# Field Artillery Journal

September-October 1980

Suppression
Of Enemy
Air Defense

# Field Artillery Journal

the journal of fire support

**Volume 48** **September-October 1980** **Number 5**


## ARTICLES



## FEATURES




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**PURPOSE** (as stated in the first *Field Artillery Journal* in 1911): *"To publish a journal for disseminating professional knowledge and furnishing information as to the field artillery's progress, development, and best use in campaign; to cultivate, with the other arms, a common understanding of the powers and limitations of each; to foster a feeling of interdependence among the different arms and of hearty cooperation by all; and to promote understanding between the regular and militia forces by a closer bond; all of which objects are worthy and contribute to the good of our country."*

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# On the Move

by MG Edward A. Dinges

One of the great privileges associated with command of the Field Artillery Center and Fort Sill is the opportunity to communicate through these pages with the "real" Field Artillery—the men and women throughout the Army, both active and reserve, who make our branch a vital community. I want to tell you at the outset how proud I am to have been afforded this privilege—to speak *to* you as steward of your school and center, and *for* you in the directing councils of the US Army Training and Doctrine Command (TRADOC) and the Army.

As my distinguished predecessor, MG Jack Merritt, reported to you in the last *Journal* issue that we at Fort Sill have been engaged during the last few years in perhaps the most profound rethinking of the fire support function since World War II. In doctrine, in organization, and in materiel development, we are on the threshold of major changes in the way we do business.

Now, while this revolution in fire support represents a tremendous future opportunity, it also poses a few problems.

First, while we try to inform you of—and involve you in—this development process, much of it must appear far removed from your daily concerns. To the unit trying to figure out how to resupply ammunition with aging GOERs and M548s, the prospect of a protected Field Artillery Ammunition Supply Vehicle (FAASV) five or six years down the pike is of less than immediate interest. To the battered survey NCO trying to put in position area survey with a theodolite while his batteries are moving six times a day, the promise of self-locating weapons a decade hence is about as substantial as summer lightning.

But the problem goes deeper than just a difference in perspective. Even though Fort Sill has a clear responsibility to tomorrow's needs, we share with you an equal obligation to today's. Both General Merritt and I have been concerned for some time that our response to these competing obligations has been somewhat unbalanced, and as such we have begun to redress this imbalance in several ways.

In doctrine we have taken a long, hard look at FIST implementation through the Close Support Study Group (CSSG) in close coordination with our maneuver brethren. The CSSG II report has been distributed to all units in the field, and we are actively pursuing its hardware recommendations with TRADOC and DA, with special emphasis on required increases in communications equipment. In the meantime, to help you work the FIST problem with equipment available today, we will be issuing to the field in late fall of this year a revised and expanded training circular on brigade fire support operations, which corrects procedural problems encountered with our current TC 6-20-10 (for example, in the use of radio nets) and which will also help you prepare for the arrival of TACFIRE and Copperhead.

Also in the doctrinal area, we have begun to pay long-overdue attention to the problem of near-term artillery survivability. Our first compendium of survivability techniques employed by various NATO forces was distributed to the field in May and elicited a broad range of comments and suggestions. We are now in the process of reviewing this encouraging feedback, with a view to giving you soon some definitive guidance on near-term survivability techniques.

Finally, we have recently completed initial work on interdiction planning procedures for use in the near-term by division and corps fire planners. While these procedures will eventually be incorporated into regular doctrinal publications, we have in the meantime provided them informally to our division and corps artilleries and are working now to incorporate them into our advanced course program of instruction.

In materiel, meeting your near-term needs is of course more difficult, both because of the fielding lag always associated with new equipment and because of Army-wide resource constraints. Recognizing these problems, we will nevertheless continue in the months ahead to press to get some of the essential "horseshoe nails" into your hands rapidly—items like the new velocimeter, the Position and Azimuth Determining System (to help that harassed survey chief), and the Small Unit Transceiver. Other such items—the Battery Computer System, our new FA Meterological Acquisition System (FAMAS), and FA Ammunition Supply Vehicle (FAASV)—may take longer; however, I pledge you our best efforts to field these much-needed pieces of hardware as rapidly as we can.

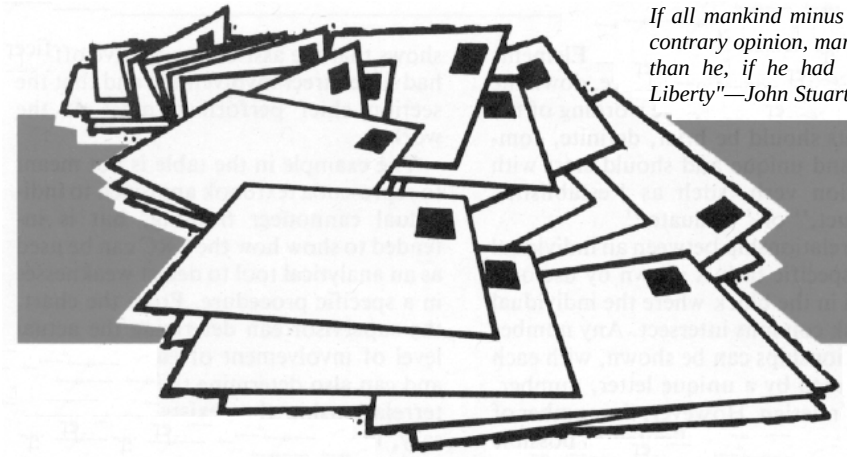
In training, many of your most persistent problems—time, distractors, lack of real estate, personnel turbulence, and so on—are not within Fort Sill's power to influence (at least, not very much). What we can and must provide you are tools which enable you to work around these problems. Training devices such as a low-cost training round and an observed fire trainer are now badly needed, and we are pressing to get them to you within the next year or two. Meanwhile, we are completing work on an ARTEP for TACFIRE-equipped units and are continuing to review and revise our various *Soldier's Manuals* and *SQTs*.

Now, despite these efforts, I recognize that many of your toughest operational problems remain to be solved—problems like battery defense, allocation of fires, tactical communications, NBC survivability, battlefield recovery, and so on. I wish I could confidently promise near-term technological solutions to these and other such problems. Given current budgetary realities, that simply isn't likely.

However, I assure you that we will keep these requirements on the front burner to insure that they are not swallowed up by the "sexier" big-ticket items.

In the meantime, we must search together for innovative procedural ways to solve some of these problems with existing means. I say "together," because this is clearly not a job we at Fort Sill can do by ourselves. The "It won't work here" syndrome reflects real differences in the operating situations of our worldwide units. But we *can* compile "menus" of solutions—as we have done with survivability—from which you can adopt and adapt those which suit your special circumstances. In this area, for us to help you, you must help us. As a branch, we are blessed with talent in abundance and we need to use every bit of it, in our own interest.

Once again, let me say how proud I am to represent you. You can count on my best effort to enhance the Field Artillery's traditional reputation for excellence. In turn, I count on your continued support.



*If all mankind minus one, were of one opinion, and only one person were of the contrary opinion, mankind would be no more justified in silencing that one person, than he, if he had the power, would be justified in silencing mankind. "On Liberty"—John Stuart Mill*

# Incoming

## letters to the editor

### More on target selection

Regarding the letter from Captain Altersitz in the July-August 1980 *Journal* and your response to him, it appears that one of the most pressing problems we now face in our preparations to fight is understanding the organization of the battlefield and the attack of targets within that organization.

If one would think of the battlefield in terms of three separate (but interrelated) areas, then target selection, weapons application, and command responsibility for attack become a bit clearer.

The first area extends from the forward line of own troops (FLOT) to the fire support corrdination line (FSCL) and belongs to the division commander. This is where the first echelon battle is fought. Fire support is primarily cannons with close air available on an immediate basis. Corps does not actively participate in this fight with the exception of allocating a corps slice to the divisions.

The second area extends from the FSCL out to a distance of 80 to 100 kilometers. This is where the corps commander engages the follow-on divisions of the first echelon and/or the leading and follow-on divisions of the second echelon army. Lance and air are the means of attack.

The third area extends beyond the 80 to 100 kilometer line and is the responsibility of the army group commander and the supporting allied tactical air force.

For simplicity, these areas can be called the direct support (DS), battlefield interdiction, and deep interdiction areas. In the case of the DS area, support to the maneuver force comes first and, as you stated, the establishment of target priorities is the prerogative of the maneuver commander, hopefully with the advice of his fire support coordinator. Immediate effects upon the battle is the objective.

In the battlefield interdiction area, we are looking toward impeding, disrupting, and delaying the movement of follow-on and second echelon units. Soft targets such as command and control centers, communications sites, artillery, air defense, and critical logistical facilities (POL vs rations) are good nominations for attack by nonnuclear Lance. Hard targets such as tank formations are attacked by air. The objective is to affect the battle in the 24- to 72-hour time frame.

The deep interdiction fight is accomplished with air assets and is aimed primarily at fixed targets such as lines of communication and crossing sites. The effects of this campaign are measured in days and perhaps even weeks.

To summarize, it should be understood that each area of the battlefield falls within the responsibility of an appropriate fire support echelon and that each area has its own unique characteristics and therefore presents different targeting situations. The ability to see the battle in this light will increase the effectiveness of our fires since each fire support agency will manage the efforts within a definite area of concern for which assets exist.

Lastly, until our more sophisticated systems for target acquisition and management are fielded, we are faced with the situation where our observers and visual resources are our best target acquisition means. In non-TACFIRE units, stubby pencil drills are still the norm for target management and will probably continue in absence of tactical data links, real-time long-range acquisition devices, a functioning ground liaison system, and a target production agency. A short-term fix consisting of a low-cost, relatively simple information management computer for non-TACFIRE div artys, brigades, and corps FA sections would certainly improve our capabilities for a higher degree of efficiency for maximum fire support.

John S. Osborne
LTC, FA
III Corps Artillery
Fort Hood, TX

### Lifetime memberships

As a member of the Field Artillery Association and a subscriber to the *FA Journal*, I wonder why there isn't a lifetime membership/subscription offered by the Association. The Commandant's note in the May-June 1980 issue about the Field Artillery Association asked for our support. What better way to show it than by becoming a lifetime member? Perhaps this would cut some administrative costs that are currently associated with continual renewals. Also, as history shows, the off-shoot of the original Field Artillery and Infantry Associations—the Association of the United States Army (AUSA)—offers lifetime membership. Why can't we?

MAJ John Ferret
TCAD, USAFAS
Fort Sill, OK

*During recent months, the feasibility of offering lifetime membership to the Field Artillery Association (FAA) has been under considerable study. Although this option would reduce certain administrative costs for the FAA, current and anticipated rising costs in other areas (mailing supplies, postage, etc.) make it difficult to arrive at an equitable fee which would allow the Association to "break even" on lifetime memberships.*

*The FAA Executive Council will address this issue during the initial general membership of the FAA to be held in October. Results of the meeting will be published in a subsequent issue of the* ***Journal****.—Ed.*

### 6th FA Bde Association?

Former members of HQ Battery, 6th FA Bde, 1937-39, interested in forming an association, contact COL (Ret) A. J. Sabel, 27 S. Shore Drive, New Port Richey, FL 33552.

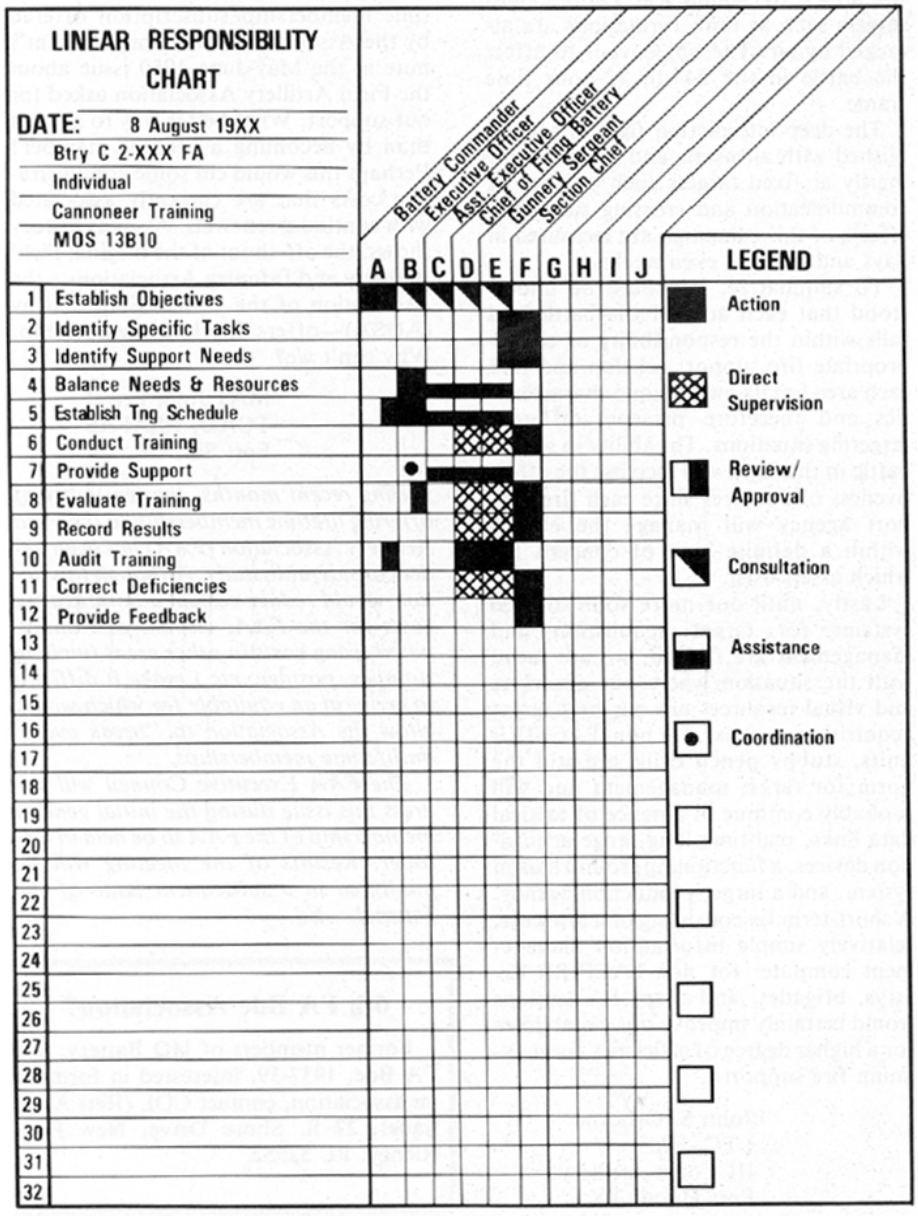
## Tools for artillery supervisors: The Linear Responsibility Chart

The Linear Responsibility Chart (LRC) offers one of the most versatile and adaptable tools available to supervisors at all levels. Basically, it is a graphical cross reference of personnel and responsibilities, indicating who, what, and how many. It shows not only which individual is responsible for accomplishing an element of work, but also the interrelationship of responsibilities and tasks that comprise the whole function.

Construction of the LRC follows a straightforward matrix format. Individuals are listed by title in the columns across the top of the chart. The arrangement is from left to right by any standard pattern; for example, by rank. Elements of work are listed, by sequence, down the left side of the chart. The wording of the elements should be brief, definite, complete, and unique and should start with an action verb, such as "establish," "conduct," or "evaluate."

The relationship between an individual and a specific task is shown by use of a symbol in the block where the individual and task columns intersect. Any number of relationships can be shown, with each represented by a unique letter, number, color, or design. However, the number of symbols should be as limited as possible to avoid too much clutter on the chart.

In the sample LRC, the overall function being charted is individual cannoneer training. Examination of the chart shows that the assistant executive officer had little direct involvement and that the section chief performed most of the work.




The example in the table is not meant to represent a textbook approach to individual cannoneer training, but is intended to show how the LRC can be used as an analytical tool to detect weaknesses in a specific procedure. From the chart, the supervisor can determine the actual level of involvement of each individual and can also determine the degree of interrelationship that exists, or is necessary, in each specific work element.

The LRC can be used for tasks within a specific, relatively simple function, or it can be used to demonstrate the complex relationships among major functions. My own battery uses the LRC to depict the entire administrative structure of the unit. Individual supervisors use the LRC to further detail those functions with which they are primarily concerned.

The LRC is not a cure-all for complex administrative problems but, in the hands of an imaginative and resourceful supervisor, it is one more useful tool.

David T. Zabecki
CPT, FA, ILARNG
2d Bn, 123d FA
Galesburg, IL

*Your approach to describe what supervisors do in relationship to unit actions appears to be an oversimplified solution to an extremely complex problem. However, if the system does actually result in a better managed and more effective organization, the effort is obviously worthwhile and is not discouraged. The School, as a result of the requirement to perform job and task analysis for FA officers, is extensively involved in determining what supervisors must do through the use of a model that relates the tasks of the supervisor to the collective (ARTEP) tasks of the organization and individual tasks of his subordinates.*

*Additional information in this area may be obtained by writing US Army Field Artillery School, ATTN: ATSF-TD-IT, Fort Sill, OK 73503.—Ed.*

## Realistic training

From marginal to outstanding—this describes the 147th Field Artillery Brigade's success in training during the past year. Although most of the training activities of this South Dakota National Guard unit were reasonably simple events which any artillery unit should be able to perform, the results were phenomenal.

In January 1980, the Fort Riley Readiness Group Field Artillery Branch Assistance

Team (BAT) was briefed on the brigade's objectives for Annual Training (AT) to be held at Fort Riley the following June. Although no small task, a scenario was prepared by the BAT to form a common bond for all units training with the brigade. This scenario was initiated during weekend training in April and May and subsequently used throughout Annual Training.

The brigade's headquarters and the Second Battalion's headquarters and service batteries were to take external evaluations under appropriate Army Training and Evaluation Programs (ARTEPs) from the First Maneuver Training Command (USAR). The First Battalion, affiliated with the 4th Division Artillery (Mech), was to have its headquarters and service batteries take external ARTEPs from its affiliated battalion. All major activities for the ARTEPs had to be coordinated with the FA Branch Assistance Team. Does this sound unrealistic? Not really, when one considers that the FA BAT acted as higher artillery headquarters and also as maneuver brigade, division, and corps headquarters for all units. Not only did the artillery units have a higher field artillery headquarters, but all of them had to support maneuver units. What then did this arrangement do to enhance training?

Under the common scenario, a change in a tactical mission meant a great deal to all headquarters since each had inherent responsibilities to consider. Now, liaison officers had another unit with which to work. For example, if a battalion was placed in direct support of a maneuver task force, the liaison officer became the fire support officer and reported to the task force commander. When the Second Battalion was assigned the mission of general support reinforcing the First Battalion, the Second Battalion's liaison officer worked in the First Battalion. Although the 147th had trained with the FA BAT in a similar role, this was the first time all liaison officers and principal staff officers had simulated headquarters with which they could coordinate.

The common scenario was taken a step further when the 740th and 1742d Transportation Companies (medium truck companies) and the 665th Maintenance Company (general and direct support) were assigned under the "operational control" of the brigade for Annual Training. The BAT was expanded to include transportation and ordnance coordinators, and the scenario was revised to include service support annexes and logistics documents to make training more realistic for the non-artillery units.

**Air Force support added to the realism. All high performance aircraft were considered hostile.**

Some commanders might be thinking that this scenario would inhibit dynamic training at platoon/section, company/battery, or battalion level. This is not the case! If a commander wanted to alter or influence the situation in order to train on or evaluate certain tasks, he merely coordinated his desires with the controllers. For example, if a hasty displacement was desired, controllers could create an appropriate situation in minutes.

What was the net results? Every soldier training at Fort Riley with the brigade during this two-week period had the same challenge and countersign, the same division to support, and responsibilities which made them feel they were really contributing to the overall mission.

Integration of Air Force support with the brigade's training program was another major step toward training realism. The 114th Tactical Fighter Group of the South Dakota Air National Guard at Sioux Falls was requested to fly simulated close air support missions to which they responded magnificently. Soldiers were told to consider all high performance aircraft as hostile, which offered an excellent means to test tactical standing operating procedures (SOPs) for warning and response to air attack. Plans for close air support were accomplished so easily that it was decided to go another step. The brigade solicited support from the 148th Tactical Reconnaissance Group (Minnesota Air National Guard) who took aerial photographs from 200 and 12,000 feet altitude. Again, low flying high performance aircraft were considered hostile. Just before takeoff time, coordinates of the units were telephoned to the 148th and minutes later they were taking aerial photographs which were later provided to soldiers for evaluation of several aspects of security operations.

Although prudent use of training time and availability of personnel prohibited units from manning the outer perimeter, every units was required to man a sector of its own perimeter. In these sectors, soldiers practiced challenge and countersign, control of access routes, and maintenance and use of the M60 and .50 caliber machineguns. (There was actual use of the gun emplacement on the perimeter as an instructional station for Soldier's Manual tasks.)

Actually, one might go on indefinitely, but FM 21-2 (A Soldier's Manual of Common Tasks) contains one of the best lists of training activities to enhance training realism. In addition to the methods discussed previously and the tasks listed in FM 21-2, the following hints may be helpful in developing realism:

- Use new training areas.
- Issue and use blank ammunition, artillery simulators, and flares.
- Use camouflage nets.
- Conduct ambushes and ground attacks.

• Organize OPFOR (opposing forces) teams and use OPFOR training aids.

• Use NBC (nuclear, biological, chemical) signs (friendly and enemy).

• Wear protective clothing (simulate protective gear if necessary).

• Set up decontamination stations.

• Have personnel practice on individual and crew served weapons while in full protective clothing.

• Eat combat rations.

• Assess casualties—use moulage kit.

• Use smoke and riot control agents.

• Conduct combined arms training with infantry, engineer, and aviation units adjacent to your training area.

• Practice medical evacuations day and night.

• Simulate accidents (artillery, vehicle, and burns).

• Simulate sickness (food poisoning).

• Simulate contaminated rations.

• Use training mines and mine detection equipment.

• Use SCOPES (Squad Combat Operations Exercise).

• Use starlight SCOPES (borrow from Active Component).

• Conduct machinegun live fire from tracked vehicles.

Training managers in the 147th Field Artillery Brigade are proud of their success in training realism. Most of the activities mentioned were actually practiced by units in the brigade during the past year and will be included in plans for future weekend training assemblies and 1981 Annual Training.

Once the commander specifies that realism is to be an important consideration in all training activities and gives junior leaders some flexibility in scheduling appropriate activities, realistic training quickly becomes the norm rather than the exception.

Harold J. Sykora
LTC, FA, SDARNG
147th FA Brigade
Pierre, SD

## One Army Concept

The *Journal* is to be commended for its work as the magazine of the Field Artillery. In particular, I appreciate the increased amount of space that has been allocated to the Reserve Components (RC). However, I feel that more needs to be done.

Those of our brothers on active duty as a rule do not realize the worth and importance of the Reserve Components. For example, most active duty types are not aware that:

• There is more artillery in the Reserve Components than in the active force.

• A large percentage of both Guard and Reserve units have many veterans in their ranks.

• Guard and Reserve artillerymen generally have more artillery experience than they do.

There are several things that both the *Journal* and the Field Artillery Association can do, as MG Merritt said, ". . . to promote understanding between the regular and militia (sic) forces. . . ."

• First, does the Executive Council have RC artillerymen? The General's article speaks only of ". . . active and retired members,"

• Second, add Reserve Component commanders to the "Commanders Update." If you have space for the USMC and space for AIT battalions, you should have space for us.

• Third, if the Association is responsible for the pictures of battalion and higher commanders in Snow Hall, include our commanders. I have noticed that even the commanders of round-out battalions were excluded.

• Last, seek more publishable information of interest and importance to your RC audience.

When these things are accomplished, you will have made a giant step toward making the One Army Concept a reality and not a platitude. It won't replace the howitzers older than the crew that mans them. It won't replace the FADAC that we don't have. It will, however, make us feel a little less like second-class citizens. I'm sure St. Barbara desires nothing less.

Eugene P. Moser Jr.
CPT, FA, VAARNG
1-111th FA
Norfolk, VA

*Appreciate your letter and candid remarks.*

*Increased coverage of specific items of interest to our Reserve Components is a direct result of coordination with and support of the Combat Arms Division, US Army Reserve Components Personnel and Administration Center, St. Louis, MO. Only through continued support from the "field" can we meet the personal/professional requirements of our readership.*

*The current "initial" Field Artillery Association (FAA) Executive Council was formed in order to establish the Field Artillery Association as a separate organization apart from the Field Artillery Museum Association. This group will be replaced by an Executive Council to be elected at the first general membership meeting this fall. Instructions to the nominating committee are to include active duty, Reserve Component and retired members when preparing the list of nominees.*

*Adding RC commanders to "Commanders Update" is not a question of space constraints; rather it is the difficulty in obtaining not only an* ***accurate*** *listing of current commanders but also timely notification of changes.*

*Special Actions, Office of the Secretary, USAFAS, is responsible for the "Commanders Corner"; however, the Reserve Components Division of the School's Directorate of Course Development and Training is currently heading an effort to provide the same service for our RC commanders.*

*The* ***Journal*** *has in the past and will continue to aggressively seek interesting and informative material for publication. In this we need* ***your*** *continued interest and support.—Ed.*

## Best yet

This letter is to state that I very much appreciate receiving the *Field Artillery Journal.* I would like to congratulate you on the July-August issue which in my opinion was one of the best ever. Having once been an artilleryman and having taught gunnery during a portion of World War II at the School, I read each copy I receive with great interest, but I felt the July-August issue was one of the very best.

George W. Barber
American National Bank
Lawton, OK

## More on "battalion FDO"

I read Captain Griffin's article "Wanted: Battalion FDO!" (January-February 1980 *Journal*) and the letters to the *Journal* in response to it with considerable interest, as I am currently assigned as the operations/fire direction officer for a direct support battalion in USAREUR. My position is usually called "assistant S3," and in garrison this is a fair description of my actual duties. However, with support of the operations officer and battalion commander, my duties in the field revolve primarily around the gunnery of the battalion, and even in the garrison the training of the battalion fire direction centers (FDCs) is one of my major concerns. In other words, I am acting as the battalion fire direction officer (FDO).

Of course, the use of the assistant S3 as the battalion FDO requires some shifts in

the way we operate both in garrison and the field. In the field, the S3 stays closer to the battalion tactical operations center (TOC) than normal, and the operations sergeant also assumes more of the load. We have also experimented with having the communication electronics staff officers (CESO) and the (non-MTOE) S4 operate out of the TOC to act as shift officers. In garrison, the operations sergeant again handles some of the work that would normally fall to the assistant S3 and the battalion chief fire direction computer (filled in our case by a staff sergeant rather than the authorized sergeant first class) is also given a greater role in the training of battalion FDCs than would perhaps be usual. With these two key slots filled by capable NCOs, I can devote some attention to the FDCs in garrison and still focus most of my attention on the FDCs in the field.

Barring the addition of another officer to the TOE, I feel that this is probably the most feasible solution to the problem. Lieutenant Vozzo's comments (May-June 1980 *Journal*) on the role of the battalion ammunition officer are very much to the point, and a similar case can be made for most officers. The fact is that all of the officers currently authorized are needed in their jobs, as are some that are not in the TOE (special weapons officer, for example).

Mark B. Wroth
2LT, FA
OPNS/FDO
2-78th FA
Bamberg, FRG

# *Order of Saint Barbara*

*It has become a tradition in the Field Artillery to initiate deserving individuals into the* ***Order of Saint Barbara,*** *an award which is bestowed only on those who have made conspicuous, long-term contributions to the Field Artillery. To qualify, an individual must have demonstrated the following:*

*• An outstanding degree of professional competence in artillery matters.*

*• Dedicated application of time, effort, and spirit in distinguished service to the United States Field Artillery and to the promotion of the esprit de corps and recognition of the Field Artillery as a major contributor to the success of the combined arms team.*

*• Highest standards of integrity and moral character.*

*• Personal and professional qualifites that generate the genuine respect of subordinates, peers, and superiors alike and make the candidate apart as an artilleryman with whom the very best would be proud to serve.*

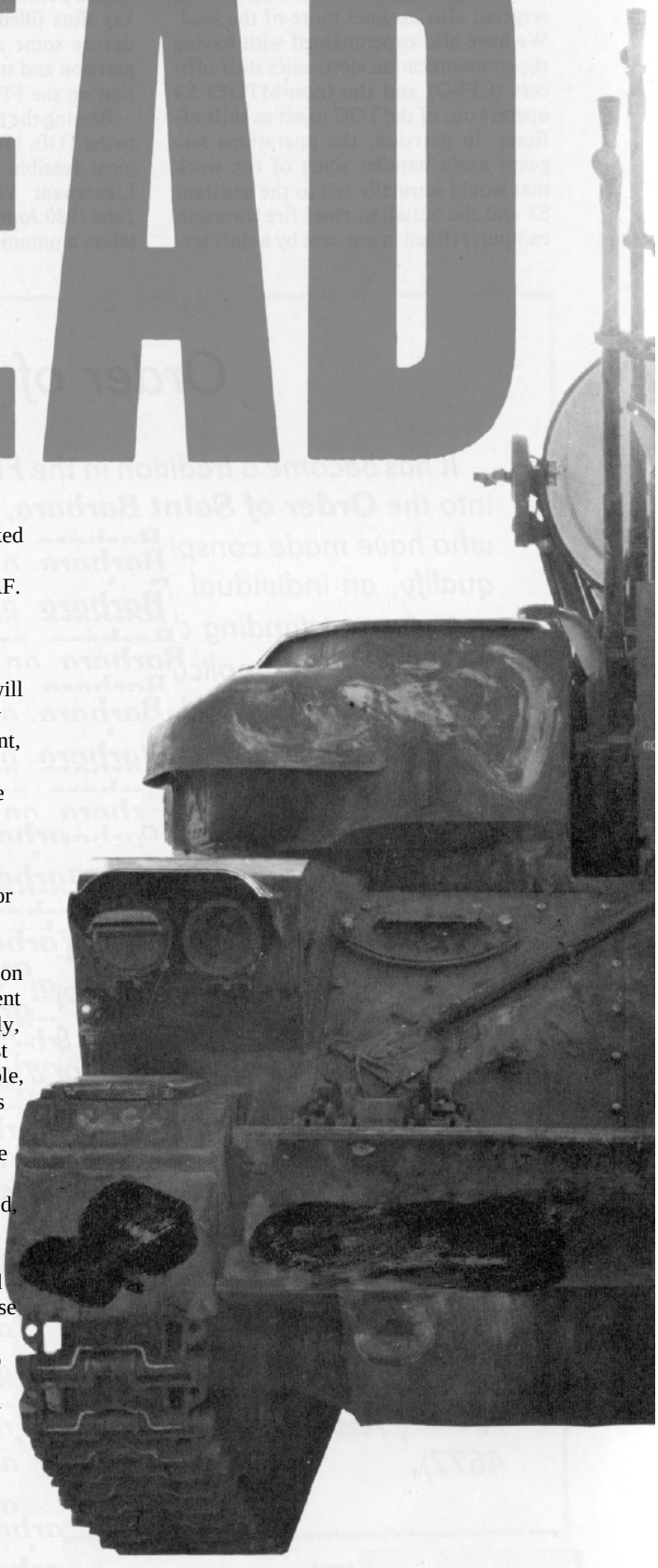
*For candidates at Fort Sill, approving authority for the Order of Saint Barbara resides with the commanding general; however, in the field, a Field Artillery officer in the grade of colonel or above (usually the senior commander) is normally the approving authority.*

*The central manager for the program and source of the award is the Field Artillery Association (FAA) and, as such, maintains an official file on individuals who have received the award.*

*The certificate and medallion with red ribbon are available for purchase at a cost of $7.00 plus postage. (An optional presentation folder is also available for an additional $7.00.)*

*Requests for further information or materials should be directed to the Field Artillery Association, Building 437, Fort Sill, OK 73503 (telephone (405) 355-4677).*

# SEAD



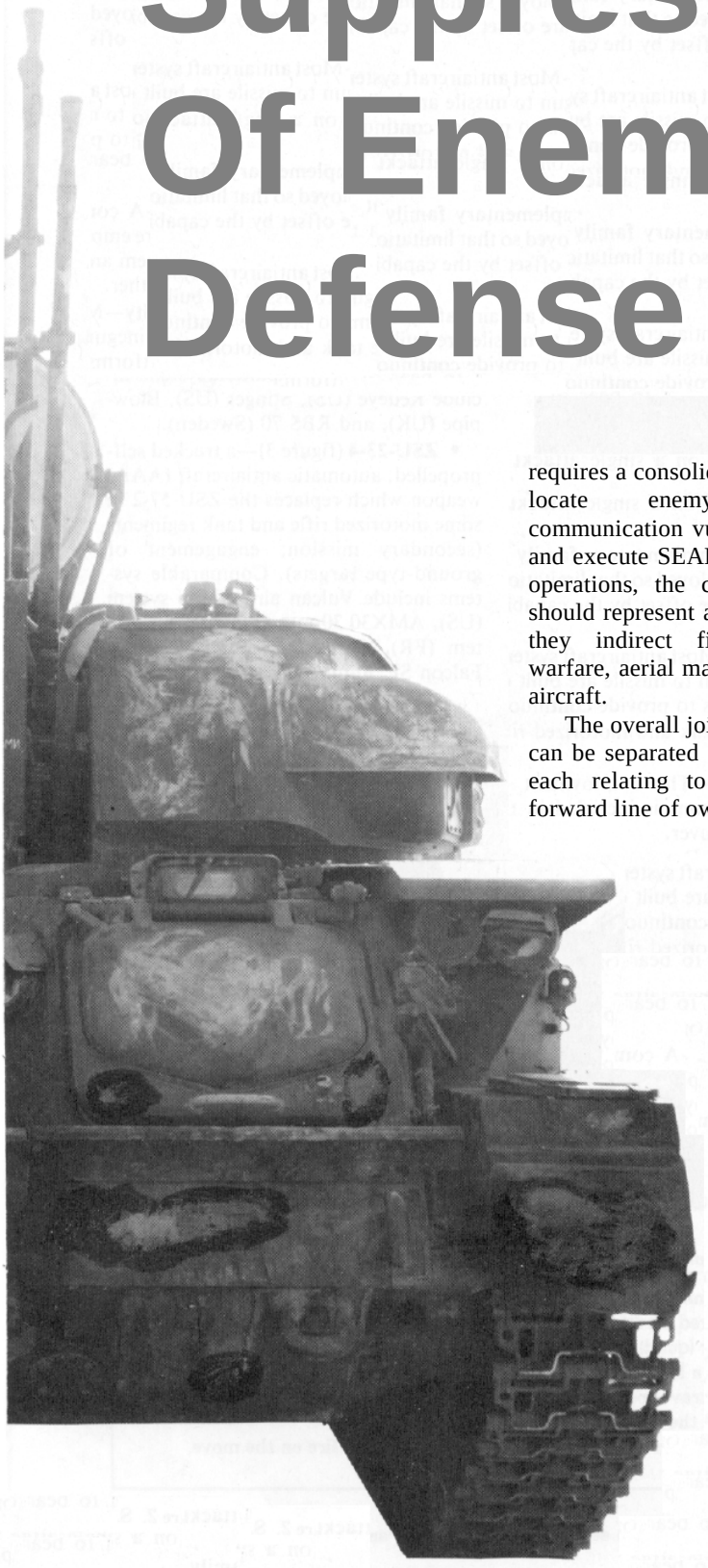
*The material contained herein represents the views of US Army and Marine Corps subject matter experts from the Tactics/Combined Arms Department as well as those of the US Air Force Representatives and Allied Liaison Officers at the US Army Field Artillery School (USA-FAS).—Ed.*

Our tactical air and aerial maneuver units have the mobility and speed to strike targets anywhere on the battlefield—unless deterred by enemy air defense. If friendly aircraft (both fixed and rotary wing) are to survive and be effective on today's sophisticated battlefield, the enemy air defense capability must be suppressed. Management of this suppression task usually falls to the fire support coordinator (FSCOORD). Since there has been very little written on how suppression of enemy air defense (SEAD) will be accomplished, this article is designed to present and discuss present-day SEAD capabilities.

