrow of Khrushchev in late 1964. By 1966 the West had clear evidence that the USSR would deploy a limited ABM network, with Moscow as the crux of the defense. On this side of the ocean the great debate over whether the USA should deploy its own system continued unabated.

Initial deployment of the Soviet ABM system was accomplished in 1966 and was concentrated around the Moscow industrial area. The heart of the system was the exoatmospheric missile known as the Galosh. This two-stage missile carries a multimegaton nuclear warhead and has a range in excess of 300 miles.[35] The first version could be fired from a vehicular launcher. Initially 64 launchers were deployed under four ABM batteries and were primarily oriented to an attack coming from the United States.[36] Prior to the recent Strategic Arms Limitation Agreement it was thought that the system deployment would have been expanded to other parts of the Soviet Union to give it defense in depth and to counter possible threats emanating from China.[37]

Several improvements have been accomplished with reference to the original version. In 1968 work on the missile sites was slowed down and not begun again until the next year. At that time there was a reconfiguration of the radars and a modified version of the missile, supposedly possessing a loiter capability, was tested. Essentially this means that the ABM can be fired into space, its engines shut off and the missile allowed to coast, then restarted when a target is designated.[38] This characteristic would make it more effective against the USA's MIRV's multiple targetable reentry vehicle). Further improvements were made in radar technology, particularly in acquisition capabilities.

The Soviet Galosh ABM works in conjunction with the Henhouse and Doghouse radar. The Henhouse is 330 feet high and 450 feet long and provides initial long-range acquisition. Located on the periphery of the Soviet borders, the phased-array radar has a range of 1,600 miles, a potential the US will not have until 1978.[39] The data is transferred from the Henhouse radars to the Doghouse radars, located closer to the ABM sites. The Doghouse refines the information and makes further target discrimination, and transmits the data to the individual sites.[40] Supposedly the Doghouse radars have a tracking range in excess of 1,500 miles, can discriminate actual warheads from decoys, and assign targets for the Galosh to intercept.[41]

The Strategic Arms Limitation (SALT) Agreement President Nixon and Russian representative Leonid Brezhnev signed in Moscow last May revolved to a great extent around the deployment of antiballistic missile systems. The pact prohibits a nationwide ABM system and limits each country to two sites with no more than 100 missiles and 100 launchers on each site. One of the two antimissile complexes will protect the respective national capitals and the other will defend a field of intercontinental ballistic missiles. Additional restrictions were placed on radar development and deployment, opening of new test ranges, and upgrading of other missiles and associated equipment to an ABM role.[42]

Although the agreements have been approved by the United States Congress and the Supreme Soviet, it should be remembered that the SALT agreement is not a panacea for the arms race. If either side wished to violate the treaty, there is considerable room for maneuver. Since it is extremely difficult to define just what an ABM missile is, either country could expand its ABM network under the guise of improving its antiaircraft defense. The SA-5, for example, if it receives information from the ballistic missile tracking and acquisition radars, could be given an ICBM intercept capability. Similar problems exist in differentiating certain radars used in ABM systems from standard air defense equipment. The distinction, thus, between ABM and antiaircraft missiles, launchers, radars, and ancillary equipment is clearly one of degree and not of kind.[43] Thus the viability of the SALT agreement will lie not in its ratification, but in the manner in which the two superpowers deign to interpret it.

PKO — The Antisatellite Defense

Much of the Soviets' work in the Anticosmic (Protivo-Kozmicheskaya Oborona) area is understandably shrouded in secrecy and not a great deal is known of their accomplishments. We do not know that the USSR tested a high-altitude satellite interception and destruction system in 1969-70, using the SS-9 Scarp ICBM as the launching vehicle for the satellite destroyer (as part of the Cosmos test series). Lower altitude destruction can be accomplished with the SS-5 Skean IRBM. A leading periodical in this field has reported that the Russians now have an operational antisatellite intercept capability, having successfully destroyed their target in two of four attempts.[44]

