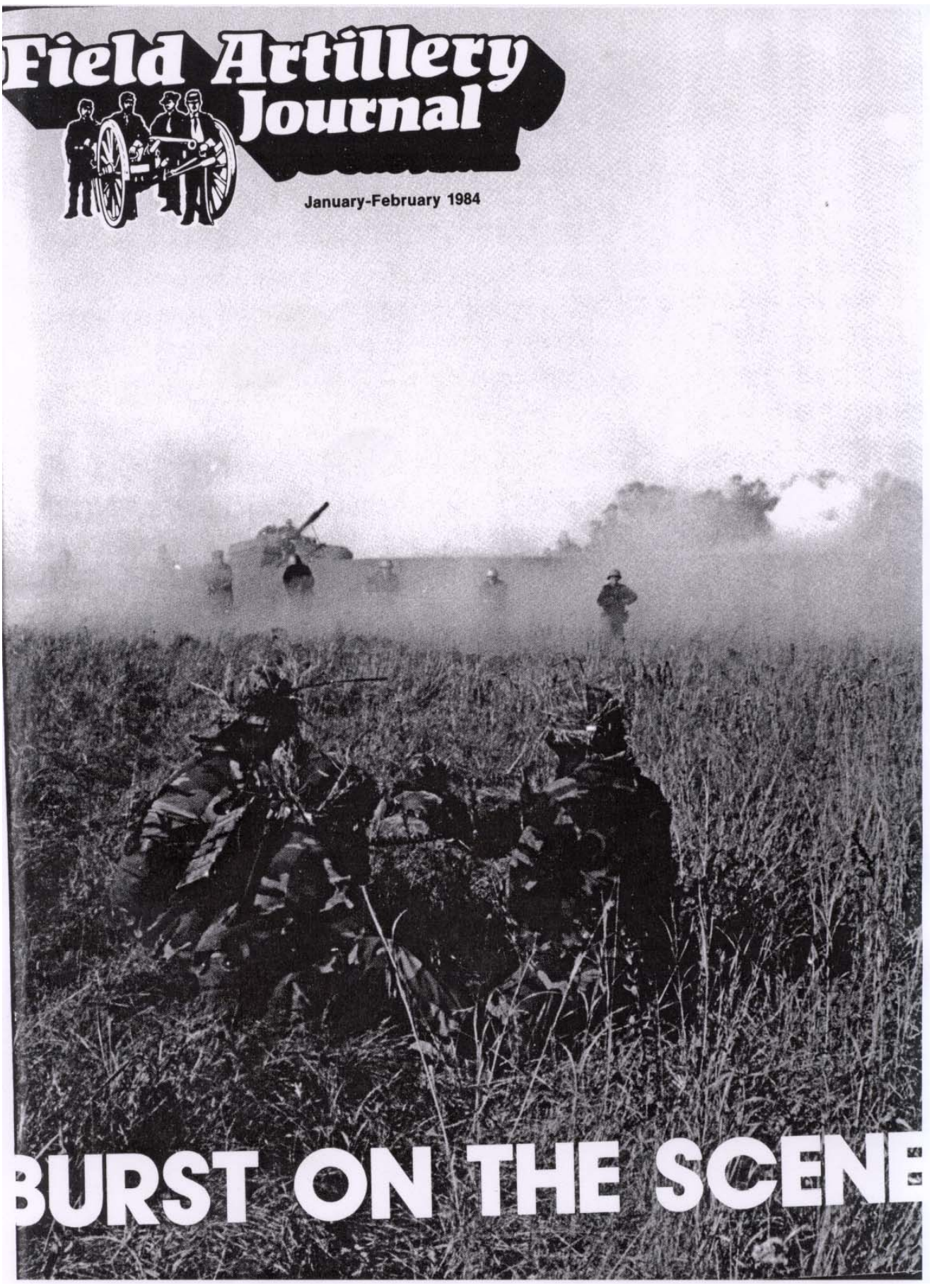
Field Artillery Journal

January-February 1984



BURST ON THE SCENE

Volume 52 **January-February 1984** **Number 1**

ARTICLES

FEATURES

Cover photo by Sam Orr

The *Field Artillery Journal* (ISSN 0191-975x) is published bimonthly at the US Army Field Artillery School, Fort Sill, OK. Funds for printing are approved by Department of the Army. However, unless otherwise stated, material does not represent official policy or endorsement by any agency of the US Army.
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 power 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."*
SUBSCRIPTIONS: May be obtained through the Field Artillery Association, P.O. Box 33027, Fort Sill, OK 73503. Telephone numbers are AUTOVON 639-5121/6806 or commercial (405) 355-4677. Dues are $14.00 per year ($27.00 for two years and $40.00 for three years) to US and APO addresses. All other addresses should add $7.00 for postage.
SUBMISSIONS: All letters and articles should be addressed to Editor, *Field Artillery Journal,* P.O. Box 33311, Fort Sill, OK 73503. Telephone numbers are AUTOVON 639-5121/6806. Material submitted for publication is subject to edit by the *Journal* staff; footnotes and bibliographies may be deleted due to limitation of space.
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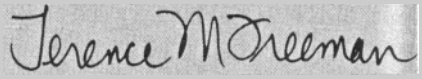
POSTMASTERS: Second-class official mail postage is paid by the Department of the Army, DOD 314, at Lawton, OK 73501. Send address changes to the *Field Artillery Journal,* P.O. Box 33311, Fort Sill, OK 73503.

When the maneuver commander and his fire support coordinator plan the defensive protective fires, the final protective fires get a lion's share of the attention. And is it any wonder? All the reasons are there in the name — after the finals, there aren't any more. "Keep the Fires Burning" suggests a new technique for making this rain of steel burst on the scene as a rain of terror.

Other interesting articles burst on the *Journal* scene for this edition. The notion of forward observers calling for tactical nuclear fires may startle at first, but the proponent for that idea argues that the eyes of the artillery can employ them best. The forward observers and other Redlegs at the battle for Khe Sanh certainly got the job done — fire support provided the Marine defenders their *coup de grâce*. Not all stories about Vietnam have a happy ending, however. One author contends that the conflict may still be casting a dark shadow which keeps junior leaders from reaching the point where they can shine. Copperhead is in today's spotlight, but the training devices for the G/VLLD-Copperhead system finally receive some important exposure. A new exposure of a proud tradition is the purpose of the Third Field Artillery Regiment's history. Future editions of the *Journal* will afford members of all of the field artillery regiments a chance to relish their connection with the past.

Here's a final note to each contributor. You really are doing it — the *Journal* is becoming more and more your voice. Now talk to those NCOs, officers, and interested civilians sitting next to you and convince them to catch the spirit.



EDITOR

On the Move

MG JOHN S. CROSBY

Not all aspects of our operations are as solid as they should be . . .

My visits to units in the field bring me face-to-face with the commissioned and noncommissioned leaders whom I trust to implement our policies and procedures. Their efforts are reflected in our improved readiness and in our healthy self-image. But not all aspects of our operations are as solid as they should be, and I want to address four major areas I highlighted to Redleg leaders during my recent visit to Europe.

Survivability

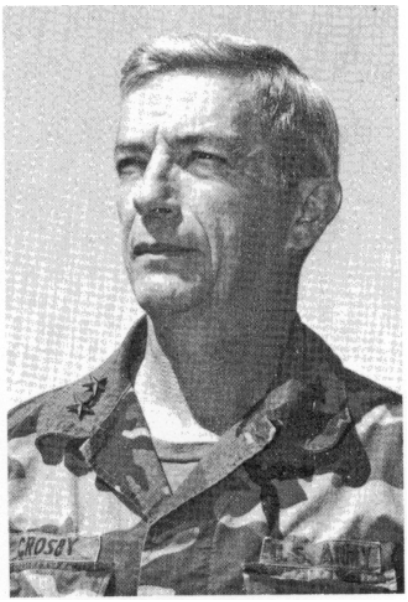
Our batteries will not survive on tomorrow's battlefield if they are not dispersed. I saw a good deal of training on a variety of dispersal techniques, but we need to pin down the focus of our doctrine concerning this aspect of survivability. Should we, for example, adopt the German field artillery technique of employing pairs of howitzers at dispersed firing positions? Do we want or need to have the firing battery support area in the vicinity of the guns? I have decided to make the whole issue of survivability a major discussion topic at the Senior Field Artillery Commanders' Conference in April, and I want all commanders to come prepared to address the issue in sufficient enough detail to permit definitive decisions on how we intend to fight. I also recognize that units are running up against safety rules and regulations when they try to practice firing from dispersed positions. I am pushing for the elimination of these hindrances. In the meantime, we need to find ways to meet safety requirements while still training units as they will fight.

TACFIRE sustainment training

An effective command and control system is the lifeblood of the field artillery — it is the key to providing the maneuver commander the fire support he needs to win. TACFIRE is at the core of our current system. The Field Artillery School knows the TACFIRE manning requirement and has the training program to support it. But the underlying assumption of this training is that the TACFIRE soldier — especially the officer — will be kept in a TACFIRE job for a minimum of 18 months. The unfortunate fact is that most officers are holding these jobs for less than 12 months, and the training base is not set up to replace these officers immediately.

Standardization

You have heard me speak on standardization in a previous column, but the message is still valid. It is an awareness problem. Once we have pooled our collective thoughts and arrived at a standard, neither a field commander nor a new equipment training team can decide unilaterally to do things differently. A list of current standards has been published and mailed to all field commanders this past November. Standardization, as I have said before, makes creative field artillery leadership possible; and so I expect aggressive enforcement of the standards from these very same leaders. I also expect a continuing flow of ideas on what the standards should be. The Field Artillery School may be at Fort Sill; but the field artillery experts are in our units in the US, in Europe, and in Korea. No tactical procedure or loading plan or layout becomes a standard until each unit has had its chance to review and comment.



Company-grade officers

The shortage of company-grade officers is the number one Field Artillery personnel problem. The division artilleries I visited are able to man only one-third of their fire support team chief positions with lieutenants. As I mentioned in my last column, we are working on increasing the base lieutenant accession structure. But this fix will only help the future, not the present. I am now advising the Department of the Army to take some extraordinary personnel measures in order to keep the existing shortage from becoming a field-grade shortage in the near future.

Conclusion

It was great to get to the field. I saw good things happening in our European corps artilleries, division artilleries, field artillery brigades, 56th Brigade (Pershing), and 512th US Army Artillery Group. But all field artillery units can attain an even higher level of excellence if we collectively attack the doctrinal, training, and personnel roadblocks which stand in our way. Let's get to it.

Incoming

LETTERS TO THE EDITOR

Speak Out
The *Journal* welcomes and encourages letters from our readers. Of particular interest are opinions, ideas, and innovations pertinent to the betterment of the Field Artillery and the total force. Also welcomed are thoughts on how to improve the magazine.—*Ed*.

TOC-A-Toy

Major Johnson has raised an interesting and relevant question in his article "TOC-A-Toy" (September-October 1983 *FA Journal*. The question is: Can a field artillery battalion tactical operations center (TOC), using its authorized equipment, effectively exercise command and control of its firing batteries while it is displacing? If the question can be answered "yes," then these techniques should be examined to ascertain the range of their applicability and perhaps standardized for US Field Artillery units worldwide. If the answer to this question is "no," then this fact, buttressed by a careful exposition of the functions the TOC must perform while it displaces, the means at its disposal to accomplish these functions during displacement, the amount of time the operations of the TOC are degraded, and the ways in which various units have sought to overcome these limitations, can then serve as the basis of an action to modify the tables of organization and equipment (TOEs) of field artillery battalions worldwide to correct this deficiency. Unfortunately, the article proceeds in neither direction; and so the question remains unanswered. The author posits that current TOEs do not allow field artillery battalions to exercise effective command and control during displacement. He then indicates that the solution to an equipment shortage is more equipment. The fact that things worked smoother with an additional command and control vehicle does not imply that the opposite is also true.

In addition to this general view, I'd like to offer the following observations. The author equates mobility with the ability or speed with which a vehicle can go down the road. Tactical mobility has a much broader sense and includes the capability of a vehicle to move under fire, to move through a contaminated environment, or to move cross-country. Part of the case for the "TOC-A-Toy" is predicated on a mobility differential it enjoys over the current command post carrier. The road net which supports this speed differential may easily be disrupted by enemy action, bad weather, or refugee traffic. In all aspects except two, the current tracked command post carriers are superior to an M109 van (those two exceptions are the highest possible speed the vehicle can make on a road in good weather and the ease of maintenance). It is my view that the section of the article which deals with the superiority of one type vehicle over another misses the real point, which is again whether or not a battalion TOC organized under the present TOE can perform its mission of command and control of its firing batteries while displacing within the existing equipment constraints.

A discussion of other radio-equipped vehicles which might have been available within the battalion to overcome this problem would have been helpful (what was the S3's jeep or the HHB commander's jeep doing?). The author also seemed to imply that the jumping of the TOC took a long period in which the battalion was forced to work with diminished capability, presumably because the jump track did not have the radio capability to support operations on all nets. Yet further on, he tells us that with the TOC-A-Toy we can operate if we place all of the FISTs, FSOs, and firing batteries on one fire net. This only works in training because we do not input the quantity of radio messages which the war games tell us we can expect in the intense European battle. In fact, if it only required one fire net to handle the volume of expected radio traffic, an FA battalion would not have radio nets CF 1 and 2 and FD 1, 2, and 3. Stacking units on nets is something the battalion would have to do whether we displaced a part of the TOC or had a dedicated jump vehicle. Thus, the battalion would have to operate with degraded capacity in either case. The only difference would be the time saved not having to road march a part of the TOC to a new location, because the jump vehicle would be in position to assume control when the TOC broke down. Given a move of up to 10 kilometers, this time difference might be as much as 20 minutes.

Finally, I have these points on communications: there is no FD 4 net in the doctrinal communications net structure; the author made no mention of where the four radios to put in the TOC-A-Toy came from and what operational capability of the battalion was degraded thereby; and lastly the process of dedicating a fire net to a battalion task force is doctrinally unsound in that it tends to result in batteries habitually firing in support of task forces instead of habitually massing their fires as a battalion, under battalion control, which is the preferred method of target engagement.

Charles J. Pedersen
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Firing battery protection

Captain Larry Altersitz's letter, "Which weapon to use," in the September-October 1983 *FA Journal* addresses an area of great interest to the entire Field Artillery Community — protection of the firing battery from ground attack by Soviet/Warsaw Pact maneuver forces. But, while raising many interesting points, he has missed the mark in three areas: organic battery anti-armor weapons, Soviet/Warsaw Pact doctrine, and utilization of mines in preparation of the battery defensive position.

In the area of antiarmor weapons, table 1 compares the capabilities of the 90-mm recoilless rifle, the Dragon, the single-shot LAW, and the Viper which is the LAW's replacement. The two major problems confronting the 90-mm recoilless rifle are that it is a short-range weapon — not a medium-range weapon — and that it requires a crew of two to operate. The signature of each of the systems shown is about the same as indicated by the backblast area. A well-trained force which is advancing will be prepared to bring immediate suppressive fire on any such signature.

The ability of the members of the 90-mm recoilless rifle crew to displace after firing is circumspect, especially if they engaged the enemy within the effective range; distance lessens the possibility of the attacker seeing the signature. The ability of the gunner to survive engagements relies primarily

Table 1. Characteristics of maneuver weapons and equipment.

	M47 (Dragon)	M67 90-mm RR	M72 (LAW)	M72A2 Viper
Weight	30.9 pounds	44.25 pounds	4.7 pounds	7 pounds
Effective range, stationary target	1,000	300	200	250 to 300
Effective range, moving target	1,000	200	165	250 to 300
Hit probability, stationary	0.7	0.5	0.5	0.6 to 0.8
Hit probability, moving	0.7	0.5	0.5	0.4 to 0.6
Backblast area	50 meters	43 meters	40 meters	40 meters
Rate of fire, sustained	---	1 per minute	---	---
Maximum time of flight	11 seconds	---	0.4 seconds to 200 meters	1 second to 250 meters
Crew required	1	2	1	1

* Data extracted from *Characteristics of Maneuver Weapons and Equipment* (April 1981), published by Tactics/Combined Arms and Doctrine Department, USAFAS.

on preparation and sighting of his defensive position(s) and effective analysis and utilization of terrain. Analysis will determine the most likely enemy avenues of approach, and utilization of the terrain will provide the flank engagements and withdrawal routes that facilitate successful anti-armor engagements.

An extensive study of battery antiarmor requirements was included in Legal Mix V, which was a force design study conducted by the Field Artillery School and completed in 1978. The study found there was a need for a medium-range antiarmor weapon at the battery level and that the best weapon to fill that need was the Dragon. The Viper is the only individual weapon to become available since the study was completed, but it is only an improved short-range weapon and cannot fulfill the medium-range requirement outlined in Legal Mix V. It would appear that trying to procure a new antiarmor system, as espoused by Captain Altersitz, would certainly not help hold down costs and probably would not be much more effective than the 70 percent probability of hit at 1,000 meters currently enjoyed by the Dragon, which is already type-classified and in the supply system.

The final point to be made in this argument is that the purpose of an antiarmor capability is not to halt an enemy attack but to delay that attack long enough to allow the battery to withdraw. Company-size or larger units cannot be stopped by a single Dragon or 90-mm recoilless rifle or a single tank for that matter. The Dragon, complemented by a number of LAWs or Vipers, would best suit this requirement. The battery also has one final weapon in its possession which can knock out an enemy armor vehicle — the howitzer itself.

The Soviets are strong believers in detailed planning and centralized control. Although Soviet commanders may well display initiative, no Soviet commander is going to "throw everything across the FLOT [forward line of own troops] the moment it [the battle] starts." An action of that type would be contrary to everything that the Soviet commander has been taught. While reconnaissance elements and platoons will not be the primary danger to firing batteries, as Captain Altersitz states, neither will companies. Once a penetration of the FLOT has been realized, the Soviet's primary maneuver element for exploiting that penetration is the battalion. A commander who is realizing success in his operation will almost assuredly approximate the classical battle formations he has been taught, which are specifically designed to facilitate rapid movement while maintaining unit cohesion. Individuals and units will fight as they are trained.

One of the underlying fundamentals of the Soviet echelonment doctrine is that the commitment of follow-on forces, at the point the Soviet commander selects, exploits his success and the defender's vulnerabilities by maintaining a continuous pressure on the enemy defense. Placing the defender in the reactive role and relying on the overwhelming force ratios at the point of decision will preclude his defeat in detail, providing he maintains his commitment schedule; this tactic has been proved in combat during the Great Patriotic War and has yet to be disproved.

The Soviet commander's ability to fight his battle and display initiative must be tempered by the very nature of the system within which the Soviet commander is functioning. Initiative, in this context, will never approach what we, as US Army officers, enjoy in our ability to approach the conduct of battle with very few constraints on our tactical ingenuity. Massing firepower and maneuver elements forward is accomplished by the Soviet doctrine, and physics and land management make it readily apparent that further massing would be counter-productive to efficient operations.

The final area that needs discussion is in the area of mines. Preplanned artillery FASCAM minefields on likely avenues of approach is an excellent idea and should be integrated into any defensive planning. However, hand-emplaced minefields are inappropriate for units that have to rapidly displace on short notice. There are numerous reasons that preclude reliance on hand-emplaced minefields. Battery commanders are not allowed to throw out minefields, willy-nilly, across the battlefield. Reporting, recording, and marking procedures are formalized and necessary to insure friendly troop safety and are normally handled through operations and engineer channels. Hand-emplaced mines are extremely bulky and weigh a considerable amount. Our lightest current conventional antitank mine weighs 18 pounds. A considerable portion of a battery's carrying capacity would be required to transport enough mines to form any kind of effective barrier. Finally, the battery does not normally have the assets available to emplace a time-intensive conventional minefield.

Howard Foster
MAJ, IN
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Is your supply room in order?

The thrust of Captain Michael A. Scott's letter ("Is your supply room in order?", November-December 1983 *FA Journal)* is right in line with current attitudes and procedures being taught at the Weapons Department. Captain Scott has put the commander's supply responsibilities in perspective with his other areas of concern. It is imperative that the commander enforce strict supply accountability to insure the unit's ability to accomplish its mission.

Proper training and command interest will allow the commander to get out of the supply room and into the field. Captain Scott's ideas will help minimize the commander's time in the supply room without decreasing control of his property. It is encouraging to read letters from the field by professionals trying to work the system.

David R. Parks
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Taking a "byte" out of time

In the past year, more and more articles in the *Field Artillery Journal* and other professional military journals have included direct or passing remarks about the use of computers other than those authorized at division level. These machines are alleged to have helped the modern supervisor to fend off the ever-increasing burden of "administrative trivia" games.

The seeds of this growing usage were sown in late 1980 by two events. First was the introduction of a few early prototypes of the affordable home computer, which occurred more or less at the same time as the proliferation (at the individual soldier's level) of highly-technical military equipment such as TACFIRE and the hand-held calculator. Soon thereafter, an article appeared in *Army* magazine by then Lieutenant Colonel Frederick Timmerman, who cited the current deluge of administrative requirements — all of which end up being executed manually at the undermanned company level. Lieutenant Colonel Timmerman theorized that this deluge was due in part to computerization (with its vast secretarial, filing, and analytical impact at the higher levels of command), which had made it possible for those at division level to know more about a company than the company itself. Without specifying it, he implied that a similar capability at the lower levels, with a communications network to eliminate multiple requests for the same information, would be a great benefit to all. Many similar sentiments have been expressed in other articles without addressing the problem directly.

Today, some may think that improvements to this situation already exist. There are, after all, word-processors at the battalion level and the TMACS computers at the brigade level, along with the obsolete magnetic-card typing systems which were given to brigades some time ago. The first two items are certainly top-of-the-line machines; but are they paying their way? I submit that they are not.

Despite the existence of the word-processors, which are tremendously expensive for their small capability, soldiers in the companies are still waiting a long time for their paperwork, or else (heaven forbid) doing it themselves on the executive officer's typewriter. The TMACS computer is being put to other uses as fast as home-grown programmers can crack its language manual. And one sees a proliferation in the use of the personal computer. Through personal knowledge or contact through journals such as ours, one discovers that the personal computer is being used to handle not just such sweeping tactical applications as independently developed fire support programs of USAREUR and the 2d Infantry Division, but also personally written programs which are helping company commanders handle the planning and administrative functions that cannot seem to get done any other way. Other programs handle air movement data in the 25th Infantry Division Artillery and the infamous DA Form 2406 report in a number of places. At Fort Benning, applications are being developed to coordinate the use of video discs to simulate situational training. There are many other examples. The point is that a huge amount of professional and difficult work is being done by a large number of independent operators.

There is unfortunately very little coordination between the authors of these programs, which has certainly led to the waste of a lot of time — more precious because it is usually the programmer's own time, spent advancing Army purposes — in various independent solutions to the same problems. More technically qualified authors of the future may propose more extreme solutions with vast Army-wide networks and so on. The purpose of this letter is to bring to light the contributions of those working on these issues, to provide a starting point for more concrete dialogue, to reduce redundancy among skillful computer programmers, and to provide an easy entry for those who might be interested in having computer assistance but are terrified of the programming task. Thus, I propose that a military applications programs service be established that provides the following system and service:

• *Concept:* a clearing-house for existing public-domain programs addressing military-oriented applications.

• *Hardware:* Basic-language computers with tape or disc drives. All models will be considered to have a video screen and a printer of minimal quality.

• *Services:* The clearing house would provide:

1) A listing of currently-available free programs, all of which have been tested by the program service facility to insure that they do load and work. The list will be available at cost.

2) A listing of commercially-available free programs might be available if provided and paid for by the commercial enterprises. These would *not* be guaranteed to do anything unless the company was prepared to provide a sample for testing. Of course they would have to be justified in their belief that the test programs would not be pirated before return.

3) A listing of applications for which requests have been received but solutions were not available would be given to programmers, on request, to help them solve useful problems rather than try to invent them. This list might be provided at cost. Discussion would be needed to determine whether to allow professional programming houses to acquire such a list for their commercial ends; and, if not, how to prevent it.

• *Program specifications:* Initially, basic programs compatible with machines as listed earlier. At first, all programs will be distributed in the form of listing sheets (much cheaper and more reliable delivery). If the idea catches on, disc-loaded programs may be possible, at cost. Programmers would also provide a listing of all variables used in the program to allow local improvements — one would hope that authorship credits from the original programs would be respected. Finally, it must be possible to copy all programs to a reasonable degree. This capability should apply to future, commercial, ready-to-run programs also, allowing at least limited backups because responsive service to a unit, say in Korea, is not expected.

To summarize, this service — if demand warrants its execution — is suggested as a public service to all those who spend their home hours working on military business at the face of a CRT. Those interested should contact the author as the initial coordinator.

After a period of discussion, I am prepared to operate the described conceptual system if necessary, but would like to make it quite clear that there are many others more qualified than I am to be in charge of this idea's execution. I will be travelling extensively this year and will not be able to bring it to fruition for some time; so I hope someone else will have time to initiate the system. Just let me know!

Good luck to all you programmers; at least you know now that people know you are there!

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Dealing Steel in the Morning Calm

I really enjoyed reading Captain David Fitzpatrick's "Dealing Steel in the Morning Calm" *(Field Artillery Journal*, July-August 1983). It brought back many memories since I was there with him on Team Spirit '82. But as the

executive officer of C Battery, 1-38th FA, I saw the exercise from a different perspective and thought I would share some of the lessons I learned.

Team Spirit has to be one of the most exciting and valuable training exercises for a field artilleryman, because it allows him to combine all of his skills in the support of the maneuver forces.

Since we were going to be operating over unfamiliar terrain, the preliminary reconnaissance of the area was one of the most important aspects of the operation. The battalion commander, the battery commander, and the battalion S3 conducted an aerial reconnaissance search for initial positions which the battalion could possibly occupy. Positions which seemed to have good trafficability and good concealment and which would support the weight of our M198 howitzers were in short supply. Once the exercise had started, the battery commander and the first sergeant made a ground reconnaissance and found that many of the positions that seemed suitable from the air were in fact poor positions and could not be occupied. The primary drawback was that the drained rice paddies and fields were too soft to support the weight of the howitzers. Furthermore, many of the areas which the batteries could occupy had only a 400- to 500-meter front. The positions that were selected did not afford the batteries much natural camouflage, and so it was imperative for battery sections to erect their nets and supplement them with hay and straw found in the fields. In addition to the positions in rice paddies and fields, we had positions in villages, on river banks, and within construction sites. Because there were so many different types of positions, the configuration of the battery was never the same. Since rapid moves in support of the maneuver forces were a regular occurrence, the battery advance party needed to be highly organized and ready to go at a moment's notice. The gunnery sergeant was responsible for the advance party and always checked the members' equipment for completeness. Batteries for the night-lighting devices and the TA-312s proved to be a problem in that the cold weather caused them to lose their charge more quickly than usual.

The unfamiliarity of the territory required that the battery commander give the executive officer a very detailed briefing after his return from reconnaissance. Since available maps were outdated, the battery commander told the executive officer exactly what to expect on the ground, based on his reconnaissance of the area.

One of the biggest coordination efforts at the battery level involved road marches and movements. Since trafficable routes were few and since all routes were narrow, the battery commander had to work closely with the S3 to insure that our unit could move when and where it was necessary. In selecting a route, the battery commander found camouflage net poles to be a helpful tool. He kept some of them in his jeep; and, by putting premeasured lengths of poles together, he could determine whether or not the widest vehicle in the battery or the tallest vehicle in the battery could pass through the narrow villages or under the ever-present low-hanging wires.

Resupply of fuel was a real challenge, and I monitored it very closely. The exercise entailed many moves that varied in length from about 5 to 15 kilometers. The S4 fuel trucks were always on the road either refueling the batteries or trying to get fuel for their pods. The battery howitzer sections could survive with refueling every third or fourth day; however, this schedule was a problem for the mess section, since it had to receive fuel every day for field stoves. Therefore, on the days when the S4 did not send the fuel trucks to my battery's area, I sent a 2½-ton truck and took 5-gallon gas cans to the battalion trains area to obtain fuel.

The battery mess sergeant had one of the most difficult jobs in the battery. Preparation of the meals was always interrupted by the number of moves that the battery made. The battalion executive officer and S4 decided to make mess resupply a unit supply system orchestrated from the battalion trains area; so the mess sergeant had to work in close coordination with the battalion mess sergeant for the delivery of food. Since the battery did not have any means of storing large quantities of perishable items, the food had to be delivered to the battery every day. The linkup between the delivery truck, which did not have a radio, and the battery mess sergeant was complicated by the battery's frequent moves; and on several occasions mess supplies were delivered during the middle of the night.

Safety was a continuing concern during Team Spirit '82. It was a 24-hour operation, and the soldiers were beginning to become both physically and mentally exhausted toward the end of the exercise. They became more careless and lost a degree of their concern for personnel safety. Therefore, the entire chain of command became ruthless in administering a system of work shifts which rested the soldiers as much as possible. Frequent movements did interfere with the soldiers' rest, and the battery leaders were truly taxed to insure that fatigue did not ruin troop safety or unit combat effectiveness.

The road conditions during Team Spirit were often treacherous, and the M198 itself made life even more interesting for our drivers. The M198 is four inches wider on each side than its 5-ton prime mover; therefore, it was necessary for the drivers to watch the howitzers very carefully in the vehicle mirrors, especially during turns, because the howitzer had a tendency to turn inside of the prime mover.

Since the battery fronts were wider than normal, perimeter defense was more difficult than usual. Each howitzer section was responsible for its own security. The battery perimeter security was handled by the maintenance, communications, ammunition, and supply sections. The first sergeant selected the positions for the crew-served weapons and coordinated the battery defense.

Prior to our arrival at the exercise area, the battalion maintenance sergeant had given all vehicle operators and section chiefs in the battery a class on the operation of the winch. This class proved to be immeasurably helpful, since we needed to use the winches several times to pull vehicles and howitzers out of the rice paddies.

Maneuver damage to the area proved to be a major problem, since many of the roads were not wide enough to handle the howitzers and some roads were damaged. Also, possible position areas had to be checked out to insure that barley, garlic, or other crops were not damaged.

There are many other memories that come to mind — how cross-training proved invaluable in allowing us to stay operational and still give soldiers their needed rest, how we forced our maintenance section to pull service in the field and make the moves as well, and how we used our ammo humpers as cannoneers. Suffice it to say that Team Spirit '82, as the name indicates, was a true team exercise. All of the soldiers worked in close coordination with each other to insure the success of the operation. By working together and treating the exercise as realistically as possibly, we learned many valuable lessons about how to survive and be successful in a demanding combat environment.

James Moughon
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2-35th FA
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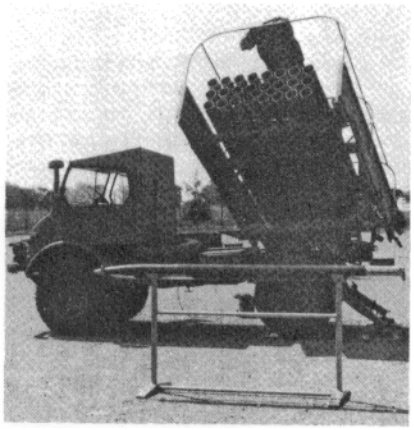
South African artillery

"Once a gunner, always a gunner." I was a gunner in the Royal Artillery for about 33 years; so, of course, all gunnery matters still interest me. As a former contributor to the *Field Artillery Journal* ("The Royal Artillery of the British Army," January-February 1974), I think the new developments that South Africa has made in artillery might be of interest to the *FA Journal* readers. Here are a few of them.

Valkiri

Valkiri is a highly mobile artillery rocket launcher system capable of producing high saturation fire on area targets at ranges between 8,000 and 22,000 metres. It can be deployed on its own or in support of conventional artillery guns against such area targets as camps, troop concentrations, and soft-skinned vehicle parks. The high mobility of the equipment makes it very suitable for shoot-and-scoot deployments.

The 24-tube launcher is mounted on a 4x4 petrol-driven vehicle, which is likely to be replaced by a SAMIL truck built in South Africa. The road speed of the fully-loaded vehicle is 90 kilometres per hour (kph). During travel the entire launcher is covered by the standard type tarpaulin over the back of the truck and is therefore suitably camouflaged.



Valkiri rocket launcher.