For a start point, the committee reviewing SEAD accepted the definition proposed for inclusion in Allied Administrative Publication 6 (AAP-6), The NATO Glossary: *"SEAD is that activity which neutralizes, destroys, or temporarily degrades enemy air defense systems in a specific area by physical attack and/or electronic warfare to enable tactical air operations to be successfully conducted."* For the purpose of this article, "tactical air operations" includes aircraft of both ground and air forces. All too often, the US Army tends to look at SEAD as a mission performed to assist the USAF in attack of enemy targets; however, it should be remembered the Army has more rotary and fixed wing aircraft operating in divisional areas than the USAF. Therefore, if Army aerial maneuver units are to be successful, they too require SEAD or friendly air losses will be unacceptable. When Army SEAD efforts are not sufficient, Air Force tactical air must provide additional or, in some cases, all of the suppression, which is costly since the additional aircraft required result in a loss of firepower for use on primary targets. It becomes apparent then that additional means of suppression must be found to make efficient use of tactical air. Additionally, adopted SEAD measures must be based on all means available, the need for tactical air versus the need for the fires used for suppression, and overall battle conditions. If joint Army-Air Force SEAD (J-SEAD) is used, it must be a planned and coordinated effort by both air and ground forces. Performed correctly, J-SEAD can increase the firepower available for winning battles which will no doubt be mandatory when enemy forces are numerically superior.

The overall objective of any SEAD effort is to permit the effective use of friendly aircraft. This

# Suppression Of Enemy Air Defense



requires a consolidated air-ground effort to locate enemy positions and communication vulnerabilities and to plan and execute SEAD targets. In US military operations, the collective SEAD efforts should represent a merger of all assets, be they indirect fire support, electronic warfare, aerial maneuver, or US Air Force aircraft.

The overall joint force effort for SEAD can be separated into three general zones, each relating to its depth beyond the forward line of own troops (FLOT):

• **Zone I** extends from the FLOT forward to the limit of the division commander's area of influence. In this zone, the main contributor to the overall SEAD effort is usually the US Army whose primary resources are fire support (FS) and electronic warfare (EW). The support provided is for both helicopter and close air support (CAS) aircraft; however, some situations may require that helicopters and/or CAS aircraft provide SEAD fires.

• **Zone II** commences where Zone I ends and extends outward to that distance where ground forces lose their capability to acquire and fire on enemy air defenses. In this area, both Army and Air Force resources are used for SEAD.

• **Zone III** extends the Zone II area to the limit of the Air Force's capabilities. Here, only Air Force SEAD resources can do the job.

This article is concerned with Zone I SEAD operations (division level) to include:

- How our SEAD effort works.
- How SEAD can be made more responsive.
- The SEAD threat.
- SEAD planning.
- Target acquisition.
- Implementation.

## The threat

Since World War II, the range, lethality, and accuracy of air defense weapons has increased dramatically. The antiaircraft weapons of 1945 were guns, some radar controlled, but all were limited in range to about 10 kilometers. In contrast, today an air defense complex of a forward Warsaw Pact division area is made up of gun and missile systems covering as much as 40 kilometers of the battlefield forward and behind the forward edge of the battle (FEBA) (an increase of 36 times as much volume of controlled airspace). Moreover, these mobile weapons are capable of moving with maneuver units and providing a continuous air defense umbrella.

Warsaw Pact ground forces will protect their forward elements with an effective, organized air defense umbrella with

the purpose of severely limiting or negating the usefulness of US close air support and attack helicopters. Both the Warsaw Pact and US adhere to the following air defense principles:

• **Mass**—A high number of air defense weapons are massed around a critical target so that maximum firepower can be brought to bear on a single attacking target.

• **Mix**—A complementary family of weapons are employed so that limitations of one system are offset by the capabilities of another.

• **Mobility**—Most antiaircraft systems from machinegun to missile are built on mobile platforms to provide continuous support to the tank and motorized rifle regiments.

• **Integration**—The employment of air defense weapons is included in the scheme of maneuver.

Warsaw Pact AD systems are generally divided into two separate types: SHORAD and HIMAD. The SHORAD (short range air defense) system consists of weapons with a slant range of seven kilometers and are primarily found at division level and below. The HIMAD (high/medium altitude defense) system, which has a slant range of approximately 40 kilometers, consists of assets belonging to division level and above.

Since our current cannon artillery generally cannot affect enemy air defense beyond Zone I, this discussion will center on the threat presented by the motorized rifle division in terms of SHORADs and HIMADs.

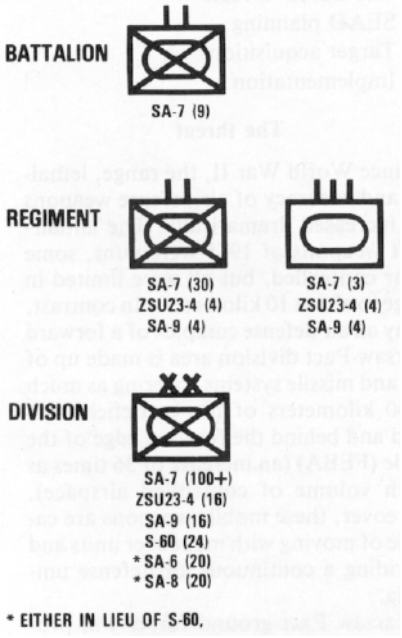



**Figure 1. Warsaw Pact motorized rifle division air defense assets.**

**Figure 2. SA-7 GRAIL (surface-to-air missile).**

**Motorized rifle division**

The motorized rifle division is the most versatile and numerous divisional size organization found within the Warsaw Pact. Air defense assets are organized as indicated in figure 1, with specific weapons systems described in figures 2 through 7.

The primary divisional air defense weapon systems include but are not limited to:

• **SA-7 GRAIL** (figure 2)—a low altitude surface-to-air (SAM), shoulder-fired, heat-seeking missile effective out to a range of 3.5 kilometers. It has a maximum altitude of 10,000 feet. There are 4 or 5 missiles per motorized rifle company. They may be consolidated within an air defense security platoon at company level or they may be issued on the basis of one per motorized rifle platoon. Built into the BMP armored personnel carrier are carrying racks for two SA-7 GRAIL missiles. Comparable systems include Redeye (US), Stinger (US), Blowpipe (UK), and RBS 70 (Sweden).

• **ZSU-23-4** (figure 3)—a tracked selfpropelled, automatic antiaircraft (AAA) weapon which replaces the ZSU-57-2 in some motorized rifle and tank regiments (secondary mission, engagement of ground-type targets). Comparable systems include Vulcan air defense system (US), AMX30 30-mm twin-gun AA system (FR), Gepard 35-mm (GE), and Falcon SP 30-mm AA system (UK).

**Recognition features**

1. Modified PT-76 tank chassis carrying a large lightly armored turret.
2. In addition to four (quad) machineguns, the turret mounts a large dish-shaped radar that, in the travel position, can be dropped behind the turret.
3. Six road wheels support a dead track.

**Characteristics**

1. Quad 23-mm guns.
2. Rate of fire: 4×1,000 rounds per minute.
3. Slant range: 3,000 meters.
4. Fire control: radar/optical.
5. Crew: 4.
6. Can fire on the move.

**Figure 3. ZSU-23-4 (quad 23-mm self-propelled automatic antiaircraft gun).**

• **SA-9 GASKIN** (figure 4)—a surface-to-air missile which is transported on a modified BRDM-2 amphibious armored vehicle which is 18 feet long and carries a probable crew of four. The SA-9 slant range is approximately seven kilometers. The missile has an infrared seeker, a high explosive (HE) warhead, and probably is powered by a solid propellant. Four missile canisters each with one missile are normally carried on the launcher turret. The SA-9 GASKIN can be utilized in conjunction with the ZSU-23-4. Estimated time for emplacement prior to firing is one minute. Comparable systems include Chapparral (US) and Javelot (FR).

**Figure 4. SA-9 GASKIN (surface-to-air missile).**

**Figure 5. S-60 (57-mm automatic antiaircraft gun).**

• **S-60** (figure 5)—a 57-mm gun which can be used against armored vehicles as well as low flying aircraft. It has a maximum horizontal range of 12,000 meters and a tactical AA range of 6,000 meters with off-carriage fire control. It has a cyclic rate of fire of 105 to 120 rounds per minute. A twin version is mounted on the ZSU-57-2. The S-60 is a standard AA weapon in some divisional antiaircraft artillery regiments. Estimated time for emplacement prior to firing is one to three minutes. Comparable systems include the 40-mm Breda/Bofors (Italy), M54 57-mm AA gun (Sweden), and 40-mm light AA gun (UK).

• **SA-6 GAINFUL** (figure 6)—a low-altitude, surface-to-air guided missile with a ceiling of 66,000 feet and a range of about 37 kilometers. The missile is deployed as part of a battery containing one STRAIGHT FLUSH fire control radar vehicle, one loader vehicle, and three launcher vehicles. Like all the vehicles in the battery, the launcher vehicles are tracked, but use components of the ZSU-23-4 chassis. It can be traversed 360 degrees, and estimated time for emplacement prior to firing is 15 to 30 minutes. Comparable systems include Hawk (US) and Rotale (FR).

**Figure 6. SA-6 GAINFUL (surface-to-air missile).**

• **SA-8 GECKO** (figure 7)—a SHORAD air defense missile which operates by command guidance and is effective at altitudes of about 150 to 20,000 feet. It is fully self-contained with acquisition, tracking, and two missile guidance radars mounted on a six-wheeled, amphibious vehicle which is approximately 29½ feet long. Four missiles, each about 10 feet long, are carried in an integrated mount. The system contains an electro-optical tracker, probably television. With a slant range of approximately 10 to 15 kilometers, the highly mobile SA-8 can provide close air defense support to armored and mechanized forces. Estimated time for emplacement prior to firing is three to five minutes. Comparable systems include Rapier (UK) and Roland (NATO).

These weapons systems are mutually supporting and give excellent coverage of the battlefield as shown in figure 8.

Air defenses are established to provide both area and point protection for troops and objectives. Area coverage is provided by surface-to-air missile systems, and point protection is provided by divisional and regimental light air defense weapons.

SAM units normally move as a battery and may be integrated into a march column or moved along separate routes to insure adequate coverage of the column. Short-range SAMs are also integrated by individual piece into march columns to insure adequate, continuous air defense protection. These weapons can fire on the move if the column is attacked and, during long halts, are usually dispersed slightly to provide 360-degree protection and still be able to move rapidly back into the march column.

Air defense units will be employed by battery in direct support of engaged maneuver elements, support activities, and other critical rear area assets. Regimental AD weapons SA-7, ZSU 23-4, and SA-9 are also employed as individual weapons and are cross-attached to operate together in support of engaged rifle and tank battalions. These systems receive missions from the battery commander in addition to monitoring the air warning net. They will be deployed well forward (figure 9) and their primary targets will be close support aircraft and attack helicopters.

All aircraft flying below 350 feet and not using the terrain flying technique (TFT) are subject to acquisition and engagement at ranges up to five kilometers from the enemy air defense location. Those flying above 350 feet encounter a sharply increased air defense threat.

**Figure 7. SA-8 GECKO (surface-to-air missile).**

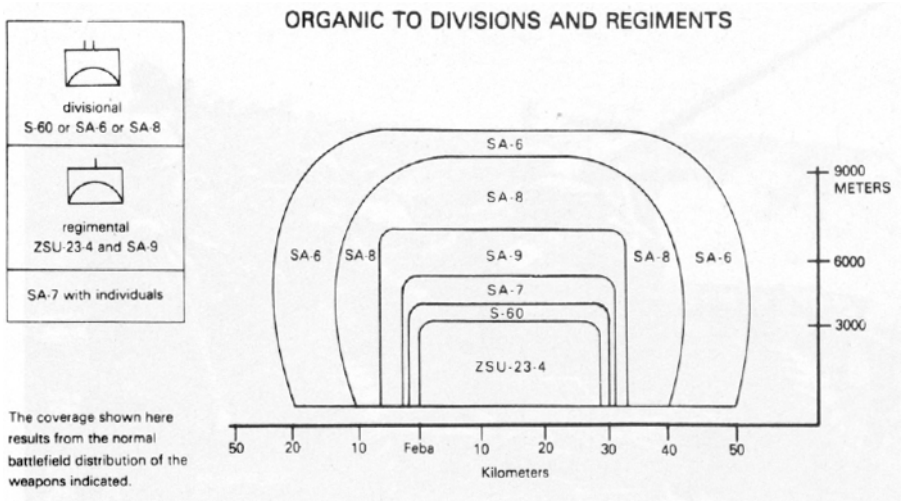



**Figure 8. Threat battlefield coverage.**

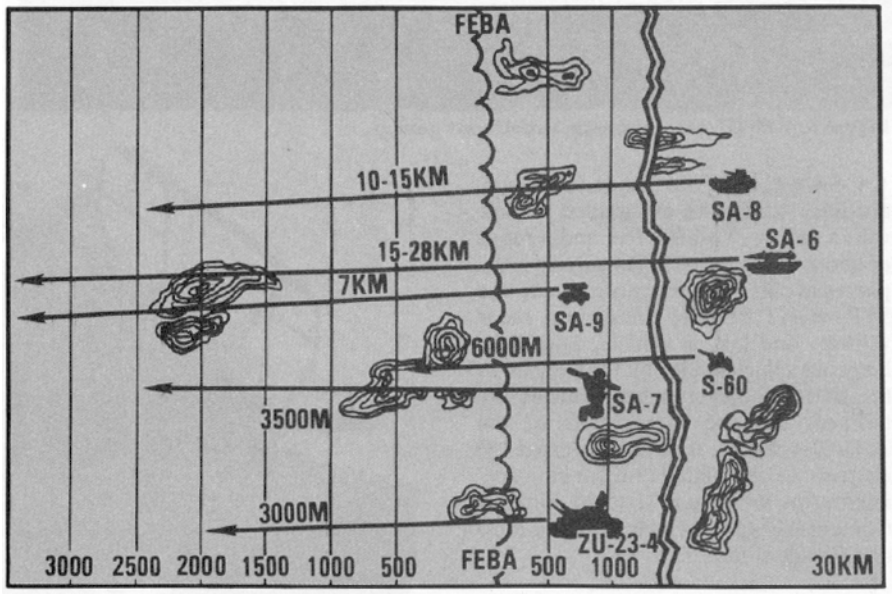



**Figure 9. Missile and antiaircraft systems deployed in forward area.**

Warsaw Pact forces have tried to offset or reduce our air combat effectiveness through use of extensive, effective, and sophisticated mobile air defense systems (figure 10).

| Weapon | Type | Units | Weapon launchers |
|---|---|---|---|
| SA-7 | SAM | N/A | 100 (+) |
| ZSU 23-4 | AAA | 4 Platoons | 16 |
| SA-9 | SAM | 4 Platoons | 16 |
| S-60 | AAA | 4 Btrys | 24 |
| *SA-6 | SAM | 5 Btrys | 20 |
| *SA-8 | SAM | 5 Btrys | 20 |

*In lieu of S-60.

**Figure 10. Warsaw Pact division air defense systems.**

Also impressive are the variety and numbers of air defense weapons accompanying a typical Warsaw Pact army of four or five divisions (figure 11).

| Weapon | Type | Units | Weapon launchers |
|---|---|---|---|
| ZSU-23-4 | AAA | 32 Btrys | 128 |
| S-60 | AAA | 23 Btrys | 138 |
| SA-6 | SAM | 5 Btrys | 15 |
| SA-9 | SAM | 32 Btrys | 128 |
| *SA-4 | SAM | 9 Btrys | 27 |
| *SA-2 | SAM | 3 Btrys | 18 |

*Indicates army level or higher.

**Figure 11. Warsaw Pact army air defense systems.**

In addition to these weapon systems, the following aspects of Soviet air defense demand equal attention.

• **Command, control, and communications** are usually decentralized and tied to high and very high frequency communications. Disruption of communications (particularly the division target identification and warning net) will degrade air defense systems, thereby limiting effective coverage and reducing early warning.

• **Long range and early warning radar** is employed to supplement radars of individual air defense units. These radars are sophisticated, effective, and reliable and are integrated throughout the force. Early warning of any inbound aircraft detected by these radars is disseminated by radio to all units.

• **Electronic countermeasure (ECM) and electronic counter-countermeasure (ECCM) units** play an important role in the air defense posture by degrading enemy communications. Radio-electronic combat has a high priority in Soviet tactical doctrine, and the sophisticated and effective equipment they possess is considered a weapon system.

• **Ammunition resupply** presents additional problems to Warsaw Pact forces since only one to six reloads are maintained on site for most systems. For example, the ZSU-23-4 has a very high rate of fire and may have to be reloaded in the forward battle area. Support facilities for these systems must also be mobile and able to function under constantly changing conditions.

Even though the air defense threat is solid, it does have some vulnerabilities (figure 12) which can be attacked and exploited.

| Weapon system | Vulnerabilities |
|---|---|
| SA-8, SA-6, SA-9, ZSU-23-4 | Thin armor plating |
| S-60, SA-7 | Exposed personnel |
| SA-6, SA-8, S-60, SA-9 | Exposed radar/radio antenna |
| SA-6, SA-8, ZSU-23-4 | Radar can be jammed |
| SA-6, SA-8, SA-9, S-60 | Exposed ammunition/missile |
| S-60, SA-7 | Fixed/open site required for firing |
| SA-7, SA-9 | Reduced visibility inhibits identification and tracking |
| S-60, SA-9, SA-8 | Wheeled vehicle |
| SA-6 | Single radar unit/control unit |

**Figure 12. Warsaw Pact weapon system vulnerabilities.**

## SEAD planning

Planning for SEAD operations must take into account the limits and availability of fire support assets based on priorities established by the force commander—priorities established to insure complete integration of fire and maneuver. The division G3 is responsible for integrating fire and maneuver and will further refine the commander's guidance and priorities with specific limitations, available assets, and objectives for the subordinate combat/combat support and combat service support units of the division. Representing the fire support agencies, the fire support coordinator will act as the G3's executive agent for SEAD, to include the acquisition, processing, and attack of all targets. During the planning cycle, the fire support coordinator must address all requirements, particularly since SEAD is not an exclusive function nor capability of any single agency, but is an element of the battlefield that must be integrated with the commander's scheme of maneuver. Because of the multiplicity of offensive systems (mortar, field artillery, close air support, attack helicopter, electronic warfare, etc.) available to attack SEAD targets, the burden of the SEAD effort will fall on the fire support coordinator at each level.

The general location of enemy assets, based on templating of enemy units, describes the battlefield for SEAD planners. Thus, the division fire support element (FSE) can begin to visualize certain specific systems within the enemy air defense array and orient efforts on refining locations of these selected systems for targeting purposes.

SEAD targets will be classified as *immediate* or *planned:*

• *Immediate* targets are targets of opportunity; targets that by their nature (i.e., relative mobility—ZSU 23-4 and SA-9) must be attacked when acquired to insure effective engagement.

• *Planned* targets may be further divided into those requiring hasty or deliberate planning. *Hasty* planning is normally developed in response to local employment of assets, when time is limited, and makes use of targeting data currently on hand. *Deliberate* planning is accomplished over a longer period of time to achieve specific objectives and involves evaluation of existing targeting data and tasking of intelligence sources to develop specific targets in defined geographical areas.

The maneuver battalion will normally be most concerned with the engagement of *immediate* targets located by their ground observers, while the brigade (with access to more sophisticated acquisition assets) will participate in *hasty* SEAD planning to support air operations in the brigade area, as well as engaging *immediate* targets. The division, with the associated acquisition systems reporting at that level, is the first echelon that can reasonably be expected to become involved in the *deliberate* planning process—seeking out and locating specific targets and then attacking them at the most opportune moment.

Certain common fire planning techniques are used in SEAD operations. For example, targeting information is recorded initially on the *target list worksheet* and subsequently disseminated on the formal *target list.* Additionally,

targets of an extraordinary nature will receive expedited handling at all levels, just as is done currently with other critical targets. As an added requirement, a SEAD *overlay* must be maintained in the targeting element of div arty tactical operations center (TOC) and the FSE since it is needed to preclude confusion resulting from adding SEAD targets to the already existing target overlay. Use of the *counterfire reference grid* should be expanded to include SEAD planning and used in much the same manner as it is to support counterfire operations. Finally, those targets selected for a deliberate SEAD program will be listed on a *scheduling worksheet* in both the FSE and div arty TOC and will become the fire support planner's tool for organizing targets into specific time/event schedules to be implemented at the direction of the commander. (As mentioned earlier, the FSE's participation has become a necessity due to the multiplicity of offensive systems.) Several SEAD programs should be developed for the division area, using a standard method such as the phonetic alphabet to identify each program; for example, SEAD Program Alfa, SEAD Program Bravo, etc. In addition to the integrated use of all fire support agencies, the use of electronic warfare capabilities must be considered to include scheduling the participation of jammers on the scheduling worksheet. The FSE requires *authority* to direct jammer operations during periods of active SEAD operations. Currently, the authority to employ jammers rests with the commander and, in most cases, is delegated to his G3. In addition to this decision channel, a direct coordination line from FSE to the actual asset appears necessary to insure timely EW support in SEAD operations. (This channel will be discussed further in the implementation portion of this article.)

Attack of SEAD targets is limited by availability of acquisition systems and *competing demands* for our fire support means. In SEAD operations, the attack of targets by fire or EW must be considered as equivalent when planning. The ADA array, presented by Warsaw Pact forces, can be broken down into two elements:

• First, there is the *point defense system*, built around the SA-7, crew-served weapons, and small arms fire. While this extensive system is difficult to acquire and attack as separate targets, suppression of this part of the ADA array will be achieved as a bonus effect from our normal close supporting fires.

• The second part of the Warsaw Pact ADA array is an *integrated divisional area defense system* made up of complementary weapons tied together by a command and control system. Attack of this command and control system promises the most immediate and greatest return on investment. Here, destruction of several air search radars will deny the enemy an overall picture of the airspace they are trying to defend and reduce the sophisticated weapons sytems role to engaging targets of opportunity.

The next state of a deliberate SEAD plan might well be the systematic destruction of a specific weapons system, thus creating a hole in the enemy air defense umbrella which can be exploited by our air assets. The decision to plan targets, or to attack them as acquired, will be based in large part on the relative mobility of the target and the overall efficiency of our acquisition effort. If our acquisition systems can locate, classify, and promulgate targets in a timely manner, effective planning will result.

The attack of the enemy ADA array will require complete participation of all fire support agencies, to include offensive use of our EW capability. When these assets are insufficient or already committed, the use of attack helicopters and close air support may be appropriate and therefore directed by the division commander to attack SEAD targets.

### Target acquisition

The sophisticated air defense threat presents a highly mobile, point target array with a variety of signatures and vulnerabilities. SEAD targets are also among the most elusive targets on the battlefield and require exploitation of all intelligence and target acquisition means to locate them. All combat intelligence sources can be considered target acquisition resources, and all elements of an organization can serve as potential sources of required information.

Intelligence sources capable of detecting an enemy air defense system will be employed throughout the division sector. These sources will be responsive to both corps and division intelligence collection centers as appropriate. Since the divisions will be carrying the bulk of the battle, we will concentrate on that level in reference to target acquisition.

Although none of the intelligence/target acquisition systems within the division TOE were expressly designed to locate air defense system components (i.e., weapons, radars, communication links, and control centers) the following assets are available to the division commander:

- Air/ground observers.
- Combat electronic warfare intelligence battalion.
- Sound and flash bases.
- Weapons locating radars.
- Fire support personnel.

There are numerous air/ground observers within the division which are not specifically a part of the fire support system. The army's heavy divisions are authorized approximately 180 aircraft, a large majority of which belong to aerial maneuver units and are flown by personnel with a vested interest in SEAD operations. Additionally, any individual with line-of-sight across the FLOT is a potential target acquisition source for SEAD targets.

Targets acquired by personnel can be considered as either active or passive; i.e., the target was acquired because it was actively functioning and thus should be considered as a target of opportunity, or it was acquired while in a passive state and could possibly be planned for later servicing. Naturally, target location error will depend greatly on the battlefield situation and the experience/training of individuals.

Another, and probably more accurate, targeting resource available to the commander is the divisional combat electronic warfare intelligence (CEWI) battalion (figure 13).

The headquarters, headquarters and operations company provides administrative and operational command and

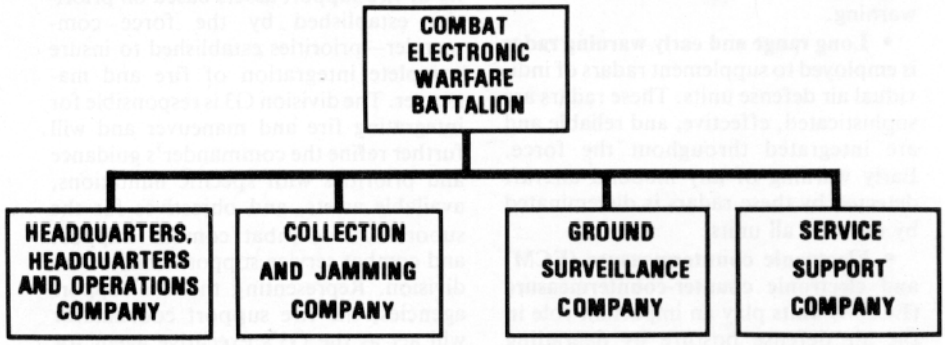



**Figure 13. Divisional combat electronic warfare battalion.**

| Electronic attack options (communications systems) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Targets** | **First echelon** | | | | | | **Second echelon** | | **Front** |
| Distance from FEBA (kilometers) | 0-3 | 3-6 | 6-9 | 9-15 | 15-20 | 20-30 | 30-50 | 50-100 | 100-up |
| Air defense | Locate | Locate | Locate | Locate | Locate | Locate | Locate | Locate | Locate |
| | | | | | | | | | |
| **Electronic attack options (noncommunications systems)** | | | | | | | | | |
| Distance from FEBA (kilometers) | 0-3 | 3-6 | 6-9 | 9-15 | 15-20 | 20-30 | 30-50 | 50-up | |
| Air defense | Locate | Locate | Locate | Locate | Locate | Locate | Primary AF responsibility | | |

**Figure 14. Collection and jamming company electronic options.**

control of CEWI battalion assets. It also provides the interface at division level with the G2/G3 by means of the division main tactical operations center support element. The assets of two companies—collection and jamming company and ground surveillance company—*provide EW,* intelligence and early warning support to the division. The service support company provides communications and maintenance support to the battalion.

Intelligence units are excellent targeting sources, but collection, comparison, and analysis of intelligence information are so time-consuming that their services are limited on the highly fluid battlefield.

The general capabilities of the collection and jamming company are shown in figure 14. Through the use of radio and radar direction finding (DF) and associated intelligence gained through intercept, SEAD targets can be produced in a timely fashion.

Other SEAD target acquisition assets to be considered are those peculiar to the division level fire support system and, in particular, the field artillery system. Initially, an acquisition means for passive SEAD targets will be the field artillery air observer (FAAO) who is a trained artilleryman. Since the FAAO observes from an aerial platform, both location and description errors of the target will be minimal; however, at the same time, these targets could immediately become active and destroy our observation capability. This loss will be minimized with the fielding of the remotely piloted vehicle (RPV), giving us a new observation capability.

Within division artillery, SEAD target acquisition assets are available in the target acquisition battery, even though they were not designed for this purpose. For example, the *sound base* of the sound and flash platoon has the capability to distinguish various gun/rocket/missile systems based on their sound signatures. This system's capabilities are degraded, however, by excessive battlefield noise, caliber of weapons, and the distance between the sound base and weapon position. Under near ideal conditions, targets can be developed out to 10,000 meters with an accuracy of up to 150 meters. The *flash base* can also distinguish SEAD targets out to the same range with greater accuracy; however, the reliability of the flash base will depend to a large extent on the enemy's use of tracer ammunition as well as missile trails generated by other systems.