Soviet writers generally describe three methods of interception of satellites. The first, and most simple, is the use of an unmanned interceptor, launched from a powerful vehicle such as the SS-9. This method is almost certainly already in use. The Russians have also discussed the possibility of launching missiles into the upper atmosphere where a thin asphalt dust cover is strewn in the path of an enemy satellite so as to ignite it.[45] Thirdly, Soviet military writers have described a possible future antisatellite scenario as follows. A space control center will make a decision to send a satellite into space to identify and inspect an unknown flying apparatus. The identification satellite will lock-on to the designated target while on-board TV cameras and assorted electronic equipment will give ground personnel a clear picture of the target. To intercept, a piloted antisatellite is launched and guided to intercept by ground computers. At an established range the astronaut takes over controls of the space ship, moves alongside the target, and destroys it using several large-caliber shells. The astronaut is then given the command, "Prepare to descend," approaches the earth along a gentle curve, and soon lands the ship at one of the military airfields at great speed. Mission accomplished.[46]

Soviet Air Defense Efforts Abroad

As a final exercise, let's briefly look at Soviet exports in the air defense field. Primary emphasis has been directed towards the countries of the Warsaw Pact, although considerable effort has been exerted in Cuba, the AER (Egypt), the Sudan, North Vietnam, North Korea, Syria, and Algeria.

The command of the air defense system covering the whole Warsaw Pact area is centralized in Moscow and directed by the Commander-in-Chief of the Soviet Air Defense System, Marshal Batitskii.[47] Quite possibly the Warsaw Pact constitutes a separate district in the PVO Strany network, as some writers have suggested.[48] The PVO system as a whole participates actively in Warsaw Pact joint maneuvers. Yearly conferences are conducted between PVO personnel of all the countries to assimilate the latest R&D and to find

ways to improve the air defense system. PVO exercises are conducted at these conferences, and the achieved results and whatever shortcomings are thoroughly and self-critically evaluated.[49] The Pact has substantially improved the electronic and technical integration of the WTO defenses and, in turn, vastly improved the transfer of early warning and vectoring and control of interceptor aircraft.

Each of the Warsaw Pact countries has been furnished with 57 and 100-mm AA guns, and East Germany, Czechoslovakia, Hungary, and Poland have incorporated the self-propelled ZSU-23-4 and ZSU-57-2 weapons in to their air defense arsenals. All have been equipped with SA-2 Guideline surface-to-air missiles, most prominently in Poland which has over 300 launchers. Additionally, all six members of the Pact's Air Forces are flying the MiG 17, 19, and 21 models. Poland alone has over 45 interceptor squadrons assigned.

Until quite recently the greatest presence of Soviet personnel outside the Warsaw Pact area was in the AER (Egypt). Prior to President Anwar Sadat's order expelling the Russians, the USSR had set up an entire PVO district in Egypt, staffed and operated by Soviet officers and men.[50] The command was under the personal direction of Colonel-General Okunev, head of the Moscow Air Defense District, on special leave to the Soviet Defense Ministry for the operation. More than 10,000 Soviet military personnel were located in Egypt prior to the expulsion.

Apparently over 100 Soviet-manned Mig 21J's (10 squadrons) were flying over Egypt in conjunction with the anti-Israel air defense system, and an additional squadron of Mig-23 Foxbats were placed on station in late 1970.[51] In the surface-to-air missile field, the Egyptians had (and presumably still have) 250 SA-2 Guidelines in 25 batteries. For added protection against low-flying aircraft, 22 SA-3 Goa sites were established along the Suez Canal, at least partially manned by Soviet personnel. Reportedly the Soviets were constructing another 23 SA-3, and possibly SA-4, sites along the canal when Sadat made his surprise announcement.[52] Undoubtedly the absence of Soviet technical expertise and equipment will hurt the AER's air defense system, and there is considerable doubt as to whether or not the Egyptians can direct the defense unilaterally.