The elevation of 888 mils and the traverse of 1851 mils of the tube pack are hydraulically assisted; power for the system is derived from the power takeoff or batteries of the vehicle. The sight is mounted on the side of the launcher frame and is stored in a special container on the vehicle when not in use. Standard artillery techniques are used to lay the launcher. During firing, the launcher is stabilized by means of a pair of hydraulic supports mounted at the rear of the launcher.

The rockets are fired singly or in ripples of 2 to 24 from within the cab by means of an electric firing unit or via a remote firing unit with a 50-metre plug-in cable. A test circuit is incorporated in each firing unit to check the status of the rockets and firing circuits.

The 127-mm calibre rockets have a double base propellant motor, a pre-fragmentation type antipersonnel warhead, and a proximity fuze. The warhead consists of a matrix of approximately 8,500 steel balls and epoxy resin cast into a thin-walled cylinder. The proximity fuze is screwed into the front of the warhead (a contact fuze is being developed for this warhead).

The necessary meteorological data required for accuracy is obtained by means of a weather balloon, while the surface conditions are determined by means of a weather vane and an anemometer mounted on a telescopic mast in close proximity to the launcher. In addition, a wind gun is provided which fires a small calibre projectile to estimate the prevailing ground wind conditions.

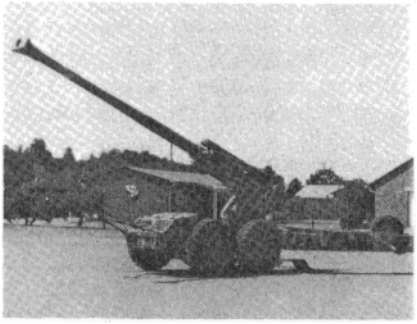
To ensure stability, the rockets are fired from the side tubes of the launcher first, with those in the centre being fired last. Even though it is best to fire the rockets in ripples, the complete load of 24 rockets can be fired by the two-man crew in 23 seconds. Spoiler rings of three different sizes are provided which fit onto the nose of the rockets; these are used to increase the wind resistance and thus reduce the range, depending on the size of the rings. These rings cause a frightening scream as the rocket flies toward its target, which adds to the morale-lowering factor of this weapon. The beaten zone of the weapon varies with range; it starts at the shorter ranges as a narrow band, then becomes a circle, next an ellipse, and at the higher ranges reverts to a band. Nominally the standard deviation at the maximum range is 290 metres in azimuth and 200 metres in range. The lethal area of a warhead is 1,500 square metres.

Spare rockets are carried in a 5-tonne military vehicle fitted with a collapsible cargo stowage assembly which is capable of carrying 48 rockets and fuzes. The launcher can be loaded by the two-man crew in about 10 minutes; and, once the launcher is on a site, the crew can bring it into action in about five minutes. A radio for communication with the command post or controller is fitted in the cab with a remote onto the firing unit. The South Africans believe their weapon is more effective than the Vought system being built for NATO because it has 24 rockets instead of the 12 of the Vought; also, they find it simpler and less expensive.

The complete Valkiri can be carried in a C-130 or C-160 aircraft. Although not as accurate as normal guns, the system has already proved to be a highly effective weapon.

Guns

Like the artillery in other countries, the South African artillery has realised that in modern warfare the 25-pounder field guns and the 105-mm light guns of the World War II and 1960 eras do not have the range or weight of warhead necessary for most operations. As a stopgap, most of these guns in the field regiments have been replaced by the ex-British World War II 5.5-inch medium gun. In 1976 the Armament of South Africa and its affiliates, the South African artillery, and private industry began a cooperative programme to develop towed and self-propelled 155-mm guns; the results are the G5 towed system and the G6 self-propelled system. The G5 is already in service, and the prototypes of the G6 have completed their trials.



Towed G5 gun.

The G5 complete system consists of the gun-howitzer itself, a complete ammunition system, a gun tractor, a meteorological station, a muzzle velocity analyser, an artillery computer, an artillery helmet, and a radio communication system. Most of these are in series production, and the remainder are in the final stages of qualification. The gun has proved itself to be robust and stable when firing and easy to bring in and out of action. The South African artillery claim that the G5 is more stable and accurate than the Anglo/German/Italian FH70, but this claim has yet to be proved. The South African artillery has the whole system in operation.

The gun can be employed in the indirect role either as a normal gun, as a howitzer, or as a mortar and has a direct fire capability up to 3,000 metres. The maximum range at sea level with a standard projectile is 30,000 metres and 37,500 metres with a base-bleed projectile. This long

range, combined with a top traverse angle of 84 degrees and a quadrant elevation of minus 5 degrees to plus 75 degrees, gives the G5 great flexibility and a good coverage area. Charge overlap is obtained during high-angle firing with a charge system of only six zones with three charges. The maximum firing rate is three rounds per minute, and the normal rate for continuous engagement for 60 minutes is two rounds per minute. The gun can be towed by a 10-ton vehicle (a SAMIL 100 is used in South Africa) at speeds of up to 90 kph. Using its own engine (mounted on the gun) the gun's speed is eight kph on hard ground and three kph on sand.

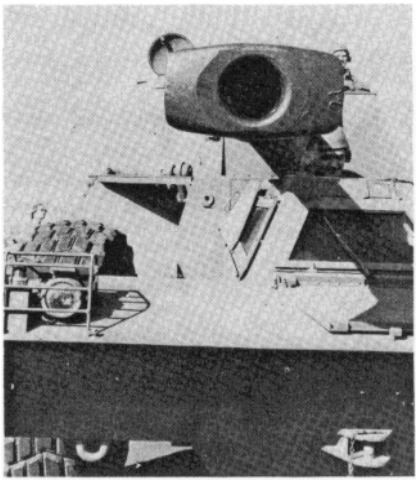
The trails, trail wheels, and firing platform are power-operated, which enables the crew of five to bring the G5 into action in two minutes; in an emergency, a crew of two men can do this in five minutes. A manual back-up system is provided to enable the crew to get the gun into action if the power fails.

The elevating mass comprises the ordnance, cradle with integrated recoil system, and loading mechanism. The ordnance consists of a monobloc 45-calibre barrel fitted with a single muzzle brake, a semi-automatic breech mechanism, and a mechanical firing mechanism. The recoil system consists of a buffer with a high-angle cut-off gear, a recuperator, and a replenisher. The optical-mechanical sight system is mounted on the trunnion with a compensating system for trunnion cant.

The gun is fitted with a mechanical electronic gun monitor with an automatic equivalent full charge (EFC) counter, a recoil length indicator, and a round counter. An alarm system is incorporated for incomplete recoil run-up, low battery voltage, and limits of firing arc. The top structure and undercarriage of the gun are made from high strength steel; there are split trails and self-digging spades with a special system to "un-dig" them after firing.

The on-board self-propelling engine is housed in a frame on the front part of the carriage and consists of an air-cooled 51-kilowatt, 68-horsepower diesel engine with hydraulic drive for the main and trail wheels.

The G6 self-propelled version of the 155-mm gun uses the same ordnance as the G5, but the ordnance is carried on a platform on six powered wheels which provide a remarkably mobile and fast vehicle both on and off the roads. (The South African Defence Force opted for a wheeled rather than a tracked vehicle for reasons of economy and suitability for long-distance travel.) The cross-country mobility has proved highly



Self-propelled G6 gun.

satisfactory under the most exhaustive tests in the local environment. The G6, unlike most self-propelled guns which basically use a tank chassis, has a vehicle designed around it and therefore has a turret that provides adequate space for the 155-mm gun as is provided in a naval turret. The hull of the G6 is armoured against small arms, shrapnel, and small arms antipersonnel ammunition. The hull has four firing ports for unexposed use of personal weapons. Eight grenade launchers are fitted to the weapon; also 44 projectiles, 50 charges, 64 primers, and 64 fuzes are carried on-board. The range is the same as that for the G5, the traverse is 80 degrees, and the normal crew is five. The normal rate of fire is three rounds per minute and the rapid rate is four rounds per minute. The maximum road speed is 90 kph, and the cross-country speed 45 kph. The overall length with gun is 10.2 metres, the width is 3.280 metres, and the height is 3.314 metres.

The air-cooled diesel engine drives through an automatic five speed gearbox onto either four or all six wheels.

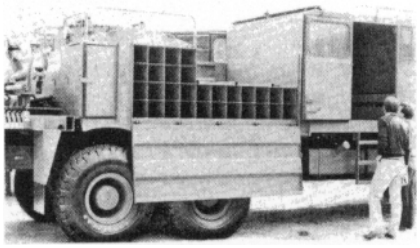
Ammunition

The South Africans have developed a special range of ammunition optimised for the G5 and G6 runs. This ammunition can be used in all modern 155-mm guns; alternatively, the guns can fire standard 155-mm NATO-type ammunition. The new high-explosive (HE) projectile is claimed to have double the effect of the M107-type ammunition because of the use of modern fragmentation steel, because of thin walls ensuring 23 percent more volume for HE than the M107, and because of RDX/TNT filling. The HE base bleed projectile has the same terminal effectiveness as the HE projectile but gives a 25 percent increase in range. Other types include white phosphorous and base ejection smoke projectiles and an illuminating projectile which provides a light intensity of 1.65 million candella for a burning time of 90 seconds. The current smoke rounds are white, red, and blue.

The charge system consists of three charges; charge one gives a range of 17,700 metres, charge two 24,700 metres, and charge three 30,000 metres with the normal HE projectile and 37,500 metres with the base bleed type projectile. Direct action and proximity fuzes are available.

SAMIL 100

The special SAMIL 100 gun tractor has an air-cooled, 184-kilowatt diesel engine. A crew compartment for eight men is situated behind the driver's cab. An observation hatch is fitted centrally in the crew compartment as well as a machinegun mounting platform. The section immediately behind the crew compartment consists of a cargo drop-side body with built-in storage compartments for the gun charges and winching equipment. On top of these compartments, storage is provided for 15 projectile pallets, each weighing 189 kilograms. A canvas cover is provided to cover all equipment on the cargo body. A hydraulic crane is mounted behind the rear cargo body; the crane is capable of swinging through 360 degrees and lifting 800 kilograms at a jib length of 3.5 metres.



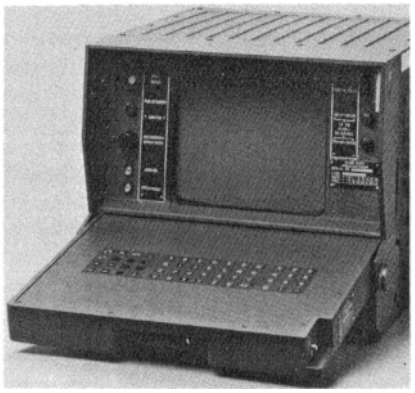
SAMIL 100 gun tractor.

The overall dimensions of the vehicle are 2.5 metres wide, 9.350 metres long, and 3.350 metres high. It is a powerful gun tower which can meet all normal cross-country requirements.

Other equipment

The newly developed fire control system, the muzzle velocity analyser, and the meteorological station are used with both the G5 and G6 weapons.

• The AS80 artillery fire control system has been designed as a decentralized system to handle the fire control computer for a fire unit of up to eight guns. The system will handle up to four simultaneous engagements where, for each engagement, four separate phases are provided; i.e., the initial orders, the definition of the target, adjustment of fire, fire for effect



FS80 fire control system.

where gun data is calculated for each gun, and end of mission. The system prompts the user throughout the mission with available alternatives. The dialogue, which has been selected to conform with normal fire control procedures, is currently available in two languages; but translations can be made to suit the user's requirements. The system includes gun display units for the display of firing data at the gun itself. These may be mounted directly onto the gun or placed on a tripod nearby. Communication between the fire control centre and the guns is by radio or land line. Ballistic programmes can be supplied for most guns in service today.

• The EMVA MARK 108 muzzle velocity analyser is a Doppler radar measuring instrument which can measure muzzle velocities in the range of 30 to 3,000 metres per second; results are presented in metres per second for direct application by the gun crew. The instrument consists of an antenna head suitable for fixing onto the gun or on a tripod and a processor unit including a printer to record all results.

• The S700 meteorological ground station is a self-contained system usually mounted in an air-conditioned container cabin for transport on a mobile trailer. It automatically tracks, receives, and processes radiosonde data from launch until flight termination. The received data is converted into actual meteorological information which is recorded on both magnetic tapes and directly onto a chart recorder. Throughout the flight, the S700 antenna tracks the radio sonde and provides angle information which is combined with real time and pressure information from the radiosonde to provide details of the wind velocity and direction at various altitudes. All data are used by the on-line minicomputer to compile the standard meteorological message, and these are supplied to artillery units and weather forecasting stations. A mobile hydrogen generator of special South African design is available to fill the meteorological balloon. The generator produces the hydrogen by breaking down water.

The South Africans have developed a complete range of radio communications for all purposes, to include data entry terminals for use at the observation posts and a helmet radio. This integrated helmet radio provides skull and hearing protection as well as communications for the gun crew.

The South African artillery and other South African Defence Force regiments and corps are fast becoming equipped with weapons and associated equipments which they believe are second to none.

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Make standardization happen

I was encouraged to see Major General Crosby's tough stand on standardization in the "On the Move" column in the May-June 1983 *Journal*.

To my mind the field artillery was making little, if any, progress toward achieving standardization consistent with either the letter or intent of the Army standardization program. To my understanding, standardization across the field artillery is designed to free officers and noncommissioned officers from the burden of the minutia of the detailed planning necessary for organized loading procedures; to give soldiers the confidence that what they see today will be, to a large extent, what they will see in their next units, thus eliminating extensive orientation drills; and to give the members of the Field Artillery Community a common point of reference for everything that we do.

Standardization is not designed to take away the initiative of the soldier in the field, although soldiers in the field seem not to understand. When we hear that Fort Sill is to standardize some task, drill, or procedure, the immediate responses always include "Who is Fort Sill to tell me how to run my unit?" or "The traditional strength of the American Army is its ability to take advantage of the creativity and initiative of its soldiers," or "Lockstep!" or "It won't work," or "The folks at Fort Sill are so out of touch with reality, how can they tell us what to do?"

The job of the Field Artillery School must be, therefore, to instill the knowledge in all the students who pass through that what standardization is meant to do is direct our initiative and energy down avenues more constructive than trying to decide where we should put our camouflage nets. The School is not fostering this idea very well; and so our standardization progress is floundering.

Many members of the Field Artillery Community are fond of saying that standardization does not apply to us because we've been doing standardized crew drill for years. Big deal. Standardization is more than that. It is a mind-set, a practiced way of doing business in the day-to-day operations of the section, battery, battalion, and on up the chain of command. The war we envision fighting will require that all of our brainpower and energy be directed toward the defeat of the enemy. If we take up valuable seconds looking around madly for a fuze wrench, -10 manual, or web gear, our inability to be organized will cost lives. Standardization in those common, every day situations can only serve to give us more time for killing the enemy. It is about time we started doing something to make it happen.

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CPT, FA
Fort Sill, OK

Lance survey team drill

Two years ago I attended the FATASOC (survey) course right before I assumed command of a Lance battery in the 6-33d FA at Fort Sill. We had some real problems in survey training. I think a big part of the problem was instilling confidence in our surveyors that they could do the job. In peacetime, Lance missiles are never fired using the data provided by the battery teams — at the annual practice firings at White Sands and Crete, the firing teams use data provided by range control. What we needed was some survey training in which the team could verify its results. What we came up with was a unique formal training drill for the Lance survey team. We had a great deal of success with it in the battery, and I think perhaps the rest of the Lance community might benefit from the following discussion.

Survey can certainly be the Lance battery commander's nightmare. With the requirement to provide directional control for Lance firing points to an accuracy of 0.04 mil, even small errors in survey can result in a target miss. When the position and azimuth determining system (PADS) is fully integrated into Lance battalions, it will provide a speed and reliability of survey

that will significantly reduce the commander's concerns. Bridging the gap until then, however, remains the responsibility of the Lance battery's two conventional fourth-order survey teams. Therefore, until the arrival of PADS, continuous, quality survey training must be provided for those battery teams.

Training the survey team, however, is often frustrated by the same problems that plague all battery training. Lack of time, personnel turnover, and shortage of qualified trainers are common problems faced by all commanders. Yet, where survey is concerned, we cannot tolerate shortfalls in training. How does the commander fix the problem? The solution for our unit was a team drill.

In recent years the Army has returned to encouraging the use of team drills to overcome common training obstacles. These drills help standardize training within the unit. In addition, when the training is standardized and simplified, the trainer's job becomes much easier since he can spend less time planning and preparing training. With scarce training resources, the team drill appeared to be the quick fix for our training troubles.

Our team drill design provided the commander a quick and efficient way to guage the status of survey training. (Normally, survey operations are an all-day affair — few commanders have the time or patience to watch an entire survey operation to find out the exact level of a team's proficiency.) In addition, the team drill design provided the survey party chief a versatile tool for standardizing his operations, kept the section from becoming rusty in the various critical survey techniques, and above all provided challenging and motivating training for the team. Finally, it required minimum resources.

Unlike most battery operations, Lance survey is complex and highly decentralized. No one tactical operation could require the team to perform all the critical operations a survey team might be required to perform for Lance. Therefore, unlike other team drills, the survey team drill did not duplicate any one operation. Rather, our drill was designed as a modified round robin requiring the team to emplace the same firing point using various survey techniques. This design allowed the drill to include most critical skills and also allowed the team and the commander the ability to compare the accuracies of the various methods.

The drill did not include all ARTEP tasks; to conserve time and minimize resource requirements, tasks such as manual computations and simultaneous observations were omitted and were trained separately. It did include the following technical and tactical tasks, which represent basic Lance survey requirements under any conditions:

- Performance of preventive maintenance checks and services.
- Reconnaissance of a firing point, survey planning, and team briefing.
- Establishment of directional control with the survey instrument, azimuth, gyro, lightweight (SIAGL) and of location by map spot.
- Establishment of directional control with astronomic observation (altitude method).
- Establishment of directional control, height, and location by traverse.
- Preparation of a Lance firing point.
- Entries in the recorder's notebook and preparation of a record of the firing point.
- Providing security during tactical operations.

Note: *Specific tasks, conditions, and standards for many of these tasks are given in the Lance ARTEP manual (for example, tasks 3-III-5-1,-2,-3, and -6).*

The day before the drill, the survey chief (trained in reconnaissance through terrain models and tactical exercises without troops) developed his survey plan and made a reconnaissance of the firing point. During the reconnaissance, he made a map-spot of the firing point for its location and altitude. In addition, he considered the tactical and technical requirements for the point, to include a level location for the launcher (less than 5-degree slope), locations in the treeline for the remote theodolite and test target, good entrance and exit routes, trafficability of terrain, unobstructed fields of fire for a launcher oriented on the main axis of fire, cover and concealment of the firing point, and an adequate hide area for the launcher.

The drill began with the team conducting pre-operation preventive maintenance checks and services on vehicles and equipment at the starting field location (30 minutes were normally alloted for these tasks). Checks were limited to those prescribed by the battery standing operating procedure (SOP) for battery stand-to in the morning. At the completion of these checks and services, the survey team was briefed by the team chief on the upcoming operation (a good guide for the briefing is in chapter 9 of FM 6-2).

To begin the survey, the team occupied a known survey control point (a battery survey control point previously established by the division artillery survey personnel). Using the theodolite and the DM-60 distance measuring device, the team conducted a traverse to the firing point (a traverse of 1,000 meters and one traverse station).

After the team had traversed to the firing point and established the remote theodolite and the test target stations, without moving the theodolite from the remote theodolite station the team emplaced the same test target station by astronomic observation (altitude method) of the sun. The team then march ordered the theodolite and set up the SIAGL over the same remote theodolite station. Using the SIAGL, the team again emplaced the same test target station. Setting up the theodolite over the remote theodolite station once again, the team traversed back to the battery survey control point.

With the completed recorder's notebook, the team used the TI-59 calculator to compute the survey data. Our team drill required TI-59 programs 01, 02, 05, 08, and 13. In our unit we found that to keep up with the battery's fast-paced operations, the team had to depend exclusively on the speed of computer operations rather than on manual computations. Finally, the team completed a record of the firing point which included not only all survey data, but also instructions for the firing team on how to locate the point. This format was established by the unit SOP. After-operations preventive maintenance checks and services concluded the drill. A quick look at the go/no-go ratings on the tasks in the survey team drill provided the commander instant feedback; and yet the only resources he required were normal MTOE equipment, a field training area about two kilometers square, and one-half day of training time.

In our unit, we found that the drill provided us with the standardization and simplicity we needed for good team training. In addition, the drill encouraged creativity and confidence in the team. The team was no longer reluctant to stray from the old formula of SIAGL and map spot. During our annual training at White Sands, New Mexico, for example, the survey team developed several new techniques for desert operations. With a fix like the team drill, all of us slept much easier.

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Mission Area Analysis

Has the Mission Area Analysis served its purpose? It was intended, quite simply, to be a better way to manage the combat developments

system. It is a front end analysis which identifies tasks to be performed; determines the ability of present and projected elements to perform these tasks; identifies deficiencies in doctrine, organization, training, and materiel; recommends preferred, feasible solutions to eliminate deficiencies; and identifies opportunities to capitalize on technological breakthroughs.

From the perspective of the materiel developer, the Army's Mission Area Analysis objectives have been accomplished. A micro look at the degree of objective fulfillment verifies that analysis.

The first objective — identification of tasks to be performed — was essentially a TRADOC function. The materiel developer was supportive, however, by developing subtasks as they relate to the utilization of equipment.

The second objective — determination of the ability of present and projected elements to perform the tasks — required that materiel developers provide weapon system performance characteristics for the play in various modeling efforts of the Fire Support Mission Area Analysis. (The Fire Support Mission Area Analysis process was described in "Mission Area Analysis: Shaping the Future of the Force," *FA Journal*, March-April 1981.) The development of these performance characteristics for projected systems such as the Corps Support Weapon System and the Multiple Launch Rocket System terminally guided warhead provided the materiel developers the opportunity to survey the technology base and insure that feasible technology handoffs to systems were entered into the Fire Support Mission Area Analysis simulations.

The third objective — identification of deficiencies in doctrine, organization, training, and materiel — was accomplished by the identification of 79 prioritized deficiencies. The first requirement was to resolve deficiencies through doctrinal, organizational, and training changes and then, and only when necessary, pursue the hardware development needed to resolve the deficiencies completely.

The prioritized list of deficiencies provides a clear set of marching orders to carry the materiel development community through the fourth and fifth objectives, which recommendations of preferred, feasible solutions to eliminate deficiencies and identify and capitalize on technological breakthroughs. Specific concepts and technologies have now been identified which address all of the prioritized deficiencies. Since, theoretically, it takes seven to ten years to move a new weapon system from concept to initial operational capability, the US Army Missile Command is using the Mission Area Analysis (together with the TRADOC Battlefield Development Plan, up-to-date threat assessments, and the Science and Technology Objectives Guide) as a important basis for its Long Range Weapons Plan, which will provide the Army with weapons systems that will have the capability to counter the threat out to year 2005.

The Mission Area Analysis has accomplished its objectives. The specific near-term objectives cited above have been met. The materiel developers have a clear set of prioritized deficiencies to work against. The Mission Area Analysis deficiencies have become the basis for near-and-far-term strategic product planning within the Department of Defense Planning, Programing, and Budgeting System.

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Designated hitter

With the proliferation of new equipment and weapons systems coming into the Army's already impressive inventory, the mid-intensity battlefield of the future will be a highly complex and incredibly lethal place. To my mind, the most impressive target acquisition/engagement system coming online to date has to be the laser designator and precision-guided munitions. The combination offers a myriad of truly devastating possibilities.

The principle (if not the mechanics) is simple enough. A lethal projectile with a seeker or sensor contained within the nose cone homes in on the reflected energy of a laser beam bouncing from the designated target. The munition locks on, and the rest is academic. As stated, the principle itself is fairly simple; but then it is not just a matter of designating and merely cutting loose. There is more to it than that!

Each designator has what is referred to as a pulse repetition frequency code. This pulse repetition frequency code must be applied to the weapon delivery platform (or the munition itself) so that the projectile will be able to readily identify its particular designator among the countless others that will be manifest on the future battlefield. Normally, while it is still developing a distinctly new system for acquisition, the military is rather sketchy on how the system is to be properly utilized once it hits the field. There will, of course, be training circulars and how-to-fight manuals and publications bordering on the fringe area of established doctrine. But it is still touch-and-go for awhile. In many cases, a "do" may become a "don't" and vice versa until some specific doctrine for employment is formulated. At present, this situation seems to exist with the Ground/Vehicular Laser Locator Designator (GVLLD)/Hellfire system.

The whole problem appears to stem from confusion as to who coordinates with whom to facilitate target engagement by aviation assets. Yes, there is an aviation representative at the brigade tactical operations center who interfaces directly with the brigade fire support officer to accomplish just such coordination once a suitable target has been discerned. But under the current system, even with conventional munitions, to say that the process is less than clearly defined and executed is an understatement. With the employment of laser-guided munitions, the coordination process becomes downright murky.

I am aware that aerial observers and scout helicopters will have a designation capability. I am also aware of the fact that the designating aerial agency can itself become a target for enemy air defense artillery if it is exposed for too long a period of time. I therefore have a tentative suggestion based on these two assumptions: first, that an adequate number of separate observation/lasing teams will be organic to the Heavy Division '86 organization and equipped with the fire support team vehicle (FISTV); and, second, that the majority of advanced attack helicopter munitions will be the laser-guided variety such as Hellfire.

I suggest that separate observation/lasing teams be deployed in the dedicated support of specified brigade sectors along with a slice of aviation assets (via task organization). The respective brigade fire support officer can exercise command and control over the teams, or they can delegate command and control down to specific battalion fire support officers depending on the tactical situation and the mission. Aviation units will have the pulse repetition frequency codes of their dedicated separate observation/lasing team, thereby streamlining target acquisition and subsequent engagement. Such air-ground hunter/killer teams can even be used to suppress

enemy air defenses beyond the forward line of own troops to facilitate the attack of second echelon targets by high-performance aircraft. Such a system configuration has the following possible advantages:

• Eases coordination between aircraft and separate observation/lasing teams because the aviation representative at the brigade tactical operations center will consistently know with whom the choppers are dealing (i.e., call sign, sector, pulse repetition frequency code, and radio net).

• Eliminates possible confusion inherent with the frequent change of designator/delivery system pulse repetition frequency codes.

• Enhances survivability of aircraft by employing their lock-on-after-launch/fire-and-forget capability, allowing the aircraft to engage a designated target from defilade.

• Allows the separate observation/lasing team maximum use of terrain and target acquisition by making its mission one of pure destruction as opposed to the positioning concerns and restraints inherent with the support of specific company-size maneuver elements engaged in offensive or defensive operations. But, by the same token, if tasked to provide such close support, the separate observation/lasing team can concentrate its designation capability on the air-to-ground delivery system while the maneuver company's FIST can concentrate on tube-delivered fire support assets. Indeed, the two working in conjunction would highly complement one another.

• Since the designator is not required to be on the delivery system-target line, it enhances the survivability of separate observation/lasing teams by allowing them to acquire, track, and destroy a target and rapidly reposition to repeat the process before they themselves can be decisively engaged.

Actually, the deployment possibilities are virtually limitless; and the above suggestion is only one of them. At best, it is a starting point. At worst, it is ample food for thought for those within the Field Artillery Community who develop tactics and doctrine.

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To sell or not to sell

I am gratified that your intention is to make the *Field Artillery Journal* a useful forum for professional discourse. If you will only nail this intent to your masthead, you will have done the Field Artillery Community a great service. My only complaint over the years has been that the *Journal* was an excellent info sheet, but no forum.

I want to address two articles in the May-June 1983 edition of the *Field Artillery Journal*. "No Sale for the Targeting Cell," which recommends "how best to enhance the existing staff," is an ineffective band-aid; and "Find and Attack," which talks of three players in the targeting game, is indicative of the duplication, competition, and resulting confusion that are at the root of the targeting problem, as well as problems with reconnaissance and target acquisition assets.

Targeting is a most timely and important subject since the lack of an efficient and accepted procedure could be the cause of disaster in combat. To an experienced observer, the problems with targeting are only one symptom of a deeper malaise. The cause of these problems is an infantry-oriented army operating on a doctrine of selling artillery support to the maneuver commander. I make this statement and feel obliged to establish the "credibility of the witness." I have been fortunate enough to live through command of an artillery battery and battalion in Europe in World War I, command of a corps artillery in Europe in World War II, and command of a division artillery in Korea.

Now on to more specific remarks. World War I was won by the artillery. After four years of terrific infighting, French artillery power and techniques had evolved as the most powerful force on the battlefield. The American artillery adopted French equipment and techniques *in toto*. As a result, the role and prestige of field artillery in the French Army and among the French people were unquestioned. This artillery prowess was properly recognized by rank and procedures. It is hard for people today to realize, for instance, that the French artillery plan for counterpreparation fires broke the German offensive in July 1918 before it even got off the ground.

Another "artillery-minded" people are the Russians. Although there are some who will argue the point, the Soviet artillery broke the Panzer attacks before Moscow. Again, after years of heavy infighting on a scale never before witnessed, Soviet artillery pulverized the German positions on the final drive west to Berlin. On visits across the Elbe to the Soviets, we soon learned that the outstanding performance of the Soviet artillery had earned it a position in the Soviet Army as a "corps d' élite," commanded by a field marshall.

Thus, the artilleries of two nations, through their power and efficient performance in bitter campaigns, earned a position of prestige and influence. There was no need to sell fire support to maneuver commanders. Fortunately this country has never experienced such prolonged, large-scale, meat-chopping campaigns; but apparently this fact has caused us to have neither an artillery-minded public nor an artillery-minded Army. Practically every chief of staff since World War II has been an infantryman. Even our Ground Forces chief in World War II was infantry-minded. Armor and airborne had to fight their way in. In all the cases I know of, artillery was never included in the initial senior general officer conferences on projected operations. Operations both in Europe in World War II and in Korea were pretty well set before the artillery plan was requested. Reread that excellent little article "The Soviet Man of Steel" in the May-June 1983 issue of the *Journal* and see what a different picture the Russians paint from start to finish.

Can we afford to allow the present artillery role and status to continue? Positively not! Technology has propelled us into the age of the guided missile or the age of firepower, whichever you want to call it. All of this to-do about the extended battlefield and attacking the second echelon boils down to simply *an extension of artillery range*.

Artillery better wake up and realize that the artillery corps commander acting on the maneuver commander's directives will be fighting the corps battle with the division commanders looking on until the action moves out of the extended battle area. The future magnitude of the air-ground assets and fire plans require compensatory changes in doctrine, organization, and procedures. Field manuals and service schools must clearly define the air-ground firepower as the most powerful force on the battlefield. In organizational matters, a complete corps artillery headquarters must be reconstituted. A rank appropriate to their responsibilities must be given to the division artillery and corps artillery commanders (one star and two stars, respectively). Target acquisition assets must be consolidated under the corps and division artillery headquarters — currently, too many overlapping competitive units exist. Procedures must provide for inclusion of artillery commanders in all formulative conferences, including and commencing with the reconnaissance. Collocation of the maneuver commander and his artillery commander both during the planning and during the critical phases of the action

is a must. Targeting procedures as outlined in FM 100-5 and in "No Sale for the Targeting Cell" are fatally flawed. FM 100-5 states, "To conduct a deep attack successfully, the fire support coordinator, G3, and G2 must cooperate fully"; and the author of "No Sale for the Targeting Cell" states that "It seems clear no one staff section could or should be responsible for the entire targeting process." This sounds like the conduct of combat by committee. I believe this procedure permits personnel problems from the interplay of conflicting or ambitious personalities and that it is too time consuming. I also believe that only the artilleryman is technically qualified for targeting. There is a statement in "No Sale for the Targeting Cell" which I do not believe is correct: "Those who argue that the commander should delegate the fire support element the overall responsibility for targeting are saying that in addition to handling standard fire support attack systems — mortars, field artillery, air support, and naval gunfire — the fire support coordinator ought to be responsible for deciding when, where, and how to use maneuver units and electronic warfare assets." By any amount of specious reasoning I have never heard such a theory even inferred.