Although designed to locate the firing point of fixed trajectory projectiles, the AN/MPQ-4 *weapons locating radar* can intercept the initial flight phase of missiles before they enter their guided trajectory, thus giving us a fairly accurate target location out to 10,000 meters. The use and accuracy of this system to locate SEAD targets will, however, depend to a great degree on operator training.

With the advent of *Firefinder* (AN/MPQ-36 and AN/MPQ-37 radars), our target acquisition accuracy and range capabilities will increase because of the computerized technology. Although operator training is still an important factor, it will not be as significant with automatic tracking and computerized processing. A TACFIRE link is also involved.

Last, let us not forget the field artillery *fire support personnel* provided to the maneuver forces who can assist in the SEAD target production effort. In addition to the field artillery observers at platoon through brigade level, FSOs at battalion through division will act as the focal point in acquisition, processing, and attack of SEAD targets. Other fire support agencies such as close air support and naval gunfire, when available, can lend trained personnel to the effort. Also intelligence and targeting information from corps assets are much more numerous and, in some cases, more sophisticated. Examples of such systems are Side Looking Airborne Radar (SLAR), infrared radar (IR), and photographic reconnaissance. The Stand-Off Target Acquisition System (SOTAS) and the Joint Service and National Intelligence Interface will add to the acquisition effort at corps level. The commander must actively solicit SEAD targeting information from these agencies.

Equally important to the SEAD effort are the channels used and the personnel involved in passing and processing SEAD targeting information. Since the field artillery and other fire support agencies (e.g., naval gunfire) have a well understood fire planning channel, we will concentrate on those assets available which are outside the fire support systems; specifically, those assets which come under the divisional CEWI battalion.

Figure 15 represents those channels used by divisional air/ground observers and the EW assets either in direct support of a brigade or in general support of the division.

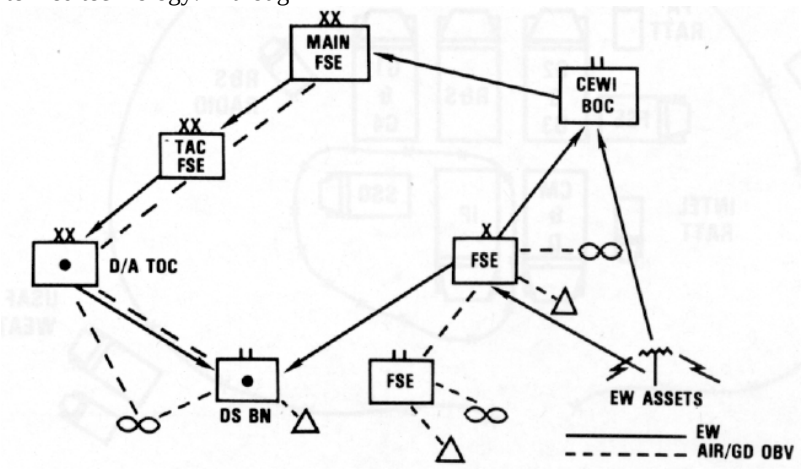



**Figure 15. Reporting channels used by air/ground observers.**

As you can see, targets developed by air/ground observers can enter the system at any level from company through division. Targets may also be entered through the FA system, as depicted, or through any of the fire support agencies. EW assets have their own specific channels for reporting and, if placed in general support of the division, will report to the CEWI battalion operations center (BOC) where information will be analyzed and provided *through the division TOC support element to the division G2/G3*. If placed in direct support of a brigade, EW assets are provided for field analysis in the collection and jamming company, and acquired information is provided to the brigade through the brigade intelligence support officer (BISO) who is furnished by the CEWI battalion to act as a coordinator of intelligence activities much the same as the FSO does for fire support.

Since our prime concern is division level SEAD assets and target processing, our discussion will focus on the division main command post (figure 16) where the planning for future operations takes place. Since the attack of SEAD targets will be a function of the FSCOORD, the interrelationships between the G2/G3, main FSE, and the CEWI BOC should be covered.

The number of vans and designation of elements will change from division to division based on the commander's desires. Not all are included in figure 16 since our concentration here is on the interface among only those depicted. The CEWI BOC which is located three to five kilometers from the main CP will provide a division TOC support element as previously mentioned. This element assists the G2/G3 in manning and managing the analytic, EW, and operations security (OPSEC) efforts in the TOC on a 24-hour-a-day basis. The division TOC support element is made up of the following elements and functional areas:

| Electronic attack options (communications systems) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Targets** | **First echelon** | | | | | | **Second echelon** | | **Front** |
| Distance from FLOT (kilometers) | 0-3 | 3-6 | 6-9 | 9-15 | 15-20 | 20-30 | 30-50 | 50-100 | 100-up |
| Air defense | Jam | Jam | Jam | Jam | | | | | |
| | | | | | | | | | |
| **Electronic attack options (noncommunications systems)** | | | | | | | | | |
| Distance from FLOT (kilometers) | 0-3 | 3-6 | 6-9 | 9-15 | 15-20 | 20-30 | 30-50 | 50-up | |
| Air defense | Jam | Jam | Jam | Jam | Jam | Jam | Primary AF responsibility | | |

**Figure 17. Electronic warfare offensive attack options.**

- **Collection, management, and dissemination (CM&D) section**—responsible for the development/implementation of the intelligence collection plan.
- **Intelligence production (IP) section**—represents division's intelligence analysis capability and provides links to corps and higher levels.
- **Electronic warfare (EW) section**—assists the G2/G3 in planning/executing EW missions.
- **OPSEC management and analysis (M&A) section**—supports the division's OPSEC program.
- **USAF weather section**—self-explanatory.

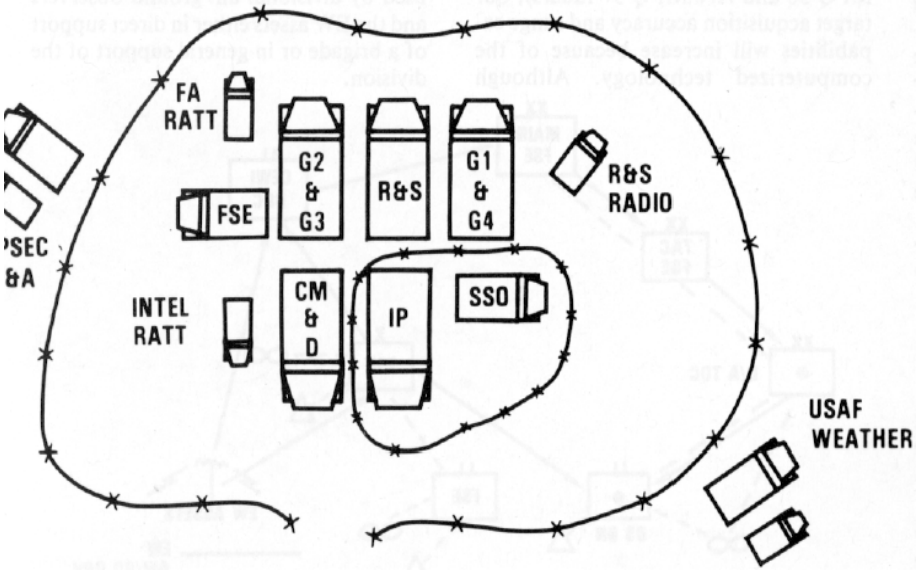



**Figure 16. Type division main command post.**

The element of greatest interest in the area of target acquisition is the intelligence production section where information from all sources—organic and external—comes together to be analyzed, processed, correlated, and integrated into intelligence products. Doctrinally, the IP section works under the supervision of the G2, but an interface with the FSE is needed.

Many people are familiar with the term "Field Artillery intelligence officer" (FAIO) (MOS 13E35-ASI 5M); yet, only a few are knowledgeable of his duties or location. In the type CP depicted (figure 17) we would expect to find the FAIO in the IP section acting as the fire support element's intelligence representative. Here all intelligence of targeting value is provided to the FAIO for action. Additionally, the FAIO is the interface between the FSCOORD and the G2/G3 for targeting priorities and information needed by the FSE. Although not specifically trained in any one functional area, this officer's knowledge and location can become the crux of the problem as it relates to the SEAD targeting effort utilizing non-fire support system assets. First, the FAIO is not located in the main FSE. Secondly, he is not an electronic warfare expert (an EW staff officer—yes; but an expert—no).

Thus, who is available to assist the fire support coordinators with EEI priorities in relation to our EW system? It is agreed that personnel from this field are available in the main CP, but not on a continual basis to the FSE alone. The fire support system has provided a full-time representative to the intelligence center. What is now needed is a full-time representative from the intelligence "side of the house" (CEWI battalion) in the FSE—a person who is trained in the capabilities and use of the various intelligence acquisition assets. Additionally, the FSCOORD requires a representative

who can assist him in determining the intelligence collection/targeting requirements based on the systems available. Just as the div arty TOC has a counterfire officer to manage the artillery's target acquisition assets, the FSE needs an intelligence officer to assist in handling the other acquisition assets available to the command.

The SEAD program will be a continuous effort and will depend to a major extent on the reliability of its target acquisition means. Once an initial plan is prepared and targets are acquired, the next step involves implementation of the program.

### SEAD implementation

When implementing SEAD operations, the fire support coordinator must consider the competing demands for fire support, available assets, and priorities established by the commander. Here, it must be clearly understood that SEAD represents but one of the roles of fire support as defined in FM 100-5 (i.e., close support, counterfire, interdiction, and SEAD), that fire support assets are limited, and that SEAD support is only one of many operations competing for these assets. We must acquire and engage real targets/target indicators, not phantoms. A "shotgun" approach to air defense suppression is not only ineffective but also unaffordable.

Assets that should be made available for SEAD operations are field artillery, mortars, naval gunfire, close air support, offensive EW, and attack helicopters. (The last two are normally controlled by the maneuver operations officer but, when used to support SEAD operations, should be made responsive to the fire support coordinator and be represented in the FSE.)

SEAD operations are considered whenever air assets are employed; the extent and priority will vary with the tactical situation. The commander's plan for SEAD operations will be contained in his operations order and will serve as the basis for attack guidance and target selection standards. For the field artillery, SEAD guidance will be amplified in the field artillery support plan and disseminated to all artillery assets supporting that particular formation.

Active electronic warfare is a most effective suppressor of sophisticated air defense systems and, as such, for management purposes, must be considered as another fire support means and should be employed by the fire support coordinator. When offensive EW is used as a fire support means, authority must be granted for the FSE to plan EW employment, influence positioning of the various elements, and retain a priority on the use of both information gathering elements of the EW system and those which will attack the enemy's air defense system.

### Counter air defense programs

Several plans must be developed and, beginning with the division, there must be a comprehensive and systematic program to degrade the enemy air defense capability. One such program would be a division counter air defense program which would be a standard, continuing effort to degrade the opposing air defense capability and would direct its efforts against longer range ADA systems, radars (search, acquisition and fire control), communications, and command and control facilities of the air defense system. Degradation of the enemy air defense capability would allow freedom of movement over friendly territory, thus enhancing both the airborne EW effort and target acquisition. This program would require Army fires, Army and Air Force EW, and Air Force fires.

Divisions will act as implementers of the overall corps/army group SEAD effort as they control the bulk of the attack assets and the corps controls most of the joint acquisition assets.

At division level and higher, there seems to be an acceptance of EW as a positive contributor to the overall SEAD effort. Brigade levels will also employ both fire support and EW at the proper time against the enemy air defense threat. SEAD capabilities would be used to attack known ADA targets, maneuver formations, and firm ADA target indicators within a designated area. The area to be attacked may be determined by a templating method which considers the current threat; terrain; aircraft type, routes, altitude, and speed; and the area of operations.

Often we will have to react to air defense fires immediately and fires (versus EW) are the best means for attack in this situation. Assignment of counterfire reference grids as areas of responsibility for fire support assets of the division (as we currently do for counterfire) would allow rapid response in unplanned situations. Air defense targets would require sub-classification into gun and missile sites to allow for the most responsive fires.

Based on procedures described in TC-17-50-1 (Soldier's Guide to Attack Helicopter Operations), there will be times when attack helicopters and A-10 close support aircraft are employed *jointly* to attack enemy armor formations. While this is a teaming of fire support and maneuver aircraft to accomplish a specific mission, the roles of each (maneuver and fire support) can reverse from one attack to the next; e.g., while one means attacks the enemy formation, the other provides suppressive fires. The brigade commander must utilize his fire support coordinator, as well as the rest of his operations staff, to integrate attack helicopters and CAS into an effective team to provide any additional suppressive fires required. In addition, selected attack helicopter formations can provide SEAD to allow the attack of the enemy by other aircraft.

***Note:*** *After making a study of brigade fire support operations, Close Support Study Group II recommended the establishment of fire support sections for aerial maneuver units, wherein the attack helicopter company commander could utilize his fire support officer plus air observation teams from the division artillery to provide additional timely fire support and to assist in the orchestration of the engagement.*

Even with formal programs and plans to suppress ADA and provisions for near-immediate reaction to unanticipated SEAD requirements, we still are faced with the point target air defense problem, which is best exemplified by the ZSU-23-4 and SA-9. The only effective method to attack these systems is to suppress the unit of which they are a part. Because air defense systems are soft targets, harassing fires on a tank or motorized rifle company may be quite adequate to suppress its air defense capabilities. Although area type fire from field artillery and mortars may not stop the attack, they do allow aerial weapons systems to engage targets without the threat of being killed by enemy air defense systems.

When either *active* or *passive* air defense targets are given a high priority for engagement, all acquisition systems and observers should be utilized. Guidance should insure that high priority targets are attacked as soon as they are acquired.

### Summary

If friendly ground forces are to win and survive against a sophisticated Warsaw Pact force, they must have assistance from both Army and Air Force supporting air elements. For aircraft to contribute to ground successes, hostile air defense weapons and their associated facilities and capabilities (radars, communications, and command and control facilities) must be effectively neutralized

or destroyed. While it is recognized that some aircraft will be lost during most intense combat operations, we must limit these losses to an acceptable level. This will require coordinated and concurrent SEAD by ground and air efforts and may necessitate the temporary diversion of combat power from other missions to support SEAD operations.

The overall SEAD effort is mainly a combination of *fire support* and *electronic warfare* operations blended into a common effort under one manager—the fire support coordinator. The FSCOORD, as the G3's executive agent for SEAD, must have the *authority* to plan and employ all assets as required and, in some cases, may recommend the use of attack helicopter/Air Force aircraft to suppress the enemy where artillery and EW assets are not available.

For this article, the *threat* of concern has been limited to the principal enemy *air defense* capabilities which normally confront a committed ground division, to include both cannon and missile weapons, together with their command, control, and communications facilities. This threat poses a challenge to both our weapon systems and EW capabilities and must be reckoned with if we are to succeed. The challenge extends outward from the FLOT to the maximum effective range of our fire support weapons.

Supported commanders must establish SEAD priorities for the use of *fire support, target acquisition*, and *EW* assets. Planners must know, from the commander, when SEAD support takes precedence over other support actions.

The fire support coordinator interfaces with intelligence and EW agencies for target acquisition, concentrating on *planned* (as opposed to *immediate*) SEAD targets, to insure EW responsiveness. This can be more easily achieved if an EW representative is collocated in the FSE.

For SEAD implementation, *fire support* and *EW* efforts must be shifted to meet changing combat priorities. SEAD support competes with the division's needs for close supporting fires, counter-fires, and interdiction fires and, because fire support assets are limited, supported commanders must use all of their assets commensurate with their current needs. Combat successes will be directly related to the effectiveness of our SEAD operations; therefore, the fire support coordinator must be able to orchestrate and call on all *fire support* and *EW* assets and, in some cases, *attack helicopters* to suppress the enemy's air defenses.

# Mule Artillery An Explosive Experiment

*From the Arizona Miner (Prescott, A.T.) June 15, 1872)*

At a certain Western fort some time ago, a major conceived the idea that artillery might be used effectively in fighting with the Indians by dispensing with gun carriages and fastening the cannon on the backs of mules. So he explained his views to the commandant and it was determined to try the experiment.

A howitzer was selected and strapped upon an ambulance mule with the muzzle pointed toward the tail. When they had secured the gun and loaded it with ball cartridge, they led that calm and steadfast mule out on the bluff, and set up a target in the middle of the river to practice at.

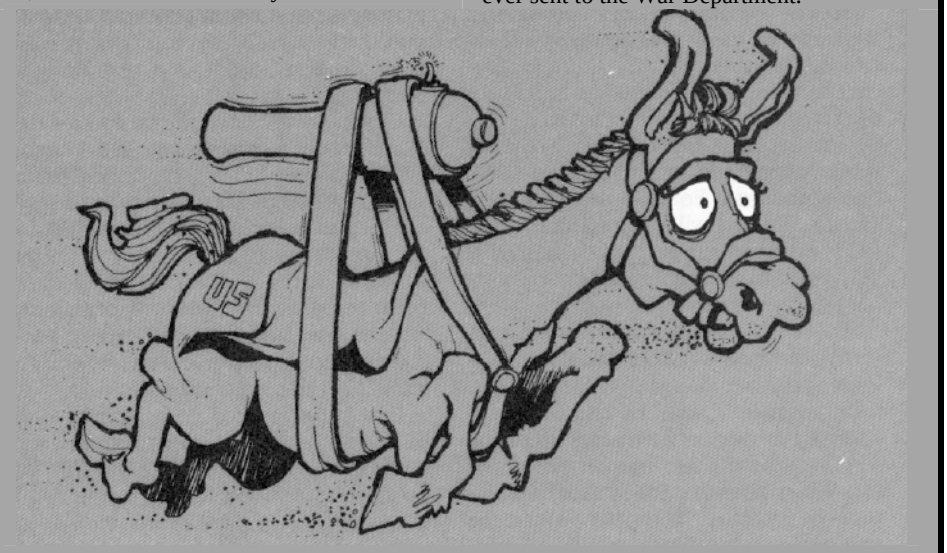
The rear of the mule was turned toward the target, and he was backed gently up to the edge of the bluff. The officers stood around in semicircle, while the major went up and inserted a time fuze in the touch-hole of the howitzer. When the fuze was ready, the major lit it and retired.

In a second or two the hitherto unruffled mule heard the fizzing back there on his back, and it made him uneasy. He reached his head around to ascertain what was going on, and as he did so his body turned and the howitzer began to sweep around the horizon. The mule at last became excited, and curiosity became more intense, and in a second or two he was standing with his four legs in a bunch, making six revolutions a minute, and the howitzer threatening sudden death to every man within half a mile.

The commandant was observed to climb suddenly up a tree—the lieutenants were seen sliding over the bluff into the river, as if they didn't care at all about the high price of uniforms—the adjutant made good time toward the fort—the sergeant began to throw up breastworks with his bayonet, and the major rolled over the ground and groaned.

In two or three minutes, there was a puff of smoke, a dull thud, and the mule—Oh! Where was he? A solitary jackass might have been seen turning successive back somersaults over the bluff, only to rest at anchor, finally, with his howitzer, at the bottom of the river, while the ball went off toward the fort, hit the chimney in the major's quarters, rattled the adobe bricks down into the parlor, and frightened the major's wife into convulsions.

They do not allude to it now, and no report of the results of the experiment was ever sent to the War Department.



# REDLEG NEWSLETTER

## Warrant officers needed

The Army is seeking retired regular and reserve warrant officers for recall to active duty in nine warrant specialities currently experiencing a shortage of qualified personnel.

The specialties are: 100B (Utility/Observation Helicopter Pilot); 100C (Cargo Helicopter Pilot); 100E (Attack Helicopter Pilot); 100Q (Combat Service Support Fixed Wing Pilot); 100R (Combat Surveillance Fixed Wing Pilot); 011A (Military Physician's Assistant); *214E (Pershing System Technician);* 221B (Nike Assembly Technician), and *260A (Nuclear Weapons Technician)*.

Military Personnel Center officials say the *214E*, 211B and *260A* specialties are critically short. Warrant officers in those specialties who return to active duty will be assigned to a long-tour overseas area.

To be eligible for recall, retired warrants must be qualified in one of the above MOSs and must not be over 55 years of age as of the last day of the fiscal year in which the application is submitted.

There is no limitation on the number of years an applicant has previously served on active duty. Warrants will be recalled in their current retirement grade and will be eligible for promotion consideration.

For more information, write MILPERCEN, ATTN: DAPC-OPW-P, 200 Stovall St., Alexandria, VA 22332 or call (202) 325-7833.

## Airborne Volunteers Sought

The 82d Airborne Division, Fort Bragg, NC, is seeking volunteers.

Soldiers assigned to the 82d have the unique mission of "constant readiness" to rapidly meet worldwide crises, and the division needs volunteers to fill personnel shortages in some combat support and combat service support specialties.

Selected CONUS-based volunteers will be assigned to Fort Bragg. En route, however, they will attend the three-week basic airborne training course at Fort Benning, GA, in TDY status. Soldiers serving overseas will be sent TDY to airborne training when they return to the United States. To improve chances for selection, overseas personnel should apply no later than six months before they expect to return from overseas.

## Changes in Enlistment Bonus Program

As of 1 July, this year, individuals enlisting in the Army for certain Field Artillery jobs skills will receive a larger enlistment bonus (EB).

A recent change to the EB program raises the bonus level for "new" soldiers from $2500 to $3000 for MOS 15J (Lance Operations/Fire Direction Specialist). Additionally, the EB award level is raised from $1000 to $1500 for MOS 13E (Cannon Fire Direction Specialist), and from $1500 to $2500 for MOS 15E (Pershing Missile Crewman).

The new EB levels do not apply to soldiers who enlisted in the Army's delayed entry program before 1 July.

In addition to these changes, two field artillery MOSs will be aded to the EB program with an EB award of $1500: MOS 13C (Tactical Fire Operations Specialist) and 13R (Field Artillery Firefinder Radar Operations).

All enlistees must meet the following requirements:

- Must be a high school diploma graduate.
- Must be in mental categories I through III.
- Must enlist for four or more years.

## Full Time Manning Program

By 30 September this year, more than 1,000 active duty (AD) soldiers will be assigned to Reserve Component (RC) units as part of the Army's Full Time Manning (FTM) Program. This action is designed to improve readiness of selected "high priority" National Guard and Reserve organizations.

These individuals will be assigned in areas of personnel management, administration, training, maintenance, and supply. Should the RC units be "called up" for active Federal service, the active duty soldiers will mobilize and deploy with it.

Expected tour length will be two to three years. Active duty soldiers will be rated (EER/OER), regardless of rank, by their RC supervisors and indorsed by an AD officer. Additionally, active FTM soldiers will not be carried in RC slots and, as such, will not affect RC promotions.

A semi-centralized system will continue for AD promotions to grades E5 and E6 while a fully centralized system will be used for E7 through E9.

## Changes in officer training

Department of the Army is changing officer selection procedures for Command and Staff College (CSC) level training. Officer Personnel Management System changes, approved by Army Chief or Staff General E. C. Meyer last April, also set up a new Combined Arms and Services Staff School (CAS3) for training staff officers.

For example, a new year-group selection method will be used to select officers for CSC level training. This new selection process will begin in academic year 1982-83 with officers competing within their own year groups for selection (a two-to-three year transition period is required for implementation of the new selection process).

Captains in a non-promotable status and officers between their 8th and 11th years of commissioned service (YOS) will be eligible for selection to attend CSC when the new system is put into effect. Officers will actually attend CSC during their 9th to 14th YOS.

Each of the four year-groups will be allocated specific spaces for each CSC class: 15 percent to the year groups in the 8th and 9th YOS, and 35 percent each for the 10th and 11th YOS.

While the new CSC selection plan is being phased in, DA will continue using the present 8 to 15 YOS selection system until 1983. Command and Staff College selections between 1982 and 1983 for officers with 12 to 15 YOS will be based on how many of those officers have already attended CSC.

**CAS3**

The mission of the new CAS3 is to provide Active duty and Reserve Component officers training to serve as staff officers with Army field units. The CAS3 will teach officers:

- What staffs do by instructing on common and collective staff procedures and skills.
- What staffs are by defining and tracing the development of staffs and staff rules.
- How staffs operate.

The exact length of the CAS3 resident course is under study by the US Army Training and Doctrine Command (TRADOC). TRADOC is also studying the possibility of holding resident CAS3 courses at other locations.

Graduates of CAS3 may be picked to attend either CSC level training, a senior service college, or both.

Other areas of the officer education system are also being studied. These include expanding officer basic courses and developing military qualification standards. TRADOC is also preparing pre-command courses and specialty courses for officers in place of officer advanced courses.

Officials say student officers will use their skills and knowledge in a variety of simulated staff situations during the two-phase program.

At present, officials plan to include 120 hours of CAS3 resident instruction and a six-hour exam. Officers will then attend the resident CAS3 course TDY in their 7th, 8th, or 9th YOS. All officers must take part in the program, and those officers who complete the nonresident phase will attend the resident CAS3 course. The nonresident course phase will be tested by the first three resident CAS3 classes prior to fielding.

The first CAS3 course is scheduled at Fort Leavenworth, KS, during FY81 for approximately 120 officers. When the resident CAS3 course is fully operational (FY85), about 1,200 officers will receive that training each year.

## Federal Emergency Management Agency

Created by Executive Order in July 1979, the Federal Emergency Management Agency (FEMA) is responsible for coordinating the disaster preparedness activities of a number of federal, state, and local agencies. As part of its ongoing effort to support the FEMA Program, the Department of the Army is assigning approximately 800 Mobilization Designees (non-unit Reserve officers) to serve with state and local Civil Preparedness Officers.

Since participating officers must perform a minimum of 24 inactive duty training (IDT) periods annually (for retirement point credit), it is imperative that they reside within reasonable commuting distance of their duty station. Normally, recruitment for vacant positions is initiated at the local level and requests for-by-name fills are forwarded to the US Army Reserve Components Personnel and Administrative Center for final screening by the Personnel Management Officer (PMO). In addition to 24 IDT periods, participants will also be afforded the opportunity to serve 12 days each year with their agency in an active duty for training (ADT) status. Assignments to Civil Preparedness Offices will normally be for a period of four years.

## "One-stop" records service available

Officers visiting MILPERCEN to review their Official Military Personnel File are now also provided assistance to update their Officer Record Briefs (ORBs). The new service is part of MILPERCEN's effort to provide "one-stop" personnel records service for officers visiting the personnel center in Alexandria, VA.

To insure that ORB information is accurate, officers should communicate first with their local MILPO to update the information and not wait until they visit MILPERCEN. There are some ORB-related actions that can only be initiated by local MILPOs.

## Branch Immaterial Officer Candidate Course

If you are an eligible warrant officer or enlisted member on active duty and your goal is to become an Army officer, consider the Army Branch Immaterial Officer Candidate Course (BIOCC). Those interested must be at least 19½ years of age but not over 29 on the date of enrollment and must have—

- Completed, or be credited with, at least two years of a four-year college degree program.
- Achieved an aptitude area GT score of 110 or higher.
- Attained a score of 115 or higher on the Officer Candidate Test (OCT).
- Achieved a minimum composite score of 200 on the OCT and Officer Qualification Inventory (OQI).

*Note:* Female applicants must achieve an aptitude area GT score of 115 or higher on the Army Classification Battery (ACB).

Physically, an officer candidate must be able to perform all duties expected and required of an officer and leader and must meet certain visual and weight standards.

Officer candidates receive, as a minimum, the pay of a sergeant, E5; however, selectees in higher grades will continue to receive the pay of that grade. Upon commissioning, the candidate will incur a three-year service obligation.

If you are enlisted, you may apply for BIOCC any time after completing advanced individual training. Eligible warrant officers with less than 10 years of service by date of commissioning may apply at any time.

Should you meet the criteria for BIOCC, talk to your unit or battery commander since he is the first person in the chain of command who will be involved in the selection process. Your commander will evaluate your leadership potential as well as your sincere interest in becoming an officer.

After your application has been processed, you will be informed by a written notice to appear before a board of officers for an interview. During the interview, current events and topics of general public interest will be discussed, and you will be observed on your reactions, behavior, and logic of answers given. Shortly after the interview you will be notified whether or not you have been accepted.

Further detailed information on the BIOCC program can be found in AR 351-5.

## The ORB

Annually all commissioned and warrant officers in the Army are asked to visit their local Military Personnel Office (MILPO) to audit individual Officer Record Briefs (ORBs). In the process, officers experience everything from mild inconvenience to utter frustration.

To make sure an officer's records are as complete and up-to-date as possible, MILPERCEN places heavy emphasis on ORB accuracy and warns of possible consequences if an officer fails to conduct the annual audit when notified to do so. These consequences may include missing a key assignment, failing to be selected for promotion or schooling, or missing the opportunity for some special program.

Although the system is working, recent feedback from the field indicates that there is still some misunderstanding about the ORB.

The ORB is a printout of key data from a much more extensive automated personnel information file called the Officer Master File (OMF)—for active duty officers—maintained at MILPERCEN. In this, two important points should be remembered:

- First, the ORB is only a reflection of information on the OMF, which is taken from a variety of sources. When there is an error or omission, it is not the ORB that needs correction, but the OMF.
- Second, the ORB is only a snapshot at a given time of a single record on a constantly changing OMF.

The OMF and ORB originate when an officer enters active duty. Basic information is usually provided by the agency through which he or she enters the Army—USMA, an ROTC Region, or BIOCC—and is reported to DA through an automated officer accession suspense system. As an officer progresses through a career, certain changes are recorded on his OMF. For example, when an individual is promoted or a change occurs in marital status, number of dependents, or unit of assignment, the MILPO submits a SIDPERS change transaction to update the appropriate sections of the OMF.

Some information, though, that is maintained on the OMF is controlled solely at Department of the Army. For example, only career managers are authorized to change specialty data, to add certain aviation data, and to record the completion of some military schools. Changes to verified active Federal service and active Federal commissioned service and Regular Army basic dates must be made by other officers within MILPERCEN. These examples highlight two points:

- The system is designed to capture information as the event occurs, which accounts for the constant change in data on the OMF and subsequently on the ORB.
- The system's success depends on having its many parts function correctly. There is no stovepipe system, one end of which is a sole source of input and the other end an ORB.

If an officer thinks that certain information on the ORB is incorrect or that some information is missing, the best source of assistance is his or her local MILPO. The officer should point out the error and be prepared to

document the correction. Once a correction has been documented, it is the MILPO's responsibility to make sure the change is properly processed. The desired result, of course, is for the correct information to be forwarded to MILPERCEN through SIDPERS and then posted to the OMF and reflected on the next ORB. Making all that happen is far more complex than it sounds. There are three categories of data elements to be handled:

- Those that can be changed through SIDPERS.
- Those that were designed to be changed through SIDPERS but aren't because of delays in systems adjustments.
- Those that can be changed only by the information manager at DA.

The first category is handled fairly simply—the appropriate SIDPERS transaction is submitted and processed through SIDPERS, where it generates a transaction for MILPERCEN and gives the MILPO clerk a record copy.

The second category is more complicated. Until certain procedural changes can be made to SIDPERS, letters from the MILPOs are sent to MILPERCEN requesting updates to the OMF. These changes will reduce processing time and also increase the efficiency of the changes processed by MILPERCEN. System adjustments will be implemented through changes to Procedure 5-1, DA Pamphlet 600-8.

The last category—changes that can be made only by the information manager at DA—will continue to be reported by letter from the MILPO.

When a transaction from the field to MILPERCEN fails to process, an error notice is returned. This allows the originator to correct the error and resubmit the transaction. This feedback system is not without problems; some transactions from SIDPERS to MILPERCEN neither update the OMF nor generate an error notice. MILPERCEN is working to close this loop so that every erroneous SIDPERS transaction gives the submitting MILPO an error notice.