Much of the total of the Soviet aid to Cuba is accounted for by air defense weaponry. The Cuban Air Force has 50 MiG-21's, 40 MiG-19's, and 75 MiG-17's. Additionally there are 144 SA-2 missiles deployed in 24 sites.[53] Of course many of these weapons have been there for some time and were not the "cause celebre" of the 1962 Cuban missile crisis. The United States became alarmed at that time when these defensive weapons were augmented with IRBM offensive missiles.

But it is Southeast Asia that has been the real testing ground for the Soviets' multifaceted air defense weapons systems. Russian aid to the North Vietnamese was generally estimated at about a billion dollars a year, much of it in the form of antiaircraft guns and missiles. The Soviet presence in Hanoi was not as visible as it was in Cairo, and the Soviet advisory effort there probably does not now exceed a thousand persons.[54] In contrast to Egypt where the Russians created and helped to staff an air defense district, the DRV has vetoed this concept. All interceptor aircraft and SAM missiles sites were manned by the North Vietnamese themselves, and the Soviet role seems to have been limited to advising, rendering technical assistance, and coordinating logistic requirements.

The NVA has in its arsenal over 6,000 antiaircraft guns, including 37-, 57-, 85-, 100-mm weapons, about half of which are radar-controlled. The self-propelled ZSU-57-2 antiaircraft gun made its debut in the war in the South, firing in support of the recent NVA invasion.[55] In the air war the North Vietnamese Air Force can field 30 MiG-21's, 60 MiG-17's, and 40 MiG-15's.[56]

Over 50 SA-2 Guideline surface-to-air missile sites have been identified in the North, each with from four to six launchers. The supply of SA-2 missiles appears to be almost endless. However, the performance of the Guidelines against USA pilots must be very disappointing to the North Vietnamese artillerymen and especially to the Soviet advisors. The SA-2 has demonstrated a lack of maneuverability, especially at lower altitudes, and will break-up in midflight if subjected to a radical course change. The SA-2 has even failed to score a hit during a proximity burst engagement; that is, the missile explodes near the target even though it has not made a direct hit. The reason for this shortcoming appears to be the fact that the SA-2 bursts forward when detonated leaving it ineffective to the sides. During the Nguyen Hue offensive that began 30 March 1972, the North Vietnamese reportedly fired over 250 SAM's in a two-week period and managed to hit only one US plane.[57] However, the DRV missileers enjoyed considerably greated success when the United States launched its blitz against North Vietnam last December following the breakdown of the Paris peace talks. Encountering the heaviest air defenses in the history of the world, the United States lost 15 B-52's between December 18 and 29. The USAF flew about 100 of the flying fortresses a day over the Hanoi-Haiphong area, suffering a loss rate between 2 and 3 percent. Reportedly the enemy had deployed 26 battalions of SA-2's comprising a total of 156 missile launchers augmented by 360 radar-controlled AA guns.[58] More than likely the enemy was not firing the newer model SA-2 missiles, but some important modifications may have been

made. Proximity fuzes were probably used in place of the command-detonated fuzes, which are very susceptible to electronic countermeasures. Further success was gained by changes in the mode of acquisition of the target through the use of auxiliary radars. Most importantly was the tactic the DRV missilemen adopted. The SA-2's were fired in salvos with shotgun-like abandon. According to the crewman the skies over Hanoi were virtually saturated with the SAM's.

The tactics involved in the SAM-2 versus US jet aircraft make for a facinating study. Our flyers have learned that the Guideline, as it is launched, is surrounded by a giant ball of fire and enveloped in a cloud of dust. The pilot, upon seeing the take-off, will watch the missile climb and then attempt to dodge it. Essentially this is accomplished by executing a split-S maneuver, a diving turn, to evade the SAM. This forces the clumsy, radar-guided missile to dive, stall, and go out of control. The NVA has partially offset this tactic by firing two SAM-2 missiles 5 seconds apart.