Apparently there are artillerymen who would sell their own birthright! Even with a profusion of targets, why imply that the artillery commander and his staff cannot solve an essentially artillery problem without a conference set up? You will tell me I have no idea of the complexity of present-day organizations and operations. I will answer that this is your present undoing. Study the Soviet procedures as outlined in "The Soviet Man of Steel." It is the only way — simple and effective ("The Soviet military is well aware of the value of a central artillery coordinating authority at all command levels"). Our doctrine must state that the artillery commander and his staff are number one in fire support planning, operations, and procedures. It is clear to me that the gobble-de-gook on targeting results from a lack of much combat experience in those who wrote it.

I have one final thought. The *sine qua non* of any army's field artillery is a modern field piece. Over a year ago, the *Field Artillery Journal* published an article on the Soviet's modern field piece, the 122-mm self-propelled armored howitzer. Not a ripple of reaction ensued from the readers. We have concentrated on heavy equipment intended primarily for use in Europe. So today our Army and Marine Corps light forces are without a modern field artillery component. Without this piece of equipment we cannot continue to call ourselves *field artillery*. Something is radically wrong with the thinking at Fort Sill today. I suggest the reading and publication of Brigadier General (Retired) Philip L. Bolte's excellent article, "A Case of Foot-Dragging: The Mobile Protected Gun System," which appeared in the July 1983 *Armed Forces Journal*.

I'm betting criticism such as this will not even be published.

Roland P. Shugg
BG (Ret), USA
Oakland, CA

Targeting cell

The May-June 1983 issue of the *Journal* ought to be made platinum — it's a classic! The article on "No Sale for the Targeting Cell" was long overdue. As an ex-branch chief who was the custodian of targeting in both the Target Acquisition Department and the Tactics, Combined Arms, and Doctrine Department, all I can say is that the author was absolutely right!

The first problem is that the Field Artillery Community did not define the problem. The second problem is that the 1982 definition of targeting is verbose and ambiguous. The third problem is that the initiative of the targeting cell cuts right to the heart of field artillery command and control.

I could not agree with the author more when he said that "they talked of the need to establish a targeting cell, when in fact they truly wanted only to establish targeting." The Field Artillery, and all branches for that matter, have been targeting since the Army was founded. The definition that we had in FM 6-122 was, and I believe is, good. AirLand Battle doctrine inferred that commanders must be responsible for targeting out to the extent of their area of interest. The rub comes to the Field Artillery Community in providing the maneuver commander the ability to perform this type of targeting without relinquishing sacred command and control.

This, I believe, is the salient reason why any targeting cell that does not include command and control of field artillery assets is doomed. In my mind, the problem is one of orientation. The field artillery has basically two areas of interest: the place from which the round was fired, and the place the round impacts. My experience tells me that peacetime armies are more interested in the line of metal and the position area, whereas in combat the fall of shot is more important.

A reorientation of US Field Artillery doctrine is required to prioritize the fall of shot and fire support coordination. The command and control of field artillery assets need to move to the maneuver headquarters. I am not advocating attaching field artillery to maneuver, but moving the fire support coordinator of the division and the maneuver brigade into the maneuver headquarters. Did you ever wonder why the field artillery is the only combat arm with a separate command and control headquarters?

For two years in the Field Artillery School we heard how the Advanced Field Artillery Tactical Data System (AFATDS) is going to make what I have just advocated happen. Will it? Will we make the same mistakes with it that we did with TACFIRE? The targeting cells already exist — they are called division artillery and direct support field artillery battalion headquarters. We need to move them and put our senior commanders in the maneuver headquarters.

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2d Bn, 12th FA
Fort Sill, OK

7th Infantry Division Artillery

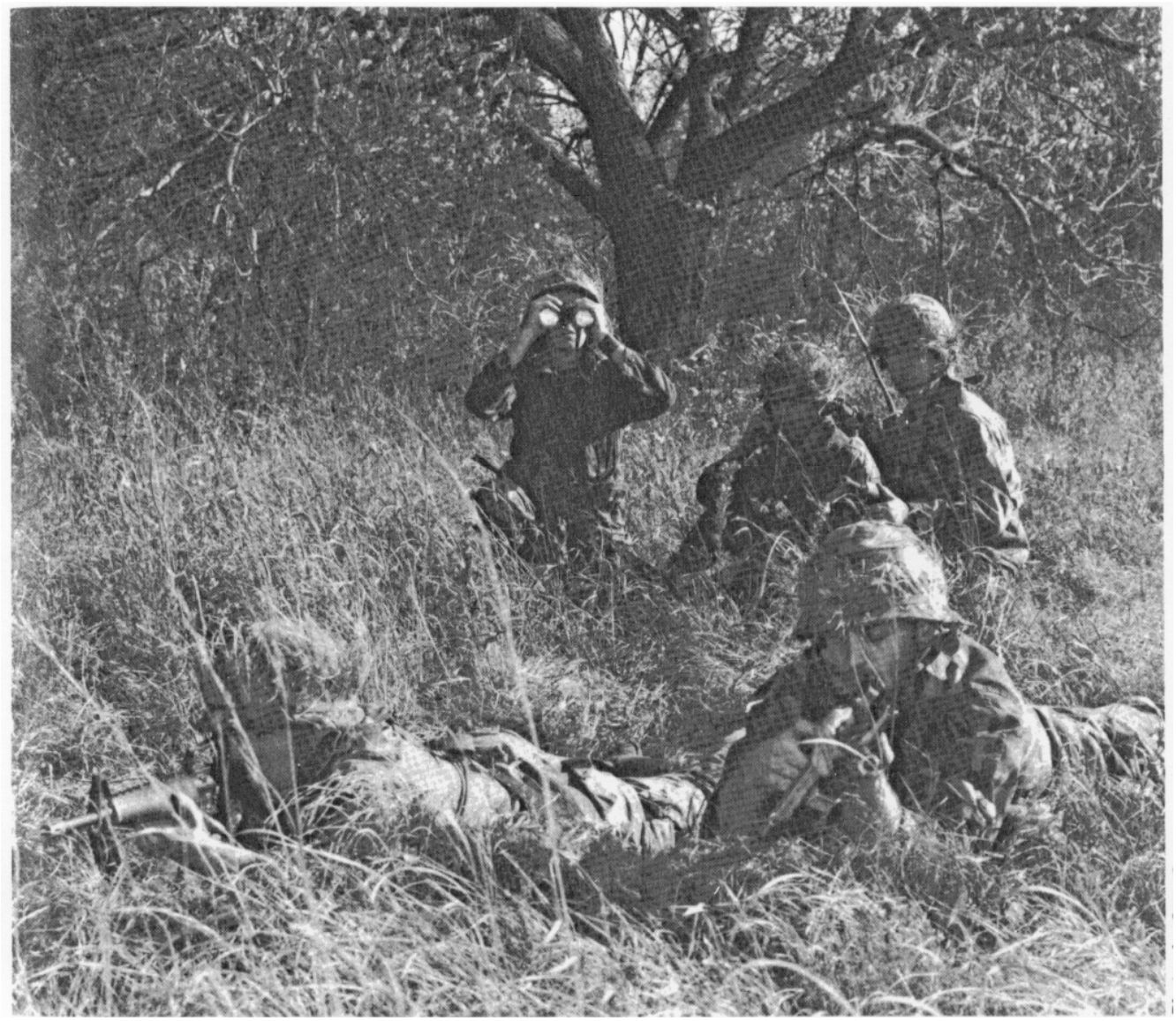
I am accumulating information for a 7th Infantry Division Artillery history from 1917 to the present. I would like to correspond with any former members of field artillery units that were part of the 7th Infantry Division from 1917 to the present. I would also appreciate hearing from members of any of the battalions of the 8th, 79th, 80th, and 333d Field Artilleries.

John Albert Makar, Jr.
1LT, FA (MIARNG)
10220 Pelham
Taylor, MI 48180

Red Barons seek help

The 1st Battalion, 29th Field Artillery, is compiling historical data in conjunction with the forming of the 29th Field Artillery Regiment. Anyone who has knowledge of how the unit received its unofficial nickname, "The Red Barons," or who has historical documents pertaining to the Regiment is asked to contact 1LT Larry D. Barttelbort, 1-29th FA, Fort Carson, Colorado, 80913; telephone AUTOVON 691-5179 or commercial 303-579-5179.

Gill H. Ruderman
LTC, FA
Commander, 1-29th FA
Fort Carson, CO



Keep the Fires Burning

by Captain (P) Patrick C. Sweeney

When field artillerymen hear the call "Fire the FPF," they know there is a company of maneuver comrades in a desperate situation. With visions of an enemy overrunning a company position and the company commander attempting to focus every ounce of fire support available on the enemy's penetration, field artillerymen know that it is up to them to provide the company commander with that immediate, responsive, prearranged barrier of steel known as the final protective fire (FPF). In theory, this wall of fire is planned so close in and is so thoroughly coordinated with the remainder of the company's direct and indirect weapons that it will prevent the enemy from overwhelming the maneuver company's position. But will it really? Will the field artillery be providing its best possible fires using existing FPF techniques? Have Redlegs allowed the FPF to keep pace with their own new developments in munitions? For the simple reason that they could save maneuver lives, some new FPF techniques might be in order to keep those final protective fires burning red hot.

To understand an FPF, one must first understand what constitutes a priority target. FM 6-20 defines priority targets as:

. . . targets so designated by a supported commander by type, by location, or by time sensitivity. He [maneuver commander] should give the FSCOORD [fire support coordinator] specific guidance as to when they become priority targets and when they are no longer priority targets. Also, he should state the desired effects on targets and any special types of ammunition to be used. Firing units lay on assigned priority targets when they are not engaged in a fire mission. Generally, each priority target has a firing unit laid on it. However, in dedicated battery operations, fewer tubes may be assigned. In this way, the rest of the battery can fire in support of the maneuvering unit while assigned tubes attack the priority target. An example of a priority target in a defensive situation is a final protective fire.

This definition dictates that a priority target must be allocated by the maneuver commander who owns the fire support resource (e.g., the maneuver brigade commander for his direct support and reinforcing artillery, the maneuver battalion commander for his battalion mortars, and the maneuver company commander for his company mortars). As an example, a maneuver brigade commander with one direct support artillery battalion and one reinforcing artillery battalion would have six priority targets to allocate. (With the fielding of the 3x8 concept, each four-gun platoon will be given a priority target; and thus there will be two priority targets per battery.) The definition does not make clear the difference between an FPF and a standard priority target. It is commonly understood that a normal or standard priority target will be engaged with a prearranged amount of munitions and then stop, while an FPF will be engaged with continuous fires and stopped only when the supported company commander calls for its termination or when ammunition is depleted.

Oftentimes, in the defense, a maneuver company has been allocated the immediate responsive fires of a priority target in the form of an FPF. But when the allocation takes place this way, has not the maneuver brigade commander robbed the company commander of the full potential of a priority target? Should the FPF be the company commander's *first* desired immediate artillery (or mortar, if a mortar priority target) fires in the defense? One hopes not, since the indications would be that the company had a rather poor defense. More than likely, the company commander would desire these instantaneous fires for use in concert with his direct fire weapons in his assigned engagement area. Once these fires are executed, the target would no longer serve any value as a priority target since there would be continuous fires throughout the

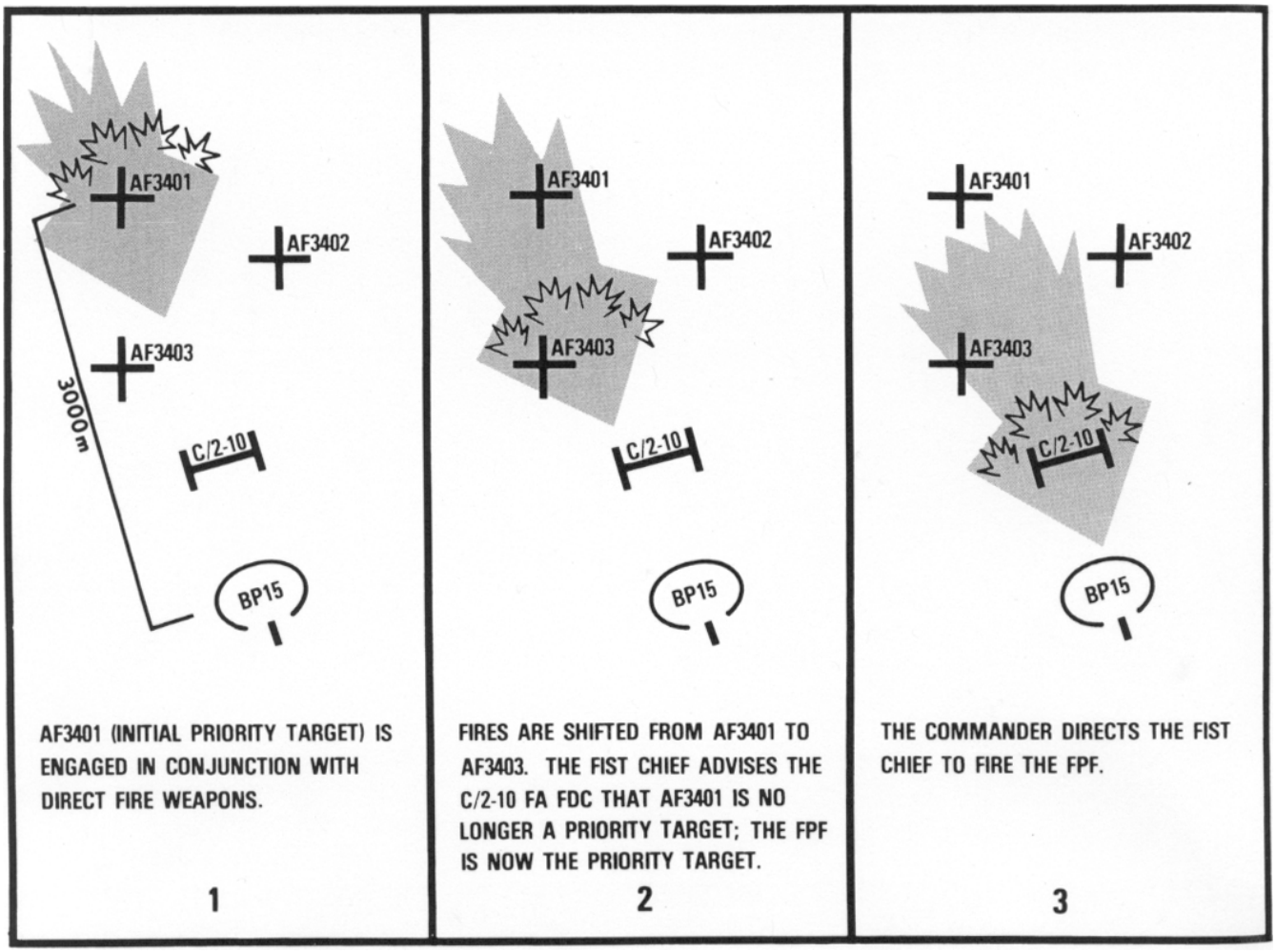


Figure 1. Two uses from one priority target.

battlefield once the enemy is engaged and battle plans unfold. Normally, the next time the company commander would be interested in immediate artillery fires would be in support of his FPF. The fire support team (FIST) chief, in coordination with the company commander, could cancel the first priority target and activate the FPF as the new priority target (figure 1). Thus the maneuver company would receive two uses from one priority target. The key is that the number of priority targets in effect does not exceed the number allocated (in this case, one). This flexibility is not possible when the commander is simply given an FPF.

FM 6-30 goes into great detail on how an FPF is to be adjusted in position. The opportunities for firing FPFs will, however, most likely be few in number for two reasons. First, the laborious process of firing each gun individually provides enemy counterfire radars with very little challenge in locating the firing battery position. Secondly, the firing of each gun provides enemy observers and radars a clear signature of the maneuver unit's position.

FM 6-30's solution to these problems is as follows: "In some instances, there will not be time to 'shoot in' the FPF. In this instance, the FPF will be called in giving the grids of the two ends or giving the center grid and attitude." When one considers that the field artillery and mortar portion of the FPF is positioned in support of the company's final protective line (FPL), which is established by the company's direct fire weapons, the major problem with this FM 6-30 "solution" is clear. The FPL is normally located 200 to 300 meters in front of the company; and so the indirect fire portion will, by necessity, be map-spotted dangerously close to friendly troops. If the FIST chief makes even a small map-spot error, the results could be disastrous. The problem is further compounded by the probability that several battery volleys would be fired before the FIST chief would be able to terminate the firing. To have the FIST chief simply plan the FPF at a more distant, and thus safer, grid would be ineffective, since it would not be tied into the FPL.

There is a better solution which is simple and could be easily incorporated into unit standing operating procedures. The initial grid and attitude for the FPF (still an open sheaf target) would be a location well forward of the company position (800 to 1,000 meters) at a site that the FIST chief is positive will compensate for any location or delivery error. When an enemy threat appears in the vicinity of the target (figure 2), the FIST chief would execute only the rapid fires of a normal priority target — not the continuous fires of an FPF. Based on the FIST chief's subsequent adjustments on the approaching enemy, the fires will eventually reach a point where they are supporting the FPL. Once the fires are in this position and the commander calls for the FPF to be fired, the FIST chief directs the field artillery and mortars to fire continuous fires. The trade-off for this safer technique is that each round will not be individually adjusted into position, and the fires for the eventual FPF would not be as responsive as they would be if they were fired prior to the battle.

This technique might be further refined if the FIST chief could fire a single adjusting round for his initial

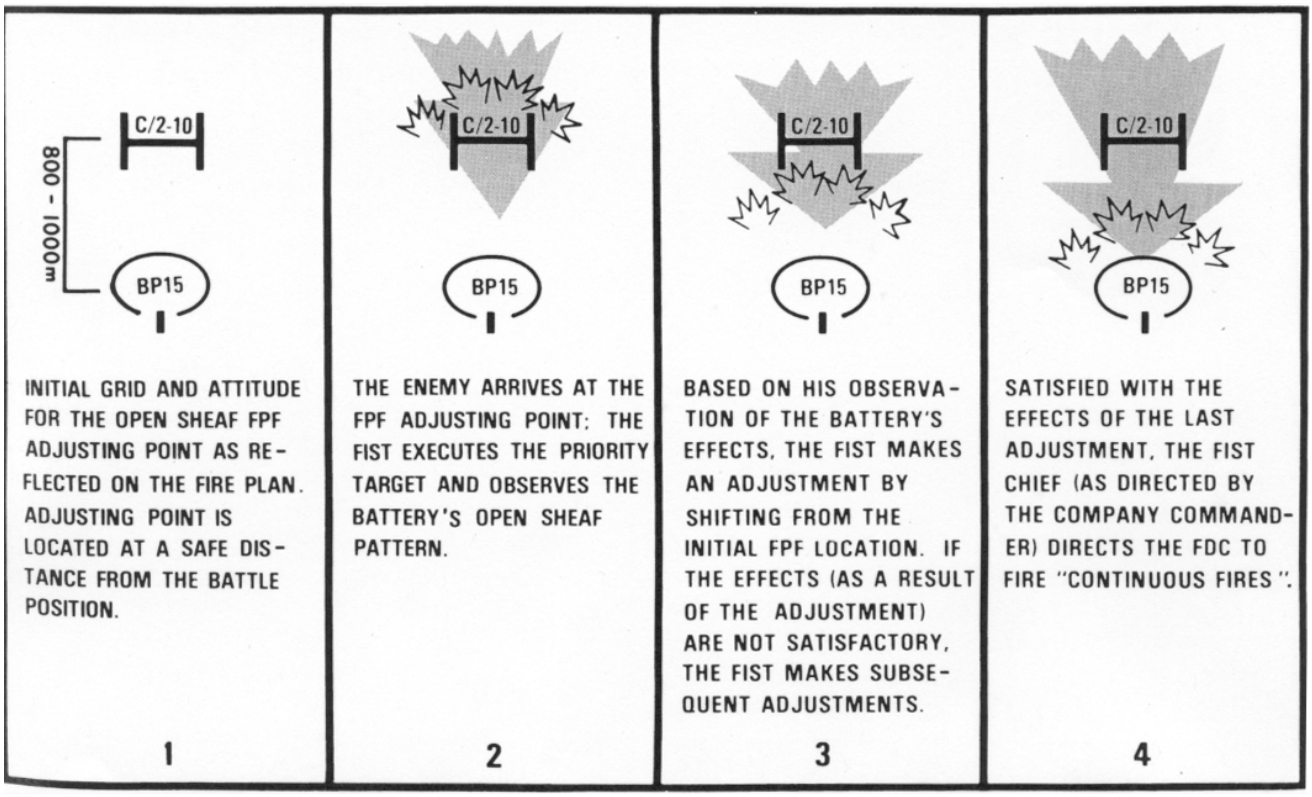


Figure 2. An FPF technique safer for friendly troops.

FPF target. This single round would not have the same disadvantages as the long technique described in FM 6-30 and would allow the FIST chief an opportunity to adjust the initial FPF target much closer to the company's position.

Not only do these simplified techniques enhance safety, but they also permit the use of the new field artillery families of munitions in FPFs. At the mention of an FPF, one might invariably think of using the high-explosive/fuze-quick shell/fuze combination, no matter what the threat might be. After all, the high-explosive/fuze-quick fragmentation pattern allows adjustment much closer to friendly positions than do the fragmentation patterns of other shell/fuze combinations. This single advantage, however, should not prevent the FIST chief or maneuver company commander from considering other shell/fuze combinations, particularly in view of the ineffectiveness of the high-explosive/fuze-quick combination in defeating even lightly armored targets. The bulk of the new families of enhanced lethality munitions are base ejection projectiles which have a larger bursting radius that is caused by the submunitions dispersal. Thus, they are normally not considered suitable for FPF since this larger radius precludes adjustment of the artillery close in because of the danger to friendly personnel.

By using the simplified FPF adjustment previously mentioned, the FIST chief would be able to safely adjust any artillery munition as close to the company's position as the maneuver commander desires and certainly up to the FPL. The key is that the FIST chief would be observing the munition effects well before they become a hazard to his own position. According to FM 6-141-1, given a parallel sheaf from a lazy W formation, dual-purpose improved conventional munitions fired by a six-gun 155-mm battery will have a radius of effects no greater than if the battery were firing high-explosive munitions but will provide a much greater kill potential to a mounted enemy. Even though improved conventional munitions have no effect on mounted enemy forces, they are significantly more devastating against the unprotected soldier than are high-explosive munitions. The differences in the radii of effect are minimal — for a six-gun 105-mm battery firing a parallel sheaf from a lazy W formation, only 20 meters; and for a six-gun 155-mm battery, only 40 meters.

The story is essentially the same for artillery delivered mines. What could be more disheartening to a force assaulting a position than to have a minefield fall on its head? The FIST chief would adjust onto the approaching enemy with dual-purpose improved conventional munitions and enter into his fire for effect with scatterable mines when the optimum position for the minefield was reached. Though continuous fires would not be required, a medium to high density minefield with one aimpoint should be considered. Before firing the mission, the FIST chief, using his safety template, would be able to determine the safety zone for the minefield. TC 6-20-5 allows for the center of a minefield to be adjusted within as close as 425 meters of friendly positions — certainly close enough to be tied into the maneuver unit's FPL.

Though no new submunition projectiles are in the field for mortar systems, the application of the high-explosive round for the new lightweight 60-mm and the improved 81-mm (if adopted) mortars may change in the FPF role. As with the artillery, mortars are only used in the high-explosive/fuze-quick mode for FPFs; however, the multi-option fuze available for the new 60-mm mortar and the improved 81-mm mortar gives the commander and FIST chief another consideration. One of the modes of firing this new fuze is the near-surface burst which causes the round to explode from zero to three feet above the ground. The multi-option fuze near-surface burst mode was designed to attack bunker apertures; but, if it were used instead of fuze quick in the FPF, one could reasonably expect to double the effects against enemy unprotected troops without endangering friendly troops.

The FPF is only one facet of the maneuver commander's defensive fire plan. The execution of the FPF should never be the basis of the fire plan, but rather it should provide the maneuver company commander with a worst-cast contingency. However, if that worst case occurs and the command "Fire the FPF" is received, it is incumbent upon the King of Battle to use techniques which provide an effective, reponsive, and safe rain of screaming metal that assists in destroying the enemy.

CPT(P) Patrick C. Sweeney, FA, was most recently a Field Artillery instructor at the US Army Infantry School, Fort Benning, Georgia. He received his commission through the Citadel, in Charleston, South Carolina. He received his master's degree in public administration from Western Kentucky University and is a graduate of the Armor Officer Advanced Course. He was a battery commander with the 2d Battalion, 320th Field Artillery, 101st Airborne Division. He is currently assigned to C Battery, 1st Battalion, 81st Field Artillery, 56th Field Artillery Brigade.

Coup de Grâce

by Captain John A. Hamilton, Jr.

The 66-day battle of Khe Sanh, which began in January 1968, became a classic defensive operation for US forces. It tested American concepts of defense and demonstrated that good fire support could effectively neutralize a superior force.

Major General David Ewing Ott, USA Vietnam Studies, Field Artillery, 1954-1973

It is generally recognized that destroying enemy forces is usually far more important than gaining and holding terrain. Unfortunately, the very nature of guerrilla warfare made this destruction difficult to achieve in Vietnam. However, at Khe Sanh in early 1968, the North Vietnamese abandoned their usual guerrilla techniques and attempted to engage American Marine forces which were supported by the full range of American supporting arms. In the battle which followed, it is safe to say, without diminishing the vital contributions made by 6,000 Marine infantrymen,

that the 100,000 tons of bombs and the 150,000 artillery rounds coordinated by Marine and Army artillerymen were the *coup de grâce* which enabled the Marines to defeat the 20,000 North Vietnamese Army (NVA) soldiers.

In April of 1967, the North Vietnamese Army made a determined effort to capture key cities in the Quang Tri province. The 1st Battalion, 3d Marines, which had replaced the US Army Special Forces elements at Khe Sanh in 1966, defeated the NVA thrust and killed at least 940 enemy soldiers. These engagements, known as the Hill Fights, demonstrated the NVA's resolve to capture Khe Sanh and open a supply route into the northern provinces from the NVA bases in Laos. Prior to the 1968 Tet offensive, five North Vietnamese soldiers, including one regimental commander and his operations officer, were killed while making a reconnaissance just outside the Khe Sanh perimeter. The official Marine history concluded: "The fact that the North Vietnamese would commit such key men to a highly dangerous, personal reconnaissance indicated that Khe Sanh was at the top of the communists' priority list." Therefore, following the Hill Fights, the entire 26th Marine Regiment replaced the 3d Marines as the defenders of Khe Sanh. (This was the first time all three battalions of the 26th Marines had been in combat together since Iwo Jima.)

In January 1968, the 26th Marines were reinforced by the 1st Battalion, 9th Marines, and the 37th Army of the Republic of Vietnam (ARVN) Ranger Battalion. The 1st Battalion, 13th Marines, which was composed of three M101A1 105-mm howitzer batteries, one 4.2-inch mortar battery, and one M114 155-mm howitzer battery, was in direct support. Three US Army 175-mm gun batteries at Camp Carroll and one 175-mm gun battery at the Rockpile, all from the 2d Battalion, 94th Field Artillery, were in general support. Camp Carroll was approximately 13 miles northeast of Khe Sanh, and the Rockpile was approximately nine miles north by northeast.

The American chain of command was well aware of both the similarities and the differences between the situation at Khe Sanh and the debacle at Dien Bien Phu in 1954. The North Vietnamese were still led by General Vo Nguyen Giap; and, like Dien Bien Phu, Khe Sanh was an isolated outpost close to NVA logistic bases. Like the French, the Americans anticipated an attack and were anxious to fix the communist forces and bring their firepower to bear. But, despite these similarities, the American aerial resupply capability stood out as a significant difference. The US Marines at Khe Sanh could count on many times the air support that had been available to the French at Dien Bien Phu. During the so-called siege, the Marines were able to receive constant aerial resupply. General William C. Westmoreland wrote: "The resupply of Khe Sanh stands as the premier air logistical feat of the war . . . . At no time during the siege did the defenders experience a serious supply shortage."

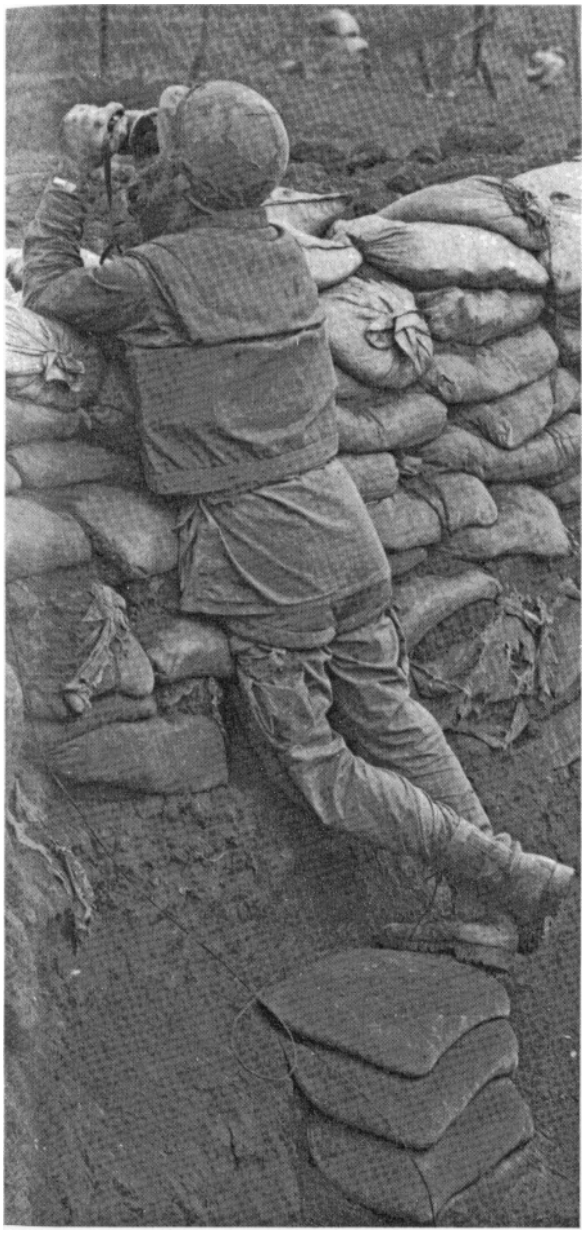
With the memory of Dien Bien Phu to motivate them, the Marines were careful to occupy the surrounding hills to prevent the NVA from looking down their throats. Intelligence had revealed that the communists would attempt to capture the surrounding hills so that they could emplace their artillery in optimum firing positions.

As a fixed outpost, Khe Sanh was vulnerable to hostile artillery fire. The NVA used Soviet-built 122-mm rockets which, even though they were fairly accurate in deflection, had a large range error due to the nature of the propellant. The rockets were launched primarily from Hill 881N so that they could be fired at the long axis of the combat base without being ranged by the US Army's 175-mm guns, and the NVA used them to good advantage.

The NVA heavy artillery, 130-mm and 152-mm guns, were emplaced in Laos. The two major positions were located on Co Roc mountain in a position known as 305, so-called because it was 305 degrees from Hill 881S. Both positions could only be ranged by aircraft, and the guns were heavily camouflaged and protected. With a low rate of fire, these guns were very difficult to detect; and they were even tougher to put out of action.

The NVA 120-mm mortars were registered on the US Marine positions on Hill 881S. The Marines did not have the materials necessary to build fortifications strong enough to protect against either a 120-mm mortar round with a delay fuze or heavy artillery. As an example, a well-entrenched bunker constructed for the new regimental command post was penetrated the day before it was to be occupied. It is probable that the NVA emplaced the 120-mm mortars in tunnels at the precise direction and elevation to hit one specific target. This emplacement would explain why there was no 120-mm mortar fire on other US Marine positions and why the mortars were never knocked out of action. This tactic had been employed by communist field artillerymen 14 years earlier at Dien Bien Phu.