An ORB is automatically furnished to the servicing MILPO for personal audit by the individual officer during his birthday month. In addition, a current ORB is furnished for review whenever an officer visits MILPERCEN to review the Official Military Personnel File (OMPF). During the review, a records specialist helps the officer check the ORB for completeness and accuracy. Changes that can be documented will be made at MILPERCEN and an updated ORB will be furnished to the officer after the changes have been processed. Requests for changes that cannot be documented must be submitted through the normal MILPO channels.

As of April 1980, DA Forms 2 and 2-1 were being phased out for officers only. The ORB will be used as the personnel qualification records both in the field and at DA. The transition should be complete by the end of October 1980. ORBs will then be furnished to the MILPO every six months, but the officer will still be required to conduct an audit once each year.

If an officer's file (ORB and Performance Microfiche) is to be reviewed within 45 days by a selection board and all attempts have failed to have the ORB corrected, as a last resort the individual should forward all corrections to the appropriate career manager. Supporting documentation, if required, must accompany the changes. The career manager then can make pen and ink corrections on the officer's ORB up to 10 calendar days after the board has convened.

## Release from active duty

Officers scheduled for release from active duty should contact Field Artillery Branch, US Army Reserve Components Personnel and Administration Center (RCPAC), prior to their separation date. Experience has demonstrated that early contact, preferably by phone, does much to insure a smooth transition from Active to Reserve Component status.

| | |
|---|---|
| Telephone: | Toll free 1-800-325-1884<br>AUTOVON 693-7871 |
| Address: | Commander US Army RCPAC<br>ATTN: AGUZ-OEC-FA 9700<br>Page Blvd. St. Louis, MO<br>63132 |

During this initial conversation, your personnel management officer will explain the participation options available to you as a Reserve officer and assist you in developing a career plan that will be compatible with your background, interests, and the demands of your civilian job. Again it is important that this process begin early, since delay might cause a Reserve officer to fail to meet minimum participation requirements during his first year in the program.

## Tuition assistance

The Army will pay up to 75 percent of the tuition cost for formal education courses leading to an associate's, bachelor's, or master's degree, under provisions of the Tuition Assistance Program. Tuition assistance cannot, however, be used for courses beyond the master's degree level or for courses leading to a second associate's degree. In order to receive tuition assistance, enlisted soldiers must have enough time in service remaining on their current enlistment to complete the course for which assistance is provided. Personnel who apply for and accept tuition assistance and then drop out for personal reasons must reimburse the Army for the amount of the assistance. Those who drop out because of military reasons or because of illness do *not* have to reimburse the Army. For further information check AR 621-5 or contact your local education center.

## USAR Training

Reserve officers have the following training opportunities available to them:

- Troop Program Unit (TPU) membership.
- Assignments as Mobilization Designees (MOBDES).
- Active-duty-for-training (Individual Ready Reservists).
- Service school attendance.

The TPU is the mainstay of the Reserve Component Program and, as such, receives priority in the allocation of personnel. Extensive troop unit experience is a career development goal for every reservist.

The MOBDES Program is equally important in terms of mobilization readiness, since it affords experienced officers an opportunity to train annually with the active organization they will serve with in the event of a national emergency. MOBDES officers generally serve two weeks of active duty with their agency each year and in many cases earn retirement credit during the year by working on assigned projects at home.

Similarly, other Individual Ready Reservists are afforded the opportunity to train with Active Army units each year and to serve in a variety of other active-duty-for-training assignments.

Reserve officers may complete career development service schools (the advanced course and Command and General Staff College) either in residence, through a USAR School, or by correspondence work. Additionally, officers accepted for the Logistics, Research, and Development and Foreign Area Officers Specialty programs may attend service schools appropriate to their specialty.

Officers who wish to inquire about programs and their individual career progression should contact their Field Artillery Branch Project Management Officer.

## Promotion points for Army correspondence courses

Soldiers in grades E1 through E5 can now earn promotion points for completing Army correspondence courses, to include those offered in their primary military occupational specialty. One promotion point is earned for every five credit hours completed.

The wide variety of courses developed by Department of Defense and TRADOC schools are offered through The Army Institute for Professional Development located at Fort Eustis, VA. Each course or subcourse has been accredited by the National Home Study Council.

Soldiers may take courses individually or in groups. The supervised on-the-job training program also may be available to sections or teams.

Those interested should select one or more of the courses listed in the Army Correspondence Course Catalogues (DA Pam 351-20) at local education centers. Then a DA Form 145 enrollment application must be completed and forwarded to: The Army Institute for Professional Development, US Army Training Support Center, Newport News, VA 23628.

Further information is available by calling AUTOVON 927-3085 or writing to the above address.

## OPMD update

Recent changes have been made in the organization of Combat Arms Division of the Officer Personnel Management Directorate, USAMILPERCEN. A full report on the reorganization and how it affects field artillery officers will be reported after the final phase of the reorganization is complete, tentatively in January of 1981.

In the meantime, the following structure will be in effect from August 1980 to January 1981:

**Field Artillery Management Section**
(DAPC-OPE-F)

| | | |
|---|---|---|
| Chief | LTC Lamm (Curt) | AUTOVON 221-0116/0118 |
| Major assignments (CONUS) | MAJ Baxter (Lee) | -0116 |
| Major assignments (overseas) | MAJ Cheeks (Bob) | -0116 |
| Foreign area officer assignments (SC 48) | MAJ Kelsey (John) | -0118 |
| Captain assignments (CONUS/overseas) | MAJ Colburn (Cork) | -0187/7817 |
| Captain assignments (CONUS/nominatives) | MAJ Crawford (Dan) | -0187/7817 |
| Lieutenant assignments (overseas/accessions) | CPT(P) Cline (Dennis) | -0187/7817 |
| Lieutenant assignments (CONUS/advanced course) | CPT Bryant (Byron) | -0187/7817 |

# Commanders Update

COL Charles J. Buel US Army Field Artillery Training Center

COL Frank Partlow 3d Basic Training Brigade Fort Leonard Wood

LTC Gary Seger 1st Battalion, 3d Field Artillery

LTC David L. Benton 1st Battalion, 14th Field Artillery

LTC Jon C. Schreyach 6th Battalion, 14th Field Artillery

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# MILPERCEN Enlisted Field Artillery/Air Defense Artillery Branch

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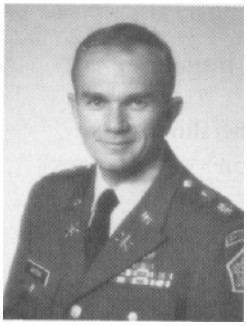

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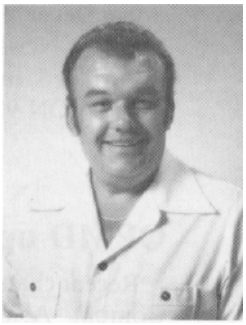

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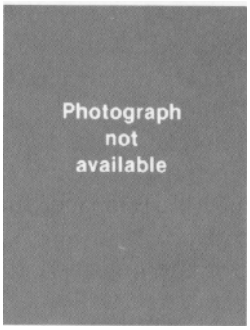


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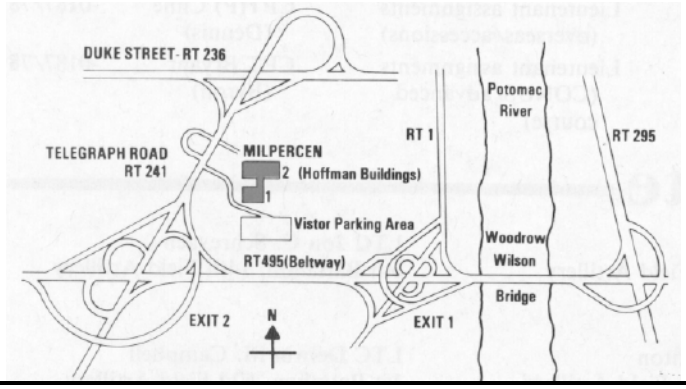


**SFC James Stanbridge**
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# The Comeback Trail:

## Challenges in Equipping the New Army

by LTG Donald R. Keith

Before we begin struggling with the Army's formidable equipment modernization problems of the 1980s, it might help us to put things in perspective by taking a brief look at the "good old days" of the 1960s. Our equipment posture in those days, relative to that of the Soviets, was unquestionably different than it is today.

The tankers of the sixties manned M60s—heavily armored, fairly mobile, more than a match for the Soviet T-54s and 55s that were the standard main battle tanks of the Warsaw Pact. Even the newly fielded Soviet T-62 appeared to be no more than the equal of the M60. Our ace in the hole, a revolutionary new missile firing tank, the XM803, seemed only a few years in the future. The other major component of our armored and mech units, the M113 armored personnel carrier, was perhaps the best vehicle of its kind in the world—rugged and reliable, if a bit slow and clumsy. It was certainly superior to the wheeled and open-topped BTR-50 series personnel carriers in the Warsaw Pact inventories.

### The sixties: Clear superiority over the Soviets

The sixties was the decade of the helicopter, and the US Army virtually wrote the book on it. The Huey, the best of its kind in the world, was entering the inventory by the thousands and would be teamed up at the end of the decade with another advanced American weapon, the TOW missile, to create a whole new concept in antitank warfare. The Cobra, heavily armed and armored, became the first helicopter designed to do nothing but fight—and it was in our inventory. Prototypes of an innovative rigid rotor attack helicopter, the Cheyenne, were already flying.

The air defense picture was also quite promising in the early to mid-sixties. The growing Soviet high performance fleet was interceptor-oriented, primarily fair weather, and posed little serious threat to our ground forces. The Soviets had no attack helicopters—didn't even believe in the concept—and still used wooden parts in their transport helicopters, which were primitive compared to the Huey and Chinook. Our air defense units were equipped with Nike-Hercules, an awesome long-range weapon, and with HAWK, the best system of its kind in the world. Redeye had recently ushered in the concept of "do-it-yourself" air defense for small units. The Soviets had been playing catch-up for years in air defense missilery. In 1961, they finally mastered the technologies that allowed them, after years of frustration, to bring down a U2 which for months had cruised with impunity over their heartland. But they still had a long way to go—or so we thought.

It was the same story in other areas: electronic warfare, communications, and bridging. We conceded the numerical advantage to the Soviets and their allies, confidently—and perhaps correctly—asserting that our strong suit, superior technology, would overcome their numbers. We still entertained the image of the Soviet soldier as a rugged peasant in a long overcoat trudging across the

battlefield with a cheap looking burp gun and antiquated equipment.

The Army was enamored of technology as the sixties moved on and it had the money to indulge its new obsession. One of the Army's Chiefs of Research and Development (R&D) was asked anxiously by a Congressional Committee chairman if he was sure he was asking for enough money in his budget request. Congress seldom quibbled with the Army's budget requests, and the hearings were considerably more perfunctory than they are today.

## The seventies: A swing of the pendulum to the Soviets

As the sixties waned and the conflict in Vietnam consumed more and more of our time and resources, the pendulum of conventional power swung with increasing rapidity toward the Soviets. We devoted an increasing percentage of increasingly scarce developmental resources to unconventional and jungle warfare—an understandable preoccupation, but one that hastened our relative decline in conventional weaponry. In the early seventies, two big disasters befell us. Congress put the hopelessly complex, excessively expensive XM803 program out of its misery, and the Army gave up on the trouble-plagued Cheyenne. R&D spending, in real dollars, declined precipitously. Congressional hearings became adversary proceedings, and the Army struggled to achieve stability during the anti-militarism and trauma of the early post-Vietnam days.

It was about this time that we began to notice that, while the American rabbit was running in circles, the Soviet tortoise had lumbered on by in the area of conventional weaponry and was picking up speed. In early 1974, we began to appreciate the situation more clearly as we examined in great detail the Soviet equipment recovered from the battlefields of the Middle East. The T-62s we looked at were fine tanks, as good as our M60s. The BMP fighting vehicle turned out to be not only superior, but a full generation ahead of our M113. The SA-6s that plagued the Israeli Air Force had a rocket-ramjet propulsion system that was more advanced than anything we had, and the system proved much more mobile than the HAWK. The ZSU-23-4 air defense system the Russians had fielded years earlier made our Vulcan look like a pea shooter. Israeli command posts were coming under fire minutes after going on the air, and their communications were being jammed by electronic direction finding and electronic warfare equipment we never took seriously. And that was just the beginning.

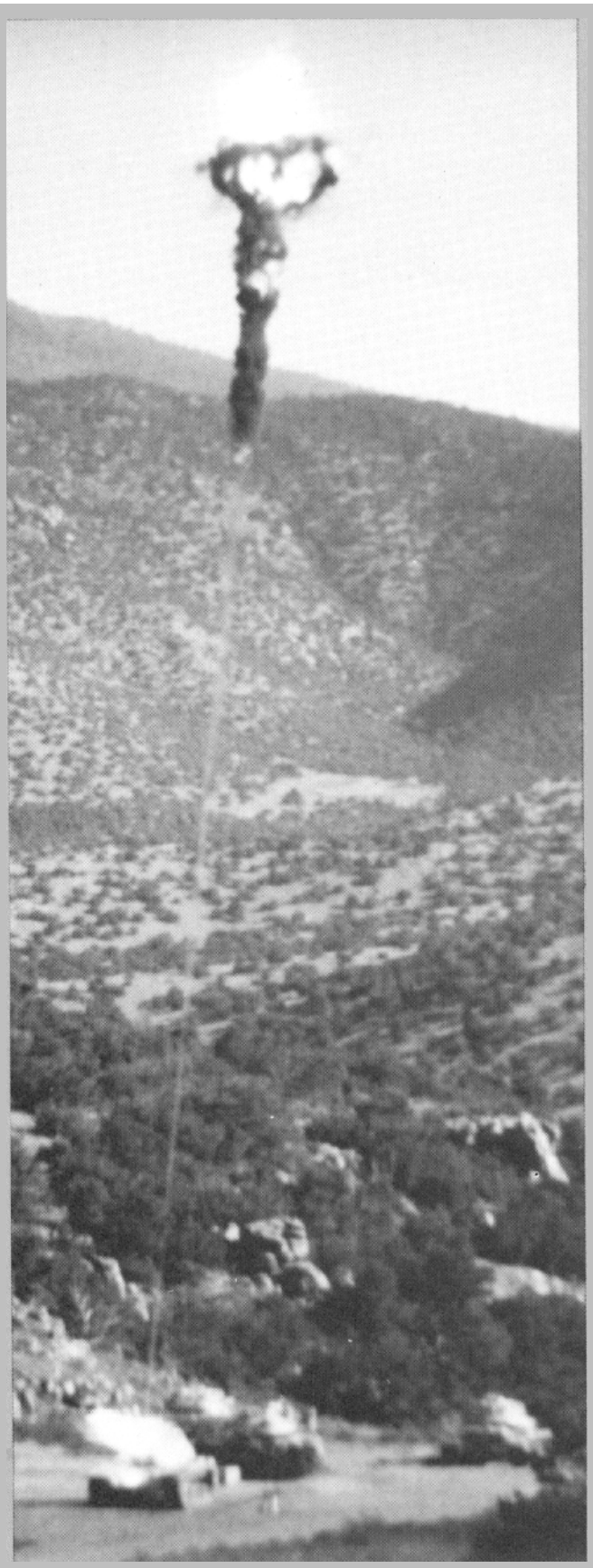
As the seventies wore on, the Soviets began to pull one rabbit after another from their well camouflaged hats. A T-64 tank began to appear in their European units; then a T-72. We learned that both tanks were highly mobile, possessed powerful firepower, and were protected by a radically new laminated armor. Our M60, despite improvements, was outclassed. Furthermore, the end was not—and is not—in sight. Word of a T-80 tank with even more advanced features began to spread. We expect to see it in the field momentarily.

Some improvements were made to the BMP, but the Soviets, smart enough to avoid gilding the lily, contented themselves with building BMPs by the tens of thousands, while our aging aluminum box—the M113—continued to lumber along. Perhaps the most radical advances came in air defense. The SA-3, SA-4, and SA-6, 7, 8 and 9—all of which were highly mobile and quite effective—were added to the radar guided gun coverage the Soviets already enjoyed. Our own Nike-Hercules continued to decline in effectiveness due to its increasing vulnerability to jamming. HAWK, although rejuvenated by product improvements, also continued to become obsolete in the face of increasingly effective countermeasures. The story runs the same in other areas—firepower, electronic warfare, bridging, and chemical warfare. Perhaps the most painful irony encountered, however, was when we were forced to conclude that the antitank capable attack helicopter—the weapon we had pioneered—had finally been accepted by the Soviets, and that theirs was better than ours.

Thus, the seventies saw the Army, as a result of Vietnam, anemic hardware funding, and self-inflicted wounds, slide from technical superiority to clear quantitative and qualitative inferiority in a world made increasingly unstable by Soviet adventurism.

**Hitting the comeback trail**

The story of the seventies is one of precipitous and perilous decline in the relative strength of the US Army. It is also the time we began our recovery. Faced with this broad inferiority in fielded equipment, we began, in 1972 and 1973, our most extensive R&D modernization effort since World War II. We picked the best men we could find to manage our programs and got to work. At the end of the decade, we could give ourselves at least a tentative pat on the back before moving on. We have developed the best tank in the world and have kept it on cost—despite the hair-raising unit cost figures produced by inflation. We have built two new helicopters and even begun to field one. We've got an Infantry Fighting Vehicle (IFV) in production that can whip the BMP hands-down. We are nearing production of four air defense systems that can handle the steadily worsening Soviet fighter-bomber threat. We're producing a laser homing artillery projectile that our gunners can drop down the hatch of a tank at 16 kilometers. We've built radars that can spot



**Antiarmor artillery projectile striking target.**

enemy projectiles in flight, calculate their source, and enable us to have counterfire on the way before the enemy's first round hits the ground. We're fielding a new 155 howitzer. We're building our first artillery rocket capability since World War II, and we're doing a lot more. There have been some bugs—there always are—but the overall picture indicates recovery.

## Challenges of the eighties

The R&D hurdle has been cleared, but the one that remains is formidable. The challenge is simply to get this equipment into the hands of the troops in sufficient quantities that it makes a difference, keeping in mind that the Soviets have not decreased the velocity of their own modernization program.

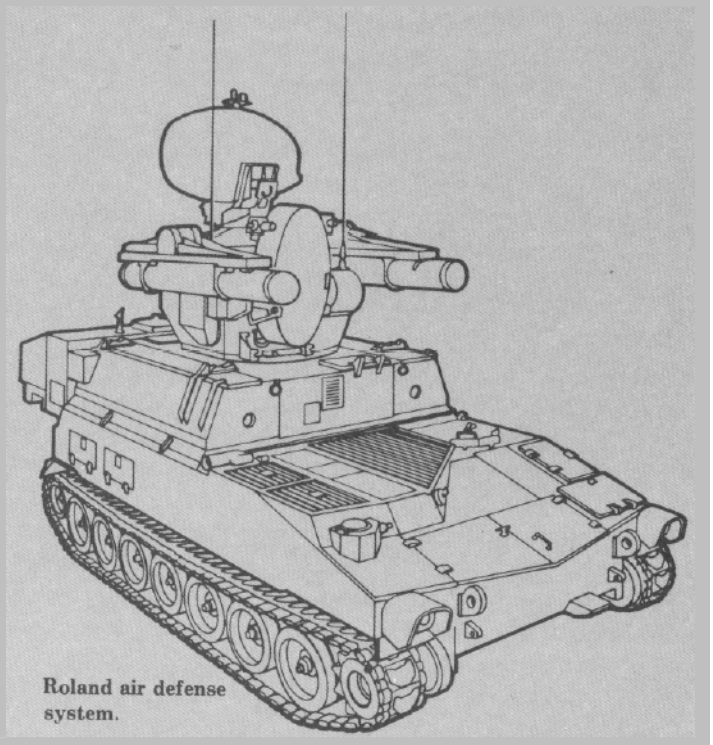
The problem we face is money—specifically the lack of it. There is a significant dollar shortfall that stands between us and fielding our new systems at the rate we deem necessary. While there is a low probability that our needs will be totally satisfied either by executive or legislative action, I would not for a moment rule out that possibility. There is a pervasive and growing realization at every strata of American society and government of the consequences of weakness in an increasingly turbulent world. Harry Truman once remarked in the late forties that he was tired of "babying" the Soviets when their behavior became increasingly aggressive and unresponsive to reason. The American people are growing tired of the Russians' current activities as well.

Our first challenge of the eighties must be to do a better job of articulating the needs of the Army to the Defense Department, the Congress, and the public. This does *not* mean that our efforts should degenerate into a crude interservice rivalry. We badly need a strong Air Force and Navy to accomplish our own mission, and neither of our sister services is free of its own resource problems. We have, however, been receiving about a fifth of the Defense procurement budget for the past decade or so, and the results have been an Army weaker than it should be. That message must be conveyed more intensely than it has been in the past.

Challenge number two in the eighties will be to digest the large number of new systems that will be entering the inventory in the near future. There are force structure, training, logistic, and personnel implications in the massive modernization program we envision. The Army Force Modernization Coordination Office was created to anticipate problems and develop a coherent plan for fielding these new systems. We *are* planning ahead and there is no reason that things shouldn't work out smoothly. One aspect of the problem—the ability of the troops to operate the new systems—seems to have been at least partially overcome as a result of prior planning and good design. A standard objection to our modernization effort, often raised by those who neglect to do their

**XM723 mechanized Infantry Combat Vehicle.**

**XM1 Abrams tank.**



Roland air defense system.

homework, is that these new systems are too complex and sophisticated for the average GI to operate. Besides being an insult to the force, this is simply not true. The enthusiasm the troops have shown for—say—the IFV and XM1 in operational testing bears this out. Integration of these systems, although a complex and important challenge, is one we seem to have well in hand.

The final challenge to fielding our new Army will involve critical decisions on the basis of financial planning and sound military judgment. It will probably be the first and most important decision the Army's financial and doctrinal communities will face in the eighties. Indeed, we are facing it now. Assuming a *deus ex machina* does not provide us with the resources to fill the shortfall alluded to earlier, what then? How do we field the equipment the Army must have without bouncing checks?

One answer proposed frequently is that the Army "must start making some tough decisions." This may be translated literally as "The Army must kill a few of its new programs so it can afford the rest." There is a superficial cleanliness about this proposal that tends to set heads nodding in agreement—sometimes even Army heads. It is wrong, however. Implementing it would vastly decrease—and possibly cripple—our ability to get the job done. What should we kill when we start making these tough decisions? The IFV that replaces the mid-century artifact the troops now ride around in? An air defense system or two that will have to cope with a growing Soviet Air Force whose first mission will be to annihilate resistance to a massive combined arms attack? An advanced attack helicopter that might well be the finger in the dike that holds off an armored attack long enough for our tanks to arrive? Command and control equipment that will allow commanders to make critical decisions in less time than any commander has ever been allowed? The answer to these questions is no. The Army has already made its tough decisions. We could use a heavy-lift helicopter, a ground scout vehicle, a new advanced scout helicopter, and several other items, but we will do without. The systems we have decided to fund are those whose absence will pose *unacceptable* risk. The absence of one or more of these systems not only removes its particular capability from our inventory, but it has an adverse effect on the power of those that remain. These systems, it should be recalled, began at about the same time and were designed as part of a combined arms team. It is like a chain whose strength is no greater than its weakest link. To buy some new links and join them to older, weaker links simply does not make good military or economic sense.

What then do we do? We buy *all* the systems that are now entering procurement, and we do so at a "tuned" rate. We buy a balanced suite of equipment for our highest priority units first. Our priority system is based on *units* rather than individual items of equipment for the entire force. The systems that promise the greatest and most immediate combat impact—the force multipliers like XM1 and IFV, to name but two—we buy at as high a rate as feasible. The systems with lesser impact we buy in lower numbers, obviously maximizing every opportunity for economic rates of purchase. Using the "hi-low" concept, we rapidly build at least the leading edge of the modern total Army we plan-to field eventually.

Will this result in uneconomic buys? It depends on the definition of "economic." In a strict, relative sense the answer in some cases is bound to be yes. No matter what the commodity, military or civilian, there is an economy of scale that one would like to take advantage of if one could afford to. But few of us would buy nothing but bread to eat because it is such a good buy by the truck load. The easy way out—killing a few and buying a lot of the rest—may produce acceptable results in an accountant's ledger, but quite possibly disastrous results on the battlefield. We need to stand together on this. We have sufficient funds now to buy at economically prudent rates. What we lack is an adequte level of procurement funding to modernize at a *militarily prudent rate*.

Another major dividend that comes with the approach advocated above is a much needed modernization of our industrial mobilization capacity, which is now in pretty bad shape. As we capitalize for producing our new equipment, we are creating a modern responsive industrial base for mobilization. Without a warm base, we would need at least two years lead time before we could begin to produce. In this day and age, I believe that is totally unacceptable to this country. How much is that insurance policy worth? I can't put it in cost-effectiveness terms, but I am certain that it is an investment that is right for the Army and the country. Even *with* the broad-based modernization effort we propose, it is going to take more time to hit full volume than one would prefer in an ideal situation.

We are serving in interesting times. We have seen, in but a relatively brief segment of our careers, an Army that held unquestioned qualitative superiority over its adversary slide rapidly into clear qualitative inferiority, and then be presented with the opportunity to regain the edge in but a few short years.

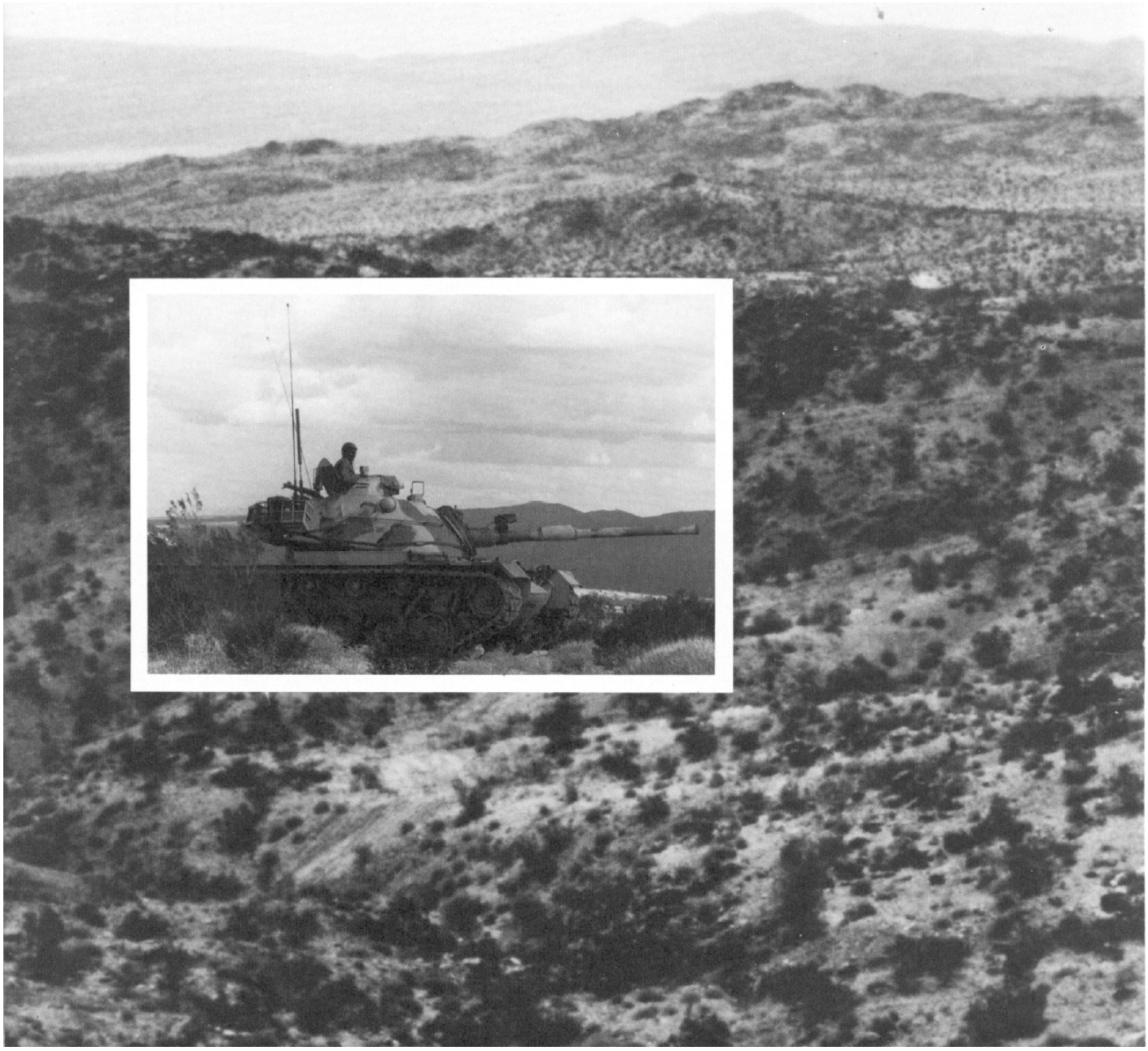
Pulling off this vital comeback will not be easy. It will require corporate self-discipline, sound judgment, and a missionary zeal—and it may well be the most important thing we ever do.

