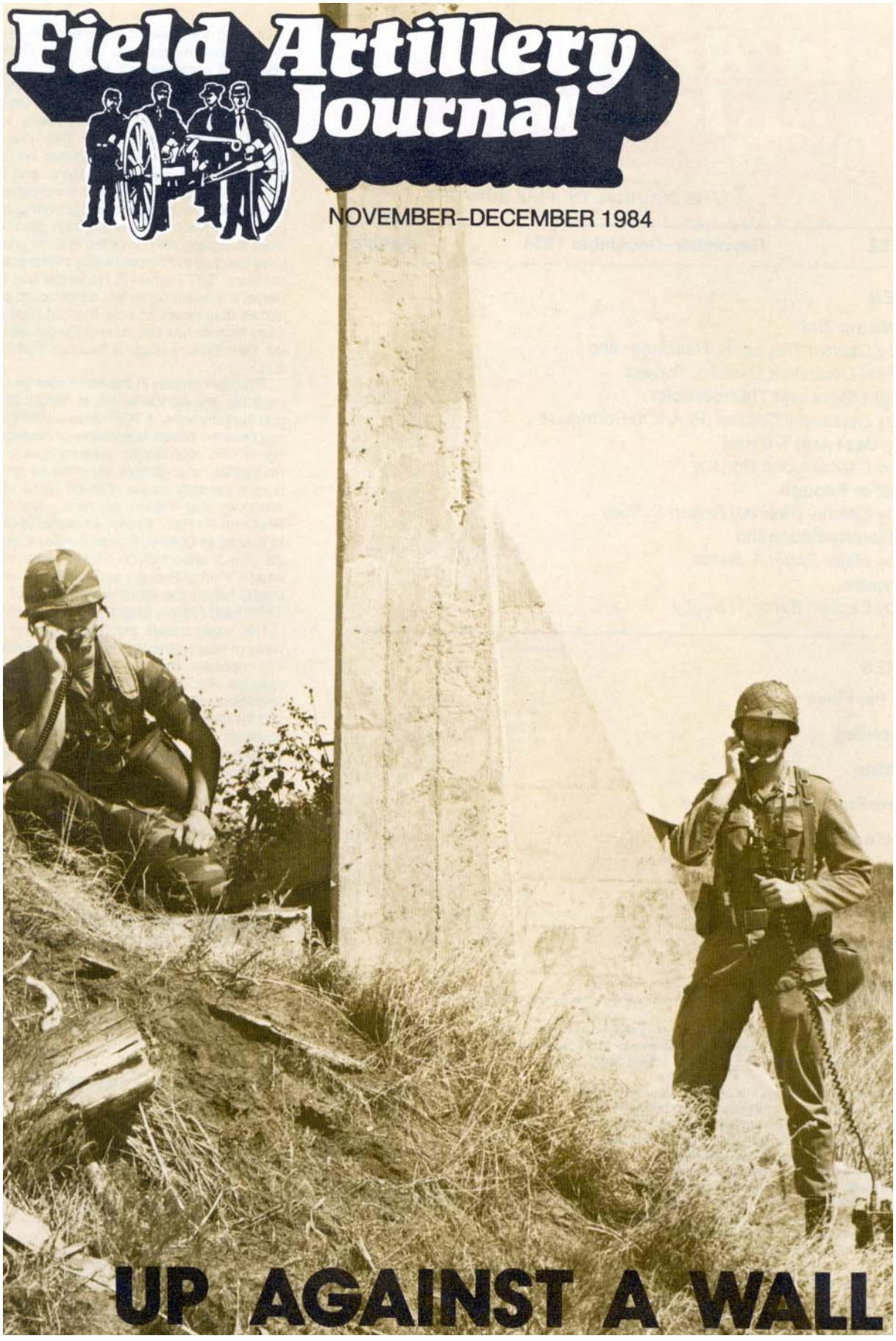
# Field Artillery Journal



NOVEMBER–DECEMBER 1984



## UP AGAINST A WALL

Field Artillery Journal

THE JOURNAL OF FIRE SUPPORT

**Volume 52** **November-December 1984** **Number 6**

## ARTICLES



## FEATURES



**Front 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 US 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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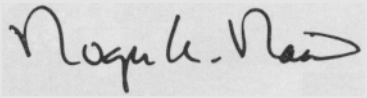
Building the road to interoperability is a deadly serious business. As GEN George Blanchard remarked not long ago, "History shows that it is not a question of philosophy when one talks about interoperability. On the multinational battlefield, it is a reality with which everybody must cope." This issue of your *Field Artillery Journal* focuses on how Redlegs of the past, the present, and the future have and will "cope" with the pragmatic challenges of working with and providing support to our allies. It seeks to knock down the walls that separate comrades in arms and to pave the road to interoperability with practical solutions. CPT Thomas R. Hansinger and 1LT Daniel J. Travers begin this construction project as they report on how the 72d Field Artillery Brigade has trained with the gunners of the 12th Artillery Regiment to put "Stahl am Ziel."

The other articles in this issue take us on a road trip around the world. In "Bright Stars and Thunderbolts," LTC(P) Arturo Rodriguez recounts the desert adventures of Redlegs in Egypt. CPT John Gordon transports us to the Philippines for a glimpse at combined operations in the early stages of World War II when American and Filipino gunners were "The Best Arm We Had." Finally, we come full circle to Europe as Col(Ret) Robert S. Riley looks at the size of allied cannon crews to determine what's "Fluff or Enough" and as CPT Byron S. Bagby relives the remarkable history of the 319th Field Artillery Regiment in "Loyaute."

This issue travels the highways and byways of interoperability; but it never detours into sophistry. Rather, it seeks to level and pave the winding, tortuous road of combined operations. It provides what GEN Blanchard and the readers of *Field Artillery Journal* want: practical, concrete solutions that allow Redlegs to "cope" with the realities of today and tomorrow.



EDITOR

# On the Move

MG JOHN S. CROSBY

Fire support is our stock in trade; it is the essence of everything we do. Two recent activities sponsored by the Field Artillery School—one completed, the other underway—will be particularly helpful to Redlegs as they go about their essential business. The Fire Support Team Force Development Testing and Experimentation II (FIST FDTE II) and the TRADOC chartered Close Support Study Group III (CSSG III) will offer us new insights regarding our doctrine, organization, training, and materiel. They will enhance our efforts to conduct an evolutionary improvement in our abilities to support the maneuver arms. Although the results of CSSG III are not yet available, the conclusions of FIST FDTE II are in hand. The final FIST FDTE II report makes one thing abundantly clear; the FIST concept is a solid concept.

The FIST FDTE II, supported by the 1st Infantry Division Artillery, included over 300 hours of scenario-driven and free play force-on-force exercises. It was the first major effort to evaluate a fully equipped J-series FIST operating in support of a battalion task force. FIST FDTE II also provided a first look at a FIST operating digitally under realistic and demanding battlefield conditions.

Throughout the test, evaluators collected a tremendous amount of data, relooked current doctrine, and experimented with different equipment and personnel configurations. The results of their efforts are now available, and the CSSG III is using FIST FDTE II as it considers what evolutionary changes in doctrine, training, organization, and materiel the Fire Support Community should make in the future. Specifically, the members of CSSG III are considering among other things the three critical issues addressed in FIST FDTE II: FIST headquarters capability, FIST command and control, and FIST execution of laser missions.

### FIST headquarters capability

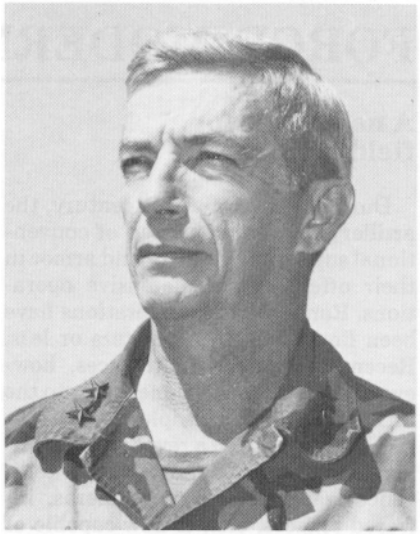
FIST FDTE II evaluated the capability of the FIST headquarters under a wide variety of demanding conditions. Overall the FIST performed well during 24-hour operations, in an NBC environment, without its full complement of personnel, and with the G/VLLD mounted or dismounted. But the test did highlight problems that require solutions. For example, the evaluation indicated that the personnel in the FIST headquarters may have too much to do. But it also showed that a Combat Observation Lasing Team (COLT)—the new name for the old separate observation lasing team made up of three enlisted men operating with a G/VLLD in a FIST vehicle (FISTV)—can complement the FIST headquarters in maneuver company teams and reduce the FIST headquarters' workload. This finding may lead to an expanded role for the COLT and allow the FIST headquarters to concentrate more on the performance of fire support coordination tasks.

### FIST command and control

The test clearly established that the FIST Digital Message Device (DMD) provides a quantum leap ahead. It enhances the capability of the FIST chief as he strives to control subordinate observers and other attached elements. The FIST DMD also eases the management of radio nets and provides a smooth retransmission facility for dismounted observers. These encouraging signs regarding materiel developments, however, were undercut to a considerable degree by software difficulties which necessitated time-consuming work-around procedures. These problems are solvable—we need to relook our procedures for developing software and to produce a system that eliminates the work-arounds. Yet another conclusion drawn from command and control testing concerned the COLT. The COLT proved to be an effective complement to the FIST concept, but it requires expanded doctrine if it is to realize its full potential as a player on the combined arms team.

### FIST laser munitions

FIST FDTE II verified the operational reliability of the total Copperhead system. The system worked well, but not as expeditiously as it might. It's our job to streamline our procedures in order to improve the system's responsiveness. This may require simplifying firing procedures so that soldiers throughout the Army will be able to use Copperhead to its full potential. Results from 27 live Copperhead firings demonstrated that both the FIST headquarters and COLTs can control laser guided munitions. To optimize the tremendous capability of Copperhead requires almost dedicated control, however. It may well be necessary for the COLTs to assume this dedicated role



while the FIST headquarters copes with the myriad of its other critical fire support coordination duties. COLTs and FISTs working together seem to be the best solution.

### CSSG III

All of these doctrinal, organizational, and materiel issues are being looked at by the members of CSSG III. With the help of your input, these experienced Redlegs and experts from the maneuver arms will integrate the detailed results of FIST FDTE II with the conclusions of other tests; develop appropriate findings, priorities, and recommendations; and provide a structured, evolutionary approach by which artillerymen can continue to improve the responsiveness of fire support to the maneuver arms.

### Conclusion

FIST FDTE II clearly establishes that the FIST is a sound concept today, and CSSG III will ensure that it will be even better in the future. New doctrine, new organizations, and new materiel will improve the FIST's capabilities and streamline its operations. However, we should never forget that good concepts and plans are only as good as the quality of execution. The FIST chief and the artillerymen he leads are crucial players on the combined arms team. They are the soldiers who do the difficult job of converting a rock solid concept into equally sound execution. Leaders at every level in the Field Artillery Community must, therefore, see to it that FISTs in the field are composed of the very best soldiers we can muster.

# Incoming

LETTERS TO THE EDITOR

## FORCE MODERNIZATION

### A new name for field artillery

During the wars of this century, the artillery role has consisted of conventional support of infantry and armor in their offensive and defensive operations. Ranges in these operations have been limited to 30 kilometers or less. Recent technological advances, however, have added new dimensions to the artillery role. For example:

- There has been a revolution in sensor technology. Multispectral intelligence (radar, electronic cameras, infrared sensors, etc.) is now capable of turning the extended battlefield (50 to 150 kilometers) into a reality. Remember, too, that this intelligence can be transmitted in real time.
- Missiles with various guidance systems can reach these 50- to 150-kilometer ranges and are now available.
- A whole series of smart submunitions have been developed and designed for specific application—antiarmor, airfield cratering, etc.

Taken together, these developments have given artillery the ability to dominate and destroy every unit and piece of equipment in an area roughly 50 to 150 kilometers behind the enemy lines which was heretofore inaccessible. Airpower will be integrated into this effort, limited at times by weather or failure to secure air superiority. This responsibility will be one of the corps artillery's missions of the future and the answer to the debate on whether to attack first-and second-echelon forces.

Perhaps the designation name of the field artillery should be changed to just "artillery" to more fittingly describe this new role.

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

*It is certainly true that the field artillery is gaining new capabilities all the time. We are in a decade of exponential advances in the areas of target acquisition, $C^3$, and munitions capabilities. The field artillery of the future will be able to perform missions unimagined by the artillerymen of only a decade ago, and today's artillerymen are accruing daily the benefits of the many new systems—Copperhead, Firefinder, RPV, etc. —coming on line. These advances will serve to further strengthen and solidify the field artillery's critical role on the modern battlefield.*

*Modernization will not modify our basic mission. The field artillery will continue to provide support to the maneuver arms in the field. This has been and always will be the essence of our job. Anything else, whether it be deep attack, counterbattery, or suppression of enemy air defense, is simply a subfunction of this mission. These subfunctions may wax or wane in importance from year to year, but no one of them will ever be the primary mission of our branch. Therefore, the name "field artillery" is highly significant and must remain unchanged. We will provide fire support to the Army regardless of the nature or location of the field of battle.—Ed.*

### Flying artillery

At the outset, let me acknowledge that I am not very familiar with the Field Artillery "trade"; in fact, I've only recently joined the Field Artillery Association. So, if my thoughts are "old hat" or out of order, please just simply disregard them.

In the November-December 1983 *Field Artillery Journal,* I read about the problems of providing fire support to the 2d Armored Division, particularly at night, now that they have the new M1 Tank. The same issue contains a discussion of the problems of MOUT. During the recent "Fire Support to Light Forces" conference, I heard a lot of words about the problems of "packing light" and airlift limitations. But then, in the February issue of *National Defense* magazine, I read about the fire support provided by AC-130 gunships to our troops in Grenada and what Major General Trobaugh had to say about them. And from all this, I feel it necessary to ask: "Has any thought been given to incorporating that order of capability in either the new Black Hawk or the older Chinook helicopters?"

I recognize that the AC-130 is a reasonably large aircraft and that it can pack a lot of volume and lift a lot of weight. It is not likely that either of the helicopters cited can come close to matching it in either category. But it should be possible to develop a "family" of weapons systems which could solve some of the problems I have heard described; they certainly could keep up with 55-mph tanks. Flying at night is not a new capability, and night-vision devices should allow for unscheduled, unplanned landings if, indeed, it is necessary to land to fire at all. Able to hover or fly above urban areas, heliborne artillery would not have many restrictions on their fields of fire. With some difficulty, such systems could travel to the combat theater under their own power, if necessary. In terms of mission applications, such systems should also improve the potential for providing fire support to air cavalry and air assault operations as well.

It should not be outrageously expensive to develop such a family of weapons systems; the US Air Force has already done the basic technological work. To adapt it to helicopters, the major remaining problems should center on selecting the optimum mix of components for each "family member" and then adapting, installing, and testing them. From an organizational standpoint, it should be possible to derive a first approximation of an air artillery unit from equivalent air cavalry and field artillery models.

It seems to me that air artillery could help. But, would it fly?

William E. Gerber, Jr.
LTC (Ret), USAF

*I showed your letter to subject matter experts within the School's Tactics and Combined Arms Department. Here is a summary of their comments:*

*The idea of air artillery within the Army is not a new one. During the Vietnam conflict, the Army developed four CH-47 Chinook helicopters to provide massive, rapid-fire support for the infantry. Each CH-47 was equipped with six-50-caliber machineguns, four 20-mm cannons, two 40-mm cannons, and a varying number of M60 machineguns. Three .50-caliber machineguns pointed out each side, as did two 20-mm cannons. The two 40-mm cannons were mounted on the tail, and the M60 machineguns were positioned at the crew's discretion. The final product was named "Guns A Go-Go." The system was quite effective and produced the desired results, but the final decision on the system was that it was not feasible to mass-produce. There*

*were several problems encountered with Guns A Go-Go. In order for it to engage a target it had to hover for an extended period of time, which made it quite vulnerable to antiaircraft fire. The storage of the ammunition was a problem not only due to space, but also because it increased the danger caused by incoming small-arms fire. Maintenance problems for the Guns A Go-Go increased, and the increase was thought to be a result of the vibration caused by the firing of the weapons. A 105-mm cannon was never used because the angle necessary to engage a target could not be achieved for the length of time required.*

*You have surfaced an interesting viewpoint. The School's Directorate of Combat Developments will be investigating the feasibility and advisability of pursuing this technology; but, for the time being, it appears that the Cobra gunship must do the job that the air artillery you describe would be capable of doing.—Ed.*

**Force modernization**

The 1st Armored Division has just completed the force modernization fielding of three major items of equipment: TACFIRE, the battery computer system (BCS), and the multiple launch rocket system (MLRS). Control of a large project such as this simultaneous fielding requires unity of command. It requires the assignment of one person to run the project; and, as the division artillery assistant S3, I was appointed as project officer for these fieldings. Here are some lessons I learned which might help others involved in the fielding of new equipment.

The fielding of any major system affects a unit's entire schedule of ARTEPs, FTXs, and day-to-day operations; therefore, the force modernization project office must be completely organized from the start and must be able to manage the unit's schedule so that it will mesh with the fielding process. A project officer who happens to be assigned to the S3 has an edge in this regard.

The project officer must first acquire all the background information available so that he can get a complete picture of the scope of the project and the impact the equipment will have on the unit. Next, he lays out some staff responsibilities in a letter of instruction signed by the unit commander. The letter of instruction should be as specific as possible because it serves as the baseline for the staff. For example, the S1 will handle acquisition of new personnel, ensure that pertinent publications are requisitioned, and take care of TDY orders and pay; the communications-electronics staff officer will monitor requisitioning actions for new communications security equipment, change Communications-Electronics Operation Instructions as required, and plan for upgrading radios. The 3d Infantry Division had fielded TACFIRE six months earlier, and the 8th Infantry Division had just fielded the MLRS; so I was able to pirate excellent information for letters of instruction from these two units. If possible, the project officer should visit a fielding in progress to see first-hand what problems are being experienced.

A project of this size required the aid of outside agencies; thus, the division artillery used unresolved issue papers to transfer actions to these agencies. Each unresolved issue paper had the following format:

*TACFIRE/BCS/MLRS/unresolved issues*

Number: (Sequential number for reference)
Proponent:
Problem: (Short statement of problem)
Discussion: (Develop all specified and implied tasks)
Recommended solution:
Recommended milestones:
Authentication: (Division artillery commander's signature)
Point of contact: (Division artillery project officer)

The division artillery initially developed 21 unresolved issue papers and used a series of briefings to distribute the issues to the agencies concerned and to the principal division staff members. Once the mechanism was in place as a result of the briefings, each new paper was sent through the chain of command to the appropriate action agency with a simple cover letter. As the project progressed, more issues were discovered and documented—a total of 29 issues were addressed by the end of the project.

Once staff responsibilities have been laid out and unresolved issue papers developed, it is useful to develop a Program Evaluation and Review Technique (PERT) chart to resolve the conflicts between fielding milestones and existing requirements such as ARTEPs and field training exercises. The PERT charts can then be used in the initial and update briefings and also as a tool to track the project and brief visitors.

Force modernization activities, by their very nature, allow a project officer to bypass normal command and staff lines to provide the necessary support. During the TACFIRE/BCS/MLRS fielding, I spend about 80 percent of my time making sure the logistical support structure was trained, equipped, and in place and the other 20 percent in writing and executing plans. The ability to sidestep normal command lines must be accomplished carefully, however, to avoid "stepping on toes." The guiding rule is that coordination is possible with everyone, but taskings are not. The goal of coordination is to promote information flow. Taskings are handled through normal staff procedures and by periodic in-progress reviews.

The agenda items for in-progress review should be the issue papers or issues that have derived from them. The agenda, which is published with an announcement letter, tells the proponents what the project officer needs to know. The announcement letter and agenda are enclosures to the letter sent through channels requesting proponent briefers. Proponent agencies can then conduct their own in-progress reviews before coming to the project officer's in-progress reviews. Here are some key points to remember about conducting in-progress reviews:

- Work friendly. Units and agencies which do the work in fieldings are usually outside of the command. Much is gained by treating them in a professional manner.
- Have actual proponents of the issue papers do the briefing.
- Invite *all* interested and affected parties.
- Have the commander chair the in-progress review. Since this is a working meeting, do not invite general officers unless they are needed to make decisions.
- Send an after-action report of the in-progress review to the division commander and logistics officer to keep them posted.

Fieldings, like all other plans, are never executed precisely as scheduled. However, a detailed, well-staffed letter of instruction which tells interested parties exactly what is to be done and what is expected of them can be an invaluable aid. If the proper groundwork has been done during the in-progress review process and if flexibility has been written into the letter of instructions, adjustments can be easily and quickly made to change schedules and adjust required support. The payoff to the force modernization project officer comes when a new system is received by the unit and the support structure to keep it operating is in place.

Karl J. Leatham
MAJ, FA
APO NY

## More on how to use MLRS

Lieutenant Colonel Samuel W. Floca, Jr.'s article "Do We Know How to Use MLRS?" (September-December, 1984, *Field Artillery Journal*) was timely and thought-provoking. He has raised issues with which combat developers at the Field Artillery School have been wrestling for some time, and I would like to provide that perspective.

As the multiple launch rocket system (MLRS) employment concept evolved, it was determined that the minimal required allocation of MLRS launchers was 27 launchers, or one 3×9 MLRS battalion per division. Unfortunately, force structure constraints precluded fielding that number of MLRS battalions. The task at hand was to maximize the MLRS firepower available to the division while remaining within acceptable force structure levels. The present configuration of a nine-launcher battery assigned to each division and the probable habitual attachment of a nine-launcher battery from the corps MLRS battalion to the division provides 18 launchers per division with minimum system overhead. Current deployment plans call for 12 divisional MLRS batteries and five MLRS corps battalions. This structure provides 27 MLRS firing batteries to the Army with an overhead of five headquarters, headquarters and service batteries (overhead total = 430 personnel). Lieutenant Colonel Floca's proposal of a two-battery MLRS battalion in each heavy division and no corps MLRS battalions results in only 24 MLRS batteries with 12 headquarters, headquarters and service batteries (overhead total = 1,032).

The possible addition of an MLRS battalion (3×9) to each field artillery brigade aligned with a heavy division (currently being considered as a future field artillery force structure initiative) will provide at least four MLRS batteries (36 launchers) to each division and a battalion headquarters capable of providing additional $C^3$ (command, control, and communication), administration, and logistics support. These additional MLRS battalions would then free the original MLRS battalions to be used by the corps commander to weight the battle, provide support for covering force and screening operations, and aid in any rear area battle.

Although an operation concept has not been developed for the MLRS battalion, some of the following thoughts may become a part of it. $C^3$ and support of MLRS is not viewed as a significant problem with only one or two MLRS batteries in the division area. $C^3$ for these high-firepower batteries could be exercised by the division artillery headquarters directly or through the TACFIRE systems of nearby cannon battalions. Command and control of an MLRS battery is primarily concerned with unit positioning, targeting information, and desired levels of target destruction. The only source of technical firing data for the MLRS is the individual launcher's on-board fire control system. The only headquarters with the necessary information available to provide detailed tactical control for MLRS is the MLRS battery. Currently only the MLRS fire direction system (battery computer system hardware with MLRS-peculiar software) is capable of determining the number of rockets to be fired to achieve the desired effect on the target and providing a check of downrange mask clearance in order to determine which launchers can fire the mission. Software has been fielded which permits digital traffic between the MLRS platoon leader's digital message device and TACFIRE. However, this traffic is non-secure, limited in format, and primarily of a tactical (target location) nature.

Although MLRS batteries were designed to be relatively self-sufficient when compared to their cannon counterparts, MLRS batteries are to be further increased in support capability (additional personnel) to better enable them to stand alone as separately employed batteries. The separate MLRS battery does require combat vehicle recovery and welding services from a higher headquarters. However, these services—along with casualty evacuation, personnel replacement, and routine administration support—could be provided by the designated combat trains of a nearby divisional or corps cannon battalion without increasing its workload appreciably. In many cases the adjacent cannon battalion would only be providing backup support to an MLRS platoon owing to the dispersion of the MLRS battery.

The situation is more complex when three or four MLRS batteries are in a division area (a field artillery brigade's MLRS battalion plus the division's MLRS battery). At this point it is apparent that an MLRS battalion headquarters, headquarters and service battery is needed. The battalion headquarters does remove significant $C^3$ burden from the force artillery headquarters when there are more than two MLRS batteries in the division area. All tactical traffic can be channeled through the MLRS battalion headquarters' fire direction system to the individual MLRS batteries' fire direction systems. The headquarters, headquarters and service battery also provides the additional medical, legal, combat vehicle recovery, and welding support that the battery does not possess.

Another advantage of maintaining corps MLRS battalions is that they enable the corps and army commanders to tailor MLRS "plugs" for forces not equipped with MLRS without disturbing the assigned assets of the MLRS-equipped divisions.

A further effort to increase the flexibility of the MLRS battery that has been under discussion at the Field Artillery School is to add an MLRS fire direction system to each MLRS platoon headquarters. The fire direction system would replace the platoon leader's digital message device which has a limited capability. The MLRS platoon of three launchers carries onboard the dual-purpose improved conventional munitions equivalent of 11 battalions of cannon artillery. All of these munitions can be launched within minutes. Currently, the platoon's major weaknesses are its inability to conduct target effects analysis, command the number of rockets to be fired to achieve the desired target effect, and perform intermediate crest checks in order to select the launcher(s) to fire. The fire direction system would provide these functions and allow the MLRS platoon to become the basic MLRS fighting unit. The platoon could be deployed anywhere in the division area and could be given a separate mission, controlled directly by the force field artillery headquarters, by the field artillery brigade MLRS battalion headquarters, or through a designated cannon battalion TACFIRE system. The assignment of separate missions to MLRS platoons can give the flexibility required by the division commander; however, administrative service support for this platoon may be necessary for missions that require displacement from the battery for an extended period.

Finally, artillerymen and soldiers of all branches must not think of MLRS as only a counterfire weapon. The MLRS packs the biggest conventional punch of any current artillery weapon. When integrated with the radar, remotely piloted vehicle, TACFIRE, and the MLRS fire direction system and with the advent of the MLRS terminally guided warhead, binary chemical warhead, and perhaps a laser-guided warhead, the MLRS also becomes a tremendous battlefield suppression, interdiction, and "attack-breaker" weapon.

Roger L. McCormick
MAJ, FA
Fort Sill, OK

## The technology war

"Take the Tech" by Colonel (Retired) Anthony Pokorny (September-October 1984 *Field Artillery Journal*) strikes at the heart of the dilemma of combat developments; i.e., moving from the articulation of a problem's solution to the fielding of the systems which actually solve that problem can be most dilatory. The Fire Support Mission Area Analysis (FSMAA) was a rational articulation of fire support problems and their potential solutions, many of which were being developed as the FSMAA was written. We are still, however, some distance from a field artillery which has the systems that can resolve all the deficiencies listed in the FSMAA.

Colonel Pokorny's focus on technology is appropriate for the US Army. We must win the technology war before any shot is fired in future combat, or we probably will lose that future war. We cannot afford the luxury of expending people to win wars; we have to expend things. It is imperative, therefore, that our things be better than those of the enemy.

The focus on a new howitzer is very important for two major reasons: Our potential enemies have fielded new artillery systems in the last five years, and our own maneuver forces have the Abrams tank and Bradley fighting vehicle. That such technologically advanced vehicles be supported by howitzers designed in the 1950s and built in the 1960s is inappropriate. A new howitzer that can fire smart munitions is an essential ingredient to our future success on the battlefield.

The article, however, moved quickly to the central fire support problem: effective command and control. The Field Artillery School is aggressively developing the Advanced Field Artillery Tactical System (AFATDS), which goes far beyond TACFIRE capabilities, and the artifical intelligence such as the Target Value Analysis which will be embedded in AFATDS. The doctrinal and materiel initiatives required for this development are moving forward, but full implementation of them remains some six to eight years in the future.

The leadership of the Field Artillery Community is energetically pursuing the implementation of the technological advantages needed for future combat, but the process remains frustratingly slow.

Joseph E. Halloran III
MAJ, FA
Lawton, OK

## More on advance party vehicle

I agree wholeheartedly with Sergeant First Class Noel W. Fox's letter (March-April 1984 *Field Artillery Journal*) about the need for a combat-effective advance party vehicle. During my battalion's last rotation to the National Training Center (NTC), it became obvious that a battery commander needs something other than an M151, M35, or M548 to take his advance party forward. It was quite incongruous to see an M35 or M548 immediately following the lead maneuver elements.

In fast-paced offensive operations such as the live-fire movement-to-contact at the NTC, the battery commander must aggressively reconnoiter forward to ensure that his battery is not outranged. To accomplish this aggressive reconnaissance, the battery commander must follow closely the lead maneuver elements. During periods of limited visibility or in dense terrain, it would not be unlikely for the battery commander inadvertently to become the lead friendly element. That is exactly what happened to one of our battery commanders in the relatively open terrain at the NTC. Given this forward positioning, the battery commander and his advance party moving in their present means of transportation, have highly questionable prospects for survival.

The M113 offers a relatively easy solution to this problem. It has a degree of protection equal to that of the vehicles of the maneuver units and blends in with other vehicles on the forward edge of the battle area. It has sufficient space to carry a reduced advance party and an M2HB machinegun to give the advance party some firepower. Finally, it can carry radios to keep the advance party in touch with the battery and with the battalion tactical operations center.

The Field Artillery School should explore the possibility of adding an M113 to the tables of organization and equipment for 155-mm and 8-inch firing batteries.

Joseph A. Roszkowski
MAJ, FA
Fort Stewart, GA

# SAFETY

## How safe should safe be?

To provide a realistic training environment for soldiers, training conditions should be as similar to wartime conditions as possible. We should take a cold, hard look at all policies, procedures, and range standing operating procedures (SOPs) with the intent of eliminating, either in writing or actual practice, all requirements that detract from realistic training. Responsibility for training safety should fall on the first-line supervisors, section chiefs, and noncommissioned officers who will be responsible for safety during wartime. We should not forget safety, but rather put it in its proper place.

The following situation, which could be found at any Army installation, post, or training area worldwide, indicates that our current policy on safety hurts our training.

0800—The advance party occupies a position. Ground guides prepare for the arrival of the firing battery.

0830—The main body of the firing battery arrives and begins to occupy the position.

0840—The chief of firing battery announces that the "battery is laid."

0900—The safety officer sets up the "safety" aiming circle and verifies the lay of the battery.

0910—The verification of lay is completed.

0920—The safety officer begins to verify each individual weapon to ensure that it is safe and ready to fire. In an effort to be absolutely certain that all possible safety checks have been performed, the safety officer, in addition to checking the actual lay of each weapon, follows a multi-item checklist to ensure that everything the section chief requires for proper firing operations is on-hand, serviceable, and ready for use.

1200—The safety officer completes the check of each weapon and determines that the weapons are prepared to fire.

After each weapon is announced "safe," gun crews emplace camouflage nets, lay wire, and make improvements on the position; but it has taken four hours for the unit to prepare for training, and all except about 40 minutes of that time was involved in safety requirements or completing second, third, and even fourth checks on proper placement and lay.

Multiple safety checks are necessary when one is dealing with live ammunition, a crowded training environment, expensive equipment, and human lives; but the responsibility for safety should be given to the individuals who will perform these duties in wartime. If they are not assigned this responsibility,

then over a period of time they begin to feel that the tactical mission takes second priority to the demands of safety and that actual combat is a slow-moving affair.

There are other negative ramifications.