But then comes step two. The American pilots, diving to avoid the SAM missile(s), are forced to fly low and into the firing range of traditional antiaircraft guns, principally the 23- and 37-mm weapons, which spread a deadly blanket of flak for them to fly through. The SAM's are thus used more for channeling the target than for engaging it. This tactic may explain the apparently low effectiveness of the SA-2.

In electronic warfare the USSR has also made considerable strides. Previously the NVA radar troops would acquire a target in range, transfer the information to target tracking and missile guidance units, and attempt the intercept. This procedure had several serious disadvantages. First, as soon as a target was acquired, on-board electronic equipment alerted the aircraft crew that they were being targeted, and served as a warning to them to take evasive action. Secondly, the target aircraft would conduct electronic countermeasures designed to confuse or jam the enemy's radars.

Finally, and most importantly, US jets are equipped with passive radar-homing devices which can guide an on-board air-to-surface missile to the source of the radio wave propagation.

To circumvent this problem the NVA, in some instances, is falling back on optical tracking. In this case the acquisition radars are turned on for only limited periods of time, sufficient to acquire a target but not so long as to allow a pilot to employ ECM measures. Planes are then tracked using an optical device in which the operator lines up the crosshairs of the instrument on the targeted aircraft and the information is automatically fed into a computer and converted into guidance commands for the missile.[59] The system is not extremely effective, but at least the tracking device can't be jammed. However, the missile is usually radar-guided, the difficulties inherent in attempting to track a Mach-3 SAM optically are obvious.

As noted earlier, the NVA has enjoyed success with their SA-7 Strela missile against US helicopters and slow-flying tactical aircraft. The countermeasure to the SA-7, the Russian version of our Redeye, is quite simple. Since the Strela is an infrared heat-seeking missile and homes on the heat produced by the engine of the targeted aircraft, it is necessary to divert the SA-7 to another heat-producing target. Our chopper pilots drop flares, which can produce tremendous amounts of heat quickly and cause the SA-7 to stray from its target. Helicopters have also been modified with heat deflectors which deflect the exhaust heat up 90° into the wash created by the rotor blades causing the heat to be diffused.

Both USSR and US have gained new respect for traditional antiaircraft artillery in engaging targets, especially at lower altitudes. Experience in Vietnam has demonstrated that air defense missiles are ineffective in a rather large dead zone surrounding the firing position. They require a long reaction time and have not destroyed their target at times even when the intercept seemed accomplished (due to erroneous burst commands, forward detonation, etc.). A Soviet writer now asserts that increased attention must be given to perfecting traditional AA artillery because of

> *"...the experience of the war in Vietnam where the Army of the Democratic Republic of Vietnam successfully shot down American planes using ground antiaircraft artillery fire and by the shortcomings of existing air defense rocket complexes.*[60]"

Just before the signing of the Vietnamese ceasefire, there were indications to the effect that the Soviet Union was considering expanding and improving its air defense aid to North Vietnam. Just prior to the recent offensive, a high-ranking Soviet military delegation journeyed to Hanoi. The group was headed by Marshal Pavel Batitskii, CINC of the Russian PVO, and included high-level specialists in both radar technology and missile defense. Probably the Soviets had agreed to shift the emphasis in war supplies to the latest antiaircraft weapons, including planes, missiles, and radars.[61] One might speculate on the nature of this equipment. As a minimum it would include more self-propelled AA guns, of both 23- and 57-mm calibers. In the SAM arena, we could expect that the SA-7 would be a high-priority item, as would be new improved SA-2 Guidelines. The NVA would certainly be aided by the introduction of the SA-3

Goa, which the Soviets had deployed in the Suez Canal area, to counter the low-altitude threat. It is extremely doubtful that the Soviets will send the SA-5 or SA-6 to North Vietnam, but the SA-4, so effective in the medium and medium-to-high altitude range, would be a welcome addition from the NVA standpoint. More advanced aircraft of the Mig-21J and SU-7 caliber may be delivered to North Vietnam. But such advanced models as the Mig-23 or SU-7B will only be flown by Soviet pilots, an unlikely instance in the Southeast Asian air war.