**(Reprinted from the *Resource Management Journal*, First Edition)**

**Lieutenant General Donald R. Keith, former Commandant of the US Army Field Artillery School, is the Deputy Chief of Staff for Research, Development, and Acquisition.**

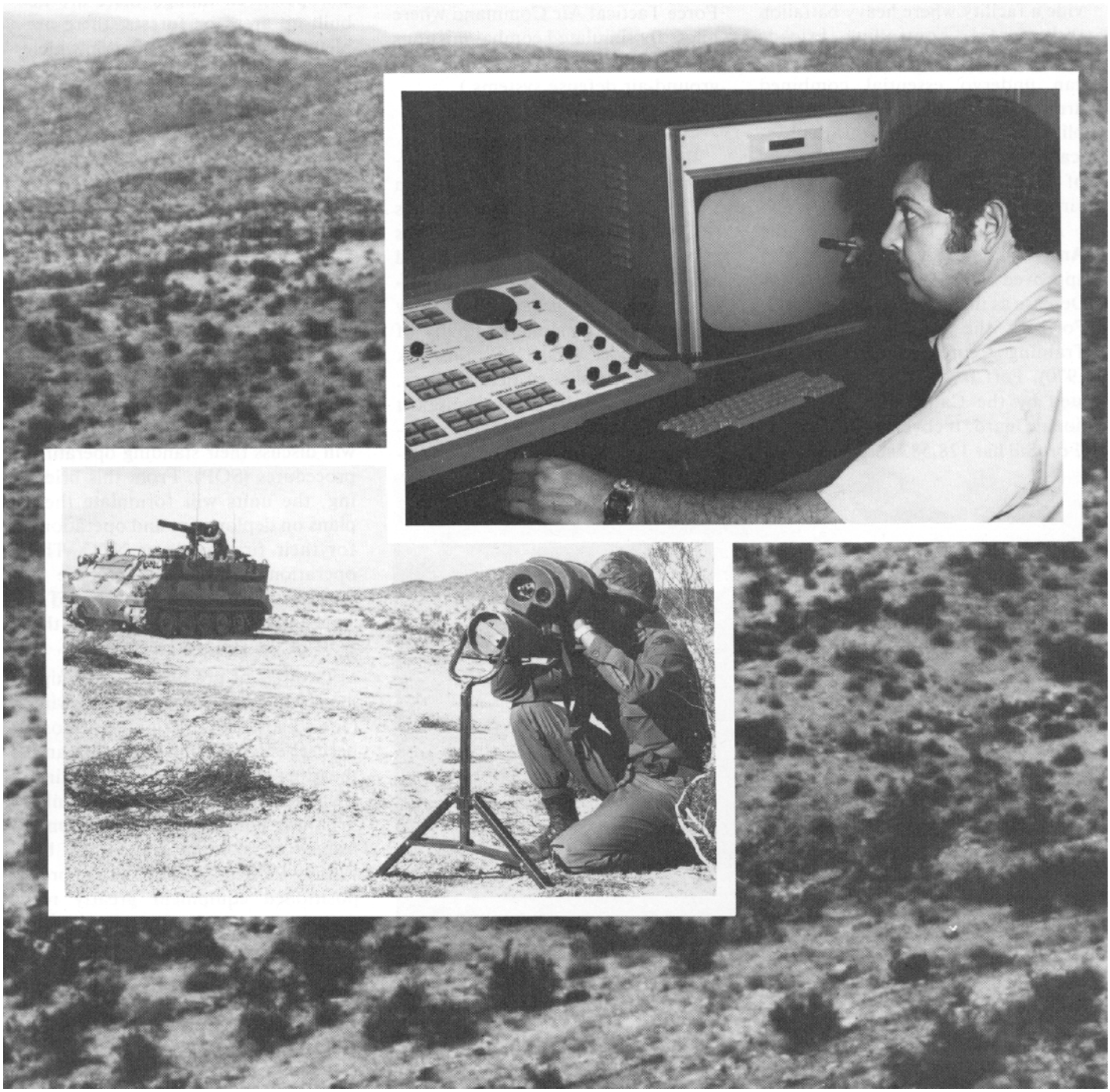
# The National Training Center

by CPT Arthur A. Shrader



**F**inally, "combined arms" is a reality!

The battalion fire direction center (FDC) was quiet for the first time in three days. As the sun rose to start another day, the chart operator remarked, "Ten straight days of clear sky; does it ever rain here?" The latest intelligence reports from the fire support teams (FISTs), fire support officers (FSOs), and S2 indicate the enemy is planning a major attack against the armor task force's defensive positions. Suddenly a call comes over the command fire net, "K27 this is F18, fire for effect, all available, over." The radiotelephone operator answers the call for fire. The FIST continues, "Target 1247, 1248, 1253, over." The FDC is now in a frenzy of activity as the fire direction officer (FDO) listens intently for a target description. "Motorized rifle regiment attacking in the open." The other fire direction nets are now responding to F18's and other FIST's calls for fire. The operations NCO yells into the battalion FDC net, "All the firing batteries and most of the task force are under chemical attack." Suddenly, the radios go silent. Frantically, each radiotelephone operator tries vainly to contact the FISTs, then the FSOs, then the firing batteries, and finally ends with "Any station on this net?" Explosions are heard outside the FDC and, in the confusion, muffled "gas, gas" is heard. Within the FDC, everyone masks. The radiotelephone operator on CF2 looks at the FDO and says, "Sir, we are being



jammed!" As he reaches for the AN/TA-312 telephone to contact Bravo Battery, the FDO quickly begins formulating contingency plans to deal with the rapidly deteriorating situation. "Sir, Alfa Battery reports 30 percent casualties."

World War III? No, but it's the closest thing to it—the National Training Center.

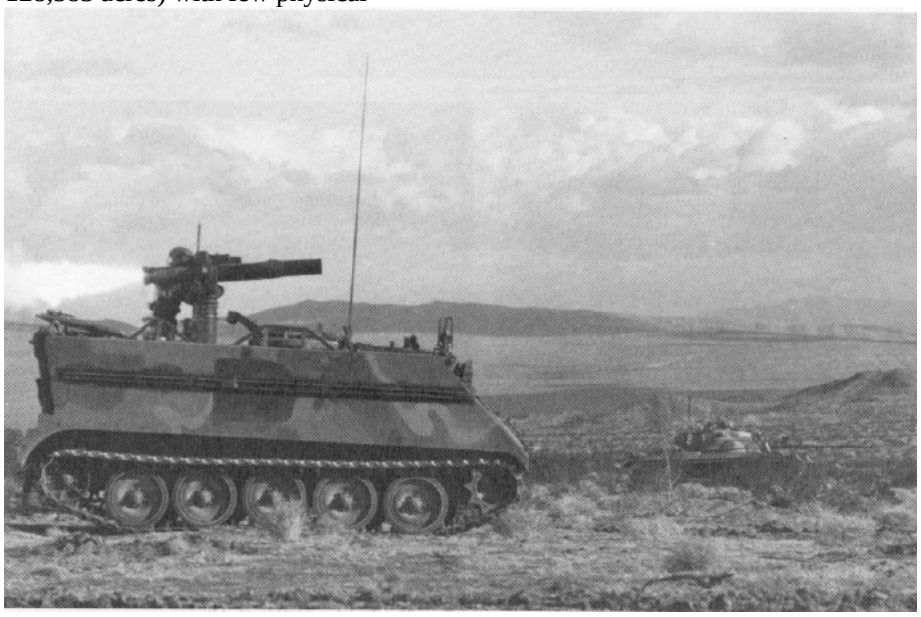
### What is the National Training Center?

The purpose of the National Training Center (NTC) is: To provide a facility where heavy battalion task forces, controlling brigade headquarters, and supporting units can undergo essential combined arms training that cannot be accomplished at home stations due to physical limitations and prohibitive costs of providing a realistic training environment (AR 350-50).

After several Department of the Army studies, Fort Irwin, CA, was approved by the Deputy Secretary of Defense as the location for the NTC. Formerly the home of the Armor Training Center (until 1 August 1970), Fort Irwin is currently operated by the California Army National Guard. It covers 642,805 acres (Fort Sill has 128,583 acres) with few physical limitations and large unrestricted maneuver and firing areas. The Post is located in the Mojave Desert, 37 miles south of the Death Valley National Monument. The nearest town (Barstow, CA) is 37 miles southwest. This remote location allows virtually unrestricted use of electronic warfare without interfering with the surrounding radio, television, or tracking stations. Since Fort Irwin is only 100 miles from Nellis Air Force Base (home of the Air Force's "Red Flag"), close air support can be easily integrated into training. ("Red Flag" is an Air Force Tactical Air Command where pilots fly simulated combat missions against "Threat" aircraft and ground-air defense systems.)

### Who will go to Fort Irwin?

Beginning in 1982, mechanized infantry and armor battalions based in the continental United States (CONUS) will travel to Fort Irwin as a task force. A tank or mechanized infantry battalion will be task organized so that mechanized infantry will have at least one company of tanks and vice versa. With this task force will be a slice of field artillery. Although normally in direct support of a brigade, a field artillery battalion (minus one firing battery and elements of headquarters and service battery) will accompany the task force along with engineer, air defense artillery, TOW Cobra, and logistical support from the home station. Having a field artillery battalion (minus) with the task forces allows massed fires and employment of the complete fire support chain. Scenarios will be designed to train the heavy task force in a European battlefield environment.



**Training with TOW.**

Fort Irwin has the same type of mountains, rolling hills, and flat plains as the terrain in central Europe. Even though there are no built-up areas or forests, there are plenty of valleys and gullies in which to hide.

When organizations are selected to go to the National Training Center, the NTC operations group will visit brigade and task force commanders and their staffs to provide comander's guidance for the "war" at the NTC, to include unit requirements and details on movement to Fort Irwin.

The commanders going to NTC will identify to the operations group their areas of weakness in training which they want emphasized while at NTC; additionally, unit comanders will discuss their standing operating procedures (SOP). From this briefing, the units will formulate their plans on deployment and operations for their first battle at NTC. The operations group will prepare a tailored scenario and brief the NTC staff and observer controllers on the SOP of the task force.

Two sets of pre-positioned equipment will be availabe at Fort Irwin: One with the M113 armored personnel carrier (APC) and M60 tanks and the other with M2 Infantry Fighting Vehicles and the XM1 Abrams tank. Whatever type of equipment the unit trained on at home station will be waiting for it at the NTC. Use of pre-positioned equipment greatly reduces transportation costs and provides a readiness exercise with a

**Simulated hit on M551 Sheridan tank.**

realistic NATO type deployment. A unit, however, will be required to bring its own individual weapons, protective masks, radiac monitoring equipment, mechanic's and armorer's tool boxes, M60 machineguns, binoculars, and compasses. (Pre-positioned artillery equipment will be from Tables of Organization (TOE) 06-365H, field artillery battalion, 155-mm self-propelled, containing two firing batteries (TOE 6-367H); a service battery (TOE 06-369H) minus one ammunition section; and the headquarters and headquarters battery (TOE 06-366H) minus two maneuver battalion fire support sections and part of the FIST sections.)

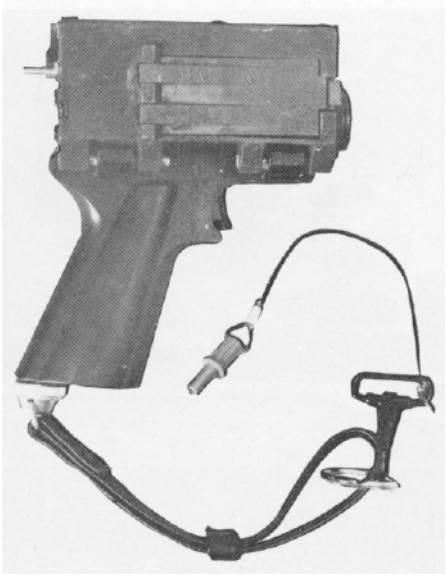
## Combined arms training

During a task force's stay (14 to 17 days) at the NTC, it will first go through a six or seven day engagement simulation exercise, during which it will fight an opposing force (OPFOR) (representing a motorized rifle regiment) in a free-play, force-on-force battle over a fully instrumented battlefield. The opposing force will be outfitted with uniforms and M551 Sheridan tanks covered with fiberglass hulls to simulate ZSU-23-4s, T-72s, and 122-mm M1974 self-propelled howitzers. The OPFOR will be permanently based at Fort Irwin and will replicate a Soviet motorized rifle regiment's organization, doctrine, tactics, appearance, and weapons capability. Known as the 32d Guards Motorized Rifle Regiment, the OPFOR will train using an opposing force training and evaluation program developed at Fort Huachuca. The first battle will be based on the plan the task force developed at home station, and the rest of the engagement simulation will consist of various missions the task force and brigade commander have selected from a "menu" of 14 offensive and defensive tasks. Each direct fire weapon system (M16 rifle to M60 tank) will be equipped with a Multiple Integrated Laser Engagement System (MILES).[1] Soldiers are equipped with a "beeper" which sounds when they receive a near miss or are killed. Mounted on each vehicle will be a xenon strobe light which flashes several times for a near miss and flashes continuously for a kill. A sophisticated computer will graphically portray to the controllers where each OPFOR and friendly vehicle is on the battlefield at any given time. Whether it is a tank, APC, TOW, howitzer, etc., the computer will record how many times it has fired, how many vehicles it killed, the range at which it killed another vehicle, and when it received a near miss or was killed itself. Every radio net will be monitored and all radio transmissions recorded. Low light video cameras overlooking the battlefield will record the major events of the battle during day or night operations. All this information will be edited for major teaching points for presentation to task force commanders and staffs after each mission.

[1]MILES uses eye-safe, laser coded "bullets" which when fired with "blanks" realistically portray the effective range of a weapon system. Detectors, located on opposing force's personnel and vehicles, receive this coded laser "bullet" and determine if it could do damage, if it was accurate enough to kill a vehicle, or if a near miss occurred. (M16 rifles or M60 machineguns cannot kill a tank.) See page 44 for more on MILES.

Since laser energy cannot be bent to provide indirect laser fire, artillery and mortar impact grids must be processed through a computer. This computer, knowing where every player is located at any given time, will check the sheaf area for possible casualties, run a program corresponding to a probability of kill or wound, and determine casualties among the players and/or vehicles. The data will then be sent to controllers in the battle area who will mark the area so that personnel within the sheaf area will see and hear a simulation of impacting artillery rounds. MILES controller guns will create appropriate casualties. Work is now going on to develop a system that will cause the strobe lights to activate without the use of a fire marker. The computer will record each mission fired and indicate which FO or FIST initiated it. This data, along with edited video tapes and radio traffic, will be the basis for replaying the battle to emphasize teaching points. Possible future additions include moving targets for engagement by Copperhead, TOW, and tank fires.

After completing the engagement simulation portion, the task force will begin a live fire exercise lasting three to four days. The defensive battle will be against an array of popup targets simulating a motorized rifle regiment. Target belts at 4,000, 3,000, 2,500, 1,500, 1,000, 500, and 300 meters will contain from 24 to 100 vehicle and personnel targets per belt. By raising and lowering successive target belts, the opposing force will appear to be attacking at 24 kilometers per hour. A target, once hit, will remain standing and give off a smoke signature. The corresponding target at a closer range will not activate. Field artillery units will provide live fires in support of a covering force and the task force's scouts as they withdraw into the main battle area. Once the main target array begins to function, live fire will not be used because fragmentation would unrealistically



**Controller gun.**

"kill" the targets. The entire field artillery fire support system will continue to exercise, but artillery fires in the array will be simulated by pre-positioned remote controlled demolition devices. (The planned introduction of the low cost indirect fire training round (LITR) in FY81 will allow the field artillery to shoot indirect fires into any location.) During the offensive phase of the exercise, live artillery fires will be allowed over an area approximately 10 by 40 kilometers in front of the advancing task force. As in the engagement simulation exercise, unit locations and radio traffic will be monitored and actions will be videotaped to provide feedback for further training at the NTC and home station. The live fire exercise will enable the complete fire support team to control mortars, artillery, and close air support in a truly combined arms mode to support the maneuver force.

At the conclusion of the two-week training and evalution cycle, a take-home package, which consists of video tapes, maps, and data consolidated from each of the live fire and engagement simulation missions, will be prepared for the task force and all accompanying elements. These NTC diagnostic results will serve as a basis for future training at home station and preparation for return to the National Training Center approximately 18 months later.

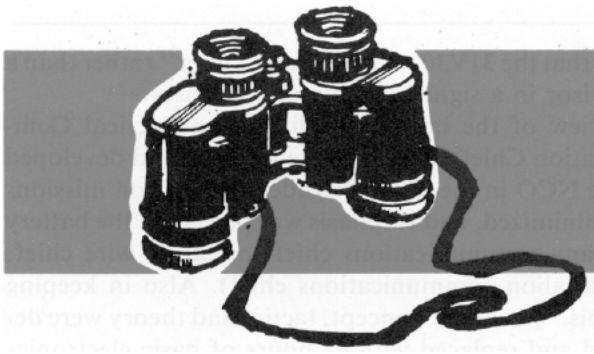
**When will the NTC be open for training?**

Fort Irwin will be upgraded and become a fully operational active US Army Forces Command (FORSCOM) post in 1981. The basic scenario for the live fire exercise has been approved, with final points being decided this year. Target construction began in August, and company-level test of the live fire range will take place in November, followed in April 1981 by a task force validation of the complete range. A successful company-level test of engagement simulation hardware was conducted from February through April this year.

The "menu" of scenarios for engagement simulation are under development. The opposing force's vehicles will be completely overhauled and reconfigured by September 1981, and OPFOR personnel will be fully trained by April 1982. The number of task forces rotating through the NTC will increase each year and, by 1984, 42 per year are expected to utilize this training area.

As new weapons, doctrine, and devices are introduced into the Army inventory, they will be incorporated into training at the NTC. The physical and mental strain, reactions to changing situations, and logistical problems will be real in a free maneuver setting. Thus, the NTC will offer a place where commanders and soldiers can experience the nearest thing to actual combat and realistically train to fight on tomorrow's battlefield.

**CPT Arthur A. Shrader, the USAFAS Representative to the National Training Center, is assigned to the Collective Training Division, Directorate of Training Developments, USAFAS.**



# View From The Blockhouse

**notes from the school**

## FADAC maintenance

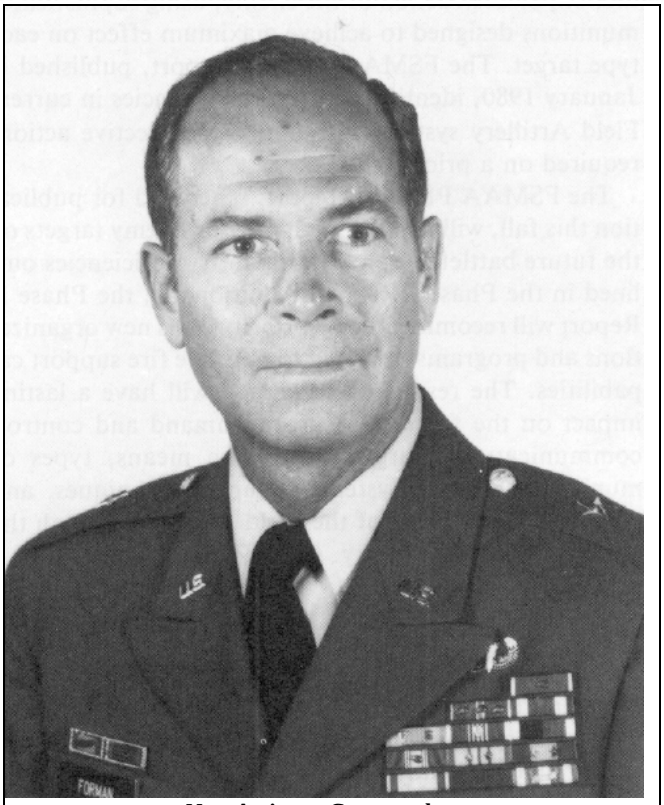
Although the Field Artillery Digital Automatic Computer (FADAC) has been much criticized by field personnel, it continues to be the primary means of computing firing data for those units not yet equipped with TACFIRE.

FADAC availability is high in many units. For example, the present and past commanders of the 9th Infantry Division Artillery have placed command emphasis on FADAC maintenance, using the Communication Electronics Staff Officer to monitor FADAC availability. As a result, FADAC "works" in this unit.

The Field Artillery School has taken specific actions to improve readiness reporting of FADACs. For example, several FA battalion/battery TOEs have been changed to reflect FADACs as Equipment Readiness Code A items instead of Code B items. (Division artillery FADACs are still listed as Code B items.) Currently, FADAC is evaluated on the monthly Unit Status Report Worksheet, DA Form 2715 (AR 220-1), but is not reported on the quarterly Material Readiness Report, DA Form 2406 (TM 38-750). The School's Gunnery and Communications/Electronics Departments are attempting to resolve this discrepancy. If the School's suggestion is approved, FADACs will become reportable in January 1981. Obviously, this, in itself, will not improve readiness but will indicate the readiness status to commanders and logistical personnel.

Additionally, it is absolutely necessary that FADAC repairmen (MOS 31V10F7) be assigned only to FA units to insure effective organizational maintenance support. There are still to many cases where FADAC repairmen are being assigned to non-FA units or where non-trained personnel have the F7 Additional Skill Identifier (ASI). Adjutant General personnel cannot correct this situation by themselves—they need help in screening records to insure that only school trained FADAC repairmen have the ASI F7 and are assigned to only FA positions. This is particularly important because only a small number of ASI F7 personnel are trained each year (90 scheduled for FY80).

Until TACFIRE is available, Field Artillery commanders should use FADAC as the primary means of computing firing data; therefore, the "old" FADACs must be properly maintained. (LTC Overby, CED)



**New Assistant Commandant**

**BG Robert C. Forman assumed duties as the Assistant Commandant of the US Army Field Artillery School on 2 July.**

## Requisitioning the Computer Set, FA, General

The Field Artillery School has received several calls and letters indicating that some units are having problems requisitioning the Computer Set, FA, General, and various program kits. When a higher headquarters requisitions these items for a subordinate unit authorized this equipment, the DODAC/UIC numbers for the subordinate unit must be listed on the requisition form as well as the DODAC/UIC numbers for the higher headquarters. If the numbers for the subordinate units are not listed, requisitions will be rejected by ARRCOM. For further information on requisitioning these items you may call Mrs. Helen Leatherman, AV 793-5631, or write her at: HQ, ARRCOM (B14), ATTN: DRSAR-MMH-L (Mrs. H. Leatherman), Rock Island, IL 61299.

## Fire Support Mission Area Analysis underway

The Directorate of Combat Developments, USAFAS, is in the process of conducting an important study known as the Fire Support Mission Area Analysis (FSMAA). The study adopts a "front to rear" approach which begins with a dynamic analysis of critical enemy targets on the battlefield and continues through all aspects of fire support from target acquisition to neutralization, interdiction, or destruction of the enemy, using sophisticated munitions designed to achieve maximum effect on each type target. The FSMAA Phase I Report, published in January 1980, identified existing deficiencies in current Field Artillery systems and outlined corrective actions required on a priority basis.

The FSMAA Phase II Report, scheduled for publication this fall, will identify high pay-off enemy targets on the future battlefield and will quantify deficiencies outlined in the Phase I Report. Additionally, the Phase II Report will recommend on a priority basis new organizations and programs designed to improve fire support capabilities. The results of this study will have a lasting impact on the force structure, command and control, communications, target acquisition means, types of munitions, weapon systems, resupply techniques, and training requirements of the Field Artillery through the remainder of this century. (LTC Zenker, DCD)

## Upgrade of Tactical Communication Chief Course (MOS 31V30)

Beginning 15 May 1979 the Communication/Electronics Department, USAFAS, conducted an analysis and evaluation of the existing Tactical Communications Chief Course (TCCC). Although this course was being taught at the Field Artillery School, graduates were eligible for assignment with any of the combined arms units. Comments from the field and students indicated the course was too closely structured to the Communications Electronics Staff Officer Course (CESOC) to optionally benefit the enlisted supervisor. Additionally, analysis of 1,512 active Army TOEs showed that the 31V30 duty position did not have TOE assigned feeder MOS duty soldiers (MOS 31V10, 31V10F7, 36K, and 05B). For example:

- 82 percent did not have an 05B10 assigned.
- 95 percent did not have an 05B20 assigned.
- 33 percent did not have a 36K10 assigned.
- 87 percent did not have a 36K20 assigned.
- 33 percent did not have a 31V10 assigned.
- 93 percent did not have a 31V20 assigned.

Based on this data, an evaluation board consisting of personnel from the Signal School, USAFAS, and III Corps Artillery convened in November 1979 and determined that the 31V30 was the actual "doer" rather than a supervisor in a significant number of cases.

In view of the board's findings, the Tactical Communication Chief Course was redesigned and developed for the NCO in the field. Brigade and division missions were minimized, and emphasis was placed on the battery (company communications chief, battalion wire chief, and battalion communications chief). Also in keeping with this "working" concept, tactics and theory were decreased and replaced with 48 hours of basic electronics with increased emphasis in systems evaluation and maintenance.

The proposed program of instruction which reflects the above changes is presently at TRADOC for approval and implementation and is scheduled to be utilized with TCCC 1-81, beginning 3 October 1980. In addition to TCCC 1-81, the Tactical Communication Chief Advanced Course and the CESOC course will also be evaluated and revised using the same procedures. Comments and/or recommendations from supervisors and graduates of these three courses are solicited; send to Commandant, USAFAS, ATTN: ATSF-CE, Fort Sill, OK 73503. (John F. Snively, CED)

## First female FA warrant officer


Mary K. Renier was appointed to the grade of warrant officer 1 by BG Robert C. Forman, Assistant Commandant, USAFAS, on 22 July 1980 and will serve as a Ballistic Meteorological Technician, MOS 201A. Ms. Renier, who enlisted in 1974, is the first female to be appointed to that grade in the Field Artillery and her initial assignment will be Headquarters and Headquarters Battery, 101st Air Mobile Division Artillery, Fort Campbell, KY.

As a Ballistic Meteorological Technician, Warrant Officer Renier will function as an assistant operations officer, responsible for providing meteorological data in support of the artillery.

## TC 6-30-1
## The Copperhead/GLLD System

The Gunnery Department, USAFAS, has obtained approval to write and have published, TC 6-30-1, The Copperhead/GLLD System. First copies should be available to the field by June 1981.

TC 6-30-1 will provide a one-source document on doctrinal, tactical, and technical guidance as well as training guidance for field units during the introduction of the Copperhead (M712) round and the GLLD (ground laser locator designator) AN-TVQ-2. Target audience for this training circular will be the members of FISTs, FDCs, and firing batteries of Field Artillery units.

TC 6-30-1 is intended to give the tactical and technical information necessary for engaging and destroying a target with the Copperhead/GLLD systems, as well as how to use the GLLD in support of other laser guided munitions and conventional missions. (SFC Evans, GD)

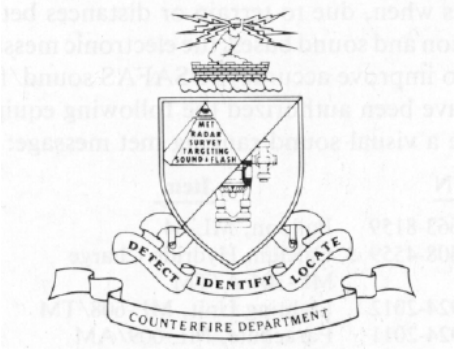
## Quadripartite conference

The 10th meeting of the Quadripartite Working Group (QWG), Surface-to-Surface Artillery, will be hosted by the US Army Field Artillery School during 10-14 November 1980 at Fort Sill, OK. The QWG includes personnel from America, Britain, Canada, and Australia (ABCA) and is the ABCA counterpart to the US Army Field Artillery participation as a member of the NATO Artillery Working Party. (New Zealand is normally represented by an observer.) Chairman for this meeting will be LtCol K. A. Timbers, UK, Director, Royal Artillery. The objectives are to:

- Standardize artillery procedures and ammunition.
- Develop surface-to-surface artillery concepts for the late 1980s and 1990s.
- Develop future artillery meteorological requirements.
- Resolve automatic data processing system interface problems.
- Achieve standardization of artillery weapons post 1990.
- Standardize procedures for the tactical use of scatterable mines on the battlefield.

The 9th meeting was hosted by Canada, 26-30 November 1979, at Mobile Command Headquarters, Montreal, Canada.

Mr. B. M. Berkowick, the USAFAS International Standardization Coordinator, will coordinate the US Field Artillery input and positions for ABCA and NATO and provide continuity. Any questions may be addressed to Commandant, USAFAS, ATTN: ATSF-CD-S, Fort Sill, OK 73503; AUTOVON 639-2900.




# COUNTERFIRE SYSTEMS REVIEW

## New Firefinder course

The new Field Artillery Firefinder radar system, which will replace the AN/MPQ-4A mortar locating radar, is to be fielded in the spring of 1981, and qualified radar mechanics are needed to work on this new equipment. Personnel with MOS 26B20 (Weapons Support Radar Repairer) can earn the additional skill identifier, K1, by completing a new 23-week Firefinder Radar Repairer Course (104-ASIK1) at USAFAS.

The first course will begin this October. All FY81 courses are dedicated solely to support worldwide fielding of these radar systems. To qualify for this training, a soldier must have MOS 26B20 and 19 months or more time remaining on active duty following course completion.

Since 26B20K1 will be assigned to each direct support maintenance shop to supervise and perform the maintenance required on Field Artillery Firefinder radar systems (AN/TPQ-36 and AN/TPQ-37), the Army needs qualified personnel to work with the solid state, digital logic, computer driven technology of Firefinder systems. Additional course information can be obtained from:

Commandant
US Army Field Artillery School
ATTN: ATSF-CT-TM-PD
Fort Sill, OK 73503
AUTOVON: 639-4420/3181
Commercial: 405-351-4421/3181

Applications for attendance should be submitted through appropriate channels (MILPERCEN) in accordance with AR614-200.

## Met expendables for sound/flash platoons

The division artillery meteorological (met) section is responsible for providing required met messages to the division artillery sound/flash platoons. However, there

are times when, due to terrain or distances between the met station and sound bases, the electronic message is not valid. To improve accuracy, USAFAS sound/flash platoons have been authorized the following equipment to compute a visual sound ranging met message:

| NSN | Item | Quantity |
|---|---|---|
| 6660-00-663-8159 | Balloon, ML-64 | 200 ea |
| 6660-00-408-4559 | Calcium Hydride Charge ML-304 A/TM | 200 ea |
| 6660-00-924-2012 | Lighting Unit, ML-608/TM | 10 ch |
| 6660-00-924-2011 | Parachute, ML-609/AM | 100 ea |
| 7510-00-189-7883 | Pencils, 5H | 2 dz |
| 7510-00-281-5918 | Clipboard | 2 ea |
| 9390-00-264-6158 | Wicks | 1 bx |
| 6660-00-223-5084 | Psychrometer, ML-224 (General range) | 1 ea |
| 6660-00-640-9162 | Psychrometer, ML-224 (Tropical range) | 1 ea |
| 7240-00-160-0440 | Can, Ash and Garbage | 1 ea |
| 4020-00-247-1737 | Twine | 1 spool |

In the past, required expendables such as balloons, hydrogen, psychrometers, etc. were not authorized, but balloons and parachutes will be added to the existing Basis of Issue, and the other items will be included in the next published change to CTA 50-970. Interim authority to requisition the above items is being requested by USAFAS and, when received, a copy will be mailed directly to each target acquisition battery.

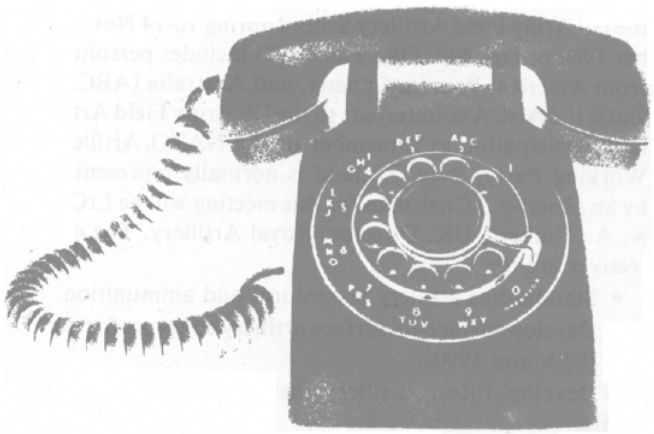
## 82C30 Basic Technical Course

Currently awaiting approval at the United States Army Training and Doctrine Command is a revision of the Combat Surveillance Target Acquisition Advanced (CSTAA) NCO Course which will incorporate the Survey Basic Technical Course (BTC) within its program of instruction (POI). The Basic Technical Course consists of a 230-hour block of instruction designed to accomplish tasks of training 82C30 personnel in the duties of chief surveyors (82C40), as well as providing intensive refresher training in all technical aspects of Field Artillery survey. Heavily integrated into classroom training and field training exercises will be survey theory and planning, subjects currently being taught only to officers attending the Field Artillery Target Acquisition Survey Officers Course. Institution of this new POI will insure that the 82C noncommissioned officer will understand the "why" as well as the "how" of survey. In this vein, the BTC will also contain instruction on manual and logarithmic solutions to survey problems and use of the programmable hand-held calculator. A large number of 82C NCOs (those reclassified from another MOS and those who entered the Army after the early 1970s) have never received advanced survey training; therefore, the Survey Basic Technical Course will be a giant step forward in fielding of well-trained technical experts.

## Ballistic met dollar crunch

The effects of inflation continue to put pressure on training of artillery meteorological (met) sections. Since 1973 the cost of an atmospheric sounding has increased 271 percent. For example, seven years ago the cost of met expendables used for producing an atmospheric sounding was $38.34, but today the cost for the same materials is $103.97.

Commanders must realize, however, that when accurate met data is available and used properly, the return in dollars saved through first round hits will far surpass the cost of met expendables. Additionally, logistical problems associated with ammunition resupply will be less, increasing the savings. This may seem difficult to comprehend during peacetime operations, but it is essential that met sections train properly to produce a combat effective unit. Thus, commanders should carefully consider the use of funds to buy expendables for the met section when a decision has to be made on the use of funds.



**Your "Redleg Hotline" is waiting around the clock to answer your questions or provide advice on problems. Call AUTOVON 639-4020 or commercial (405) 351-4020. Calls will be electronically recorded 24 hours a day and queries referred to the appropriate department for a quick response. Be sure to give name, rank, unit address, and telephone number.**

**Please do not use this system to order publications. Consult your FA Catalog of Instructional Material for this purpose.**

# Results of 1980 Readership Survey

With this report the *Journal* staff offers sincere appreciation to the more than 500 respondents who completed and returned our 1980 Readership Survey. Results have been consolidated, tabulated, and reviewed and 100 plus letters have been forwarded to readers who indicated an interest in contributing to the *Journal* or required response to specific questions.