- Second lieutenants assigned as safety officers receive little or no training in the military duties and responsibilities of their true job positions.
- Responsibility for actions is diluted among numerous individuals. If a second, and, in fact, a third person is required to check the same actions on several different levels, then no one is really answerable in the final analysis.
- Communication between units and Range Safety is a major factor in the safe operation of the training area. Units using direct or indirect fire training facilities must often maintain two-way radio communications with Range Safety at all times on the Range Safety net. If Range Safety cannot contact any unit that is in a "wet" firing status, that unit will be placed in a "dry" status by the unit headquarters or by the Range Safety Patrol NCO. The intent here is clear—to ensure that units can be informed if unsafe conditions occur. But while the intent is clear, what happens in practical application? Tactical units must dedicate a radio specifically to monitor range control. Is it always a problem? No; but it does detract from realism, forces artificial requirements upon units in peacetime which they would not have in wartime, and creates an additional responsibility for units already overburdened.

Does this mean that the safety of our soldiers is not of prime consideration or that we disregard the importance of protecting property or equipment? Absolutely not, but we must provide a realistic training environment for our soldiers and place responsibility where it will be in wartime. Safety will come as a direct result of each person doing his job properly.

Richard D. Koethe
CPT, FA
APO NY

## More on airspace management

Redlegs hate to be check-fired; but it happens all the time in the name of the sacred cow—safety. No future enemy will give us the opportunity to check-fire while a brigade commander helicopters into his command post or fast movers head out over the forward line of own troops to give our grunts some close air support.

Captain John L. Hensley's article, "A Fly Paper" (May-June 1984 *Field Artillery Journal*), addressed a very important issue, ignored, in my view, far too long. We must learn now to manage the airspace over and directly in front of our forces safely and efficiently so that the US Air Force aircraft and Army helicopters can operate while, simultaneously, Redlegs put steel on targets. It could mean the difference between victory and defeat on the next battlefield.

Captain Hensley's article is right on, but we must take the doctrine and put it into practice. We have to integrate US Air Force aircraft, Army helicopters, and artillery fire on our peacetime ranges. We cannot—we must not—check-fire the artillery every time the Air Force wants to make a bomb run or a helicopter lands or takes off. The procedures outlined by Captain Hensley can make it safe for the Air Force.

We have to practice air management now so we can do it on the next battlefield. We cannot win if we check-fire the artillery!

Dennis S. Greene
COL, FA
Denver, CO

# TACTICS and THINGS TACTICAL

## Dwell time formula is useful

Captain Philip J. Millis' article "Bracketing the Dwell Time" (September-October 1984 *Field Artillery Journal*) surfaces an interesting approach to the problem of determining how long a second echelon target might be expected to remain in a given position.

The division artillery and field artillery brigade tactical operations center's order of battle section uses space, time, and topic analyses to predict where and when targets may appear on the battlefield at any given time. This prediction, when compiled with the target productions section's system of producing valid targets, does not give any indication of how long a target may be in a given location. In addition, today's division artillery tactical operations center is primarily concerned with counterfire targets and does not spend a great deal of time assessing convoys, assembly areas, and support units. Targeting information for those noncounterfire targets usually comes from the all-source production capability in the division tactical operations center support element. The field artillery intelligence officer is responsible for expediting fire support targets to the main fire support element after the sensitive information associated with the target has been removed. Often, by the time the target reaches the targeting element, a considerable amount of time has passed. A determination must then be made as to whether or not the target is still in the reported location.

By applying Captain Millis' formula for determining dwell time, fire support personnel will be better able to select the appropriate fire support means to engage targets based on the nature of the target and the fire support capability at the time. His method, while admittedly an educated guess, does give targeting elements more education on which to base their guess. Until target acquisition systems are available which allow constant monitoring of targets with rapid communication of data to the attack asset managers, analytical methods will be required to determine target validity. Without such techniques, scarce fire support assets are likely to be wasted.

Kenny W. Hendrix
MAJ, FA
Mike Holthus
CPT, FA
Rich Young
CPT, FA
Fort Sill, OK

## An exaggerated problem

Major Larry A. Altersitz displays a pessimistic attitude in his letter, "Nasty thoughts" (September-October 1984 *Field Artillery Journal*). He does, however, present a tactical situation which could possibly occur if hostilities break out across the inner German border. In Major Altersitz' scenario, US covering force elements are being pushed back from forward positions along the border to subsequent locations (not identified) beyond the Haune and Fulda Rivers; the bridges across the Haune and Fulda Rivers and all other major bridges within 100 kilometers of the border have been destroyed. However, destruction of all bridges would be an unlikely, worst-case eventuality. The logistical coordination and support required to destroy all of these bridges within a relatively short period of time would be phenomenal, and the Soviets would need to be very lucky. The NATO forces are not going to sit back and permit the destruction to take place unchallenged. If, however, for the sake of argument, the bridges were destroyed, then bridging, fording, and rafting become possible alternatives for crossing the rivers. Fording depths vary from 40 to 48 inches for most US vehicles

(such as the M207 MLRS and the HEMTT) and can be increased by the use of fording kits (i.e., to 9.8 feet for the M1 tank with the kit). Admittedly, available bridging and rafting equipment are limited in US divisions; and so careful coordination with corps support units is required when that type of gear is needed. The key to success of fording, bridging, and rafting lies in the availability of equipment and the training and familiarity of soldiers in its use.

By the way, presuming to form reserves out of covering force units when they withdraw behind the forward edge of the battle area is precarious. The easiest mission transition for covering force units is to reserve status; however, if my enemy knows that I plan to make my covering force a reserve force and I am aware that he knows it, I will change my plans. The covering force, instead, will occupy second, third, or fourth-echelon battle positions in their zones, rearm and refit for a counterattack, or move to concentrate in the area of the main thrust. Once the covering force has completed its mission, it provides the force agility and a means by which to seize the initiative.

In any event, it is my opinion that Major Altersitz' presentation of Warsaw Pact capabilities are exaggerated, while NATO's ability to counter enemy initiatives is underplayed.

Robert William Siegert III
CPT, FA
Fort Sill, OK

## Some good thoughts

The following letter is in response to Major Larry A. Altersitz' letter "Nasty thoughts" (September-October 1984 *Field Artillery Journal*) concerning the ability of the Field Artillery and other branches to cross various water barriers in the Fulda Gap. He asks this question: "How does one withdraw covering force artillery units across the Haune and Fulda Rivers if the Soviets destroy the bridge at the onset of hostilities?" We must remember that it is just as imperative to the Soviet forces as it is to friendly forces that the crossing points (bridges) along the Fulda and Haune Rivers remain intact. Soviet doctrine dictates a rapid assault of their first-echelon forces. It would seem impractical for the Soviets to destroy those bridges at the onset of hostilities because such an act would not only slow their assault, but would prove contradictory to their current doctrine.

Major Altersitz said that "By destroying the bridges, the Soviets put a great strain on our bridging capacity. There is no way other than air to resupply the covering force artillery units. We lose all equipment that cannot swim." His statement is not entirely true. It should be noted that the fording of the Haune and Fulda Rivers is possible—it is, however, seasonally dependent and is restricted to certain areas or locations due to the steep river-bank inclines. More importantly, there are engineer units available to support both the artillery and maneuver forces in resupply operations and in retrograde maneuver if required to do so.

Major Altersitz suggested that self-propelled vehicles have an alternative means for crossing—perhaps inflatable bladders that could be attached to the hull lifting points (each section or platoon would need a compressor). He wonders whether a flotation kit would allow a fully loaded M109 to make a crossing, whether an M548 or a FAASV with a basic load would need a kit, and whether an M207 MLRS SPLL would float. First, an M548 cargo carrier would not require such a kit as it *now* has swim capabilities with a maximum allowable load of six tons. The FAASV is built on an M109A2 chasis; so it can ford, but it cannot swim. Attempting to rig up all these vehicles with attachable floats would be very time consuming as well as very costly, and who would *carry* all this extra equipment? It seems much quicker to get engineer assets for support (that is why we have bridge companies) rather than adopt a do-it-yourself scheme.

Terry K. Frost
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Fort Sill, OK

## Cold food for thought

In response to Major Robert Glacel's article "Where Only the Fit Survive," (September-October 1984 *Field Artillery Journal*), I would like to address two points that deserve further consideration. But before I do, I want to state that I was a member of a Field Artillery Branch Mobile Training Team that visited the 1-37th FA in Alaska—all the members of the team found the 1-37th to be a highly motivated and professional unit of field artillerymen.

Now to my first point. The article addresses two-gun artillery raids in great detail, and during the Mobile Training Team's visit to Alaska it was briefed on the two-gun raids. I have some problem justifying the tactical necessity and the doctrinal justification for such a use of the force's valuable artillery assets. FM 6-20, *Fire Support In Combined Arms Operations,* contains the following statement: "A field artillery unit assigned the mission of direct support is immediately responsive to the FA support needs of a particular maneuver element, normally a brigade. . . . It is used most frequently to place an FA Battalion in support of a maneuver brigade." At the section and battery level, two-gun raids seem on the surface to be a dynamic, motivating way to train. But a two-gun raid as described by Major Glacel takes extensive planning, coordination, training, and practice. I question, in terms of METT-T, whether a two-gun raid is necessary enough to warrant such effort. Major Glacel gives as the primary reason the fact that the range of the M101A1 105-mm howitzer is limited. But, if one considers METT-T, the decision by the maneuver commander to insert a two-gun artillery raid would have the effect of degrading the artillery available to the Alaska Arctic Brigade. There are many historical cases which show that to use combat power piecemeal is a road to defeat. Artillery effects are best felt when fires are massed. There should be many more considerations other than the range limitations of the M101A1 105-mm howitzer to conduct the two-gun raids, but these considerations were not provided by Major Glacel.

My second point concerning Major Glacel's article deals with the FIST and on a larger scale the combined arms team in action in the Arctic. The article only mentions the FIST operations during Golden Trace; but I would have liked to learn how the fire support personnel respond not only to the harsh environment of the Arctic, but also how they balance these unique climatic conditions with providing fire support to the maneuver forces. During the visit of the Mobile Training Team, we encountered fire support personnel of the highest caliber who were extremely well-versed on fire support matters. Here are two areas of interest peculiar to their situation: Arctic survival equipment and mission-essential equipment add up to be an extremely heavy load to carry on the backs of soldiers assigned to fire support positions; and the Arctic terrain causes target location problems, but the training set, fire observation, and extensive field training helps fire support soldiers to overcome these problems.

As I stated above, the 1-37th FA represents artillery in the Arctic in an extremely competent manner. Anyone considering operations in that region of the world would gain significantly from sharing in their experience. I offer these comments only as food for thought to other artillerymen hoping to learn how to provide the best possible fire support to the maneuver anywhere in the world.

Daniel W. Shupe
Capt, USMC
Fort Sill, OK

## Use of M17 for determining location

Since the inception of the FIST there has been much emphasis placed on the need for the forward observer to determine distances and grid locations accurately. The field artillery's most recent attempt to ensure such accuracy is the laser rangefinder (AN/GVS-5). It is a beautiful piece of equipment, but let's look at how it is presently used. The forward observer applies the laser distance to an observed fire fan. The observed fire fan shows increments of 100 mils; so he estimates the direction to the nearest 10 mils on the map. He then reads the six-digit grid. Here's the best part—to find an eight-digit grid, he either adds zeros or guesses to the nearest 10 meters.

All of the new "Buck Rogers" equipment is great, but we should widen our horizons. The M17 plotting board can help significantly. Let me put it into a scenario. A forward observer is given a mission to occupy an observation post with primary observation to the northwest. While in his assembly area, prior to departure, he prepares the M17 plotting board by superimposing the grid reference lines of his area of operation, plotting his proposed location, and plotting any defensive targets (figure 1). Once the forward observer has occupied the observation point, he prepares his position as per the unit SOP. The only change occurs with the completion of the terrain sketch. Instead of map-spotting the grids, he records the direction and laser distance to each target on the terrain sketch. He then refines the M17 proposed location to an accurate, actual location. By spinning off the direction on the M17 (figure 2) and measuring the distance (figure 3), he can plot the target. By re-orienting the M17 to the north (figure 4) he can obtain an accurate eight-digit grid. This accurate grid can be placed with the direction and distance located on the terrain sketch.

This is nothing more than the reverse process of the steps taken by a mortar fire direction center to find a target grid given to it by a forward observer.

With practice, the process can be quick and accurate. With all systems there is some flaw; and with this system, it is the M2 compass. The M17 is accurate to within 1 mil; the M2 in the hands of an experienced soldier is accurate to within 10 mils. By measuring an accurate direction to two or three reference points in the area of observation, a forward observer can use his binoculars and the RALS adage to obtain a direction accuracy of plus or minus 2½ mils.

The M17 is currently used by most fire direction centers for terrain gun position corrections. The fire direction officer or chief computer can be the local in-house expert to teach fire support personnel how to use the M17 in this way.

Tom Adams
SSG, USA
Fort Bragg, NC

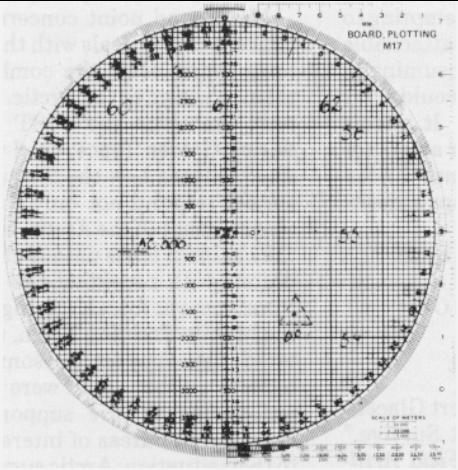



**Figure 1. Step 1—superimpose grid reference lines and proposed observation post location. Target AC0001 is an offensive target to cover the occupation.**

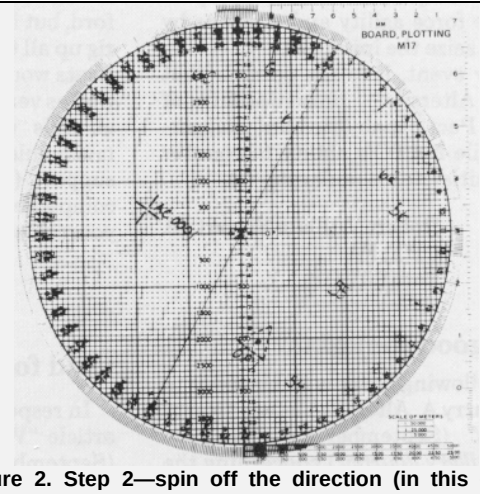



**Figure 2. Step 2—spin off the direction (in this case, 5,900 mils).**

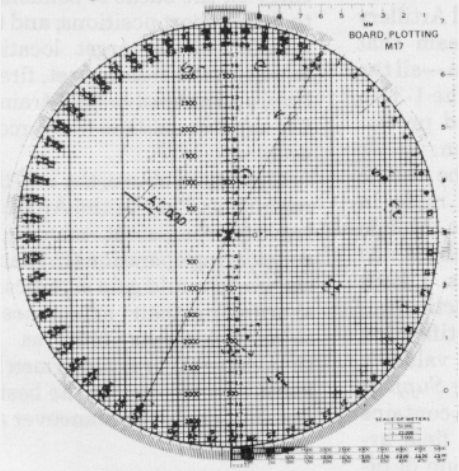



**Figure 3. Step 3—measure the laser distance on the M17 (in this case, 1,500 meters).**

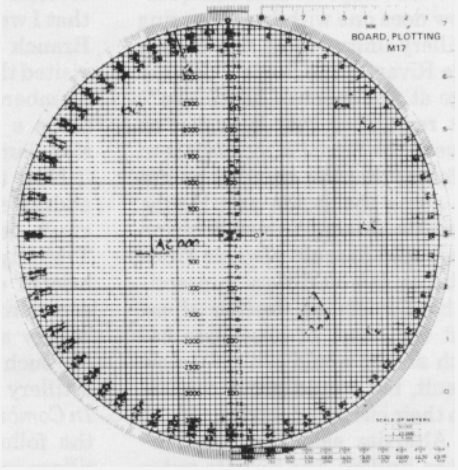



**Figure 4. Step 4—orient north to read the eight-digit grid (in this case, 60835554).**

## From a one-time rifleman

"Keep the Fires Burning" (January-February 1984 *Field Artillery Journal*) has prompted me to share these thoughts on final protective fires, field artillery in the direct fire mode, the relationship between the maneuver commander and the artillery coordinator, the importance of time in thwarting a counterattack, and a realistic evaluation of the effects of artillery fire.

### Distance

One recurring misconception pops up again in "Keep the Fires Burning," and that is the confusion between safety limits for peacetime exercises and wartime safety limits.

The author states, "The FPL (final protective line) is normally located 200 to 300 meters in front of the company, and so the indirect fire will . . . be spotted dangerously close to friendly troops." In combat there are reasons for placing the final protective fires, including those from artillery, some 200 to 300 meters to the front, but troop safety is not one of them. To this onetime Third Army rifleman, anything over 50 meters might be dangerously distant. The effective wounding radius of most artillery shells against troops in the open is about 8 to 10 meters. For troops in foxholes, as the friendly troops ought to be, then any shell that does not come right into the foxhole with me probably won't hurt me (assuming, of course, that the shell is high explosive with a point-detonating, super-quick fuze).

The article outlines an enemy having good counterbattery capability. That kind of enemy would normally fire a preparation, perhaps a multibattalion preparation in support of his counterattack. If a few of our shells fall short and drop in with those of the enemy, it won't make a whole lot of difference overall.

The most important effect of shell fire from our one battery may be to cause the attacking infantry to occasionally dive into the ground for cover, thereby slowing the enemy attack and giving the defenders more chance to stop him with direct fire. Within limits, artillery shells from indirect artillery fire are relatively easy to dodge. With good unobstructed bilateral hearing, a rifleman has time to determine the path of flight of the incoming shell, move a few meters away from its apparent point of impact, and dive into a depression such as a wheel rut and evade all the effects of that shell, other than perhaps getting a little muddier. (The new Kevlar helmet design obstructs that kind of hearing, and therefore our infantry may take many more casualties than they have in the past; but that's another problem.)

### Direct fire

By the way, in contrast to indirect fire, direct artillery fire (as with the German 88 and as copied now by the Soviets) is so effective against the rifleman that our doctrine should include guidance on our employment of artillery in the direct fire mode also.

### Responsibility

It is wrong for a maneuver unit commander to give technical direction to the artillery. He may say *what* he wants done, but *how* it is done is the province of the artillery.

### Time

As it is with almost everything in life, with good timing, you win; with poor timing, you lose. The scenario presented in "Keep the Fires Burning" was one of fluid conditions—presumably each of the six available maneuver companies of the brigade attacked, gained its objective, and was to be counterattacked by an in-place enemy reserve division, say within 15 minutes of the time those companies reached the far side of their objective. The companies then have perhaps 15 minutes to reorganize and dig in. In 15 minutes, a rifleman can usually dig a good enough foxhole to survive most artillery fire.

The line of departure for the enemy counterattack is normally the next line of concealment, which is often as close as 200 to 300 meters away. From the time we see the enemy leave his line of departure until he is on our positions may be only 20 or 30 seconds. One hopes that word of the counterattack and our call for final protective fires can get back to our supporting battery in maybe 10 seconds, that the field artillerymen can slam a round into the chamber in maybe 5 seconds, and that we can get a burst on the ground in front of us in a total elapsed time of maybe 20 seconds. By that time the attacking enemy might be within 50 meters of us, and that is where the shells need to land.

### The effects of artillery fire

If the company commander has only one priority target on which the artillery tubes are laid when not shooting, this one-time rifleman would want that target to also be the final protective fires. That a priority target is fired with a limited number of rounds is no problem. The counterattacking enemy either makes it or is stopped in about 60 seconds anyway; so "battery six rounds" might be all that it takes. If not, then there will be time available to adjust as indicated while those rounds are being fired. (Mortars, especially company mortars, should be employed in a manner perhaps much different from the manner in which artillery is employed. At the company level they are much more responsive to the needs of the rifle squads than is artillery, and their role in final protective fires has important differences; but this too is a separate problem.)

To think in terms of having only one battery to support a company when final protective fires are needed is pitiful, but it could happen. Six or eight artillery shells exploding across a company front every 10 or 15 seconds is pathetic as far as supporting fires go—it is worth shooting, but by itself it is just an inconvenience for the attackers. It would take two or three battalions of artillery to stop an attack over the area of a company front by artillery fire alone.

Here is a story which illustrates my point about the effect of artillery fires. In one attack on a company-sized objective (a small town which was a strongpoint in the Siegfried Line), my company was supported by a 5-minute time-on-target preparation fired by eight battalions of artillery. That was maybe 140 tubes firing over 3,000 rounds. Under cover of the smoke and dust raised by those shells, we closed to within about 50 meters of the shell bursts, waited for the shell smoke which was the last shell fired, and then occupied the town. (Actually we reoccupied the town since we had taken it once and had been counterattacked and driven out.) Most of the defenders left out the back edge of the town as we were coming in the front edge. The remaining defenders were pretty well dazed, and those we simply rounded up and sent to the rear. There were casualties among the defenders, but not nearly what might be expected from 3,000 rounds of artillery. The margin of victory is almost always paper thin. Among other things, let us keep our evaluation of the effects of our artillery fire realistic.

Robert P. Kingsbury
LTC (Ret), FA (USAR)
Laconia, NH

**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*.

# Hotline

## QUESTIONS AND ANSWERS

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

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

***Question:*** *What is the reference to use for completing howitzer range cards; i.e., to determine type of shell, fuze, and quadrant elevation?*

**Answer:** FM 6-50, page 4-8, discusses the preparation of howitzer range cards. Shell and fuze are determined according to the nature of the expected target. The highest charge should be used for direct fire. The quadrant elevation is determined from the tabular firing tables.

***Question:*** *My question concerns the Field Artillery Regimental System, particularly as it pertains to the 41st Field Artillery Regiment. Where will the battalions be located and in which major division?*

**Answer:** Regimental affiliation for the following units was originally scheduled for March 1985 but has been postponed one year. Unit designations, major divisions, and locations are:

- 1st Battalion, 10th Field Artillery, 3d Infantry Division, Schweinfurt, Germany.
- 1st Battalion, 35th Field Artillery, 24th Infantry Division, Fort Stewart, Georgia.
- 2d Battalion, 35th Field Artillery, 24th Infantry Division, Fort Stewart, Georgia.
- 2d Battalion, 39th Field Artillery, 3d Infantry Division, Kitzingen, Germany.
- 2d Battalion, 41st Field Artillery, 3d Infantry Division, Bad Kissengen, Germany.
- 5th Battalion, 41st Field Artillery, 194th Infantry Brigade, Fort Knox, Kentucky.
- 3d Battalion, 37th Field Artillery, 210th Field Artillery Brigade, Herzo Base, Germany.

***Question:*** *Will the 4.2-inch mortars at the mortar platoon level be able to interface with TACFIRE?*

**Answer:** If the Fire Control Calculator (FCC) is available at the mortar platoon, the mortars can be interfaced with TACFIRE. The Infantry School is the proponent agency for the FCC.

***Question:*** *Where can I obtain a copy of the J-series table of organization and equipment (TOE) for a 155-mm self-propelled field artillery battalion in direct support to a heavy mechanized separate brigade so that the unit can figure out the footage necessary for motor pool expansion?*

**Answer:** The J-series table of organization and equipment does not exist at this time, but when the TOE is published (approximately six months from now) a copy can be obtained by calling AUTOVON 639-5523.

***Question:*** *Is there any literature that tells how to set dummy fuzes? Also, how can these fuzes be obtained?*

**Answer:** Each field artillery weapon's -10 technical manual has detailed instructions on setting the M564 and M577 MTSQ fuzes. The Fort Sill Training and Audiovisual Support Center (TASC) has prepared plastic fuzes for the M564, M565, and M728 fuzes (TASC Catalog, page 7-41). TASC has also prepared a 4- by 8-foot training aid (page 7-42, TASC Catalog) which can be used to teach personnel how to set the M564 and M565 fuzes. These items can be obtained through your local TASC.

***Question:*** *Our unit needs a BB 590/U battery for our Lance Fire Direction System computer. We used the national stock number, NSN 6140-01-063-5918, listed in the Additional Authorization List of TM 11-7440-283-12-1, but without success. What is the correct nomenclature to order the battery?*

***Answer:*** There was a misprint in TM 11-7440-283-12-1, and a DA Form 2028 has been submitted to correct the error. The correct nomenclature is: Battery, rechargeable, BB 590/U, nickel-cadium sealed, NSN 6140-01-063-3918, FSCM 51828. The battery is manufactured by Brentronics.

***Question:*** *FM 6-20 (28 Jan 83) mentions the existence of Target Spread Sheets and Target Sheets that can be used to identify high payoff targets in different threat scenarios. Where does one obtain these sheets?*

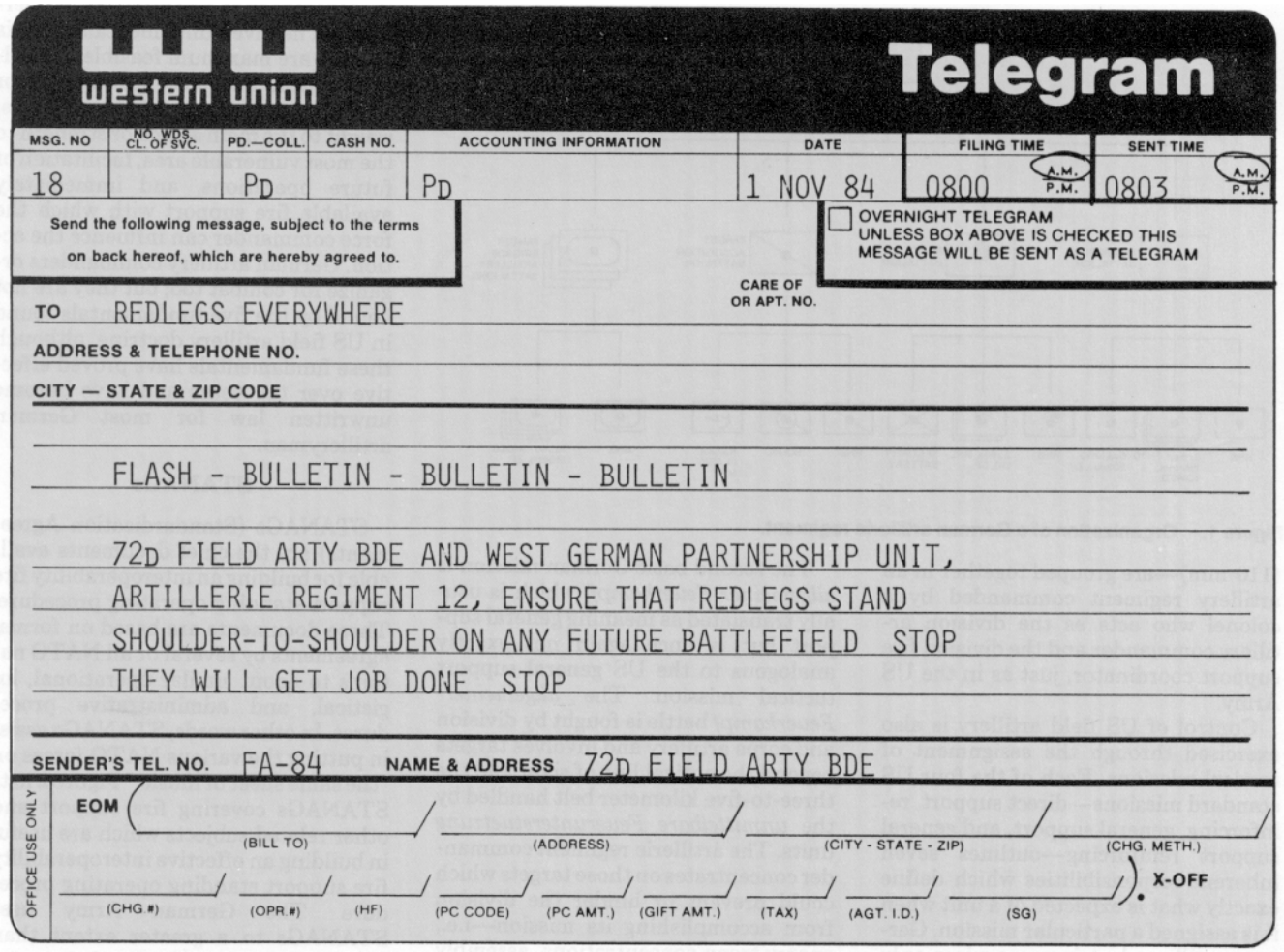
**Answer:** The target value analysis was originally published as chapter 3 of the Fire Support Mission Area Analysis (classified SECRET-NOFORN) which can be obtained by writing to Commandant, US Army Field Artillery School, ATTN: ATSF-CCT, Fort Sill, Oklahoma 73503-5600.

***Question:*** *The old FM 6-40 (Dec 78), page 8-15, in column 2 of the TGPC Form, indicates that one should never use a 100/R value of 25. The new FM 6-40 (Final Draft, Feb 84) makes no mention of this; in fact, page 12-29 shows an example of using a 100/R value of 24.*

**Answer:** The value of 24 was used in the cited example along with the procedures in paragraph 3, page 13-29 of FM 6-40, to determine the position deflection correction. A maximum 100/R value of 25 should still be used to compute manual special corrections to avoid the possible crossing of trajectories. Terrain gun position corrections (TGPCs) are no longer addressed in FM 6-40 and are no longer taught at the Field Artillery School because their validity rapidly deteriorates at anything other than center range or center sector.

***Question:*** *Page 3-9 of FM 6-20 (28 Jan 83) shows a matrix of type units and communication nets FISTs monitor. The matrix suggests that neither armored cavalry troop nor tank company has a requirement to monitor the squadron fire support net. Following these guidelines, how is the non-TAC-FIRE equipped fire support officer or fire support team (FIST) to exchange fire support and planning information?*

**Answer:** The illustration on page 3-9 of FM 6-20 shows a matrix of the type of unit, net, and radio to be monitored by the FIST. The armored cavalry troop or tank company FIST would communicate with the squadron fire support officer on the established fire net designated in the first column of the matrix. The figure on page 3-15 of FM 6-20 details the radio net requirements for the squadron fire support section.



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# Stahl am Ziel

**by Captain Thomas R. Hansinger and First Lieutenant Daniel J. Travers**

Interoperability is a term which represents a concept which may be critical to the survival and combat effectiveness of artillery units on future battlefields. Joint Chiefs of Staff Publication 1 defines it as "the ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together." For the NATO alliance it means that, to defend against a Warsaw Pact attack, the armed forces of the member nations will have to fight together; communicate with each other; effectively pass intelligence data, target information, and operations orders; and conduct fire support coordination. And if they have interoperability, it means *Stahl am Ziel*, or steel on the target. Unfortunately, interoperability training receives too much "lip service" and too few appearances on a unit's training calendar.

Successful interoperability in the conduct of fire support coordination will be the key to making maximum use of available field artillery assets. The 72d Field Artillery Brigade has been working for quite some time on joint US-German fire support operating procedures with its partnership unit, Artillerie Regiment 12. As a result of this work, it can now offer suggestions on the development of fire support standing operating procedures which overcome differences between US and German field artillery doctrine and procedures.

### Command and control

The variations between US and German techniques do not significantly inhibit interoperability. Command and control of field artillery in the US Army is established through command relationships, assignment of tactical missions, or organization for combat. Command relationship indicates whether the field artillery unit is organic, assigned, or attached.