As far as we know, no Soviet "volunteers" were dispatched to Vietnam to aid the DRV's war effort. Yet it is significant to note that the official history of the PVO Strany applauded a group of soldiers from the Moscow Air Defense District who expressed a desire to volunteer for service in Vietnam. In a telegram sent to a North-Vietnamese general, they condemned the "criminal piracy" committed by US pilots, claiming it violated all human laws. Motivated by the spirit of proletarian internationalism, the soldiers recalled the participation of the (largely Soviet led) glorious International Brigade in the Spanish Civil War that motivated them to send the telegram. They requested the "Comrade General" to render all necessary cooperation towrds allowing them to participate in Hanoi's air defense effort.[62] Alas, we did not learn of Hanoi's reply or the official Soviet retraction.

FOOTNOTES

32. John Thomas, *op. cit.*

33. Marshal V.D. Sokolovskii, *op. cit.*, p. 419.

34. *Struggle Against Rockets* (Bor'ba s Raketami), Moscow, 1965, English translation from JPRS TT 65-33916, 15 Dec. 1965, p. 90.

35. *Military-Balance, op. cit.*, p. 7.

36. Laird, *op. cit.*, p. 44.

37. "Soviet Union's Technological-Military Drive," *Aviation Week and Space Technology*, 4 Oct. 1971, p. 12.

38. *Ibid.*

39. *Jane's All the World's Aircraft, op. cit.*, p. 569.

40. "Soviets Closing Gap in Avionics...," *op. cit.*, p. 43.

41. *Ibid.*, p. 41.

42. Full text of the SALT Agreement can be found in the 22 June 1972 issue of *Commander's Digest* (U.S. Government Printing Office).

43. For a fuller discussion of these problems, please see *The Strategic Survey* (International Institute of Strategic Studies, London, 1972), pp. 13-15.

44. "Soviet Union's Technological-Military Drive," *op. cit.*, p. 12.

45. *Newsweek*, 12 Oct. 1970, p. 31. Also see I.I. Anureev, *op. cit.*

46. Described in V.T. Surikov, *op. cit.*, pp. 142-144.

47. "Krepnet Boevoe sodruzhestvo voisk PVO stran Varshavskovo Dogovora" (Strengthening the Military cooperation of the air defense troops of the Warsaw Pact Countries), *Vestnik PVO*, #11, 1971, p. 15.

48. Mackintosh, *op. cit.*, p. 316.

49. "Krepnet Boevoe...," *op. cit.*, p. 15.

50. John Erickson, *Soviet Military Power*, (Institute for Defense Studies, London, 1972), p. 97.

51. *Military-Balance, op. cit.*, p. 45.

52. *Ibid.*

53. *Ibid.*, p. 76.

54. Erickson, *Soviet Military Power, op. cit.*, p. 99.

55. *Army Times*, 24 May 1972, p. 5.

56. *Military-Balance, op. cit.*, p. 70.

57. *Washington Star* wire story by Orr Kelly, in European edition of *Stars & Stripes*, 16 April 1972, p. 2.

58. "Big B-52 losses were expected," in Pacific edition of *Stars and Stripes*, 24 Dec 1972, p. 4.

59. "New Perils for U.S. Pilots," *Newsweek*, 17 April 1972, p. 12.

60. *Sovremennaya Artilleriya, op. cit.*, p. 33.

61. "Hanoi's Growing Soviet Ties," 27 March 1972 Radio Free Europe Research report.

62. *Voisk PVO, op. cit.*, p. 403.

The attackers were also changing their tactics. They abandoned their traditional stream for simultaneous approaches around the compass that foiled flight path prediction. Jamming techniques were more skillfully applied. Fighter-bombers attacked the SAM sites between B-52 raids.