Generally, this year's survey results follow much the same pattern as those tabulated over recent years. For example, an analysis of our current readership indicates 50 percent are Active Army, 23 percent National Guard, 8 percent Army Reserve, 6 percent retired, and 5 percent US Marine Corps. Commissioned/warrant officers comprise 75 percent of our readers, noncommissioned officers 15 percent, and junior enlisted grades 3 percent. Somewhat less than half of our respondents (39 percent) are in cannon assignments with only 3 percent in missile units. Seventy-one percent have college degrees of which 31 percent are graduate level. (Note: Percentages will not always add to 100 since some questions were not answered by all respondents.)

During the last year, 81 percent of *Journal* readership read most articles published while 67 percent kept each issue for future reference. Overall content was rated "moderately to highly useful" by 90 percent and, compared to other military publications, the *Journal* was rated "better than most" by 70 percent of the respondents. Reading ease, layout, and use of illustrations showed significant improvement and 89 percent of our readers indicated the *Journal* continues to provide an open forum for field artillery worldwide.

Standard features or "departments" of the *Journal,* in order of reader preference were: FA Test and Development, Right By Piece, View From The Blockhouse, Incoming, Commanders Update, Redleg Newsletter, With Our Comrades In Arms, On The Move, and Redleg Review.

Most interesting/popular articles were "Field Artillery Survivability," "Development of Pershing II," "Battery Positions are Out-Of-Date," "Hand-Held Calculator: Meeting Todays Needs Today!" "The Roar of the 8-Incher," "Battery Security in the Active Defense: A Proposal," and "Training and Indoctrination of the Soviet Soldier."

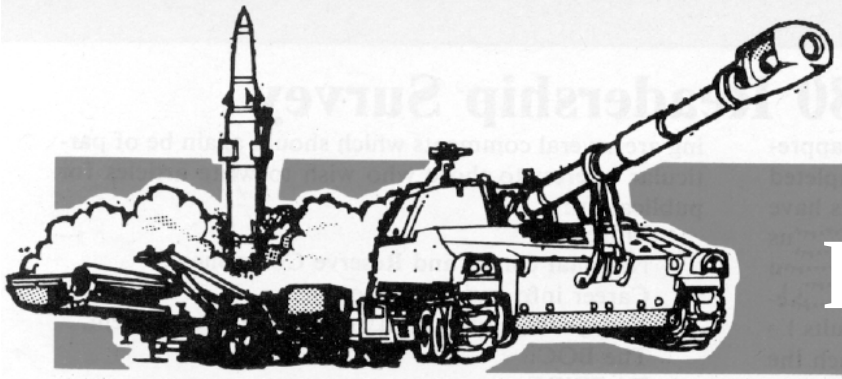
Subject areas which our readers would be most interested in seeing expanded are Field Artillery tactics; weapons and equipment; foreign armies and equipment, strategy, future concepts, and maintenance. This particular information should be of special interest to our potential contributors.

The final section of the survey solicited readership recommendations on how to improve *our Journal.* Although there may be some redundancy with the question concerning areas requiring greater emphasis, the following are several comments which should again be of particular interest to those who wish to write articles for publication:

- More on:
  National Guard and Reserve Components.
  Career info and guidance.
  Todays difficulties and new ideas to solve them.
  The BOC.
  TACFIRE.
  NBC, an upcoming issue in artillery units.
  Current trends in what the artillery is doing.
  Efforts in standardization of Field Artillery equipment, operations.
- More emphasis on how to take over new jobs for officers.
- More from the field. Too many "School" solutions do not prove to be practical.
- Articles should address battery level problems—too many brigade and higher.
- Articles on possible US FA battery problems, like what we could expect from Soviet airborne or armor forces.
- More data from DA in professional development.
- More subjects relating to/impacting on "continuous operations in a combat environment"; e.g., fatigue, organization, implication, and training.
- FA training impacting on RC/NG equipment/ammo problems.
- Occasional article strictly on the organization of a foreign army or artillery units of a foreign Army.
- Article on how to fight Middle East and Asian scenarios; and more info that would help the guys in the more vulnerable towed units.
- More emphasis on artillery combat experiences. Less on purely technical aspects and more on people. Dissenting views on capabilities of new equipment.
- More detailed articles on FA developments. Publish gunnery related articles in each issue.
- More "how to train" articles.

As stated many times in previous issues, the *Journal's* real existence and subsequent value to the Field Artillery depends primarily on readership contributions. Only through *your* active participation in and support of *our* magazine can the *Journal* meet the personal and professional needs of our community.

Again, the *Journal* staff wishes to thank those who took time to answer the Readership Survey. Additionally, as your editor, I want to personally pass on my appreciation to our published authors and to encourage others to follow suit. Whether you are a cannoneer or corps artillery commander, Active Army or Reserve Component, member of a sister service, civilian industry or our retired community, we want to hear from all of you.



# Right by Piece

## Black clouds from St. Helens

YAKIMA FIRING CENTER, WA—On Friday 16 May 1980, the 2d Battalion, 218th Field Artillery, moved to Yakima, WA, to conduct service practice with its howitzers. The battalion, whose equipment was secured in the maintenance assistance and instruction team (MAIT) compound at Yakima, was moved by elements of the 1210th Transportation Company.

On Saturday training was conducted with all units firing, with fire support teams (FISTs) from the 1st and 2d Bn, 162d Infantry, adjusting the fires of the battalion. Night firing was conducted after 2130 hours with shell illumination.

Sunday morning all personnel were performing vehicle maintenance, securing equipment, and clearing the barracks in preparation for moving to home station. At approximately 1015, a black cloud began to fan out across the sky, approaching rapidly from the southwest. The main body of the cloud was flat black with patches of brown swirling inside. The leading edges appeared fingerlike and flashes of lightning could be seen as the cloud approached. The cloud raced across the sky, darkening the sun as cinder ash began to fall. The sound of the falling ash was that of light rain striking the leaves of the trees. Visibility rapidly faded as the sky was completely covered. Visibility continued to deteriorate and vehicles 30 feet away became vague objects in the gloom. Ash began to pile up, filtering down and getting into everything.

Just before the cloud arrived, an attack helicopter troop from the Wyoming National Guard was ordered to make an emergency departure and fly north to Fort Lewis to participate in upcoming rescue operations. Pilots and crews ran to their aircraft and made emergency starts, springing from the ground and hastily departing to the north. This hurried scramble was more reminiscent of WWII than Yakima.

The men were told to go inside the barracks and to stay put. As conditions worsened, it became clear that we were in for a seige, so C-rations were drawn from DIO for the evening meal. (They were to become a steady diet!) A battalion command post was established in headquarters and headquarters battery billets and the headquarters of the 41st Inf Bde was notified of the situation and the battalion's intentions.

Vehicle movement of any kind became very hazardous. Heavy clouds of ash raised with each passing vehicle and lingered in the air for minutes, obscuring oncoming traffic. The base was closed and all vehicle traffic stopped with the exception of MP patrols. Marooned civilian travelers were given emergency shelter in nearby billets.

Farm animals in the area became confused and frightened, calling and bawling in panic. Roosters crowed continuously and small birds and animals huddled in the underbrush and trees.

Throughout the night and most of Monday, the fallout continued with dark gray ash obscuring all details. Total accumulation at the firing center approached one inch with deeper drifts near buildings and vehicles. All aircraft remaining at the airfield were grounded to avoid

**The coarse ash clogged air filters and eroded brake drums on vehicles.**

damage to turbine engines. Wheeled vehicle brake drums were eroded by the coarse ash, requiring emergency repairs. Air filters clogged repeatedly and had to be watched closely to avoid overheating engines.

The battalion staff worked closely with rear parties in Portland to identify those safe in Yakima and those with advance parties who had left before the storm. Individuals in the advance party told tales of zero visibility with assistant drivers watching the side of the road and ditches to keep the cars on the road. By 2300 hours Sunday, the advance party arrived safely in Portland and families were notified that their men were safe in Yakima.

It was clearly too dangerous to attempt to move personnel in unprotected trucks. Protection for eyes and breathing masks would be required for each man. Military or commercial buses that could be sealed seemed the best approach and were requested from the 41st Bde. Commercial bus companies refused to send buses into the area, so three military buses from Camp Withycombe were dispatched at 1630 hours Monday. They carried rations, water, protective masks, spare parts, and tools and were accompanied by a wrecker. Arriving in Yakima at 2235 hours, the buses were met with a rousing cheer from the anxious men of the battalion and then were driven to the MAIT compound of the Washington National Guard and inspected for brake wear or filter damage.

A departure time was set for 0830 the next day. Early the next morning the battalion cleared billets, checked out with the MPs and post commander, and departed. Buses were separated by three-minute intervals to allow the dust to settle. Privately owned vehicles were sent ahead to avoid the turbulent conditions and a wrecker and sedan followed the convoy. The fallout thinned 20 miles down the road at Toppenish and Highway 97 proved to be clear through Satus Pass and on down to the Columbia River.

A minor breakdown of one bus caused a slight delay, but it was quickly repaired while the other two waited at Brooks State Park. After a hearty lunch of C-rations (not fully appreciated) the unit moved on, closing into Portland at 1600 hours Tuesday.

Although the weekend had its trying moments, the men of the unit took it in stride and cooperated with their NCOs and officers, making the best of a poor situation. Card games, bull sessions, gopher races, and some not too melodious singing helped to pass the time. All in all the experience was good, bringing the unit closer together as a team.

## Mini cannons pack wallop

FORT LEWIS, WA—"They're like one's children. I can't bear to part with one unless I've made another one like it," said SGM (Ret) Clair Stairrett.

Stairrett, who retired 31 July after 29½ years in the Army, designs and makes miniature cannons that actually fire.

The process of building a cannon begins with researching through musty books and getting an idea for a design. "Every cannon is built to scale," Stairrett pointed out. He measures the size of real cannons and scales down the models. "If they aren't exactly to scale, they won't fire," he added.

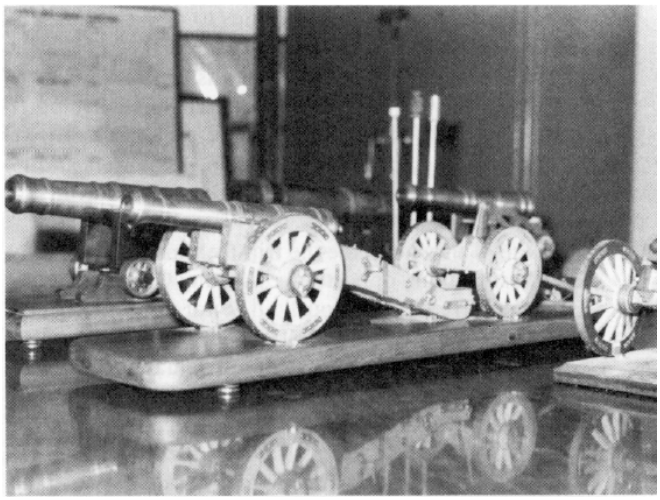
According to Stairrett, the noise from his cannons is about as loud as the bang of the post's retreat cannon. "If the cannons aren't mounted, their recoil is about a yard," he said.

The ammunition for the weapons is black powder, a lead ball or steel bearing, and a small piece of tissue. Stairrett emphasized the safety factor in using black powder as the explosive.

Right now, he has about 32 cannons. Each is a one-of-a-kind model. "I've also either sold or given away about the same amount," he added. The materials he uses include wood and brass. "I use walnut, maple, cherry, or whatever wood appeals to me at the time. Apricot wood is the most beautiful I've seen lately," he said.

The barrels of the cannons are made of either brass or bronze. His bronze barrels are cast in Italy. "I make a wood pattern and send it there to be cast," he said. The only really special tool required according to Stairrett is a lathe to turn the barrels.

The actual dollar cost is not that expensive; however, Stairrett spends up to 70 hours on a small cannon and as many as 200 on the larger ones. He also wants to try his hand at miniature firearms and ships in bottles. (Pam Dufresne)



**These scaled-down models of real cannon can actually fire.**

## 138th goes to Europe

LEXINGTON, KY—"ONE ARMY CONCEPT," "COME AS YOU ARE WAR," "D + 30," "D + 60," "CAPSTONE." These are common phrases often heard in a discussion between Active Army and National Guard personnel. These statements hold more meaning now for 30 Guardsmen of Headquarters and Headquarters Battery (HHB), 138th FA Brigade, from Lexington, KY, who recently completed two weeks training with HHB, 17th FA Group, in Augsburg, Germany. There, the importance placed on the National Guard was very much emphasized as we were briefed by both the 17th Group and VII Corps and were told where we would fight and what our mission would be.


**Left to right: Command Sergeant Major Bailey, Captain Williams (counterfire officer), Major Rickerd (operations/intelligence officer), Colonel Collins (brigade commander), and Lieutenant Colonel Underwood (brigade executive officer).**

HHB, 138th FA Brigade, was notified in November 1979 that it was being considered for OCONUS (outside continental United States) training (30-man cell configuration) for late February or early March 1980. This was no small problem, since most Guardsmen must arrange for time off with employers for two weeks Summer Camp, but now they had to ask for an additional two weeks. Following careful negotiation, 13 officers and 17 enlisted men were able to go, and every section in the battery was represented.

Those of us who made the trip feel this was probably the finest training opportunity that any Guardsman has ever been offered. (Obviously, it is not necessary for all Guard units to have OCONUS training; however, for early deploying organizations, it is invaluable. Cost-wise it is also understandable that entire units may not be offered this opportunity, but the 30-man cell and smaller cells are quite adequate for training purposes.

After the briefing, during the first week, we visited the East German Border at HOF West Germany and were given a tour by the 2d Armored Cavalry Regiment. Never before has the Iron Curtain and Communist ideology meant more to our small group of 30 Kentuckians than it did that day as we looked across 50 meters at two East German Border Guards who apparently had spent most of their lives in virtual slavery. It made us realize why it was so important that we be trained and ready to protect the freedom we so often take for granted.

The real highlight of our training came during the second week when we participated in a command post exercise, using the "first battle, the artillery threat" for structure. The 17th FA Group had gone to great length to make this a realistic and meaningful training experience which incorporated real world problems, using actual terrain, real world "Go to war TAC SOPs," etc.

In addition to the training opportunities we gained, many intangibles which can not be measured such as familiarization with terrain we will fight on and personal contacts which will improve communications between our unit and those units we will fight with if activated in Europe.

Perhaps most important, we now fully understand the true meaning of the "One Army Concept."

## Crossbuck III

CAMP ESSAYONS, KOREA—Battery A, 6th Battalion, 37th Field Artillery, (155, towed), 2d Infantry Division, recently participated in Operation Crossbuck III, a large-scale joint US-ROK (Republic of Korea) combined arms exercise. The battery was in general support of the 73d ROK Regiment consisting of two Republic of Korea Army (ROKA) infantry battalions, one US infantry battalion, one ROKA tank battalion, two US cavalry troops, and one US air defense artillery battery. The 196th ROKA Field Artillery Battalion (105, towed), was in direct support of the 73d Regiment.

The four-day exercise began with a no-notice alert and deployment into assembly areas. The battery then moved into its firing position along the Han-Tan River Valley.

As the force artillery headquarters, the 196th planned the fires and positioned the US unit. This presented a significant challenge to the US battery since all operations orders and fire plans were published in Korean. Despite language difficulties, both units were able to function smoothly and execute all orders effectively. The US unit was aided by its organic KATUSA (Korean Augmentation of US Army) soldiers and by its US liaison team, located with the ROK battalion fire direction center. 1LT John Harkey, liaison officer, remarked, "The Korean fire plans were constructed with such clarity and standardization that they were relatively easy to understand and implement."

Near completion of the exercise, a number of "duty" exchanges were made between the ROK and US units. For half a day the commander of Battery A, 6-37th FA,

exchanged places with the commander of Battery B, 196th (ROK), and led their respective units through a deliberate occupation. In addition to "trading" commanders, the two units exchanged howitzer sections, each demonstrating its respective advance party and occupation techniques. In other areas (such as survey, communications, and ammunition) the ROK and US soldiers trained and performed their missions side by side.

Partnership and cross-training among Redlegs around the world is important. The cannoneers of the 6-37th FA are doing their part in Korea.

## Group to Brigade

FORT SILL, OK—The 212th Field Artillery Group at Fort Sill recently became the 212th Field Artillery Brigade.

The brigade headquarters will gain approximately 20 additional soldiers, raising its strength to 149. The 212th will also receive more equipment to insure faster and increased artillery fire support capabilities. (It will be the first full artillery brigade to be equipped with TACFIRE.)

The brigade can provide tactical command and control for six battalions; however, it is now organized with four: 2d Battalion, 12th Field Artillery; 2d Battalion, 18th Field Artillery; 3d Battalion, 18th Field Artillery; and 2d Battalion, 37th Field Artillery.

Commander of the 212th is COL James W. Wurman.

## Female OP

FORT CARSON, CO—Battery H (TA), 29th Field Artillery, may be the first unit in target acquisition history to boast an all female observation post. The OP team is led by SGT Delores Pressley, chief observer, and other members include PVT Virginia Baez, senior observer; PVT Michelle McPherson, observer; and PVT Harriet Langston, radiotelephone operator/observer.

## Dragons down under

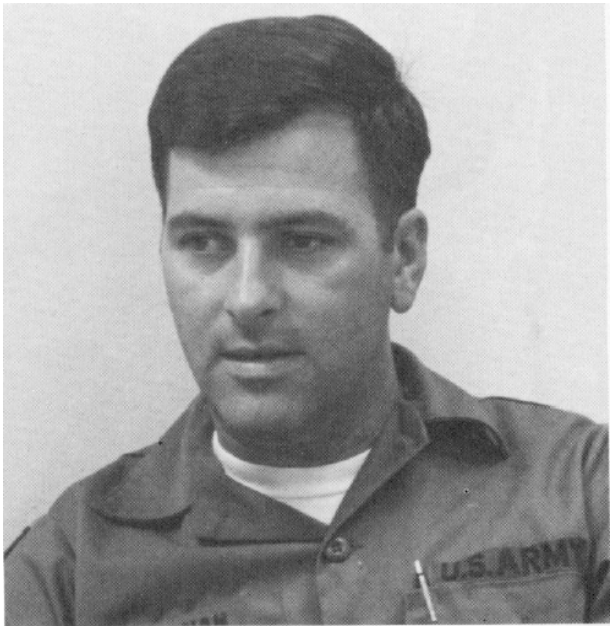
SCHOFIELD BARRACKS, HI—The Red Dragons, B Battery, 3d Battalion, 13th Field Artillery, deployed to Sydney, Australia, as the artillery contingent on Exercise Pacific Bond '80.

While "down under" the battery received formal instruction at the Royal Australian School of Artillery in Manly. There, soldiers became familiar with Australian weapons, fire direction, and fire support.

The artillerymen then moved to Holsworthy and were fully integrated into the 103d Medium Battery, 8/12 Medium Regiment, Royal Australian Artillery.

Training focused on live fire exercises with the 5.5-inch howitzer, the small arms ranges with the 9-mm submachinegun and crew drills with the 5.5-inch howitzer which is equivalent to our 155-mm towed howitzer.

The highlight of the exchange was a salute to the Queen of England fired by complete sections of US and Australian artillerymen in downtown Sydney.

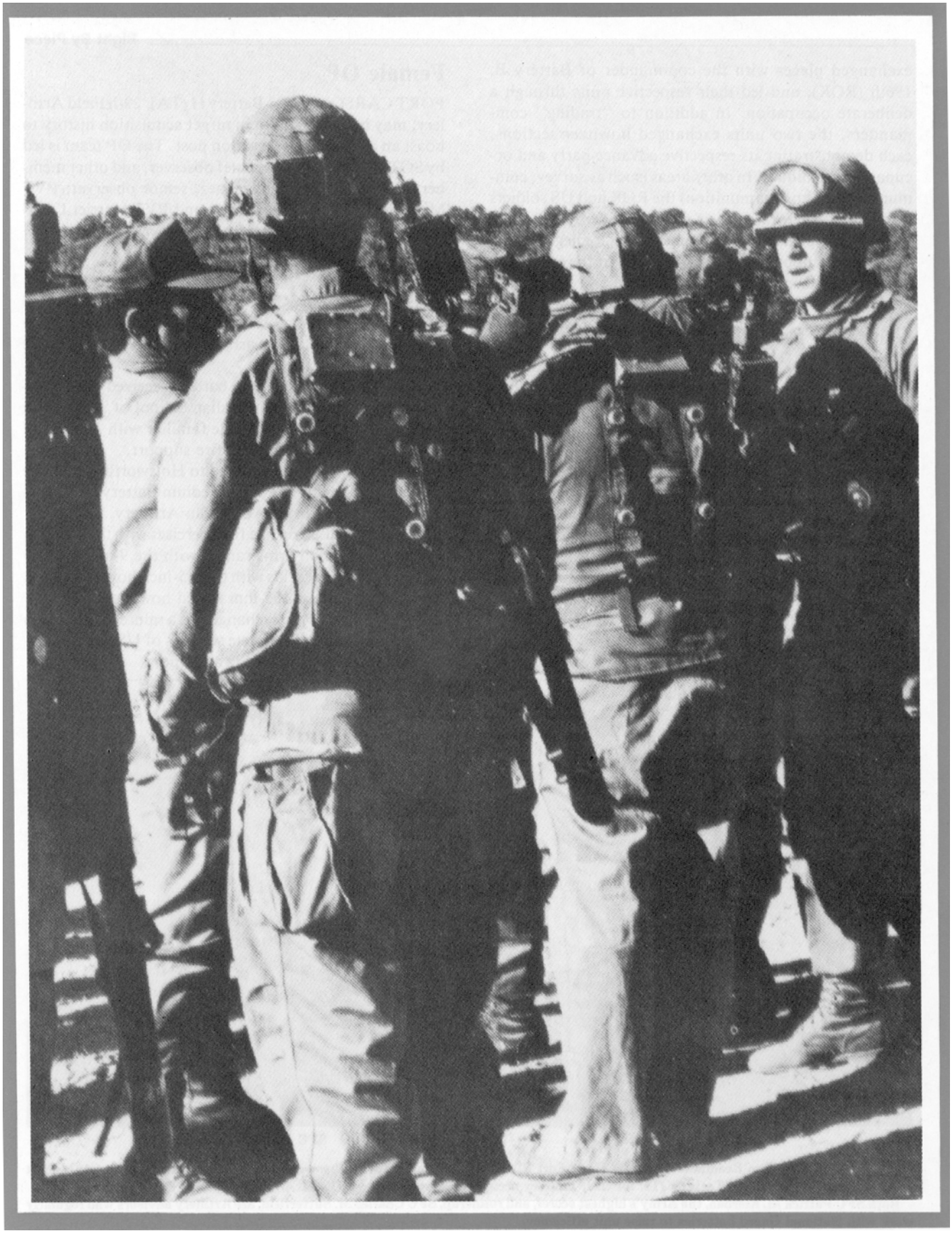



SFC Patrick M. Kiernan

SFC Charles M. Sutterfield

**FORT RILEY, KS—Two Readiness Group NCOs at Fort Riley recently distinguished themselves by achieving the Army's two highest scores on Skill Qualification Tests (SQTs) for their military occupational speciality—MOS 13E4, Chief Artillery Computer.**

**Both SFC Patrick M. Kiernan, the Army's highest scorer, and runnerup, SFC Charles M. Sutterfield, are Artillery advisors who regularly work with National Guard batteries to raise unit efficiency.**



# MILES

# Realistic Training For Direct Support Artillery

## MILES is coming.

MILES is the Multiple Integrated Laser Engagement Simulation System, a field training innovation for maneuver forces, where lasers mounted on direct fire weapons will determine the casualties in simulated battle. What happens in a MILES confrontation will be close to what would have happened in combat, except that the "casualties" will be alive to learn from their experiences. Leaders will learn by actually seeing the consequences of their plans and orders; yet they and their soldiers will be able to continue to do it better another day.

MILES is not an entirely new technique. It is the latest in a family of training systems referred to as Engagement Simulation (ES). It grew out of a program that was initiated with SCOPES, a system for simulating rifle squad combat, and REALTRAIN, which simulated combined arms combat at the platoon and company level. Both of these programs required extensive controller personnel and a great deal of communications equipment in order to control field exercises. This meant that until MILES came along, most ES exercises were at rather low echelons, not requiring support by artillery personnel. The only artilleryman in ES was the forward observer (FO), or fire support team (FIST) member, who called for indirect fire. (When called for, indirect fire was marked directly on the ground wherever the maneuver company commander wanted it and provided no training for artillerymen at the guns or in the fire direction centers (FDCs)). The advent of MILES means that larger exercises can be run with fewer controller personnel.

The entire artillery firing system needed a technique for integration into an ES program so that it could become a full partner with combat maneuver forces in realistic field training. MILES will increase the importance of maneuver training with realistic artillery involvement.

Several alternatives are possible in using field artillery in ES exercises. The first, of course, is to go out and do the same thing that has always been done in a nonfiring field training exercise (FTX). The FO request fire, the battery goes through the motions of firing, and the fire is marked more or less where the FO asked for it. Nothing the battery or the FDC does has any effect on where the fire is marked. No artillery skills are involved except the map-reading ability of the FO and the fire marker, and the battery gets no performance feedback at all. Considering the intense, dynamic feedback potentially available for the maneuver troops in MILES exercises, it seems the artillery ought to be able to get more out of an FTX.

A recent research effort by the Army Research Institute for the Behavioral and Social Sciences with contractor support from Human Sciences Research, Inc., examined the elements necessary for realistic artillery simulation. Sponsored by the Field Artillery School, the purpose of this research was to develop a training system that would permit the inclusion of all elements in the indirect fire sequence into realistic field exercises. This system would allow the performance of the FO (or FIST), the FDC, and the firing battery to be reflected accurately in the delivery of "steel on the target." The solution includes two steps:

1) Obtaining data from the actual settings on the guns, which had been computed by the fire direction center after a call for fire from a FIST member.

2) Using that data to replot for the probable impact point. Fire markers would mark the actual targets as in the past. However, the targets would be marked where the rounds would have actually burst, rather than where the maneuver company commander called for the fire.

The first problem was how to obtain the data from the guns without interfering unduly with battery operations. Currently the chief of section checks his own gun; however, placing a senior NCO or officer in the firing battery to collect the data would be costly in terms of manpower and also would represent a threat to battery personnel.

by Dr. Earl S. Stein, COL (Ret) Francis King,
Dr. Exequiel Sevilla, and LTC (Ret) Richard Seed (USMC)

Could a junior enlisted man be trained to read the data off the sights and transmit it accurately to the Fire Marker Control Center (FMCC) for replotting? Would the gun controller get in the way? Exploratory work at Fort Sill indicated that men in the last week of Advanced Individual Training (MOS 13B) could check deflection, quadrant, shell, charge, and fuze setting accurately and without any noticeable restriction of the gun crew activities.

The goal was to involve everyone in the artillery firing system, including the FIST, fire direction center, and firing battery. The system had to make all elements feel responsible for the final result of putting "steel on target" and had to include a procedure for providing performance feedback. The steps in the system developed for artillery engagement simulation are as follows (figure 1):

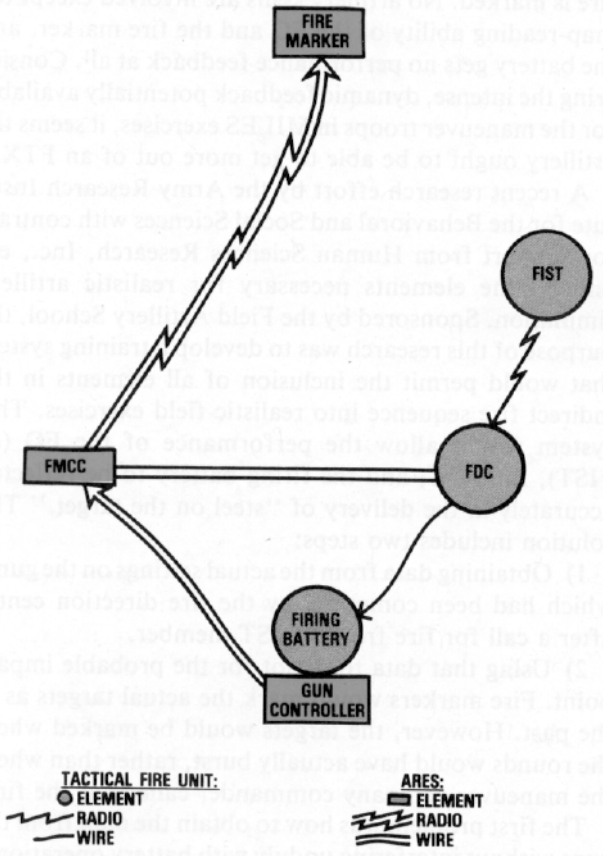



**Figure 1. Elements of artillery engagement simulation in operation.**

- Maneuver commander designates the target.
- The FIST calls for a fire mission.
- The fire direction center computes firing data and transmits it to the firing battery sections.
- The firing battery places the data on the guns and "dry fires."
- The gun controller transmits the data on the guns to the FMCC.
- The FMCC computes the probable impact point and sends movement instructions, including distance and direction, to fire markers located at known points in the maneuver area.
- The fire marker paces off or drives the distance and marks the target.
- The FIST team observes the burst and adjusts fire accordingly.
- The FIST team provides feedback to the fire direction center which provides feedback in turn to the firing battery.

### Test of the system

An M109A1 howitzer battery participated in a week of developmental trials of the Artillery Engagement Simulation System. Control personnel were drawn from the same battalion. The Fire Marker Control Center was manned by personnel from the battalion FDC trained to do FMCC tasks. A combat scenario was written, and the firing battery was designated to fire missions for imaginary maneuver units. The FIST was accompanied by a member of the research staff who played the role of the commander of a maneuver company team. He designated targets of opportunity and in addition required the FIST to plan and fire preplotted missions based on attack and defense scenarios. Gun controllers—an E3, E4, and E5—who communicated the data to FMCC were all trained gunners. Generally two guns were employed at one time. The data sent to the FMCC was based on randomly checking different guns, and every gunner was informed that he could influence where the rounds landed in the impact area. The FMCC was established about 100 meters from the guns, separate from the FDC.

The FMCC replotted for the probable impact point in two ways:

- Using the standard chart procedure, graphical firing table (GFT) and graphical site table (GST).
- Using the TI-59 calculator with a special program developed for the purpose.

As soon as the probable impact point was plotted and cross-checked, the FMCC sent movement instructions to the fire markers, who were Jeep-mounted. They had received extra training in compass use and land navigation before the trials began.

The fire markers moved from surveyed reference points to the designated probable impact points. These points may or may not have been the target called for by the FIST team, depending on the accuracy of the artillery firing system and, within limits, on the accuracy of the fire markers themselves. A flash base was then established to determine the actual burst point of the rounds and to verify fire marker accuracy. During the four days of actual exercises, 36 missions were "fired."

### Results of the field trials

A goal of artillery training is to improve speed of delivery and accuracy of impact.

Artillery system delay for first round delivery is the period from the moment when a target is designated by a maneuver commander to the moment the firing battery indicates they have fired the first round. For the purposes of analysis, the 36 missions were divided into three blocks of 12 missions each. Table 1 presents the average time for the artillery system delay within each block of 12 missions. There was a noticeable improvement across the three blocks of missions, with the last 12 having the fastest delivery time. The variability in performance within blocks, as measured by the standard deviation, also decreased considerably, from 175 to 61 seconds, respectively.