In the German Army, each maneuver brigade has an organic 155-mm artillery battalion, which is *commanded* by that brigade's commander. As indicted in figure 1, the other three artillery battalions in the division—target acquisition, heavy composite (155-mm and 203-mm), and rocket

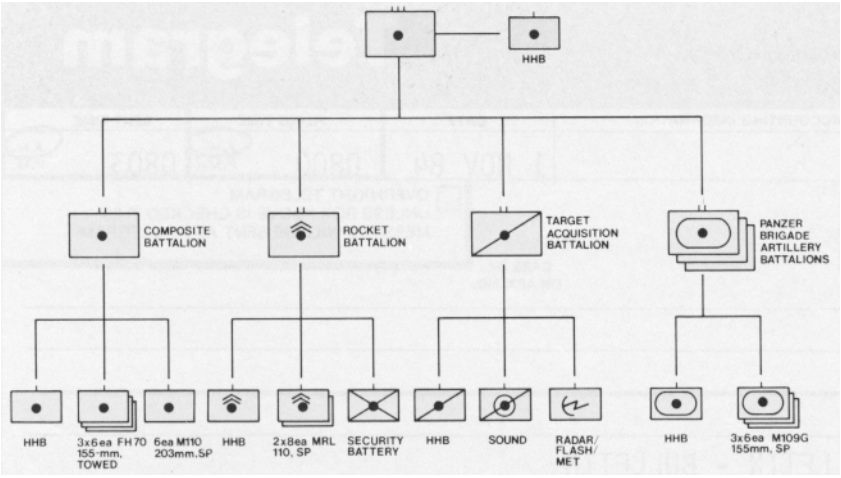


**Figure 1. Organization of a German artillerie regiment.**

(110-mm)—are grouped together in an artillery regiment commanded by a colonel who acts as the division artillery commander and the division fire support coordinator, just as in the US Army.

Control of US field artillery is also exercised through the assignment of tactical missions. Each of the four US standard missions—direct support, reinforcing, general support, and general support reinforcing—outlines seven inherent responsibilities which define exactly what is expected of a unit when it is assigned a particular mission. German artillery doctrine recognizes only two basic missions—*unmittelbare Feuerunterstuetzung* and *allgemeiner Feuerkampf*.

The mission of *unmittelbare Feuerunterstuetzung* may be compared to the US mission of direct support, but it is carried out solely by the organic brigade artillery because it requires the closest possible cooperation with the maneuver troops. Artillery performing *unmittelbare Feuerunterstuetzung* concentrates on area targets located in a belt three to five kilometers from the forward edge of the battle area, and these targets are acquired through the use of the battalions' own observers and the moving-target-locating radar AN/TPQ-58, known to the Germans as RATAC. Quick-fire channels may also be established between these battalions and the two "Green Archer" mortar-locating radars from the division's target acquisition battalion (Beobachtungs Bataillon). German battery commanders from the *unmittelbare-Feuerunterstuetzung* battalions perform all the duties of the US fire support officer, but otherwise the inherent responsibilities associated with the US direct support mission are the same. The significant difference is the command relationship.

The second basic German mission is *allgemeiner Feuerkampf,* which is usually translated as meaning general support but is once again not exactly analogous to the US general support tactical mission. The *allgemeiner-Feuerkampf* battle is fought by division and corps artillery and involves targets beyond the optical line of sight and the three-to-five kilometer belt handled by the *unmittelbare Feuerunterstuetzung* units. The artillerie regiment commander concentrates on those targets which could prevent or hinder the division from accomplishing its mission—i.e., enemy troop concentrations, assembly areas, command and control facilities, and counterfire. Targets are acquired primarily through technical means such as sound and flash ranging and radar.

Although the German Army does not consider reinforcing or *Feuer Verstaerkung* as a standard mission, the fires of the *unmittelbare-Feuerunterstuetzung* and *allgemeiner-Feuerkampf* battalions may be reinforced either through command relationships (attachment and assignment) or through fire. Units used in an *Feuer-Verstaerkung* role may be from the corps artillery, from the *unmittelbare-Feuerunterstuetzung* battalion of the division's reserve maneuver brigade, or from a rocket battery of the artillerie regiment.

The German Army does not recognize the mission of general support reinforcing, although an *allgemeiner-Feuerkampf* battalion may be directed in an artillery order to dedicate a certain number of rounds to the reinforcement of another battalion.

In the US Army, the fire support coordinator uses the organization for combat to ensure that field artillery assets are allocated properly and that proper missions are assigned to support the force through all phases of the operation. The five fundamentals of this process are maximum feasible centralized control, adequate fire support for committed close combat elements, weight to the main attack or strength to the most vulnerable area, facilitation of future operations, and immediately available fire support with which the force commander can influence the action. German artillery commanders organize for combat too; but they are not bound by the five fundamentals found in US field artillery doctrine, although these fundamentals have proved effective over the years and have become unwritten law for most German artillerymen.

## STANAGs

STANAGs (Standardization Agreements) are the chief documents available for building an interoperability fire support standing operating procedure. These documents are based on formal agreements by several or all NATO nations to adopt similar operational, logistical, and administrative procedures. In other words, STANAGs assist in putting the various NATO forces on "the same sheet of music." Figure 2 lists STANAGs covering fire support and other related subjects which are useful in building an effective interoperability fire support standing operating procedure. The German Army uses STANAGs to a greater extent than does the US Army; in fact, their target lists and fire support plans come directly from the STANAGs while those of the US Army are derived from FM 6-20 and bear little resemblance to the NATO version.

## Liaison

By working together on various field training and command post exercises, the 72d Field Artillery Brigade and Artillerie Regiment 12 found that the key to successful interoperability was the establishment of effective liaison. To set the stage for further discussion, it will be useful to assign a hypothetical mission for a US field artillery brigade; namely, *reinforcing* a German division artillery (artillerie regiment).

Figure 3 illustrates a possible organization for combat in which the US battalions in the brigade (203-mm) have the mission of reinforcing (or general support reinforcing) the German brigade *unmittelbare-Feuerunterstuetzung* units and the *allgemeiner-Feuerkampf* (heavy composite) battalion. Liaison should be established in accordance with STANAG 2101. Experience has shown that utilization of the Communication-Electronics Operation Instructions of another nation and

STANAG 2008—Bombing, Shelling, Mortaring, and Location Reports
STANAG 2011—Target Grid Procedures.
STANAG 2014—Operation Orders, Annexes to Operation Orders, and Administrative and Logistics Orders.
STANAG 2020—Tactical SITREPS.
STANAG 2031—Proforma for Artillery Fire Plan.
STANAG 2088—Battlefield Illumination.
STANAG 2099—Fire Coordination in Support of Land Forces.
STANAG 2101—Principles and Procedures for Establishing Liaison.
STANAG 2103—Reporting Nuclear Detonations, Radioactive Fallout, Biological/Chemical Attacks.
STANAG 2104—Friendly Nuclear Strike Warning to Armed Forces Operating on Land.
STANAG 2111—Target Analysis.
STANAG 2144—Call for Fire Procedures.
STANAG 2147—Target Numbering System (Nonnuclear).
STANAG 2865—Recording of Data for Artillery Survey Control of Points.
STANAG 2867—Radio Telephone Procedures for the Conduct of Artillery Fires.
STANAG 2875—Calls for Destruction, Smoke, Illumination, and Danger Close Missions.
STANAG 2887—Tactical Tasks and Responsibilities for Control of Artillery.
STANAG 4061—Adoption of a Standard Ballistic Meteorological Message.

**Figure 2. Standardization agreements upon which to build an interoperability fire support standing operating procedure**

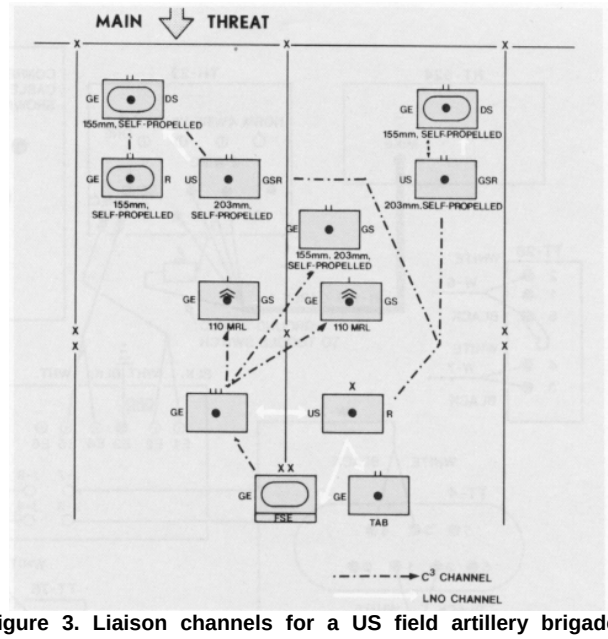


**Figure 3. Liaison channels for a US field artillery brigade reinforcing a German artillerie regiment in the main battle area.**

communicating on the radio in a foreign language are possibilities that are useful in specific cases, but should not be the rule. Therefore, the employment of liaison personnel will generally mean that they use their own equipment, including vehicles and radios, and speak in their own language while transmitting. The reinforcing battalion's liaison parties reporting to the reinforced battalion's tactical operations center should be bilingual, as should the German liaison party reporting to the US field artillery brigade's tactical operations center. This exchange of bilingual liaison personnel between the German artillerie regiment and the US field artillery brigade headquarters greatly enhances communications and fire support coordination. For example, during the move of a reinforced German battalion, the liaison element of the reinforcing US battalion is also moving. To ensure that the US battalion can still receive fire missions and provide effective fire support, one of three options is recommended:

- A second liaison element of the US battalion reports to the German artillerie regiment headquarters before the move is in effect.
- Fire missions are relayed through the liaison channel of the US field artillery brigade down to the battalion.
- Bilingual personnel in the US battalion's fire direction center monitor the German artillerie regiment's fire direction net.

## Counterfire

Another role for the US field artillery brigade is counterfire. In the German artillery, counterfire is viewed a part of the *allgemeiner-Feuerkampf* battle. The mission for counterfire is normally assigned to the artillerie regiment and is usually delegated to the heavy composite battalion. On order of the regiment, artillery battalions of the German brigade may also participate if its close support mission permits. Common practice is to assign the German division's two Green Archer weapons-locating radar sections to the artillery battalions of the German brigade. In a general support counterfire role, the US 203-mm battalions can lift much of the burden from the artillery battalions of the German brigade and the heavy composite battalion. Collocated with the artillerie regiment's fire direction center is the S2 evaluation center of the Beobachtungs Bataillon. All identified counterfire targets will be transmitted there, or the target acquisition personnel can be instructed to coordinate directly with the designated counterfire units. A very effective method of using the US field artillery brigade in this role is to send a counterfire cell from the field artillery brigade headquarters to the Beobachtungs Bataillon S2 evaluation center. Targets are then passed through US channels, and the 203-mm units are employed in a general support or general support reinforcing counterfire role—i.e., they provide reinforcing fires to the German close support battalions and at the same time, along with the German composite battalion, provide general support fires across the division front. Under existing modified tables of organization and equipment, this collocation of the US field artillery brigade's counterfire cell with the processing center of the Beobachtungs Bataillon has proved difficult due to the counterfire cell's lack of radios and an organic vehicle.

Another possibility for increasing the ability to provide effective counterfire would be to have the US field artillery brigade monitor the German radar quick-fire channel. A linguist at the receiving end would greatly facilitate responsiveness.

## The challenge of communications

For any artillery unit to accomplish its mission, it must be able to shoot, move, and communicate. In the US field artillery brigade, coordination of communications assets is at the very least a meticulously monitored task; but when NATO communications assets are introduced into the command and control structure, seemingly insurmountable problems may arise unless the commander has adequately prepared the unit to meet this challenge.

The communications assets—FM radio systems, radioteletype systems, field wire and cable, and switchboard systems—available to the US field artillery brigade parallel those available to its German counterpart. But, while the descriptions of the systems are the same, there are inherent technical differences between US and German equipment which must be overcome to

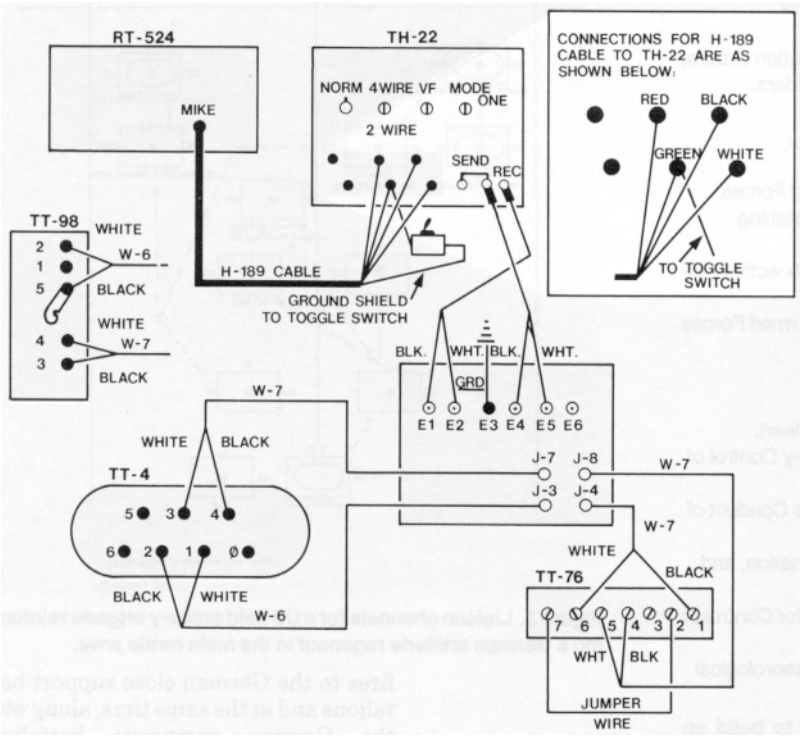


**Figure 4. A secure FM teletype system which uses US equipment.**

allow the NATO commanders to enhance their communications rather than impede them. Nevertheless, these communications assets can be meshed to achieve optimal command and control; in fact, the 72d Field Artillery Brigade has developed interface equipment to achieve the desired effect.

The AN/VRC-12-series of FM radios, of which the major receiver-transmitter component is the RT-524, is compatible with its German counterpart over a narrow frequency range. The US AN/VRC-12 radio has a range of 35.00 to 75.95 megahertz, while its German counterpart has a range of 38.90 to 58.40 megahertz; therefore, the FM frequency range must be taken into consideration in frequency planning. Care must be exercised by the US commander to ensure that frequencies dedicated to radio nets accessible to German units remain within the frequency range of German FM equipment. This coordination can become a tedious task for frequency planners due to frequency allocations available to a given locality or unit.

Another problem encountered in FM radio communications involves squelch settings. In order to interface US and German FM radios, US radio operators must set their squelch setting on the "old squelch on" position since the German FM radios do not have a "new squelch on" position. While this may sound like a small problem, it can be significant. The massive influx of Vinson secure systems and FM radio systems into Europe (all of which require "new squelch on" settings to operate) have caused most operators to forget about other squelch positions.

Another FM radio problem that has manifested itself in recent months is the problem of talking in the secure-voice mode with German units. The Vinson secure voice system, now the mainstay of secure-voice FM systems, is not releasable to foreign nationals. If the US commander wishes to talk in the secure-voice mode with a German counterpart, he must send US personnel and equipment to live with the German unit and act as a liaison element. Since some unit's modified tables of organization and equipment do not allocate these additional liaison assets, the US commander must make a decision on whether to talk in the non-secure mode or to reallocate personnel and equipment designated for a different mission to liaison services.

Radioteletype systems, be they AN/GRC-142 one-way reversible or AN/GRC-12 full-duplex systems, provide the field artillery commander with secure hard-copy message traffic. This communication system plays a vital role in the field artillery since it is highly mobile, can be effective over long distances, and has a planning range of at least 100 kilometers. The German artillery commander utilizes the radioteletype system in much the same way as does his US counterpart. However, while the German system uses an FM radio, the US equipment uses an AM radio (AN/GRC-106). The radio is the only part of the receiver-transmitter system that is not compatible. To overcome this problem, Staff Sergeant Kenny L. Thompson of the 72d Field Artillery Brigade's communications-electronics platoon used US equipment to develop a secure FM teletype system which effectively interfaced with German equipment. The system includes and AN/VRC-12-series receiver-transmitter (RT-524) as a carrier, a TH-22 signal converter with a modified H-189 microphone cable, a TT-76 perforator, and either a TT-4 or TT-98 teletype. The signal is received through a KW-72 ORESTES system also employed by the German army as secure gear; it can be set up to work via FM radio or over land-line (wire) teletype. A schematic diagram of this FM radio teletype system is shown in figure 4. If this FM radioteletype system is employed, certain factors must be considered. For example, the equipment used for the FM radioteletype system is allocated in the unit's modified table of organization and equipment for support of other teletype nets; therefore, commanders must be willing to designate FM radio and teletype equipment for employment outside of its designated purpose. Also, the minimum planning range of a US radioteletype system using AM radio equipment is 100 kilometers, while FM radio equipment has a maximum planning range of 20 to 40 kilometers, depending on which antenna system (whip or ground planar) is employed. Thus, the communications distance

**Notes:**

**1. This system must be run at 66 words per minute in order to be compatible with the German teletype system and must be grounded.**

**2. This system provides the capability of transmitting and receiving on both the TT-4 and the TT-98. Connections for the TT-98 are shown above.**

**3. Switches on the TH-22 must be set as shown above: Norm, 4-wire, VF, and mode one.**

**4. One can make this system capable of transmitting over a secure land-line by disconnecting the black and white wires on the TH-22, setting the TH-22 in the 2-wire mode of operation, and putting a WD-1 wire line in place of the black and white wire that has been removed. (If one follows all these steps and is still unable to communicate, then it may be necessary to switch the two ends of the WD-1 wire line.)**

**5. The RT-524 is keyed by using the toggle switch.**

enjoyed through AM radioteletype is greatly reduced. Also, the US commander must ensure that he either uses German key settings for the KW-72 blocks for the KW-7 or else uses allied releasable key lists. These key lists may be different from those normally employed by his unit's communications-electronics security personnel.

Both US and German units use WD-1 or WD-1A field wire, and the US TA-312 and TA-43 telephone sets are compatible with German field telephones; thus, simple wire communications are no problem. Under certain circumstances, due to circuit type or to reduce individual wire lines, a commander may wish to use 26-pair field cable. German units do not have 26-pair cable; 10-pair cable is their standard field cable. Also, US cable junction boxes (J-1097) will not accept German 10-pair cable ends for termination; nor will German junction boxes accept US 26-pair cable ends. The US commander can solve this cable interface problem by using the procedure shown in figure 5. A junction box applicable to each cable type is placed at the end of each cable in close proximity. Then WD-1 field wire is run between the terminal strips in each junction box, thus interfacing the two cable types. This method works well and gives the US commander a greater capability in case of circuit loss due to cable-pair failure; since there are 16 extra cable pairs not being employed (10-pair would be the maximum amount the German cable could accept at any given time), the commander can merely switch pairs if a cable-pair fails.

The US and German switchboards are compatible with certain adjustments developed by Sergeant Jeffrey L. Walker, Switchboard Section Chief in the 72d Brigade's communications electronics platoon of Headquarters and Headquarters Battery, 72d Field Artillery Brigade. The US SB-3614 switchboard—the major end item of the AN/TCC-41 switchboard system—is used by the 72d Field Artillery Brigade and must have German circuits terminated at a Type I circuit card, ring-down trunk mode. If direct dialing without operator assistance is desired and the German switchboard is a manual type, the SB-3614 must carry an 02 classmark in its program. Also, a telephone (such as a US TA-838) with dual-tone multifrequency capability and local battery power for voice amplification must be present at the German switchboard. If the German element has this equipment, then the SB-3614 treats the German switchboard like a US SB-22 manual switchboard operating as a dual-tone multifrequency telephone from the emergency operator position. If dual-tone multifrequency equipment is not present at the German element, the SB-3614 treats the German switchboard like a straight SB-22 manual switchboard; and operator assistance is mandatory. In either case, as indicated in figure 6, this is a two-wire connection. Internal patching in the TCC-41 system is manual for a four-wire trunk circuit.

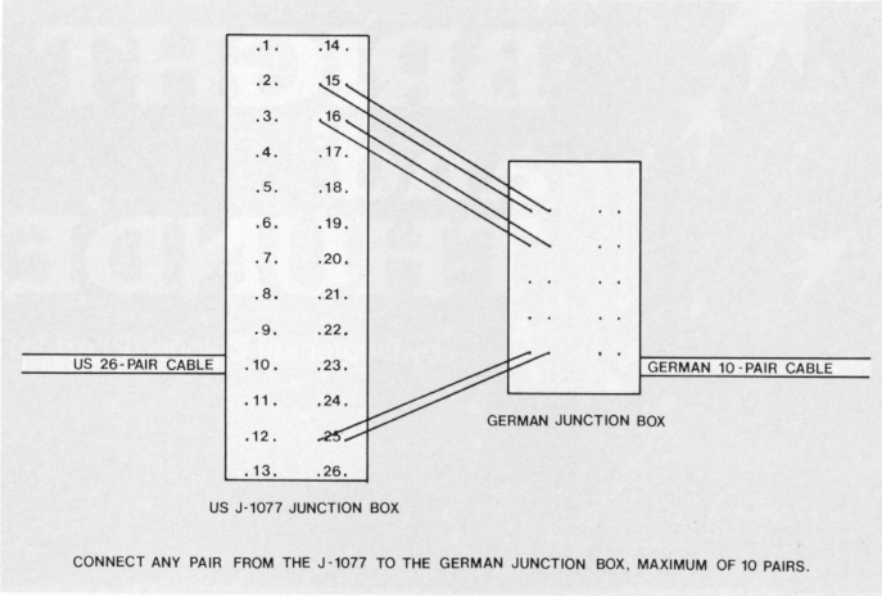


**Figure 5. Procedure for joining Erman 10-pair cable to US 26-pair cable.**

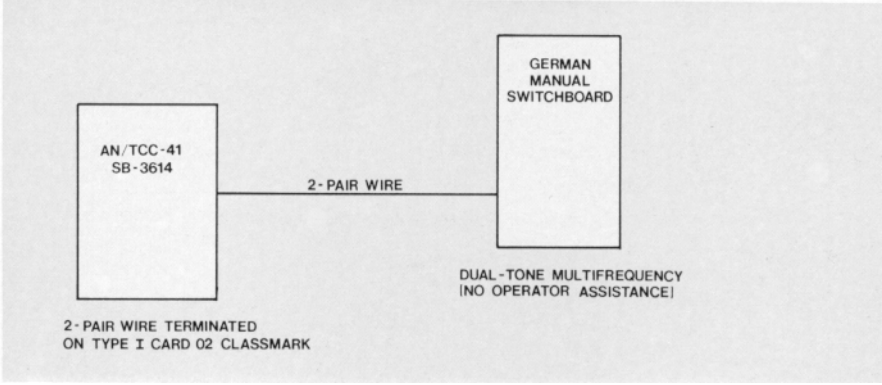


**Figure 6. Hook-up for German and US switchboards.**

## Conclusion

The US and German commanders can effectively communicate with their given assets if they compensate for equipment differences. Once a US unit establishes a joint fire support standing operating procedure with its allied unit and becomes familiar with its implementation, then fire support coordination should be accomplished as easily as though one were working with another US unit. A US unit will know it has achieved true *interoperability* when a German unit can control the fires of a US unit and vice versa. The 72d Field Artillery Brigade and its partnership unit, Artillerie Regiment 12, have gone a long way toward ensuring that Redlegs from both countries can stand shoulder-to-shoulder on any future battlefield and get the job done.

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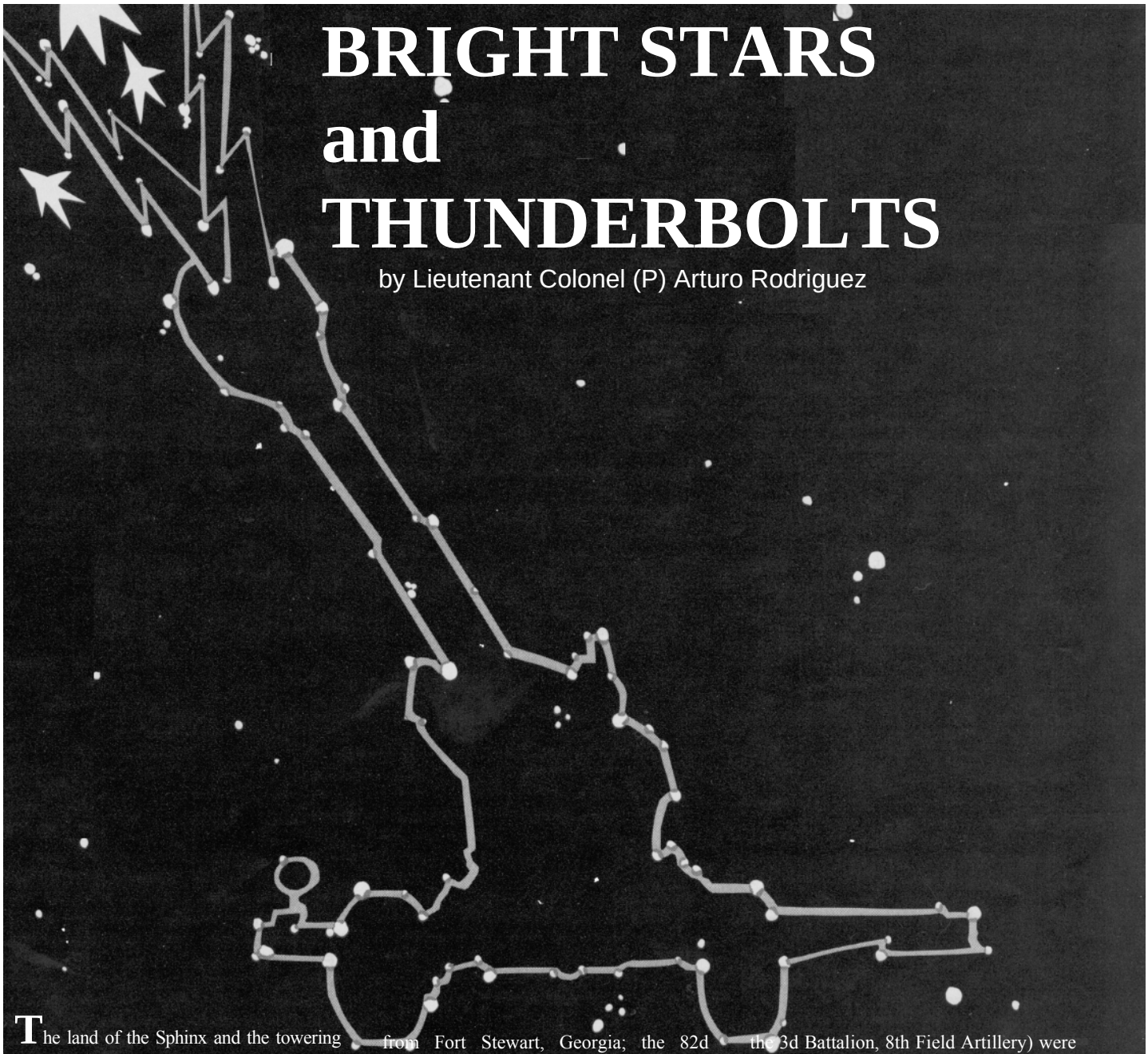
# BRIGHT STARS and THUNDERBOLTS

by Lieutenant Colonel (P) Arturo Rodriguez



The land of the Sphinx and the towering pyramids of Giza framed the scene for Bright Star 83 conducted in Egypt and Sudan in August and September 1983. Bright Star 83 was a Joint Chiefs of Staff directed, US Central Command coordinated combined training exercise to demonstrate the United States' capability and resolve to deploy a substantial force to that troubled area should a contingency arise.

The XVIII Airborne Corps tailored the troop list to represent a complete cross-section of the corps combat and support forces with elements of all major subordinate commands participating. Included were combat task forces of the 24th Infantry Division (Mechanized) from Fort Stewart, Georgia; the 82d Airborne Division from Fort Bragg, North Carolina; the 101st Airborne Division (Assault) from Fort Campbell, Kentucky; and the 6th Cavalry Brigade (Air Combat) from Fort Hood, Texas. Supporting forces represented the 11th Air Defense Artillery Brigade from Fort Bliss plus the 18th Field Artillery Brigade, 35th Signal Brigade, 16th Military Police Brigade, 525th Combat Electronic Warfare and Intelligence Group, and 1st Corps Support Command from Fort Bragg. In all, over 2,500 personnel from XVIII Corps were deployed to the exercise area.

The Thunderbolts from Battery B, 1st Battalion, 73d Field Artillery (now the 3d Battalion, 8th Field Artillery) were chosen as the artillery unit to participate in the exercise. The mission of the 1-73d FA is normally general support or general support reinforcing, butor this exercise Battery B was directed to function in a direct support role using fire support teams (FISTs) and fire support officers (FSOs) from the maneuver forces of the 24th, 82d, and 101st Divisions. Battery B's training objectives were to:

- Provide direct support in combined arms operations.
- Test the mobility of the M198 with narrow tires.
- Fire the rocket-assisted projectile in a desert environment.

• Test the mobility of the new 5-ton M923 as a prime mover for the M198 155-mm howitzer and compare its capabilities with the M813 prime mover.

• Learn how to survive in a desert environment.

• Gain insight into the host nation's training priorities and methods.

• Interoperate with the host nation's artillery.

• Learn the capabilities and limitations of the host nation's artillery and related equipment.

• Become familiar with the host nation's small arms and crew-served weapons.

• Learn the host nation's field artillery tactics and techniques in support of maneuver forces in the desert.

To accomplish these objectives within the constraints of limited cargo space in ships and airframes, the field artillery contingent consisted of battalion and battery fire direction centers, a battalion S4 section, a battalion operations section, a battery headquarters platoon, four M198 howitzer sections, and the 18th Field Artillery Brigade meteorological section. In addition to a position and azimuth determining system (PADS), the major items of equipment included four medium towed howitzers; five M813 5-ton, 6×6 cargo trucks with winch; one M923 5-ton cargo truck; one M813 5-ton cargo truck with fuel pods; one M561 1¼-ton cargo truck; two M35A2 2½-ton cargo trucks; one M109 van; three ¼-ton utility trucks; and two water tank trucks.

Predeployment training for the contingent consisted of briefings on the customs and traditions of the host nation, concept of operations, desert operations, survival, snakes, insects, rodents, map reading, range estimations, land navigation, safety, terrain, climate, sanitation, personal hygiene, disease prevention, special equipment, driving, acclimation, physical endurance, field artillery tactics and techniques in a desert environment, host nation cannon and related equipment, accidents or incidents, and counter-terrorism procedures to mention only a few of the literally thousands of task areas that demand attention.

## Deployment

Deployment operations for the field artillery contingent began with a ground convoy from Fort Bragg to the Port of Wilmington, North Carolina, where the equipment and supplies were loaded in the break-bulk ship *Trans-columbia*. The ship departed on 21 July 1983 and arrived in the Port of Alexandria, Egypt, 13 days later. During the transit period, the unit's advance parties deployed to Cairo West Air Field using C-5 and C-141 aircraft. The main body of the field artillery contingent deployed by charter aircraft on 9 August and arrived in time to meet the equipment already being unloaded in Alexandria, Egypt. It then convoyed with the aid of Egyptian heavy equipment transports to Gebel Hamza (a deserted World War II British airfield located 56 kilometers northwest of Cairo) and established a cantonment area in the desert with members of the 9th Cavalry Regiment from the 24th Infantry Division and 11th Air Defense Artillery Brigade. Other Bright Star units moved into Cairo West Airfield, an active Egyptian Air Force base just west of Cairo. By 13 August, all units and their equipment were in place and ready to begin individual and small-unit training.

## Individual and Small-Unit Training

For the next seven days, the field artillery contingent conducted desert orientation, day and night navigation exercises, and interoperability training with their Egyptian counterparts to include firing of small arms, crew-served weapons, and field artillery pieces. All of these activities were designed to build soldier and small-unit leader confidence in their ability to function in an alien environment and to coordinate their actions closely with those of the allied Egyptian troops.