The communist shelling was often intense. In one engagement the communists successfully hit the base's main ammunition dump with their artillery; and the Marine gunners who were busy returning fire not only



had to contend with the incoming communist artillery fire but also had unexploded ordnance from their own ammunition dump raining down on them. The Marine response to these shellings was immediate counterfire and/or close air attack. The 1-13th fire direction center (FDC) made extensive use of FADAC in its speedy production of firing data. An example of the determination of the 1-13th gunners to return fire is recounted in the official Marine history:

> *Artillerymen quickly manned their guns and began returning fire. The executive officer of the 1-13th . . . ignored the heavy barrage and raced from one shell hole to another analyzing the craters and collecting fragments so that he could determine the caliber of the enemy weapons as well as the direction from which they were being fired. Much of the counterbattery fire was a direct result of his efforts.*

The Marine garrison suffered setbacks due to the enemy shelling. The constant dust and shock effects caused serious maintenance problems for the base's communication and radar equipment. After the Marines' main ammunition dump was destroyed, the communists were able to score hits on the Marines' subsequently dispersed ammunition bunkers. It should be noted, however, that the Marine gunners answered every communist round with at least 10 of their own. Colonel David E. Lownds, commander of the 26th Marine Regiment, believed that the side that kept its artillery intact would win the battle of Khe Sanh. Only three howitzers of 1-13th Marines were damaged during the entire battle, leading Colonel Lownds to conclude, "Either the enemy was amazingly inaccurate, or we were amazingly lucky."

The poor weather and visibility that characterized the early weeks of the battle hampered American air operations, but the artillery proved again to be an all-weather

system. The ground fog that restricted the aviators to radar-controlled missions did not slow down the artillery projectiles flying to their targets. As the weather cleared, the communist gunners became more reluctant to fire. With airborne tactical air controllers and observers in the skies, the communists suffered instant retaliation if they fired their weapons. Generally, the communist batteries remained silent anytime the Bird Dogs or Hueys were airborne.

As was typical, the communists did most of their maneuvering at night; so this was when the artillery was the most active. When the communists attempted to build siege works outside the base, the Marine gunners achieved tremendous results by firing variable time fuze munitions over the NVA trench lines.

It is generally believed that the major thrust made by the communists occurred the night of 29 February 1968. Intelligence indicated that the NVA was moving toward the east perimeter of the base. The fire support coordination center unleashed all of the artillery at its disposal against the southern and eastern areas outside the perimeter. Aircraft arrived and complemented the artillery attack. Within two and a half hours, B-52 bombers arrived on the scene with their massive payloads. The NVA had launched their initial attack against the 37th ARVN Ranger Battalion, and the lead element was believed to be a battalion from the 304th NVA Division. The enemy made three assaults that night, but each time failed to reach the wire. The South Vietnamese fired their final protective fires, and the NVA soldiers retreated without ever breaching the outer defenses. The enemy dead were carrying bangalore torpedoes which they never advanced close enough to use. Montagnard tribesmen reported 200 to 500 enemy bodies stacked along the trails leading to Khe Sanh. American intelligence believed that the better part of an NVA regiment was wiped out that night. In any case, the communists never again made a major ground assault against the garrison. The Marine history concludes, "It was obvious that they [NVA soldiers] had been caught on the march and mangled by air raids and piston-like artillery concentrations. While many of the defenders of Khe Sanh never fired a shot, what was believed to be the long-awaited enemy onslaught came and passed with a whimper instead of a roar."

Fire support coordination was a big job at Khe Sanh and certainly a key factor in the success of the fire support effort. The 26th Marine Regiment's fire support coordination center (FSCC) included the 1-13th Marine FDC as well as the Khe Sanh direct air support center (DASC). Requests for air support were sent from the DASC to the 1st Marine Air Wing (MAW) tactical air direction center. Requirements beyond the capabilities of the 1st MAW were directed to liaison teams from the other services located within the Khe Sanh DASC. Air operations over Khe Sanh were conducted by the 1st MAW, the 7th Air Force, the Strategic Air Command, the US Navy Task Force 77, the Vietnamese Air Force, and various US Army aviation companies. High-level planners had accurately forecasted that massive, coordinated air and artillery support would make up for geographical and numerical disparities. Despite the large numbers of aircraft in the area, artillery rarely had to be check-fired. Rounds from the guns usually hit the target within 40 seconds after the initial call for fire. A target intelligence/information officer's description gives an idea of the scope of FSCC operations:

> *An average night's pattern of preplanned fires was as follows: Combined TOTs [time on targets] from nine batteries [USMC and USA] totaled 4-6; separate battalion TOTs, Army 4-6 and Marine 10-15; battery multiple volley individual missions, 40-50; battery H&Is, 20-30. Normal one-gun, one-round H&Is were not used; this type of fire was of little value. Marine and Army artillery were employed in target areas and at ranges to reduce to a minimum check fires caused by the arrival of MPQ [radar guided] and reconnaissance aircraft. Later, as we learned finesse, air was given the targets south of the base and west of the maximum range of the 175-mm guns; 1-13 was given any targets whose range required a maximum ordinate of 14,000 feet (altitude of an MPQ controlled airstrike), and the 175-mm guns were assigned to targets to the north, northwest, and east of the base. Such were the preplanned fires.*

The most dramatic air sorties over the Khe Sanh were made by the B-52 stratofortresses from the 4133d Provisional Heavy Bombardment Wing from Andersen Air Force Base in Guam and from the 4528th Strategic Bombardment Wing from bases in Thailand. The B-52s, not normally regarded as close air support assets, were tremendously effective in that role. These aircraft, which carried 27-ton payloads made up of 500- and 750-pound bombs, were extremely effective against area targets. The concussion from a B-52 attack was so violent that fatal casualties were produced from concussion effects alone. The gunners from the 1-13th would often fire into an area 15 to 20 minutes after a B-52 attack to produce additional casualties among the dazed survivors of the bombing. About 95 percent of the B-52 missions were targeted by the 26th Marines' FSCC. A rough rule of thumb for the dropping of air-delivered ordnance near friendly positions was one meter distance per each pound of TNT in the bomb. A 500-pound bomb could be and was delivered as close as 500 meters from the friendly lines, which prevented the communists from concentrating their forces close to Marine positions. Marine artillery paid particular attention to the narrow bands unsafe for air attack.

Besides the B-52s, numerous fixed and rotary winged aircraft operated over Khe Sanh. Airborne tactical air controllers from the Air Force were constantly in the air during daylight. Operating in either O-1E Bird Dog or UH-1E Huey helicopters, the tactical air controllers directed attacking planes and helicopters to their targets and were an important source of intelligence and battlefield damage assessments. Also assisting the pilots was Air Support Radar Team Bravo from the Marine Air Support Squadron 3, which operated from Khe Sanh and directed

attacking aircraft to their targets with the AN/MPQ-10 radar.

Apart from some conspicuous instances of close support, the 26th Marines utilized their fire support assets primarily to attack enemy second echelon forces. Since the North Vietnamese usually attacked with their battalions in column, the FSCC was able to isolate the reserves from the first wave. As shown in figure 1, the FSCC would surround the reserves with two constricting boxes. The first box would be laid down by the 1-13th Marine batteries and the outer box by a combination of airstrikes and fires from the 2-94th FA. Therefore, when the communists assaulted the Marine positions and the enemy commanders called frantically for their reserves, these reserves were usually not forthcoming since the second echelon forces would be undergoing an intensive and effective artillery attack. The first echelon forces would then be attacked by the organic 81-mm mortars and 106-mm recoiless rifles of Marine infantrymen. Consequently, the NVA was unable to mass its attacks effectively.

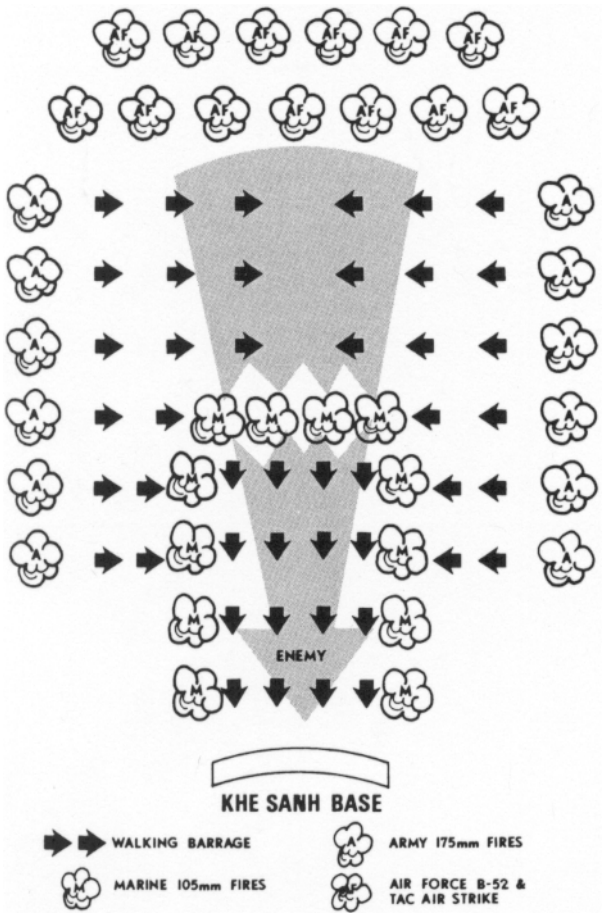


Figure 1. Constricting fire boxes.

The major enemy ground attack against Khe Sanh was broken up by the supporting fire available to the 26th Marines. Indirect fire frequently prevented the enemy infantry from closing with friendly troops. When the enemy did make contact, its attack forces usually had been severely depleted. Marine and Army artillery fired rolling barrages reminiscent of World War I; their effects were tremendously enhanced by the intelligent use of air attacks. The artillery was used so often that the 1-13th Marines and 2-94th FA could fire preparations for ground operations and still retain surprise — the gunners fired so much, so often, that intense artillery bombardment did not alert the NVA to possible ground maneuvers. Although it will probably never be possible to establish the number of NVA casualties, it is believed that the actions around Khe Sanh effectively dismembered two crack NVA regular divisions. This destruction was predominately the result of American artillery and air attacks.

Operation Pegasus, the relief operation, finished an already defeated enemy. The 1st Cavalry Division, the 1st Marine Regiment, and the ARVN 3d Airborne Task Force were the key elements. As the batteries of the 1st Cavalry Division Artillery moved within range, their fires were effectively integrated with the assets already available to the Khe Sanh garrison. Thirty-one batteries fired in support of Operation Pegasus — up to that time, this was the greatest artillery concentration to support a single operation in Vietnam.

The fire support battle of Khe Sanh reteaches old lessons. The devastating effectiveness of artillery against light infantry was again demonstrated. Effective fire support coordination enabled the Americans to get the most efficient use of their massive expenditure of munitions. The airplane was still less responsive than artillery and was more vulnerable to weather considerations. Fixed fortifications proved to be extremely vulnerable to indirect fire. The Marines demonstrated that the only defense against hostile artillery directed at a fixed, fortified base was aggressive suppression and destruction of the hostile artillery.

The NVA failure at Khe Sanh has been attributed by some as a conscious decision by the NVA not to take Khe Sanh. Some writers have stated that Khe Sanh was merely a diversion for Tet and that the communists never intended to capture the base. However, evidence does not seem to support this theory. The disparity in troop strengths on both sides clearly demonstrates that it was the NVA which was tied down at Khe Sanh. There are some who argue that the preponderance of American airpower was decoyed at Khe Sanh, but American air assets could easily have been directed elsewhere had there been more lucrative targets available. In point of fact, the communists simply did not have the capability to capture Khe Sanh. As always, the ultimate weapon in the US victory was the American infantryman. But the gallant Marine foot soldiers could not have won without the efforts of the Marine and Army Redlegs who coordinated and executed the fire support that suppressed the NVA artillery and broke the back of the ground forces.

CPT John A. Hamilton, Jr., FA, is a recent graduate of the Armor Officer Advanced Course at Fort Knox, Kentucky. A member of the 5th Field Artillery Regiment, he has served in the 1st Battalion, 5th Field Artillery, as an adjutant, a headquarters battery commander, an S4, and a FIST chief. Captain Hamilton received his B.A. in journalism from Texas Tech University and an A.A. from New Mexico Military Institute. He is now serving with the 2d Infantry Division Artillery in Korea.

Command Update

NEW REDLEG COMMANDERS

Active Army

COL Ross W. Crossley
V Corps Artillery

COL Richard Manupella
528th Artillery Support Group

COL Leonard D. Miller
5th Infantry Division Artillery

Reserve Components

The following is a list of US Army National Guard and Reserve unit commanders as of 1 November 1983.

Army National Guard

XI Corps Artillery
BG James M. Miller
1-140—MAJ(P) John R. Cox
1-145—LTC Donald M. Ewing
2-222—LTC Randy J. Ence

26th Infantry Division Artillery
COL Joseph R. Austin, Jr.
1-101—LTC Santo L. Bonaccorso
1-102—LTC Louis R. Berube
2-192—LTC Terrance J. McGurk
1-211—LTC Richard A. Barcelo

28th Infantry Division Artillery
COL Elton D. Reep
1-107—MAJ Raymond D. Faczan
1-108—LTC Clarence A. Bricker
1-109—LTC Joseph F. Perugino
1-229—LTC William C. Rischar

38th Infantry Division Artillery
COL Donald D. Cox
1-119—LTC Howard A. Becker, Jr.
3-139—LTC David L. Huffman
2-150—LTC Ronald W. Henry
1-163—LTC David M. Burgett

40th Infantry Division Artillery
COL Melvin G. Gordon
1-143—LTC Marshall L. Wattel
1-144—LTC James P. Lowsley
2-144—LTC Stephen A. Tyler
3-144—LTC Eugene W. Schmidt

42d Infantry Division Artillery
COL Robert H. Ford
2-104—LTC William Horvath
1-105—LTC Donald Roberts
1-187—MAJ(P) William P. Kiley
1-258—LTC John T. Ruggiero, Jr.

47th Infantry Division Artillery
COL Philip L. Potter
2-123—LTC Edward L. Goett
1-151—LTC Duane A. Geisen
1-175—LTC John P. Pedersen
1-194—LTC Donald E. Banwart

49th Armored Division Artillery
COL Paul N. Biediger, Jr.
2-131—LTC Jame R. Cantwell
1-133—LTC David L. Harmon, Jr.
3-133—LTC James C. Harvie
4-133—LTC Sherman L. Vinyard

50th Armored Division Artillery
COL Richard S. Schneider
1-86—LTC Harold M. Goldstein
1-112—LTC Thomas J. Sitzler
3-112—LTC George J. Blysak
4-112—LTC George A. Bannon

45th Field Artillery Brigade
COL Tommy G. Alsip
1-158—LTC Ronald W. Holt
1-171—LTC Johnny L. B. McWhirter
1-189—LTC Robert A. Cruce

57th Field Artillery Brigade
COL Charles F. Scharine
1-121—LTC John L. Dunlap
1-126—LTC James W. Holmes

103d Field Artillery Brigade
COL Cyril E. Frost, Jr.
1-103—LTC Richard P. Kanaczet
2-103—LTC Donald E. Dowling

113th Field Artillery Brigade
COL James C. Broome
4-113—LTC Charles H. Cross
5-113—LTC Stanley W. Brown

115th Field Artillery Brigade
COL John Zaysoff, Jr.
1-49—LTC Robert D. Carter
3-49—LTC Robert G. Sharp

118th Field Artillery Brigade
LTC(P) Elton F. Hinson
1-214—LTC Joe W. Seymour
2-214—LTC Jordon B. Gaudry

130th Field Artillery Brigade
COL Joseph H. Wolfenberger
2-130—LTC Fred H. True
1-161—LTC Malen E. Dowse

135th Field Artillery Brigade
COL Dale L. Strannigan
1-128—LTC Elbert F. Turner, Jr.
1-129—LTC James Wakeman

138th Field Artillery Brigade
COL Julius L. Berthold
1-623—LTC Walter R. Wood

142d Field Artillery Brigade
COL Richard L. Holt, Jr.
1-142—LTC James R. Pennington
2-142—LTC Bobby H. Armistead

147th Field Artillery Brigade
COL Roger D. Kernn
1-147—LTC Ernest T. Edwards
2-147—LTC Leon J. Vanderlinden

151st Field Artillery Brigade
COL Louis C. Addison
3-178—LTC Claude W. Boone
4-178—LTC John B. Duffie

153d Field Artillery Brigade
COL Benny P. Anderson
1-180—LTC Joseph P. Hanford
2-180—LTC Jose A. Diaz

169th Field Artillery Brigade
COL Robert G. Hancock
1-157—LTC Gerald G. Neel
2-157—MAJ(P) Jesse T. Stacks III

196th Field Artillery Brigade
COL Carl E. Levi
1-115—LTC James S. Pack
1-181—LTC Jackie T. Rose

197th Field Artillery Brigade
COL Francis E. Merrill
1-172—LTC Alan R. Young
2-197—LTC Charles E. Hanson
3-197—LTC Rene J. Ferland

209th Field Artillery Brigade
COL Joseph N. Brill
1-156—LTC Glenn W. Losel
1-209—LTC Austin D. Nixon

224th Field Artillery Brigade
COL Franklin D. Simmons, Jr.
1-111—LTC Terry J. Tyler
2-111—LTC Daniel B. Wilkins

227th Field Artillery Brigade
COL Eugene M. Bass
1-116—LTC Leo A. Lorenzo

631st Field Artillery Brigade
COL James H. Powell, Jr.
1-114—LTC James L. Elmore
4-114—LTC Carl B. Cooper

Separate Units
2-110—LTC August P. Boerschel
1-113—LTC Robert A. Collins
2-114—LTC Johnny B. McRaney
3-115—LTC James L. Sharp
2-116—LTC Terry O. Ballard
1-117—LTC Samuel M. Carr
2-117—LTC Joel W. Norman
3-117—MAJ(P) Harold K. Logsdon
1-120—LTC Ellis R. Langjahr
2-122—LTC Walter J. Whitfield
1-125—LTC David W. Larson
1-127—LTC Robert E. Dunn
1-136—MAJ(P) John T. Donnellan
2-138—LTC Thomas R. Ice
1-141—MAJ(P) Rene C. Jacques
2-146—LTC Gordon C. Goheen
1-152—LTC Gregory A. Ward
1-160—LTC Ray W. Standifer, Jr.
1-162—MAJ Raul Barreras
2-162—Ernesto A. Ramos
1-168—LTC Wesley D. Tlustos
1-178—LTC Harry J. Vann
1-182—LTC Joseph A. Latyszewski
1-201—MAJ(P) John L. McCane
5-206—LTC David G. Dodd
2-218—LTC David T. Connor
1-230—LTC Cecil L. Pearce
1-246—LTC Ronnie M. Guthrie
1-487—LTC John K. Hao

United States Army Reserve

3d Field Artillery Brigade
COL Gary W. Orten
1-334—LTC Carleton K. Thompson
2-334—LTC Bruce W. Koopika
3-334—LTC Michael G. Andrae

428th Field Artillery Brigade
LTC Francis T. Mataranglo
4-20—MAJ Dale T. Dummer
4-38—MAJ Stephen W. Dunkle
4-333—MAJ George E. Dunn

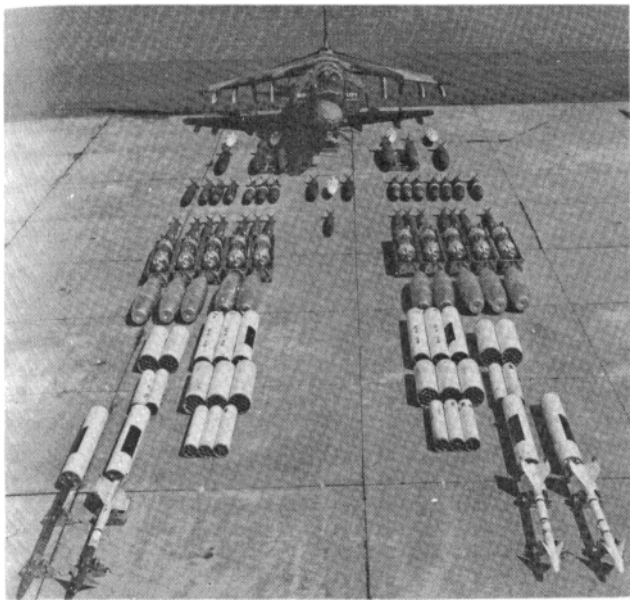
434th Field Artillery Brigade
COL Robert E. Fornoff
7-1—LTC James P. Fergo
4-75—MAJ Robert E. Grunewald, Jr.

479th Field Artillery Brigade
COL Robert R. Armstrong
4-8—LTC Robert E. Burkett
4-92—LTC Ricard M. Ranus

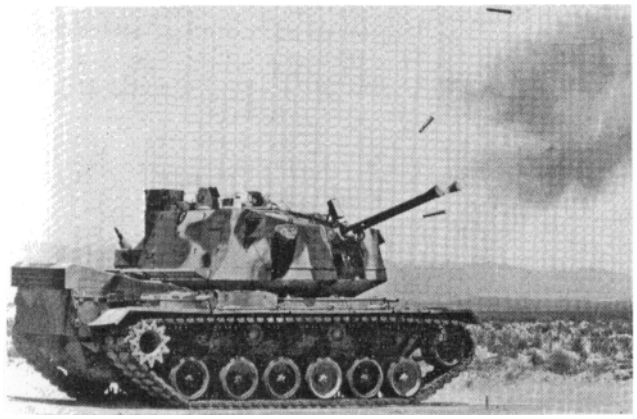
Separate Units
5-5—MAJ Michael M. Jones
7-9—LTC Charles H. Sadek
3-14—LTC Michael C. Archibald
3-15—LTC Toby W. Craft
4-17—MAJ(P) Joseph A. Brake
5-28—MAJ(P) Jimmy E. France
3-42—LTC Martin W. Sayne
3-75—LTC Jackie D. Robinson
3-83—LTC George L. Norwood
6-83—LTC Harold E. Stites
3-92—MAJ(P) George A. Fromholtz

Fragments

FROM COMRADES IN ARMS



This array of bombs, rockets, and missiles can all be carried by the AV-8B Harrier II short-takeoff vertical landing combat jet to support US Marine Corps ground troops. The weapons can be fitted in various combinations on the Harrier II's seven weapons stations. The AV-8B carries payloads of up to 9,200 pounds in addition to a 25-mm Gatling gun beneath its fuselage. Beginning with the four AIM-9L Sidewinder air-to-air missiles in the foreground, the other weapons shown are: four 577-pound LAU-10 and six 216-pound LAU-68 rocket launchers; six 542-pound LAU-61 and four LAU-68 rocket launchers; six LAU-10 and four LA-61 rocket launchers; 10 Mk-77 520-pound bombs; 10 Mk-20 490-pound bombs; 15 Mk-81 270-pound bombs; 16 Mk-82 530-pound bombs and a triple-ejector rack capable of carrying up to three bombs; six Mk-83 985-pound bombs; and four more triple-ejector weapons racks. The Harrier II also can carry Maverick air-to-ground missiles and other types of bombs and rocket launchers. (McDonnell Douglas Corporation photo)



The Sergeant York gun spews out 40-mm ammunition during recent tests at McGregor Range near El Paso, Texas. The tests were conducted by Ford Aerospace, the prime contractor for the Sergeant York gun, to verify the operation of the ammunition-feed system against high-speed targets and helicopters and to insure that the sensors on the new lighter-weight turret were properly integrated to the radar, gun sight, and guns. *(Air Defense Artillery Bulletin)*

Battlefield navigation aid

The Army is developing a simple, rugged, low-cost battlefield navigation aid designed to increase the maneuvering accuracy of combat and logistics vehicles over unfamiliar terrain. The aid uses fluidic technology which allows manufacturers to build sensing and control systems with no moving mechanical parts and to produce systems with low initial costs, high reliability, and little or no maintenance requirements.

The first all-Army fluidic navigation aid will consist of a heading reference unit into which a vehicle operator enters the bearing of the vehicle, as well as a sensor which keeps track of changes in that bearing. To use the aid, the driver sets the graphic positions and heading indicator at his approximate location and drives off in a known direction. After about half a kilometer, the driver aligns the displayed track with a map overlay showing geographical landmarks such as roads, contour lines, buildings, and streams and then enters the coordinates and bearing of the position and bearing indicators on the map. The system displays a vehicle's position, heading, and course as a series of luminous dots on a display screen and provides a printed standard digital readout of coordinates and bearing.

The battlefield navigation aid is aimed primarily at giving the combat commander a tool to locate himself and his unit on the battlefield. But it also enables logistics support vehicles to find their way from rear-area supply points to combat units that are frequently displaced.

In the near future, the Army expects to have a first-generation battlefield navigation aid system that uses a state-of-the-art flat panel display and a heading reference sensor to perform a more complex navigation function.

The navigation display is designed to sit up in front of the operator so that he can quickly check his position on the map against the land markings he is passing. If the display on the map does not match the terrain, the operator can easily adjust the display of his position on the map to coincide with his actual position on the ground.

Redleg Newsletter

ITEMS OF GENERAL INTEREST

ASI management

Additional skill identifiers (ASIs) are an important management tool in making assignments for enlisted soldiers. The addition of many new items of equipment under the Army modernization program makes the use of ASIs more important than ever. In the Field Artillery career management field, new ASIs are being added to the military occupational specialty codes (MOSCs).

What is an ASI, and how is it used in the management of soldiers? The ASI is the last two digits of a soldier's nine-digit MOS. It is used to identify additional skills requiring specialized training.

In the Field Artillery, ASIs are given to soldiers who attend special training in the operation and maintenance of specific systems such as TACFIRE, MLRS, or Firefinder. Currently, the 10 Field Artillery MOSs carry seven ASIs:

MOSC	Title	ASI	Title
13B	Cannon crewman	U6	FA weapons maintenance
13F	Fire support specialist	Q8	Tactical air operations
		X3	TACFIRE operations
13M	MLRS crewman	S8	MLRS organizational maintenance
13R	FA Firefinder radar operator	X5	Radar maintenance
13Y	Cannon/missile senior sergeant	Q8	Tactical air operations
13Z	FA senior sergeant	Q8	Tactical air operations
15D	Lance crewmember/MLRS sergeant	Z3	Lance organizational maintenance
15J	MLRS/Lance operations/fire direction specialist	X3	TACFIRE operations
17C	FA target acquisition specialist	X3	TACFIRE operations
93F	FA meteorological crewmember	H1	Meteorological equipment maintenance

The ASI management responsibilities of commanders and personnel managers at all levels include:

• Insuring that authorization documents (TOE, MTOE, and TDA) are up-to-date and reflect actual requirements. (Documented positions determine how many soldiers the Army trains. Once ASI positions are documented, units can then requisition and train soldiers in the right numbers.)

• Identifying and training qualified soldiers to meet Army needs.

• Awarding appropriate ASIs to soldiers who successfully complete ASI training.

• Insuring that soldiers' records, files, and orders reflect their ASIs.

• Insuring proper use of ASI-trained soldiers.

In many cases, unit commanders can best determine the selection of soldiers to attend ASI training based on their units' current and projected requirements and assets. Furthermore, it may even be more efficient in both time and money for major commands or installations to fund ASI training on a TDY-and-return basis rather than wait for a requisition.

When soldiers with ASIs are requisitioned through the usual personnel requisition procedures, the appropriate career branch at MILPERCEN has responsibility to identify, train if necessary, and assign a qualified soldier. It is during the identification and selection process at MILPERCEN that the ASI digits on the MOSC are critical. If a soldier in the correct grade, MOS, and ASI is available and can be identified, that soldier will be assigned to fill the requirement. If a qualified soldier is not available or cannot be identified, a soldier must be programmed for training en route to fill the requirement.

Award of an ASI is accomplished by a SIDPERS transaction (normally at the midpoint of the training course). If a soldier's ASI is never reported through SIDPERS, additional skill training goes unrecorded on the enlisted master file and is therefore unknown to assignment managers.

Noncommissioned Officer Education System

The Noncommissioned Officer Education System is a formal training system designed to provide enlisted soldiers the know-how they need to lead, train, maintain, and fight in units. The following courses are included in the system:

• Combat support and combat service support soldiers begin training with the four-week Primary Leadership Course which teaches essential leadership and how-to-train responsibilities to skill level 1 and 2 soldiers (E4 and E5) or duties at skill level 2 (E5) in MOSs 13M, 13R, 15D, 15E, 15J, 17B, 17C, 82C, and 93F.

• Combat arms soldiers begin training with the four-week Primary Noncommissioned Officer Course for Combat Arms. Leadership ability is developed by having the student train his peers on selected tasks and lead a small unit in various field situations. This course trains skill level 1 and 2 soldiers (E4 and E5) for duties at skill level 2 (E5) in MOSs 13B, 13C, 13E, and 13F.

• The Primary Leadership Development Course is a standard course for all field artillery MOSs in the ranks of specialist four, corporal, and some privates first class. The course is designed to teach skill level 2 tasks in combat survivability and leadership tasks inherent in all MOSs. It is the first step in formal leadership training and will combine the Primary Leadership Course and Primary Noncommissioned Officer Course for Combat Arms into one course starting in the second quarter of FY84.

• The Primary Technical Course is a formal course which focuses mainly on those critical tasks listed in the soldier's manual. The Field Artillery does not teach a Primary Technical Course.

• The Basic Noncommissioned Officer Course for Combat Arms stresses performance-oriented training

techniques for MOSs 13B, 13C, 13E, and 13F. This course is designed to teach skill level 3 tasks in maintaining, operating, and employing weapons and equipment. This training complements the leadership training received in the Primary Noncommissioned Officer Course for Combat Arms and is a four-week course.

• The Basic Technical Course is a formal course taught at resident service schools and focuses mainly on those critical tasks listed in the soldier's manual. It is designed to teach all CMF 13 soldiers the skill level 3 tasks. The Field Artillery program will start in the second quarter of FY85 for most CMF 13 MOSs. Course length will vary by MOS and mode of training.

• The Advanced Noncommissioned Officer Course (ANCOC) teaches MOS-related responsibilities and trains students in skill level 4 tasks. The Field Artillery has three ANCOC courses: the Field Artillery Cannon Noncommissioned Officer Advanced Course (8 to 11 weeks), Field Artillery Missile Noncommissioned Officer Advanced Course (7 weeks), and the Combat Surveillance and Target Acquisition Noncommissioned Officer Advanced Course (7 weeks). Personnel to attend the Advanced Noncommissioned Officer Course are selected by a Department of the Army selection board and are centrally managed by the Military Personnel Center.

• The Senior Noncommissioned Officer Course is an eight-week resident block of instruction at either Fort Bliss, Texas, or the 7th Army Combined Arms Training Center in Germany. It trains first sergeant designees in the most critical tasks of a first sergeant, and graduates must be utilized in first sergeant positions.

• The US Army Sergeants Major Academy trains selected soldiers for positions of the highest responsibility throughout the defense establishment. This course is the capstone of enlisted training. It is located at Fort Bliss, Texas, and is 22 weeks long. Attendees are in a permanent-change-of-station status and are selected by a Department of the Army centralized selection board. The Sergeants Major Academy also has a nonresident course available to those individuals who submit a formal application and are selected by the centralized selection board.

For more specific information on Noncommissioned Officer Education System courses, interested individuals should check chapter 6 of AR 351-1. Eligible soldiers should talk to their supervisors and ask to be nominated for this training. Commanders and supervisors have an obligation to permit deserving soldiers to attend these courses. It hurts to lose a good soldier for 4 to 10 weeks of training; but, in the long run, the soldier, the unit, and the Army will benefit. (LTC Samuel A. Biank, Jr., and LTC George F. Hill of Headquarters TRADOC, with additional information provided by SFC(P) Dennis L. Viets of the Field Artillery Proponency Office)

Command tours shortened

There is a revised policy relative to command tour lengths. Battalion and brigade tour lengths have changed from 30 months to 24 months. Commanders in the rank of major general and above are delegated authority to extend tours up to six months.

Those officers scheduled to relinquish command during the period 22 July 1983 through 29 February 1984 will do so in accordance with the 30-month policy. Those officers now scheduled to come out of command during the period 1 March 1984 through 30 September 1984 will not be reprogrammed earlier than 1 March 1984. These FY84 changes will be filled with a previously slated FY84 principal selectee who will assume command early. Those command positions currently scheduled by MILPERCEN to change during FY85 will be filled by the FY85 principal command selectees to be selected by the FY85 command boards that met in the fall of 1983. Those officers scheduled to change command in FY86, who will now relinquish command in FY85, will also be replaced by FY85 principal command selectees.