By the fifth day, the northern defenses were beginning to sag and no B-52s were lost for two full operational days. Only random losses were experienced during the rest of the campaign.

By Dec. 28, the northern defenses were shattered, and B-52s roamed the skies with impunity. Hanoi could no longer track B-52s with its radar, get MiG-21 interceptors off their airfields or launch any significant SAM defense. The damage to the north was devastating. Virtually all industrial capacity was gone. Power generating plants and their transmitting grids were smashed. Gas and oil storage dumps were burned-out shells. Railroad marshaling yards looked like lunar landscapes. Roads and canals were clogged with shattered transport. SAM storage areas, tank, artillery and truck parks were pulverized. Military traffic dwindled to a trickle.

There are hundreds of aerial photographs in the Pentagon that authenticate this crippling damage, as well as the precision of the bombing of military targets. These pictures show some minor spillage of bombs into nearby civilian areas, but they refute the claims of "carpet bombing" of urban areas.

On Dec. 30, Hanoi decided to resume serious peace negotiations; the cease-fire is gradually being established, and U. S. prisoners of war are on their way home.

The American people, who have had so much of their blood and treasure squandered in futile, ineffective military effort in Vietnam, deserve to know that the war was finally ended by two decisive, effective applications of military power. And the lonely President, who made these unpopular but effective decisions, deserves their thanks for putting a period to this sad chapter of American history.

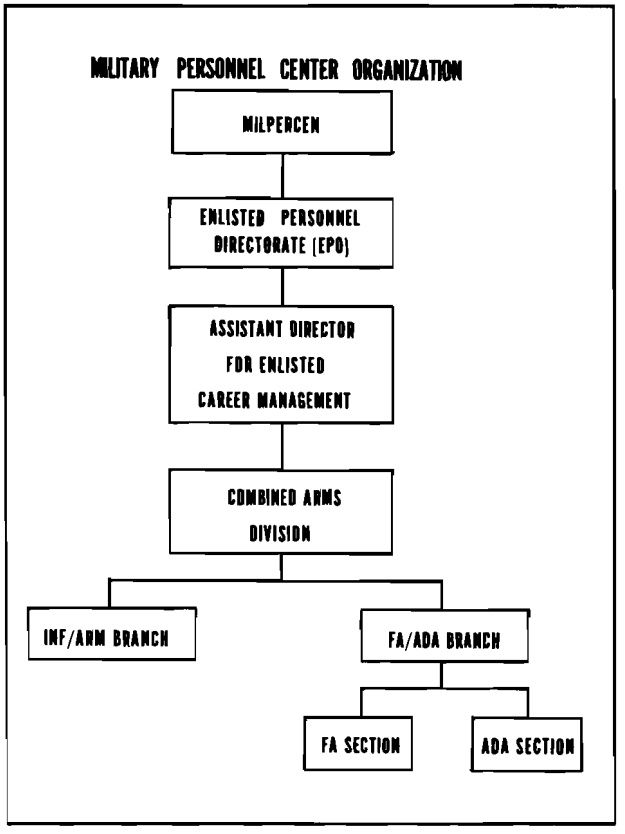
From the Director of Enlisted Personnel

(US Army Military Personnel Center)

Field Artillery and Air Defense Artillery Branches' New "Career Home"

Headquarters, Department of the Army, recently announced in DA Circular 600-91 the establishment of the Military Personnel Center (MILPERCEN). The establishment of MILPERCEN provides for consolidation of military personnel operational functions under one manager and will result in streamlined organization to serve the soldier and the Army.

The figure below shows a part of the MILPERCEN organizational chart to include the Combined Arms Division under The Assistant Director for Enlisted Career Management.



The Enlisted Personnel Directorate is the enlisted personnel operator for MILPERCEN. The Directorate's mission is to get qualified people to the right place at the right time in the right numbers. The directorate functions range from service entry and initial training through distribution, evaluation, professional management, reclassification, and reenlistment.