Land navigation in the desert was extremely difficult because of the lack of prominent terrain features, sun glare, and the shimmering effect caused by the heat. The units used maps, compasses, and vehicle odometers to navigate.

During this phase of the operation, the field artillery contingent briefly exchanged soldiers with the Egyptian Army. The American soldiers were trucked over to the Egyptian encampment to view short presentations on Egyptian weapons to include the AK-47 assault rifle, the Soviet-made light and heavy machineguns, and a variety of Soviet-made artillery weapons, equipment, and vehicles. The next day the Americans gave the Egyptians an introduction to their weapons to include the M16 rifle, M60 machinegun, and M198 howitzer. The Egyptian soldiers were formed into two or three-man groups to receive hands-on instruction which was very effective in spite of the language barrier. The Thunderbolts of Battery B also demonstrated the emplacement and displacement of the M198, conducted a dry fire mission, gave the Egyptians a hands-on class on the operation and handling of the medium howitzer and its ammunition, and demonstrated the position and azimuth determining system

Photo by author

**An Egyptian soldier takes aim with an M60 machine gun during a weapons exchange training session.**

(PADS) and meteorological equipment.

Two days later, members of the field artillery contingent and the 9th Calvary Regiment carved a firing range on an isolated part of the desert for a weapons interoperability shoot. Each Egyptian soldier received two magazines of M16 and 100 rounds of M60 ammunition to fire. They were also allowed to fire the .45-caliber pistol, .50-caliber machinegun, and the light antitank weapon (LAW). The Egyptians then brought their weapons forward for the American soldiers.

Several days later, two Egyptian batteries (122-mm and 130-mm) challenged the Thunderbolts of Battery B to a friendly "shootout." Four targets were selected by the senior of two Egyptian brigadier generals who directed the competition. These targets were engaged quickly and accurately in various fire-for-effect and adjust missions by all three batteries, as senior Egyptian and American artillery officers looked on from an observation post. After the friendly competition, the Egyptian soldiers demonstrated their artillery procedures and the handling of their 122s and 130s.

Interoperability training with the Egyptian artillerymen resulted in enhanced mutual respect and broadened the American's understanding of Egyptian artillery doctrine, tactics, and techniques in a desert environment.

## Combined field training exercise

The complex heavy-light combined field exercise required the integration of air cavalry, field artillery, air defense, signal, and military intelligence units supported by Air Force and Navy close air support. The airborne forces seized and held key terrain, while the heavy forces (tank and mechanized infantry) maneuvered against and destroyed the enemy's heavy forces. Air assault forces attacked the enemy's command and control and communications installations, targeted enemy

**Egyptian 130-mm howitzer crew fires during friendly competition with Battery B, 1-73d FA.**

combat service support elements, and destroyed the enemy's air defense assets. Air cavalry and attack helicopters covered the corps' main body, blunted the attack of enemy lead elements, and supported or reinforced (by aerial fires and observations) all other types of combat operations.

The 1-73d FA battalion tactical operations center and fire direction center remained stationary next to the corps' forward command post while the gunners of Battery B displaced a total of six times (four times during daylight and two at night) and fired 82 dry fire missions and four preparations in support of the maneuver forces.

**Soldiers of Battery B, 1-73d, ram an M549 rocket assisted projectile.**

## Testing of the M923

Extensive testing of the M923 5-ton, single-tire, automatic transmission, 5-ton truck with the enhanced mobility system as a prime mover for the M198 revealed that the central tire inflation system greatly enhanced the truck's mobility. The central tire inflation system, a key component of the enhanced mobility system, allowed the driver to inflate or deflate vehicle tires from inside the cab compartment. The M923 was primarily used as a prime mover; but, because of the poor mobility of the M813, the M923 also served as the artillery contingent's recovery vehicle. Personnel nicknamed it the "super truck."

## Maintenance

Maintenance in the desert was a constant challenge. Dust storms, jagged rocks, and extremes of heat and cold increased the overall maintenance effort. Larger quantities of repair parts and packaged products and a maintenance tent were included in the artillery contingent's maintenance plan. The maintenance tent was worth its weight in gold. It protected the unit's mechanics and equipment from the scorching heat and constant sand and dust. Naturally, the unit placed tremendous emphasis on timely and effective operator and crew maintenance. No one wanted to be stranded in the middle of the desert, and good preventive maintenance ensured that none were.

## Physical conditioning

Physical training was conducted in the early morning hours while it was cool. The program consisted of exercises followed by a four-mile run in the desert sand. The soldiers also played softball, tackle football, volleyball, and horseshoes at the camp site. The benefits of the conditioning program became obvious to all as the artillery unit accomplished its mission despite dramatic temperature fluctuations.

**Demonstration of emplacement of the M198 howitzer to senior FA Egyptian officers.**

## Tours

After the field training exercise, personnel concentrated on equipment maintenance and preparations for redeployment, but they also took advantage of the cultural tours offered by their Egyptian hosts. They visited the Egyptian Field Artillery School which is similar in structure to the US Field Artillery School at Fort Sill but is much smaller. The major difference noted was that the Egyptians include antitank weapons and tactics as an integral part of the school. Most of the School's materiel was Soviet-made, but the target aquisition, survey, and meteorological equipment was mostly British and American.

## Observations

Although few of the experiences in Bright Star 83 could be described as new or revolutionary, the exercise did serve to highlight some fundamental principles about fighting alongside an allied force in a desert environment.

• The western Egyptian desert floor has a hard crust which is trafficable to most vehicles, but the M813 prime mover was completely ineffective in this environment. Pulling the M198 howitzer, the M813 became entrenched in sand during 19 out of 20 displacements. This distraction caused the unit great difficulty in keeping up with the maneuver forces. However, the M923 5-ton truck with the enhanced mobility system performed superbly as a prime mover and recovery vehicle.

• The weather conditions in the Egyptian desert will definitely support air movement operations with the M198 howitzer; unfortunately, helicopters were not available to exercise this capability.

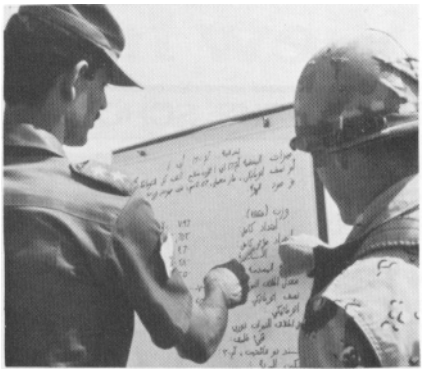
• The openness of the western desert favors fluid warfare in which armored, mechanized, and airborne forces are predominant. Airpower is crucial to winning the land battle to a greater degree than in other types of environment. Engagements may be fought at great distances, thus placing a premium on gunnery at long ranges.

• Survey is absolutely essential in the desert, and PADS was indispensable during Bright Star 83. The total lack of terrain features made navigation challenging during the day and most difficult at night. Without PADS, it was not uncommon to map spot positions in error by several grid squares. The speed and accuracy of PADS is essential to the field artillery in such an environment. The only other alternative means for obtaining accurate data until survey is established is to construct an observed firing chart with vertical control being established by firing an executive officer's high burst registration.

• In temperate zones and at altitudes other than sea level, meteorological (met) corrections may be huge; therefore, timely met data is essential. Accurate survey and met data are the elements that make the gunnery system work. Battery B, 1-73d FA, fired 300 high-explosive, 12 illumination rounds, and 40 rocket-assisted projectiles using survey, met, and muzzle velocities. The results were excellent. Accuracy was within 50 to 75 meters on fire for effect in 90 percent of the missions fired. The rocket-assisted projectile proved to be as accurate as the regular high-explosive round at all ranges up to 30 kilometers.

• Since the observer's ability was inhibited by the lack of prominent terrain and heat waves, the use of the laser rangefinder is imperative.

• Maintenance cannot be overemphasized in a desert environment. Air and fuel filters became clogged quickly; therefore, air filters were cleaned daily and replaced every five days. Water evaporates quickly from the batteries making it necessary to add water every two days. Recapped tires are worthless; the tread completely separates from the tire because of the heat and reduced



pressure caused by deflating the tire for better traction in the sand. Jagged rocks punctured rubber tires as well as the innertubes. A desert environment requires units to carry larger prescribed load lists.

• US personnel had to be flexible, patient, and understanding in their dealings with the Egyptian forces. The language barrier was particularly troublesome with personnel below the colonel rank. This made coordination difficult.

• Decision-making by the Egyptian forces seemed to be very centralized. In fact, even a slight modification to a training schedule had to be approved at the higher level. American leaders simply must learn to deal harmoniously with organizations whose procedures deviate from their own. In combined operations, tact and tolerance are imperative.

## Conclusion

In spite of the challenges experienced in coordinating training activities, interaction with the Egyptian forces was one of the most interesting and informative aspects of the exercise. Many Egyptian leaders were quite eager to debate combat tactics, and they were universally committed to making Bright Star 83 a success. The Thunderbolts of the 1-73d FA look forward to future combined exercises. Only by extracting the full training potential of events such as Bright Stars' can the Thunderbolts learn more about moving, shooting, and communicating in the deserts and mountains of Southwest Asia.

**LTC (P) Arturo Rodriguez is the past commander of the 1st Battalion, 73d Field Artillery (now 3-8th FA). An ROTC graduate from the University of Puerto Rico, he has a master's degree in business administration from Old Dominion University in Virginia. He is a graduate of the Naval Command and Staff College and has served in numerous field artillery assignments in Europe, Vietnam, Laos, and the United States. Currently, he is a student at the Army War College.**

# View from the Blockhouse

FROM THE SCHOOL


**Brigadier General Raphael J. Hallada is the new Assistant Commandant of the US Army Field Artillery School. He came to Fort Sill from Fort Leavenworth where he served as the Director for Command, Control, Communications and Intelligence. Prior to that assignment, he was Commander of the 82d Airborne Division Artillery.**

## New ARTEPS

The coordinating draft editions of ARTEP 6-300, *Corps Field Artillery Section, Division Artillery and Field Artillery Brigade;* and ARTEP 6-300-1, *Corps Field Artillery Section, Division Artillery and Field Artillery Brigade—TACFIRE,* are being distributed to the units concerned for comments. These ARTEPs have been totally rewritten and airborne and air assault tasks included as appropriate. All reviewers are encouraged to submit comments to:

Commandant
US Army Field Artillery School
ATTN: ATSF-DUA
Fort Sill, Oklahoma 73503-5600

## No sweat

**Due to delays in mailing, the suspense date for the return of address verification forms is now 1 January 1985.**

## Updating doctrine

The dynamic nature of today's army dictates that each service school develop and maintain a program to ensure that doctrine keeps pace with developments. Events which dictate review of doctrine include:

- Changes in threat organization, tactics, or equipment.
- Changes in friendly organization, tactics, or equipment.
- Shortfalls or gaps in current doctrine identified by the field.
- Shortfalls identified by regularly scheduled reviews of existing doctrinal publications.

The rapid changes in these areas coupled with the lead time required to develop and publish updated doctrine often result in new equipment reaching the field and new units being organized prior to the publication of appropriate doctrine. The Field Artillery School recognizes this problem and has undertaken several initiatives to deal with it. A staff element—the Doctrine Division, Directorate of Training and Doctrine—has been created within the Field Artillery School to manage and expedite development of doctrine including the publication and distribution of doctrinal literature.

Once the need for the development or the updating of doctrinal literature is identified, the Doctrine Division begins its work. It assigns a proponent department and the department in turn selects a subject matter expert (SME). The SME develops a chapter outline and a proposed milestones chart. Once this chapter outline is approved, the Doctrine Division notifies the field that the subject publication is being developed or revised and that comments from the field are solicited. This is the first opportunity soldiers in the field have to provide input. It is important that field units respond to this message to ensure that doctrinal publications meet their needs. A preliminary draft is developed and staffed within USAFAS, and the SME consolidates the comments received into a coordinating draft. The draft is then distributed to the field and other interested DA agencies for their review and comment. Comments received from this second opportunity for field review are incorporated into a final draft which is published in limited form and distributed to the field as interim approved doctrine until receipt of the finished product from DA.

The normal cycle from need identification to distribution spans approximately 16 months for field manuals (FMs). Field circulars (FCs) are used to get critical information to the field in a more expeditious manner. Field circular development parallels the field manual cycle with less external coordination and reduced times between milestones. Field circulars will normally be included in the next revision of the field manual at which time the field circular is superseded. Field circulars are published and distributed on a one-time basis

with authority for major Army commands to reproduce them locally.

Outlines are being developed for the following field manuals and should be forwarded to the field for comments not later than the date shown in parentheses.

• FM 6-2, *Field Artillery Survey*—A guide for commanders, survey officers, and personnel engaged in the conduct of field artillery survey (February 85).

• FM 6-20-1, *The Field Artillery Battalion*—How cannon battalions are organized, fight, and operate as part of the combined arms team (December 1984).

• FM 6-20-2, *Division Artillery, Field Artillery Brigade, and the Field Artillery Section (Corps)*—How corps field artillery sections, division artillery headquarters, and field artillery brigade headquarters are organized and equipped to support the AirLand Battle (March 1985).

The following coordinating drafts are scheduled to be distributed for review and comments.

• FM 6-40-1, *Field Artillery Cannon Gunnery (Automated)*—Procedures encompassing all aspects of field artillery cannon gunnery employed by cannon units during training and combat using the automated gunnery systems (March 1985).

• FM 6-141-1 and -2, *Target Analysis Munition Effects Tables*—Guidance to commanders and staff officers on the nuclear and nonnuclear employment of field artillery weapons systems as well as the target effects of selected artillery weapon systems (December 1984).

Final drafts of the following manuals should be approved and forwarded to the field as indicated. Once the final drafts arrive in the field, they will supersede the existing field manuals.

• FM 6-1, *TACFIRE Operations*—Guidance to commanders and their staffs on the employment of the tactical fire direction system (TACFIRE) (November 1984).

• FM 6-11, *Pershing II Battery Operations*—The organization and operation of a Pershing II battery in combat (March 1985).

• FM 6-30, *The Field Artillery Observer*—Observed fire procedures for the fire support team (FIST) and other observers (January 1985).

• FM 6-42, *Field Artillery Battalion, Lance*—The missions, organization, and the tactical employment of Lance (December 1984).

• Change 1 to FM 6-50, *Field Artillery Cannon Battery*—Addresses doctrine and procedures for the cannon battery in offensive and defensive situations. It is designed for the battery commander (March 1985).

The following field circulars have been approved for publishing:

• FC 6-42-20, *Lance Employment Handbook*—A handbook for the executive officer of a Lance battery (November 1984).

• FC 20-2, *Construction of Field Expedient Antennas*—Graphically illustrates procedures for constructing field expedient antennas (March 1985).

Doctrine Division action officers solicit comments from the field. Contact them at AUTOVON 639-4225 or 6063 or write Commandant, US Army Field Artillery School, ATTN: ATSF-DD, Fort Sill, OK 73503-5600.

**It's now a COLT.**

# From SOLT to COLT

Doctrinal manuals which have been approved within the last few months refer to a separate observation lasing team (SOLT). The lasing team lases for all units and should not be associated with one organization; therefore, the decision was made to change the name to "combat observation lasing team (COLT). References to the SOLT in those manuals which have been published should be changed to COLT or "combat observation lasing team."

## BATTLEKING projects

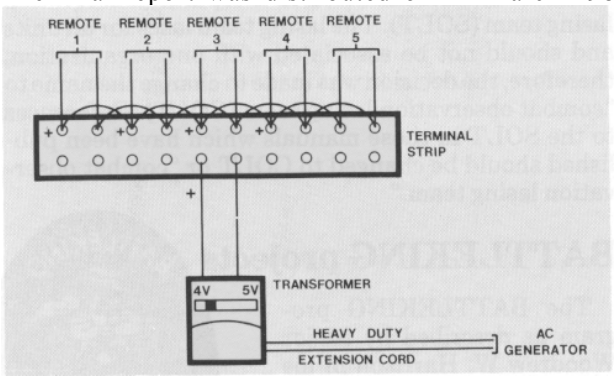
The BATTLEKING program as described by Major Woodrow W. Harrison in his "Common Scents" article in the July-August 1984 *Journal* is well underway. Four proposals that have been evaluated or that are being evaluated are listed below:

• *SW3-83, improved track for M109-series self-propelled howitzer (source: Tank Automotive Command).* The Tank Automotive Command has developed a new improved track (designated the XT154 track) to replace the T-164 track currently being used. The improved track is lighter, has a larger pad area, and is secured to the shoe with only one bolt. The pins are 1/8-inch larger in diameter. The sprocket has been redesignated to accommodate the new track. The XT154 track is available in both a cast and a forged version. The US Army Training and Doctrine Command has issued a letter of execution designating this proposal a customer test in view of the one-year test length.

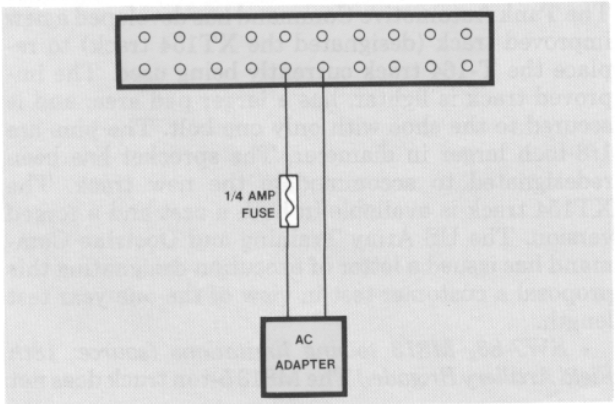
• *SW7-83, M813 towing limitations (source: 18th Field Artillery Brigade.)* The M813 5-ton truck does not

have an adequate capability to tow the M198 howitzer. This deficiency is particularly evident in off-road situations where the surface is soft or sandy. A battalion of the 18th Field Artillery Brigade used an M923 5-ton truck with an enhanced mobility system (EMS) during operation Bright Star in August 1983. The M923 demonstrated exceptional mobility. The M813 truck is being replaced by the M923 (without EMS). The mobility characteristics of the two trucks, however, are the same. The Tank Automotive Command (TACOM) is evaluating different tires as well as an EMS developed by AM General. TACOM test results of a "super single" radial tire (1400-R20) has also demonstrated dramatic increases in mobility. These studies are currently ongoing at TACOM.

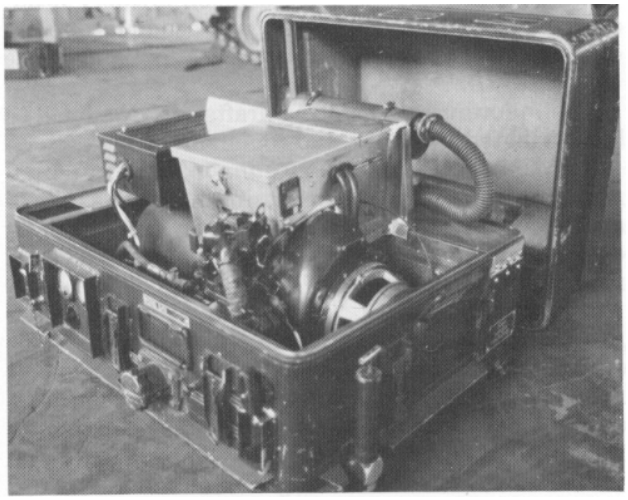
• *SW12-83, remote power supply (source: 2d Battalion, 3d Field Artillery).* TACFIRE-equipped field artillery battalion tactical operations centers have two shelter radios and three radios in the S2 M577 track vehicle. These radios are powered by BA-30 batteries. When all five radios are remoted, they use approximately 145 "D" cell batteries in a 24-hour period. The 2-3d FA proposed that a low-cost commercial voltage transformer be used in line with a generator. The proposal was evaluated successfully using a commercial transformer (cost $11.00) and a terminal board (cost $1.00) in line with an alternating current generator. The final report was distributed on 12 March 1984.



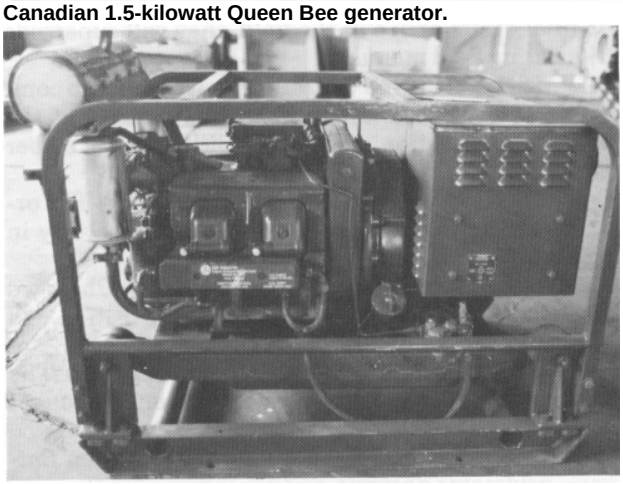

Since then, however, a suggested improvement includes the addition of a ¼-ampere fuse between the transformer and the terminal strip to prevent accidental shorting of the wires. This fuse will break the circuit at 250 milliamperes which is 50 milliamperes under the alternating-current adapter rated value of 300 milliamperes.



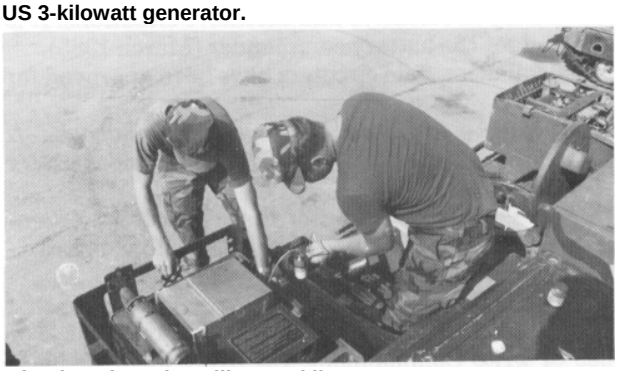

• *SW13-83, alternate auxiliary power units for the M577 (source: Directorate of Combat Developments, US Army Field Artillery School).* This proposal is currently being evaluated. The 4.2-kilowatt generator currently on the M577 command post vehicle exceeds field artillery power requirements, and it also has a low reliability rate. Alternate generator sets are being considered for field artillery applications. BATTLEKING is evaluating the use of the Canadian 1.5-kilowatt generator (Queen Bee) and the standard US 3-kilowatt generator. The 3-kilowatt generator will have muffler kits and electric starters installed. Either of the proposed generators will fit in the space allotted for the 4.5-kilowatt generator on the M577.



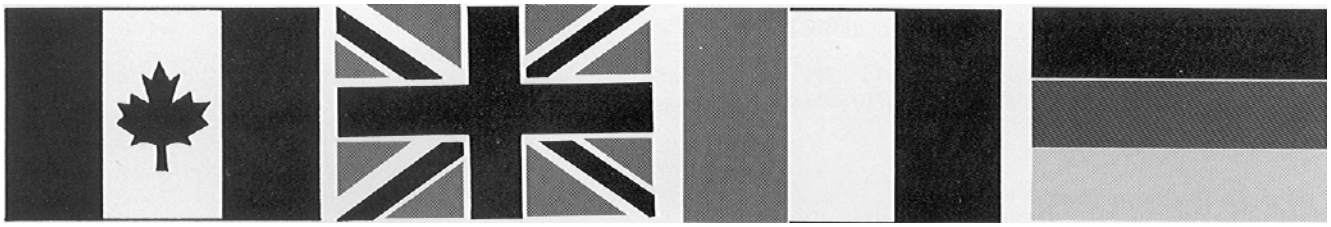
**Canadian 1.5-kilowatt Queen Bee generator.**



**US 3-kilowatt generator.**



**'Skunkworkers' installing a 3-kilowatt generator on an M577.**



## Field Artillery Foreign Liaison Officers

Major Douglas A. Lockridge, Royal Canadian Artillery, has held a wide variety of regimental, staff, and instructional positions. He has served as a United Nations Military Observer in Palestine and has been the Canadian Forces Liaison Officer to USAFAS since 20 July 1982.

Lieutenant Colonel Nicholas J. Bird, Royal Artillery, received his commission from the Royal Military Academy at Sandhurst. He has served in field, medium, and guided weapons regiments as well as in a series of instructional posts. Colonel Bird arrived at Fort Sill on 21 August 1984.

Lieutenant Colonel Henri Hure is a graduate of the St. Cyr Military Academy. From 1978 to 1981 he served as the French Liaison Officer to the British Artillery School at Larkhill. Subsequent to an assignment on the French Army General Staff he arrived at USAFAS 4 August 1984.

Lieutenant Colonel Dietmar Hoffman has served as both a battery and battalion commander in the Bundeswehr. He is a graduate of the German Command Staff Course and has been at Fort Sill since August 1981.

**MAJ Douglas A. Lockridge, Lt. Col. N. J. Bird, Lt. Col. Henri Hure, and Lt. Col. Dietmar Hoffman.**

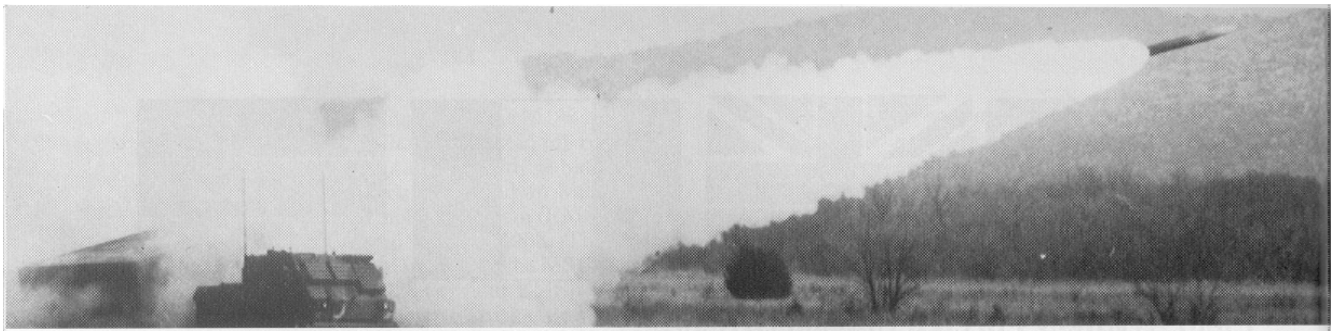
## M804 155-mm practice projectile

The Field Artillery School has recevied an advance copy of Technical Bulletin (TB) 9-2350-309-10, dated July 1984, which provides operator-level information on the use, handling, and maintenance of the M804 155-mm practice projectile, formerly known as the LITR (low-cost indirect fire training round.) The M804 is used in place of the M107 high-explosive projectile for training in indirect fire of 155-mm howitzers.

The new technical bulletin authorizes PD, MTSQ, or proximity fuzes for the M804 projectile. Authorized fuzes are the PD M557, M739 series; MTSQ M564 and M582; or the short intrusion M732 VT fuze. The following propelling charges are authorized for 155-mm howitzers using the M804.

- *M114, M114A1, and M114A2* howitzers—GB M3 and M3A1 charges 1, 2, 3, 4, and 5; WB M4A1 and M4A2 charges 3, 4, 5, 6, and 7.
- *M109A2 and M109A3 howitzers*—GB M3 and M3A1 charges 2, 3, 4, and 5; WB M4A1 and M4A2 charges 3, 4, 5, 6, and 7 (charge 1 must *not* be fired in the M109A2, M109A3, or M198 howitzer tubes because of stickers); M119A1 and M119A2, charge 8 white bag and charge 7 red bag (the M119A2 charge 7 red bag is equivalent to the M119/M119A1 charge 8 white bag. Refer to firing tables for small difference in velocity which affects range.)
- *M198 howitzer*—same propelling charges as for the M109A2 and M109A3 howitzers.

This information will be incorporated into ammunition and weapon technical manuals, but it is recommended that 155-mm units retain a copy of the new technical bulletin TB 9-2350-309-10 with their operator's technical manual until such time as a new change is published for their operator's technical manual. (Clay Turpin, Weapons Department, AUTOVON 639-6590/5523.)



# MLRS maintenance

Since the fielding of the multiple launch rocket system (MLRS), several recurring maintenance problems have surfaced. Here are some lessons learned and some maintenance tips to help MLRS maintainers face the problems.

## Lessons learned

• On the first nine tactical self-propelled loader launchers received at Fort Sill, all plastic strips in the fixed beams were slightly loose. The adhesive used by the manufacturer did not hold, and this caused the rivets to pull through the plastic. The manufacturer suggested that more rivets be installed except for the last three feet of the strips (from the point of the double beam).

*Note:* Procedures in the -30 manual do not address counterboring new plastic strips; new strips are not drilled or bored (reference quality deficiency report control number M132730, report control number PF83047).

• The circuits in the electronic unit presently will not keep the batteries charged; maintenance personnel solved this problem by securing extra batteries, charging them with an external charge, and swapping batteries at 60-day intervals.

• Failure of the 1.25-degree limit switch can cause the switch to bypass all mechanical limits. The 1.25-degree switches on nine of the launcher loader modules received at Fort Sill were defective. The switches indicated that the launcher loader module was within 1.25 degrees of 0 mils in azimuth; this position defeats both the 15-degree limit switch and the 73-degree limit switch; i.e., it removes all mechanical safeties which were designed to prevent the launcher loader module from crashing into the vehicle cab. Prior to operation, maintenance personnel should check the 1.25-degree switch daily until a more reliable mechanical safety can be installed on the launcher loader module.

• The plus or minus 1.25-degree limit switch is difficult to adjust and hold when the new style (13032051) switch is used; for example, if the bracket has become loose, the pressure required to depress the limit switch will cause the bracket to yield if the switch is not extra clean and lubricated. Presently, there are no procedures to verify the width of the plus or minus 1.25-degree setting (normal is 20 to 25 mils.) Also, there are no good procedures to verify centering of the 1.25-degree setting. If the 20- to 25-mil setting is increased, the side pressure required to depress the switch is increased.

• In some cases the mounting bracket (serial numbers 4AA0008 and 4AA0010) for the hydraulic power pack cracks at welds. Also, the repaired bracket which holds the hydraulic power supply assembly (13025233) to the base has been breaking in the gusset welds and across the top of the weld.

• Elevation actuator limit switch wires (figure 157, item 5, TM 9-1425-646-34P) rub against the ball screw assembly (figure 155, item 11, TM 9-1425-646-34P) and wear away the insulation. The electrical wire shorts to the frame ground and intermittently causes the launcher drive system to shut down, generally as the cage is being raised or lowered.

## Tips

• Most of the launcher loader module failures are caused by defective electronic or fire control units. These two units are easy to replace and should be checked before a lengthy troubleshooting procedure is initiated.

• If the transmission is not adjusted properly, the vehicle will creep in forward or reverse and attempt to turn by itself (reference TM 9-1450-646-4, page 6-425, Controller Neutral and Steer Adjustment).

• Fuel pumps may become inoperative because of a diode failure; the diode is in wiring harness IW30 between wires 79F and 79S, pins A and D (reference pages 9-29 and 9-30, TM 9-1450-646-34).

• The speedometer/encoder drive within the final drive continually becomes loose.

• The elevation actuator bolts become loose which allows oil to leak around the shims.

• Power tools must *not* be used to extend or extract the travel lock actuator because this will damage the actuator.

• Improper strapping of cables at the encoder and final drive shaft causes damage to the encoder and cables.

• The azimuth drive servo motor causes the launcher loader module to drift one or two mils in azimuth when the cage is raised or lowered.

• The azimuth transducer can become contaminated with dirt and water or frozen dirt and water in cold weather.

• Dirt on the mounting surfaces, guide pin, and holddown brackets causes expressure on the locking arm.

• New transmissions (SN 2000 and above) have new oil dip stocks with a cold oil level reading and a hot oil reading; oil level readings are checked with the engine turned off.