**Table 1. Average artillery system delay for first round delivery.**

| Missions | Mean time (seconds) | Standard deviation |
|---|---|---|
| 1-12 | 251.00 | 175.86 |
| 13-28 | 222.30 | 72.42 |
| 29-36 | 179.00 | 61.44 |

The accuracy of the artillery firing system was measured by the median difference in meters between the coordinates that the FIST team requested and the most probable impact point as computed by the FMCC. This measure of accuracy includes errors made by all members of the artillery firing system.

Figure 2 shows the mission accuracy across the blocks of 12 missions. From Block 1 to Block 3, the accuracy improves by well over half the initial median error.

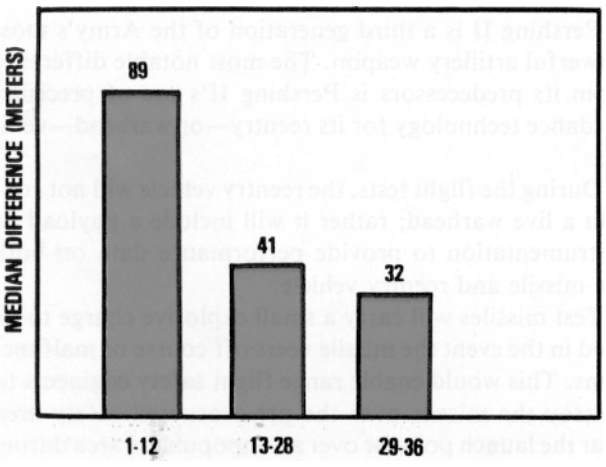



**Figure 2. Artillery system accuracy. (Accuracy was determined by the distance between the coordinates requested by the FO and the impact coordinates computed by the FMCC.)**

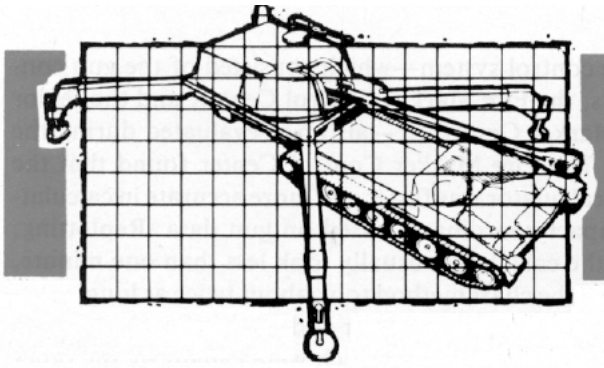
The control system—which consisted of the gun controllers, the Fire Marker Control Center, and the senior Fire Marker Controller—also was evaluated during the trials. The Fire Marker Control Center found that the TI-59 calculator was faster and more accurate in calculating impact coordinates based on gun data. Replotting, using the calculator, usually took less than one minute, whereas the chart method took about twice as long. In 36 missions, the chart operator and the calculator operator each made three errors, which were caught by the other computer. In the firing battery, gun controllers built credibility by their attention to detail. They found that if they stood outside the turret or in the corner until after the lanyard was pulled, they caused no appreciable interference during the firing of the missions. The fire markers made some errors in accuracy, which has always been a problem in simulating the impact of indirect fire. The errors were perceived by FIST members, however, to represent the dispersion pattern of the 155-mm battery.

The overall delay, from the time the maneuver company commander asked for fire, until it was marked by the fire markers, included both artillery system time and control system time. Over the 36 missions, this overall delay averaged approximately five minutes. FIST members stated that this did not unduly detract from the realism of the exercise.

Artillery engagement simulation appears to share one thing in common with maneuver arms ES—the enthusiasm it generates among the trainees. Troop interest remained high, after some initial skepticism about dry fire exercises. Initially, gun controllers routinely found two to three mil errors on the guns. When these rounds were "fired," feedback from the FIST team was as quick and intense as it might have been with live fire. The word moved fast from the fire direction center to the battery that the fire was being marked with their errors included. NCO supervision picked up, pieces were properly laid on the collimators, and the bubbles were leveled. Accuracy was a result.

What we have developed is an engagement simulation technique for the artillery cannon battery. New simulation systems for maneuver arms training should include realistic indirect fire training. Artillerymen have a right to fully participate in realistic tactical training. Now they have a method for it.

**Dr. Earl S. Stein is a Research Psychologist with the US Army Research Institute for the Behavioral and Social Sciences, Alexandra, VA. COL (Ret) Francis King is an Analyst for Science Applications, Inc., McLean, VA. Dr. Exequiel Sevilla, Research Scientist, and LTC (Ret) Richard Seed (USMC), Research Associate, are assigned to Human Sciences Research Inc., McLean, VA.**



# FA Test and Development

**design • development • testing • evaluation**

## Firefinder contracts

The US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, VA, has exercised options valued at more than $6.2 million on contracts awarded last year for the initial production of a 10-kilowatt, 400-hertz, gas-turbine, engine-driven generator set for the Army's Firefinder system.

Delco Electronic Division, General Motors Corporation, is manufacturing the power conditioners which regulate the flow of electricity being generated by the system. Solar Turbines International manufactures the power plants and frames and mates the power conditioner to these units to form the complete generator set.

The complete set will supply power for the mobile AN/TPQ-36 mortar locating radar system which uses electronically scanned radar to detect and track enemy artillery.

The option being exercised is for 66 units plus spare parts and related packaging which would bring the total production contracted for thus far to 112 sets, with a contract value in excess of $15.7 million. Initial deliveries are scheduled to begin in September this year.

## Phase II netted radar demonstration

A Phase II netted radar demonstration is currently scheduled to be conducted at Fort Sill during first quarter FY81. The demonstration will consist of two modified AN/PPS-5s, one airborne MTI radar, and one AN/TPQ-36 mortar locating radar, all feeding target information into one target integration center (TIC). The TIC correlates the data from all radars and displays it on a screen and, if desired, with the local road network and terrain features as background.

The following are some of the concepts to be demonstrated during Phase II.

- Netting of airborne and ground-based radars.
- Attack of stationary and moving targets.
- Artillery battery pattern classification.
- Display of MTI data at TIC and on displays at remote locations.
- Registration and fire adjustment.
- Target classification (wheeled, track, helicopter, troops).
- Surveillance and track during scan.

## PII launch sites

White Sands Missile Range officials have announced plans to survey areas in Utah and Idaho for possible use as temporary launch sites for Pershing II.

MG Duard D. Ball, range commander, said the Army's Pershing Project Office is interested in two general areas for medium and long range tests of the new system.

The third firing range, already in use, is the preferred site for short range tests. This is the Army's McGregor Range, just northeast of El Paso in southern New Mexico.

The Utah, or medium range, site would be at or near the Utah launch complex at Green River. Although the Green River site has been occupied by the Army since 1962, no Pershing missiles have been fired from the area since 1974.

An area near Mountain Home Air Force Base, southeast of Boise, is the proposed site for the long range tests. Most of the real estate that would be involved is administered by the Bureau of Land Management.

Plans call for test firings of the Pershing to take place in late 1982 and early 1983.

A total of 26 missile firings are planned during the engineering development tests. Eight rounds will be fired from McGregor, four from the Utah site, and 14 from the selected Idaho location.

Pershing II is a third generation of the Army's most powerful artillery weapon. The most notable difference from its predecessors is Pershing II's use of precision guidance technology for its reentry—or warhead—vehicle.

During the flight tests, the reentry vehicle will not contain a live warhead; rather it will include a payload of instrumentation to provide performance data on both the missile and reentry vehicle.

Test missiles will carry a small explosive charge to be used in the event the missile veers off course or malfunctions. This would enable range flight safety engineers to destroy the missile over the pre-evacuated safety area near the launch point or over an unpopulated area during its flight to White Sands Missile Range.

All rounds fired during the test will be programmed to impact on designated targets within the boundaries of the White Sands Missile Range.

## Missile Command reorganizes

What was formerly the Advanced Systems Concepts Office at Restone's Army Missile Command (MICOM) has become the Future Weapon Systems Directorate (FWSD), a team of more than 30 researchers and engineers.

According to Dr. Samuel Hardy, Deputy Director, FWSD, "We're focusing the people, talent, and resources available to the Army—not only at Redstone but elsewhere as well—to satisfy the Army's current and long-range missile and rocket requirements. We must give the soldier what he needs to fight out-numbered and win."

A current major thrust of the Army is the analysis of weapon system needs by mission area. FWSD is the responsible office at MICOM for mission area analysis and as such has already been working with soldiers at the schools and centers to find out what they need and tell them what is available.

Future weapon systems will receive long-range threat projections from MICOM's Foreign Intelligence Office and technology status and technology thrust from the missile laboratory. These data are then shared with the Army Training and Doctrine Command in defining their deficiencies and requirements.

MICOM, in turn, must take available technology from all sources and focus it toward a solution for the soldier's requirement, whether developing a new weapon system or improving an old one.

Under its new structure, FWSD consists of Experimental Systems and Future Systems. Future Systems, consisting of Fire Support, Air Defense, and Close Combat Teams, will work closely and coordinate activities between soldiers and MICOM's technology base.

As technology matures, Experimental Systems would transition and manage the technology to demonstrate the feasibility and potential of a weapon system.

The reorganization will assist in accomplishing the MICOM mission by providing a clearly defined interface with the user, a focus for technology programs, and formulation of long range plans.

## Acting director for CSTAL

Vincent J. Kublin was recently appointed acting director of the Army Electronics Research and Development Command's (ERADCOM) Combat Surveillance and Target Acquisition Laboratory (CSTAL) at Fort Monmouth. He succeeds COL J. George Mikula who is now the commander of ERADCOM's Technical Support Activity.

CSTAL is responsible for improving the Army's capability in battlefield surveillance, target acquisition, and designation. The primary focus of the Laboratory is on radar and sensor data development.

## UK firm to work on Copperhead

Marconi Space and Defense Systems has joined as the UK partner of a group examining the feasibility of manufacturing the Copperhead projectile in Europe.

Industrial firms from four other NATO countries are already working in partnership with the European industrial consortium, PGM Systems, which is planning to establish a European multinational group for Copperhead by January 1981.

Under the proposed plan, each national industrial partner would receive co-production work in ratio to the size of each country's Copperhead purchase.

Copperhead can be fired from conventional 155-mm artillery weapons common to all NATO armies.

# Letters to an Artilleryman

by LTC Donald K. Griffin

In the late winter and early spring of 1980, a new division artillery commander in Germany called a friend at the US Army Materiel Systems Analysis Activity (AMSAA) with a request that essentially said, "I just came from the Pre-Command Course and they tell me that things are going to get much better by 1986. I have the uneasy feeling that there isn't much analytical horsepower available for *today's* problems. Can you give me some quick thoughts about artillery today—like what targets are we most effective against, how much ammunition should we fire at them, and what should we do to survive?"

What follows is a series of letters to that artilleryman trying to help him unravel tough tactical problems. The letters are offered in hopes of helping others. The contents represent the best 1980 estimates of the Support Weapons Analysis Branch at AMSAA, an organization which usually works on tomorrow's developments, not on today's problems. The technical portions are inputs from civilian analysts. The tactical conclusions are primarily those of the author.

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6 February 1980

Dear Sir:

Thanks for the call. Your questions strike home. The analytical experience at AMSAA (Army Materiel Systems Analysis Activity) has made me only too well aware of our present limitations.

AMSAA is aimed at future systems, but we would be happy to turn some analytical talent on *today's* problems—most people won't give us much credibility on the tactics side since that is operating out of our box. Please take what I send you as good analytical input but is only *my* tactical input.

Here is what we are going to do as soon as possible:

a. We will send a matrix of *current* ammunition effectiveness against current targets of most interest—showing effects of 1, 3, and 6 battery volleys (it is not linear). The basic conclusion you will draw is that artillery is quickly going out of business if we concentrate on trying to destroy armored vehicles. Suspect it will show

best targets are *towed* artillery; then other artillery also can see that we should work on *suppression* of overwatch positions with HE/ICM and smoke.

b. We will make some simulation runs directed at the question "What is the best survivability tactic consistent with mission accomplishment for an artillery force TODAY?". We will work on frequency and distance of battery moves and on spread battery. Spreading is *very* effective. We will try to illustrate out to 200 meters between guns although I know that is really pushing it. We should be able to get some runs on the following force:

| **Division** | **FA Brigade** |
|---|---|
| Three DS 155-mm bns (3 × 6) | Three 155-mm bns (3 × 6) |
| One GS 8-inch bn (3 × 4) | Two 8-inch bns (3 × 4) |

We will play BLUE Forces with Q36/37 and RED forces with Q4.

Numbers will follow very soon. Let me know if we need to modify our approach.

For what it is worth, here is a bit of blasphemy that struck us about a year ago—I think conventional wisdom says DS units should be 3 to 5 kilometers behind the FEBA (forward edge of the battle area); GS units, 8 to 10 kilometers behind the FEBA. We think that is *backwards*. DS shoots close targets (2 to 5 kilometers)—moving DS back (in defense) gives better protection and cuts down on mini-moves and on moves generated by the FEBA falling back. That means more continuous support. GS units need to shoot deeper, so they cannot afford as much setback, particularly the 8-inch. Right now GS only has credible deep acquisition against artillery—we think they are mostly in the 3 to 10 kilometer band. I guess that idea is contrary to tradition—like putting the first lieutenant in the FDC and the second lieutenant on the guns!

Will send you more as soon as possible.

DKG

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12 February 1980

Sir:

Here is installment 2. Hope the kill numbers do not depress you too much.* As you can see, they substantiate the idea that artillery killing armored targets, including SP howitzers with today's ammunition, is not very productive. Obviously you can be effective against enemy battery personnel who are outside—but if you are effective, they won't stay outside.

Probably no one in the Army knows how to handle the suppression question (how effective is it?), particularly against armored targets. It has to be an important factor. It certainly seems prudent to deliver suppressive fire against overwatching tanks, BMPs with SAGGERs, and artillery observers in armored vehicles. I would be looking hard for these things at 2 to 4 kilometers beyond friendlies. Massive suppressive fires against assaulting armor at 3 kilometers on in may well be counterproductive. The smoke and dust could eat up our own direct fire systems. But that is our speculation. We have nothing much to add to the body of knowledge on suppression.

Based on the expected damage estimates in the attached paper,* I guess my priorities would go like this:

a. Given a Q37, counterfire first—hope they are towed—or that you can force them to move.

b. Suppressive fires against overwatch positions—real or suspected.

c. Fires against CPs if you can find them.

d. Fires against ZSU-23s when seen.

e. Suppressive and obscuring final protective fires to allow maneuver forces to disengage. These should be planned in the 500 to 1,000-meter band beyond friendlies. General DePuy said TOWs should withdraw when the enemy is within 1,000 meters and tanks should withdraw when the enemy is within 500 meters.

Hope the ammunition effectiveness estimates begin to help. Will send simulation results on moves and survivability as soon as possible—we broke our model.

Standby for installment 3.

DKG

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*The reference is to an AMSAA paper entitled, "Artillery Ammunition Effectiveness," February 1980, which is classified. Authorized agencies may request this four page document from Director, AMSAA, ATTN: DRXSY-GS, Aberdeen Proving Ground, MD 21005.

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15 February 1980

Sir:

Okay, here comes installment 3. We do not have those simulation runs yet, but I have been thinking about the stuff I sent in installment 2.

It strikes me that if our present ammunition is ineffective against an enemy's hard targets, then with today's ammunition he will have trouble with our hard targets too, even though he can shoot more. It strikes me that, just like us being able to tear up his towed howitzer crews, he can sure make it tough on our 8-inch crews. You will recall I mentioned that we may have things a bit bass-ackwards—the 8-inch needs to be up close for GS role while the 155-mm can afford to back off. That idea along with the 8-inch nuclear capability spells a high priority very vulnerable target.

As you probably know, there is a development program underway to put a ballistic crew shelter on the M110. That program, however will not protect your crewmen during your command. In the interim you might want to consider a field expedient nylon blanket. These blankets can be locally fabricated within a division

and can provide nearly the same ballistic protection that is available for the M109 howitzer.

Construction of these blankets is described in the attached publication.* Figures 1 and 2 show the effectiveness of various protection schemes. Figure 3 gives the cost for several options. In our professional opinion, even a couple of 16-ply, 4- by 8-foot blankets hanging on simple frames along both sides of each howitzer would provide very worthwhile protection.

A 16-ply, 4- by 8-foot blanket can be easily manhandled (about 50 pounds). You can spray paint the material to help camouflage and to allow decontamination.

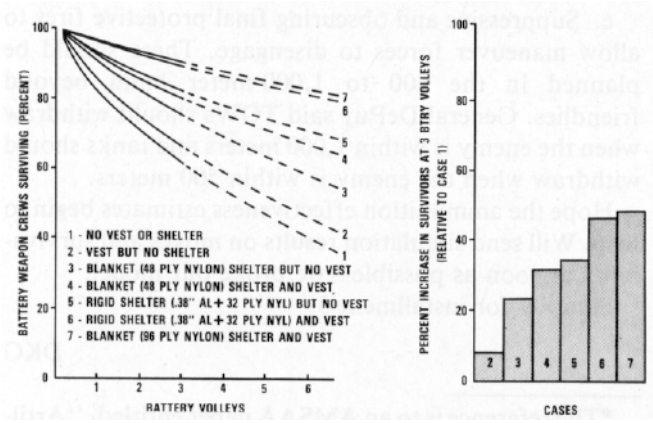


**Figure 1. Effectiveness of crew protection alternatives, HE projectile.**

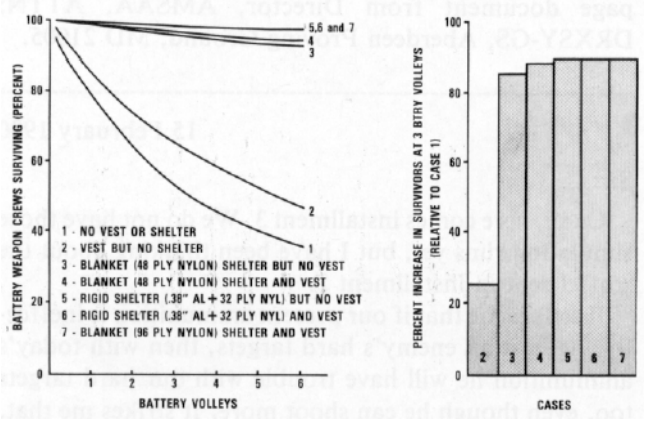


**Figure 2. Effectiveness of crew protection alternatives, ICM projectile.**

Nylon cost = $3.00 a square yard per ply
Cost per howitzer (nylon only):

| Ply | Two sides, top, 1/2 rear | | Two sides, 1/2 rear (7 yd$^2$) | |
|---|---|---|---|---|
| 16 | $ 860 | (260 lbs) | $ 530 | (160 lbs) |
| 32 | $1730 | (420 lbs) | $1060 | (320 lbs) |
| 48 | $2590 | (580 lbs) | $1590 | (480 lbs) |

**Figure 3. Field expedient cost.**

Obviously this kind of protection would have to come out of your own budget. But, without it, your 8-inch crews are being held at a very high risk. We really can't afford to lose that counterfire and nuclear capability.

Get back to you soon.

DKG

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*The publication is AMSAA Interim Note No. SV-13, "Do it Yourself Ballistic Protection," June 1979, unclassified, available from Director, AMSAA, ATTN: DRXSY-S, Aberdeen Proving Ground, MD 21005.

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28 March 1980

Sir:

Installment 4—a bit late.

First, received your paper on today's artillery—yes, it is *needed*; no, it is not too elementary. But, I think it should maybe be more hard-hitting and specific on what guys in the field should do. In your paper you mention "an understanding of our capabilities and limitations." We think that is the key to surviving *and* to doing our job.

So about specifics—in this installment I want to tell you what we *know* and what we *suspect* about the balance between doing our artillery mission (we would opt for "delivering effective fire at the right place and time") and surviving in *1980*, opposed to *1985* and beyond where we are usually looking.

## Surviving to do our mission

To turn FM 100-5 backwards, if we are going to survive to do our mission then the artillery rules must be:

- Don't be seen (detected) (hide, minimize shooting and commo, move).
- If seen, don't be hit (spread out, move).
- If hit, don't be hurt (harden yourself).

Okay, that's straight forward. But, as you appreciate, if the artillery hides individual guns, moves continually, never uses the radio, and never shoots, it will survive while our maneuver forces die. The other extreme is equally ridiculous. So we need to look at various survivability tactics two ways:

- What do they buy us in survivability?
- What do we pay in degraded mission capability?

In this light, the two charts in figure 4 consider the survival tactic of moving.

You may need to think about these two charts a bit before you go on. Note that for each the abscissa is "survivability effort," *not* battle time. To get the picture of what probably would happen over time, you need to look at the two charts together. The top chart is *benefit*; the bottom one is *price*.

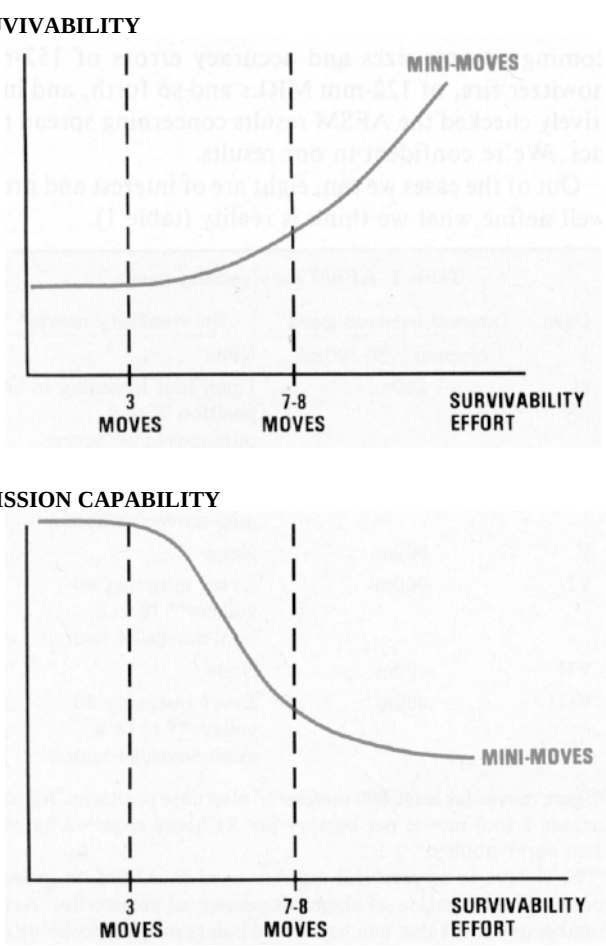


**Figure 4. Survival tactic of moving—benefit and price.**

The top chart says that if a battery puts more effort into moving, either when hit or in anticipation of being hit, the battery survives better, with worthwhile benefits beginning at about 7 to 8 moves per day. The bottom chart says that the price for this added survivability is some loss of battery mission capability (can't shoot while moving, troops get tired, survey requirements go up, etc.). Mission capability is significantly reduced if a battery tries to move more than 3 or 4 times per day. These curve "knees" are based on AMSAA simulations, on the DRS experience at Fort Hood and on field experiences you and I have shared. Beyond that, the curve shape is my intuition. Taken together, the two charts propose that in 1980 our artillery batteries can't move often enough to survive and still do the mission—if moving is the only survivability tactic we use.

*Talk less, shoot less (from any one position).* On the two charts in figure 5, the "reduce commo and firing" curves are pure intuition. Obviously holding down longwinded radio transmissions, rigging directional antennas, using low radio power, and avoiding volleys of fire coming out of one position helps survivability. But we still have to talk and shoot so there is a limit to what we can do today to survive in this way. In short, talk less/shoot less is motherhood—sounds right but tough to measure. The best rule here must be:

*Don't talk and don't shoot unless you must for the mission.* (That's not very helpful).

*So hide (figure 5).* Get back into those treelines, get the camouflage up, shoot out of built-up areas, move in small groups. That has got to help survivability—but again there are limits. Hiding protects you from human, radar, and infrared "eyes," either airborne or on the ground. But shooting and talking make hiding tough. The curve is intuitive. So is the bottom chart curve on "hiding," but with confidence. It's pretty clear that "hiding" comes *cheap*. It doesn't degrade your ability to deliver effective fire at the right place and right time.

*Hardening (figure 5).* The bottom chart also suggests that "hardening" doesn't degrade your mission capability much. In an earlier letter I sent you expected damage estimates of our own artillery. They are also a fair estimate of Soviet capabilities in 1980. That means Soviet artillery is most effective against exposed personnel and that killing our relatively hard targets like SP howitzers is

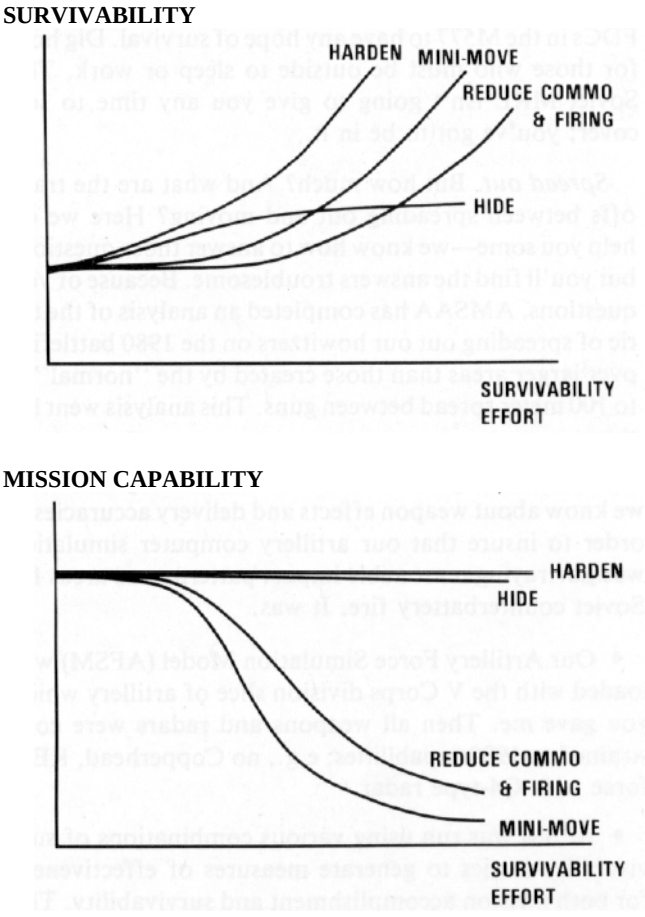


**Figure 5. Hide and harden.**

tough. But please note one big difference from the Soviet point of view. If, for example, expected damage estimates suggest that cannon artillery can expect only one howitzer kill out of 200 rounds delivered on a battery, the Soviets have the ability to quickly deliver that number—we don't. In the near-term there are some things we can do in the field to harden our battery positions.

• I told you before about fabricating nylon blankets to protect 8-inch crews. These blankets can also be used to protect your M548s.

• Protect your powder. Batteries are literally sitting on powder kegs. I have several Israeli reports of whole crews being killed from powder detonations. A hot fragment will make the powder blow. By contrast, projectiles are almost impossible to detonate, even with direct hits. You can actually use projectiles to protect powder. Better yet, get most of the powder out from behind the guns. It's inconvenient; but there is good reason to park M548s away from the guns and run back and forth occasionally. You can also protect powder with nylon blankets.

• Get people inside. Battery XOs and CFBs on the gun line, ammo handlers, and FDC people in M577 extensions are the most vulnerable components of the battery. It may be uncomfortable, but you have got to put the FDCs in the M577 to have any hope of survival. Dig holes for those who must be outside to sleep or work. That Soviet MRL isn't going to give you any time to seek cover; you've got to be in it.

*Spread out.* But how much? And what are the tradeoffs between spreading out and moving? Here we can help you some—we know how to answer those questions; but you'll find the answers troublesome. Because of your questions, AMSAA has completed an analysis of the tactic of spreading out our howitzers on the 1980 battlefield over larger areas than those created by the "normal" 50 to 100 meter spread between guns. This analysis went like this:

• Soviet firing doctrine was reviewed along with what we know about weapon effects and delivery accuracies in order to insure that our artillery computer simulation was portraying reasonable impact patterns and areas for Soviet counterbattery fire. It was.

• Our Artillery Force Simulation Model (AFSM) was loaded with the V Corps division slice of artillery which you gave me. Then all weapons and radars were constrained to 1980 capabilities; e.g., no Copperhead, RED force with Q4-type radar.

• AFSM was run using various combinations of survivability tactics to generate measures of effectiveness for both mission accomplishment and survivability. The threat was heavy—a SCORES 2A target type.

• We returned to what we know about probable incoming pattern sizes and accuracy errors of 152-mm howitzer fire, of 122-mm MRLs and so forth, and intuitively checked the AFSM results concerning spread tactics. We're confident in our results.

Out of the cases we ran, eight are of interest and pretty well define what we think is reality (table 1).

**Table 1. AFSM survivability cases.**

| Case | Interval between guns | Survivability moves* |
|---|---|---|
| I | "Normal" (50-100m) | None |
| II | 200m | Upon first incoming in any position (5 to 6 mini-moves/24 hours) |
| III | 200m | Upon second incoming in any position (2 to 3 mini-moves/24 hours) |
| IV | 200m | Every outgoing 60 volleys** (2 to 3 mini-moves/24 hours) |
| V | 300m | None |
| VI | 300m | Every outgoing 60 volleys** (2 to 3 mini-moves/24 hours) |
| VII | 400m | None |
| VIII | 400m | Every outgoing 60 volleys** (2 to 3 mini-moves/24 hours) |

*Short moves (at least 500 meters) to alternate positions. All cases include 2 to 3 moves per battery per 24 hours required by other than survivability.

**60 volleys is an artificial number used in AFSM to generate moves in anticipation of about 50 percent of counterfire. Actual number of volleys that can be allowed before moving probably cannot be predicted short of battle experience.

Figure 6 shows the number of US tubes still in the battle after each hour of a very intense 24-hour scenario. Figure 7 highlights the results at the end of the 10th hour which appears fairly representative.

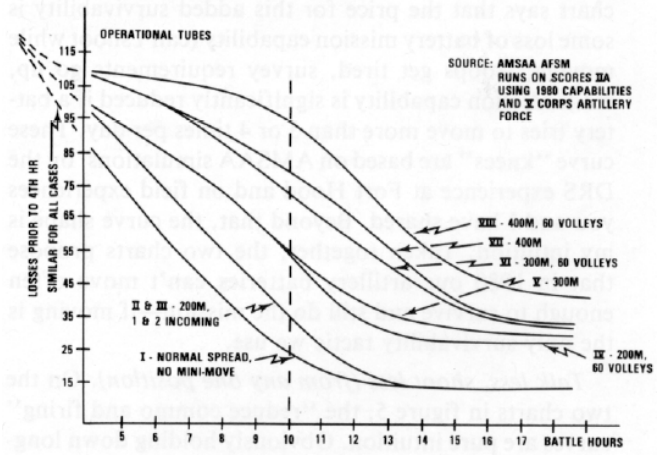


**Figure 6. Tube losses (attrition and RAM) as a function of survivability tactics.**

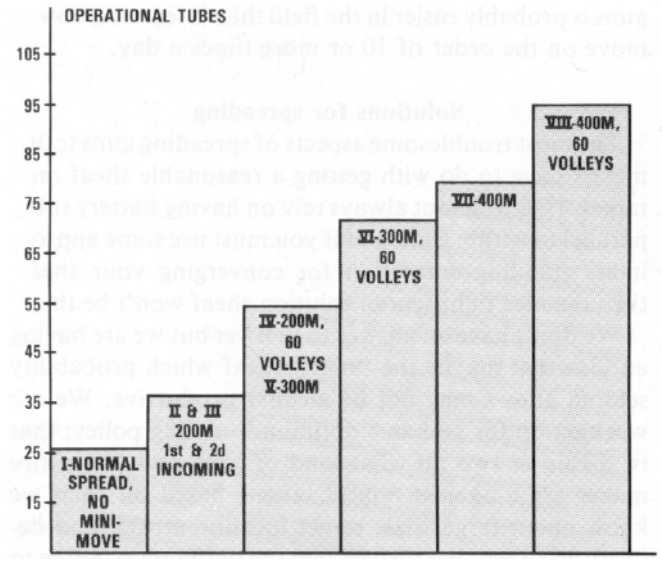


**Figure 7. Operational tubes, 10th hour.**

If the tactic of using the "normal" 50 to 100 meters between guns and no mini-moves is taken as the norm (1.0), then our AFSM work says that survivability and a common representative measure of mission accomplishment would be as shown in table 2.