The Assistant Director for Enlisted Career Management directs the Army-wide assignment of enlisted personnel and controls overall career management. He supervises the Combined Arms Division which is one of five branch or specialty-oriented divisions.

The Combined Arms Division assigns and manages all enlisted personnel assigned to the Field Artillery, Air Defense Artillery, Infantry, and Armor branches and all soldiers performing as drill sergeants.

The FA/ADA Branch of the Combined Arms Division has overall responsibility for all FA and ADA enlisted personnel. The branch now has career management files on those sergeants first class and specialists 7 (E7) through sergeants major (E9) that it manages. The branch is gathering files on enlisted personnel in the ranks of staff sergeant and specialist 6 (E6). Files for those in the rank of sergeant and specialist 5 (E5's) will be assembled at a later date.

The Field Artillery section has responsibility for over 36,000 field artillery enlisted men. The Air Defense Artillery section manages over 23,000 ADA soldiers. Each section is further divided into teams of assignment managers dealing with specific military occupational specialties. This is where each soldier is selected for assignment.

The FA/ADA Branch is located in Hoffman Building I, Alexandria, Virginia.

Personnel assigned to the branch are dedicated to providing a "career home" for all Artillerymen. They will tell it like it is and help to insure that each soldier receives personal and equitable consideration of his assignment and professional development problems.

Compassionate Reassignment Stabilization

The maximum authorized stabilization period for compassionate reassignment is 1 year. Not all compassionate reassignments authorize this maximum period and, in a few cases, no stabilization is authorized. After approval at Headquarters, Department of the Army, the assignment instructions directing a compassionate reassignment will specify the period of stabilization or the lack thereof.

Commanders and custodians of military personnel record jacket are reminded that the assignment eligibility and availability (AEA) code "U" must be reported on DA Form 1-1 in accordance with rules 35 and 36, table 5-3, AR 640-2 (Qualification Records and Management Data Reporting) for approved stabilizations in conjunction with compassionate reassignments. The AEA code "U" remains in effect until the specified stabilization period ends; then it is automatically withdrawn. If the individual's problem for compassionate reassignment is resolved prior to the end of his stabilization period, the custodian must immediately withdraw the AEA code "U" and enter an appropriate AEA code. Individuals receiving permissive reassignments are not stabilized and their eligibility for reassignment, especially foreign service, does not change. They will be reported in the appropriate AEA code during the permissive assignment period.

Enlisted Civil Schooling Under New Management

Due to a recent reorganization the enlisted undergraduate training and degree completion (Bootstrap) programs are now being managed by the Education/Professional Development Division (DAPC-EPC-E) of the Assistant Directorate for Enlisted Career Management, Enlisted Personnel Directorate. This transfer of responsibility is intended to increase the Army's ability to handle the professional soldier's civilian educational needs.

These two programs remain unchanged by the creation of the new office. The Enlisted Undergraduate Training Program continues to consist of 2 years of college at Army expense. However, this program is restricted to four disciplines — Automated Data Processing Systems, Business Administration, Engineering, and Law Enforcement. Although the needs of the Army limit the number who are selected for enlisted undergraduate training, qualified individuals are encouraged to apply.

Soldiers interested in furthering their civilian education should also consider the degree completion (Bootstrap) program, where opportunities are more numerous than in the fully funded enlisted undergraduate training program.

Bootstrap is for enlisted men and women who can acquire their associate degree in 6 months or their bachelor's or advanced degree in 18 months or less. A letter of acceptance from an accredited school indicating the period of time to complete the requirements for a degree is necessary. Preference is given to those who can complete their degree work in the shortest time and those whose area of study best matches the requirements of their career field or the Army's needs.

Potential applicants should read AR 621-1 (Training of Military Personnel at Civilian Institutions) and talk with their education advisor before applying. Questions which cannot be answered by these sources may be addressed to HQ DA, Chief, Education/Professional Development Division, ATTN: DAPC-EPC-E, Washington, DC 20310.