This tour length modification optimizes cohesion and stability while increasing the opportunity to command. It provides an improved balance between stability and the opportunity for professional development. Major commands may adjust current tours in accordance with the revised policy.

New Field Artillery MOSs

There are two new repairer MOSs that affect the Field Artillery. They are 27L (Lance system repairer) and 27M (Multiple Launch Rocket System (MLRS) repairer).

MOS 27L has been split out from 27B (land combat support system test specialist). MOS 27B was supporting Lance repair, and all those positions have been converted to 27L. The personnel serving in those Lance support positions are also being reclassified to 27L. This conversion action will cause no degradation of Lance maintenance.

MOS 27M is a new MOS. Initially soldiers serving in MOS 27H (Shillelagh repairer), an overstrength MOS, were identified for reclassification into 27M. Currently, 27M at skill level 2 is wide open for qualified soldiers who wish to be reclassified into this MOS. The US Army Recruiting Command is filling school seats, and the MOS is being specially managed to insure that the MLRS deployment schedule is not endangered. The MLRS repairer course is taught at Redstone Arsenal, Alabama; and the graduation date for each course is scheduled to precede the deployment date of each MLRS battery by a few months to insure that repairers will be on hand when the battery arrives.

Calling for Shell Nuclear

by Major (P) Robert H. Kimball

The employment of tactical nuclear weapons in division level exercises normally occurs at the end of a training exercise and traditionally signals its termination. In accordance with national policy, these weapons are used as a last resort; and, usually, only a few staff officers in the fire support element become actively involved in their employment. This type of last-ditch employment does not support doctrine in that it fails to train key personnel in the employment of tactical nuclear weapons.

Since the AirLand Battle concept envisions a battlefield which could be characterized by operations supported by tactical nuclear weapons, maneuver commanders and their staffs at battalion, brigade, and division levels must become thoroughly familiar with the employment of tactical nuclear weapons if they are to use them effectively. By integrating nuclear weapons employment within the division's exercise, commanders can develop more effective training.

One capability which effective employment training must develop is the capability to obtain accurate and timely intelligence data. It is true that the current US intelligence capability allows targeteers to look deep. However, they often receive information which is several hours or days old. This type of information is almost useless in the fast-moving situation which follows a counterattack — the timely attack of enemy maneuver forces is not possible in the absence of a target acquisition system that provides real-time intelligence data. The future does offer a family of target acquisition systems (such as the remotely piloted vehicle, the elevated target acquisition system, and the Air Force's Pave Mover) to provide real-time intelligence data linked to tactical nuclear fire support assets. But how can this intelligence collection gap be filled in the meantime?

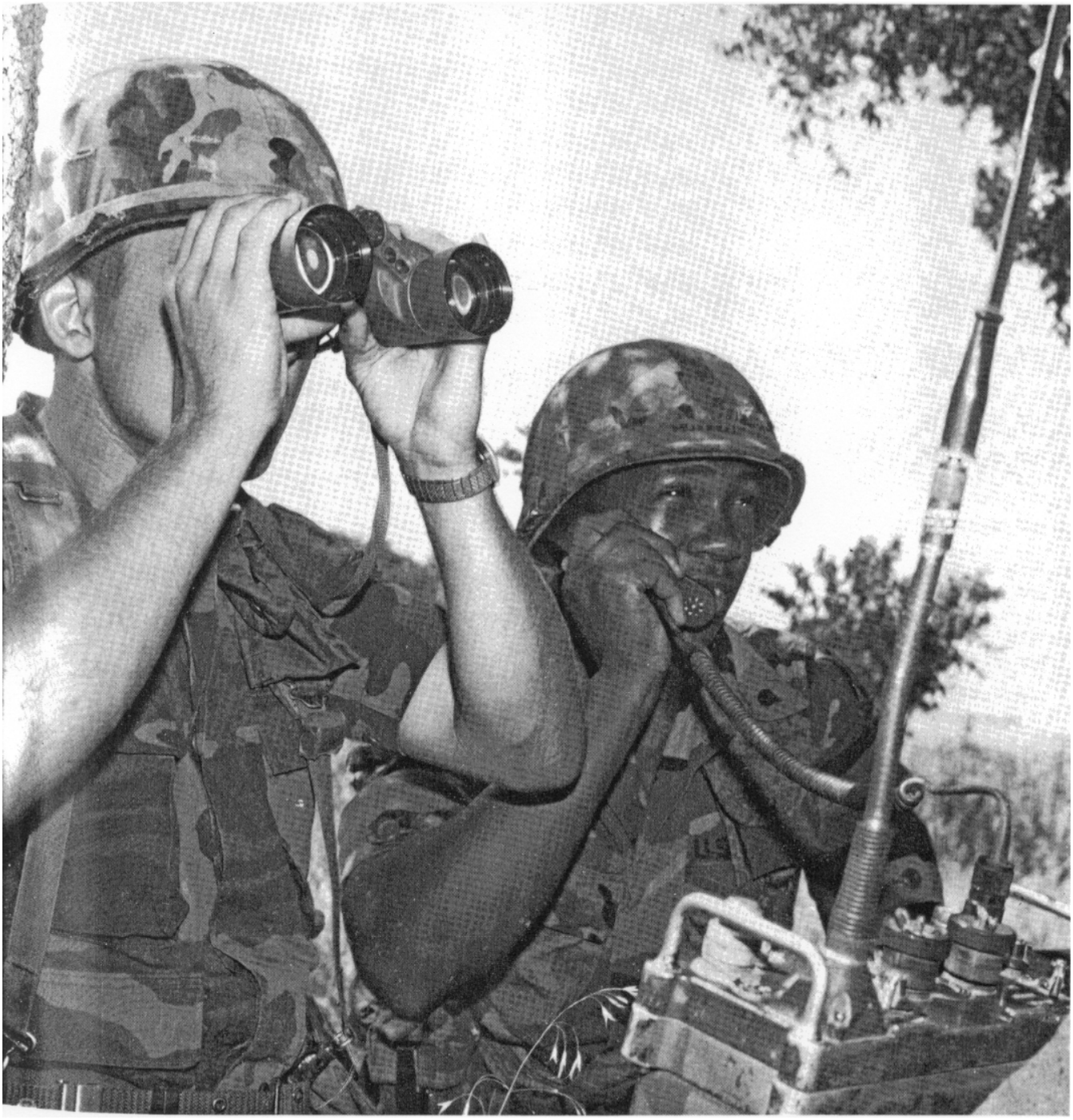
In the absence of real-time target acquisition systems, there are few, if any, targets generated by intelligence systems which are suitable for nuclear strike plans. A recent senior observer of a REFORGER exercise noted that a division with eight field artillery battalions could not acquire one enemy target for its nuclear strike plan. Oftentimes, the tactical nuclear weapons employment planners targeted tactical nuclear weapons on key terrain or avenues of approach. Perhaps these planners were too dependent on the intelligence system to provide target information. Perhaps it was because of a falsely perceived danger that they overlooked the use of forward observers for the gathering of intelligence for employment planning, and perhaps they did not understand that the type of target best suited for tactical nuclear weapons in a counterattack is a tank formation close to the forward edge of the battle area (FEBA).

If one agrees that tactical nuclear weapons can be employed to attrit the enemy and breach his strong-points near the FEBA, then good targets for small tactical nuclear weapons are maneuver units close to the FEBA. Furthermore, the best way to acquire these targets and receive accurate target locations and real-time intelligence data is with a forward observation post capable of tracking the target. Intelligence reports are normally at least four to six hours old and are not always as accurate as a report by a human observer with visual contact. Since the effects of tactical nuclear weapons are extremely limited, the accurate locations and real-time tracking provided by forward observers located in the various pockets of the battlefield are an essential part of tactical nuclear weapons employment planning. The number of tactical nuclear weapons will be severely limited; therefore, their use must be both tactically and psychologically effective.

FM 6-20, *Fire Support in Combined Arms Operations,* states that "subkiloton weapons are generally ineffective when used individually against poorly located targets. They should be used near the FEBA where direct target location is more possible . . . ." Nevertheless, a maneuver commander will often not authorize their use near the FEBA because he is not always sure of the exact location of friendly forces at the prescribed time-on-target and cannot take the chance that the close proximity burst will cause more than the normally allowable negligible risk to unwarned exposed personnel on the forward line of own troops (FLOT). If there were a decentralization of short-range tactical nuclear weapons employment authority and a limit of advance for maneuver forces, such coordination problems could be eliminated.

The decentralization of nuclear weapons could be accomplished by suballocating short-range nuclear weapons to maneuver brigade commanders after the release has been received and the division commander has authorized execution. A brigade commander could best maximize the effects of the weapons by employing them on tank formations or motorized rifle battalions approaching his frontline, rather than on targets like key terrain and chokepoints or on targets generated by intelligence data already several hours or days old.

Under this concept, a possible scenario would have a fire support team (FIST) located on an outstanding vantage point from which it identifies a tank formation of 50 tanks moving toward the FLOT. The FIST chief would send this target information to the brigade fire support officer (FSO) and the direct support battalion tactical operations center (TOC). The TOC could prepare for executing the mission while a request for approval goes to the brigade commander. The brigade FSO would conduct a hasty target analysis for the brigade commander with the TI-59 calculator.



(Such target analysis for the employment of nuclear weapons is currently an ARTEP task for a brigade fire support officer.) He would then advise the brigade commander of the minimum safe distance for friendly troops and publish the STRIKEWARN. If he decides to employ a nuclear weapon, the brigade commander could direct a temporary limit of advance for all friendly units in his area of operations to insure the safety of his soldiers when the weapon is fired.

The use of a FIST to call in targets for nuclear weapons is a departure from the current practice of using intelligence data to select targets; but here again, FM 6-20 supports this method. It states that "DS units should provide the [nuclear] fires nearest the FEBA. This is because of the low yield and the ability of FISTs and FSOs to identify close-in critical targets that can result in aimpoint refinement during hostilities . . . Divisional heavy battalions can also place

small nuclear fires close to the FEBA for the same reason . . . ." In the past, the FIST has adjusted spotting rounds for the heavy cannon battalions' preparation for a nuclear strike. But, if a brigade has a short-range cannon nuclear weapon and can meet troop safety criteria, there should be no reason why a FIST could not call the nuclear strike in on a tank formation of 50 tanks. If the engagement is successful, there is also no reason why a FIST could not give a correction and fire another tactical nuclear weapon, if available, on another large tank formation threatening friendly tank battalions.

What does FM 6-20 mean by "close to the FEBA"; how close is close? FM 101-31-3 (Unclassified), *Staff Officer's Field Manual, Nuclear Weapons Employment Effects Data*, states that the safety distance for a short-range cannon nuclear weapon with a hypothetical yield of one kiloton is approximately three kilometers for negligible risk to unwarned exposed personnel. The safety distance with the same troop safety criteria for a medium-range cannon firing a weapon with a hypothetical yield of eight kilotons is 7,600 meters. These safety distances are reduced by approximately 40 percent if the troop safety criteria is changed to address warned and protected personnel. This last troop safety criteria would apply in a situation in which an isolated tank battalion desired to use a tactical nuclear weapon to engage an enemy tank battalion only four kilometers from its position and attacking in its direction. Therefore, close-in to the FEBA could be as close as two kilometers depending on the yield of the weapon and the risk to his own troops that the maneuver commander is willing to accept.

The AirLand Battlefield, like battlefields in the past, will continue to be, for the most part, unpredictable. US field artillery units could find themselves in a fast-moving situation in which the division might be 15 to 20 kilometers from the FEBA. Nuclear target subpackages in such an operation will have to be controlled by phasing to prevent them from becoming quickly out of date. The first nuclear target subpackage plan could be prepared giving aimpoints located between the FEBA and the nuclear planning phase line approximately 25 kilometers beyond the FEBA. A second nuclear target subpackage plan would be prepared for the area between the first nuclear planning phase line and an area 20 to 30 kilometers from that line in the direction of the attack. These packages could be listed as contingency numbers 1 and 2 as FM 6-20 recommends. They would, of course, be refined and the aimpoints changed as the enemy situation develops. A brigade commander may want to plan several on-call limit of advance lines in the direction of his attack in order to safeguard friendly forces when he decides to use tactical nuclear weapons.

In summary, serious consideration is warranted for suballocating targeting authority for short-range nuclear weapons to maneuver brigade commanders. Except for the field artillery forward observer, the intelligence assets to obtain real-time intelligence information are just not available at this time in a division. Short-range cannon tactical nuclear weapons are extremely limited in their effects and should not be wasted on reported intelligence data, the accuracy and timeliness of which is questionable. The FIST chief provides the best means to insure that short-range cannon tactical nuclear weapons are effectively employed against a numerically superior force. The use of the forward observer in the employment of tactical nuclear weapons offers the only real potential of obtaining damage assessment reports. A maneuver division should become more aggressive in using its 10 aerial observation helicopters to identify troop concentrations and engage them with medium-range cannon nuclear weapons. FISTs should be trained in the effects of tactical nuclear weapons to assist them in the proper employment of the weapons. Maneuver commanders should become familiar with the effects of tactical nuclear weapons to insure good target selection and troop safety. Control measures such as limits of advance and nuclear planning phase lines should be used in offensive operations.

Winning the AirLand Battle requires effective firepower to defeat the opposing highly mechanized forces. Tactical nuclear weapons targeted on the basis of terrain or intelligence data on close-in forces will not guarantee the most effective use of those weapons. The combined team of the maneuver commander and the eyes of the artillery can guarantee the successful employment of the limited supply of tactical nuclear weapons.

MAJ(P) Robert H. Kimball, FA, is the Assistant G3 of III Corps at Fort Hood, Texas. Prior to assuming those duties, he was the assistant fire support coordinator for the 2d Armored Division. He served as the S3 of a Lance battalion and the executive officer of an 8-inch battalion in Germany. He has commanded firing batteries in M109 and M110 battalions. A graduate of the Command and General Staff College, he holds an M.A. degree from the University of Oklahoma. He has authored other articles for the *Field Artillery Journal*.

Right by Piece

NOTES FROM UNITS

GRENADA — Field artillerymen of the 82d Airborne Division fire on enemy hill positions in support of mopping-up operations in Grenada. (US Navy photo by Peter D. Sundberg)

FORT STEWART, GA — Staff Sergeant Howard Cobb (kneeling) and Sergeant James M. Brown, both members of Battery A, 1st Battalion, 24th Field Artillery, Georgia National Guard, assist in laying their unit's 155-mm self-propelled howitzers during two weeks of intensive field training at Fort Stewart. (Photo by MSG Mitch Kinney)

Major General Thomas F. Healy (center), 1st Armored Division Commander, presents the Harmon Award to Lieutenant Colonel Tommy R. Franks as Command Sergeant Major Donald Mann looks on.

2-78th FA Wins Harmon Award

BAMBERG, GERMANY — As reported in the November-December 1983 *Journal*, the 2d Battalion, 78th Field Artillery, was presented the Harmon Award for 1983 as the best fire support unit in the 1st Armored Division. The award, named after Major General Earnest N. Harmon, the third commander of the 1st Armored Division (March 1943-July 1944), is awarded annually to the Field Artillery, Air Defense, Combat Aviation, or Engineer battalion which makes the greatest overall contribution to the division's combat readiness. The 2d Battalion's contributions were determined based on the following accomplishments:

• Satisfactory completion of all battalion ARTEP tasks during external evaluation in October of 1982.

• An annual SQT pass rate of 98 percent.

• First and third place batteries (Battery B and Battery A, respectively) during Division Artillery Best-By-Test Competition in March 1983.

• Satisfactory completion (with very high marks) of a VII Corps Operational Readiness Test in November 1982.

• Best small unit maintenance operations in the fire support category for three out of four quarters (Headquarters and Headquarters, C, and Service Batteries).

• Nomination by 1st Armored Division for the prestigious Connelly Dining Facility Award.

• Selection of Battery C to replace the Berlin Battery for six weeks while the latter trained in Grafenwoehr.

• Winner of the 3d Brigade military and sports "Bulldog Week" competition in 1982 (Headquarters and Headquarters Battery).

• Demonstration of its capability to take care of all soldiers through training, education, promotion, awards, and quality of life needs.

Artillery rocket/missile technology

REDSTONE ARSENAL, AL — Where do some of the state of the art ideas for future rocket/missile fire support systems come from within the United States Army? The answer to this question, with respect to artillery rocket/missile technology (AR/MT), can easily be furnished by the Fire Support Team, Advanced Systems Concepts Office of the US Army Missile Laboratory, US Army Missile Command, Redstone Arsenal, Alabama. The missions of the Advanced Systems Concepts Office are to analyze weapon system requirements and provide research and development plans to satisfy these requirements; to coordinate with US Army Training and Doctrine Command and Army staff agencies to insure integration of combat requirements and tactical concepts in new or evolutionary system generation; to act as the Missile Command focal point for Mission Area Analysis (MAA); to conduct evaluation and tests of friendly foreign missile systems; to manage research, development, test, and evaluation programs to assure the orderly evolution of preferred weapon systems candidates from program initiation to completion of the project; to manage the integration of technology to demonstrate systems' feasibility and potential; and to provide expert analysis in the system effectiveness and concept engineering of advanced missile and rocket systems.

In addition to conducting research and development, the Advanced Systems Concepts Office coordinates ongoing systems' acquisition activities. The Fire Support Team, through the efforts of its military personnel and its civilian force of general, electronic, and aerospace engineers, directs and coordinates the planning and execution of new system developmental activities and the integration of technology to demonstrate a new system's feasibility, as well as new applications of existing systems. It is because of this concentration that the team serves as the principal staff advisor to the Army Missile Command on Army requirements and concepts for future rocket/missile fire support systems. In addition, new applications of existing systems are accomplished within the team. Product improvements are currently being pursued in conjunction with the Pershing, Multiple Launch Rocket System, and Lance programs.

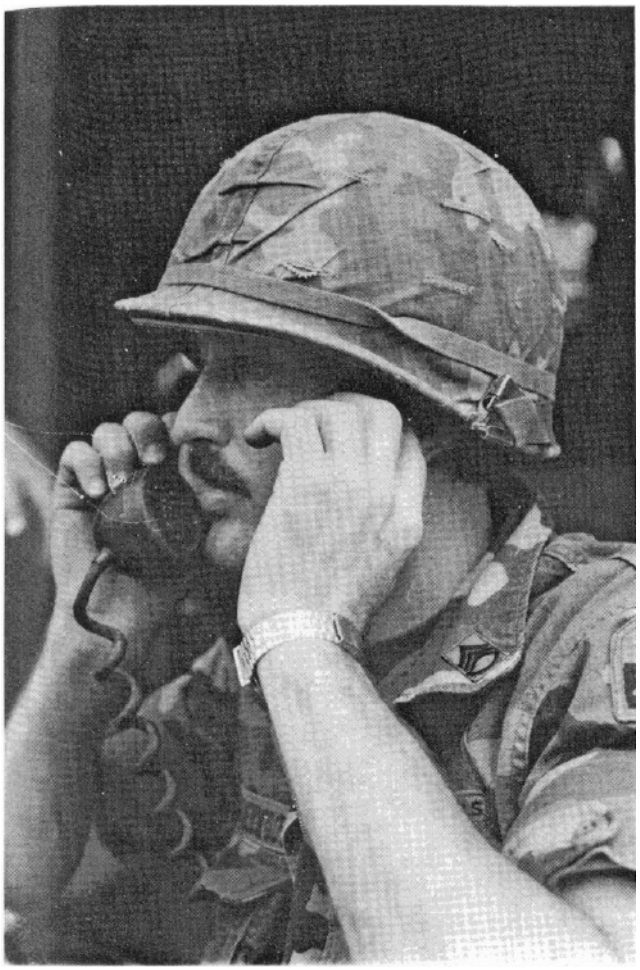
The development of new capabilities is enhanced through liaison with Department of Defense organizations, other Government agencies, universities, and industrial organizations. In order to insure user interaction, the Advanced Systems Concepts Office maintains close ties with the Field Artillery School's Directorate of Combat Developments, which has responsibility for overall artillery materiel and doctrine development and is addressing the Army's fire support requirements through the Mission Area Analysis procedure.

Mission Area Analysis entails the identification of deficiencies affecting the various TRADOC mission activities in relation to their assigned tasks and the development of doctrine, training, materiel, and organizations to cope with the dynamic, multi-faceted threat. It has identified hardware deficiencies to the Government materiel developer, which for rocket/missile fire support systems is the Department of the Army Readiness and Development Command, the major subordinate command which includes the Missile Command.

To facilitate the state-of-the-art efforts, the Advanced Systems Concepts Office also maintains close liaison with industrial organizations which conduct independent research and development with government funding. The Fire Support Team is instrumental in orchestrating the identified hardware deficiencies and their proposed rocket/missile hardware solutions vis-a-vis technological advances made by the organizations. (At present, the Team is working on such projects as lethal attack of emitters, terminally guided warheads, rapid deployment integrated rocket systems, and total air base attack systems.)

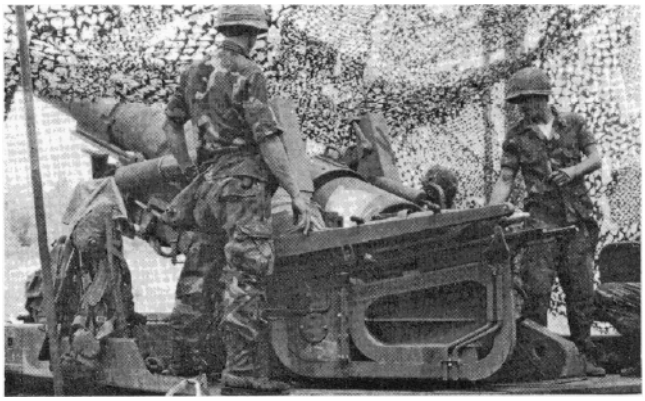
To establish a framework for planning and allocation of resources, the Advanced Systems Concepts Office has developed and manages the Missile Command Long Range Weapons Plan. This document is the result of a process by which the Army Missile Command identifies development and acquisition strategies for proposed concepts to meet user needs within the allocation of Department of Defense resources. These resources are allocated based upon the priorities of the user command; and, through interactive computer-aided analysis, the Advanced Systems Concepts Office is able to obtain a realistic projection of affordable weapon system acquisition programs over the next 15 to 20 years. This planning is coordinated with the user, then with the Department of the Army Readiness and Development Command, and, finally, with the Department of the Army as part of the Army's planning, programming, and budgeting system.

The personnel in the Advanced Systems Concepts Office and the functional directorates of the Army Missile Laboratory interact in multiple mission areas, technology base development, support to project management offices, and product improvements; and it is through the efforts of all these personnel, in cooperation with the user and the industrial community, that the missions of the Fire Support Team are successfully accomplished. (LTC Paul A. Hays and Mr. Jeffrey D. Cerny, Fire Support Team, Advanced Systems Concepts Office, US Army Missile Command)



FRANKFORT, KY — Preparing for the next fire mission of Battery B, 1st Battalion, 623d Field Artillery, Kentucky Army National Guard, Staff Sergeant Charles C. Underwood listens for the fire commands during annual training field exercises at Camp Shelby, Mississippi. (Photo by SGT F. Patrick Collins)

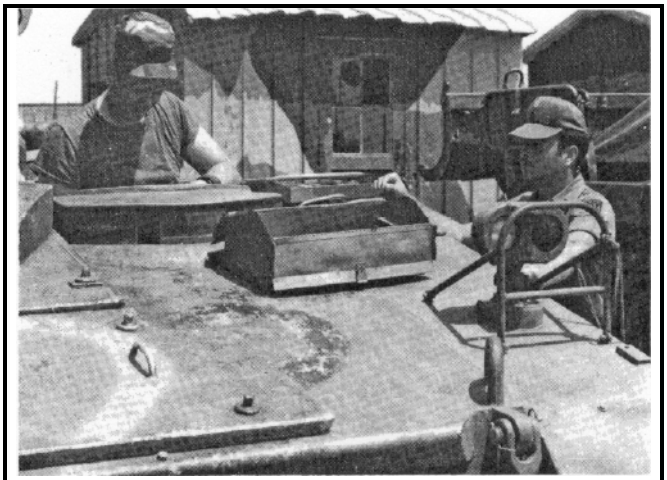
FRANKFORT, KY — As the temperature reaches above 90 degrees Fahrenheit, Specialist Four William V. Crawford computes the effects of weather variations during artillery exercises at Camp Shelby, Mississippi. Crawford is a member of Battery B, 1st Battalion, 623d Field Artillery, Kentucky Army National Guard. (Photo by SGT F. Patrick Collins)



FRANKFORT, KY — Practice! Practice! Members of Battery A, 1st Battalion, 623d Field Artillery, Kentucky Army National Guard, prepare to fire an 8-inch howitzer during field exercises at Camp Shelby, Mississippi. (Photo by SGT F. Patrick Collins)

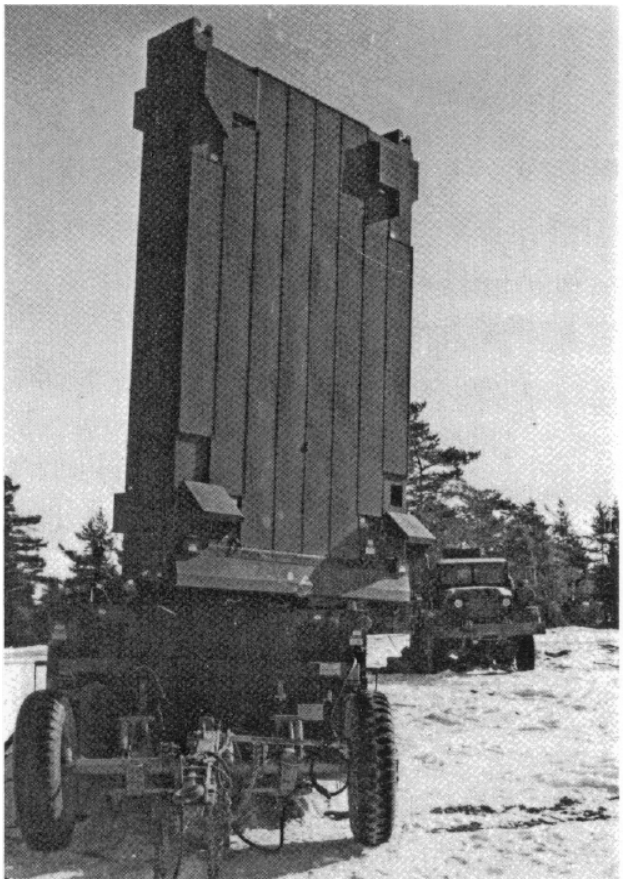
Big voice

FORT HOOD, TX — The 12 8-inch howitzer sections of the 1st Battalion, 21st Field Artillery, distinguished themselves during the howitzer section evaluation conducted by the 1st Cavalry Division Artillery this past May. Competing against the standards set forth in FM 6-50 and against howitzer sections from the two 155-mm direct support battalions, 10 of the 12 howitzer crews of this general support battalion earned distinguished section patches, with the highest score achieved by Staff Sergeant Issard C. Legington's section in Bravo Battery. The remaining two sections in the battalion earned outstanding ratings. The Big Voice of Gary Owen proved itself still ready to provide "accurate and timely" artillery fires in support of the 1st Cavalry Division. (CPT Johnny E. Tolliver, HHB, 1-21st FA)



FORT SILL, OK — Staff Sergeant Manuel Villarreal (right) of the 2d Battalion, 18th Field Artillery, has been chosen as Fort Sill's NCO of the Year. Sergeant Villarreal is pictured here supervising his howitzer section's maintenance activities in the battery motor pool. (Photo by CSM Webster A. Woodruff, 2-18th FA)

VILSECK, GERMANY — One of the 105-mm howizters of Battery D, 4th Battalion, 325th Infantry Regiment Airborne Battalion Combat Team, is hooked to the belly of a UH-60 Blackhawk helicopter for transport to Vilseck, Germany, where the battery participated in a week of live-fire exercises (top photo). In the bottom photo, artillerymen of the 4th Section, Battery D, prepare to send another live round downrange. Specialist Four Shawn McKenna pushes a high-explosive round into the tube while Specialist Four Mark Saia waits to slam the breech shut. (Photos by SP4 Ken Hudson)



GRAFENWOEHR, GERMANY — The AN/TPQ-36 Firefinder radar, which belongs to Target Acquisition Battery F, 29th Field Artillery, scans the skies for any incoming rounds during a 1st Armored Division exercise at the Grafenwoehr Training Area in West Germay. (Photo by Rick Chaney)

GRAFENWOEHR, GERMANY — During the Best by Test competition at Grafenwoehr Training Area in West Germany, soldiers from the 6th Battalion, 14th Field Artillery, 1st Armored Division, await the word for their next fire mission (top photo). In the bottom photo, a 6-14th FA soldier guards his perimeter during the competition. (Photos by SP4 Jacob Knight)

German-American Friendship Week 1983

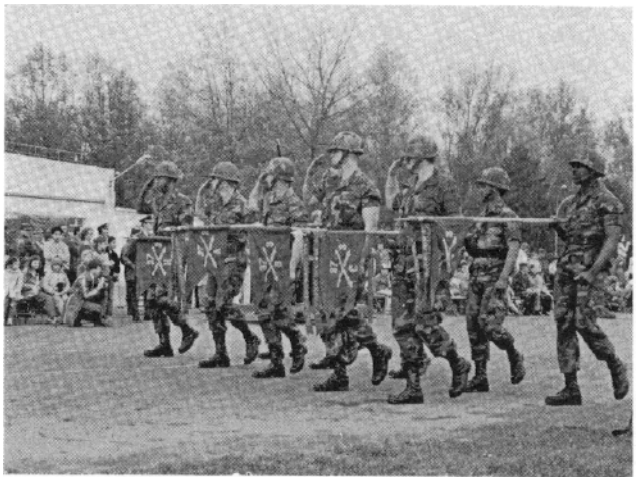
HERZOGENAURACH, GERMANY — Personnel of the city of Herzogenaurach and the Herzo Artillery Base in Germany look forward to the annual German-American Friendship Week which is held during the first week of May. The 17,000 inhabitants of this Franconian city and the 2,000 members of its American community participate in numerous exchanges and activities throughout the year, but none match the excitement of friendship week activities.

While many communities in Germany focus their German-American Friendship Week on fund-raising programs, the people of Herzogenaurach and the Herzo Artillery Base concentrate on fostering new friendships and contacts between Americans and Germans. There is a full program of activities for families and single soldiers, to include sports tournaments for both team and individual competitors.

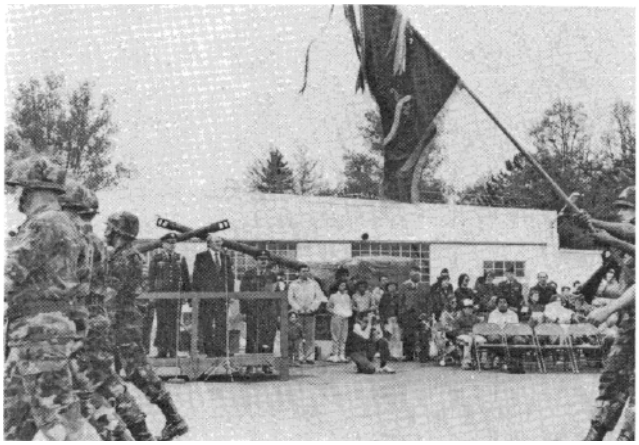
Local businesses and factories conduct tours for the American soldiers and their family members, many of whom visit the actual assembly lines. Two of the tours given each year are at the world headquarters for Adidas and Puma sportswear manufacturers. Of course, a perennial favorite for the soldiers is a tour of the local brewery.

And, what would a German-American celebration be without a festival? Each evening the beer tent opens, and German and American bands play all types of music. The week ends on a Saturday with a full day of music, food, games, military displays, and a parade.

