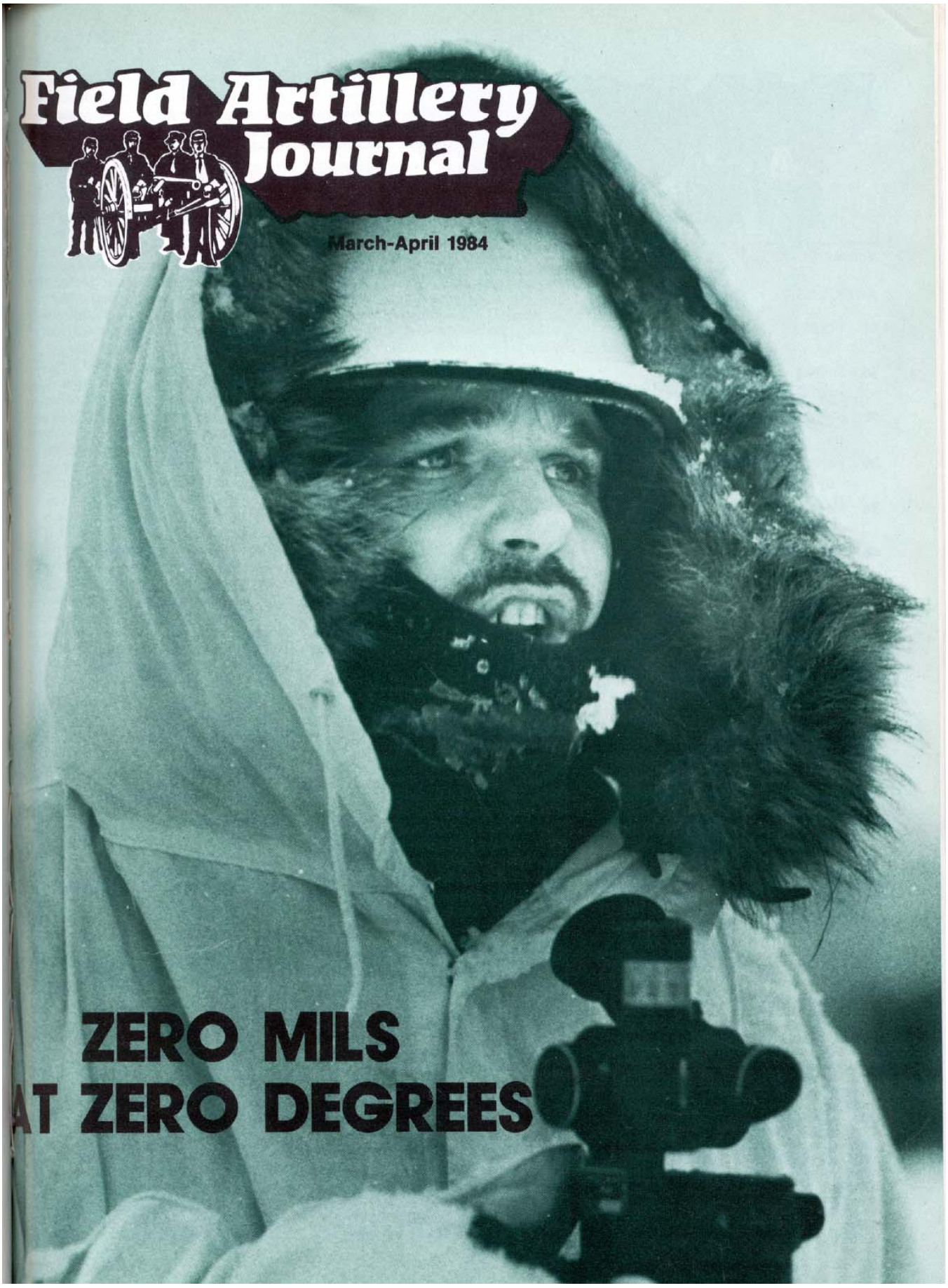
Field Artillery Journal

March-April 1984



ZERO MILS AT ZERO DEGREES

Field Artillery Journal

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ARTICLES

FEATURES

Cover Photo by 1LT Michael Edrington

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PURPOSE (as stated in the first *Field Artillery Journal* in 1911): *"To publish a journal for disseminating professional knowledge and furnishing information as to the field artillery's progress, development, and best use in campaign; to cultivate, with the other arms, a common understanding of the 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."*

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What a difference a degree can make. A degree of error in direction can move steel off the target. A degree of difference in the temperature can play havoc with men and equipment. We safeguard against the directional errors by measuring with the basics — mils. And then we shoot for the ultimate accolade in both gunnery and mission accomplishment — zero mils. We can also safeguard against extremes of temperature by measuring with the basics — the basic technical and tactical skills of the field artillery leader. At least that's the conclusion of a Redleg unit which fought a truly cold war. "Freeze Frame" details how getting back to the basics resulted in zero mils at zero degrees — and lower.

It's a long way from Alaska to the Mojave, but the importance of the basics seems independent of snow or sand. You can read about many of the challenges of the National Training Center in an article which may keep the heat on the OPFOR instead of on you. A continuing challenge for all of us is to know the enemy well enough to find and attack him. Two updates on the threat field artillery mesh nicely with a report on how to focus our acquisition and targeting efforts. Finally, space permits only an outline of the action-packed history of the Fifth Field Artillery Regiment; but you'll still get a good feel for the "Faithful and True."

Your days are busy, but I hope you find time to read the *Journal* from cover to cover. Treat yourself to a full plate of the topics that concern us most. You'll find the spirit of contribution catching.

EDITOR

In the Move

MG JOHN S. CROSBY

If our junior leaders know their business, our soldiers will too.

Success in battle — as was recently demonstrated in Grenada — requires tactically and technically competent leaders in the battery. The chain of command in the field can develop and refine this competency, but we at the Field Artillery School must lay the solid groundwork. We must never lose sight of the fact that our mission is to support the maneuver arms. Everything we do must have that as our objective. I want to describe some examples of how the School curriculum is changing to produce junior officers and noncommissioned officers who fit the bill.

Officers

Field artillery officers face a dual challenge. As fire support coordinators they must understand the AirLand Battle as well as or better than the maneuver commanders whom they will advise. At the same time, they must be completely schooled in field artillery tactics and techniques. Our Basic and Advanced Courses recognize the need to graduate officers who can meet both challenges confidently and competently.

Basic Course students currently arrive to find a 17-week program of instruction which gives an increased emphasis to leadership, maintenance, fire support coordination, and physical fitness. They will see more of the same when the course expands to 19 weeks in May.

The Basic Course begins with the Combined Arms Center's new 52-hour block of core leadership instruction, and we reinforce the classroom instruction throughout the student's stay. Officers find themselves in leadership roles during inspections, physical training, fire direction and command post exercises, and especially during an extended field training exercise called the Seven-Day War. Recently expanded from four days, this exercise gives every student a chance to rotate through key FIST and firing battery positions and to experience the rigors of simulated combat. Further reinforcement in leadership comes from resident students in the Advanced Course who act as Basic Course tactical officers and PT instructors. Finally, we are teaching these young officers to seek excellence; and we reinforce that message through drill and ceremony and through mandatory study halls for those who do not meet the academic standard.

Maintenance instruction in the Basic Course puts greater emphasis on getting equipment into the hands of the students. Each student must perform maintenance tasks during field training exercises. At the end of the Seven-Day War, for example, students perform a complete after-operation PMCS on organizational equipment. Classroom instruction on the maintenance management system remains important, but now our students can get familiar with maintenance by doing it. Instruction on how to conduct maintenance training is integrated throughout their hands-on work with the equipment.

One of our more exciting initiatives in Basic Course training on fire support coordination is the use of the G/VLLD in a close air support exercise. Students get a chance to designate targets for A-7 and A-10 aircraft equipped with Pave Penny. We also stress lessons learned at the NTC in our instruction.

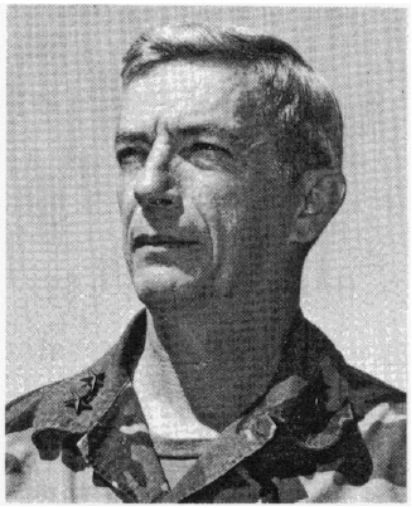
Physical fitness and weight control programs are underway in both the Basic and Advanced Courses. Physical training usually occurs three times a week, and an officer must meet the Army's fitness and weight standards to graduate. Overweight officers are not even permitted to enter the Advanced Course.