• The fuel control handle must remain all the way out after shutdown to avoid hydrostatic locking of the engine.

# 1984 Redleg Reference

The following is a list of *Journal* articles, "On the Move" columns, and "View From the Blockhouse" items for calendar year 1984 and the issue in which the material was published. The letters (VB) indicate "View from the Blockhouse" items.

**Ammunition/Fuzes**

Calling for Shell Nuclear, Jan–Feb.
M804 155-mm practice projectile, Nov–Dec (VB).
Shell Game, Sep–Oct.
Snake Charmers, May–Jun.
Take the Tech, Sep–Oct.

**Doctrine**

A Fly Paper, May–Jun.
Change along the Chosin, May–Jun.
FIST employment and control, May–Jun (VB).
Fraternity Education, Nov–Dec.
Standardization/interoperability update, May–Jun (VB).
Standardization update, Jan–Feb (VB).
Updating doctrine, Nov–Dec(VB).

**Equipment Technology**

BATTLEKING projects, Nov–Dec (VB).
Common Scents, Jul–Aug.
Doing Cueing, Sep–Oct.
Dutch Treat, Jul–Aug.
FA tactical data systems hotline, Jul–Aug (VB).
Field artillery ammunition support vehicle, Mar–Apr (VB).
Field artillery software update, Jan–Feb (VB).
Field artillery survey in the 1990s, May–Jun (VB).
Goin' Frogging, Mar–Apr.
Kogti Medvedya, Mar–Apr.
Lance and TACFIRE, Sep–Oct (VB).
Lase Phase, Jan–Feb 84.
M109 for the 1990s, Jan–Feb (VB).
M110A2 headlink, Jan–Feb (VB).
One up on la, Jul–Aug.
Operation of the gun display unit, Jan–Feb (VB).
PADS procurement date, Jan–Feb (VB).
Safety tips, Jul–Aug (VB).
TACFIRE tips: Interface with Firefinder, Jan–Feb (VB).
TACFIRE tips: Location of the fire support officer. May–Jun (VB).
The Aquila, May–Jun (VB).
The old "75," Sep–Oct (VB).
Tripod passes test, Jul–Aug (VB).

**Foreign/Interoperability**

A Gunner's Tale, Mar–Apr.
Bright Stars and Thunderbolts, Nov–Dec.
Fraternity Education, Nov–Dec.
Jawans, Sahibs, and Firepower, May–Jun.
Stahl am Ziel, Nov–Dec.
Standardization/interoperability update, May–Jun (VB).
The Best Arm We Had, Nov–Dec.
Warring with the Warriors, Sep–Oct.

**Gunnery**

A Gunner's Tale, Mar–Apr.
New firing tables being distributed, Mar–Apr (VB).
Operation of the gun display unit, Jan–Feb (VB).

**History**

A Gunner's Tale, Mar–Apr.
Celeritas et Accuratio, Jan–Feb.
Coup de Grace, Jan–Feb.
Dutch Treat, Jul–Aug.
Faithful and True, Mar–Apr.
Fidelis et Verus, May–Jun.
Jawans, Sahibs, and Firepower, May–Jun.
Lawton-Fort Sill history, Jan–Feb (VB).
Loyaute, Nov–Dec.
The Best Arm We Had, Nov–Dec.
Through Smoke of Distant Fires, Jul–Aug.

**Leadership/Personnel**

Drummond's four rules, May–Jun (VB).
Dutch Treat, Jul–Aug.
Field artillery survey in the 1990s, May–Jun (VB).
Fluff or Enough, Nov–Dec.
MLRS personnel management, Jan–Feb (VB).
MOSs 45D and 13BU6, Jan–Feb (VB).
Professional development pamphlet for enlisted soldiers, Jul–Aug (VB).
Redleg Future Read Here, May–Jun.
Reserve Component Commanders' Update, Jan–Feb.
The Order of Saint Barbara, Sep–Oct (VB).
The Order of Molly Pitcher, Sep–Oct (VB).
The Shadow Effect, Jan–Feb 84.

**Maintenance**

Get SMART, Mar–Apr (VB).
MLRS maintenance, Nov–Dec (VB).

**Miscellaneous**

Annual address verification (Journal notes), Jul–Aug (VB).
Artillery Order of Molly Pitcher (Journal notes), Sep–Oct (VB).
Award for authors (Journal notes), Mar–Apr (VB).
Correction (TM 38-750), Mar–Apr (VB).
Dutch Treat (interview) Jul–Aug.
FA tactical data system hotline, Jul–Aug (VB).
Hotline—persons using hotline should state name, rank, mailing address, and telephone number (Journal notes), Mar–Apr (VB).
LTC Juergen Nolte receives FORSCOM Fourth Estate Award for Excellence in Journalism (Journal notes), Jan–Feb (VB).
Order of Saint Barbara (Journal notes), Sep–Oct (VB).
Readership survey mailed (Journal notes), May–Jun (VB).
Readership survey results (Journal notes), Sep–Oct (VB).
Wear of the award of the Order of Saint Barbara, Jul–Aug (VB).

**"On the Move" Topics**

Doctrinal, training, and personnel roadblocks, Jan–Feb.
FIST concept, Nov–Dec.
Moving along the right azimuth, May–Jun.
Senior Field Artillery Commander's Conference topics which included survivability, signature, and special weapons, Jul–Aug.
Streamlining our decision-making process, Sep–Oct.
Training and leadership, Mar–Apr.

**Regiments**

Celeritas et Accuratio, Jan–Feb.
Faithful and True, Mar–Apr.
Fidelis et Verus, May–Jun.
Loyaute, Nov–Dec.

**Research and Development**

BATTLEKING projects, Nov–Dec. 84
Common Scents, Jul–Aug.
Field Artillery software update, Jan–Feb (VB).
M109 for the 1990s, Jan–Feb (VB).
Shell Game, Sep–Oct.
Skunkworks, Jan–Feb (VB).
Take the Tech, Sep–Oct.
The operational test cycle, Mar–Apr (VB).

**Tactics/Strategy**

A Fly Paper, May–Jun.
A Gunner's Tale, Jan–Feb.
Bracketing the Dwell Time, Sep–Oct.
Calling for Shell Nuclear, Jan–Feb.
Change Along the Chosin, May–Jun.
Coup de Grace, Jan–Feb.
Doing Cueing, Sep–Oct.
Dutch Treat, Jul–Aug.
FIST employment and control, May–Jun (VB).
Freeze Frame, Mar–Apr.
Keep the Fires Burning, Jan–Feb.
One up on la, Jul–Aug.
Snake Charmers, May–Jun.
TACFIRE tips: Interface with Firefinder, Jan–Feb (VB).
TACFIRE tips: Location of the fire support officer, May–Jun (VB).

**Target Acquisition**

Bracketing the Dwell Time, Sep–Oct.
Doing Cueing, Sep–Oct.
Field artillery survey in the 1990s, May–Jun (VB).
Focusing the Eyes, Mar–Apr.
From SOLT to COLT, Nov–Dec (VB).
PADS procurement update, Jan–Feb.
TACFIRE tips: Interface with Firefinder, Jan–Feb (VB).
The Aquila, May–Jun (VB).

**Threat**

Goin' Frogging, Mar-Apr.
Kogti Medvedya, Mar-Apr.

**Training**

Bright Stars and Thunderbolts, Nov–Dec.
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New ARTEPs, Nov–Dec (VB).
New 13B and 13E job books, Jul–Aug (VB).
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Reserve Components OBC and OAC, May–Jun (VB).
Reserve Components officer training, Jul–Aug(VB).
Stahl am Ziel, Nov–Dec.
Tennessee Turnabout, May–Jun.
Training at Fort Chaffee, Sep–Oct (VB).
Warring with the Warriors, Sep–Oct.
Where Only the Fit Survive, Sep–Oct.

# The Best Arm We Had

By Captain John Gordon

United States field artillerymen fought their first battles of World War II under adverse conditions in the distant Philippine Islands which, at that time, were a commonwealth of the United States. Months after the British had been defeated at Hong Kong, Singapore, and Burma and after the Dutch had surrendered the East Indies, US troops held out on the Bataan Peninsula and Corregidor Island to delay the Japanese conquest of the Philippines. This prolonged defense was made possible, in large part, by the invaluable support provided by American and Filipino gunners—those whom General Douglas MacArthur called "the best arm you have."

It may surprise some Americans to learn that the two principal fighting forces containing artillery were manned, for the most part, by Filipinos. One of the fighting forces was the Philippine Army, which belonged to the Commonwealth Government; and the other was the Philippine Scouts, an element of the Regular United States Army. These artillerymen defended the Island of Luzon and were eventually pushed back into the Bataan Peninsula.

## Philippine Army

From 1937 to 1941 General Douglas MacArthur, retired from the United States Army, was attempting to build a Philippine National Army in preparation for Philippine independence in 1946; but the chronic lack of funds during the 1930s greatly hampered his efforts. However, as mid-1941 arrived and MacArthur was recalled to active duty, a plan to create a Philippine Army of one regular and ten reserve infantry divisions was well underway. Each of these divisions would have a strength of 8,200 officers and men—considerably smaller than a similar United States division. Each division would contain a three-battalion artillery regiment of 1,000 to 1,100 men, and each battalion would in turn have two four-gun batteries which would give the regiment a total of 24 weapons. Although the plan included eventual procurement of modern 105-mm howitzers, the only weapons available at that time were ancient Vickers-Maxim Model-1898 2.95-inch mountain (pack) howitzers and the so-called British 75 gun, which was the World War I British 18-pounder that had been retubed to accept 75-mm ammunition. Some of these guns had been modernized with rubber tires and carriages and could be towed by a high-speed truck; but many others retained the old wooden spoked wheels of World War I.

As MacArthur convinced the War Department of the validity of his scheme to defend the Philippines with a National Army, more and more weapons and units were promised by Washington. The principal island of Luzon was divided into two areas—one each for the Northern and Southern Luzon Forces (each equivalent to a corps). Each of the two corps was to have a 155-mm howitzer regiment of 24 howitzers; and there was to be an Army-level 155-mm gun regiment, also with 24 weapons. Several independent 105-mm motorized regiments were also planned, once the equipment could be obtained. In November General George C. Marshall promised to send MacArthur 40 modern 105-mm howitzers for the Philippine Scouts in the Philippines, thus releasing a like number of the older 75-mm and 2.95-inch weapons for the Philippine Army. An artillery school was also planned for the fledgling Philippine Army.

## Philippine Scouts

Formed prior to World War I, the Philippine Scouts were Filipino enlisted men serving in the Regular United States Army under American officers. Limited by law to a maximum strength of 12,000, the Scouts were an elite organization; and American officers considered it a privilege to lead Scout units. In December 1941 the following Scout artillery units were in place on Luzon:

- 24th Field Artillery Regiment—The 24th Field Artillery was organic to the 10,000-man Philippine Division and was composed of two battalions of three four-gun batteries each, most of which were armed with the 75-mm gun, but some of which were armed with 2.95-inch pack howitzers. The total unit strength was 843 personnel.
- 23d Field Artillery—Although a part of the Philippine Division, the 23d Field Artillery rarely operated with that organization. With a strength of 401 personnel, the 23d FA was armed with 75-mm guns and 2.95-inch howitzers, the latter drawn by pack mules.
- 86th Field Artillery Battalion—This organization was a nondivisional 155-mm gun battalion with 388 men.
- 88th Field Artillery Battalion—This organization was also a nondivisional unit which was equipped with 75-mm guns and had a strength of 518 men.

## American field artillery

There were no American field artillery units in the Philippines when the war began. On 7 December 1941, the *Pensacola* Convoy (so named because the heavy cruiser *Pensacola* was escorting the troop ships) was bringing three American National Guard field artillery battalions to Manila. Armed with 75-mm guns, these battalions were to replace Scout units as the divisional artillery of the Philippine Division. In that way, the Scout Redlegs would be able to form a new 155-mm gun battalion for the division, bring up to strength the Scout Coast Artillery units guarding Manila Bay, and provide instructors for the growing Philippine Army. Unfortunately, these plans never came to pass. The *Pensacola* Convoy never reached the Philippines.

## The initial days

The Japanese destroyed almost 50 percent of MacArthur's air force when they attacked on 7 December—much of it was caught on the ground. By the end of the first week of war, Army airpower in the Philippines had been reduced to a shambles; and the Navy's tiny Asiatic Fleet, based in Manila, had been forced to run south to the Dutch East Indies. Within a week it became clear that the fate of the Philippines depended entirely on the ground forces.

Almost as soon as the war began, Filipino and American gunners scrambled to increase the number of artillery units available. Stored in a Manila warehouse were 24 155-mm M1918 Grand Puissance Filloux guns that were intended for coast artillery emplacements in the southern islands of the Philippines. These guns were turned over to a new organization—the 301st Field Artillery Regiment, Philippine Army, under the command of Colonel Alexander S. Quintard. The 301st was manned with 700 volunteers from both American and Philippine Army units. Just prior to the beginning of the war, 50 half-tracks mounting the M1897 75-mm gun had arrived in Manila. Although these half-tracks were primarily intended as antitank weapons, they were instead given to three newly formed 16-gun field artillery battalions. Once again, personnel were obtained from Philippine and American Army units. Two of these self-propelled battalions were sent to Major General Jonathan M. Wainwright's Northern Luzon Force, and the third battalion went to Major General George M. Parker's Southern Luzon Force.

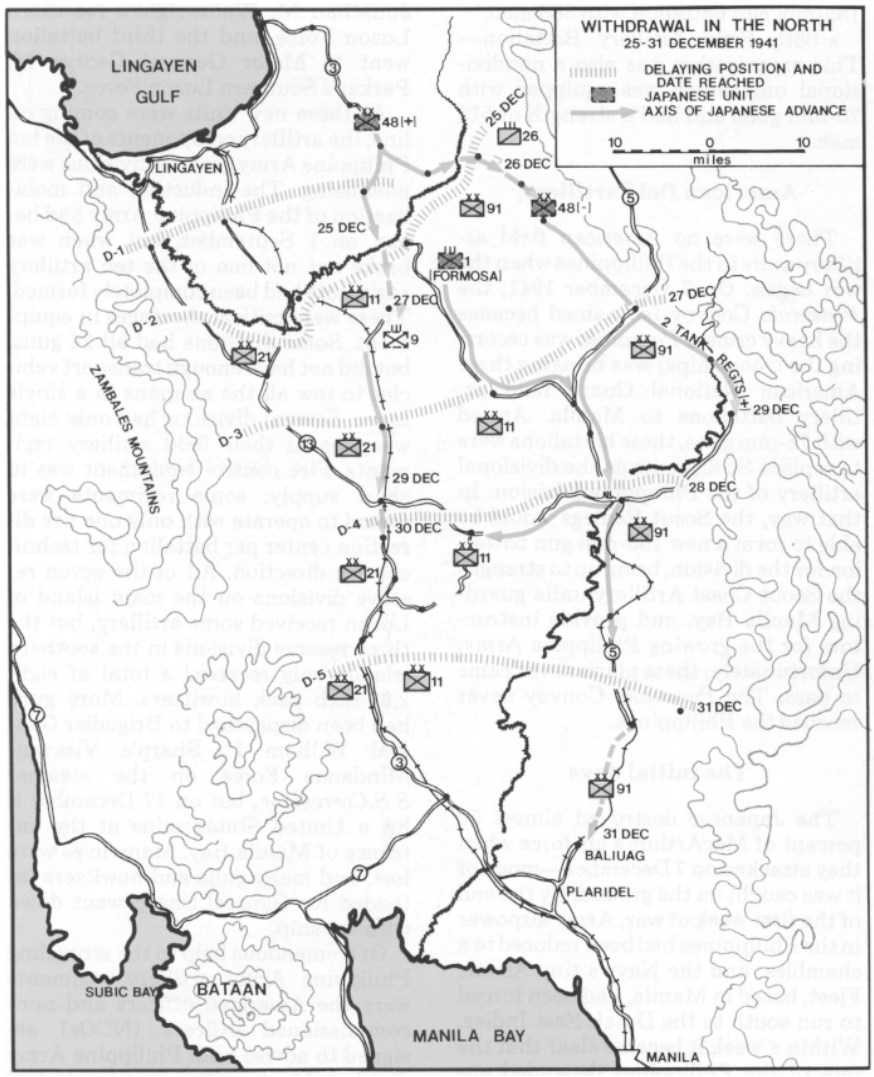
As these new units were coming on line, the artillery components of the ten Philippine Army reserve divisions were mobilizing. The induction and mobilization of the Philippine Army had begun on 1 September, but when war broke out not one of the ten artillery regiments had been completely formed. There were critical shortages in equipment. Some divisions had all 24 guns, but did not have enough transport vehicles to tow all the weapons in a single move. Several divisions had only eight weapons in their field artillery regiments. Fire control equipment was in short supply; some regiments were forced to operate with only one fire direction center per battalion for technical fire direction. All of the seven reserve divisions on the main island of Luzon received some artillery, but the three reserve divisions in the southern islands only received a total of eight 2.95-inch pack howitzers. More guns had been dispatched to Brigadier General William F. Sharp's Visayan-Mindanao Force on the steamer *S.S.Corregidor*, but on 17 December it hit a United States mine at the entrance of Manila Bay. Many lives were lost, and many guns and howitzers intended for General Sharp went down with the ship.

Of tremendous help to the struggling Philippine Army artillery regiments were the American officers and noncommissioned officers (NCOs) assigned to advise each Philippine Army division. Most artillery regiments had an American lieutenant colonel or colonel as the artillery advisor. As these units went into combat, the American officers often became the actual commanders, replacing less experienced Filipino officers.

By 10 December 1941, all of the Filipino divisions had occupied their assigned beach defense sectors even though they were still in the process of mobilization. Their haste was justified, because the Japanese were on the way.

## The first actions

On the evening of 10 December, Colonel Richard C. Mallonee was catching his first rest since the war began. He was the senior American advisor to the 21st Field Artillery (regiment), Philippine Army, which was deployed along the shores of the strategic Lingayen Gulf, north of Manila Suddenly reports began to arrive that "something" was out in the dark bay. Mallonee authorized the 3d Battalion




to open fire with one battery. Moments later the entire gulf was ablaze as all the artillery and small arms in the area were fired into the gloom. This action was the first for American field artillery in World War II. Unfortunately, the 21st Field Artillery was only engaging a small Japanese scout trawler that dutifully noted the fierce fire at the southern end of the gulf. Less than two weeks later, the enemy would come ashore miles farther north where resistance was much weaker.

On 22 December, the main body of the Japanese 14th Army landed on the northernmost shore of Lingayen Gulf. Quickly routing the poorly trained Filipino of the 11th and 71st Divisions, the crack Japanese 48th Division, heavily reinforced with tanks and artillery, pushed south into the great valley that leads directly to Manila. The 86th Field Artillery of the Philippine Scouts had four 155-mm howitzers in position in the gulf area, and they opened fire on Japanese cargo ships and hit but did not sink several of them. As the Japanese 48th Division advanced, the 155s were forced to withdraw.

By evening on 23 December, MacArthur was forced to abandon his plan to defend the beaches, and his troops retreated to the densely jungled Bataan peninsula. The word went out that "WPO-3 (War Plan Orange) was in effect."

Withdrawal to Bataan was a complex affair with both corps-sized forces pulling back to a mutual pivot point north of Manila and then turning into Bataan. As depicted in figure 1, Wainwright's Northern Forces had to establish a series of defense lines (D-1 through D-5) in the great valley north of Manila in order to buy time for General Parker's Southern Luzon Force to retreat and for quartermaster personnel to move supplies to Bataan.

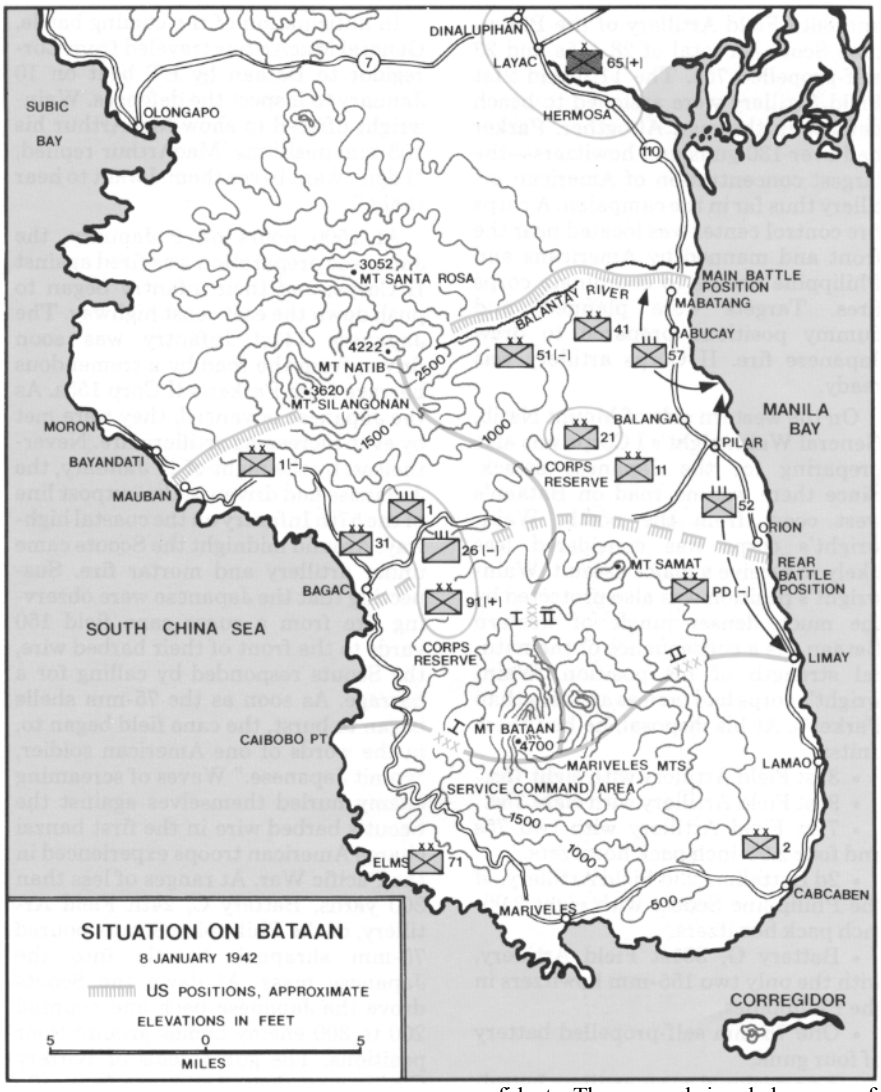
Prior to dawn on 24 December, the main body of Wainwright's force fell back—an infantry-artillery rear guard was left behind to hold the enemy for a few hours while the main body prepared the next line. At times the artillery held the line alone. From 24 December 1941 to 5 January 1942, Wainwright's force slowly fell back under increasing Japanese pressure; but only twice did the line crack, and in both cases the artillery prevented a disaster.

In the first case, on 31 December, the Japanese caved in the front of the Filipino 91st Division along the east flank of the D-5 line and made a breakthrough south toward Manila. The situation was critical since many of General Parker's troops were still moving through Manila. If the Japanese reached the town of Plaridel, Parker's men would be cut off from the escape route to Bataan. On the evening of 31 December, a sharp battle took place at the town of Baliuag, only ten miles north of Plaridel. The weak 71st Division had failed to stop the Japanese armored spearhead, and its infantry had fallen out of Baliuag in disorder. Only one company of American tanks were left to block the road to Plaridel—except for the artillery, that is. At dusk the American tanks moved out to counterattack without infantry support. However, the nearby 71st Field Artillery opened fire with its 15 guns. A battery of 75-mm self-propelled guns pulled onto a field near Baliuag and took the town under fire. As the little American Stuart tanks closed on the village, the artillery pounded the town and set buildings afire, killing many Japanese infantrymen. The gunners ceased fire as the United States tanks entered the burning village. After a wild melee in which eight Japanese tanks were destroyed at no loss of American lives or equipment, the United States tanks withdrew. As soon as the last American vehicle cleared the town, the artillery resumed fire until 2200 hours and threw the Japanese advanced guard into such confusion it was unable to continue its attack. This spoiling attack allowed Parker's men to slip past the Japanese forces into Bataan.

The second instance in which the artillery saved the day occurred on 3 January while the 21st Division was holding off strong elements of the Japanese 48th Division north of Bataan. After bringing up their own strong artillery support, the Japanese pounded the Filipino 21st Infantry and attacked with a regiment of infantry. The inexperienced Filipinos broke and streamed to the rear. The Japanese 9th Regiment surged forward to exploit the breakthrough and ran headlong into the guns of the 21st Field Artillery. Instead of limbering up as the Filipino infantry raced to the rear, cannoneers of the 21st Field Artillery stood their ground and broke out shrapnel shells.

When the hostile infantry appeared, the Filipino gunners opened direct fire at a range of 600 to 800 yards and drove the Japanese to cover. The Japanese formed up and attacked again and again but were unable to envelop the Filipino gunners because of the ravines on the 21st's flanks. Urged on by their American advisors, the Filipinos fired hundreds of rounds and beat back wave after wave of attacking Japanese. Colonel Mallonee made this comparison: "I know what Cushing's artillerymen must have felt with the muzzles of their guns in the frontline as the Confederate wave came on and broke on the high water mark at Gettysburg." For six hours the 21st Field Artillery held the line *alone,* withdrawing only when it was ordered to move back.

By 6 January, virtually all the American and Filipino forces on Luzon had withdrawn into mountainous, jungled Bataan. The last delaying position was at Layac Junction, at the very top of the Bataan peninsula. Here the rebuilt Filipino 71st Division, now reduced to regimental strength, joined the American 31st Infantry and the Philippine Scout 26th Cavalry (the last American horse-cavalry unit to engage in combat) to buy more time for the troops farther south on Bataan to dig in. They were supported by the 71st Field Artillery Philippine Army and by the 1st Battalion, 23d Field Artillery, and the 88th Field Artillery Battalion of the Philippine Scouts; unfortunately, none of these units were equipped with 155s. On 6 January the Japanese struck the American position in full force. Held off initially at the coastal highway by accurate fire from the two Scout battalions, the Japanese began a flanking move to the west and brought up 150-mm guns to shell the Filipino-American defenders. Using their range advantage, the Japanese raked the American line and, capitalizing on their total domination of the air, used observation planes to call in fire. Soon the Japanese 150s were pounding American artillery positions. The Filipino gunners could not reciprocate because their 75s and 2.95s simply did not have the range. The 1st Battalion, 23d Field Artillery, was destroyed as unit—it lost 10 guns and sustained heavy casualties. The 88th was also hard hit but was able to continue in action. It was for gallantry during this bombardment that Philippine Scout Sergeant Jose Caluga received the Medal of Honor, one of only four given to American artillerymen during World War II. That evening the Layac position was abandoned, too. As the tired Americans and Filipinos moved south along Bataan's coastal highway, the Japanese halted to reorganize; and there was a brief pause before the battle of Bataan began.




## The battle of Bataan

After the costly delaying action at Layac Junction, the Filipino-American Forces on Bataan were finally ready to stand their ground in a protracted battle. Generals Wainwright and Parker had skillfully brought their Northern and Southern Luzon Forces into Bataan. These two forces were redesignated the I and II Philippine Corps, respectively, and were deployed on either side of jungled Mount Natib to await the Japanese who were massing to the north. Some of the American and Filipino units had been in Bataan since 26 December; so there had been ample time to construct formidable defenses. General Parker's II Corps in eastern Bataan was expected to receive the main Japanese thrust, and his 25,000 men were ready along the Abucay Line as shown in figure 2. With the 57th Infantry of Philippine Scouts deployed astride the coastal highway and the 41st and 51st Philippine Divisions extending the line 12,000 yards farther inland, Parker felt confident. The rugged jungled mass of Mount Natib seemed to offer security to his left flank. Ominously, there was no direct, physical contact with Wainwright's I Corps on the other side of the mountain; but neither Parker nor Wainwright considered this lack of contact significant.

Parker had excellent artillery support, particularly on his east flank. In direct support of the 57th Infantry on the exposed coastal highway was the 1st Battalion, 24th Field Artillery, of the Philippine Scouts. The Scout gunners placed one battery of 75s directly behind the main line of resistance to provide antitank fire on the coast road. To the rear of the line were the 2d Battalion, 24th Field Artillery, and the 88th Field Artillery, both of the Philippine Scouts; the 41st Artillery with its 24 75-mm guns and 2.95-inch howitzers; and the 51st Division's eight 75s which were incapable of high-angle fire (a factor that proved critical in the division's rough terrain).

In general support of the corps, Parker had the 301st Field Artillery

and 86th Field Artillery of the Philippine Scout—a total of 28 155s and 23 self-propelled 75s. The 11th and 21st Field Artillery were assigned to beach defense in the rear. Altogther, Parker had over 130 guns and howitzers—the largest concentration of American artillery thus far in the campaign. A corps fire control center was located near the front and manned by Americans and Philippine Scouts to coordinate corps fires. Targets were planned, and dummy positions prepared to draw Japanese fire. II Corps artillery was ready.

On the western side of Mount Natib, General Wainwright's I Corps was also preparing for the Japanese attack. Since there was no road on Bataan's west coast from the north, Wainwright's corps was considered less likely to receive a major assault. Wainwright's position was also protected by the much denser jungle of western Bataan. As a consequence of the natural strength of his position, Wainwright's corps had far less artillery than Parker's. At his disposal, he had these units:

- 31st Field Artillery with eight 75s.
- 91st Field Artillery with eight 75s.
- 71st Field Artillery with two 75s and four 2.95-inch pack howitzers.
- 2d Battalion, 23d Field Artillery, of the Philippine Scouts with eight 2.95-inch pack howitzers.
- Battery G, 301st Field Artillery, with the only two 155-mm howitzers in the Philippines.
- One 75-mm self-propelled battery of four guns.
- A provisional coast artillery battalion of six 155-mm guns to protect Wainwright's rear from amphibious assault.

To the rear of both corps, Army engineers were installing 31 naval guns ranging from 1-pounders to 6-inch guns for beach defense. All was considered ready to meet the Japanese.

Japanese Lieutenant General Akira Nara's heavily reinforced 65th Brigade was preparing to push southward against the Filipino-American positions. Nara controlled powerful artillery assets of his own:

- 1st Field Heavy Artillery Regiment with 24 150-mm howitzers.
- 8th Field Heavy Artillery Regiment with 16 105-mm guns.
- 9th Independent Heavy Artillery Battalion with eight 150-mm guns.
- An organic 75-mm gun battery in each of the four infantry regiments.

Moving toward Bataan were two more Japanese battalions of 75s that would soon be in action. The effectiveness of the enemy artillery was greatly enhanced by its total air superiority.

In anticipation of the coming battle, General MacArthur traveled from Corregidor to Bataan by PT boat on 10 January to inspect the defenses. Wainwright offered to show MacArthur his 155-mm positions. MacArthur replied, "I don't want to see them. I want to hear them."

At 1500 hours on 9 January, the Japanese preparation was fired against II Corps; and their infantry began to push down the east coast highway. The Japanese 141st Infantry was soon driven from the road by a tremendous barrage from Parker's II Corp 155s. As the Japanese advanced, they were met by ever-increasing artillery fire. Nevertheless, by the night of 11 January, the Japanese had driven in the outpost line of the 57th Infantry on the coastal highway. Around midnight the Scouts came under artillery and mortar fire. Suspecting that the Japanese were observing fire from a sugar cane field 150 yards to the front of their barbed wire, the Scouts responded by calling for a barrage. As soon as the 75-mm shells began to burst, the cane field began to, in the words of one American soldier, "vomit Japanese." Waves of screaming enemy hurled themselves against the Scout's barbed wire in the first banzai charge American troops experienced in the Pacific War. At ranges of less than 300 yards, Battery C, 24th Field Artillery, of the Philippine Scouts poured 75-mm shrapnel directly into the Japanese mass. At dawn the Scouts drove the Japanese back and counted 200 to 300 enemy bodies around their positions. The gun shields of Battery C's 75s were dented and torn from rifle and machinegun bullets. Realizing the coastal highway was too well defended, the Japanese moved westward into the jungle to search for the end of the American line. Since the Americans had placed their faith in the jungled mountain mass to protect their left, the Japanese soon found a dangling flank.