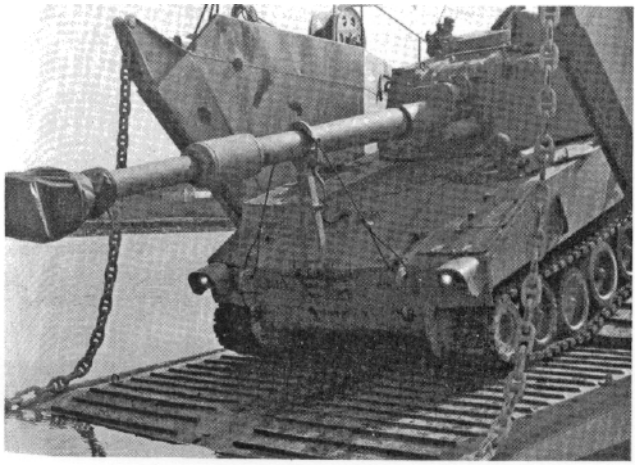
The 1983 edition of Friendship Week highlighted the 300th anniversary of German emigration to the United States. First Mayor of Herzogenaurach, Hans Ort, said, "We have 300 years of common culture and heritage to build upon. We both believe in democracy and freedom, and for these ideals we work together." (Story and photos by Ruthann M. Sprague)



Battery commanders and guidons of the 3d Battalion, 37th Field Artillery, pass the reviewing stand during the German-American Friendship Week parade.

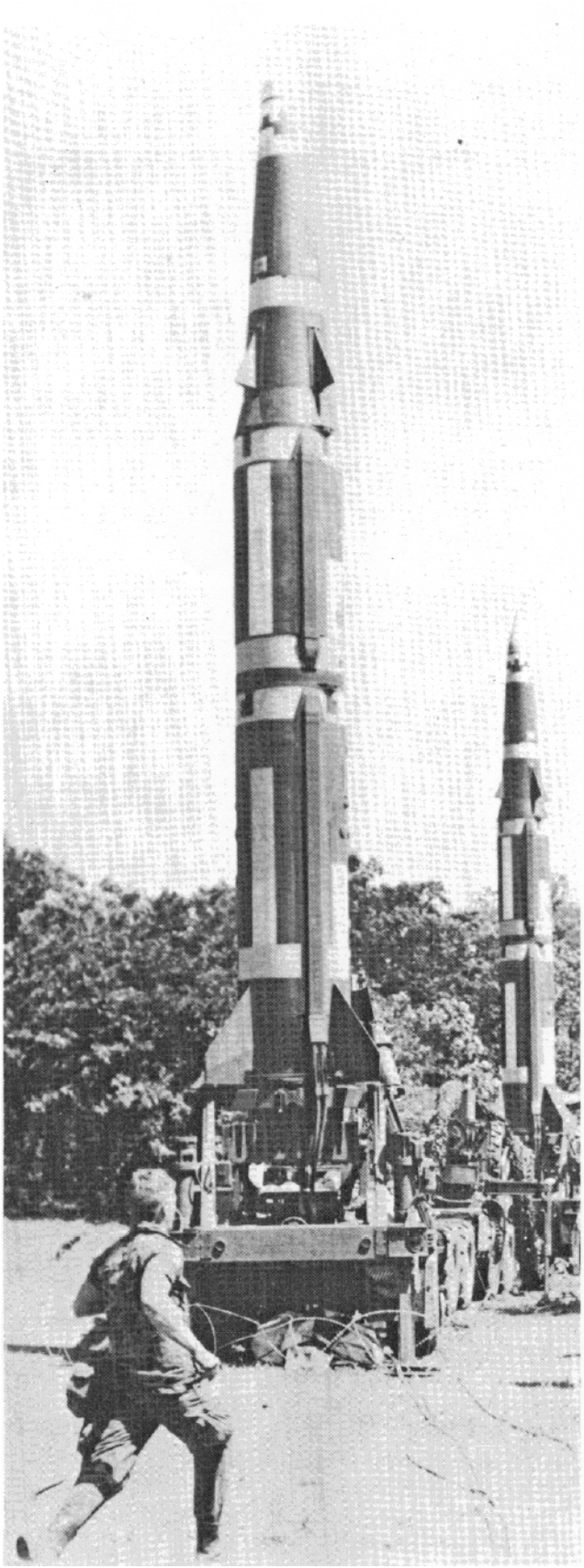


Colonel Jerome Granrud, 210th Field Artillery Brigade commander, and Hans Ort, First Mayor of Herzogenaurach, review the troops during the German-American Friendship Week parade.



FORT STEWART, GA — During Operation Lifeline, Private First Class Roger Maddux of the 2d Battalion, 35th Field Artillery, backs an M109 howitzer onto an Army landing craft at the port of Brunswick, Georgia. Some 200 vehicles were moved to Brunswick for deployment by sea to Savannah, Georgia. (Photo by SP4 Mark Bersani)

GRAFENWOEHR, GERMANY — Soldiers from the 1st Battalion, 22d Field Artillery, 1st Armored Division, demonstrate their night firing techniques on M109 howitzers during the "Best by Test" competition at Grafenwoehr. (Photo by Rick Chaney)



Pershing II missiles tower above a soldier from the 3d Battalion, 9th Field Artillery. (Photo by PV2 Steve Infanti)

Pershing II

FORT SILL, OK — Personnel of the 3d Battalion, 9th Field Artillery, are receiving training on the Pershing II missile, which will replace the Pershing Ia missile.

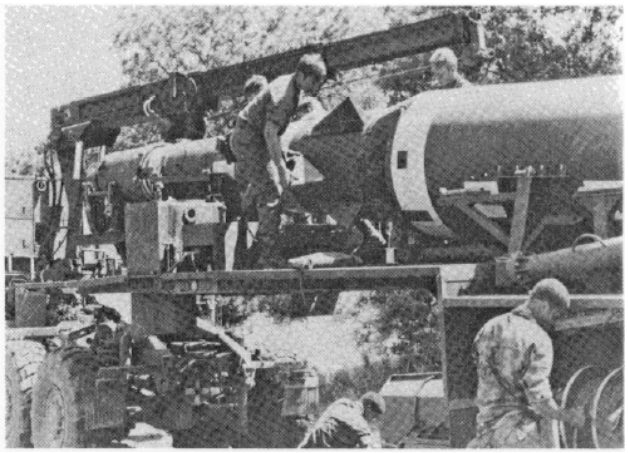
There are four military occupational specialities (MOSs) involved in the Pershing system. MOS 15E (Pershing missile crewmember) and MOS 21G (Pershing electronics materiel specialist) personnel perform crew work and receive training at Fort Sill, while MOS 21L (Pershing electronics repairer) and MOS 46N (Pershing electrical-mechanical repairer) personnel provide direct support maintenance and receive training at Redstone Arsenal, Alabama.

Fort Sill soldiers go through the one-station unit training; and, while attending advanced training at the Field Artillery School, crewmembers learn about the erector launcher which is used to transport, assemble, and fire the missile. They learn to remove the missile from shipping and storage containers and assemble it on the launcher. Next, they are instructed on how to maintain and use power generation equipment, how to inspect the warhead, how to mate and demate the warhead, and how to handle nuclear weapons. The final phase of instruction is the countdown operation, which teaches the students to prepare the missile for launch and actual firing. Collective training is then accomplished at their assigned unit.

The 3d Battalion, 9th Field Artillery, has 700 soldiers who possess Pershing MOSs; and the demands placed on these soldiers are extremely high. They go through constant checks, annual skill qualification tests, primary weapon proficiency inspections, and annual NATO tactical evaluations.

There are only four Pershing battalions — one at Fort Sill and three in Germany — and each battalion gets to fire two rounds per year as annual service practice. Personnel assigned to Pershing units normally rotate between assignments in Fort Sill and Europe.

The Pershing missile system is the US Army's longest range field artillery weapon system and is designed to support a large field army. Pershing II, which will replace Pershing, 1a, has a 1,000-mile combat range, compared with 400 miles for the Pershing 1a.



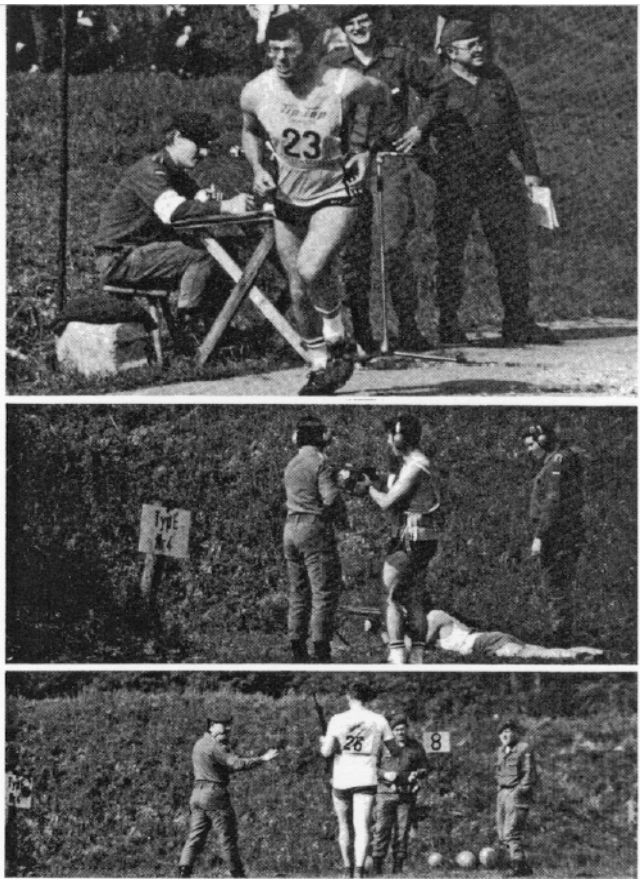
Pershing II crewmembers from the 3d Battalion, 9th Field Artillery, disassemble a Pershing II missile at Fort Sill, Oklahoma. (Photo by SP5 Toni Sprinkle)

Partnership contests

REGENSBURG, GERMANY — Soldiers from F Battery (Target Acquisition), 29th Field Artillery, placed third in a Triathlon and won the guest class competition in a Biathlon sponsored by Beobachtungsbataillon 43 of the Bundeswehr's Artillerieregiment 4 in Germany. The Triathlon team consisted of Chief Warrant Officer Roger I. Padgett, Staff Sergeant Arne J. Kalka, Staff Sergeant Charles N. Flaherty, Sergeant Mitchell W. Daniel, and Sergeant Timothy R. Luhring. The Biathlon team consisted of Staff Sergeant Arne Kalka, Sergeant Timothy Luhring, Corporal John Skidmore, and West Point Cadet Tamela Halstead; Corporal Skidmore won the individual competition in the guest class, and Sergeant Luhring placed second.

During the contests, soldiers were required to run 1,500 meters, fire the German G3 rifle, run another 1,500 meters, fire the G3 rifle again, and then sprint to the finish line. After a short rest, each individual entered in the Triathlon was required to complete a 200-meter, free-style swim.

F Battery has a formal partnership with Beobachtungsbataillon 43 (an observation battalion); and the two units participate in numerous joint training exercises, sport contests, and social events. Such activities strengthen the comradeship between German and American units as well as providing a forum for exchanging ideas and finding solutions to problems that confront all professional soldiers. (Story and photos by CPT John M. House)



Chief Warrant Officer Roger I. Padgett begins the Beobachtungsbataillon 43 Triathlon (top photo) and then prepares to fire the German G3 rifle (middle photo). In the bottom photo, Sergeant Timothy R. Luhring (number 26) prepares to fire the G3 rifle.

Operation Sommerwind I

CRAILSHEIM, WEST GERMANY — The 2d Battalion, 42d Field Artillery (Lance), 17th Field Artillery Brigade, was presented the United States Army, Europe Partnership Award for 1983 by General Glenn Otis, Commander-in-Chief, USAREUR. The award recognized the outstanding efforts made by the battalion to strengthen partnership with the Bundeswehr and, particularly, the 250th Rakenten Artillerie Battalion (Lance) of the II German Korps.

To mark their receipt of the award, the 2d Battalion, 42d Field Artillery, and the 250th Rakenten Artillerie Battalion held a joint field training exercise, Operation Sommerwind I, in the Schwaebisch Alps during the latter part of June 1983. The battalions formed a Lance brigade and conducted fire support operations in support of a national Army corps. The exercise, based on an AirLand Battle scenario, was the first operational test of the Lance brigade concept and provided data that could be evaluated by Army planners. The brigade headquarters and headquarters battery and tactical operations center were composed of both German and American personnel.

The battalions also practiced interoperability. The 250th Rakenten Artillerie battalion maintained operational control of Bravo Battery, 2d Battalion, 42d Field Artillery throughout the exercise; and survey parties and fire direction center personnel were detached from the American battalion to the German 2d Battery and 4th Battery, allowing the Germans to survey firing points for American launcher platoons and to compute nonnuclear firing data. An air convoy resupply with German aircraft and an airmobile fire mission with American aircraft were conducted, and they involved both American and German firing and assembly and transport platoons. The two battalions and the brigade headquarters moved in retrograde over 100 miles during the exercise, but moved forward by air to deliver fire support for offensive operations. The brigade shot 29 training fire missions, both nuclear and nonnuclear.

Operation Sommerwind I demonstrated that American and German field artillerymen can easily achieve interoperability in staff planning, command, control, communications, fire control, survey, and logistics; it also indicated that the Lance brigade concept may have applications in organizing American Lance battalions for combat to support the AirLand Battle. The main value of the exercise, however, was partnership — the soldiers of both nations overcame linguistic, cultural, and procedural barriers to become efficient co-workers and comrades. (1LT Gary Bowman)

Target reference for Pershing II

FORT BELVOIR, VA — Redlegs from the 56th Field Artillery Brigade at Schwaebisch, West Germany, and from the US Army Field Artillery School and the Pershing II TRADOC Systems Managers Office at Fort Sill, Oklahoma, visited the US Army Engineer Topographic Laboratories to learn how to make target reference scenes (machine-readable maps) for Pershing II on the Reference Scene Generation Facility. The Redlegs made a reference scene for use in a test firing of the 34-foot missile.

Test firings of Pershing II early last year validated the fact that soldiers can make sophisticated scenes with the Reference Scene Generation Facility. The missile's near-pinpoint accuracy is achieved through a technique called radar area correlation; and, as the reentry vehicle descends toward a target area, it compares live radar reflection from the target with reference scenes stored in the missile before launch. The reentry vehicle then makes course adjustments based on the comparative readings supplied by the guidance system.

Sergeant First Class Donald V. Bowles, Captain John D. Schorr, Sergeant First Class Roger W. Crider, and Chief Warrant Officer Michael Lukes watch Captain David W. Adams operate the Reference Scene Generation Facility.

FORT ORD, CA — Sergeant Jon Dewey (right), ammunition section chief of/A Battery, 2d Battalion, 8th Field Artillery, was chosen as Fort Ord's NCO of the Year. (Specialist 4 Marco Calvo, pictured on the left, is an aircraft hydraulics repairman with E Company, 7th Combat Battalion, who was named as Soldier of the Year.) Soldiers competing for NCO of the year had to appear before a board made up of sergeants major. Selection was based on a point spread system similar to the one used by a promotion board. Competing NCOs were judged on their manner of reporting, individual achievements, military bearing, knowledge of military subjects, personal appearance, manner of expressing ideas, military courtesy, and knowledge of current events. (Photo by Tim Guthrie)

XI Corps Artillery

SALT LAKE CITY, UT — Brigadier General James M. Miller received his star prior to assuming command of the XI Corps Artillery — the only corps artillery in the Reserve Components. The XI Corps Artillery serves as one of the major commands in the Utah Army National Guard and has a two-fold mission: it provides assistance to the state and local communities during emergencies and disaster and is the controlling headquarters for all surfaced-delivered fire in support of corps level operations. There are three field artillery howitzer battalions attached to the XI Corps — they are headquartered at Ogden (1-145th FA), Salt Lake City (1-140th FA), and Cedar City (2-222d FA). In civilian life, General Miller is the Dean of Education at Southern Utah State College in Cedar City, Utah.

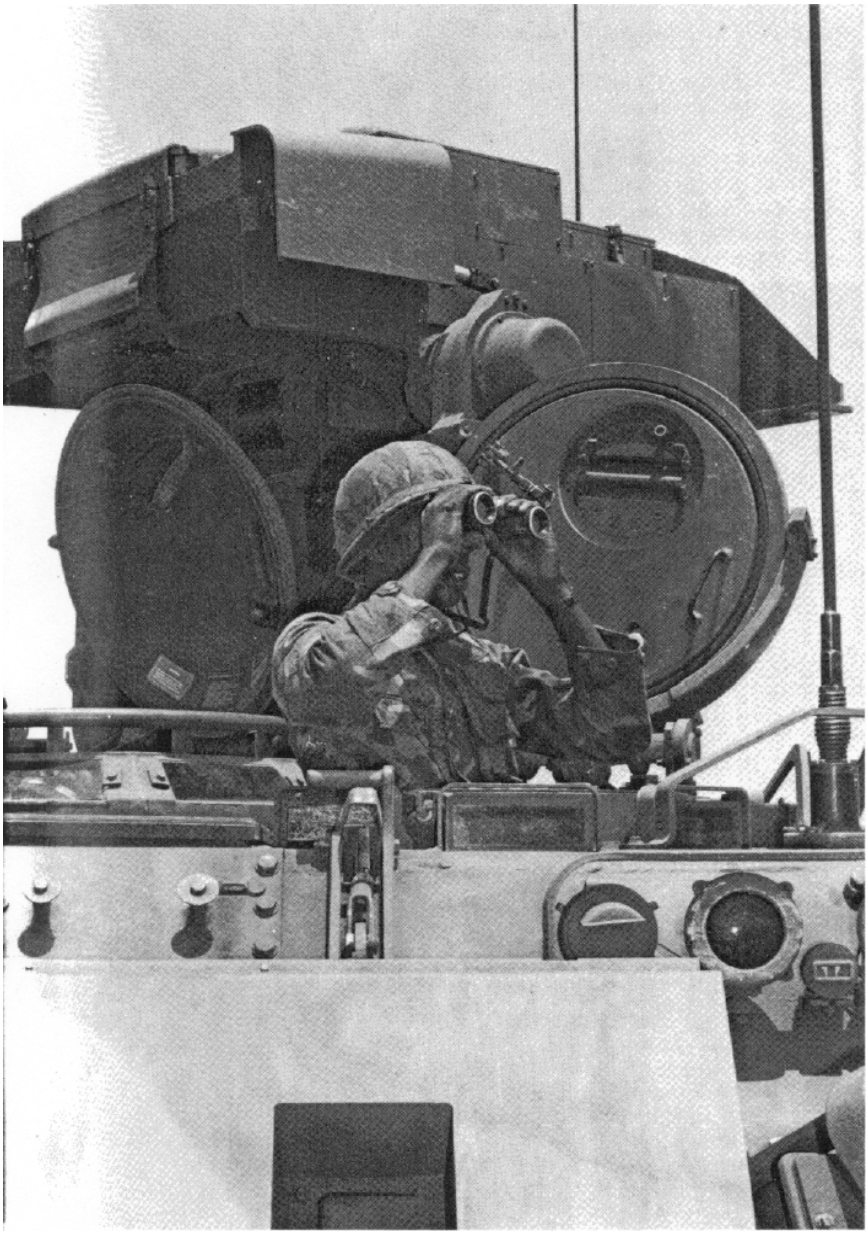


Photo by Jill Ponto

Lase Phase

by Captain Timothy M. Knigge

The Ground/Vehicular Laser Locator Designator (G/VLLD)-Copperhead system adds a new dimension in effectiveness to the field artillery. With the G/VLLD, members of the fire support team (FIST) and separate lasing teams can accurately locate targets, adjust conventional artillery fire more efficiently, guide precision munitions such as Copperhead, and hand off targets to various airborne weapon systems. The effectiveness of the G/VLLD-Copperhead system depends on a variety of factors, the most important of which are the skill of the individual operator in target tracking and the command, control, and communications teamwork among the laser designator operator, fire direction center (FDC), and gun crew.

With the fielding of the G/VLLD-Copperhead system well underway, trainees have surfaced questions concerning this "lase phase" of their training program. What training devices are available to support these systems? How and where does a unit train with existing items to achieve maximum proficiency? Who receives this training? The answers to these questions form the basis of this presentation.

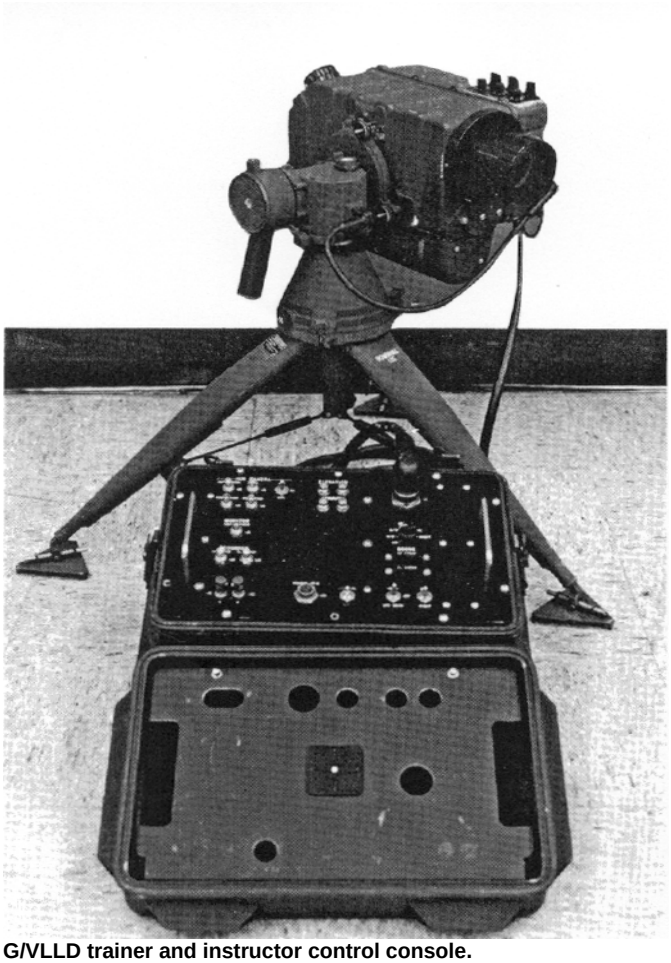
Training devices

Since each Copperhead projectile costs over $70,000 it is not efficient to use the projectile in unit training. Additionally, since the bulk of the cost of the projectile is its complex electronic guidance system, there is no cost advantage in producing an inert Copperhead projectile. Another training problem is that safety precautions must be taken when training with the G/VLLD due to the laser hazards involved. The G/VLLD is the most powerful laser ever fielded by the Army. The laser beam is invisible and, under certain conditions, could cause eye damage as far as 24 miles away.

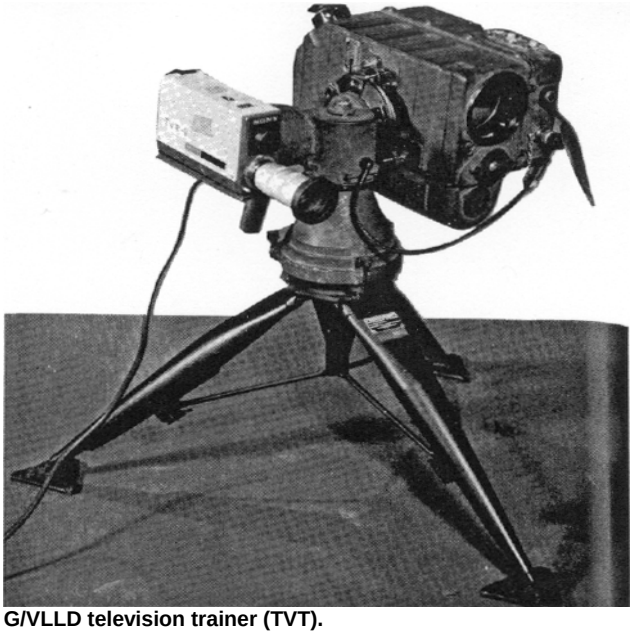
The training aids and devices for the G/VLLD-Copperhead system offer realistic alternatives for training personnel on the system at different organizational levels. No single training device completely solves all training problems; by using the entire array of available devices, however, field artillery personnel can achieve and maintain system proficiency.

Operator target tracking is by far the most difficult task in the overall G/VLLD training program. There are a number of training devices, aids, and programs already in existence or under consideration as remedies for the target tracking problem. The G/VLLD trainer set is used to objectively evaluate the target-tracking skills of G/VLLD operators. It is primarily a diagnostic tool for semiannual target tracking qualification and testing of operators in division artilleries, separate field artillery brigades, and separate field artillery cannon units (basis of issue is one per division artillery or separate field artillery brigade). It also is useful for initial G/VLLD training for personnel attending courses at the Field Artillery School.

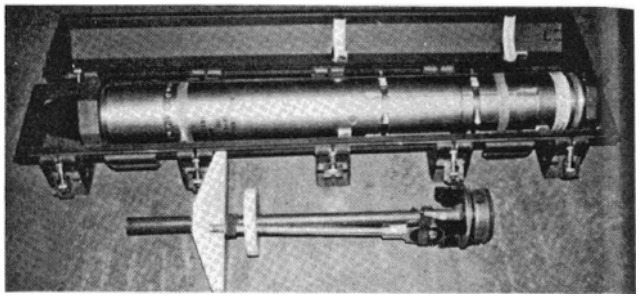
The principal components of the G/VLLD trainer set are the G/VLLD trainer and the instructor control console. The G/VLLD trainer, which looks and handles in a manner similar to the tactical G/VLLD but contains a Maverick TV tracking camera instead of laser producing components, is interconnected with an instructor control console which displays a numerical tracking error score. The control console tests the tracking skills of the G/VLLD operator by determining and digitally displaying the instantaneous



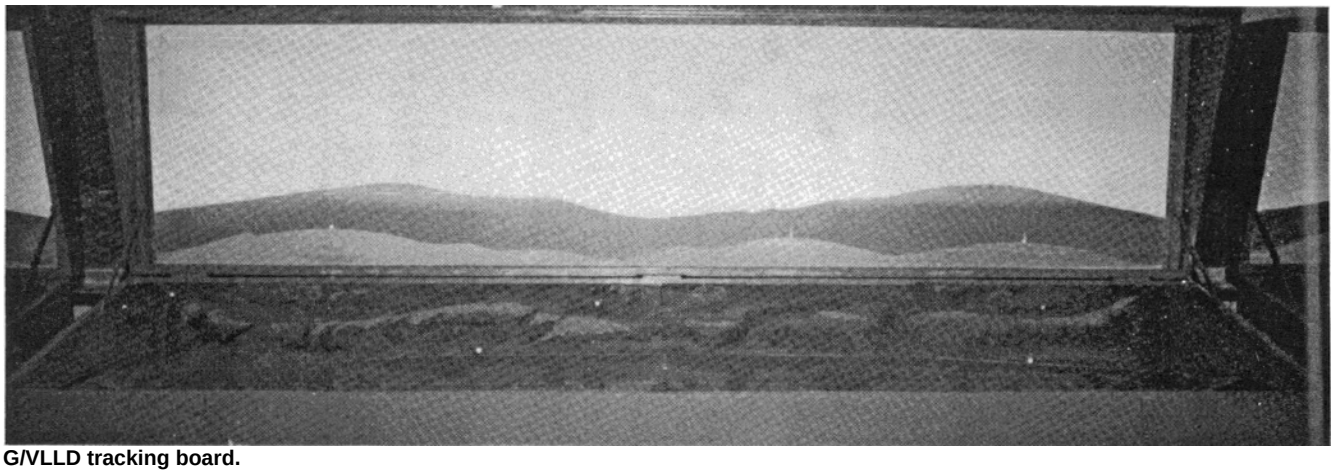
G/VLLD trainer and instructor control console.



G/VLLD television trainer (TVT).



Copperhead 155-mm training projectile M823.



G/VLLD tracking board.

angular error between the operator's line-of-sight and the target. Hence, an instructor or trainer has immediate access to an operator's standard deviation score in azimuth and elevation.

The G/VLLD trainer set is normally used in conjunction with the G/VLLD tracking board. The tracking board is a ¾-inch plywood container which opens lengthwise to display a terrain board and panorama simulating a Copperhead target area. There are several moving targets which follow a fixed grooved track and are powered by a small chain which is driven by a rheostat-controlled motor. There are a variety of moving target speeds. A ½-inch white target square with a 1-mm centered black circle inside the square is attached to each target for tracking with the G/VLLD trainer set. By activating the appropriate switches on the tracking board control box, the tracking board operator can select one of 14 possible target scenarios. The fielding plan and basis of issue for the G/VLLD tracking board is identical to that of the G/VLLD trainer set. If the G/VLLD tracking board is not available, a 20-inch white square with a 1 ¼-inch black circle centered inside it or a 10-inch white square with a centered ¾-inch black circle may be mounted on the side of a moving vehicle located at a distance of 500 and 250 meters, respectively.

The G/VLLD television trainer (TVT) camera, camera mounting bracket, TV monitor, and vinyl crosshair permit target tracking training with the tactical G/VLLD at battalion level. The TVT camera mounting bracket, which fits on the G/VLLD nightsight adapter bracket, attaches the TVT camera to the tactical G/VLLD. The vinyl crosshair is inserted behind the lens of the TVT camera, which is boresighted by centering the crosshairs of the G/VLLD on the target to be tracked and then adjusting the TV camera until the crosshair displayed on the TV monitor is superimposed on the same target. When the TVT camera is boresighted with the G/VLLD, the supervisor receives immediate feedback during the operator G/VLLD target tracking. By using a video cassette recorder, the instructor can record an operator's tracking session and play it back then or at a later date for a critique session. These training aids offer a realistic exercise of the most critical skill — target tracking — in the operation of the tactical G/VLLD.

The TVT cameras used with the G/VLLD are available from training and audiovisual support centers and currently are Sony and JVC models. An additional benefit of the camera is that it has a zoom lens capability for effectively viewing targets for tracking out to 1,000 meters.

When it becomes available, the vidicon, silicon TV camera system will significantly enhance target tracking training with the tactical G/VLLD (basis of issue is two cameras for each major installation which has laser ranges that serve units with the G/VLLD-Copperhead system). This system will allow both the supervisor and the G/VLLD operator to see where the laser spot hit the target. The vidicon, silicon TV camera system includes a TVT camera with video viewfinder fitted with a vidicon, silicon diode; 200-mm telephoto lens; laser line interface filter; camera tripod; portable TV monitor (7- to 9-inch screen); and a video player/recorder. This system will require the establishment of a camera station, a target vehicle station, and a G/VLLD operator station.

The camera station, operated from the covered cargo bed of a unit wheeled vehicle which is situated 200 to 300 meters from the center of the path of the target vehicle, requires a camera operator and a station supervisor to operate the camera and accompanying video player/recorder and portable TV monitor. A generator is necessary to power the video equipment, and an FM radio is required for communication between the G/VLLD operator station and the target vehicle station. The camera operator films the target vehicle at the same time that the G/VLLD operator tracks and lases it. The G/VLLD operator station supervisor tells the camera operator when to start and stop filming and insures that the operator keeps the target vehicle within the center of the picture by viewing the portable TV monitor. In addition, he records the name of the G/VLLD operator lasing the target vehicle and provides initial feedback on the operator's tracking performance to the G/VLLD operator station over the FM radio.

The G/VLLD operator station consists of one supervisor and a group of G/VLLD operators, is equipped with a tactical G/VLLD and FM radio, and should be located on high ground 2,500 to 3,000 meters from the target vehicle path. Other G/VLLDs may be located at the G/VLLD operator station to allow several operators to practice tracking at the same time; however, only one G/VLLD should lase the target vehicle at any one time. When actual lasing is being conducted, the G/VLLD operator station acts as the controlling station. The station supervisor tells the target vehicle station when and at what speed to move and tells the camera station which G/VLLD operator is lasing and when to start and stop filming.

The target vehicle station, which is manned by a station supervisor and a vehicle driver, should be a tracked vehicle (M113 personnel carrier, M577 command post vehicle, M60 tank, etc.) equipped with an FM radio and intercom system (a wheeled vehicle may be used if it is equipped with an FM radio). All personnel operating downrange from the G/VLLD must wear laser safety goggles, and reflective surfaces associated with the camera station or target vehicle station must be removed or covered with nonreflective materials.