The Advanced Course students now face a course more finely tuned to their needs and to the needs of the combined arms team. Instruction on TACFIRE has increased from 31 to 71 hours to insure that the graduate is ready to assume fire support officer responsibilities in the TACFIRE environment. A Fire Direction System Exercise teaches them the interface between the G/VLLD, BCS, and DMD. They also share in lessons learned at the NTC. In addition to the primary focus on fire support tactics and techniques, the students receive enrichment training in leadership and ethics from guest speakers, reading discussion groups, and a leadership symposium.

On a final note, the School is looking at better ways to insure that its officer graduates retain their edge after they leave Fort Sill. One initiative is the production of a field circular which, when it reaches the field in July 1984, will assist the commander in conducting an officers' professional development program.

Noncommissioned officers

Junior noncommissioned officers shoulder a higher degree of responsibility in the semi-autonomous, broad-front operations of the AirLand Battle. If they are to train battery soldiers to survive and win, they must have absolute confidence in their tactical and technical competence. Recent modifications to the Field Artillery School NCO courses immerse the students in the Soldier's Manual tasks and ultimately



involve them in the full range of battery-level operations. Here are a few highlights.

The 13B Basic Course now has 31 hours of instruction in maintenance supervision, including a significant amount of hands-on training. In early FY85, missile and target acquisition NCOs will see exportable programs of instructions which will fill the current lack of skill level 3 basic technical courses.

The Cannon Advanced Course, recently expanded by three weeks, requires students to perform common and MOS skills to standard. It is tough training which places students in positions they can expect to fill in combat, to include the position of firing platoon leader. There are demanding field training exercises — one dry-fire and one live-fire. During these exercises, each student takes charge of firing platoon operations, to include reconnaissance and occupation of positions, lay of the howitzer, preparation of the executive officer's report, and computation of safety. The dry-fire exercise features a map and communications exercise, and the live-fire exercise requires a minimum of six platoon moves a day during a five-day period.

Lastly, you should have recently received Field Circular 29-299, which was issued by the School at year's end. It constitutes a first step in establishing a framework for successful noncommissioned officer professional development.

Conclusion

Field Artillery leaders will not graduate from the school without demonstrating a command of the basic tactical and technical skills. I look to you in the field to judge the product honestly and let me know how we can do better. I also look to you to develop the leaders you receive. If our junior leaders know their business, our soldiers will too. And we will win.

LETTERS TO THE EDITOR

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

Nuclear Weapons Technical Inspections

I have always considered myself a true "fan" of General Trefrey because of the many outstanding contributions he made to the Army during his tenure as the Inspector General. But he misses the mark in his reply to Major Mike Speltz's article on the state of the Nuclear Weapons Technical Inspection (NWTI) as it exists in the 59th Ordnance Brigade. Although Major Speltz's article was written over a year ago and despite the much appreciated and truly intelligent efforts of members of the USAREUR IG Inspection Branch, the thrust of the article remains valid.

This past June, I completed a three-year tour of duty in the 59th Ordnance Brigade where I served as Group Operations Officer and Group Executive Officer supporting British and Belgian NATO units in northern Germany. It doesn't take a three-year tour in this brigade to learn that to "pass" an NWTI means to avoid being awarded a failing deficiency attributed to the inspected unit. (Apparently, this question was not asked when General Trefrey visited the 59th Ordnance Brigade last June; for even a private soon discovers this fact of life.)

I do not intend to rehash the points Major Speltz brought out in his article, but I feel it may be useful to discuss some reasons why the NWTI "ideals" that General Trefrey lectures us on in his editorial reply do not fit the "realities" described by Major Speltz.

First of all, the 59th Ordnance Brigade, as it is currently structured, is a virtually uncommandable organization with its thousands of soldiers spread in nearly a hundred locations from the Danish to the Austrian borders. This situation represents a monumental span of control problem to the brigade commander. (The current brigade commander performed the truly prodigious feat of visiting every one of his assigned detachment-sized units in his first four months of command — a remarkable accomplishment, but one which emphasizes the command and control difficulties of this organization.) Many of the brigade staff sections are forced into a "benign neglect" form of management and coordination ("If you don't bother me, I won't bother you"), which leads directly to two other problems: near autonomy of action for the widely dispersed group commanders, and a reliance on statistical type indicators as measures of performance. Thus, the resulting emphasis on "passing" NWTIs (by far *the* most important of the scores of inspections an artillery group endures in any 18-month period) is obvious. Exacerbating this problem is the fact that, as a separate brigade, the 59th Ordnance Brigade commander must report directly to the DCINC, USAREUR, at whose level the concentration is more on the numerical indicators of unit performance (number of POV fatalities, number of DWIs, number of NWTI failing deficiencies, etc.) than it is on, as General Trefrey described them, ". . . training requirements that will lead us to true professional competence."

A second reason which contributes to the difficulties Major Speltz discusses is the fact that, as a NATO unit, the artillery groups are usually at the mercy of the supported NATO nation when training goals and plans are drawn up. Although the nuclear weapons training General Trefrey describes is a primary area of training emphasis and interest to brigade units and occupies most of the US unit's training time, it is *not* the only area in which supported allied artillery units must conduct training. Joint training in preparation for NWTIs occurs, but it is scheduled by the supported NATO unit so that it does not interfere with conventional firing camp, Exercise Snow Queen (winter skiing lessons for the troops similar to US adventure training), or block leave during the summer months (the entire regiment, minus a skeleton caretaker crew, takes leave at the same time each summer). I do not mean to condemn the supported allied units; rather, these comments are intended to point out that their training priorities are not always consistent with those of the supporting US unit's throughout the 18-month NWTI cycle. Additional problems are caused by the financial constraints which most of our allies usually experience. One nation's supported artillery unit, for example, is so chronically short of fuel that the associated US artillery detachment has never been able to conduct joint field training in which all of the detachment's teams and elements are simultaneously deployed. There are other problems, but these major ones impact the most on NWTIs.

A final area that should be brought out is one of perception. There is a real perception in the Field Artillery Community, both inside and outside the 59th Ordnance Brigade, that by serving in an artillery group assigned to this brigade, one automatically becomes a second class field artilleryman; that is, ignored by Fort Sill and the rest of the Army's field artillery, Redlegs in the Brigade have somehow committed some sin against St. Barbara and may only be redeemed by doing penance there until it is time to move on to a "real" artillery unit. Even the unit designations in the brigade contribute to this perception: artillerymen are assigned to *groups*, not battalions; young captains and lieutenants command *detachments*, not batteries; detachments are composed of *teams*, not sections. (Two years ago, there was an initiative to alleviate the perception problem by replacing the designation "detachment" with that of "battery," thereby recognizing that mere numbers of soldiers assigned does not adequately measure the true scope of the responsibilities of the commanders of these units. But the initiative was killed by an official DA reply which merely echoed what the existing regulation stated. Instead of helping to change some of the "second class artillery" perceptions, this rejection only served to reinforce it.) If there is any doubt that a perception problem exists, an investigation of how many lieutenant colonels turn down command of one of these groups should remove it. A rumor circulating through the 59th Ordnance Brigade in August of 1981 held that seven officers turned down command of one of the artillery groups before one was found who would accept it. While this may be exaggeration, I know from personal experience that the last two commanders of the group I recently left were not the first choices in either case. It emphasizes the fact that most field artillery officers do not want to "waste" their one shot at

battalion command on a custodial unit. This perception problem has a direct impact on the problems Major Speltz brought out and the syndromes General Trefrey finds so distressing.

These points I have brought out represent most of the reasons why the NWTI system, as it exists in the 59th Ordnance Brigade, contains the problems Major Speltz addresses and why it is a long way from the ideal of which General Trefrey writes. Major Mike Speltz and other intelligent, thoughtful officers like him *know* how the system in the 59th Ordance Brigade is run. They have had to put up with it for three years. It is adding insult to injury to lecture them on what the system ought to be. Thank God there are men like Mike Speltz who have the guts to take a stand and address these problems. If there were more men like him who put professional values, beliefs, and ethics ahead of their own career advancement, you could have retired years ago, General Trefrey. I am still a fan of yours, General Trefrey; but don't waste your parting shot by "shooting the messenger."

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Noncommissioned officer development

Noncommissioned officer development is a much discussed subject that has the concern of many Redlegs. I would like to express my views on this subject.

I submit that the Army is dangerously close to being led by managers rather than by true leaders. I attribute this phenomenon to our advanced technology and increasingly sophisticated systems and equipment. However, "manager" and "leader" are not synonymous. The noncommissioned officer ranks contain an abundant supply of technical experts in their primary MOS; but the art of leading and teaching soldiers — soldiers' business — is slowly fading away. Being a technical expert is certainly important; but if NCOs do not keep abreast of basic soldiering duties as much as they do technical proficiency, what are we accomplishing?