By the evening of the 16th, the Japanese had virtually destroyed the weak Filipino 51st Division in the jungle on the slopes of Mount Natib. The powerful artillery protecting the coast road could not range far enough into the jungle, and the Filipino line collapsed. Despite counterattacks, Parker's left was falling apart; and the Japanese started an enveloping drive to Manila Bay. On 22 January Parker decided to withdraw to the reserve battle position across the east-west valley of Bataan. Parker completed his move by the evening of 26 January, and no artillery pieces were lost.

On Bataan's western shore Wainwright's I Corps had also pulled back, but here the withdrawal was a disaster for the artillery. Making contact with Wainwright's line on 15 January, the local Japanese commander quickly dispatched a battalion of infantry across the western slope of Mount Natib to search for Wainwright's flank. On the morning of the 18th, the Japanese battalion established a strong roadblock in Wainwright's rear on the only road leading to the front. Dense jungle made it impossible to bypass the roadblock. Wainwright personally led a counterattack in a futile attempt to smash the roadblock, but the Japanese pushed hard against the main line north of the roadblock. At first the Filipino infantry had excellent support from Lieutenant Colonel Halstead C. Fowler's 25 2.95-inch and 75-mm weapons. But, by the evening of the 24th, the situation was growing desperate since ammunition for the guns was almost gone. On the 25th, the frontline troops disengaged, slipped down onto the beach, and infiltrated south with their small arms. All the guns—15 2.95-inchers and 10 75-mm—were destroyed by their crews; some were pushed over the cliffs above the beach. By the evening of 25 January, Wainwright's frontline artillery consisted of only two 155-mm howitzers and four 75-mms on half-tracks, all of which had been south of the roadblock.

Despite the heavy casualties they had suffered along the Abucay Line, the Japanese surged ahead in pursuit of the retreating Americans and Filipinos. Expecting a quick victory, the Japanese were brought to a halt along the Bagac-Orion Line. Even amphibious assaults against Wainwright's I Corps rear were contained and destroyed. Heavy fighting raged from 26 January until 15 February when the Japanese pulled back into northern Bataan. From 6 January to 1 March, the Japanese 14th Army had suffered 7,000 casualties, including 2,700 dead; and artillery had played a major part in stopping their advance. On 31 January, for example, the Japanese 9th Infantry Regiment attacked the Filipino 31st Division following a two-and-one-half-hour artillery preparation. As the Japanese infantry assaulted across a ford on the Pilar River, a carefully planned barrage of the 31st Field Artillery smashed the attack in what the Japanese described as "a fierce bombardment." On 2 February the 31st Division counterattacked and, supported by direct fire from 2.95-inch howitzers, drove the Japanese back.

During the fighting in the rear of I Corps, where the Japanese had landed several infantry battalions by barge, the artillery proved vital. After the enemy had been located and confined to

small promontories along the coast, artillery batteries were moved onto adjacent points of land to place direct fire against trapped Japanese. On one occasion field artillery fire inflicted severe casualties on a Japanese force which attempted to reinforce a beachhead by landing at night. It was during the battles along the coast in the I Corps' rear that the field artillery was assisted by heavy coast artillery on Corregidor. One party of Japanese landed near Bataan's southernmost point and was fired upon by huge 12-inch mortars from the island fortress. The 670-pound, high-explosive projectiles from Battery Geary contributed greatly to the crushing of that landing attempt.

From mid-February to early April, a lull settled over the Bataan peninsula as both sides prepared for the next battle. On 10 March General MacArthur departed from Corregidor by PT boat to go to Australia. As he said farewell to his successor, General Wainwright, MacArthur advised him to ". . . be sure to give them everything you've got with your artillery. That's the best arm you have." Guns were redistributed to make up for the losses I Corps had suffered, and positions were improved. By the last week in March the following artillery was available to I and II Corps:

- **I Corps—**
  - 11th Field Artillery with ten 75-mm guns.
  - 24th Field Artillery (Philippine Scouts) with eight 75-mm guns and four 2.95-inch howitzers.
  - 88th Field Artillery Battalion (Philippine Scouts) with eight 75-mm guns.
  - 71st Field Artillery (Philippine Army) with two 75-mm guns and four 2.95-inch howitzers.
  - 91st Field Artillery with eight 75-mm guns.
  - 86th Field Artillery Battalion (Philippine Scouts) with eight 155-mm guns and two 155-mm howitzers.
  - Provisional Battalion, Coast Artillery, with six 155-mm howitzers.
- **II Corps—**
  - 21st Field Artillery with twenty-four 75-mm guns.
  - 31st Field Artillery with eight 75-mm guns.
  - 41st Field Artillery with sixteen 75-mm guns and eight 2.95-inch howitzers.
  - 51st Field Artillery with eight 75-mm guns.
  - 301st Field Artillery with sixteen 155-mm howitzers.
  - Battery B, 86th Field Artillery Battalion (Philippine Scouts) with four 155-mm howitzers.
  - 1st Battalion, 24th Field Artillery (Philippine Scouts) with eight 75-mm guns and four 2.95-inch howitzers.
  - 88th Field Artillery Battalion (Philippine Scouts) with eight 75-mm guns.

Under Army control were the 27 remaining 75-mm self-propelled guns and the fixed naval beach defense guns. While ammunition was still fairly plentiful, food and medicine were not. By the end of March, nearly 1,000 men were reporting to the hospital every day. The ration had been reduced to about one-fourth of a normal peacetime portion, and this decrease in nourishment took a great toll of the men. In one two-gun coast artillery battery, only four men were strong enough to lift the 98-pound shells, one of them being the battery commander.

While the Americans and Filipinos grew weaker, the Japanese were gaining considerable strength. After their February defeat, the Japanese received large reinforcements which, by 1 April, included the following additional units:

- 1st Heavy Field Artillery Regiment (240-mm howitzers).
- 3d Independent Mountain Artillery Regiment (75-mm guns).
- 14th Independent Mortar Battalion (300-mm mortars).
- 2d Independent Mortar Battalion (150-mm mortars).
- 20th Independent Mountain Artillery Battalion (75-mm guns).
- 5th Artillery Intelligence Regiment (sound and flash bases, plus an observation balloon).

At 0900 hours on 3 April, the Japanese began their final offensive by attacking the left of II Corps. Over 150 guns, howitzers, and heavy mortars were in place to support the assault on a 2 ½-mile portion of the American line. At 1000 hours, the Japanese began to fire for effect against the Filipino 21st and 41st Divisions. With only one 30-minute pause, the barrage went on until 1500 hours. It was probably one of the heaviest bombardments American troops had suffered in World War II. The defenses of the luckless 21st Division were shattered; all efforts at counterfire failed. So thick was the smoke that artillery observers on 1,900-foot Mount Samat could not direct fire. The Japanese infantry and tanks advanced into an area that had been pulverized.

On 5 April the Japanese swarmed over the summit of Mount Samat, and the 41st Field Artillery was forced to roll its guns over the cliffs. Without its weapons, the artillery could no longer provide the effective fire that had been holding the enemy back; so the Japanese rapidly pushed ahead and smashed a II Corps counterattack launched on 6 April. By 8 April, II Corps was in a state of disorder. Along the coastal highway, a scratch force tried to hold the Japanese back; roughly half the troops were artillerymen, manning their guns to the last.

On the morning of 9 April, the battle on Bataan ended; 78,000 American and Filipino soldiers surrendered. They had delayed the Japanese conquest of Luzon for months and inflicted heavy casualties on the enemy. The brothers of these field artillerymen—the coastal artillerymen on Corregidor Island—held out for another 27 days before being overwhelmed.

Throughout the battle for the Philippines, artillerymen fought hard under extremely adverse conditions. The newly-formed Philippine Army artillery regiments went into battle with outdated, insufficient equipment and hastily trained troops; nevertheless, with the leadership and guidance of their American instructors, these artillerymen stood up well against the Japanese. Even though the first campaign of World War II was a defeat for American and Filipino forces, artillerymen earned MacArthur's praise. All of those who survived the campaign had nothing but the highest praise for the artillery battalions of the Philippine Scouts. Whether it was during the withdrawal to Bataan or the hard fighting on the peninsula itself, the Scouts proved to be the bulwark of the defense. Indeed, cadres of NCOs drawn from the Scout battalions were in large measure responsible for the success of the Philippine Army artillery. According to the Japanese timetable, the Philippines were to be occupied 55 days after the attack of Pearl Harbor; but Bataan did not fall until 9 April, and Corregidor lasted until 6 May. The gunners of "the best arm you have" did their share.

**CPT John Gordon, FA, received his commission through ROTC at The Citadel University in South Carolina. He is a graduate of the Field Artillery Officer Advanced Course and has served with the 82d Airborne Division Artillery, with the G3 of the 2d Infantry Division in Korea, and as a basic gunnery instructor. He is now commander of D Battery, 6th Training Battalion, US Army Field Artillery Training Center, Fort Sill, Oklahoma.**

# A "Roving Gunner" Remembers: Lieutenant General Wright today

*On 20 September 1984, Lieutenant General (Retired) John M. Wright, Jr., flew to Fort Sill from Irving, Texas, to speak at a luncheon of the Military Order of the World Wars. General Wright fought in three wars, eventually commanding the 101st Airborne Division in Vietnam.*

After graduating from the US Military Academy in 1940, he was sent to the Philippines where as a first lieutenant with less than two year's service, Wright became the commander of one of Corregidor's 155-mm "roving guns." When Bataan fell on 9 April 1942, the Japanese lost no time in emplacing some 25 batteries of guns to shell "The Rock." Very quickly, they smothered with fire the fixed concrete emplacements of the American heavy coastal guns. Wright's unit dismounted its 155s from their fixed positions and towed them around the island in one-gun units called roving batteries. Setting up in defiladed positions or between wrecked buildings, the roving batteries fired hundreds of rounds each day at the Japanese guns on Bataan. Communications with the Seaward Defense Command on Corregidor were almost impossible to maintain; so Wright was virtually on his own. Observing fire through a BC scope mounted atop wrecked barracks, Wright looked for telltale smoke rising out of Bataan's jungle. On one occasion, after his gun had hammered away at a suspected Japanese battery, Wright received a call from his regimental executive officer. The gleeful lieutenant colonel had been watching Wright's fire and described "guns, men, caissons, horses, and all sailing through the air" as the ammunition of the Japanese battery exploded.

On the morning of 6 May, after Japanese troops landed on Corregidor, Wright contacted a nearby 12-inch mortar battery and learned that General Wainwright had directed that they surrender at 1200 hours. Wright had a difficult time convincing his Philippine Scout gun crew that it would have to destroy its 155. Finally, the Scouts understood that they would have to obey General Wainwright's order, but they wanted to fire until the last possible moment. Thus, just prior to 1200 hours on 6 May 1942, "Battery Wright" fired the last artillery round in the defense of Corregidor. Then there was silence; a tremendous battle had come to an end.

General Wright spent three and a half years as a prisoner of the Japanese. He vividly recalls his experiences as a prisoner of war and those of the men who served with him. "In many ways, the time spent as a POW was the most significant experience of my life—I learned to appreciate freedom."

General Wright has never returned to Corregidor, but he has nothing but praise for the Philippine Scouts. Today's artillerymen can look in awe at the feats of the Redlegs who defended the "Gibraltar of the East." They can learn much from this inspiring story of Americans and Filipinos working hand-in-hand against an intractable foe.

# Command Update

## NEW REDLEG COMMANDERS

COL John C. Ellerson
24th Infantry Division Artillery

COL Craig H. Leyda
41st Field Artillery Brigade

MAJ(P) Craig V. Silcox
2d Battalion, 4th Field Artillery

LTC Randall L. Rigby, Jr.
4th Battalion, 4th Field Artillery

MAJ(P) Thomas J. McGuire
1st Battalion, 5th Field Artillery

LTC Cecil M. Robison
6th Battalion, 14th Field Artillery

LTC William R. Brown
3d Battalion, 19th Field Artillery

LTC Lester A. Kelly
6th Battalion, 27th Field Artillery

MAJ(P) Robert M. Dudley
3d Battalion, 35th Field Artillery

LTC David R. Mosser
6th Battalion, 37th Field Artillery

*LTC Ray E. Porter
1st Battalion, 75th Field Artillery

LTC Duane A. Lempke
2d Battalion, 83d Field Artillery

LTC Michael L. Simonich
1st Battalion, 84th Field Artillery

LTC David L. Baggett
1st Battalion, 319th Field Artillery

LTC Jeffrey Schwander
1st Battalion, 321st Field Artillery

LTC Charles Feldmayer
2d Battalion, 377th Field Artillery

LTC Stanley J. Weathers
557th US Army Artillery Group

LTC David L. Ingle
Training Command Battalion
Fort Sill, Oklahoma

LTC Michael S. Moseley
Officer Student Battalion
Fort Sill, Oklahoma

*Listed in July-August 1984 *Journal* as commander of the 6th Battalion, 5th Field Artillery.

Photo by Sam Orr

# FLUFF or ENOUGH?

by Colonel (Retired) Robert S. Riley

All too frequently one hears the Field Artillery criticized for having too many crewmen in its cannon system. Too many or not too many, that seems to be the question; and the answer requires a thorough understanding of the duties and support tasks which a cannon crew must accomplish to fulfill its mission. It will also be useful to take a brief look at the crew strength of cannon systems in other armies. It should become apparent that the real question should focus on what's "fluff or enough"—if the crew strength of a cannon system cannot support 24-hour combat, then the system will likely not survive to support the maneuver arms. The crew strength of the 155-mm self-propelled howitzer is a case in point.

## US M109A2/A3

The fighting tasks and duties for individual cannon crew members are listed in the Field Artillery School's handout entitled "Duties of the Personnel of the 155-mm Howitzer M109 Series Self-Propelled Section." The doctrinal support and sustainment tasks are identified in FM 6-50, *The Field Artillery Cannon Battery*. Given that the M109A2/A3 155-mm self-propelled howitzer is a product of the mid-1950s technology and that, in spite of various product improvement programs, it has no essential features of automation, it becomes obvious that the 24-hour operation of the howitzer is manpower-intensive. Each field artillery crew must be able to perform its fighting tasks including emplacement, firing, and displacement as well as support and sustainment tasks such as camouflage, security, reconnaissance of new positions, replenishment of resources, and crew rest. The problem, of course, is that crew members who are not directly involved in firing the weapon can perform some, but not all, of the support and sustainment tasks when they are "off-shift."

During a briefing at Fort Sill in 1979, a former Under-Secretary of the Army for Research and Development wondered why a tank crew consisted of only three or four men, while field artillery tables of organization and equipment authorized a crew of ten for the M109A2/A3. After all, both weapons were tracked vehicles with a large gun mounted in a movable turret and the same overall appearance to the untrained eye.

Compared to the duties of a field artillery howitzer crew, the duties of a tank crew are basically simple. The tank commander commands, the driver drives, the gunner guns, and the loader loads. Tank ammunition consists of a fixed round containing the projectile and the powder cartridge, and each round weighs approximately 50 pounds. Under intense combat conditions, each tank is capable of firing as many as 120 rounds per day. Under normal circumstances, however, the number of rounds fired per day would probably be somewhat less than 120.

On the other hand, the duties of an artillery crew are somewhat more complex. The chief of section supervises not one vehicle, but two—the howitzer and the accompanying ammunition carrier (the field artillery ammunition support vehicle or an M548). The gunner guns, but he also sets off the deflection. It takes another crewman—the assistant gunner—to set the quadrant elevation.

Artillery ammunition is unlike tank ammunition. It consists of four separate components—the fuze, primer, projectile, and powder increment. The average 155-mm projectile weighs approximately 100 pounds—twice that of the tank round—and the complete 155-mm round including powder cannister weighs approximately 162 pounds. The loader must load the projectile and the

powder bag separately. These functions can be accomplished simultaneously by two men; or they can be done sequentially by one man, which would result in a slight delay in the loading process. All four components of the artillery round must be assembled in proper order every time the howitzer is fired. Except for an impact burst, the fuze setter must accurately set the fuze for each round fired. Normally, the fuze is mated to the projectile in the support vehicle; and the complete round is passed forward into the howitzer for firing. A minimum of two men are required to perform the assembly functions in the support vehicle.

When they are not on a firing shift in the howitzer or the support vehicle, the crew members must perform support duties or catch a few winks of sleep. But there are extra complications. Since 155-mm howitzers are capable of firing nuclear projectiles, they are high priority targets for potential adversaries and warrant greater physical security than do tanks. A minimum of one two-man security team is required for the sole purpose of securing each vehicle on which nuclear rounds are carried. Normally, the howitzer crew members must perform this duty—it is a duty which cannot be assigned to just any soldier because guards for nuclear rounds require special training and security clearance. Unlike tank units, artillery batteries lack cross-attachment with infantry units and must provide early warning outposts even if they cannot man a perimeter. Two such outposts per firing platoon require four men as a minimum. Therefore, the crew members of the howitzer sections provide the security force personnel.

Based on the US Army Training and Doctrine Command Approved Standard Scenario, *Europe I, Sequence 2A,* a 155-mm self-propelled howitzer unit is projected to fire an average of 300 rounds per howitzer per day with a peak rate of 500 rounds per howitzer per day during surge periods. The physical labor for field artillerymen involved in maintaining these rates of fire is very significant. At the average rate of 300 rounds (162 pounds each) per tube per day, the weight of ammunition fired equals 48,600 pounds; at 500 rounds, 81,000 pounds. Currently, crew members must manually pass and load this ammunition into the howitzer and also handle it during off-loading and preparation of the ammunition at the firing position. In other words, each crew member could assist in lifting between 5,000 and 8,100 pounds of ammunition per day. At the end of his duty shift in each combat day, the howitzer crewman will undoubtedly be physically exhausted and, if he does not receive adequate rest be apt to make mistakes which affect crew and unit safety.

With the advent of material-handling equipment and other automated features in the proposed Howitzer Improvement Program, the physical labor required of the howitzer crew may be lessened and could possibly permit a reduction in the size of the crew. In addition to this program, the Field Artillery School has been actively and aggressively pursuing other equipment solutions which will reduce the number of crew members for cannon weapons systems. But, in the meantime, several studies and analyses conducted on the crew size for the 155-mm self-propelled howitzer should be added to the equation. In all cases, a reduction in the crew size of currently fielded weapons was weighed against mission requirements. The results are quite revealing. In conjunction with the Field Artillery School, the Fort Sill Field Unit of the US Army Research Institute developed a crew performance model for the 155-mm self-propelled howitzer M109. This study supported a howitzer crew manning of 11 men by showing that a crew of 10 or less men might be unable to maintain the rate of fire of 300 rounds per tube per day with a surge rate of 500 rounds per tube per day. Further, Science Applications, Inc., evaluated the crew size of the M109 155-mm self-propelled howitzer using the Analysis of Military Organizational Effectiveness Model and recommended that the crew be divided into two shifts of five men each per day supervised by an eleventh man—the chief of section. (It is interesting to note that the current crew size has never exceeded 10 men.) In 1978, the field artillery 3×8 organization developed by the Division Restructure Study underwent field testing at Fort Hood, Texas. The recommendations evolving from this test were that nine-man 155-mm self-propelled howitzer sections are inadequate for sustained operations and that the section size should be increased from 9 to 10 personnel.

Some might agree that Reserve Component field artillerymen could augment reduced-size Active Component howitzer crews in time of war. But the fact is that the Reserve Components are not structured to support this type of augmentation. Most field artillerymen in the US Army Reserve are officers and noncommissioned officers. The number of Reserve Component cannoneers is insufficient in quantity and in the degree of training to serve as augmentations to Active Army howitzer crews in combat. Furthermore, the Army cannot realistically maintain and manage a pool of augmentees for this single purpose over the years and then expect such persons coming from civilian life to report for combat duty within 96 hours. National Guard units, on the other hand, are organized by tables of organization and equipment and tables of distribution, and any attempt to strip away their low-ranking cannoneers would surely destroy unit integrity and delay scheduled unit deployments in the time of a national emergency. In sum, the augmentation of Active Army howitzer crews would necessitate a major restructuring of the Reserve Components; and, since the positions in question involve only low-ranking enlisted men, the Army should not be overly optimistic in filling them because the pay and prestige are probably too low to attract sufficient volunteers.

There are also those who point out that US howitzer crews seem to be larger than those of similar foreign weapon systems. Although the foreign crews are composed of fewer men, the figures can be misleading.

**French AU F1**

### Howitzer section and unit strengths

Table 1 compares the equivalent 155-mm howitzer crew manning in the US, British, German, French, and Soviet armies. The crew strength ranges from nine men in the US Army to four men in the French and Soviet armies. Recently, the Department of the Army decided that howitzer crews would be reduced by one man, and the new crew strength of nine is being implemented in revisions to tables of organization and equipment. The US and British howitzer sections each have a support vehicle assigned; but the German, French, and Soviets have only the self-propelled howitzer per section. The Germans have the second largest crew in peacetime; and, if they had a section support vehicle assigned, they would require probably a crew equal in size to that of the US section. The British crew strength in peacetime would appear to be the result of economy measures and force structure constraints. And, as Major Jonathan Bailey, MBE, Royal Artillery, noted in the September 1983 issue of *Military Review,* an equally small crew for the 105-mm gun proved inadequate in combat:

> *The intensity and duration of operations and the workload imposed . . . revealed serious deficiencies in manpower. Besides the demands for local and air defence, digging, cooking and sleep—which are part of an exercise routine—gun detachments encountered the novel experience of receiving large quantities of ammunition, preparing it, and dealing with salvage. A gun detachment of seven for a 105-mm light gun is inadequate; it should be nine. Everyone from Blowpipe operators [air defense missilemen] to "bottle washers" was pressed into "serving the guns." Had operations continued for several more weeks or even light casualties been sustained, the batteries could not have provided the support the infantry expected and deserved.*
>
> *This seems to be an example of peacetime expediency and exercise requirements failing to stand up to the realities of the battle for Port Stanley, five batteries fired the equivalent of one regiment's training ammunition allocation for four years. After firing 300 rounds, it took a gun detachment between two and three hours just to move the salvage back 30 meters behind their gun.*
>
> *. . . All aspects of life on the gun positions were dominated by the demands of ammunition flow. Peacetime thinking and experience proved inadequate . . . .*

**Soviet 152mm self-propelled gun 1973.**

Table 2 shows the artillery firing battery and battalion or regimental strengths for the five armies. Although the US Army has maintained a larger crew for its 155-mm SP howitzer than have other Western armies for their similar weapons, its overall firing battery and battalion strengths are comparable to or less than that of units of the European armies when one considers the number of cannons per unit. In other words, the US field artillery is simply using its comparably manned total force differently—it is beefing up the howitzer sections to permit 24-hour sustained combat operations.

### Conclusions

Since World War II, US Army policy has been to build 24-hour sustainability into its force structures. Field artillery tables of organization and equipment have been prepared in accordance with this policy, and units in the field—to include howitzer crews—have been maintained at wartime strengths. As mentioned earlier, the decision was made to reduce the 155-mm howitzer crew size from ten to nine men and to incorporate that reduction in upcoming revisions to the tables of organization and equipment. Is the size still too large? Is it too small? These facts need to be added to the deliberation over these questions:

- If war starts, the US Army will fight in the initial, critical hours and days with only the forces in theater.
- Recent studies, analyses, and field tests confirm that the crew of the 155-mm self-propelled howitzer M109A2/A3 should not be less than ten men.

**Table 1. Crew manning for 155-mm SP howitzers.**

| | US M109A2/A3[1] | UK M109A2/A3[1,4] SP-70 | GERMAN[3] M109G SP-70 | FRENCH AU F1 | SOVIET[5] M1973 152-MM SP HOW |
|---|---|---|---|---|---|
| Chief of Section | E6 | E6/E5[2] | E6/E5[2] | E6/E5[2] | E5 |
| Gunner/Bombardier | E5 | E5 | E4 | – | E4 |
| Ammo Team Chief | E5 | – | – | – | – |
| Cannoneer | E3 | E3 | E3 | E3 | E3 |
| Cannoneer | E3 | E3 | E3 | E3 | – |
| Cannoneer | E3 | – | E3 | – | – |
| Cannoneer | E3 | – | E3 | – | – |
| SP Howitzer Driver | E4 | E3 | E3 | E3 | E3 |
| Support Vehicle Driver | E4 | E3 | – | – | – |
| Crew Size | 9 men | 6 men | 7 men | 4 men | 4 men |

[1]The US and British howitzer sections each have a support vehicle; the others do not.
[2]The section chief grades of these armies fall between the US grades E6 and E5.
[3]The German crew has seven men in peacetime and eight in wartime.
[4]The British crew has six men in peacetime and nine in wartime.
[5]The Soviets add two men to the crew during peak periods (wartime).

**Table 2. Unit strengths.**

| | US M109A2/A3 | | UK M109A2/A3 SP-70 | | GERMAN M109G 1984 | | FRENCH AU F1 | SOVIET M1973-2S3 152-MM SP |
|---|---|---|---|---|---|---|---|---|
| | J410[1] | J420[2] | Peace | War | Peace | War | War | HOW[6] War |
| HQ, HQ & SVC BTRY OR HQ & HQ BTRY | 208 | 232 | 99 | 111 | 200 | 232 | 312 | 49 |
| FIRING BATTERY | 115[3] | 115[3] | 106[4] | 169[3] | 90[4] | 110[4] | 146[4] | 61[4] |
| SERVICE BATTERY | 135 | 135 | 93 | 102[5] | — | — | — | — |
| BATTALION TOTALS | 688 | 712 | 510 | 720 | 470 | 562 | 880 | 232 |

[1]TOE 06366J410, eight armor company FISTs, four infantry company FISTs.
[2]TOE 06366J420, four armor company FISTs, eight infantry company FISTs.
[3]Eight howitzers per firing battery; three firing batteries per battalion.
[4]Six howitzers per firing battery; the French have four batteries, but the others have three.
[5]The British do not have a service battery; however, a Royal Electrical and Mechanical Engineers (REME) Workshop of 85 personnel commanded by a captain and a signal detachment of eight are assigned to each Royal Artillery regiment (battalion). These elements are under direct command of the regimental commander, and they provide all the weapon, track, automotive, and signal maintenance and repair for the regiment.
[6]Compared to the artillery battalions of the Western armies, the Soviet battalion obviously does not have sustainability built into it. Soviet units fight intensely until they are depleted in two or three days of combat; after that time, they are replaced by new, fresh units. If they survive, they will be replenished in men and supplies and will reenter combat with a fresh echelon. Otherwise, they will be reconstituted.

• The M109A2/A3 howitzer reflects the mid-1950s technology basically and is not automated sufficiently to allow a reduction in the size of its crew.

• The US Army Reserve Components are not structured to support augmentation of Active Army howitzer crews.

• US Army crew manning of the 155-mm self-propelled howitzer is larger than that in foreign armies for the same or equivalent howitzers, but the howitzer sections of those foreign armies may be less resilient, redundant, and robust than the US equivalent and hence less able to conduct 24-hour sustained combat operations. Overall US Army field artillery unit strengths compare quite favorably with those of its Western Allies.

If these facts are not considered and howitzer crew size is made an ill-advised sacrifice to the existing force structure constraints, if the question of crew strength—"too many or too few"—is answered without reference to the corollary—"fluff or enough"—then the field artillery could find itself fatally flawed before the next fight even begins.

**COL (Ret) Robert S. Riley, FA, a field artillery specialist in the Field Artillery School's Directorate of Combat Developments, is a Department of the Army Civilian. He is a graduate of the US Military Academy and the US Army Command and General Staff College and holds master's degrees from the University of Oklahoma and Columbia University in public administration and international affairs. During his active military career, he served in field artillery assignments from battery to corps artillery level, to include three combat tours.**

# Fragments

FROM COMRADES IN ARMS

## Improved 81-mm mortar

The improved 81-mm mortar, one of the few weapon systems to undergo a combined developmental plan between the United States and another country, is nearing completion of its developmental testing at Aberdeen Proving Ground.

The "I-81" is made up of a combination of selected components from mortars from both the United States and the United Kingdom. Its baseplate, M64 sight unit, fire control equipment, and multi-option fuze on the high-explosive (HE) round are from the United States. The United Kingdom provides the cannon, bipod mount, and the HE rounds minus the fuze. Both countries are testing the improved mortar system, which is intended to save scheduling time and duplication of effort. The entire program is based on safety and performance to determine whether the system meets these requirements.

The improved 81-mm mortar has an extended range capability while retaining high precision. The maximum range of the present US 81-mm mortar is approximately 4,800 meters, and the maximum range of the improved mortar is approximately 5,600 meters.

It also has a high rate of fire; its sustained rate is 12 to 15 rounds a minute. It is lightweight and transportable; it weighs about six pounds less than the present 81-mm mortar.

Perhaps the best feature of the I-81 is the M734 multi-option fuze on the HE round. It gives four modes of functioning:

- The proximity function allows for a detonation three to 13 feet off the ground.

**Specialist 4 James Gipson drops a high explosive into the improved 81-mm mortar while assistant gunner Sergeant Freddie McRay, kneeling, looks on.**

- The near-surface burst function allows for a detonation zero to five feet off the ground.
- The impact function allows for a detonation upon impact.
- The delay function allows for a 0.05-second delay before detonation. (Patricia Deal, PAO, Aberdeen Proving Ground, MD)

## Hot news on hotlines

Two hotlines have been set up by the US Army Belvoir Research and Development Center to answer questions about camouflage and fuels and lubricants.

The Camouflage Action Hotline, which is operated by the Center's Combined Arms Support Laboratory, handles inquires about camouflage colors, patterns, and painting requirements. Most of the questions are about the new three-color pattern recently adopted by the Army and the new chemical-resistant camouflage coatings. The hotline number is AUTOVON 354-2654 or commercial (703) 664-2654.

The Fuels and Lubricants Hotline is operated by the Center's Materials, Fuels, and Lubricants Laboratory. Common questions are about clogged fuel lines or new specifications for lubricants. Sometimes a laboratory representative is available to visit a site to study a particular situation. The hotline number is AUTOVON 354-3576/4594 or commercial (703) 664-3576/4594.

Both hotlines operate 24 hours a day, seven days a week. During working hours, someone will assist the caller; after hours, an automatic answering machine will record the caller's message for action.

**An XM-86 automatic liquid agent detector system is being checked during developmental testing of the device at US Army Dugway Proving Ground, Utah. The XM-86 can be connected by radio to a central alarm as far away as four kilometers. (US Army photo).**

## The NBC draft

To win on the modern AirLand battlefield, soldiers must be able to conduct successful operations in widely varying situations, including operations in which nuclear, biological, or chemical (NBC) weapons, as well as toxins, are employed. To defend against such weapons, commanders and soldiers must be able to apply sound NBC defense fundamentals. Thus, the Chemical Corps has developed new doctrine and published five new manuals in draft form which reflect the current NBC doctrine. Listed below are the manuals and a brief summary of each draft.