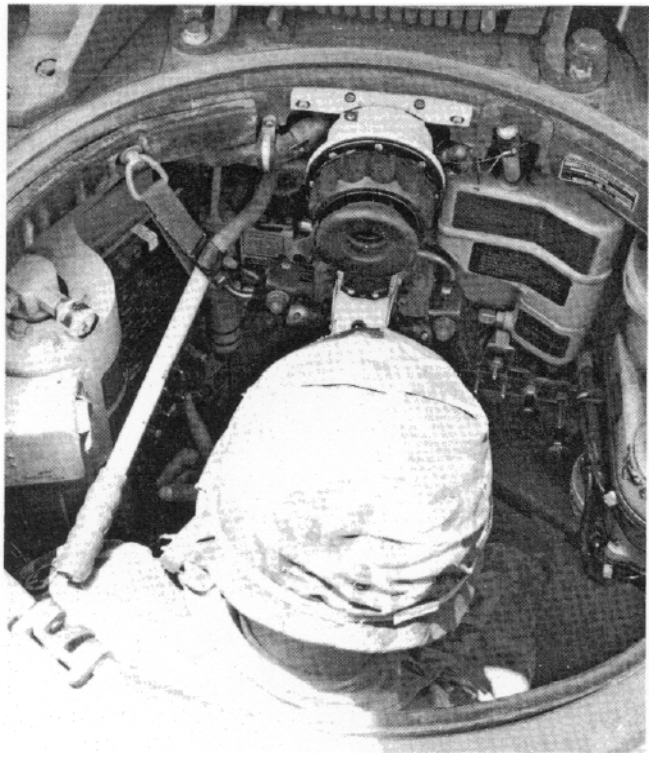
Another training aid used with the G/VLLD system is the G/VLLD attenuator filter assembly, which reduces the intensity of the laser energy emitted by the G/VLLD. This device allows the G/VLLD to be used in the rangefinding mode on ranges where the allowable eye hazard distance has been limited by Army Regulation 385-63 or where the ranges are very small. The attenuator filter, made of clear glass with a plastic frame attached to the filter in a laser mode switch adapter, is issued as a part of the laser training kit for the tactical G/VLLD. When the attenuator filter is inserted in front of the lens of the tactical G/VLLD, the eye hazard distance in rangefinding is reduced from 8 kilometers to 2.4 kilometers. The laser mode switch adapter prevents the operator from operating the G/VLLD in the designate mode, which would cause the attenuator filter to burn up.

Another training device is the Copperhead 155-mm training projectile M823, which is a reusable inert round designed to train 155-mm howitzer crews in preparing a Copperhead round for firing, to include unpacking, repacking, inspecting, setting the required time and codes, and ramming and extracting the tactical projectile. The training projectile simulates the M712 Copperhead in weight, in center of gravity, and in all aspects of external appearance except for color. Even though the M823 Copperhead training projectile was not designed for firing, it can be repeatedly rammed into the howitzer tube and extracted using the Copperhead round extractor.

The Copperhead M823 training projectile simulates the M712 in all artillery unit activities except that propellant charges or other hazardous materials are not used in training exercises with this item. The M823 consists of the M712 projectile ogive, the M712 closure plug modified for easy removal and reassembly in connection with obturator replacement, and the plastic M712-type obturator. Besides these actual components, the training projectile has a one-piece body assembly with five M712-type code and time switches mounted in a bracket located in the forward bourrelet. Its appearance also simulates the recessed fins and wings of the M712 projectile. Both the tactical and training rounds use the same clamshell container. Since few full-service Copperhead rounds will be authorized to a unit for training, each 155-mm firing battery will receive one M823 Copperhead training projectile to provide ample crew training.

Currently, four additional training device projects are underway to further enhance sustainment training with the G/VLLD-Copperhead system:

- ***FISTV:*** The G/VLLD trainer is being modified under a product improvement proposal to enable its use in the hammerhead of the fire support team vehicle (FISTV). Used in conjunction with the G/VLLD tracking board (emplaced on an elevation platform) and the instructor control console, this modification will allow training and evaluation of G/VLLD operator tracking skills on the FISTV.
- ***TSFO:*** The second G/VLLD-Copperhead system training device project underway is the program enhancement



"The G/VLLD is the most powerful laser ever fielded by the Army."

of the training set, fire observation (TSFO). The TSFO trains forward observers in the adjustment of artillery and mortar fire on stationary and moving targets; and, with this program enhancement, forward observers will be able to train realistically for Copperhead fire missions. Using the existing G/VLLD trainer or a similar device and a computer software program for the TSFO, the forward observer will be able to range and designate targets for engagement with Copperhead. Using the instructor's TSFO computer control console, the instructor will enter all applicable mission data, to include observation and cloud height. Upon completion of a Copperhead fire mission, the instructor will be able to play back the fire mission for a critique. At any point during the fire mission, the instructor will be able to project the Copperhead footprint on the screen to aid students in the formulation of the call for fire and in target engagement. This TSFO program enhancement enables a unit to exploit more fully the entire closed-loop training concept.

Photos by Jill Ponto

• ***MILES:*** Laser safety requirements and the cost of the Copperhead projectile prohibit routine use of the actual system in combined arms training. But with the integration of G/VLLD into the multiple integrated laser engagement system (MILES), the FIST team will be able to designate armor or other targets for the Copperhead round and obtain realistic feedback on the effects ("near miss" or "kill"). G/VLLD-MILES training begins with the FIST using the digital message device (DMD) to send the Copperhead fire mission request to the appropriate battery or battalion FDC. The FDC processes the FIST's request, computes firing data, and relays this information to the howitzer section(s) selected to fire the mission. the FDC digitally notifies the FIST when the round is fired; and, at the appropriate time based on time-of-flight (approximately 20 seconds to impact), the FIST DMD automatically illuminates the green fire command (designate) light in the G/VLLD-MILES eyepiece. At this time (13 seconds prior to impact), the FIST lases and continues to track the target at ranges of 3,000 to 5,000 meters depending on light conditions. If the target is successfully acquired and tracked, it presents the appropriate MILES "near miss" or "kill" signature. The G/VLLD-MILES allows maneuver commanders to integrate the use of G/VLLD-Copperhead into combined arms exercises and permits the FIST chief and armor or infantry commander to conduct essential training for the FIST and supported maneuver units.

• ***STAGS:*** The Simulated Tank Antiarmor Gunnery System (STAGS), developed by the Naval Training Equipment Center for the US Army and the US Marine Corps to provide training for a family of antiarmor and laser weapon systems, has already proved its success with the Dragon and TOW weapon systems. For the G/VLLD-Copperhead systems, STAGS will provide realistic firing scenarios to include sound, "kill" or "near miss" effects, and true sight pictures for either optical or thermal sights.

Training

Training for the G/VLLD-Copperhead system will be accomplished through a combination of three major training efforts: new equipment training, unit sustainment training, and institutional training.

• New equipment training. New equipment training for the G/VLLD-Copperhead system is conducted in three phases over a three-week period concurrent with unit fielding. These three phases are discussed in great detail in "G/VLLD-Copperhead New Equipment Training Team," which appeared in the November-December 1983 "View from the Blockhouse."

• Unit sustainment training. This training will involve the three elements of the gunnery team: FIST, FDC, and firing battery. To facilitate unit-level training, the unit has the available training devices and aids mentioned earlier. Unit training managers should make every effort to insure that G/VLLD-Copperhead system tasks are integrated into unit command post exercises, field training exercises, and other applicable facets of the unit training program. Firing battery training should focus on the preparation and handling of the Copperhead projectile and Copperhead fire mission procedures. Fire direction training should center around Copperhead firing data computations and mission processing. (No G/VLLD-Copperhead training devices have been developed for the FDC since the actual firing data computational materials can be used in both live and dry firing.) FIST training should emphasize the operation and employment of the G/VLLD and night sight, Copperhead mission processing, and moving target tracking. Of these major areas, moving target tracking will require the greatest amount of time. Experience has shown that proficiency in moving target tracking requires concentrated initial training and frequent refresher training.

Laser-safe ranges are needed to train G/VLLD operators. Unfortunately, areas where target ranging and laser designation may occur often are not available or practical for sustainment training with the tactical G/VLLD. For this reason the laser inhibit (shorting) plug was developed. Used with the G/VLLD, the yellow laser inhibit (shorting) plug allows target tracking and limited target location in environments where laser emission was previously prohibited by Army Regulation 385-63. The laser shorting plug, which is part of the laser training kit issued with the tactical G/VLLD, is mounted on the left side of the G/VLLD to prevent the emission of laser energy. Thus, the G/VLLD operator can track a target anywhere and simulate designation without the hazard of actually firing a laser in the rangefinding mode. Target direction and vertical angle are displayed in the eyepiece; and, since no target distance is determined, range is displayed as 9760.

The following procedures and preparations are recommended for use during the semiannual target tracking qualification and testing of G/VLLD operators using the G/VLLD trainer set and G/VLLD tracking board. The G/VLLD trainer is centered with respect to the front of the tracking board at a distance of 15 to 40 feet. Nominal distance is 200 inches, which represents 3,000 meters. The close-up lens is attached to the G/VLLD trainer optics, and the operator brings the reticle into focus by adjusting the eyepiece focusing ring (a piece of paper is placed in front of the objective lens to aid in this process). The close-up lens is then adjusted to bring the target into focus. The operator moves his head while observing the target through the eyepiece to detect any apparent target motion which indicates the presence of parallax. The operator then readjusts the close-up lens to eliminate the parallax. Each operator on the G/VLLD trainer readjusts the eyepiece to accommodate his visual acuity, but it is not necessary for him to readjust the close-up lens. Operational checks for the G/VLLD trainer set are then conducted in accordance with TM 9-6940-477-14.

Practice sessions should be conducted on two separate days prior to the qualification session. On each day the practice session is conducted, the G/VLLD operator completes 18 practice runs for each tracking board movement scenario with a five-minute rest after each group of six runs. The instructor/supervisor selects the movement scenario to be tracked on the training board and tells the G/VLLD operator when to begin and when to stop tracking. Each tracking run lasts 20 seconds; and, at the end of each tracking run, the instructor/supervisor records the mean and standard deviation scores as read off the instructor control console.

The qualification session should be conducted on a separate day from the practice sessions. During this session, the G/VLLD operator completes 10 qualification runs for each movement scenario; and the instructor calculates the average mean and standard deviation score for the 10 runs. The average standard deviation score constitutes the operator's score for that movement scenario. Qualification scores for the 5-and 10-mile-per-hour (mph) constant speed (right to left and left to right) scenarios are 0.125 and 0.150 microradians or less in standard deviation for azimuth and elevation, respectively. (Qualification scores for the 15-mph constant speed and the four variable speed scenarios are being validated by the Field Artillery School and will be published in the near future. Until these qualification scores are validated and published, tracking qualification will be used on the scores for the 5- and 10-mph constant speed scenarios only.)

Mean azimuth data indicates a tendency of the operator to track forward (plus values) or behind (minus values) the center of the black circle within the white targeting square. Mean elevation data indicates a tendency of the operator to track high (plus values) or low (minus values) of the centered black circle within the white square. Values of zero normally indicate an even depression of tracking errors.

Tracking data of the G/VLLD operators should be recorded on a tracking data sheet produced locally by the unit (suggested formats for the practice and qualification sessions are shown in figures 1 and 2). These records should be kept on an individual until the next semiannual target tracking qualification is completed.

After the training exercise, the video cassette tapes can be taken to a classroom equipped with a TV monitor and video cassette player and be played back to the G/VLLD operators and their supervisors.

As proficiency is gained by the individual elements of the gunnery team, the entire team should train together as often as possible since timing is critical for a successful Copperhead mission. The requisite communications should be exercised frequently to insure that the timing requirements can be met. In addition, command and control responsibilities associated with employment of Copperhead should be exercised whenever possible.

G/VLLD OPERATOR TRACKING DATA SHEET PRACTICE SESSION

NAME/RANK _____ UNIT _____ DATE _____

SCENARIO																
RUN	MEAN		STD DEV		MEAN		STD DEV		MEAN		STD DEV		MEAN		STD DEV	
	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL
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Figure 1. G/VLLD operator tracking data sheet — practice session.

G/VLLD OPERATOR TRACKING DATA SHEET QUALIFICATION SESSION

NAME/RANK _____ UNIT _____ DATE _____

SCENARIO																
RUN	MEAN		STD DEV		MEAN		STD DEV		MEAN		STD DEV		MEAN		STD DEV	
	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL	AZ	EL
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Figure 2. G/VLLD operator tracking data sheet — qualification session.

Training standards for G/VLLD-Copperhead specific tasks appear in the revised 13F soldier's manual and in the new ARTEP manuals 6-100 and 6-400. A revised 13C soldier's manual which will include G/VLLD-Copperhead tasks will soon be in distribution. The initial SQT test period under the revised soldier's manuals should commence by the end of FY84.

• Institutional training. This training for the G/VLLD-Copperhead system will include operator and maintenance training. The Ordnance Center and School will conduct the G/VLLD maintenance training above operator level. Proponency for G/VLLD operator training and all training related to Copperhead employment belongs to the Field Artillery School.

The Ordnance Center and School resident instruction for the G/VLLD-Copperhead system will be covered in the MOS 45G initial entry training and will include G/VLLD tactical system description, introduction to the ground support equipment, laser designator rangefinder function description and maintenance, fault locator, and cable maintenance.

The Field Artillery School resident instruction will integrate G/VLLD-Copperhead system training into the Field Artillery Officer Advanced Course, Field Artillery Officer Basic Course, Field Artillery Advanced Noncommissioned Officer Course, and MOS 13B initial entry training programs of instruction. These courses will incorporate topic areas such as the introduction to G/VLLD-Copperhead, G/VLLD-Copperhead observed fire procedures, employment considerations, FDC procedures, G/VLLD operations and maintenance, handling and preparation of the Copperhead projectile, and integrated training.

By using the training devices and aids available for the G/VLLD-Copperhead system in conjunction with the tactical hardware, a unit with a solid training program will not only become proficient in all the related facets of the system, but will also be able to sustain this proficiency in training and in combat.

Captain Timothy M. Knigge, FA, received his commission through the ROTC at the University of Tennessee at Chattanooga. He has been a Lance maintenance and assembly platoon leader and an executive officer of the 69th Field Artillery Detachment. Prior to his present assignment as assistant S3 of the 6th Battalion, 33d Field Artillery, he was the Field Artillery School's project officer for G/VLLD, FISTV, Pershing II, and thermal night sight training devices.

View from the Blockhouse

FROM THE SCHOOL

Journal notes

It is always a pleasure to see *Journal* contributors rewarded for their efforts. Lieutenant Colonel Juergen Nolte, the commander of the 5-41st FA, recently received the FORSCOM Fourth Estate Award for Excellence in Military Journalism for his "Right by Piece" submission entitled "Field Artillery at the Armor Center," which appeared in the March-April 1983 *Journal*.

Many prospective authors visit, call, or write the *Journal* office to check on editorial policies and seek guidance on manuscript preparation. The *Journal* staff produces an "Author's Guide" which is a good starting point for these discussions with the editor. It highlights, for example, the importance of authorial creativity in the areas of original photography and sketches which supplement the written text and portray the message visually. The "Author's Guide" is available upon request and can save author's a good deal of time by focusing their efforts.

Operation of the gun display unit

Recent comments from the field indicate that some units are experiencing an operational problem with the gun display unit (GDU), a component of the battery computer system (BCS). The problem occurs with self-propelled howitzers and is related to the vehicular power for the electrical system. When the 5-horsepower electrical motor is started, it sometimes causes all segments of the section chief's assembly display to be illuminated, which produces a wagon wheel effect and causes a loss of firing data. When this loss occurs, the chief of section must insure that the power is recycled on the gun display unit, that the gun number is reestablished on the section chief's assembly, and that the firing data is retransmitted from the battery computer unit.

The chief of section can minimize the impact of this problem by insuring that the fire commands have been announced *prior* to operating the loader rammer, since this operation could start the 5-horsepower electrical motor which, in turn, would pressurize the hydraulic system. This problem may also occur when the vehicle is started or when the master switch for the cab is turned on.

A team from Norden Systems, Inc., the battery computer system contractor, is currently investigating the problem. In the meantime the problem may be avoided by:

• Operating solely on internal gun display unit batteries.

• Wiring the gun display unit directly from the vehicle battery (using wire WD-1 and leaving enough slack to allow the turret to rotate).

The performance of the gun display unit can be improved by:

• Having an operational lithium battery in the gun display unit at all times.

• Changing batteries every five to seven days, depending on the intensity of firing and use of vehicular power.

• Connecting the AN/GRA-39 or TA-312 to a separate wire line between the fire direction center and the howitzer if voice communications are required.

• Connecting a headset to the section chief's assembly when voice communications are required and a second wire line has not been laid.

• Insuring that the wire line from the MX-155 goes directly to the gun display unit and is not attached to the binding posts on the rear of the howitzer.

If the gun display unit becomes inoperative, turn it in for repair. If communication cannot be established with the gun display unit in the NORMAL position, try communicating with the gun display unit in the BITE position which, if successful, will allow operation of the gun display unit until it can be turned in for repair.

Standardization update

Australia hosted the twelfth meeting of the Quadripartite ABCA (America, Britian, Canada, and Australia) Working Group on surface-to-surface artillery at the Royal School of Artillery in Sydney, Australia, from 5 to 11 October 1983. The agenda was an ambitious and challenging one which included discussions of the following working papers:

• Training implications as a result of introducing improved conventional munitions and precision guided munitions. (The United Kingdom led this discussion.)

The tactical employment of scatterable mines. (The United Kingdom was also the leader for this discussion.)

The implications of introducing surface-to-surface artillery advanced programs on to the battlefield. (The United Kingdom led this discussion too.)

• Artillery data processing and software management. (The United States led this discussion.)

• Use of training devices, simulators, and training munitions for surface-to-surface artillery. (The United States also led this discussion; and this working paper has been developed into a quadripartite advisory publication — QAP-20, "Training Devices.")

• Attack of armor by indirect fire. (The United Kingdom led this discussion.)

In addition to these discussions, here are other events which took place:

• QAP-26, an adaptation of a NATO document that identifies ammunition interchangeability, was introduced by the United States.

• Twenty-four current Quadripartite Standardization Agreements (QSTAGs) and ten proposed QSTAGs were discussed for possible acceptance.

• National research and development projects were reviewed to determine areas for further possible cooperative or collaborative action.

• Three new QSTAGs were announced as having been initiated since the last meeting. They were QSTAG 726 (The 155-mm Gun L118/L119 and Its Associated Ammunition and Fire Control Equipment), QSTAG 727 (The 155-mm Howitzer M198), and QSTAG 728 (Interoperability of Artillery ADP Systems). QSTAG 728 is to replace STANAG 4130 which is in the process of being redesignated as STANAG 5620.

The United States point of contact for the Quadripartite Working Groups and the NATO Working Party is Mr. B. M. Berkowick, the Field Artillery School's international standardization coordinator (NATO/ABCA), whose AUTOVON number is 639-2900.

M109 for the 1990s

Following a one-year study involving 35 government agencies and 15 civilian contractors, the Division Support Weapon System Special Study Group has concluded that modification of the venerable M109 self-propelled 155-mm howitzer is the best approach to meet artillery mission requirements in the 1990s.

The Fort Sill-based Special Study Group was chartered by the Training and Doctrine Command to determine whether to develop a new direct support weapon system, adopt a foreign system, or improve the M109. The Group discovered that both the new system and foreign candidate options cost considerably more than the option of improving the M109 and achieved only marginal projected improvements in performance. The Group's evaluation also produced the recommendation (strongly endorsed by Department of the Army officials) that advanced technologies be carefully fostered for field artillery application. The Special Study Group cited developmental programs in robotics, liquid propellant, and electromagnetic propulsion as promising technologies for the year 2000 and beyond.

The M109 variant recommended for advanced development is expected to be designated the M109E5 — it is a follow-on to the ongoing Howitzer Extended Life Program, which will field the M109E4 later this decade. The M109E5 will incorporate survivability enhancements designed primarily to permit combat operations in a semi-autonomous mode, thus reducing vulnerability to enemy counterfire. It will also have advanced position and azimuth determining equipment with an on-board fire control system and upgraded communications. Individual howitzers are positioned in a one-square-kilometer area; and within that zone of operation, automatic gun laying, improved day/night vision capabilities, improved secondary armament, and data interface with the battery operations center will permit the section chief to move randomly in response to counterfire or at predetermined time/mission intervals to thwart detection and destruction by the enemy. Improved nuclear, biological, and chemical protection and on-board fire suppression systems are priority modifications.

A mechanical-assist loader will permit a rate of fire of six rounds per minute through an improved cannon that will be the ballistic twin of the M199 cannon used on the M198 155-mm towed howitzer. Completing the main armament package are a new recoil mechanism, mount, and hydraulic system which will make the M109E5 more reliable, available, and maintainable and will increase the rocket-assisted-projectile range of the weapon to 30 kilometers. These changes will enhance operational capability in a battlefield environment requiring significantly greater volumes of fire than those for which the M109 was originally designed. Other enhancements will address crew fatigue and heat stress, potentially reducing overall manpower requirements.

The proposal for the howitzer improvement program will be considered by the Army staff early this year, and initial operational capability for the M109E5 is projected for 1991. (Major Jeff Boucher)

TACFIRE tips: interface with Firefinder

TACFIRE/Firefinder communication and software initialization requires some additional explanation.

At TACFIRE, the Firefinder is entered in the subscriber table with a device type "T," since the radar uses a digital message device (DMD) emulator.

At Firefinder, the Firefinder requires the specific initialization information which is shown below and which also appears in the Firefinder technical manual. The right column contains recommended initial settings which are based on interface exercises between the two systems. This information would normally be provided in standing operating procedures and is just a starting point.

• **Sender ID, 0-9 or A to Z**	**CEOI**
• **Keying block length, 0-9**	**Radio-3 (1.7 sec) Wire-1 (0.7 sec)**
• **Maximum wait time for ACK or NAK: 2 to 17 seconds**	**6**
• **Clear net delay, 0-9**	**0 (0.5 sec)**
• **Clear net threshold — audio (wire), 0-15**	**0**
• **Clear net threshold — radio, 0-15**	**0**
• **Destination address, 0-9 or A to Z**	**CEOI**
• **Signal attenuation, 0-9**	**0**
• **Secure/unsecure indicator, 0 (secure) or 1 (unsecure)**	**1**
• **Grid zone, 0 (standard) or 1 (east of std)**	**Always 0**
• **Transmission index, 0-9999**	**1 (Q field in SBT)**
• **Reception index, 0-9999**	**1 (Q field in SBT)**

Operators should experiment with these values until efficient communications can be established.

MLRS personnel management

The development of the Multiple Launch Rocket System (MLRS) progressed at a pace so rapid that it resulted in a rather unique personnel management problem: a new military occupational specialty (MOS) had to be created for personnel manning the new equipment. Thus, MOS 13M (MLRS crewmember) was developed to train new acquisitions in skill level 1 and 2 (E1 through E5) MLRS tasks. Additionally, Lance noncommissioned officers (NCOs) were chosen for cross-training in the two systems to alleviate the grade imbalances that would be created by the new system and provide the supervision necessary for its fielding. MOS 15D (Lance crewmember/MLRS sergeant) noncommissioned officers have had to fill the skill level 3 and 4 (E6 and E7) positions for both Lance and MLRS. Similarly, MOS 15J (MLRS Lance operations/fire direction specialist) personnel have received cross-training in all skill levels on both the Lance and MLRS fire direction systems.

Although this program has created some difficult decisions on the part of personnel managers, it has created many advantages for personnel with the involved MOSs. In general, MOS 15D and 15J soldiers will be cross-trained in MLRS/Lance tasks and thus will have an increased variety of assignments, both in the Continental United States (CONUS) and Outside Continental United States (OCONUS).

The MLRS will be fielded in 14 divisional batteries and four corps nondivisional battalions over the period from fiscal year 1983 to fiscal year 1988. When the MLRS is fully fielded, the typical personnel authorization of MOS 15Ds, 15Js, and 13Ms per battery will be as follows:

Grade	E7	E6	E6	E5	E5	E4	E4	E3	E3
MOS	15D	15D	15J	13M	15J	13M	15J	13M	15J
Authorized	4	12	1	15	1	24	4	22	5

Initially, the 15 skill level 2 15Ds will be required to fill the 15 skill level 2 13M personnel slots until such time as 13M personnel are fully trained. Once the MOS 13M soldier has reached skill level 3 (E6), his specialty is changed to 15D; the skill level 3 or 4 (E6 or E7) 15D is trained to perform both MLRS and Lance duties as required. Reclassification of personnel to MOS 13M and 15D will be coordinated by the MILPERCEN Enlisted Personnel Management Directorate. The approximate MLRS personnel requirement for all 15D, 15J, and 13M personnel through 1988 is:

MOS	15D40	15D30	15D10	15J40	15J30	15J20	15J10	13M20	13M10
Grade	E7	E6	E3	E7	E6	E5	E4/E3	E5	E4/E3
Total	104	312	12	4	30	34	242	390	1000

Training concepts

Permanent unit location determines the training concept for personnel transitioning to MLRS — i.e., MOSs 15D, 15J, and 13M.

MOS 15Ds and MOS 15Js being assigned to CONUS MLRS units from Lance units can expect to report on temporary duty (TDY) to Fort Sill for individual training en route to CONUS installations. CONUS batteries will conduct unit training at permanent CONUS locations. The training projected for these CONUS personnel will last approximately 19 weeks. A typical training concept for transition to MLRS for personnel assigned to CONUS units is:

Activity	Duration in weeks
In-process at the US Army Field Artillery School	1
Individual training at Fort Sill/out-process	7
Conduct unit training at CONUS installation	9
Battery organized at CONUS installation	2

MOSs 15D and 15J personnel transitioning to MLRS and en route to OCONUS assignments will report to Fort Sill no later than one week prior to the first week of individual training. OCONUS units are formed at Fort Sill as table of distribution and allowance augmentations to the parent unit and are then transferred as a unit to the gaining theater upon completion of training. The Fort Sill training for these personnel will last approximately 21 weeks. The typical training concept for transition to MLRS for personnel assigned to OCONUS units is:

Activity	Duration in weeks
In-process US Army Field Artillery School/battery organized	1
Individual training	7
Assemble/issue training equipment	2
Unit training at Fort Sill	9
Maintain equipment	1
Out-process Fort Sill	1

Training programs

By October 1984, 15D, 15J, and 13M NCOs will attend the Basic Technical Course (BTC) on Lance or MLRS tasks, depending on the system to which the individual is transitioning.

- ***MOS 15D30/40*** personnel will attend the cadre course in preparation for the fielding of an MLRS unit. The course is designed to train these NCOs as supervisors of MLRS crewmembers. Those 15D30/40s replacing personnel in units already fielded with MLRS will attend additional cadre courses when needed. Course length will be approximately six weeks.

- ***MOS 15J*** personnel will attend the 15J transition course in preparation for the fielding of an MLRS battery. This course is designed to train

15J10/20/30/40 personnel in MLRS fire direction and operations. The 15J personnel must have previously graduated from the 15J10 Lance advanced individual training (AIT) course. After April 1984, the 15J AIT course will become a nine-week course including instruction on both the Lance and MLRS fire direction systems. This course will not include instruction on manual computations due to the increased speed and reliability of the fire direction systems in providing technical firing data.

• ***MOS 13M*** personnel will attend advanced individual training in preparation for the fielding of an MLRS battery. This course is designed to train 13M personnel in driver's training and system operation. The 13M course will consist of one station unit training, which means that the 13M will attend both basic training and advanced individual training at Fort Sill. Relacement 13M personnel will attend the MLRS replacement course. Driver's training in both courses is geared to train the 13M to operate the heavy expanded-mobility tactical truck (HEMTT) and the self-propelled loader/launcher (SPLL). An additional skill identifier (ASI) S8 course will train 10 percent of the 13M10 students newly graduated from advanced individual training on MLRS organizational maintenance. This course will also be given to certain personnel upon the completion of either advanced individual training or the replacement course.

Skill Qualification Tests

TRADOC has approved the tracking of MOS 15D Skill Qualification Tests (SQTs) toward the weapon system in which an individual is assigned; i.e., Lance personnel will not be tested on MLRS tasks and vice versa. The first MOS 15D soldier's manual that will include both Lance and MLRS tasks will be in the field by the second quarter of fiscal year 1984 and will support the tracked SQT available by December 1985.

The 15J SQT for fiscal year 1985 has been deleted entirely until more MLRSs are fielded. The next MOS 15J soldier's manual will be in the field by the second quarter of fiscal year 1985, and the new 15J SQT will appear in the second quarter of 1986 and will test a 15J soldier only on the applicable Lance or MLRS tasks.

Promotional programs

Personnel with MOS 15D, 15J, or 13M should realize that the promotion potential is good within their specialties. An exception to policy for MOS 13M skill level 1 soldiers in MLRS units will authorize accelerated promotions to alleviate grade imbalances. MOS 13M is part of the Army's Enlistment Bonus Program. The initial enlistment bonus was $3500.00 effective November 1983, but the dollar amount may be modified in accordance with recruiting results and Army needs. Effective 22 August 1983, MOS 13M was added to the Selective Reenlistment Bonus Program at level 2A (base pay x 2 x years in service). Lance MOS 15D personnel who have received the enlistment bonus or selective reenlistment bonus are authorized for assignment to MLRS units in MOSs 13M or 15D; these soldiers will not incur loss or repayment of the selective reenlistment bonus.

Update information

For updates on this information, individuals should contact their supporting military personnel office. Information on training can be obtained from the Field Artillery Proponency Office (AV 639-1266) or Weapons Department (AV 639-5704/3092) located on Fort Sill. (CPT John C. Pacey, Weapons Department)

Lawton-Fort Sill history

Field artillerymen the world over will soon have the opportunity to relive their experiences at Fort Sill and nearby Lawton with the publication of a detailed history of these longtime neighbors. Written by Steve Wilson, Director of Lawton's Museum of the Great Plains, *Lawton-Fort Sill: A Pictorial History* will be available in the spring of 1984. It is filled with nearly 300 photos which trace the evolution of both Fort Sill and Lawton. The Lawton Chamber of Commerce (P.O. Box 1376, Lawton, OK 73502) is offering the 1,500 copies at $25.00 each.

PADS procurement update

The initial fielding of the position and azimuth determining system (the 99 units committed under the fiscal year 1979 to fiscal year 1981 contract) has been concluded in CONUS and US Army Europe. The second contract for fiscal years 1982 to 1984 calls for 182 systems and was signed on 5 July 1983 — deliveries should begin in December 1984. The production rate will increase to 10 systems per month in March 1985, and production will be complete by October 1986. The production rate includes an additional 40 systems for the US Marine Corps for a total production of 222 systems. The latest contract will fulfill fielding requirements for all Active Army units (H-series TOE) and National Guard roundout units.

Skunkworks

The Field Artillery School, in conjunction with the US Army Field Artillery Board, has initiated an innovative new program which will identify and quickly resolve shortfalls and problem areas regarding equipment, doctrine, force design, and training. It is called BATTLEKING (nicknamed "Skunkworks"), and it is designed to streamline the process for applying quick fixes and product improvements to existing systems, as well as to experiment locally with latest state-of-the-art technology for the systems of the future. The Chief of Field Artillery has already sent out the word through Field Artillery command channels, and the response has been great. The "Skunkworks" crew is already working on more than 20 proposals. If *you* have an idea about a "better way," write to President, US Army Field Artillery Board, ATTN: ATZR-BDW (BATTLEKING), Fort Sill, Oklahoma 73505. Watch for a full-length article on project "BATTLEKING," as well as periodic updates on the program, in future issues of your *Journal*.

M110A2 headlink

The authority to order the 8-inch howitzer M110A2 loader/rammer headlink as a complete item has been withdrawn by the US Army Armament, Munitions, and Chemical Command. Units requiring replacement items will be required to order by component parts as listed on pages 174 and 175 of TM 9-2350-304-34P2. This information updates the "View from the Blockhouse" feature which appeared in the May-June 1983 *Journal*.