Assignment as Drill Sergeant

The drill sergeant is the living image of the Army during the formative weeks when the trainee is transformed from civilian to soldier. The drill sergeant builds the foundation upon which the soldier will succeed or fail during the remainder of his military life. The responsibilities are great. They include developing leadership, motivation, morale, espirit de corps, and professionalism in the trainees at Army training centers. The challenge, responsibility, and rewards of drill sergeant duties may be yours if you can measure up.

The Army needs drill sergeants. Can you measure up? To qualify you must be an NCO in a grade of E5, E6, or E7. Women's Army Corps personnel in grades of E4 through E7 are eligible to become drill sergeants and may be accepted in the drill sergeant program.

Other qualifications the applicant must have include:

- Fluency in English

- General technical aptitude area (GT) score of 100 or higher. (Depending on other qualifications this score may be waived to 90.)
- High school diploma or equivalent.

- A score of at least 300 on physical combat proficiency test (PCPT) for male personnel. (Weight must be within limits as prescribed in table I, app III, AR 40-501 and maximum physical profile allowable is 111221).

- Physical condition for female personnel that clearly indicates they are physically able to perform the duties of a drill sergeant. (Weight must be within limits as prescribed in table II, app III, AR 40-501 and maximum profile allowable is 111221).

• Good military bearing, leadership ability, no signs of emotional instability, and no record of disciplinary action that would adversely affect ability to perform as a drill sergeant.

WAC personnel serving in CONUS may apply for drill sergeant duty at any time during their tour. Applications from male personnel must be submitted prior to completion of the first year of current CONUS assignment. All personnel serving in oversea commands should apply before or during the eighth month prior to their date eligible for return from overseas (DEROS). Early application is needed to provide for complete processing prior to return to CONUS. Applications will be forwarded from the installation directly to DA, attention: DAPC-EPC-CI. Approval of the application means attendance at one of the Drill Sergeant Schools for 6 weeks of special training. Schools are located at Fort Ord, California; Fort Knox, Kentucky; Fort Polk, Louisiana; Fort Leonard Wood, Missouri; Fort Dix, New Jersey; and Fort Jackson, South Carolina.

Applicants will be awarded the drill sergeant MOS-OOF upon successful completion of the course. Once awarded this MOS they begin receiving $75.00 special duty assignment proficiency pay per month which continues as long as they serve in an authorized drill sergeant position. In addition they are issued supplemental uniforms (which are laundered and cleaned free of charge) and the distinctive drill sergeant hat and badge. Also, they may look forward to a stabilized tour of at least 24 months with an option for extension to 36 months.

If you think you can measure up, submit your application in accordance with section XV, AR 614-200. A true copy of your DA Form 20 must accompany each application. See your personnel officer for assistance in applying.

MOS Expanded

The enlisted military personnel career field is being expanded. Five new military occupational specialties (MOS) replaced the current 71H series (Personnel Specialist) on 1 Sep 73. The new MOS will establish career management and development program for the military personnel career field. Enlisted men who hold a 71H MOS will be reclassified to the new MOS most appropriate to their grades and qualifications.

Effective 1 Jul 73 the Personnel Administrative Branch, General Support Division, Office of the Assistant Director for Enlisted Career Management, Enlisted Personnel Directorate, Military Personnel Center, assumed responsibility for assignment and career management for all personnel in the new program.

The new MOS by number, grade, and position are 75B20, E5-E4, company/detachment clerk; 75C20, E6-E4, personnel management specialist; 75C40, E6, personnel management supervisor; 75D20, E5-E3, personnel records specialist; 75D40, E6, personnel records supervisor; 75E20, E5-E4, personnel actions specialist; 75E40, E6, personnel actions supervisor; 75Z40, E7-E6, personnel sergeant or E7 supervisor in personnel management, actions, or records; and 75Z50, E8-E9, all positions currently classified in MOS 71H50. ANF

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