We are trying to train sergeants to be sergeants after they have become sergeants. The junior noncommissioned officers do not know the basics of soldiering because they do not practice the basics in the ranks before their promotions to sergeant. How many Active Army units *routinely* do such things as dismounted drill, inspection in ranks with and without weapons, wardrobe and full-field inspections, inspection of the Class A uniform in ranks, and vehicle inspections with associated equipment layouts. These activities are usually only pursued by most units as preparation for an inspection from higher headquarters. These activities and others like them teach privates and specialists how to do it. By the time sergeant stripes are put on, they have a fair understanding of duty and responsibility. (Of course, sergeants learn and relearn what it's all about.) Unfortunately, the rationale for too many is that these things are not important anymore or that they do not have time for them.

Formal schooling to further the development of noncommissioned officers is certainly important, but it cannot be used as the sole device to bring out knowledge and professionalism. The knowledge of basic soldiering comes from learning in the trenches. If we do not teach in the trenches and repetitiously reinforce what we teach, a gap will form which obstructs the learning process.

The decentralization of training has become a nightmare. Training schedules are loaded with training with section chiefs listed as instructors — not a bad idea until you examine who the section chiefs are. In more cases than not, section chiefs are very junior sergeants — E5s or specialists four. And often the seasoned, experienced NCOs are not in the neighborhood to coach and correct what is being taught. As many as six section chiefs can be teaching the same subject to their respective section members; and each presents the instruction differently and in many cases incorrectly. Is a cohesive unit really being developed? The need to centralize not all, but a great deal of training, at least to battery level, is apparent.

The leaders in Army units must be the developers of noncommissioned officers. It cannot be done by having a weekly class. It must be a hands-on exercise conducted on a daily basis. If we train privates and specialists four, they will develop into knowledgeable sergeants. The learning process must start early-on, not after the stripes are sewn on. The noncommissioned officer development program would be enhancing if basic knowledge was a "lesson learned" prior to promotion to NCO rank. One fact remains after all is said and done — NCOs are promoted from the ranks.

How do we accomplish what I have suggested? In a nutshell, reasonable emphasis has to be placed on basic soldiering which should be part of every soldier's day, not those days just prior to the skill qualification test. We need soldiers who are not only technically proficient, but also soldier-proficient. Army units have so many multiple missions on a given day that time becomes vital — so vital that it seems an hour cannot be spent inspecting soldiers and their equipment or training collectively. Leaders must make the time that our soldiers deserve. Otherwise we really do not soldier during the duty day; we just go to work.

Looking through a telescope can be deceptive. An object far away, seen through a telescope, may look good; but many times, the closer you get the worse it looks. Are we all seeing the same image?

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Logistic Hot Spot support

Training and evaluation of the field artillery battalion often pays too little attention to the logistic support provided by the battalion trains. Evaluations frequently concentrate primarily on the efforts of the firing batteries and the battalion operations center. The logistic system, especially ammunition resupply, does not receive adequate exercise during these evaluations. Trains operations are covered within published doctrine, but the nuts and bolts of resupply deserve treatment in detail. Hot Spot resupply is one technique that works.

Three facts underlie Hot Spot support. First, current tables of organization and equipment (TOEs) do not provide a quantity of personnel, vehicles, and supporting equipment to tolerate the many battlefield casualties. In simple terms, a battalion cannot lose mess trucks, truck and pump units, or ammunition trucks without severely affecting the support capability. Secondly, the four aspects of the threat which most endanger support operations are, in descending order: nuclear, biological, and chemical (NBC) attack; indirect fire from conventional munitions; air observation and attack; and ground attack. This threat sequence is based on current doctrine and on practical experience found in USAREUR-based US Army Training and Evaluation Programs (ARTEPs). As Colonel Andrew McVeigh indicated in "Your Right to Survive" in the May-June 1983 *FA Journal*, all elements of the cannon battalion must reduce their vulnerability to the threat; and enemy NBC and artillery fire are the greatest

threat dangers. Finally, support operations must be able to react to continuous, rapid movements of the firing batteries. This assumption is again based on practical experience gained during exercise Carbine Fortress. During this exercise, firing batteries were required to move long distances many times a day; often during execution of the movement, firing batteries were required to move in a new direction to a new location.

In light of these three facts, it is clear that not all resupplies can continue to be delivered to the firing battery location. The trains commander can neither afford to expose assets to the threat nor risk dispatching assets to locations which the firing batteries might never occupy. To survive, logistic elements must be kept small, mobile, and hidden. Battalions must be prepared to conduct resupplies on the roll during firing battery movements under conditions of reduced visibility. The Hot Spot resupply technique fills the bill.

The first requirement for a successful logistic Hot Spot is close coordination between the S3 and S4. Firing battery commanders, who must of necessity become experts in determining the amounts of rations, POL (diesel, MOGAS, and packaged products), and water their batteries will need for the next 24-hour period of the projected operation, send estimates to the S4 to allow the S3 and S4 time for preparation. The S3 projects and reports to the S4 the amount of ammunition required to support the projected operation and presses the division artillery or field artillery brigade headquarters to project required movements and ammunition. The S4 coordinates all the required support and transmits his requirements to the forward support base for his battalion. Since all required supplies may not be available, the S4 must keep the S3 informed of changes in the logistic situation.

The S3 and S4 must then agree on a Hot Spot location and a movement schedule for the firing batteries. In the reconnaissance of a possible Hot Spot location, the S4's considerations are that the location should offer cover and concealment for the entire resupply operation, that it must permit nighttime resupply operations, that it must be defendable against ground attack, and that it must provide an adequate road network, sufficient length and depth to allow for uncongested resupply, and an assembly area in which the firing battery can reconstitute its organization after resupply. After a successful reconnaissance, the S4 must notify the S3 of the Hot Spot location.

Once the location has been coordinated, the Hot Spot element moves on station and establishes the services permitted under existing TOEs. These services include rations; potable water; POL; ammunition (small arms and howitzer); class IX repair parts; class II and IV supply sets, kits, and outfits; radio/COMSEC troubleshooting, repair, and direct exchange; and replacement of end items.

The personnel manning the Hot Spot must first secure the location. Given the NBC threat, the resupply team should travel in a MOPP4 status and conduct an NBC survey upon arrival. The location must be swept and secured. Automatic weapons should cover high speed avenues of approach. A mine detector should sweep the Hot Spot road network. During these security operations, ammunition trucks, POL tankers, and water tanks should be hidden in a location away from the Hot Spot.

When the position is secured, the resupply elements are brought forward. The best time for this movement is just before darkness. At this point, the commander of the Hot Spot should position the resupply elements and have guides rehearse their roles.

Efficient performance of guides and a good signaling system are crucial to the success of Hot Spot resupply. There are four locations requiring guides. The entrance guide marks the entry to the Hot Spot and remains concealed until a firing battery convoy approaches; he then passes the convoy to the traffic control point guides. The traffic control point guides separate and direct the elements of the battery convoy to each area of resupply. The resupply point guides direct elements through their individual resupply points and then guide them to the next resupply point or to the assembly area upon completion of resupply. The assembly area guide insures that the elements of the convoy gather in one location so that they may be reconstituted into a battery convoy. Each guide must have a working light and must have sight lines to guides on either side.

The other crucial step for insuring successful Hot Spot resupply is a thorough reconnaissance of the Hot Spot by the battery executive officer. After the commander of the Hot Spot has contacted each battery via FM radio and announced that the Hot Spot is on station, the battery executive officer or his representative makes a reconnaissance of the Hot Spot operation so that he can communicate its layout to his unit. He must pay particular attention to entry routes, road networks, and the assembly area. He must remember that the firing battery will be responsible for providing its own security throughout the Hot Spot operation.

In a typical Hot Spot operation conducted at the Grafenwoehr training area in Germany, firing batteries could effect resupply of class I, III, and V stocks in only 19 minutes. The class V resupply, which included the transfer of 32 rounds, the collection of expended munitions, and the tiedown of ammunition on the M548, took just 10 minutes. All fuel tanks and five-gallon cans were filled, and packaged POL products were delivered. There was the direct exchange of one RT-524 radio and one secure system, and all unit water cans were refilled.

Within that short 19-minute period, there were six operational stages.