**Table 2. Case comparisons.**

| Case | Relative mission accomplishment (24 hours) | Relative 10th hour survivability | Relative 24th hour survivability |
|---|---|---|---|
| I (normal, no mini-move) | 1.0 | 1.0 | 1.0 |
| II (200m, first incoming) | 1.12 | 1.38 | 1.0 |
| III (200m, second incoming) | 1.15 | 1.38 | 1.0 |
| IV (200m, 60 volleys) | 1.21 | 2.19 | 2.0 |
| V (300m) | 1.38 | 2.19 | 2.07 |
| VI (300m, 60 volleys) | 1.39 | 2.77 | 2.33 |
| VII (400m) | 1.51 | 3.08 | 2.40 |
| VIII (400m, 60 volleys) | 1.56 | 3.58 | 2.87 |

The numbers in table 2 are certainly not absolute predictions but the trends are clear. We draw the following conclusions:

• Spreading definitely makes a worthwhile contribution to survivability.

• Big survivability and mission payoffs occur at about 300 meters between guns (a finer cut of our results shows it takes about 400 meters between "soft" 8-inch howitzers to achieve this payoff).

• If you can develop a rule (such as move every X number of volleys) which allows you to avoid about half of the incoming that you would normally receive, then that buys you survivability and mission accomplishment roughly equivalent to what you would get from spreading your guns another 100 meters. For example, spreading 200 meters and using "half-smart" moving gives you about the level of survivability and mission accomplishment you would get from spreading 300 meters with no mini-moves. However, the model does not measure the physical effort and troop fatigue inherent in moving 4 to 6 times each 24 hours.

Nor does the model account for the obvious operational problems in spreading 200 or 300 meters between guns—things like communications, resupply, laying the battery, converging the sheaf, and local security. These difficulties would lead us to suspect that mission capability really drops off if you try to put much more than 100 meters between guns.

These ideas on the tactic of spreading out are illustrated in figure 8. The top chart suggests that survivability dramatically improves at about 300 meters between guns. The bottom chart suggests that operational problems won't let you spread that much today and still do your job. Obviously, if you can overcome the operational problems and bring mission capability up to the dashed curve, then you will dramatically improve our artillery effectiveness.

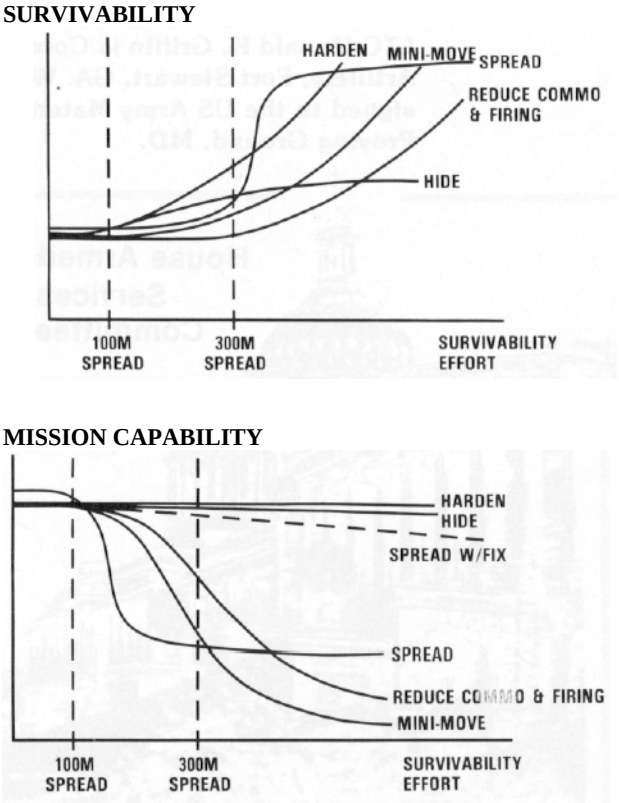


**Figure 8. Spreading out.**

**An algorithm for surviving to do our mission**

From what we have learned, the following advice is offered in priority:

• Step 1—Hide and harden your positions and you will get payoff for small cost.

• Step 2—Spread your guns to your operational limit with 300 meters as a goal (400 meters for 8-inch). If spreading individual guns is too difficult, go to spread platoons.

• Step 3—Be prepared to compensate with mini-moves for your inability to spread. These moves must *anticipate* incoming which means you must be on a fast learning curve when you go to war. If you spread by platoon, move by platoon. Moves should cover at least 500 meters.

• Step 4—Don't talk and don't shoot unless you must for your mission.

## The dilemma . . .

is that we think all of the above leaves you in a box. With present operational constraints on spreading out and on frequency of moves, there is probably no combination of survivability tactics today which can even approximate your desire to survive and do your mission. We need a breakthrough in our ability to move frequently or in our ability to spread out. Intuitively it seems that solving the problems of putting 300 meters between guns is probably easier in the field than is learning how?? move on the order of 10 or more times a day.

**Solutions for spreading**

The most troublesome aspects of spreading guns to 3?? meters have to do with getting a reasonable sheaf on?? target. If you cannot always rely on having battery tub?? parallel to within a mil and if you must use some approximate standing correction for converging your shea?? then the nice tight school solution sheaf won't be the??

We don't have an answer to that yet but we are having an idea that maybe the "nice" sheaf which probability seldom allows may not be all that productive. We are working up for you an "optimum" aiming policy; that is, a rule or two on what kind of zone and sweep fire makes sense against typical targets based on what we know about target size, target location errors, and delivery accuracy. We suspect that the optimum size area to be targeted may argue for allowing looser sheafs—it is possible that damage probabilities may actually increase. If that were so, then some approximations in gunnery to accommodate wide spread may be just what we need.

DKG

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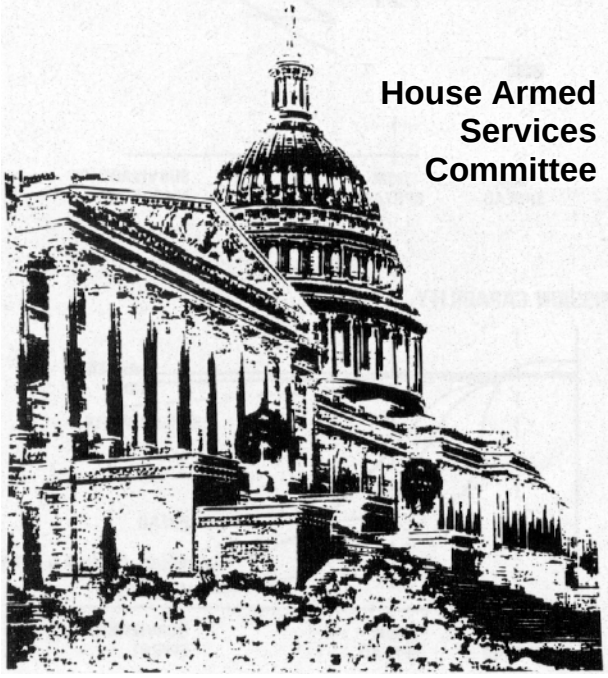
*When available, the results of this study will be published in a future issue of the* ***Journal.****—Ed.*

**LTC Donald K. Griffin is Commander of the 1st Battalion, 13th Field Artillery, Fort Stewart, GA. When the letters were written, he was assigned to the US Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.**

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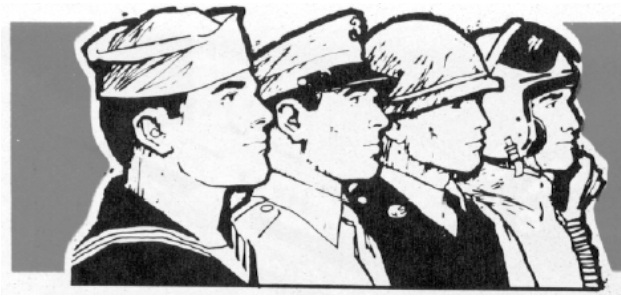


# With Our Comrades In Arms

**notes from other branches and services**

## Association asks for assistance

The Montford Point Marine Association is seeking monetary assistance to help research and write the story of Montford Point and the history of black Marines for national television.

According to a representative of the Association, the television program will depict the story of the United States Marine Corps and its goal will be: "To demonstrate to our countrymen and the world the common heritage and esprit de corps that today's Marine has inherited through the dedication and committed service of past generations of Marines."

Those desiring to contribute or to obtain additional information should contact Dr. Herman Rhett, National Treasurer, Montford Point Marine Association, 75 Karen Rd., Framingham, MA 01701.

## Partnership Program

Beginning with annual training (AT) this year, division and brigade sized combat units of the Army National Guard and the US Army Reserve will train with Active Army "partner" units. The new Active Component (AC)/Reserve Component (RC) Partnership Program, initiated by the US Army Forces Command (FORSCOM), will pair the major infantry and armor units of the Guard and Reserve with similar Active Army units for training support, evaluation, and assistance.

Partnership differs from earlier Active Component training support programs in two ways:

- First, it is planned as a long-term relationship.
- Second, partnership will be expanded beginning in FY81 to provide year-round AC support for RC training.

In comparison, the two programs (the Active Component Support to Annual Training and the AT evaluation programs) being replaced by partnership were operated only during the RC unit's two-week AT period, and the AC/RC unit alignments changed each year.

Partnership complements on-going programs, such as the Affiliation Program and the Army Capstone Program.

The list of RC divisions, brigades, and regiments and their supporting AC partner units is shown below. (Partnership program relationships were developed based on several factors, including geographic proximity of units, likeness and compatibility of skills and equipment, AC units' capabilities to provide training support, previous relationships (ACSAT, etc.), and Capstone methodology.)

| AC unit | RC unit |
|---|---|
| 1st Infantry Division (Mechanized) | *69th Infantry Brigade (Mechanized), KS ARNG<br>32d Infantry Brigade (Mechanized), WI ARNG<br>157th Infantry Brigade (Mechanized), PA USAR |
| 1st Cavalry Division | 38th Infantry Division, IN and MI ARNG<br>45th Infantry Brigade, OK ARNG |
| 2d Armored Division | 49th Armored Division, TX ARNG |
| 4th Infantry Division (Mechanized) | 47th Infantry Division, MI, IL, and IA ARNG<br>*67th Infantry Brigade (Mechanized), NE ARNG |
| 5th Infantry Division (Mechanized) | *256th Infantry Brigade (Mechanized), LA ARNG<br>31st Armored Brigade, AL ARNG<br>155th Armored Brigade, MS ARNG |
| 7th Infantry Division | *41st Infantry Brigade, OR ARNG<br>40th Infantry Division (Mechanized), CA ARNG |
| 9th Infantry Division | *81st Infantry Brigade (Mechanized), WA ARNG<br>26th Infantry Division, MA and CT ARNG |
| 24th Infantry Division (Mechanized) | 50th Armored Division, NJ and VT ARNG<br>*48th Infantry Brigade (Mechanized), GA ARNG<br>218th Infantry Brigade (Mechanized), SC ARNG<br>278th Armored Cavalry Regiment, TN ARNG |
| 82d Airborne Division | 28th Infantry Division, PA ARNG<br>58th Infantry Brigade, MD ARNG<br>116th Infantry Brigade, VA ARNG<br>30th Infantry Brigade (Mechanized), NC ARNG |
| 101st Airborne Division (Air Assault) | 42d Infantry Division, NY ARNG<br>*39th Infantry Brigade, AR ARNG<br>73d Infantry Brigade, OH ARNG<br>187th Infantry Brigade, MA USAR |
| 3d Armored Cavalry Regiment | 116th Armored Cavalry Regiment, ID and OR ARNG<br>163d Armored Cavalry Regiment, MT and TX ARNG |
| 172d Infantry Brigade (S) | 205th Infantry Brigade, MN USAR |
| 193d Infantry Brigade (S) | 92d Infantry Brigade, Puerto Rico ARNG<br>53d Infantry Brigade, FL ARNG |
| 194th Armored Brigade | 30th Armored Brigade, TN ARNG<br>107th Armored Cavalry Regiment, OH ARNG |
| 197th Infantry Brigade (S) | 33d Infantry Brigade, IL ARNG |
| WESTCOM<br>25th Infantry Division | *29th Infantry Brigade, Hawaii ARNG |

*Affiliated unit.

## New hovercraft for Army

The Soviet Union has a huge lead in naval hovercraft, according to the authoritative *Jane's Surface Skimmers*, but the United States Army is trying to close the gap.

While the Navy continues to test and develop a suitable air cushion vehicle for amphibious operations, the Army has quietly certified and begun production of a hovercraft to fill its role in resupply over the shore.

The LACV-30 (Lighter, Air Cushion Vehicle, 30-ton Payload) will give the Army a quick means of moving cargo from ship to shore and then overland in areas where fixed ports do not exist.

The Army began with a stretched version of a commercial hovercraft built by Bell Aerospace Textron called the Voyageur. The craft, capable of speeds in excess of 50 miles per hour, was put through three years of testing and evaluation. Thus, Army officials were satisfied that the high-speed craft powered by jet engines would significantly increase the amount of cargo that could be moved compared to the slower amphibians currently operated by the Army.

The LACV-30 is now under production at the Bell Aerospace factory in Buffalo, NY, and the first production model is expected to be delivered to the Army early in 1981. In the meantime, the prototypes are stationed at Fort Eustis' Felker Army Airfield. They will be used to train operators, navigators, and mechanics for the hovercraft.

The Army has already funded the production of eight LACV-30s that will be stationed at Fort Story in Virginia Beach. It's hoped that the next Army budget will include funding for at least four more hovercraft to fully equip the US Armed Forces first air cushion vehicle company. The Army would ultimately like to purchase 29 of the LACV-30s and are now looking at the possibility of a larger model capable of carrying the new XM1 Abrams tank which weighs nearly 60 tons.

*Janes Fighting Ships* lists a variety of Soviet air cushion vehicles ranging from a 27-ton model designed to carry 24 Marines at 50 knots to a 90-ton craft which can carry tanks.

The Soviets now have more hovercraft in service than all 15 NATO countries. (TRANSLOG)

## Correction

The July-August 1980 issue (page 52) contained a short piece announcing a reorganization of CONUS Active Army divisions under three corps headquarters.

Following publication of this information, the *Journal* learned that the release was somewhat premature and that specific changes to CONUS command and control have not as yet been fully resolved.


**US Marine Corps Major John P. Bland inspects an AGM-65E Laser Maverick mounted on an A-4M attack aircraft prior to the test flight in which he launched the air-to-surface missile in the first firing of a Maverick by a Marine Corps pilot and the first from a Marine aircraft. The recent low-altitude, long-range launch scored a direct hit on an armored personnel carrier target at Eglin Air Force Base, FL. This was the third launch in succession of the AGM-65E to score a direct hit. The missile is a laser-guided version of the US Air Force's Maverick with a heavier warhead. The air-to-ground weapon is being developed by Hughes Aircraft Company under an Air Force contract primarily for use by the Marine Corps for close air support of combat troops.**

## Threat newsletter

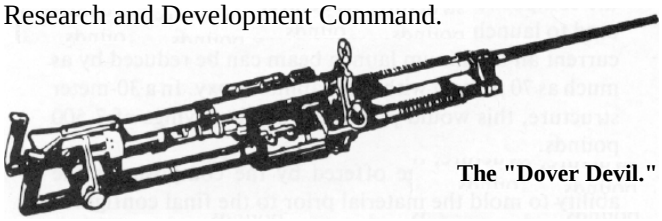
*The Threat*, a quarterly newsletter published by the Amphibious Instruction Department, Education Center, Quantico, has made its initial appearance at Marine Corps installations. The purpose of the new publication is to assist Marines, especially those assigned to operational billets with the Fleet Marine Force (FMF), in knowing more about the enemy they may face, in learning how he operates and equips himself, and in stimulating thought on how best to defeat the enemy in combat. Personnel holding billets in non-FMF organizations will also find valuable information in the newsletters.

The main emphasis of *The Threat* is on Soviet strengths, weaknesses, and vulnerabilities. Familiarization with the Soviet's techniques will serve as a sound basis for understanding other threats because most draw heavily on Soviet tactics and equipment.

For more information on *The Threat* address all correspondence to: Threat Analysis Division, Amphibious Instruction Department, Education Center, MCDEC, Quantico, VA 22134 or call AUTOVON 278-2754/2755 or commercial (703) 640-2754/2755.

## New weapon

A new, heavy, general-purpose machinegun is under development and testing at the Army's Armament Research and Development Command.



**The "Dover Devil."**

Called the "Dover Devil," the machinegun is being developed to replace the current 1917-vintage Browning .50 caliber machinegun. The concept of the new weapon is unique in that it will eventually have a modular design. This will, through a quick and easy interchange of barrel, feeder, and bolt head, allow change from .50 caliber to 20-mm.

Additionally, there is a dual-feed capability that allows the gunner to selectively fire antipersonnel rounds from one feed or antimateriel rounds from another.

Although the weapon is still in its initial test phase, the goal is to develop an improved prototype weapon that can be demonstrated as useful to all military services.

## New electro-optical sensor

A new device, being developed by Hughes Aircraft Company, scans the sky with electro-optical sensors to detect, track, and identify attacking aircraft and incoming missiles, classify them by order of priority, and pass this data almost instantly to a fire control computer. The device, called an electro-optical threat sensor, can be used with ground, ship, or airborne fire control systems.

To confirm feasibility of the project, Hughes scientists have demonstrated the first working hybrid focal plane array for infrared search and track applications—the key element for this type of system.

Under a US Air Force Wright Aeronautical Laboratories' contract, Hughes' Electro-Optical and Data Systems Group has conducted a design study and component validation effort and is currently fabricating a ground-based demonstrator model of the threat sensor. The threat sensor consists of an acquisition unit, an interrogation unit, and a computer. Field testing of the demonstrator is scheduled to occur in the mid-1980s.

In operation, the acquisition unit scans the sky, acquiring aircraft and incoming missiles by sensing radiated infrared energy. (The system will have the capability to continue searching for more threats as it tracks those already acquired.) A signal processor extracts the target signal from background radiation and feeds this data to a computer, along with the target's relative bearing, to cue the interrogation unit.

The interrogation unit uses additional sensors to further classify the target. The computer processes this information and classifies each target as to the type of threat, such as aircraft or missile, and then lists the targets in order of priority, based on which ones pose the most immediate threat.

The system can detect, track, identify, and classify multiple targets almost instantly and relay this data to the airborne, ground, or ship-based fire control systems.

The electro-optical threat sensor will have several advantages over conventional radar. The acquisition unit is a "passive" sensor which radiates no signals of its own and therefore cannot be detected while searching for and tracking targets. The system is relatively small and can rapidly search a large surveillance volume, accurately pinpointing threat locations.

## Revision of FMs

Field Manuals 21-13, 22-5, and 22-6 are currently being revised by the Infantry School, Fort Benning, GA. The manuals—drill and ceremonies, guard duty, and a soldier's guide—have been used for several years.

The Infantry School solicits suggestions and recommendations from the field concerning revision of these materials. Comments should be submitted on DA Form 2028, Recommended Changes to Publications, to: Commandant, USAIS, ATTN: ATSH-I-V-ET, Fort Benning, GA 31905.

## OCS Commemoration Day

The first annual Officers' Candidate School (OCS) Commemoration Day will be observed at Fort Benning on 27 September. This observance will commemorate graduation of the first OCS class on 27 September 1941 and will enable OCS graduates to reestablish past friendships and associates.

Further information can be obtained by writing the Adjutant, 5th Student Battalion, The School Brigade, Fort Benning, GA 31905 or by calling AUTOVON 835-3412/3275 or commercial (404) 545-3412/3275.

## New bridge material tested

The US Army Mobility Equipment Research and Development Command (MERADCOM) is exploring the possibility of using composite materials in future Army bridging equipment.

The material, graphite fiber and epoxy resin, isn't new, but its application to military bridge structures is.

MERADCOM is currently participating in a tri-national effort with West Germany and England to develop a new system of "Bridging for the 1980s." Current prototype bridges being evaluated by each country are all-aluminum structures capable of carrying 60-ton loads. With the proposed bridging equipment, one soldier

would be able to deploy a 30-meter bridge span over a dry or wet gap in three to five minutes. This rapidly deployable bridging structure can be carried and launched from either a wheeled transporter as a tactical bridge or an armored vehicle for assault bridging. Initial bridge design for the follow-on engineering development phase will continue with the aluminum construction that has been undergoing development testing for the last two years.

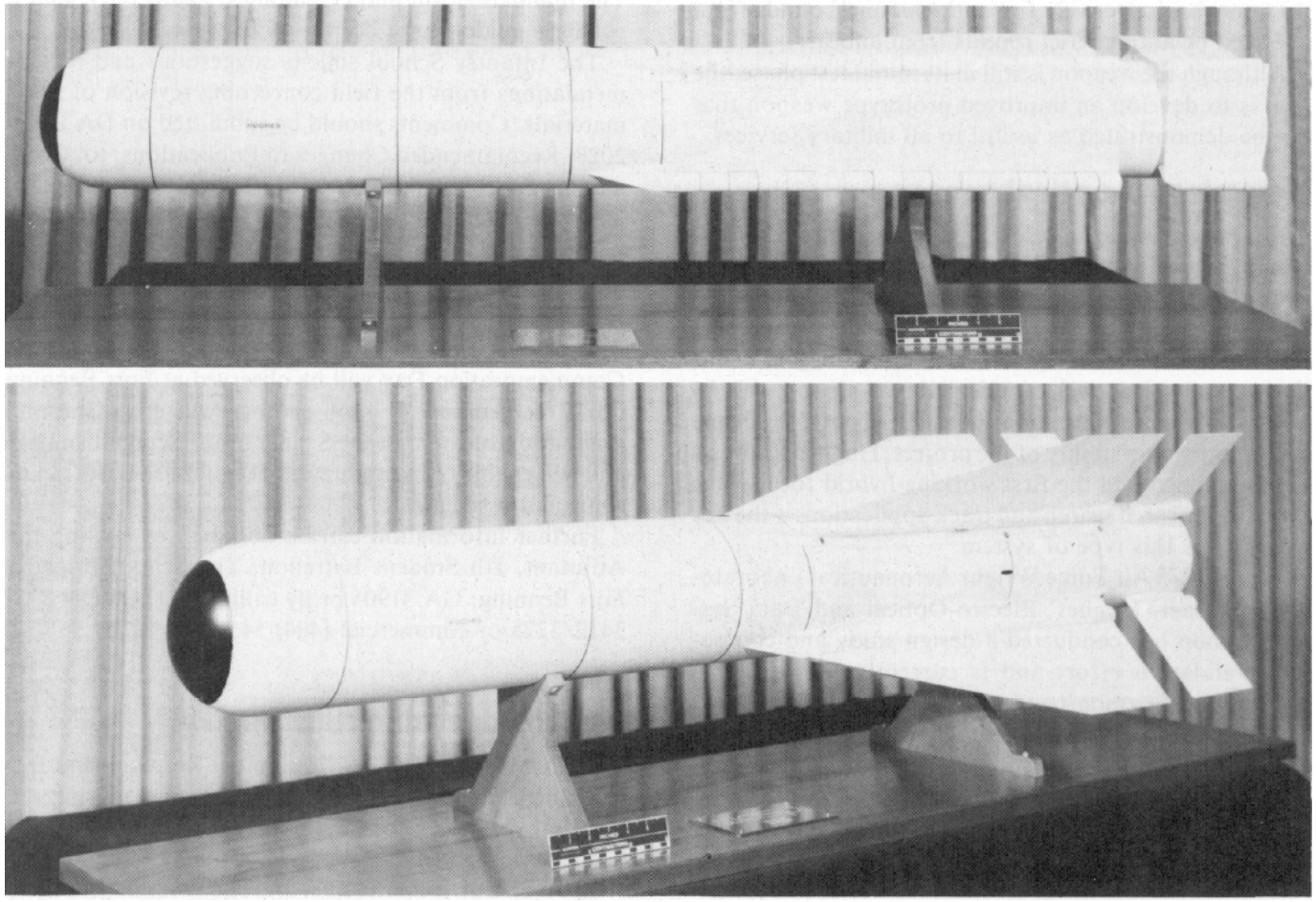
Utilization of composite materials, however, will result in further weight savings and allow both the span and load class of the structure to be increased.

It is envisioned that the composite can be used in a sandwich fashion in three areas of the superstructure.

By replacing the current bottom plate with an aluminum/graphite epoxy/aluminum plate, two improvements will be realized. The structure will actually be stronger which will increase the bridge's load-carrying capability, and the composite plate will be 30 percent lighter than the all-aluminum plate it replaces.

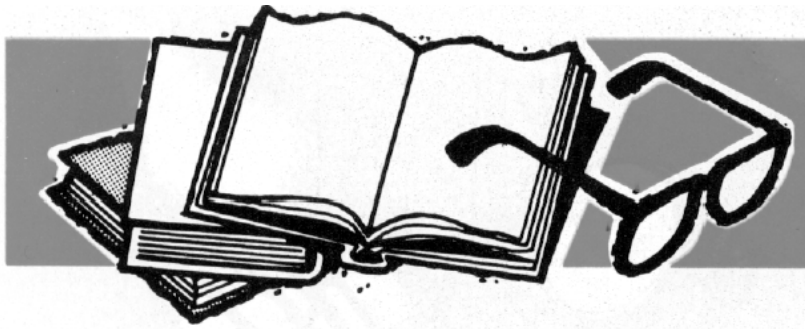
Even greater weight savings can be achieved by using the composite material in the traversing beam, which is used to launch and recover the bridge. The weight of the current all-aluminum launch beam can be reduced by as much as 70 percent with the graphite epoxy. In a 30-meter structure, this would produce a weight savings of 7,500 pounds.

Another advantage offered by the composite is the ability to mold the material prior to the final configuration which allows simpler fabrication techniques to be used and improves the bridge's flotation characteristics. By molding the composite during fabrication, the hollow web structure of the bridge can be totally sealed. This sealed air pocket will provide the bridge's flotation, which is necessary when using the bridge in a wet gap configuration.



**STRETCHING ITS WINGS—In the first publicly released photograph of the Hughes Aircraft Company's Wasp antiarmor missile, the wings and fins of a full-scale model are folded (top) as they would be while the air-to-surface missile is stowed in an aircraft pod prior to launching.**

**The Wasp measures approximately five feet in length, has a span of 20 inches (less than 10 inches with the wings and fins folded for pod storage), and weighs approximately 100 pounds. The antiarmor missile will be launched from an aircraft pod either singly or in a "swarm" of up to 10 or more. Wasp will have a "lock-on after launch" capability, meaning the aircrew will not have to see and designate a target for the missile before it is fired. Wasp's seeker will be able to identify the armor independent of the launching aircraft and will guide the weapon to an individual target. This autonomous targeting capability greatly increases the attacking aircraft's chances of survival.**



# Redleg Review

**INTERNAL SECURITY WEAPONS AND EQUIPMENT OF THE WORLD, by Michael Dewar, Charles Scribner's Sons, New York, 1979, 128 pages, $12.50.**

*Internal Security Weapons And Equipment Of The World* is a fine source and reference work by Michael Dewar who has attempted to cover all types of special purpose internal security equipment employed by various police and government organizations throughout the world.

The book contains over 150 photographs and extensive data on vehicles, weapons, and individual equipment that is being used to combat the ever-increasing threat of international terrorism and political security problems facing all police and government agencies. Dewar has taken each piece of equipment and given the reader a detailed breakout of its technical data, development, and different variants of employment making this an excellent, easy to read reference.

The book will be of interest to anyone concerned with the growing problem of internal dissent and will provide them with a comprehensive source of types of internal security equipment available to assist in fighting the problem.

*MAJ Jerry D. Dyer is former Deputy Provost Marshal at Fort Sill, OK.*

**THE DEADLY FUSE, by Ralph B. Baldwin, Presidio Press, Novato, CA, 1980, 347 pages, $14.95.**

The Allies used the proximity fuze with deadly effectiveness throughout World War II; yet its existence remained top secret until the war's end. For years artillerymen had dreamed of a fuze that could sense the presence of a target and detonate automatically at the optimum distance. Though the theory was simple, the project ran into problems, frustrations, and puzzling malfunctions.

Ralph Baldwin, an engineer who played a major role in the development of the proximity fuze, tells the story as only an insider can.—Ed.

**U-BOAT WAR, by Lothar-Gunther Buchheim, Alfred A. Knopf, Inc., New York, 1978. Translated from German by Gudie Lawaetz with an essay by Michael Salewski, 350 pages, $17.50.**

U-Boat War is magnificient! It is antiwar in tone but offers much more than a historical account, describing such experiences as the smell of oil, diesel fuel, and sweat; the tension of the attack; the anxious anticipation of death during a depth-charge attack; the repugnant stench of one's own body after weeks of bathless existence. The reader is crammed between a confusion of pipes, cables, vents, weapons, intricate machinery, and superhuman nerve. Buchheim makes you a crew member of the U-96!

This book is so well done it is much like watching a movie as Buchheim's camera captures the moment by moment life of German World War II submarine warfare. This work contains 205 of the more than 5,000 photographs taken by the author as an official German Navy artist during World War II. Also provided is a diagram of a VII-C type U-boat.

The crew of U-96, a VII-C class submarine launched in September 1940 and sunk in March 1945, is the author's main focus except for the brief but gripping period of time he served aboard the U-309 in July 1944.

U-Boat War also provides a photographic history of fighting men from the early human-interest photographs of young sailors as they sail off to war to the marked contrast when they return. Buchheim captures it all.

The most riveting photos, however, are those taken from the U-309 off the coast of La Pallice, France, when a sister submarine, U-981, was sunk by mines and air bombardment. Here the reader can see sailors at the guns, men scrambling to pull survivors from the sea, and surviving crewmen huddling on the deck of the U-309. All the emotion is right before your eyes with a narrative as colorful as the sea itself.

Michael Salewski, a distinguished German historian, ends the book with his own essay on the German naval war.

The pages are not numbered, but it will make little difference to the reader. This book is enough to lift the most cynical armchair adventurer into the conning tower. U-Boat War is an underseas classic!

*William M. Brooks is the head librarian at North Brunswick High School in Leland, NC, and is also the publications NCO for the 650th Transportation Company (TT) USAR located in Wilmington, NC.*

**AFRIKA KORPS AT WAR (Volumes I and II), by George Forty, Charles Scribner's Sons, New York, 1978, 288 pages, $14.95 each.**

Desert warfare as conducted by Rommel's famed Deutsches Afrika Korps against the British in North Africa is vividly portrayed by the author with the support of several hundred photographs of the soldiers, their weapons and equipment, and the environment in which they fought. Numerous charts and maps illustrate battle tactics, weapons capabilities of both sides, unit insignia, and uniforms.

From a foreword by General Siegfried Westphal, Rommel's Chief of Staff in Africa, through Operation Torch, both volumes are replete with eyewitness accounts of organization and tactics, battles, and desert living conditions. Credit for much of the Afrika Korps' success is attributed to its employment of combined arms.

Volume I concerns the action from February 1941 through the end of that year. Volume II begins with January 1942 and treats the remaining campaigns, ending with the German surrender in May 1943.

A continuing theme through the books is that of the honorable conduct in battle by soldiers of both sides and the respect which each side held for the other. For military history and tactics buffs, these volumes should not be overlooked.

*William F. Finnegan is Editor of the **All Volunteer** magazine, Fort Sheridan, IL.*



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