MOSs 45D and 13BU6

Some misunderstandings concerning the turret/artillery mechanic military occupational specialties (MOSs) 45D and 13BU6 still seem to exist. Here are some facts which unit modified tables of organization and equipment (MTOEs) should reflect:

• ***MOS 45D.*** The MOS 45D soldier, commonly called a turret mechanic, performs organizational maintenance on carriage-mounted armament and associated fire control and related systems on all self-propelled field artillery weapon systems. MOS 45D is in the system mechanic 63 career field; and career progression moves from 45D in skill levels 1 and 2 to 13D at skill levels 3, 4, and 5. The MOS 45D soldier should be cross-trained with MOS 63D, not with the MOS 13B. MOS 45D did replace the MOS 13BU6 in self-propelled units; but the duty position should be in battery maintenance, *not* in the firing battery headquarters (the 13BU6 location). The MOS 45D training course, which is conducted at Fort Sill and is five weeks in length, graduates approximately 250 soldiers each year. Major areas of instruction in this course include electrical troubleshooting (M109/M110), purging of fire control, slip ring maintenance (M109 series), sight mount synchronization (M109 series), use of vehicle technical manuals, equilibrator filling (M110 series), hydraulic systems (M109/M110), and wiring harness repair (M109/M110).

• ***MOS 13BU6:*** Historically, MOS 13BU6 included field artillery mechanics for all weapons. At this time, however, the MOS 13BU6 soldier is only trained to maintain the M198 howitzer; and so the MOS should appear only in the MTOE for the M198 firing battery and M198 battalion maintenance. Personnel should be slotted in the firing battery headquarters and work under the chief of firing battery or the battery executive officer. MTOEs for M101A1, M102, and M114A1 units should not carry the 13BU6 MOS. The two-week training course for MOS 13BU6 is also conducted at Fort Sill. The major areas of instruction include use of the -20 manual for the M198, maintenance of wheel assemblies (including wheel bearings), maintenance of brake assemblies, maintenance of equilibrators, the purging of fire control equipment, adjustment of M17/M18 range quadrants, and the conduct of services.

Unit reinforcement training for both MOSs is available upon request to the Field Artillery School, and letters sent by the School to division artillery and field artillery brigade headquarters contain appropriate coordinating instructions.

Soldiers with MOS 45D or 13BU6 are valuable assets in each unit's maintenance program. They should continually monitor turret performance during firing, should inspect during the conduct of quarterly and annual services, and should be active in the "check it out" preventive maintenance program to correct little problems before major problems come up. Questions or comments concerning both MOSs should be referred to:

Commandant
US Army Field Artillery School
ATTN: ATSF-WCL
Fort Sill, OK 73503
Telephone: AUTOVON 639-2323/2561

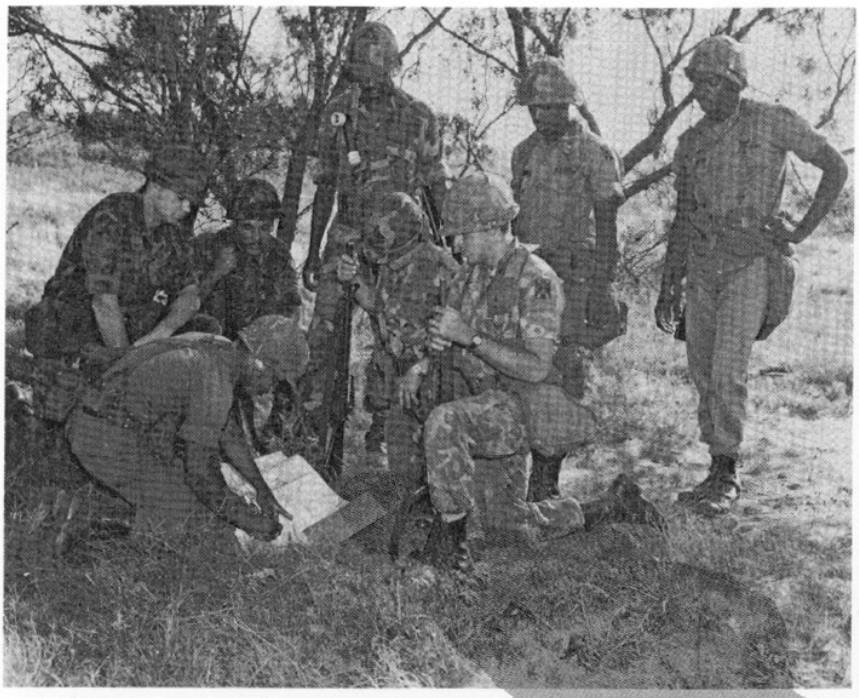
Field Artillery software update

During any period, there are two or three updated software versions of field artillery tactical data system tapes in concurrent development. Past "Field artillery software update" articles have presented the current status of TACFIRE master tape versions 5, 6, and 7. This article provides an update on the software for the cannon battery computer system (BCS). BCS cannon software tape versions are developed concurrently with the TACFIRE software tape versions to insure compatible functions and interoperability. Currently, BCS cannon software tape versions 5, 6, and 7 are in various stages of development. BCS tape version 5 will undergo the same test as the TACFIRE master tape version 5 (Operational test II, 28 Nov 1983 through 27 Jan 1984).

BCS tape version 5, which is scheduled for release in March 1985, will have the following changes:

- Processing of fire support team digital message device (FIST DMD) relay capability to BCS.
- Processing for preplanned family of scatterable mines (FASCAM) missions.
- Aligning software fire support mnemonics with current Army doctrine (FCA to RFA, NFL to CFL, FRLT to FLOT, FCL to RFL).
- Aligning BCS nuclear-related message formats with TACFIRE formats.
- Improving registration processing.
- Providing additional characters for use in the subscriber table.
- Correcting the Fischer Spheroid function that designates that map series.
- Correcting 15 priority problems received from the field.

Future updates will discuss the status of MLRS and LANCE software. Although this series of updates has referred to individual field artillery systems, the fact is that all field artillery tactical data systems are managed together and when discussed should be referred to as the Field Artillery Tactical Data Systems (FATDS) software package 5, 6, or 7. In all cases, the previous software tape version is the baseline or starting point for each succeeding version.



The Shadow Effect

by Captain R. Bruce Salisbury

One legacy of the Vietnam conflict still haunts today's Army. It continues to cast its darkness over what would otherwise be an exciting time for commissioned and noncommissioned officers alike. It is the shadow effect — the lack of responsibility which results from some senior leaders' oversupervision of their subordinates and creates an atmosphere of mistrust and discontent which ultimately breaks down authority. The problem is bigger than the Field Artillery alone; but, if field artillerymen understand it enough to take corrective measures, perhaps they can kill the Shadow Effect before it gets them killed in combat.

The seeds for the Shadow Effect were sown in the personnel management actions taken to support the Vietnam conflict. Officer Candidate Schools (OCSs) began to open up in greater numbers in order to begin filling the required positions. Officers were being pumped into the system by the hundreds. Where such quantity is desired, quality is often sacrificed. Some soldiers enrolled in OCS with only minimal aptitude qualifications and education. The Army was, therefore, receiving immature officers who lacked the experience and educational background to lead soldiers adequately. One analysis of this period concludes that,

> *In Vietnam the officer corps grew in inverse proportion to its decline in quality, defined by its ability to act as a cohesive force around which combat units could cluster. Further, as the number of officers proliferated, an expansion of the rank structure occurred so that second lieutenants often did sergeants' jobs while majors did captains' jobs and so on.*

In a similar vein, another analysis reports that,

> *In 1969 there were 407,951 officers of all ranks in the armed forces — a ratio of an officer for every eight servicemen. There were at least twice as many noncommissioned officers as officers on*

duty which means there was one officer or one NCO to supervise every two enlisted men. It is no wonder that NCOs are frustrated at being unable to exercise command. With so many officers as managers, supervisors, and commanders, there is little supervising left for the thousands of NCOs to do.

Even after the initial thrust of producing officers was over, the system did not slow down. It had to compensate for the large number of West Point graduates who were leaving the Army after their first hitch. Faced with diminished quality in large numbers of their officers, senior leaders began to oversupervise. The Shadow Effect was developing.

A similar story unfolds in the noncommissioned ranks. In order to fill noncommissioned officer positions created by the rapid expansion of the US Army during the Vietnam conflict, several actions took place. Promotions were accelerated, and schools were created to develop NCOs at a quicker pace. A soldier could make sergeant within 18 months and staff sergeant three years from the day he entered the Army. There were so-called shake-and-bake academies which produced sergeants within a short period of time. Raw recruits could make specialist four at the end of Advanced Individual Training just by being the top student in the class. At the NCO academies, graduates would make sergeant; and honor graduates would make staff sergeant. In almost all cases these junior leaders did not have experience in leading other soldiers and could not handle the common problems of their subordinates. Their supervisors often began oversupervising, and once again the Shadow Effect was getting a secure foothold in Army affairs.

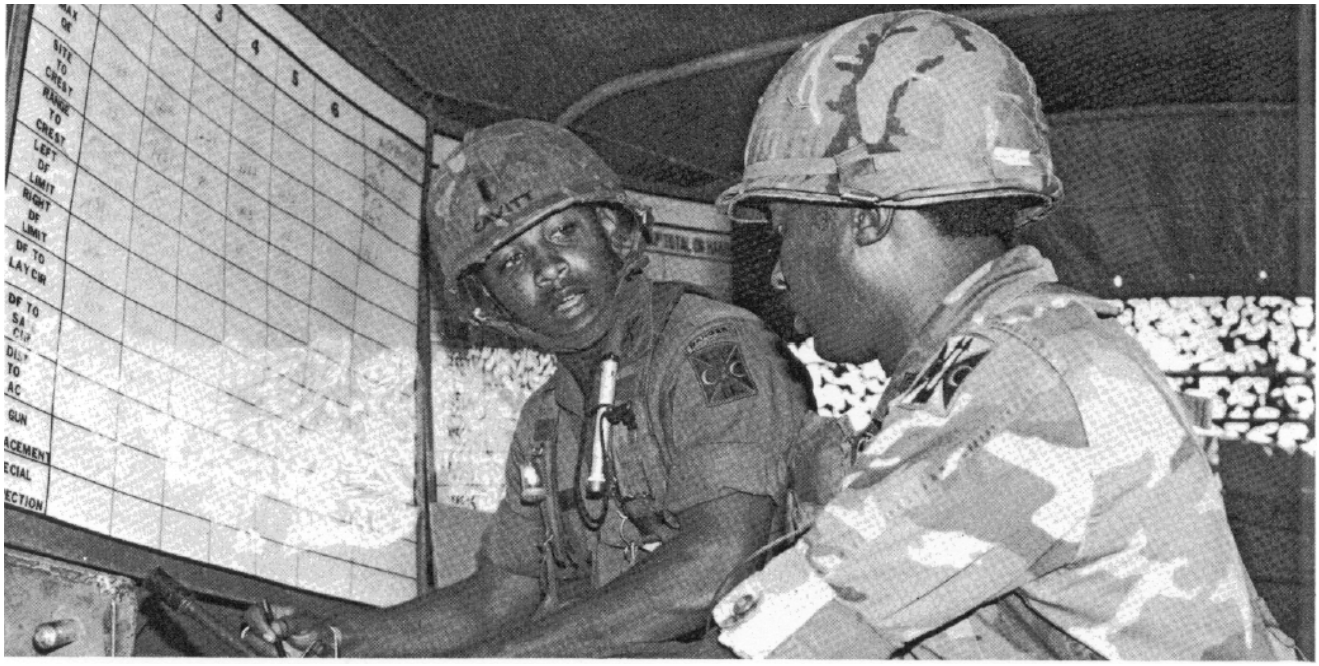
In addition to these personnel management actions, the Vietnam conflict saw a rotation system which prevented effective professional development. Soldiers rotated in and out of Vietnam on a 12-month rotation basis, and unit cohesion became nonexistent. As one analysis concludes, DEROS [date eligible for return from overseas] dates, plus the frequent rotation of officers, made it clear that the policy was virtually every man for himself. (This same situation was noted during World War II when units would fail in combat if they did not adequately make a soldier feel a part of the organization; also, the Israeli Army recently learned that unit cohesion was improved greatly by returning combat stress soldiers to their old unit.) Lack of unit cohesion meant little development of NCOs. They needed good supervision and an adequate length of time in grade to develop their skills, but they found inadequate amounts of both in Vietnam. As a further direct result of individual rotation, lessons learned were passed on ineffectively, if at all. A famous observation about the Vietnam conflict was that "the United States had not been in Vietnam for 10 years, but in for one year 10 times." Individual rotation was developed as a good management tool, but a turnover rate above 12 percent monthly and a unit strength averaging 85 percent made it next to impossible for NCOs to develop proper skills.

Taken together, the inexperience and decreased quality of the officer corps and the inexperience and inadequate development of NCOs resulted in a situation in which the only person held responsible by senior leaders was the battery or company commander. Yet, as S.L.A. Marshall explains in his book *Men Against Fire*, no commander can adequately lead an entire battery in combat. The commander must rely on others to help him lead the unit as a whole. The Shadow Effect revived the old adage that "the commander is totally responsible for all that does or does not happen within the command"; but Marshall, writing within two years of the end of World War II, noted that this philosophy stifles a leader's growth and development. Commanders need to trust and depend on their subordinates, but this trust will never develop until junior commissioned and noncommissioned leaders have the ability to fail and learn from their mistakes. The Shadow Effect's oversupervision syndrome does not give them this ability.

What the Shadow Effect has done and continues to do is to place a great deal of strain on a junior leader's feelings about responsibility and his sense of professional worth, especially within the NCO corps. Oversupervision by senior leaders has made junior officers doers and noncommissioned officers spectators. The Shadow Effect continues to tell them all that they are considered less than totally reliable, less than totally trustworthy. Who has not observed a scene similar to this one: A brigade or division artillery commander goes down to the platoon level and actually takes over for the platoon leaders. After chewing the platoon leader up one wall and down the other, the colonel steps in and dictates orders to the platoon as though he were a section chief. Then he jumps into his helicopter and looks for someone else. In the aftermath, the platoon members bow their heads in shame as their "leader" attempts to pick himself up and gather his wits. The younger enlisted soldiers see the platoon leader as a failure, and the sergeants walk away shaking their heads in disgust and thankful that they are not in charge. The battalion commander makes sure to chew out the battery commander for not training his unit properly. In these and similar situations, respect is lost; and authority suffers.

In many units it has reached the point that, if the battery commander is not overseeing each area personally, he is reprimanded for not properly training his battery. Instead of NCOs teaching the classes, the battery officers are giving all the instruction. The NCOs stand by and watch instead of gaining and sharing knowledge and experience. The battalion officers receiving the greatest amount of praise are those who conduct their own training. NCOs are not being held responsible for knowing their jobs, and lieutenants are receiving commendations for doing sergeants' business. As a direct result of the Shadow Effect, NCO development is suffering. NCOs should be proud of and grow through their accomplisments; but having been spoon-fed, they are rapidly drained of a sense of responsibility and initiative.

Those junior leaders who do retain some element of responsibility run into another fallout from the Shadow Effect. As they try to train to combat



Photos by Sam Orr

effectiveness, they find that in many units the Battalion Training Management System (BTMS) is stressed in name only. The battalion commander, battery commanders, battalion S3, and key NCOs attend the BTMS workshops together; but the principle of sticking to a training schedule is rarely applied. Brigade or division artillery commanders change or add requirements throughout the year as they see fit. They do not trust their subordinates to do it correctly on their own and hence do not protect them in the way BTMS indicates they should protect them.

How can field artillerymen brighten things and eliminate the Shadow Effect? A good starting point is for commanders at all levels to get serious about insuring that their subordinate leaders have an ample opportunity to develop and then get hard-fisted about eliminating those who do not meet the standards of quality, even if it means admitting that they could not train them and that there will be turbulence in the command. Commanders simply must accept this challenge, because keeping these below-standard officers and noncommissioned officers on active duty weakens the dignity and respect of the officer and NCO corps and makes the Shadow Effect more likely to continue.

Another way to eliminate the Shadow Effect is for senior commanders to insure that officers do not teach unit classes. Giving classes is an NCO responsibility for which NCOs should be held accountable. Just as instructors in basic and advanced courses prepare themselves well in advance for the instruction they present, so should an NCO in a unit prepare for the next day by spending one or two hours (after duty if necessary) to insure that the next day's instruction is ready to go and is professional.

A third way of halting the Shadow Effect is to insure that the only officers who become senior leaders are quality officers who know the importance of giving all junior leaders a chance to learn from their mistakes and who, consequently, do not oversupervise. These quality officers should be retained in the service for a longer period. For example, retirement should be extended to 30 years; and the officer's time in grade should be lengthened so that no one makes lieutenant colonel until the 20-year mark. Officers selected for battalion and brigade command positions should have at least two battery commands with a minimum of 18 months in each. Battery commands should be lengthened to two years and in some cases three years.

Next, the Officer Evaluation Report (OER) and Enlisted Evaluation Report (EER) should have blocks for use by all raters and senior raters similar to the one the senior rater uses on the current OER form. The leaders using these blocks should be held accountable for the profile they develop. The current rating systems do not require raters to be as responsible as they should. Raters would think twice before writing a favorable report on a low-quality individual if it meant they might not be promoted because they were easy raters.

If the United States Army, and in particular the Field Artillery Branch, is going to survive on the battlefield of the 1990s, senior officers must allow junior officers and noncommissioned officers to learn their jobs and thereby earn trust and self-respect and develop a sense of professional worth. A continuation of the Shadow Effect will break the junior leaders who are the backbone of the United States Army.

Captain R. Bruce Salisbury, FA, received his commission through the Officer Candidate School. He has an M.A. in management from Webster University and is a graduate of the Field Artillery Officer Advanced Course. He was a deputy test director for the office of the MLRS TRADOC System Manager and commanded a Lance battery in the 1-12th FA. He is currently the battery commander of C Battery, 3-16th FA, which recently joined the 8th Infantry Division Artillery in Germany.

Celeritas et Accuratio

by First Lieutenant Philip Schlatter

The tradition of the Third Field Artillery Regiment continues. From its beginning in 1794 as Captain Thompson's Company of Artillerists and Engineers to its rebirth in 1983 as five battalions of self-propelled artillery, the Third has lived by its motto *"Celeritas et Accuratio"* (Speed and Accuracy).

Battery E

Thompson's Company became Company Q of the Northern Division, Corps of Artillery, in 1815 and in 1821 became Battery F of the 2d Regiment of the US Artillery. This battery saw action in the Seminole War, the Mexican War, the Civil War, and the Spanish American War. Between these conflicts, it was at various times stationed at Fort Adams, Rhode Island; Fort Monroe, Virginia; Fort Leavenworth and Fort Riley, Kansas; and Fort Meyer, Virginia. Even a partial listing of its combat service reads similar to a history of the US Army: Wilhacoochie River, Welika Pond, Wahoo Swamp, Vera Cruz, Churbusco, Molino Del Rey, Chapultepec, Shiloh, Kenuesaw Mountain, Lochahatchie River, Santiago, El Caney, Aquadores, and San Juan Hill. In 1901, the battery became the 4th Field Battery of the US Artillery and in 1907 was redesignated at Fort Meyer, Virginia, as Battery E, Third Field Artillery Regiment.

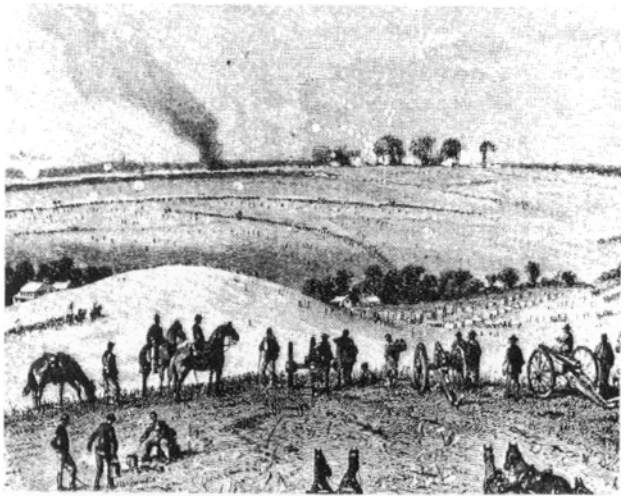
Battery D

The second oldest battery of the Regiment, also designated at Fort Meyer in 1907, was Battery D, which began its life in 1798 as Wadsworth's Company of Artillerists and Engineers of the 2d Regiment. It participated in the War of 1812 and was later redesignated as Company M, 2d Battalion, Northern Division, Corps of Artillery. Again, redesignated as Company A of the 2d Regiment, it fought the Indians

in the Seminole War. These Redlegs battled the Mexicans at Palo Alto, Resaca, Matomoros, Monterey, Vera Cruz, and Chapultepec and served the Union at Bull Run, Yorktown, Cold Harbor, Mavern Hill, Harrison's Landing, Antietam, Fredericksburg, Chancellorsville, Gettysburg, and the Shenandoah Valley. They fired the first shot at Gettysburg and witnessed the surrender at Appomattox Courthouse. After the Civil War, Company A fought Indians in the West and later arrived in Cuba just in time to fire the first shot in the battle of San Juan Hill. During these years the company was headquartered for varying lengths of time at Fort Mitchell, Alabama; Trenton, New Jersey; Buffalo, New York; Corpus Christi, Texas; Fort McHenry, Maryland; Fort Leavenworth, Kansas; Carlisle Barracks, Pennsylvania; San Antonio, Texas; Little Rock, Arkansas; Fort Riley, Kansas; and in Cuba as part of the Army of Occupation.

Battery A

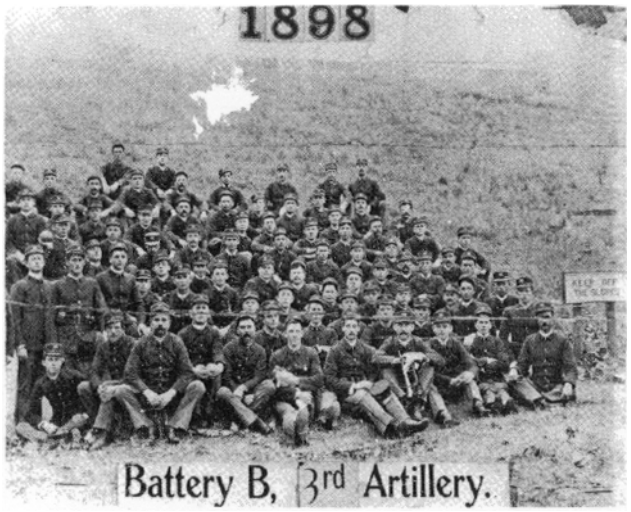
Three enterprising captains in the southeastern United States formed three artillery companies in 1812. After the three companies merged into Company E, Southern Division, Corps of Artillery, this unit became Light Battery F of the Third Regiment of Artillery in 1821. Eight years of Indian wars in the late 1830s and early 1840s were followed by a long sea trek to Monterey, California, to help keep the peace with Mexico. Back on the east coast at the start of the Civil War, Light Battery F fought in the Peninsular Campaign and at Fredericksburg, Chancellorsville, Gettysburg, and the Shenandoah Valley. The Spanish-American War saw the unit in Puerto Rico, most notably at the battles at Coamo and Asomanto Mountain. After designation in 1901 as the 6th Field Battery, the unit became Battery A of the Third Field Artillery Regiment in 1907 and was stationed at Fort Sam Houston, Texas. At various times during its earlier history, the unit headquarters were at Fort Moultrie, South Carolina; Fort Christus, Florida; Washington, DC; Fort Riley, Kansas; and various garrison forts in the northeast United States.



F of the 5th at the Battle of Antietam.

Battery C

Battery C's history dates back to 1861. In that year Light Battery F of the 5th Regiment was organized to defend Washington, DC. The battery fought at Yorktown, Gaines Mill, Antietam, Fredericksburg, Chancellorsville, Gettysburg, and Petersburg. After some 20 years of garrisoning posts on the Atlantic seaboard, the unit headed for Cuba in 1898 and supported the troops at Santiago and San Juan Hill. It then shipped out to the Philippines to squelch an insurrection there and later helped breech Peking's Wu Gate during the Boxer Rebellion. After redesignation as the 10th Field Battery in 1901, the unit became Battery C of the Third Field Artillery Regiment in 1907 and was stationed at Fort Snelling, Minnesota. At various times during its earlier history, the battery had its headquarters in Richmond, Virginia; the Presidio in San Francisco, California; and Fort Leavenworth, Kansas.



Battery B

Light Battery M of the 7th Regiment, organized in 1898 at Slocum, New York, is the ancestor of Battery B of the Third Field Artillery Regiment. From a headquarters at Fort Meyer, Virginia, the unit proceeded to fight in Puerto Rico, Cuba, and the Philippines. In 1901, while still in the Philippines, it became the 15th Field Battery. It transferred back to Fort Sam Houston, Texas, in 1903 and in 1907 received its new name and affiliation with the Third Field Artillery Regiment.

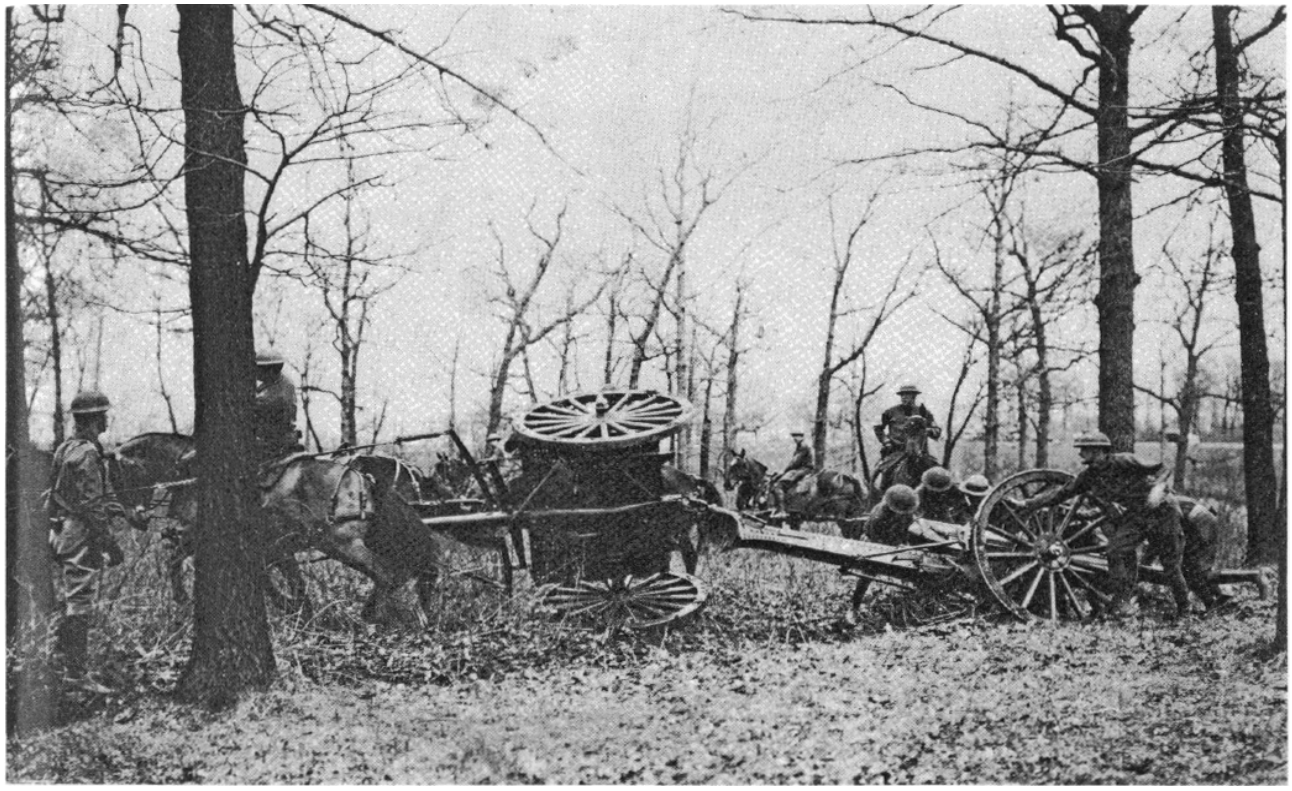
Battery F

The last of the original six batteries of the Third Field Artillery Regiment was Battery F. Organized as Light Battery C, 7th Regiment, in Fort Slocum, New York, it travelled to Fort Meyer, Virginia, and then in succession to Puerto Rico; Fort Adams, Rhode Island; and the Philippines. Redesignated in 1901 as the 14th Field Battery, the unit went to Cuba in 1906 and there became Battery F.

Third Field Artillery Regiment

Equipped with horse-drawn American 3-inch rapid-fire field guns, the Third Field Artillery Regiment began to consolidate. Battery F returned from Cuba to Fort Meyer and joined Batteries D and E to form the 2d Battalion. In 1910, the battalion, augmented by Battery B, provided border security during the Mexican Revolution. The rest of the 1st Battalion — Batteries A and C — entered the Mexican border skirmishes in 1911. In 1916 the entire Third Field Artillery Regiment gathered at Camp Shaftner, Eagle Pass, Texas, and continued to support troops along the border.

Just prior to World War I, the batteries trained other field artillery regiments — the 7th, 12th, 20th, and 21st Regiments. After assembling at Fort Sill in 1918 and then shipping out to Europe as part of the 6th Field Artillery Brigade, the Third Regiment trained in France but was kept in reserve and did not see combat. After a period at Camp Grant, Illinois, the Third moved to Camp Knox, only to find orders



3d FA in action, 1918.

disbanding the batteries and forming redesignated battalions of artillery regiments. In 1921, the 2d Battalion was inactivated and redesignated as the 1st Battalion, 14th Field Artillery, at Fort Sheridan, Illinois. (Battery F was separated from the battalion and redesignated as Battery F of the 14th Field Artillery at Fort Snelling.) Other members of the Third were collected at Fort Des Moines, Iowa, in 1922 to form the 1st Battalion, 9th Field Artillery Regiment. The 1st Battalion, 3d Field Artillery, retained its designation. Then in 1927, the 1-14th became the 2-3d and the 1-9th became the 2-18th Field Artillery.

The 1930s saw more unit redesignations and movements — the 2-18th became the 1-14th and moved to Fort Riley in 1934. In 1935 the 1-3d and the 2-3d were both at Fort Sheridan, Illinois; but the 1-3d was inactivated that same year. A year later the 1-14th became the 84th Field Artillery Battalion (Horse); and in 1939 this unit joined the 2-3d FA at Fort Sheridan, Illinois, and became the 1st Battalion, Third Field Artillery. The next two years saw the inactivation of the 2-3d FA and the redesignation of the 1-3d FA first as the Third Field Artillery Battalion (Horse) and later as the Third Armored Field Artillery Battalion. This unit landed at Normandy with the 9th Armored Division in 1944 and drove all the way to Karlsbad, Germany. In 125 continuous days of combat, the battalion Redlegs fired 56,426 rounds and earned 163 combat decorations.

In 1946 the Third was inactivated, but it was reactivated at Fort Hood in 1950. In 1957, the battalion consolidated with the 3d Antiaircraft Artillery Battalion to form the Third Artillery Regiment. The regiment received M102 105-mm howitzers in 1967 and 155-mm self-propelled howitzers in 1969. When Air Defense Artillery became a branch, only four battalions of the Third Artillery Regiment of 1957 remained; and two of these (the 3d and 4th) were deactivated in 1971. But the 3-3d was reactivated at Fort Knox in 1975 and joined the 1-3d FA at Fort Hood and the 2-3d at Butzbach, West Germany, as keepers of the tradition.

In October 1983, the rebirth of the Third Field Artillery saw these modifications to the Regiment: the 3-3d at Fort Knox was recently deactivated and then reactivated as the 5-41st FA; the 1-78th at Fort Hood was redesignated the 3-3d; the 1-14th at Garlstedt (2d Armored Division, Forward) became the 4-3d FA; and the 6-9th at Giessen became the 5-3d.

Conclusion

The Third Field Artillery Regiment was there to see the dawn of the American Army. Its rebirth affirms the continuing stability, excellence, and esprit de corps of that Army's Field Artillery — the King of Battle.

1LT Philip Schlatter, FA, received his commission through the United States Military Academy. He has served as a FIST chief, battery FDO and XO, and battalion S1 in the 1-3d FA. He prepared this brief history of the Third Field Artillery Regiment from unit history files and from Major General (Retired) George Ruhlen's *The Third Field Artillery in World War II* and Captain Thomas G. Waller, Jr.'s *The History of the 3rd Regiment of Field Artillery*.

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