- First, battery executive officers led their elements into the Hot Spot location. The movement schedule had been coordinated by the S3 and S4 to allow one hour between elements. The tactical operations center arrived with one of the firing batteries.
- The second step was the separation of the M548s from the rest of the convoy. Traffic control guides separated these vehicles and directed them to the ammunition resupply point guides. These guides positioned the M548s, and the loading began.
- Stage three was the separation of the convoy into MOGAS and diesel vehicles. The traffic control point guides directed each type of vehicle to the appropriate tankers, which were marked with numbers illuminated by a chemical light (NSN 6260-00-106-7478). These lights were easily seen by vehicle crews, and the traffic control point guides merely released vehicles from the holding point to a designated number. Another particular advantage of this lighting and numbering system was that vehicles such as the M548 and M577, which can be filled from one side only, could be easily dispatched to the correct pump. Radio repair/direct exchange for the command/control vehicle radios was coordinated at the MOGAS position while these vehicles (such as jeeps, the fire direction center vehicles, and the radioteletype vehicle) were being filled with MOGAS.
- In stage four, the M548s returned to the firing battery convoy upon completion of loading and were led back through the diesel refueling station.
- In the fifth stage, battery executive officers directed the elements of the convoy into an assembly area where water was provided from water trailers marked by chemical lights. Each battery executive officer was required to provide his own local security and to reconstitute his unit

into an orderly convoy. This stage was the most difficult in the entire operation. Finding the right howitzer and M548 and placing these vehicles in the correct order in the dark of night proved most difficult. Success in this step required a standard operating procedure which specified an order and a position for each section's vehicles. The most effective arrangement was a clock system based on the location of the executive officer's jeep.

• The final stage saw the firing battery return to the road to move to its next position. The noncommissioned officer in charge of the final vehicle in the convoy (usually the motor sergeant) became a traffic controller. The executive officer would give the motor sergeant the order of march and any additional instructions; and, as the executive officer led the battery from the assembly area, the motor sergeant and his section would insure that the vehicles fell into the appropriate order.

Given the nature of the threat, battlefield fluidity, and current cannon battalion TOEs, there must be effective logistic support accomplished during battalion moves. The Hot Spot technique achieves a "train as we will fight" reality and may be exercised during ARTEPs and field training exercises such as REFORGER. The Hot Spot technique demands increased coordination and communication between operations and logistics personnel, but it will facilitate the resupply of beans and bullets at the tremendous rates required in the AirLand Battle. Paradoxically, using the Hot Spot may keep AirLand forces out of a hot spot.

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More on Combat Artillery Badge

I want to address Captain David T. Zabecki's letter, "Combat Artillery Badge," in the September-October 1983 issue of the *Field Artillery Journal*. As an ex-infantryman holding a Combat Infantry Badge (CIB), I see absolutely no reason why combat artillerymen should not display a similar award, the CAB. There is absolutely nothing in such an award that would detract or take away from the infantry CIB.

I served in both combat infantry and combat artillery, and I am as proud of that service as I can be. Although I "retired" on combat disability when I had just turned 31 years of age in 1951, I have great pride in my continued associations with both arms. On occasions, I have the opportunity to wear my dress blues. None of my awards indicate my prior service with artillery. The CAB would, I assure you, be worn with as much pride as my CIB. So, count me as pro-CAB. As far as 1LT Ricardo Cardenas' threat to throw his CIB in a Korean River if the CAB was to be awarded, that was probably just "hot air."

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The Chief of Staff of the Army recently approved the concept of skill badges for all branches. The Field Artillery School's Directorate of Training and Doctrine has the mission of preparing and submitting to the Department of the Army a draft regulation which would authorize an Expert Field Artillery Badge (EFAB). — Ed.

Just as robust

While finding Brigadier General (Ret) Shugg's letter, "To sell or not to sell" (January-February 1984 *FA Journal)* interesting in its choler, I disagree with his major premise that the field artillery is ready to sell its collective birthright. General Shugg posits many tenets to which current field artillery developments faithfully adhere, but a number of his statements do not present an accurate appraisal of what the field artillery is doing today.

The US Army today could be labelled infantry-oriented only if one were to disregard the developments of the last 10 years. The focus for this last decade has been on the development of methods to overcome the preponderance of Warsaw Pact armored formations in Europe. The development of a new tank, a new attack helicopter which is a better tank-killer, and new precision-guided artillery munitions which can defeat tanks all speak against the idea of an infantry-oriented Army.

The AirLand Battle doctrine, with its emphasis on speed and initiative, is hardly an infantry-oriented creed. This doctrine, with its emphasis on an extended battlefield, is not really all that new either. General Starry, the then TRADOC commander, said as much when he began instructing on the AirLand Battle. This doctrine does, however, shape our operations to be more offensive than had been the case in the mid-1970s. No longer were commanders given the implication that they should focus on determining the most efficient way to react to the enemy and absorb his blows. Our doctrine now emphasizes striking the enemy in a manner which he least expects and making him react to our battle and campaign plans. While that doctrine naturally entails the corps commander's being a fighter and not simply an allocator, it goes beyond simply an extension of artillery range (which enables decisive maneuver to occur) and calls for dramatic, aggressive employment of all combined arms.

Such doctrine cannot and will not be "the conduct of combat by committee." Since American doctrine has always stated that the primary role of the field artillery has been to "support maneuver by fire and add depth to the battlefield" (FM 100-5, 1941), American field artillerymen cannot fulfill their important role in battle without coordination with the other arms. The field artillery will, of course, take the lead in any targeting effort; but the field artillery takes that lead only in a coordinated effort with the other parts of the force.

Far from giving up its rightful place as a leader in combat operations, the field artillery is maintaning its role as the decisive element of the battle. Field artillerymen have been the primary developers of our current operational doctrine. The strengthening of the fire support coordination aspects of the field artillery and the development of proposals such as the one for an artillery division are only two examples of the continued evolution of simple, yet robust field artillery operations and organizations which will prevail in combat.

A final specific aspect of General Shugg's letter is the idea that our light forces have no modern field artillery weapon. The development of the M198 155-mm howitzer gave our light forces a longer-range, more lethal artillery piece than anything they had previously. The M204 105-mm howitzer, while it is type-classified, has not replaced the M102 105-mm howitzer, since the M204 shows no significant improvement over the M102. The Multiple Launch Rocket System, now being fielded, also takes a great step forward in providing light corps the firepower they require on the battlefield. Fort Sill continues to examine methods by which light weapons systems can achieve the lethality required on the modern battlefield.

The field artillery, of course, is not without its current package of flaws; but it is continuing to improve as it moves into the future while still retaining its role from the past.

Joseph E. Halloran III
MAJ, FA
Fort Sill, OK

New form for computing M422 8-inch nuclear round

I have enclosed a form (figure 1) which the 1-27th FA has developed to compute data for the M422 8-inch nuclear round using the new computation method. Captain Mark Wroth, currently the commander of B/1-27th FA, was the battalion fire direction officer who deserves most of the credit for developing the form.

I would appreciate it if you would staff the form with the people in the Gunnery Department to see if they think it is a valid form.

David J. Fitzpatrick
CPT, FA
Fort Carson, CO

The analysts in the Gunnery Department of the Field Artillery School feel that your form is a valid aid. The draft FM 6-40 has a form (figure 2) very similar to yours, and I have included it for your information. By the way, both forms are classified "Secret" when you have entered the required data. — Ed.

203-mm NUCLEAR COMPUTATION WORKSHEET FOR M422A1

1. M106 GFT Setting _____ CHG _____ LOT _____ RG _____ EL _____ TI _____ GFT DF CORR ___
2. KNOWN DATA: BTRY ALT _____ PROP TEMP _____
   TGT ALT _____ HE PROJ WT _____
   CHT RG _____ NUC PROJ WT _____
   DATE _____ TIME _____

ENTER THE INTRO TO 8-ADD-H-1 FOR CORRESPONDING CHG FROM 1 ABOVE CHG _____

3. RG CORR FOR PROP TEMP (8-ADD-H-1, TBL C) → _____
4. RG CORR FOR PROJ WT DIFFERENCE, (8-Q-1, TBL F) → _____
5. ITEMS 3 + 4 + CHT RG = CORR. RG. → _____
6. ADD TGT ALT AND HOB → _____
7. SUBTRACT BTRY ALT FROM ITEM 6 = VI → _____
8. DETM. SITE CORRESPONDING TO ITEM 7 (GST) → _____
9. IF VI ≥ 100, USE C + D SCALE TO DETERMINE ANGLE OF SITE → _____
   IF VI > 100, GO TO ITEM 11
10. SUBTRACT ITEM 9 FROM ITEM 8 = CAS → _____
11. DETM EL CORRESPONDING TO CORRECTED RG (ITEM 5) → _____
12. DETM FS ~ EL + CAS (ITEM 10) → _____
13. ADD ITEMS 8 AND 11 = HE QE → _____
14. ADD CHT DF _____ + DRIFT _____ + GFT DF CORR _____ = HE DF _____
15. CORRECTIONS TO HE QE FOR SHELL NUCLEAR (8-ADD-H-1, TABLE A) → _____
16. CORRECTIONS TO HE DF FOR SHELL NUCLEAR (8-ADD-H-1, TABLE A) → _____
17. CORRECTIONS TO HE FUZE FOR M591 FZ (8-ADD-H-1, TABLE B) → _____
18. ADD ITEM 12 AND ITEM 17 NUCLEAR TIME M591 → [ ]
19. ADD ITEM 14 AND DF CORRECTION FROM ITEM 16 NUCLEAR DF → [ ]
20. ADD ITEM 13 AND QE CORRECTION ITEM 15 NUCLEAR QE → [ ]

Figure 2.