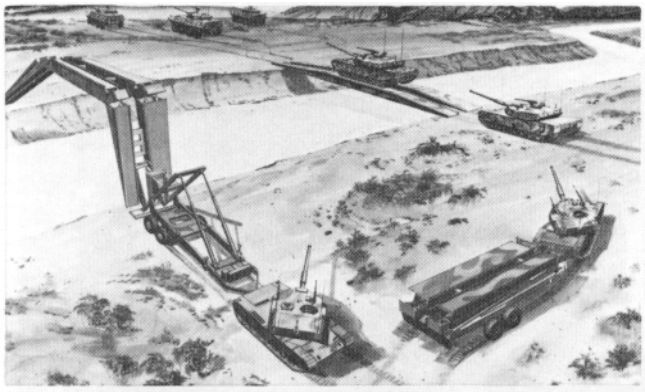
• FM 3-3, *NBC Contamination Avoidance*—Explains how to avoid NBC attacks, how to avoid being a target for enemy NBC attacks, how to reduce the effects of an attack, and how to avoid contamination.

• FM 3-4, *NBC Protection*—The primary doctrinal reference on individual and collective protection. The intended audience is personnel concerned with NBC protection, especially those personnel in MOS 54E who are advisors to their commanders on all NBC matters. FM 3-4 provides information on how to plan and prepare for individual and collective protection to include individual and collective protection equipment, systems, and procedures.

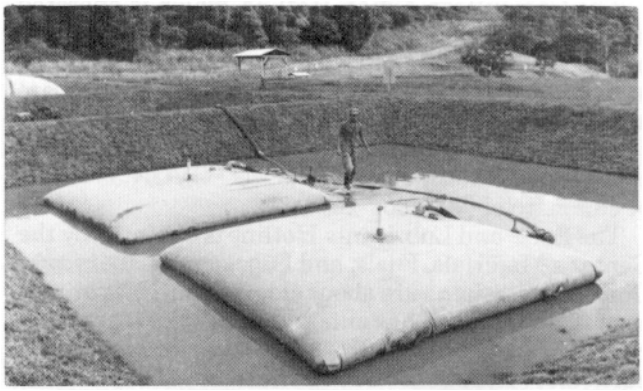
• FM 3-5, *NBC Decontamination*—Defines and clarifies the entire process of nuclear, biological, and chemical decontamination. It shows how contaminated forces survive, sustain, and restore their combat potential when contaminated. Seven standard decontamination techniques have been specified for the battlefield. They range from the individual actions needed to survive to the complex activities that chemical decontamination companies use when they help reconstitute a fighting force. These techniques have been developed to use the equipment already fielded or that will be fielded in the near future.

• FM 3-87, *NBC Chemical Units*—The chemical unit's how-to-fight manual. It tells chemical units how to reduce the effects of nuclear, biological, and chemical weapons through contamination avoidance and decontamination support; presents a basic doctrine governing the functions of chemical units in a theater of operations; and gives the commander and his staff guidance and procedures concerning the capabilities, command and control relationships, and logistical requirements of chemical units as an important part of the combined arms team.

• FM 3-100, *NBC Operations*—Gives a general overview on how NBC weapons affect combat operations and explains how operations must be altered on the integrated battlefield.



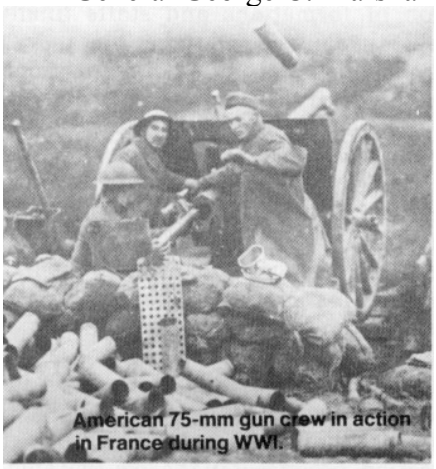
**Artist's concept shows the trailer-launched bridge that is being developed for the Marine Corps. Specifications call for the bridge to be a 24-meter structure capable of supporting 70 tons. In operation, the bridge will be mounted on a trailer/launcher which can be towed by a tank. The entire unit will be air-transportable by a C-130 aircraft. The first prototype will be delivered in June 1986, and a second unit will be delivered six months later.**



**Sergeant Nelson Pineda, a petroleum supply specialist at the US Army Tropic Test Center in Panama, wades through the aftermath of a heavy tropical rainfall to inspect two of the four 3,000-gallon collapsible fabric tanks undergoing an 11-month storage test to determine their sturdiness in the tropic environment. Two of the fabric tanks being tested are filled with diesel fuel, and two are filled with gasoline.**

***We are a strong nation. But we cannot live to ourselves and remain strong.***

—General George C. Marshall



American 75-mm gun crew in action in France during WWI.

Photo by SP4 Todd Kottmyer

*Train together to fight together*

103d ARVIN FA battalion in training.

Photo by L. Hughes

# Fraternity Education

**by Major Roger A. Rains**

The history of American wars is by and large a history of combined operations. The Frenchmen of Rochambeau's *Expedition Particuliere* played a vital role at the seige of Yorktown; Major General Adna R. Chaffee's relief expedition of 1900 participated in the multinational liberation of the embattled legations in Peking; the doughboys of General John J. Pershing's American Expeditionary Forces found themselves amalgamated into French and British formations in the trenches of the Great War; and the soldiers of World War II, Korea, and Vietnam fought shoulder-to-shoulder with soldiers from around the world. Even in their most recent confrontation with the "iron face of battle" on the tiny island of Grenada, American paratroopers operated with Caribbean allies.

Yet peculiarly, almost inexplicably, the US Army has never integrated into its doctrinal canon the many significant lessons learned from this broad experience in coalition warfare. One need only peruse the single chapter devoted to combined operations in the Army's capstone manual, FM 100-5, *Operations,* to realize how little guidance and how few procedures exist regarding the integration of multinational forces at the operational and tactical levels. This consistent lack of guidance has inevitably led to the relearning of the same, old lessons at a considerable, perhaps unconscionable, cost in mission accomplishment, materiel expenditure, and blood letting. General George S. Blanchard cut to the heart of this issue when he noted in the January 1979 edition of *ARMY* that:

> *For the practicing professional . . . any debate about the necessity of interoperability is irrelevant and does not accurately reflect the nature of current operations in the multinational military environment . . . . History shows that it is not a question of philosophy when one talks about interoperability. On a multinational battlefield, it is a reality with which everybody must cope*.

Indeed, interoperability, as it contributes to operational and tactical unity of effort, is both an imperative of modern combat and a potential combat multiplier. Thus, in order to fulfill its role as a deterrent and a war-fighting force, the US Army must develop doctrinal literature as well as the operational and tactical capabilities to conduct efficient and effective combined operations in both established and contingency theaters.

The growing threat in the established theaters of Europe and Northeastern Asia as well as the burgeoning unrest in the strategically critical and ultimately more precarious regions of Southwest Asia and the third world have prompted the orchestration of military-political activities at the highest levels. The breadth of the US contribution to this strategic dialogue about combined operations stands in poignant contrast to the dearth of similar discussion and doctrinal development at the operational and tactical levels. Yet to mount an effective deterrent and to prepare to fight and win, the Army's leaders need guidance beyond the wiring diagrams and sketchy area descriptions found in the current FM 100-5. They need generic guidance on interoperability infused throughout the doctrinal canon. As a minimum, the capstone document, in addition to its present treatment, should describe the three dimensions of interoperability—hardware, software, and human—as well as identify the problems that history suggests are commonly associated with attaining interoperability in each of its dimensions and recommend possible solutions to these recurring problems. Similar but more specific treatments in manuals devoted to corps-, division-, and brigade-level operations and their associated ARTEPs would at least alert commanders and their staffs to the issues that they will likely confront and provide some historically validated methods for resolving them. For example, American commanders have repeatedly faced the need to orchestrate combined operations at corps and division levels in unestablished theaters. Our failures in North Africa and in the Anzio beachhead during World War II in this regard are legend. But where within the doctrinal canon can a contemporary commander find guidance regarding the types of forced integration of formations and staffs finally adopted by the Allies in Tunisia and Italy? The answer to this rhetorical question is painfully clear; he cannot.

The procedure for rectifying this blatant doctrinal omission is the marriage of historical research and doctrine production. Teams of historians from the Army's Combat Studies Institute working in close accord with the doctrine writers at the Combined Arms Center should be able to fill the present void. Only the stimulus and the human resources need be supplied.

Doctrine is in most instances the *sine qua non* of training. It is logically necessary to the conduct of training but by itself may not be sufficient to guarantee that training occurs. For interoperability to occur, individual leaders require more than readily available doctrine. They must assimilate the doctrine through training and education, practice it in the low-risk environment of peacetime, and apply it in the heat of battle. Therefore, the Army's officer training system must produce leaders at every level capable of identifying and solving interoperability problems germane to their likely wartime assignments. To that end, Military Qualification Standard I (MQS I) training should develop an officer candidate's awareness of the historical pervasiveness of combined operations and the tactical implications of major interoperability issues. MQS II and III graduates should know the basic tactical doctrines of America's principal allies as well as the procedures required for successful interoperability at the brigade and lower levels. For example, Officer Basic and Advanced Course graduates should be steeped in STANAGs and knowledgeable of the significant tactical differences among the German, British, French, and American doctrine appropriate to the branches. Officers completing the Combined Arms and Services Staff School should expand their knowledge of combined operations by learning the procedures for successful interallied liaison and the various methods for the integration of multinational staffs. Staff college graduates should acquire an in-depth understanding of interoperability doctrine at the tactical and operational levels as well as a substantial appreciation of the strategic implications of coalition warfare. In fact, the interallied composition of the staff college community creates an environment pregnant with potential for the identification of divergent operational and tactical doctrines, the development through historical and doctrinal reviews of interoperability procedures and checklists, the conduct of combined command post exercises designed to illuminate interoperability problems and their resolution, the integration of combined planning into the joint operations planning system (JOPS) structure, and the disclosure of divergent strategic perspectives. Finally, the senior service colleges should train their graduates to deal with the strategic implications of coalition warfare to include a thorough exposure to the complex human, hardware,

and software problems associated with theater-level operations and the methods that have proved successful in solving them. In this regard, Major General Fox Connor's observation at the US War College on 10 February 1938 remains true today.

> *Dealing with the enemy is a simple and straightforward matter when contrasted with securing close cooperation with an ally. By the same token no small part of our War College studies should be devoted to an endeavor to foresee exactly what to expect and how to reduce friction should we have allies, which may God forbid, in the next war*.

Beyond this baseline of institutional training on interoperability, the Army must take steps to expand combined operations training for those specific individuals assigned as commanders or staff officers in combined organizations or in areas of likely multinational operations. Corps commanders in established theaters and division commanders whose organizations are earmarked for contingency operations must program and conduct tailored, individual training to ensure that these pivotal actors are not only knowledgeable of local interoperability arrangements but also completely informed of the commander's *modus operandi*. Liaison officers—if necessary, drawn from the immediate augmentation reserve pool to ensure their availability, capability, and stability—must receive formal training in order to develop the three essential skills that Field Marshal Erwin Rommel, an accomplished master of coalition warfare, demanded of his personal representatives: tact, military competence, and linguistic ability.

Just as individuals must become efficient and effective operators in the multinational arena, so too must units. Army units assigned to established theaters should develop a well-refined capability to conduct combined operations through the creation of close intra-alliance ties, the production of combined plans and standard operating procedures (SOPs), and the conduct of routine, realistic combined training exercises. As General Blanchard notes:

> *If history has shown us anything, it is that interoperability, like any other operational problem, yields to command and staff awareness, detailed planning, and practice. Interoperability becomes a stumbling block only when the multinational partners involved refuse to recognize the importance of cooperation and fail to practice it in peacetime*.

Unit leaders must personally know and be communicative with their counterparts in associated allied units. Initiatives such as the Gateway Program and the Pre-Command Course can do much to prepare Army leaders to participate in this important professional and social linkage. American leaders must exploit their personal relationships with the leaders of adjoining or supporting allied units in order to develop and validate integrated operations plans and SOPs. The resulting understandings on issues ranging from liaison to fire support coordination to transportation can do much to reduce the friction inherent in combined operations. Of course, close personal relationships and well-drawn and maintained plans are merely preliminaries. As a rule, soldiers and their units do well what they practice well. To conduct successful coalition warfare, units must train in a combined context. Commanders and their training managers must confront their subordinates with demanding, unusual circumstances requiring imaginative reaction to coalition problems such as assimilating, reinforcing, or supporting an allied unit.

Like their colleagues in established arenas, leaders in Army units earmarked for contingency operations should develop an in-depth understanding of their potential areas of operations and their likely allies as well as create institutional procedures supportive of smooth transitions into combined operations. To this end, unit commanders in contingency-oriented units should ensure that their training scenarios portray employment in their designated contingency area and that their staffs plan with a full appreciation of the likely host nation and alliance support that may be available. Indeed, training exercises at the battalion and higher levels should include role-playing to simulate combined operations and to stimulate the identification of interoperability problems and their potential solutions. The results of such training should provide the basis for the development of SOPs reflecting generic guidance regarding force integration, liaison, and other interoperability concerns. Beyond the previously noted academic familiarity and the conscious effort to incorporate the dimensions of interoperability into training and SOPs, commanders and their principal staff officers should, whenever possible, visit their likely areas of operations, meet their potential allies, and learn firsthand their doctrines. In the absence of such opportunities, officer exchanges and visits by potential allies to American units may prove useful.

Frederick William of Brandenberg, "The Great Elector," once noted that "Alliances, to be sure, are good, but forces of one's own are still better." The harsh reality of the modern strategic scene is that to deter or to fight successfully, Americans cannot act alone. Our military leaders must know both their likely friends and enemies, and they must train to be able to operate with the former to defeat the latter. Interoperability must become a keynote in American doctrine as well as in the Army's individual and collective training. If not, our leaders will be condemned to learn yet again the historical lesson taught by so many ill-executed combined campaigns; Sir John Slessor captured the essence of that lesson when he observed that: "War without allies is bad enough—with allies it is hell!"

**MAJ Roger A. Rains, FA, received his commission from the United States Military Academy. His field artillery tours include assignments as battery commander, assistant brigade S3, and battalion S3. He has an M.A. degree from Duke University and has served as an assistant professor of English at West Point. Major Rains is a graduate of the US Army Command and General Staff College and is currently the Editor of the Field Artillery Journal and the Executive Director of the United States Field Artillery Association.**

# Right by Piece

NOTES FROM UNIT

**A German soldier sets up a machinegun as part of the security provided by the LANDJUT Corps to the 294th US Army Artillery Group.**

## Soldiers helping soldiers

FLENSBURG, WEST GERMANY—Interoperability and technical proficiency were put to the test recently during the NATO exercise Battle Balance—an exercise designed to test the ability of the Danish, German, and American forces of the Allied Land Forces Schleswig-Holstein and Jutland (or LANDJUT) Corps to work together under wartime conditions. The 294th US Army Artillery Group used the exercise as an opportunity to be evaluated by its brigade headquarters under the Army Training and Evaluation Program (ARTEP.)

In the field, the 294th's headquarters is located with the corps artillery operations center or fire support element. Although the LANDJUT Corps Artillery is commanded by a brigadier general, the 294th's direct point of contact is the Danish lieutenant colonel who commands the fire support element. Each of the 294th's artillery detachments, the 13th and 75th, are positioned with their supported artillery regiment or battalion. Thus, the detachment commanders who are captains work directly with the regiment or battalion commanders—a challenging responsibility. The 99th Ordnance Detachment is located with the corps artillery ammunition company.

**An ammunition truck passes through a security point manned by soldiers of the 294th US Army Artillery Group during a simulated chemical attack.**

Soldiers of the 294th as well as their comrades in arms testified to the success of the exercise. "First and foremost, the objective of the ARTEP is training for the troops," said Captain Calvin Pilgrim, commander of the 99th Ordnance Detachment. "We develop standing operating procedures (SOPs) for everything and train all year long. This is the chance to see just how well we are trained."

"This command has British, Germans, Danes, and Americans," said Sergeant Major David Bynos, operations sergeant major of the 294th. "We have to test our operations to make sure we iron out our differences. The allies are very cooperative. We can discuss differences and work out solutions acceptable to everyone."

Interoperability is a big concern in the 294th," said Private First Class Andrew Young. "We test our ability to handle messages and interoperate with our allies. No where else can you get the training with soldiers of other countries; it is the only way to see how operations work."

"Working with the Americans is a very good experience," said Lieutenant Thomas Assmuth, the operations officer of the 611 Nachschubkompanie, the 99th's partner unit. "Although language is a problem, the contact allows one to develop a broader perspective, militarily and socially. It allows each of us to learn the other's language . . . . We work well together. We are a team—one cohesive unit."

"The objective was to come to the field and support the LANDJUT Corps—to test the fully tactical mission and exercise procedures." said Lieutenant Colonel Carl Schott, commander of the 294th US Army Artillery Group. "From the tactical standpoint, the exercise was a success. There were some unforseen problems, but that's why we are out here." (Story and photos by CPT Lee J. Hockman)

**Specialist Four Childers and Captain Rodriguez, Battery A, 4-5th FA, receive instructions on the German G3 rifle. The recoil of the 7.62-mm G3 rifle is muchgreater than that of the 5.56-mm M16A1 rifle.**

**A 3d Company Unteroffizier (NCO) ensures that Specialist Four Duran's G3 rifle is cleared after firing. The 4-5th FA soldier hit the pop-up targets six out of six holes.**

# Redlegs participate in German boot camp

BUNDESWEHR, GERMANY—"Wenn sie nichts zu tun haben, dann tun sie es bitte nicht hier" ("If you have nothing to do, then please don't do it here") read the sign on the door leading to the company commander's office. And, as the nine US soldiers from Battery A, 4th Battalion, 5th Field Artillery, soon learned when they joined the German Third Company (Basic Training), 210 Supply and Support Battalion, at Wilhelmsburg Kaserne in Ulm, there is no time to do "nitch." The American Redlegs participated in a 36-hour field training exercise with the German "boot camp" company.

After receiving a briefing from the Third Company commander, the American Redlegs joined in a 5-kilometer road march to the company bivouac site with the Bundeswehr trainees who had been awakened at 0300 hours by a surprise alert. After the soldiers set up their pup tents (similar to the American two-man tents), they hiked another three kilometers to the rifle range for a day of shooting. The trainees were required to hit a pop-up target at a range of 250 meters a minimum of three times with six rounds fired from the German G3 7.62-mm semiautomatic rifle. The shooters were then required to run one lap around the shooting lane and then shoot in the prone position. After another lap, they fired from the kneeling position. After completing the third and final lap, soldiers fired from the standing position. Soldiers then donned their protective masks, ran a lap, and engaged pop-up targets at 250 meters.

The trainees returned to the bivouac site and practiced their version of the three-second rush as well as cover and concealment and squad movement. After a meal of cold German C-rations, "Epas," the men trekked another three kilometers for night firing. The wearied soldiers returned to camp at 0100 for a block of instruction on light and noise discipline.

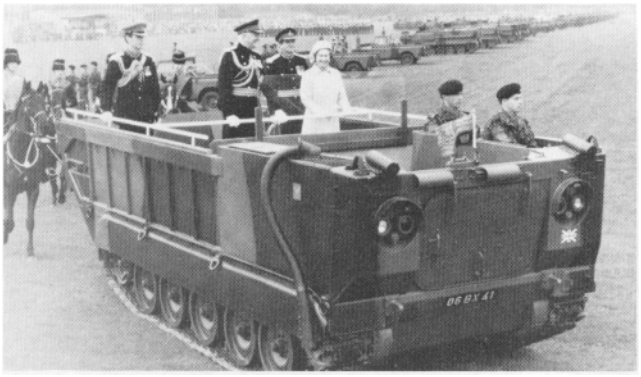
Aggressors greeted the new day at 0600 hours with an assault on the platoon's perimeter. The trainees finished the morning with more practice in three-second rushes and squad movement. Then they took down their tents, enjoyed a warm meal, and hiked back to their billets. After a few hours of weapon cleaning and personal hygiene, the commander showed a combat film.

The life of a drafted German trainee is very much like that of his American counterpart. He must learn in a stressful environment many of the same basic fundamentals of individual soldiery. German soldiers go through three months of basic training and then spend the remaining 12 months of their active duty obligation with their assigned units where they receive advanced individual and on-the-job training. German regulations require that trainees spend a minimum of 572 hours in field training exercises. (1LT Peter I. Dubravec, A/4-5th FA.)

# On target

BAMBERG, GERMANY—Redleg sharpshooters of Battery A, 2d Battalion, 78th Field Artillery, can fire individual weapons with the accuracy expected of an infantry soldier. This sharpshooting was reflected by 32 Redlegs who qualified for the German *Schuetzenschnur* (shooting medal) when Battery A traveled to Bayreuth to train with their partnership unit, 2d Battery, 125th Panzer Artillery.

The individual weapons qualification consisted of qualifying on three German weapons: 9-mm pistol, 7.62-mm rifle, and machinegun. The course is considered one of the toughest in Europe. The awards are given at three levels: gold, silver, and bronze. Five Redlegs earned silver medals, and 27 qualified for the bronze medal.



**Dortmund, West Germany--Her Majesty The Queen reviews the Royal Regiment of Artillery in Germany. (Photo courtesy of *Gunner* magazine.**

**FORT SILL, OK—Brigadier General Peter Rohde (left) recently visited the Field Artillery School. He is the Commandant of the German Artillery School in Idar-Oberstein, West Germany. Here, he is being briefed by Fort Sill's German Army Liaison Officer, Lieutenant Colonel Dietmar Hoffman. (Photo by SP5 Mike Howard.)**

**FORT RILEY, KS—Brigadier General (Retired) John A. Seitz, a Distinguished Member of the 5th Field Artillery Regiment, accepts the "Honorary Colonel of the Regiment" certificate on behalf of Major General (Retired) Charles C. Rogers. Major General Neal Creighton, Commander of the 1st Infantry Division (Mechanized) and Fort Riley, installed Major General Rogers as Honorary Colonel of the 5th Field Artillery. Honorary Colonels are appointed for one-year renewable terms and, along with Distinguished Members, participate in unit organizational days, changes in command, social activities, and visits to units stationed throughout the world.**

**General John Wickham, Jr., Army Chief of Staff, is briefed on the capabilities of the Lance missile by Captain John Westbrook of Battery A, 6th Battalion, 33d Field Artillery. (Photo by SPS Mike Howard.)**

# Army Chief of Staff visits post

FORT SILL, OK—General John Wickham, Jr., the US Army Chief of Staff, recently visited soldiers in the field at Fort Sill and viewed the post's most sophisticated field artillery equipment.

General Wickham then addressed nearly 400 officers and senior noncommissioned officers and gave them an insight as to the Army's future:

"The Army must use technology to enhance its productivity, concentrate on quality soldiers and equipment, and try to build a solid doctrinal base which makes use of our limited resources.

"The Army is smaller than it has been in 34 years—780,000 soldiers; the goal is to keep within that number and still add 20 maneuver battalions and one active duty division to its unit strength. Using labor-saving technology throughout the Army will provide more soldiers to go into combat arms units.

"Leaders need to create an environment where junior leaders can grow—where young people can make mistakes and still survive, where a young commander will not be relieved for a minor mistake, and where a noncommissioned officer can accept responsibility without the fear of making a mistake and being severely reprimanded."

# Around-the-world cannon shoot

FORT HOOD, TX—The 3d Field Artillery, the Army's oldest and most decorated artillery regiment, fired its first around-the-world regiment cannon shoot on 25 July 1984.

Major General (Retired) George Ruhlen, the honorary commander of the regiment, gave the fire command from the 2d Armored Division's Artillery operations center at Fort Hood, Texas. Using his World War II radio call sign, Commerce Six, Ruhlen communicated his order with a radio transmitter in one hand and a telephone conference hook-up to Germany in the other. The time-on-target mission linked up the five battalions in the regiment from their various remote locations across the Atlantic.

The 1st and 3d Battalions assigned to the 2d Armored Division fired from field sites at Fort Hood while the remaining three battalions shot their missions abroad. The 2d Battalion fired at Butzback; the 4th, stationed at Garlstadt, shot at Meunster; and the 5th, stationed at Giessen, fired its mission at Grafenwoehr. At exactly 0800 hours (1500 hours in Germany) 90 howitzer cannons fired one round. (This was the first collective fire mission attempted since its activation on 1 October 1983.)

After the battalions reported back all rounds shot and mission completed, Ruhlen acknowledged: "This is Commerce Six, mission accomplished . . . end of mission . . . well done . . . ."

General Ruhlen could recall the execution of only one other such fire mission. At the time, Ruhlen was a lieutenant colonel commanding the 1st Battalion. It was New Year's Eve, 1944; and the 3d Field Artillery Regiment, along with soldiers of the 101st Airborne Division and various other units stationed at Bastogne, Belgium (Battle of the Bulge), decided to sound the new year in. At exactly midnight, the units fired three rounds each. But, according to the general, the mission fired on 25 July was the first time the unit fired solely as a regiment.

**Major General (Retired) George Ruhlen watches the seconds tick off until it is time for him to "call for fire" enabling all five battalions of the 3d Field Artillery Regiment around the world to fire their guns simultaneously. (Photo by Jackson C. Stevens.)**

# Redleg Run

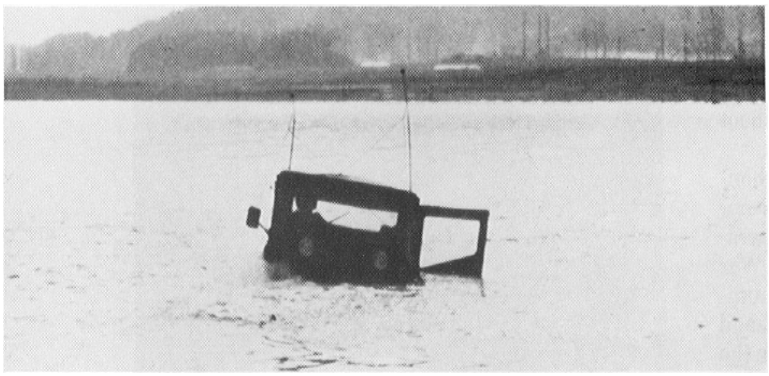
MUENSTER, WEST GERMANY—The drizzly day in July was just the sort of weather the running enthusiasts participating in the 570th US Army Artillery Group's third annual 10-kilometer run and organization day activities were hoping for. The 374 participants were from the 570th US Army Group's detachments, the 1st British Corps, the 1st Belgium Corps, local German units, and the Warendorf Sports Centrum which is the German olympic training facility.

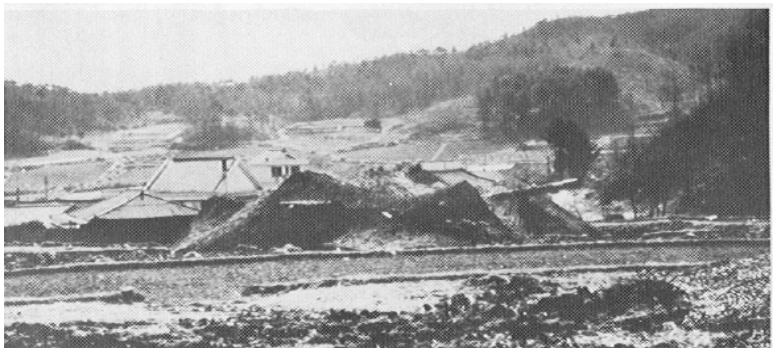
The runners included soldiers, family members, and local civilians who ranged in age from 10 to 45 years old.

British Gunner Conrad Watson from the 2 Field Royal Artillery was the first to cross the finish line with a time of 32:34. Second place was taken by Private First Class Keith West, 69th US Army Field Artillery Detachment, who finished with a time of 33:09. The first woman to come in was First Lieutenant Debbie Hill of the 8 Regiment Royal Corps of Transport.

After the scores were tallied, Colonel Ronald E. Little, Deputy Commander of Operations for the 59th Ordnance Brigade, presented medals to the winners.


**Soldiers and family members of British, Belgium, German, and US Army units and local German civilians hit the pavement and woodland trails during the 570th US Army Artillery Group's third annual Redleg Run. (Photos by SP4 Tamara Richmond.)**





# Team Spirit '84

CAMP STANLEY, KOREA—The resident US 2d Infantry Division teamed up with units from the US 7th Infantry and 25th Infantry Divisions and elements of the US 3d Marine Division for one of the largest military exercises in the free world—Team Spirit '84. Team Spirit was not limited to ground forces—US and Republic of Korea (ROK) fleet units maneuvered at sea, and US and ROK Air Force worked together and in concert with the ground forces including the Redlegs of the 8th Battalion, 8th Field Artillery—"Automatic Steel."

The 8-8th FA began Team Spirit '84 with a 10-day commander's reconnaissance of the exercise maneuver area. The battalion staff worked out the details of the exercise plan; the five battery commanders searched for battery positions for the unit's M198 155-mm towed howitzers. These were no easy tasks, particularly in light of the limited road network in the Republic of Korea.

The battalion habitually supports the 2d Infantry Division's 2d Brigade. For Team Spirit, the 2d Brigade was task organized with the 1st Battalion, 31st Infantry (Mechanized), from the 3d Brigade; the 2d Battalion, 72d Armor, from the 1st Brigade; and the 1st Battalion, 91st Infantry (ROK). Consequently the 8-8th FA's fire support officer worked with the fire support officers from the 2d Battalion, 17th Field Artillery; the 1st Battalion, 15th Field Artillery; and the 311th Field Artillery (ROK). The 8-8th FA fire support officers and fire support teams remained with their habitually supported units. Battery B of the 8-8th FA, a COHORT unit, was deactivating during Team Spirit, and Battery B, 6th Battalion, 8th Field Artillery, a COHORT battery from Fort Ord, participated as the 8-8th FA's third firing battery.

The 8-8th FA, an all-wheel unit, road marched from Camp Stanley to the exercise area. The road network in Korea is primitive and brutal. Once a vehicle broke down or became stuck, the entire column became immobilized. When a recovery vehicle could not move to the front to aid a stopped vehicle, it had to go on a long circuitous route to meet the vehicle head on. Generally, there was simply not enough room to move a wrecker alongside a stopped convoy. The narrowness of the roads was further complicated by the many soft shoulders. More than one howitzer slid into a rice paddy simply because the road shoulder could not support the combined weight of a 5-ton prime mover loaded with the unit basic load and a towed M198. The M198 demonstrated a propensity for getting stuck to a point beyond the battalion's organic 5-ton wrecker's ability to recover it. Often a battery would have to beg, borrow, or spirit away M578s, M88s, or D7 bulldozers in order to extricate its equipment. This situation raises serious questions about the utility of M198s in the rugged terrain of Korea. Once a howitzer dropped a wheel over the side of a road, it became obvious how top-heavy the M198 is. Outside of hooking up a tow chain to a high point on the howitzer— there are very few places on the trails to hook a tow chain—each recovery required a different approach.

While the hospitality shown by the Korean people was awe-inspiring, driving courtesy was nonexistent. Convoy infiltration by fast-moving, zig-zagging taxis was a constant fact of life. Our vehicles would drive off into rice paddies to avoid colliding with passenger buses passing them at breakneck speed.

The four-hour convoy from Camp Stanley ended with each battery pulling directly into its initial position to support the covering force battle. All batteries

were positioned to ensure that at least two-thirds of their weapon's range extended beyond the forward edge of the battle area. Two batteries were positioned well-forward to capitalize on their range capability to attack deep targets. The battery farther back was to maintain continuous support when the forward batteries needed to displace.

After the covering force handed off the battle to the 2d Brigade in the main battle area, the 8-8th FA resumed its habitual direct support mission. As the defending 2d Brigade yielded territory and displaced south, the problem of coordinating unit locations became increasingly complex due to the number of units moving simultaneously. A battery would often find itself on the heels of a displacing trains element, and some batteries would arrive in a position before the previous occupants left it. The omnipresent mud made movements difficult, and it was not uncommon for an arriving unit to help pull vehicles out of the mud for a unit displacing from the same position.