NUCLEAR DELIVERY — M422 8-inch round

Unit _____ Target Number _____ Charge _____

1. M80 Propellant Temperature (_____ °F)		(10°F)	
2. Chart Range (_____ 10m)		(500m)	(10m)
3. Range Correction for Prop Temp (Addendum, Table C)			(1m)
4. Nuclear Projectile Weight (_____ . _____ lb)		□	
5. HE Projectile Weight (Registered Lot)		□	
6. Change in Projectile Weight INC/DEC		□	
7. Range Correction for Proj Weight (Table F, FT 8-Q-1)		(1m)	
8. Line 6 x Line 7			(1m)
9. Corrected Range (Line 2 + Line 3 + Line 8)			(10m)
10. Target Altitude		(1m)	
11. Height of Burst		(1m)	
12. Altitude of Burst (Line 10 + Line 11)		(1m)	
13. Battery Altitude		(1m)	
14. Vertical Interval (Line 12 — Line 13)		(1m)	
15. Site (Line 14 divided by Line 2 (10m); GST 8-Q-1)		(1σ1)	
16. Elevation corresponding to Line 9 (GFT 8-Q-1)		(1σ1)	
17. HE M106 Quadrant (Line 15 + Line 16)		(1σ1)	(1σ1)
Note: If Line 14 ≤ 100m, go to line 20			
18. Angle of Site (C and D Scales; GST 8-Q-1)		(1σ1)	
19. Elevation + Comp Site (Lind 17 — Line 18)		(1σ1)	
20. HE M106 Fuze Setting Corresponding to Line 16 (or Corresponding to Line 19 if VI ≥ 100m)		(0.1s)	
21. Ballistic Fuze Correction (Addendum, Table B)		(0.1s)	
22. NUCLEAR FUZE SETTING			(0.1s)
23. Chart Deflection		(1σ1)	
24. Drift Corresponding to Line 16		(1σ1)	
25. GFT Deflection Correction (HE GFT Setting)		(0.1σ1)	
26. Ballistic Deflection Correction (Addendum, Table A)		(1σ1)	
27. NUCLEAR DEFLECTION (Line 23 + Line 24 + Line 25 + Line 26)			(1σ1)
28. HE M106 Quadrant (Line 17)		(1σ1)	
29. Ballistic Quadrant Correction (Addendum, Table A)		(0.1σ1)	
30. NUCLEAR QUADRANT (Line 28 + Line 29)			(1σ1)

Figure 1.

Combat-effective advance party vehicle needed

The Field Artillery needs a more combat-effective advance party vehicle. FM 6-50 does not require that the M548A1 be used as an advance party vehicle, but how many field artillerymen have never seen an M548 used for such purpose? The advantages of the M548 as an advance party vehicle are that it carries all necessary personnel, negotiates difficult terrain, and carries the potent .50-caliber machinegun. On the other hand, it offers the driver/gunner no protection from small arms fire; for that matter, all personnel aboard are far too vulnerable. Could you imagine the effect of a mine detonation on an M548 full of men and advance party equipment? The only thing between the men in the cargo area and the explosion is 100 gallons of diesel fuel. With all the new weapons systems being developed, how about the guys up at the "Field Artillery Think Tank" coming up with an advance party vehicle that will do the job and save lives? If nothing else, give those of us out here in the field an M113; but do something, and do it now, while we have the time to experiment with it and work the bugs out before we really need it.

Noel W. Fox
SFC, FA
B/1-230 FA (GAARNG)
Reidsville, GA

TACFIRE nonnuclear fire planning

Automated fire planning is one of the major contributions of TACFIRE to fire support operations. Some problems do exist, however, and are not adequately addressed in the technical manual. I would like to identify the more serious problems, offer solutions to work around them, and explain other requirements peculiar to fire planning with TACFIRE.

The first step in the fire planning sequence is to establish the commander's criteria (COMCRIT) file which is either "built" from the current file or from an existing plan or allowed to "default" to the current tactical and technical fire control/tactical fire control (TTFC/TFC) modifications (MOD) file. The new equipment training team (NETT) has developed a procedure to make the decision easier and guarantee uniformity among all fire planning agencies.

During initialization, the operations section at either the battalion and/or division artillery level enters all TTFC/TFC commander's criteria into the current modification file. Then, using the nonnuclear fire planning command (NNFP;COMD) message, the planner moves the information in the current commander's criteria modification to a new plan called master (build NEWPLN:MASTER from CURRENT). Any changes in fire unit association, maximum volleys (MAXVOL), attack tables (ATTACKS), etc., are then entered into the PLAN:MASTER file with the appropriate input message. All subsequent modification files are then built from PLAN:MASTER into the NEWPLN in order to guarantee uniformity and eliminate the requirement to enter individual nonnuclear fire planning commander's criteria (NNFP COMCRIT) messages each time a new plan is built. Only the operations section will enter commander's criteria into the PLAN:MASTER file.

When building the related files — i.e., ammunition fire unit (AFU) and support (SPRT) — care must be taken when using these TACFIRE input messages: AFU;BUILD and SPRT;BUILD and NNFP;COMD. The important point is that TACFIRE will allow data to be built from a plan into the current file. If the NEWPLN mnemonic is left blank, the date entered under the name in the PLAN mnemonic will either be built into or overlay the data in the current file, thereby causing unauthorized changes to TTFC/TFC MOD files and the "moving" of fire units in the current situation to proposed locations used for planning purposes. This "moving," of course, would be disastrous. Since no error and warning (EW) message is generated, the damage may go undetected for some time. The burden is on the fire planner to fill out formats properly in accordance with the technical manual and the artillery control console operator (ACCO) to detect errors before computer action.

At division-artillery level, problems have often surfaced when operators neglect to specify firing unit (FU), weapon (WPN), or ammunition (AMMO) on the AFU;BUILD format when they are building the AFU file for a plan. It is important to remember that each cannon battery, each missile battery, and each tactical fighter wing is stored as a fire unit in the current AFU file. The total number of fire units in the current AFU file will almost always exceed 30, with 30 being the maximum number of fire units that can be built into a plan. The computer will build the *first* 30 fire units in the file into the plan, regardless of weapon type. Therefore, the planner should always build by fire unit or weapon type to prevent building unwanted weapon systems.

At battalion level, the PLAN:MASTER file may also be used to store 4.2-inch mortars used in fire planning. Battalion fire support officers enter 4.2-inch mortars as 105-mm units and use actual mortar locations, mortar ranges, and TACFIRE mnemonics for ammunition in the AFU file under PLAN;MASTER. To insure that mortars will be chosen for all targets within their range, the mortar units are "ordered" first in the nonnuclear fire planning fire unit selection (NNFP:FUSEL) format *and* associated with the controlling field artillery battalion. If mortars are selected for too many targets, operators should reassign excess targets to artillery fire units. Mortars may then be built from PLAN:MASTER into new plans. Current technical and tactical fire control (TTFC) is not affected. Planners provide the mortar platoon fire direction center with their targets in the schedule of fire (TISF) targets in the nonnuclear fire planning X-target and nonnuclear fire planning X-schedule (NNFP;XTGT and NNFP;XSCD) format. Mortar units will compute their own firing data.

When the AFU;BUILD message is used, the current controlled supply rate will be built into the new plan, to include all current TTFC/TFC expenditures. The planner may or may not find this inclusion to be desirable. If it is not, to reset the "expenditure counter" to zero, the planner should enter the artillery fire unit ammunition supply rate (AFU;ASR) message with the plan specified and "zero" (ø) in the EXPEND field. If a different controlled supply rate is desired, it must be entered using a separate input message.

During development of the preliminary target list (FPLST), the planner should always use the artillery target intelligence prepare fire plan (ATI;PREFP) format, not the artillery target intelligence query format *(ATI;QUERY)*, to count targets and store targets in the plan. Processing of the ATI;PREFP provides an automated system for resolving duplicate targets because only SOLUTION reports and single target reports will be retrieved. Processing of the ATI;QUERY message includes shell reports and constituent reports which should not be included in a fire plan.

When developing the fire plan target list (FPTGT), the planner should normally only specify targets (TGTS), fire plan phases (PHASE), and volleys (VOL) on the nonnuclear fire plan instruct (NNFP;INST) message and let the software do the rest. The other mnemonics are most often used to resolve an exception, fill in time gaps, or provide specific instructions for a specific fire unit, such as with chemical munitions. In the absence of instructions the computer will always use commander's criteria from the modification file.

Revolving exceptions and recomputing a plan involve the most serious software problem in fire planning with TACFIRE. When the nonnuclear fire plan compute fire plan (NNFP;COMFP) message is processed, some anomalies occur. Targets are moved into, out of, and among phases; specific instructions are ignored; and the results are unpredictable, unreliable, and undesirable. This result occurs each time a recomputation is attempted, even if no new instructions are input between computations. Fortunately, a simple solution exists which will provide satisfactory results. Before recomputing a plan, the planner should delete TISF using the nonnuclear fire plan command message (NNFP;COMD) with the mnemonics PLAN:___, DELETE:X, TISF:X. This action may be taken either before or after reinstructing with the NNFP;INST and must be done before recomputing with the NNFP;COMFP. Deleting the TISF is required; otherwise, the computer will attempt to use scheduling data already on file from the previous TISF or attempt to schedule all targets in the first phase of the plan.

Keeping track of fire unit moves is another serious problem, especially at

division-artillery level, because of the numerous moves expected with current doctrine. Maintaining an up-to-date planned AFU file requires a concentrated effort. The new equipment training team has developed a procedure that will ease some of the pain.

When a fire unit is ordered to displace, the battalion operations section will exclude (XCLUDE) from processing that fire unit from TTFC and show it out until a specified time (OUTTIL). When making the fire unit OUTTIL, the planner should also enter the proposed fire unit location and azimuth of lay. The automated AFU function at battalion will update the current AFU file in the battalion and in the division-artillery-type computer. That update action, however, does not update any fire planning files.

The division artillery operations section will receive the artillery fire unit update (AFU;UPDATE) via message of information (MOI) processing with fire units (FU), coordinates (CORD), azimuth (AZ) and out until time (OUTTIL). This message is the indication that the specified fire unit is displacing. Before computing the plan, the planner should rebuild the AFU file, either in total or for the displaced unit(s) only. Realizing that proposed locations are subject to change, the planner should find that using that location should be sufficient for tactical fire planning since the battery computer system (BCS) will compute individual piece fire commands.

After closing in the new position, the BCS will update TACFIRE with the actual battery center. Again, the current AFU file will be updated. Obviously, if the coordinates in the command message (AFU;UPDATE) which makes the fire unit ready for processing (READY;X) and the coordinates in the command which exclude the unit from processing (OUTTIL) do not agree (small variations may be acceptable), that fire unit must be rebuilt again and the plan recomputed.

Rebuilding and recomputing could very easily become a vicious circle; and, at some point, the circle must stop. That decision rests with the planner. The battery computer system, by standing operating procedure (SOP), will recompute fire plan targets after a displacement to determine whether these targets are still ballistically in range. Any target out-of-range should be reported to the battalion operations section.

Use of the PLAN:ALL function at battalion level will automatically update the current file and all planning files. The BCS cannot, and should not, enter PLAN:ALL; only the artillery control console operator or the operation and intelligence section uses PLAN:ALL, and they should not use PLAN:ALL when planning for future operations.

Another serious problem, at division-artillery level, is keeping the NNFP;FUSEL updated concerning fire unit association for battalion shelter displacement and/or failures. During battalion mutual support, the fire mission fire unit selection (FM;FUSEL) format must be modified to associate the fire units of the displaced/failed battalion with its mutually supporting unit. The NNFP;FUSEL must also be modified; otherwise, TISF targets for the displaced/failed battalion will not be sent to its mutually supporting unit. Recent new equipment and training team procedures have added the FM;FUSEL to the MOI file destined for the operations section and counterfire section. Receipt of the FM;FUSEL via MOI indicates that battalion-level mutual support operators have been initiated.

Two methods exist to reassociate fire units for battalion-level mutual support operations.

- Method 1: Enter the NNFP; FUSEL, by plan, identical to the FM;FUSEL. Then transmit the TISF.
- Method 2: Build a new modification file from the current file. Then transmit the TISF. (This procedure has two basic shortcomings. First, if the plan must be recomputed, the modification file must be built from PLAN:MASTER in order to reset any difference between the current tactical fire control modification (TFC MOD) file and the PLAN:MASTER MOD file. Second, a message of information (MOI) is transmitted (XMITTED) even though a format may fail syntax. Therefore, there is no guarantee the FM;FUSEL was processed even though the message of information is sent.)

The BCS has the capability of storing only four plans or a total of 59 targets. It is likely that a direct support battalion will have more than four plans at one time. The current new equipment training team solution is to compute fire commands, manually record them at the guns and in the fire direction center, and then delete the plan to make room for further plans. This solution will have to be an SOP item based upon the unit's tactical experience.

The shortcomings of the current software, while inconvenient, can all be overcome. Filling out formats properly and modifying procedures slightly will prevent problems and allow the fire planner to take full advantage of TACFIRE's fire planning capabilities.

The new equipment training team has developed instructions for nonnuclear fire planning that will assist both the experienced and unexperienced TACFIRE person. These instructions are very detailed, with example formats and output reports. Specific subjects are nonnuclear fire planning at the division artillery or field artillery brigade operations and intelligence section; nonnuclear fire planning at the battalion operations and intelligence section; fire support officer fire planning sequence; division artillery and field artillery brigade operations and intelligence planning sequence; field artillery scatterable mines fire planning; hasty fire planning; consolidated fire plans; and mortar fire planning with TACFIRE. For further information, I invite interested personnel to send their questions to Chief, CECOM NETT Field Office, APO New York 09407.

Johnnie F. Pearson, Jr.
MSG, USA
APO New York

Lessons from the NTC

Howitzers boom and send rounds crashing down upon advancing enemy columns. A-7 aircraft scream overhead with their loads of 500-pound bombs. Cobra gunships fire their 20-mm rounds. Over the radio the task force commander anxiously asks whether his scouts have made it back to the defensive line. His fire support officer (FSO) calls for preplanned series and groups of fire. Still the enemy moves rapidly forward, and the tension builds. The mortars add their distinctive sound to that of the artillery. The TOWs fire. Then come flashes of light and sound as the tanks pick up the battle. One hears the .50-caliber machinegun. Amidst this crescendo of battlefield noise comes the voice of a FIST chief, muffled by his gas mask, who calls excitedly for the final protective fires. That is what it is like to experience the live-fire defensive phase as it happens at the National Training Center (NTC) at Fort Irwin, California. The pressures and stress encountered at the NTC are very real; and they bring to light the weaknesses and strengths of our combined arms team and, consequently, point to the effectiveness of our training.

One area of weakness is fire support coordination. The marriage between the artillery and the maneuver arms is not as sound as it should be. At task force level, the fire support officer must be more completely incorporated into staff planning; and the 4.2-inch and 81-mm mortars, which are not good at moving, shooting, and communicating

in a fluid battlefield environment, must be effectively integrated into the fire support plan.

The crux of the problem is branch parochialism which carries over into training. The artillery is as technically and tactically competent at providing timely and effective indirect fires as are the infantry and armor at maneuvering. The forward observers are proficient at calling fire missions into an impact area from a vantage point on an observation post. The FSOs and FIST chiefs are very capable of drawing up overlays and target lists that include series, groups, preparations, and smoke. The task force and team commanders are equally capable of formulating their maneuver plans. The mortars are competent when it comes to firing from static firing points. But bring all these elements together in the high pressure environment of the NTC, and the fire support system does not work smoothly because each element usually trains separately instead of together.

There are probably many solutions to this problem of ineffective training. One is to insure that the fire support elements and fire support teams are involved in all command post exercises (particularly at maneuver brigade and battalion levels). In this way, fire support will become an integral part of the maneuver unit's command and control system; and, additionally and perhaps more importantly, there will be a valuable opportunity to practice command and control within the fire support system. With a good reporting system, information generated by the command post exercise scenario can be sent up from fire support teams to the battalion fire support element and from there to the brigade fire support element.

Another solution is to have the battalion FSO and FIST chiefs become more involved in training the battalion heavy mortar and company mortar personnel. The Field Artillery School's publication, *Mortars and the FSO,* points to this need and says the FSO must make himself available to the maneuver commander in order to share his knowledge with mortarmen, whether it be in gunnery or tactics. It also allows him to train the mortarmen to displace rapidly, set up quickly, fire, and displace again — actions which are traditionally the mortarmen's greatest weaknesses since they tend to become bound to firing points and, therefore, do not understand the urgent necessity of being able to move as well as to shoot. As the FSO and FIST chief involve themselves in training mortar personnel, they will establish a mutual trust and confidence which will greatly enhance planning, coordination, and execution in a battlefield environment.