As the defensive phase of the exercise continued, units crossed the Namian-Gang River. Only one major bridge existed in the brigade sector, but one additional bridge was constructed by the division engineers. The forward battery, which narrowly missed being overrun by Orange Forces, crossed on the indigenous bridge. The remainder of the batteries forded the river at a battalion fording site. Because all of the crossings took place during darkness and since the river was close to the maximum fording depth of the 8-8th FA's howitzers and prime movers, marking the fording site was critical. A party of cannoneers marked the lane using flashlights and aiming posts. Jeeps crossed with one man on the hood of the vehicle to guide the driver so that he could steer clear of any holes in the river bed. Drivers wore their overshoes because the water reached seat level in the jeeps.

The last battery to cross the river was a self-propelled unit which arrived at the crossing site about 0145 hours. That unit had been alerted at 2100 hours and had stood poised to move at any time. The unit's drivers got very little sleep, but driver fatigue caused few problems.

The river crossing was made in good order, and the battalion occupied new positions. It reverted to a general support mission while the 2d Brigade refitted for

the counterattack. The M198's 24,000-meter range allowed the battalion to assume a very effective general support role while the brigade prepared to launch its counterattack.

As the 8-8th FA transitioned from the defense to the offense, the batteries accomplished some much needed maintenance. Once the night counterattack began, the infantry and armor of the 2d Brigade passed through the 8-8th FA's positions along a major route of the limited regional road network. The counterattacking force's convoy—ROK infantry loaded on their trucks with their assault boats, US M113s, and finally US tanks whose tracks stretched fully from one side of the road to the other—seemed unending. Subsequent to the counterattack across the Namian-Gang River, the 8-8th FA resumed its habitual direct support mission to the 2d Brigade. Although the 8-8th leadership had originally planned to occupy positions just south of the Namian-Gang River, they soon found that the momentum of the attack necessitated barrelling back across the river on the heels of the maneuver units. During the river crossing, Battery A was placed under the operational control of the 6-37th FA, an 8-inch battalion. After the 8-8th FA had set up on the other side of the river, Battery A reverted back to the control of its parent unit.

As the 2d Brigade's offensive continued to gain more and more objectives, the 8-8th FA displaced northeast to its final positions of the exercise. The paucity of good positions was clearly demonstrated during this phase. The Battery A position, for example, would have been good except for the clutter of adjacent units. To the immediate front was an engineer company and an 8-inch battery. To their front was an ROK infantry division. To the immediate rear of Battery A was a brigade headquarters. The density of units would have made a terrific target array for hostile artillery or air attacks.

Team Spirit '84 was a resounding success for the 2d Infantry Division Artillery. When the 8-8th FA returned to Camp Stanley, the battalion's strength was reduced from seven batteries to five. At a regimental ceremony, the battalion bid farewell to Battery B, our COHORT unit, and welcomed a new COHORT unit, the former Battery A, 2d Battalion, 8th Field Artillery. We also bid farewell to the visiting battery from Fort Ord—Battery B, 6th Battalion, 8th Field Artillery. (Story and photos by CPT John A. Hamilton)

# Saint Barbara guards the 59th Brigade

PIRMASENS, WEST GERMANY—A statue of Saint Barbara, the patron saint of the field artillery and an enduring symbol of professionalism within the US Army, was installed in the hallways of the 59th Ordnance Brigade headquarters this past February.

A gift from the 59th's artillery group commanders, the statue pays tribute to the service and dignity rendered to the brigade by all artillery officers and soldiers—past, present and future.

Cast in Brussels, Belgium, through the efforts of the 13th Belgian Artillery Group, the statue was presented to the Brigade during the annual German-American Artillery Conference.

According to legend, Saint Barbara was the beautiful daughter of a wealthy pagan in the 4th century. To prevent losing her to potential suitors and to protect her from the outside world, her jealous father shut Barbara in a tower whenever he left his castle.

Upon his return from a particularly long absence, the tyrannical father discovered that his daughter had converted to Christianity. Infuriated, he tortured and beheaded her. Immediately following the execution, he was struck by lightning, and his body was consumed.

Saint Barbara was venerated as early as the 7th century. The legend of the lightning bolt that struck down her persecutor caused her to be regarded as a patron saint in times of danger from thunderstorms, fires, and sudden death.

With the advent of gunpowder, Saint Barbara became the symbolic protectoress against accidental explosions. Early artillery pieces often blew up, and their crews often sought the aid of Saint Barbara as a protectoress.

The tradition of Saint Barbara also lives on today in the highly sought-after military order which bears her name. The Ancient and Honorable Orders of Saint Barbara recognize artillerymen who have made a truly significant contribution to the field of artillery through their dedicated, innovative, and consistent service. The Order of Saint Barbara may also be awarded to distinguished persons and nonartillerymen who have made contributions deserving the award.

Each of the brigade's artillery group commanders wears the Honorable Order of Saint Barbara. Lieutenant General Sir Martin Farndale, Commander of the British Army on the Rhine; Major General Guy Hansard Watkins, Commander of the 1st British Division; and Brigadier General J. P. M. Bruenig, Commander of the 1st Netherland Corps Artillery, have all received the Ancient Order of Saint Barbara.

The statue of Saint Barbara now occupies a place of honor at the 59th Ordnance Brigade headquarters. It is, and will remain, a symbol of the great pride and tradition which artillerymen contribute to the brigade. (Story and photo by CPT Lee J. Hockman.)

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**The German battalion commander briefs the commander of Battery A, 2-39th FA.**

# Task force partnership

KITZINGEN, WEST GERMANY—Battery A, 2d Battalion, 39th Field Artillery, 3d Infantry Division (Mechanized), stationed in Kitzingen, West Germany, had a rare opportunity to train with its German Army partnership unit during a nine-day exercise called Task Force Partnership at the Grafenwoehr Training Area.

Task Force Partnership had three objectives:

• To strengthen the already close partnership ties between the 2d Battalion, 39th Field Artillery, and the 365 Panzerartillerie Battalion.

• To promote soldier confidence in NATO interoperability. Although many of the soldiers had participated in the annual REFORGER exercises, this exercise was entirely different—Battery A was completely under the control of and dependent on the 365 Panzerartillerie Battalion.

• To enable US soldiers to learn German operating procedures and to enable the German soldiers to learn US operating procedures.

The Redlegs of the 2-39th soon learned that they had to adjust to an officer structure and doctrine significantly different from that of an American field artillery battalion. The modified table of organization and equipment of a US direct support field artillery battalion authorizes 45 officers; in contrast, the 365 Panzerartillerie has only 13 officers (an 05 battalion commander; three 04s who serve as either the S3, the headquarters and service battery commander, or battalion maintenance officer; five 03s who serve either as one of the three firing battery commanders, as the S4, or as the battalion doctor; and five lieutenants who serve either as one of two firing battery executive officers, as the S1, as the S2, or as the signal officer.) German doctrine positions the battery and battalion commanders on the observation point most of the time. During displacements, the firing batteries are led by a lieutenant or a sergeant equivalent in rank to an American noncommissioned officer in the rank of E7; the battery commander gives verbal guidance on the displacement from the observation point.

The partnership officer for the 2d Battalion, 39th Field Artillery, spoke German fluently; so he accompanied

Battery A and acted as the liaison officer between the US and German units. The leaders from both units spoke and understood enough of the other's language to communicate their messages, but the liaison officer was very helpful during the daily command and staff meetings when conversations became technical in nature.

Included in the nine-day exercise were two live-fire phases of three days each. In phase one, the 365 Panzerartillerie S3 assigned Battery A firing points and furnished it firing and movement tables. The German S3 gave his other three batteries similar orders. Phase two was a battalion exercise consisting of one day of maneuver and two days of live fire.

The German battalion commander and his S3 briefed the battery commanders and staff on a simulated tactical scenario involving elements from the 12th Panzer Division. The maneuver brigade, supported by the 365 Panzerartillerie, was conducting an active defense and was preparing to counterattack that afternoon. The firing batteries were given two positions, each with a movement table to occupy its first position. The guidance required advance parties to move out immediately; the remainder of the unit was to follow the movement tables. After the first position was occupied, the advance party moved out and prepared position number two.

The tactical operations center for the 365 Panzerartillerie was set up in a tactical posture behind the firing batteries, similar in location to US positioning. Battery A informed the 365 Panzerartillerie S3 of its activities through the liaison officer located with the 365 Panzerartillerie tactical operations center. While en route to position two, the German commander had each of the batteries execute a fire mission so that he could observe each unit's ability to hipshoot. Each of the batteries made at least three moves and occupied three positions during the dry-fire portion of the exercise.

Battery A had just completed TACFIRE and battery computer system training, and the German commander was anxious to compare the accuracy of the battery computer system with the German manual methods. The German commander sent Battery A a Standardization Agreement (STANAG) met message compatible with the battery computer system; it was entered into the battery computer system without any difficulty. Initially, during the live-fire portion of the exercise, visibility in the impact area was limited; so the battery used the German radar to conduct a mean-point-of-impact registration. After determining and applying registration corrections, Battery A was ready to accept fire missions. The German observers called in several battalion mass fire-for-effect and time-on-target missions to the battalion fire direction center. The four batteries massed fires accurately and quickly on repeated missions.

During the maintenance day between the two phases of the exercise, the Battery A fire direction center and one fire support team set up a demonstration of the battery computer system and digital message device for the staff of the 365th. The Germans also took this opportunity to become more familiar with Battery A's M109A2 howitzers and M548s.

The German food was excellent, but the soldiers of

**German artillerymen give "thumbs up" to the US digital message device.**

Battery A were disappointed in the quantity served. A typical breakfast included German rolls or bread, butter, jelly, a few cold cuts, and coffee; the US soldiers' breakfast normally included bacon, sausage, eggs to order, coffee, toast, pancakes, cereal, and fruit. The lunch menu varied; frequently it was a hot meal of sausage and sauerkraut, hamsteaks, or beef over noodles. It was a well-prepared and tasty meal; but, once again, the quantity was less than that usually served at an American dining facility. Dinner was the robust meal of the day, and portions were comparable to those served at an American dining facility. The majority of the German cooking was done in a centralized garrison facility and transported to the field. The Battery A cooks spent the entire nine days working with the German cooks, and they were fascinated by the way the German cooks prepared their meals. Much of their food was prepared days in advance; they pickled many of their vegetables and sometimes sauteed their meats the day prior to serving.

The procedures for refueling vehicles were also interesting to the American soldiers. The Germans normally do not have 5-ton trucks with MOGAS and diesel pods or Goer tankers to "top-off" vehicles. They use a 5- or 10-ton truck loaded with hundreds of 20-liter (approximately 5-gallon) cans full of either diesel or MOGAS. When the truck arrives at a firing point, it drops off the required number of cans at each vehicle. The soldiers empty the cans and return them to the truck. This procedure becomes tedious when an M109 howitzer requires up to 135 gallons of gas.

The members of the maintenance section from Battery A had an interesting experience when they had to change the starter on one of its M109A2 howitzers. They needed a vehicle that could lift the pack out of the howitzer hull to replace the starter. Unfortunately, the German operator of the 5-ton wrecker could not speak English; and no one in the maintenance section could speak much German. But the mechanics used hand and arm signals to communicate and managed to hook up the wrecker's crane to the pack, pull it out, and then reset it.

During the live-fire exercises, cannoneers from Battery A were sent to one of the 365 Panzerartillerie's firing batteries while Battery A received an equal number of German cannoneers. The section chiefs of both armies were quite surprised at their section's efficiency in performing crew drill during live-fire missions when crews consisted of both US and German soldiers. Standardization of crew drills made the exchange of soldiers much easier. It was obvious to all concerned that NATO interoperability is a reality. (CPT Martin L. Vozzo, A Battery, 2-39th FA.)

**German soldiers serve chow to Specialist Four Alexander Kalusz, 85th Detachment, 557th US Army Artillery Group, at a field location. (Photo by SP4 Tamara Richmond.)**

# Exercise Heisse Spur

HERBORNSEELBACH, WEST GERMANY—While many American soldiers were celebrating the Fourth of July with their families and friends, others spent their holiday stuck in the mud in West Germany. More than 350 soldiers from the 557th US Army Artillery Group participated in the III German Corps field exercise, Heisse Spur, held annually the first week in July. The exercise is the largest of its kind in Europe with more than 4,500 German soldiers participating.

The 557th provides technical and tactical support for the III German Corps through custody, security, and maintenance of weapons systems.

The 557th takes advantage of the Heisse Spur exercise each year to fulfill its annual Army Training and Evaluation Program (ARTEP) requirement. The ARTEP identifies critical war-fighting unit tasks and allows leaders to evaluate their unit's proficiency. The evaluation emphasizes the mission, tactical survival, and administrative and logistical tasks that a unit would have to perform in combat.

Heisse Spur is a big exercise in interoperability; the Americans rely on the Germans for ration, medical, transportation, and some communications support. The overall objective of the exercise is to test procedures for inter-corps resupply, including aerial and ground convoys. The ability to accomplish this vital function ultimately impacts on the larger goals of continuity and survivability.

The Northern and Central Army Groups, the two major NATO commands supported by the 49th Ordnance Brigade, also participate in Heisse Spur. While it is important to the US soldiers of the 557th, the exercise is equally important to the German Army. The III German Corps does its homework early, and the result is a well-coordinated exercise. The Germans also attempt to do something new every year.

The results of Heisse Spur demonstrated the ability of German and American soldiers to work together effectively—an important link in NATO's deterrent and defensive capability.

# OCS Hall of Fame

FORT SILL, OK—When Major General John S. Crosby, Major General Berwin Granger, and Brigadier General (Retired) Marlin W. Camp cut an artillery red ribbon to open the renovated Office Candidate School (OCS) Hall of Fame at Fort Sill, Oklahoma, members of the audience could almost hear the chanting voices of young soldiers echo from Jark Hill across the now empty spaces that once were a bustling Robinson Barracks. Each speaker at the 13 August ceremony paid tribute to the heroism and exceptional achievements of some 47,500 graduates that the School produced over its 32-year history and acknowledged the value of the OCS Hall of Fame which preserves an important dimension of the field artillery's legacy.

The ceremony in the front of historic Durham Hall also marked the induction of Major General Fragner, the Assistant Deputy Chief of Staff for Mobilization, Department of the Army, as the 414th member of the OCS Hall of Fame. General Fragner joins a select fraternity of OCS graduates who have achieved national prominence, attained the rank of Colonel while serving on active or inactive duty, or received the Medal of Honor or Distinguished Service Cross. During his remarks, General Fragner acknowledged a heartfelt debt to the field artillery and to OCS which have both served the nation so well.

The first small class of Field Artillery OCS reported to Fort Sill on 10 July 1941. America's growing involvement in World War II forced the rapid expansion of the School which by the time of its closing on 12 December 1946 had graduated 179 classes and produced over 26,000 second lieutenants. The press of events in the Far East prompted the reopening of the School on 21 February 1951; and an expanded 23-week course, conducted at Robinson Barracks after 15 April 1953, produced a continuous flow of Redlegs until 2 July 1973 when the last class of 26 field artillerymen graduated.

Over its long history the Field Artillery OCS has produced a remarkable number of heroes. Two of these men warrant special mention. First Lieutenant James E. Robinson, Jr., who gave his name to the OCS barracks, was the only artillery officer to be awarded the Medal of Honor during World War II, and Second Lieutenant Harold B. Durham, Jr., a Medal of Honor winner from the Vietnam era, gave his name to the old OCS Brigade Headquarters which now houses the Hall of Fame.

Established by general order on 26 June 1968, the OCS Hall of Fame has known many locations, but owing to a generous grant from the United States Field Artillery Association and the hard work of Lieutenant Colonel Martin H. Beach and the men of the 6th Training Battalion, Army Training Center, Fort Sill, Oklahoma, it now has a permanent home. The Hall of Fame, which is open to public from 0830 to 1600 hours Monday through Friday except for a brief lunch break, captures the vital spirit of OCS and provides any organization or unit which wishes to use it a link with the grand traditions of the field artillery's legacy. Persons desiring to use Durham Hall should contact the Commander, 6th Training Battalion.

The OCS Hall of Fame operates exclusively by contribution. Individuals desiring to contribute to the further operation and preservation of the OCS legacy should send their tax-deductible donations to the United States Field Artillery Association, P. O. Box 33027, Fort Sill, Oklahoma 73503.

# Loyaute

**by Captain Byron S. Bagby**

On 6 April 1917, President Wilson made the decision to enter the "war to end all wars," and the United States was reluctantly forced into a global conflict. At that time, the forces commanded by General John J. Pershing consisted of little more than a division, and it became obvious that our efforts in Europe would require much more. So, at the request of General Pershing, the 82d Division was formed; and on 2 September 1917 A, B, C, D, and E Batteries, 319th Field Artillery, were organized at Camp Gordon, Georgia, as fire support units in that division. The 319th Field Artillery was a subordinate element of the 157th Field Artillery Brigade, which provided direct support fires to the 82d Division.

The regiment was equipped with 75-mm horse-drawn howitzers for its training in Georgia, but was issued 155-mm truck-drawn howitzers upon its arrival at La Courtine, France. The 82d Division was soon involved in extensive training in the European theater of operations. General Pershing, who felt an obligation to keep close tabs on all of his new units, remarked in his diary on 31 May 1918 that the 82d Division looked very promising and that he was especially impressed by the much-needed artillerymen, particularly those of the 319th.

The 82d Division's first big chance to prove itself occurred at the St. Mihiel salient—a bulge in the enemy lines which had to be reduced before the Allies could make an all-out attack against the Hindenburg Line. The 82d made the main attack and completed its first combat operation with what was described later as "professional perfection."

After St. Mihiel, the Americans advanced through German fortifications at a much faster rate than anticipated. The Germans prepared to make a stand. This resulted in a major allied offensive in the Meuse-Argonne area. For the 319th, along with the rest of 82d, this meant meeting the Germans between the Meuse River and the Argonne Valley. The 319th, along with her sister field artillery units, participated in massive artillery preparations which punched an opening in the German defensive lines. The result was the achievement of all major Allied objectives and the eventual acceptance of an armistice on 11 November 1918.

On 18 May 1919, after having spent two years and having participated in three campaigns in Europe, the 319th Field Artillery was demobilized at Camp Dix, New Jersey, only to be reconstituted on 24 June 1921 in the Organized Reserves with assignment to the 82d Division.

On 25 March 1942, because of the Nazi threat to world peace, the 319th Field Artillery was ordered back into active military service and joined the remainder of the 82d at Camp Clairborne, Louisiana. On 15 August 1942 a final reorganization before its entry into World War II took place. The 319th Field Artillery was fitted and redesignated as the 319th Glider Field Artillery Battalion. The glider borne unit's first taste of combat came in the Sicilian theater. Approximately 600 men jumped into Sicily and advanced up the toe of Italy. Under the command of General Mark Clark, the men of the 319th assisted in the capture of key objectives at the port of Naples and the Foggia airfields. The battle line was subsequently moved farther north, and the 319th, in direct support of the 508th Parachute Infantry Regiment, was credited with much of the success in this campaign.

After successful completion of two campaigns in Italy, the 319th Glider Field Artillery Battalion went to England for a much needed rest and additional training. This preparatory work was soon to be put to good use in the greatest Allied undertaking of all—"Operation Overlord." The 319th left Membury Airdome, England, at 2137 hours on 6 June 1944 in 40 Horsa-type gliders. The gliders landed about two miles northeast of St. Mere Eglise, France, and about five kilometers from the designated landing zone. In fact, they touched down near the German frontlines along the outpost line of the US Fourth Infantry Division. Two officers and 15 enlisted men were killed.

The battalion was cut off from the rest of the division, and most of the following day was spent in reorganizing and attempting to contact the division as well as providing direct support to the 508th Parachute Infantry Regiment. During this confusing period the battalion was able to muster only one seven-gun battery, because the remainder of the guns, which had been damaged during the glider landing, had been abandoned. Even with only seven 75-mm truck-drawn tubes, the 319th Glider Field Artillery Battalion maintained continuous support for the 508th, consistently bringing timely and accurate fire within 100 yards of friendly troops.

The 82d's subsequent advance was rapid, causing the battalion to displace numerous times during a 37-day period. On 7 July 1944, the 319th was placed in support of the 507th Parachute Infantry Regiment after the 508th had been given the mission of division reserve. On 11 July, the 319th was officially relieved of combat, and on 13 July departed for Utah Beach and a long awaited trip back to the United Kingdom. Because of the outstanding performance and the courage displayed during the St. Mere Eglise operation, the battalion was awarded its second Presidential Unit Citation.

On 13 September 1944, the 319th was alerted for another airborne operation, code-named "Market-Garden." The operation was part of a joint airdrop (Market) and ground thrust (Garden) in the vicinity of Arnhem. Each battery was to take off from a different airfield at 15-minute intervals and, after linking up in the air, to cross the English Channel and land at a designated landing zone. By 15 September, all preparations had been completed, and the batteries departed for their respective airfields. After three delays due to poor visibility, the main element of the battalion left England on 18 September 1944 to participate in the invasion of Holland.

One glider was lost when it ditched into the English Channel. The excessive turbulence produced by the British bombers, which were used as tow ships, had caused the glider to slip loose. However, the remainder of the 319th made the crossing intact. Most of the firing battery gliders landed under fire at the designated site near Nijmegen around 1445 hours. By 1700 hours the battalion was in place and firing. This highly professional performance was a direct result of the extensive glider landing, recovery, and assembly training the unit had received in Great Britain. Only 12 of the 20 headquarters gliders landed on the designated landing zone. Two loads came in close to the German border and were subjected to extremely heavy enemy fire. There were 12 casualties, with an additional 52 men missing and presumed captured by the enemy.

The days that followed were hectic and costly. The 319th was spread out over a considerable distance, and conditions were made more difficult by torrential rains. As the infantry advanced toward Arnhem, the battalion was forced to displace seven times over the next two months. Finally on 12 November 1944, a message was received to proceed to the division base camp located at Suippes, France. During operations around Arnhem, the 319th had fired a total of 34,423 rounds.

After only a short rest and training period at Suippes, the gunners of the

Photo by SP4 Lynn M. Slabney and SP5 Erlan Pedersen

**Soldiers of Battery A, 3-319th FA, set up a M102 howitzer during FIREX 76.**

319th responded to the massive German counterattack into Belgium. Alerted for combat on 17 December 1944, the men of the 319th had a cheerless Christmas. The only gifts they received were artillery fire from the nearby German batteries. They felt the full blast of winter for the first time, but the battalion continued to fire effectively. In one noteworthy instance, over 150 prisoners were taken in a small town. Their excuse for surrender was their inability to fight or withdraw under the devastating American artillery fire.

On 31 January 1945, the 508th Infantry received a sharp German counterattack consisting of seven tanks and approximately 300 infantrymen. Calls for the 319th's support came only minutes after the battalion had begun to displace. The battalion reacted immediately—the first rounds left the tubes within minutes. Even as the battalion continued its road march to a new position, an alert forward observer saw about 300 more Germans staging for another attack. Two of the 319th's five batteries executed a "hipshoot"; another counterattack was spoiled.

Finally, on 21 February 1945, word was received to move to Aachen, Germany, where the battalion would be readied for the long move back to the division base at Suippes. This brought an end to the 319th Glider Field Artillery's fourth major campaign of the way; 66 days of combat during which over 20,000 rounds of artillery ammunition were expended.

On 2 April 1945, the 319th was alerted for action which would take them into Germany for a third time. This time, however, the battalion's tactical mission was to provide general support-reinforcing fires to the 320th Glider Field Artillery Battalion. At this point the infantry had begun to move so rapidly that a position was rarely occupied for more than one day. During the month of April, the 319th travelled some 500 miles. On 3 May 1945 the battalion made contact with the Russian Army, and with the occupation of the towns of Alt Krenzlin and New Krenzlin, the 319th's soldiers began their duties as occupation troops. The battalion had earned two Presidential Unit Citations—for Chiunzi Pass during the Italian campaign and St. Mere Eglise.

A few weeks later, the battalion boarded the *Queen Mary* and headed for Fort Bragg, North Carolina, where all five batteries remained for some time.

On 15 December 1947, the 319th reorganized as the A, B, C, D, and E Batteries, 319th Field Artillery Battalion. On 15 November 1948 the battalion was withdrawn from the Organized Reserve and alloted to the Regular Army. This change produced another reorganization and redesignation; on 15 December 1948 the unit became the 319th Airborne Field Artillery Battalion.

Since August-September of 1917 with the original constitution and organization of the 319th, all five batteries of the battalion had been assigned to the 82d Division. They all participated in the same battles, earned the same campaign streamers, and were awarded the same unit citations. But, on 1 September 1957, the 319th was relieved from assignment to the 82d Airborne Division and was reorganized and redesignated as the 319th Artillery, a parent regiment under the Combat Arms Regimental System. Another redesignation took place on 1 September 1971, and the unit became the 319th Field Artillery. The following paragraphs portray highlights and histories of the five batteries and, subsequently, battalions of the 319th beginning in 1957.

## Battery A

On 1 September 1957, Battery A, 319th Airborne Field Artillery Battalion, was reorganized and redesignated as Battery A, 319th Artillery, an element of the 82d Airborne Division. It was reorganized and redesignated on 25 May 1964 as Headquarters, Headquarters and Service Battery, 1st Battalion, 319th Artillery.

Nineteen years after Battery A, 319th Glider Field Artillery, had sailed into New York Harbor, the 1st Battalion was called to war. On 30 April 1965, it deployed to Santo Domingo, Dominican Republic, for operation "Power Pack." The Battalion fought as infantry and performed missions such as house-to-house searches, roadblocks, and civic actions. The highlight of these non-artillery activities was when the unit captured two rebel 105-mm Krupp howitzers. On 30 May 1965, 1st Battalion personnel departed San Isidro Airfield by C-130 aircraft for Pope Air Force Base, North Carolina. A final redesignation to 1st Battalion, 319th Field Artillery, took place on 1 September 1971, and the unit settled into years of training.

October 1983 saw the 18-year period of peace come to an abrupt end. In response to Cuban involvement in Grenada, the 82d Airborne Division was called upon to participate in an operation code-named "Urgent Fury." The 1st Battalion's tactical operations center and A and B Batteries provided direct support to the 3d Brigade of the All-American Division. But the highlight of the 1st Battalion's participation in the operation was the firing of almost 500 rounds onto the Cuban and Soviet training camp at Calivigny in support of the airmobile assault conducted by the Rangers. The final elements of this battalion to pull out of Grenada were the fire support sections attached to Task Force 2-505th Infantry, which ended its seven-week stay on 12 December 1983.

## Battery B

On 1 September 1957, Battery B, 319th Airborne Field Artillery Battalion, was reorganized and redesignated as Battery B, 319th Artillery, 82d Airborne Division. Relieved from assignment to the 82d on 1 February 1964, the unit was assigned to the 101st Airborne Division at Fort Campbell, Kentucky.

On 3 February 1964, it was organized and redesignated as Headquarters and Service Battery, 2d Battalion, 319th Field Artillery.

Deploying with the 101st, the 2d Battalion arrived in Vietnam on 19 November 1967 and provided direct support to the 3d Brigade. The 2d Battalion, 319th Artillery, was initially committed in the III Corps tactical zone. In April and May of 1968, the 2d Battalion supported the 101st operations along the lowlands of the Quang Tri and Thua Thien Provinces. This battalion, along with the remainder of the 101st Airborne Division, was converted into a fully airmobile configuration by August 1968.

During 1969, the division protected the populated regions of the Thua Thien Province. Most of 1970 was spent on Operation Texas Star, where the 2d Battalion supported the 3d Brigade's offensive sweeps against the enemy in the western portions of Quang Tri Thua and Thien.

In recognition of its achievements in Vietnam, the battalion was awarded a third Presidential Unit Citation, the Valorous Unit Award, the Meritorious Unit Commendation, two Republic of Vietnam Crosses of Gallantry with Palm and the Republic of Vietnam Civil Action Honor Medal. The 2d Battalion, 319th Artillery, departed Vietnam on 20 December 1971 as part of Increment X of the US Army withdrawal from Vietnam. On 1 September 1971, the battalion was redesignated as 2d Battalion, 319th Field Artillery, and was inactivated 31 July 1972 at Fort Campbell, Kentucky.

## Battery C

On 1 September 1957, Battery C was redesignated and reorganized as Battery C, 319th Field Artillery Battalion. On 24 June 1960, it was relieved from assignment to the 82d Airborne Division and assigned to the 25th Infantry Division. Relieved from assignment to the 25th on 1 July 1961, it was reorganized and redesignated on 25 June 1963 as Headquarters and Service Battery, 3d Battalion, 319th Field Artillery, and assigned to the 173d Airborne Brigade.

At 0530 hours on 5 May 1965, the first of over 150 sorties of C-130 aircraft loaded with men and equipment of the 173d Airborne Brigade landed at Bien Hoa Air Base in Saigon from Okinawa. In direct support of the brigade was the 3d Battalion (Airborne), 319th Field Artillery. The men of the 319th had a jump of two months on their fellow "Redlegs" destined for Vietnam. This enabled them to compile an impressive list of firsts. One of the most important was firing the first field artillery round by a US Army unit in Vietnam from the base piece of Battery C during a registration. Another battery in the battalion also won recognition for its participation in a combat jump into Katum on 22 February 1967 with some other elements of the brigade. This operation included a heavy drop of all of the battery's howitzers.

Photo by SP5 James I. Hatton

**Members of Battery B, 3-319th FA fire a 105-mm howitzer during the Vietnam conflict.**

The 3d Battalion participated in numerous campaigns during the Vietnam conflict and returned to the United States on 23 July 1971. It received its third Presidential Unit Citation, the Republic of Vietnam Cross of Gallantry with Palm, and the Republic of Vietnam Civil Action Honor Medal. On 14 January 1972, it was relieved from assignment to the 173d Airborne Brigade and assigned to the 101st Airborne Division at Fort Campbell, Kentucky, as the 3d Battalion, 319th Field Artillery.

## Battery D

Battery D, 319th Airborne Field Artillery Battalion, was reconstituted and redesignated on 25 April 1957 in the Regular Army as Battery D, 319th Artillery; assigned to the 101st Airborne Division; and activated at Fort Campbell, Kentucky. On 3 April 1964, Battery D was deactivated at Fort Campbell, Kentucky, and relieved from assignment to the 101st Airborne Division. This Battery was redesignated on 1 September 1971 as Battery D, 319th Field Artillery.

## Battery E

The 319th Airborne Field Artillery Battalion's Battery E was reconstituted on 25 April 1957 in the Regular Army and concurrently redesignated as Battery E, 319th Artillery; activated at Fort Campbell, Kentucky; and assigned to the 101st Airborne Division. After being deactivated at Fort Campbell and relieved from assignment to the 101st on 3 April 1964, it was redesignated on 1 September 1971, as Battery E, 319th Field Artillery.

## Conclusion

The 319th Field Artillery Regiment continues to live by its motto "Loyaute" (Loyalty). In October of 1985, the 319th Field Artillery Regiment will be reorganized under the Army's new regimental system. The regimental home base battalion will be 1st Battalion (Airborne), 319th Field Artillery, which will retain its current designation. The 1st Battalion (Airborne), 320th Field Artillery, and the 2d Battalion (Airborne), 321st Field Artillery, will be redesignated as 2d and 3d Battalions (Airborne), 319th Field Artillery, respectively. All three battalions are located at Fort Bragg, North Carolina.

**CPT Byron S. Bagby, FA, was commissioned a Distinguished Military Graduate through the ROTC program at Westminster College in Fulton, Missouri. He has served as fire direction officer (battery and battalion), executive officer, fire support officer, and S1. He was assigned to 1st Battalion, 15th Field Artillery, at Camp Stanley, Korea. In his second tour to Fort Bragg, North Carolina, he is currently the commander of Battery A, 1st Battalion (Airborne), 319th Field Artillery, 82d Airborne Division.**



☆U.S. GOVERNMENT PRINTING OFFICE 1984—769–034/5