In the same way that mortarmen become bound to firing points, so too do forward observers become bound to observation posts on top of a hill. A solution to overcoming this unrealistic tendency is to insure that the FOs move frequently and that they call in missions from ground level, preferably in their organic vehicles. In this way the FOs become accustomed to viewing the impact area from different perspectives and become more adept at developing new terrain sketches and keeping themselves accurately located on the map.

Another way to solve the problem of ineffective integrated training is to insure that FOs, FIST chiefs, and FSOs are habitually associated with their commanders and platoon leaders. Habitual association does not come easy. The tendency is to let maneuver units conduct their training while the artillery and fire support personnel conduct theirs elsewhere. An aggressive FSO is essential to overcoming this tendency. As the maneuver battalion S3 plans training, the FSO needs to ask him how the FIST will be involved. Whether it be platoon lanes, company-level live-fire exercises, or battalion field training exercises, the fire support personnel need to be involved. And it will undoubtedly take imagination and creative planning on the part of the FSO to insure that his personnel do more than just go along for the ride. Finally, it is of utmost importance that maneuver and field artillery commanders take a personal interest in how the fire support elements are trained and exercised. If they take an interest, so will their subordinates; and the combined arms team will work better.

It is good that the NTC training focuses attention on the weakness of fire support coordination and, by implication, on the effectiveness of our combined arms training. As a chain is only as strong as its weakest link, so is the fire support system only as strong as its fire support coordination. By enabling us to identify the problems, NTC training has moved us one step closer to eventual solutions. By learning hard lessons now, we can increase our effectiveness on the battlefield. Brigadier General Burton D. Patrick says it all: "It's too late to study on the battlefield. You do there what you can to apply what you know. So, to do even a little, one must already know a great deal and know it well!"

R. Scott Reid
1LT, FA
C/1-29th FA
Fort Carson, CO

Battery defense

In response to Captain Larry Altersitz's letter, "Which weapon to use" (September-October 1983 *FA Journal*), we acknowledge the fact that battery defense is a real-world problem. We do, however, feel it is necessary to make a number of observations which take issue with many of his points.

- First of all, the primary reason for the addition of the Dragon to the table of organization and equipment (TOE) was to put an increased antiarmor capability down at the battery level — not as a total solution to battery defense. As new antiarmor weapon systems are integrated into the Army inventory, the antiarmor battery defense system can be upgraded.

- Next, the training problem with the Dragon is no different than the training associated with the direct fire of the howitzer or the M72 LAW — it takes practice to become proficient.

- Third, when one considers the tactical employment of any antiarmor weapon, the primary consideration is the engagement of the enemy when the most damage can be done. We know that the closer we allow the threat to penetrate, the more our kill capability will increase. Firing at close ranges will mean there is less time of flight and thus less time for reaction by the threat.

- The threat, as with our own forces, will fight as they have trained. Their reconnaissance elements are directed not to become decisively engaged, although they could inflict extensive damage if they confronted a US field artillery battery in a meeting engagement. In any event, the Dragons in the firing battery will provide an increased capability to slow and deter the threat elements on their avenue of approach.

- Finally, when one considers the use of mines for battery defense, there are several important considerations. Hand-emplaced mines are difficult to emplace and impracticable to recover. The employment of any minefield requires reporting and marking and requires the approval of the maneuver commander at brigade level or higher. The emplacement of the mines has to be tied into the overall obstacle plan for the brigade. A better deterrent to the threat would be the mutual supporting fires of friendly field artillery.

David L. McFerren
Robert W. William
Michael D. Holthus
Vincent R. Bielinski
CPTs, FA
Fort Sill, OK

More on hasty surveys with the TI-59

I submit the following comments concerning the letter "Performing hasty surveys with the TI-59" which appeared in the September-October 1983 issue of the *Field Artillery Journal.*

• In the illustration of the user instructions, the display column shows obvious errors in what would be displayed upon entry of the specified data; i.e., the northing coordinate would not be divided by the conversion factor for mils to degrees, nor would the distance be multiplied by the same factor.

• Probably of greater significance, however, is the impression that a 2-meter subtense bar can be used to determine distances beyond 75 to 100 meters with an aiming circle. A variation of 0.5 mil in the measurement of the subtended angle of a 2-meter subtense bar at a nominal distance of 100 meters would produce a variation in excess of 2.5 meters in the computed distance, which is well beyond the limits of desired accuracy. The provisions of FM 6-2 on subtense distance determination would probably preclude the use of the aiming circle for such determinations (angular measurements to 0.1 mil).

The program and general procedure, however, are very neat applications of the TI-59 polar to rectangular coordinate conversion capability which is not specifically covered in the TI-59 manual or FM 6-2.

Lee N. Elmer
LTC (Ret), FA
Leavenworth, KS

I have checked with the subject matter experts at the Target Acquisition Department who originally reviewed the hasty survey program. Here is a summary of their comments.

• *The user instructions are indeed misleading and could have been better illustrated. The northing is not divided by the conversion factor of .05625; rather, the northing is displayed, a pause takes place, and then .05625 is displayed. Instead of expressing the pause as a slash (/), it would probably have been better for the authors to indicate "(pause)" between NNNN and .05625. The "X" is a similarly misleading entry under the display column. The distance is not multiplied by .05625. Nevertheless, these illustration errors do not affect the validity of the program itself.*

• *This program was intended for use by firing battery personnel performing hasty survey, not by personnel in a battalion survey section. Hence, the standards for accuracy and procedures set forth for hasty survey in FM 6-50 should be followed, not the accuracies and procedures set forth in FM 6-2. The techniques of hasty survey are used by firing battery personnel when the battalion survey section cannot establish control. The standards of accuracy are different because the firing battery personnel possess the M2 aiming circle, whereas the battalion survey section has the T16 theodolite.*

• *The authors refer to this program as a replacement for graphic traverse and state that the program will accommodate continuous subsequent survey legs. They then show, as examples, certain situations in which this program could be used. Therefore, the letter implies that more than one traverse leg would be needed to extend survey control in excess of 250 meters. Personnel familiar with FM 6-50 would have no problems adapting to this program.*

• *You are absolutely correct in saying that this program is a very neat illustration of a viable suggestion which augments existing doctrine. — Ed.*

One Mean Screen

I was very interested in Captain Leroy Stevens' excellent article on the training set, fire observation ("One Mean Screen," July-August 1983 *FA* Journal). It is made by Invertron Simulated Systems Ltd of Sussex, England; and I was involved with its development from its inception in 1977. I also trained the US operators for the 1980 "shoot-off" with the other British system made by Marconi. To date about 125 systems have been sold to 16 countries, including a closed-loop concept (CPOP Trainer) to four of these countries. I understand that the TSFO with the 17th Field Artillery Brigade has been modified to a CPOP Trainer for the M109. The British Artillery has yet to go for the CPOP Trainer, though I believe it is the natural follow-on; and I hope to be able to promote this aspect when I return to the United Kingdom.

The TSFO systems which went into service with the British Army in 1979 incorporated a laser rangefinder simulator, and I understand that the manufacturer has given considerable thought to modifying this system to simulate a ground/vehicle laser locator target designator.

R.C.F. Craven
Lt Col, Royal Artillery
British Liaison Officer
Fort Sill, OK

Artillery trains

Many recent studies project high expenditure rates for field artillery units; yet most field experiences indicate that a field artillery battalion's logistical element is severely limited in its ability to support the battalion using existing procedures and doctrine. The article, "Loaded to Kill," in the March-April 1983 *Field Artillery Journal* provided a survey of 155-mm firing rates ranging from 426 to 3,330 rounds per six-gun battery per day. But, as Major George Demetriou indicated in "FTX Sankt Georg" (March-April 1981 *Field Artillery Journal),* a service battery has difficulty in supporting this firing rate: "The service battery is extremely lean and yet has the most demanding mission in the battalion. Moreover, it does not have sufficient communications to exercise command and control over its assets, nor to effect the coordination with widely separated batteries." How can we accomplish the Herculean task of resupply? There are some simple modifications to existing organizations, methods of control, and procedures that can be implemented quickly to improve the field artillery's total logistics capability.

Current logistical system

Table of organization and equipment (TOE) 6-365H100 provides for ammunition trains and battalion supply and maintenance sections in a service battery, a personnel administration center (PAC) and medical section in a headquarters and headquarters battery (HHB), and an ammunition section in each firing battery. These sections are authorized a total of five radios: one each for the service battery commander, the PAC, the battalion ammunition officer, the battalion maintenance technician (the motor officer is only a required position), and the M578 recovery vehicle. The battalion executive officer is authorized neither a vehicle nor a radio.

FM 6-20-1 recommends that the organization of single or dual (combat and field) trains be based on the battalion mission, the enemy, the terrain, and the resources available. It states that "Unit trains may be appropriate in slow-moving or static situations, when firing batteries have organic or attached support, or when the tactical situation forces the trains to be a self-contained and self-sustaining operation" and further that "Echeloning trains into combat and field trains provides: immediately responsive forward support tailored to the tactical situation, flexible resources

usage, and increased resource survivability."

Organizational modification

Conceptually, the statements from FM 6-20-1 are correct; but, in practice, units encounter several major problems. Foremost is control of both elements. The S4, who is also the service battery commander, must be concerned with future positioning of the trains and coordination with the forward area support team (FAST) and the widely dispersed firing batteries. The PAC vehicle with its radio is a courier to the FAST and division artillery. The maintenance technician with his AN/VRC-160 — a poor radio for his use due to its extremely limited range — is constantly on the move assisting batteries with maintenance problems, coordinating with support, and scrounging parts (as most maintenance technicians do). Admittedly the battalion executive officer uses a vehicle, albeit unauthorized or commandeered from internal sources. He must travel throughout the battalion to stay abreast of the tactical situation to insure that units are getting what they need when they need it and to determine whether instructions and orders are being properly executed (the battalion commander is normally involved in fire support coordination and the management of tactical operations). Though the HHB commander could control the combat trains, he normally is not familiar with logistics; also, he may be required for liaison or other vital tasks associated with the battalion tactical operations center.

Battalion supply	Battalion aid station
PAC	Survey (laager only)
Ammunition trains	HHB and service battery mess
Battalion ammunition	Battalion maintenance
Firing battery ammunition	Service battery maintenance HHB maintenance (-)

Figure 1. Battalion trains organization.

Though a quick look at the organization of a battalion trains (figure 1) might indicate otherwise, there are not enough personnel for habitual manning of the security and housekeeping requirements of two trains. Most personnel are committed to functional requirements, and their availability for such tasks is unpredictable. Requirements for resupply must take precedence. Splitting the trains also dilutes technical expertise, particularly in maintenance where young mechanics are still learning their profession from the few seasoned noncommissioned officers.

The end product of the employment of dual trains is a fragmented effort. By violating the principle of unity of effort, the gain in responsiveness due to proximity to units is often negated by these problems. In the final analysis, judicious positioning can minimize the long distances normally associated with a single trains. The single trains should be positioned so as to balance the distance between the FAST (normally positioned about 20 kilometers behind the frontlines) and the firing batteries. Field experiences (particularly during FTX Certain Encounter, a REFORGER exercise conducted in September 1981), indicate that the trains should be within about five kilometers of the brigade FAST in order to allow the single trains easy, close coordination with the different support elements (maintenance, medical, ammunition, and supply) of the FAST and still maintain a distance to the firing batteries of about 8 to 12 kilometers (the trains is just a pipe that connects the unit with the source of supply). Improving the control of the battalion logistical elements with a single trains organization can overcome the problems discussed and may, in the long run, prove more responsive.

Modification to method of control

To control logistical operations, an administration and logistics center should be established in the trains and should consist of representatives from the PAC and the battalion maintenance, ammunition, and supply sections. The administrative and logistics center can accomplish the following specific functions:

- Control and coordinate all aspects of combat service support for the battalion.
- Function as the single point of contact for all matters of combat service support both internally and externally.
- Maintain current unit location by monitoring the battalion command net (FM).
- Brief and debrief drivers on routes, locations, and items for delivery and backhaul.
- Establish necessary measures for control within the battalion, such as routes, refuel points, and maintenance collection points.
- Consolidate trips from the trains to batteries to the maximum extent possible.
- Act as the net control station on the battalion admin-log net (FM).

To improve coordination, the battalion maintenance technician, the ammunition officer, and the service battery commander should remain on the battalion admin-log net (FM) except during movement of the entire trains. Batteries will enter this net only as required to pass high-priority requests.

Procedural modification

Implicit in this concept is maximum use of the unit supply method. Battalion trains elements pick up required

BROWN 5 REPORT

LINE	ITEM	QUANTITY REQUESTED
	PROJECTILES	
A	HE	
B	DPICM	
C	APICM	
D	RAP	
E	WP	
F	Smoke	
G	Illumination	
H	FASCAM, AP, L	
I	FASCAM, AP, S	
J	FASCAM, AT, L	
K	FASCAM, AT, S	
	PROPELLANTS	
L	Green Bag	
M	White Bag	
N	Charge 8 (M119A1)	
	FUZES	
O	M557 PD	
P	M564 MTSQ	
Q	M577 MTSQ	
R	M565 MT	
S	M78 CP	
T	M728 VT	
U	M501 MT	
	MISCELLANEOUS	
V	Flash Reducers	
W	Primers	
X	5.56-mm	
Y	7.62-mm	
Z	.50-cal	
AA	40-mm HE	
AB	.45-cal	
AC	Hand grenade, fragmentation	
AD	Redeye	
AE	Other (specify)	

Figure 2. Sample preestablished high-priority request format.

supplies from the brigade FAST and deliver them to the batteries. Trips must be consolidated. For example, a vehicle might be dispatched from the trains to deliver mail and rations (not prepared meals since the batteries still retain mess sections); on the return trip, it may be carrying low-priority requests for additional supplies or an unserviceable repair part from the battery prescribed load list that will be eventually exchanged at the FAST and returned to the battery.

High-priority requests should be sent immediately to the trains on the battalion admin-log net (FM) by means of a series of preestablished report formats that only require selected inputs (figure 2 is an example). Once such a request is received at the administrative and logistics center, the appropriate element will be immediately notified and will obtain the required item (either from its own stocks or from the FAST). Then, the required item will be delivered immediately to the requesting unit.

Disadvantages

This concept is not without disadvantages. Personnel must be able to read a map, and a great deal of prior planning and thought must be given before implementing this concept — most PAC clerks normally do not know how to use a radio, let alone understand the significance of some messages. In the short run, there may be some loss in responsiveness; however, once this system is used for a while, this loss is more than offset by the more efficient management of resources. Though the concept has been explained in the context of a direct support battalion, most of it is applicable to all field artillery battalions.

Despite these disadvantages, the critical evaluations during FTX Certain Encounter showed that the concept can work and can provide required logistics better than can a dual trains system. By employing a single trains, improving the control of battalion logistical elements, and streamlining procedures, we can unequivocally improve our resupply capability to meet the requirements envisioned for the next war.

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FIST proficiency course

Effective fire support coordination will come from experienced, technically proficient fire support coordinators (FSCOORDs) who are adept at making the communications between maneuver and field artillery units clear and productive. Because senior field artillery FSCOORDs have competing duties, the challenge of fire support coordination falls upon less experienced personnel. Field artillery units need the time and a program to get these personnel prepared to support their maneuver units adequately.

Maneuver and field artillery units have training missions that often do not allow for the optimum overlap in the area of combined arms training. Each requires a certain amount of training time separate from combined training. This separate training must be devoted solely to improving individual soldier skills. It becomes necessary to determine how long each force should train separately prior to combined arms training. If fire support coordinators can communicate effectively the field artillery battalion's training missions to the infantry commander, they could arrive at the type of training spectrum depicted in figure 1. The spectrum includes fire support training events ranging from MOS-related individual training to collective combined arms training. Its key feature is the fire support proficiency course. To develop fire support expertise prior to and during involvement with the maneuver forces, the fire support coordinators assigned to the 2d Battalion, 8th Field Artillery, 7th Infantry Division Artillery, designed a fire support proficiency course (figure 2) which accommodates one entire support platoon, concentrates on Army Training and Evaluation Program (ARTEP) tasks from the level of the fire support team (FIST) headquarters down to that of the forward observer party, tests communication equipment and radiotelephone procedures, and emphasizes the fire support principles in FM 6-20.

The battalion fire support element (FSE), under the supervision of the battalion fire support sergeant, simultaneously provides control for the proficiency course while training battalion fire support specialists in their responsibilities at the infantry battalion tactical operations center (TOC). The FSE, which is approximately 4.7 kilometers from the course, acts as controller for both offensive and defensive scenarios by providing events and intelligence to FIST elements via a master events list. The distance between the battalion FSE and the course allows testing of communication equipment and requires remoted or relayed communications to the battalion FSE just as they would be required during a combined arms exercise.

Collocated with the battalion FSE is a FIST section which is not participating on the course. At the FSE, the FIST sergeant uses training extension courses and structured lesson plans to train the FIST team in calls for fire and any areas of inadequate proficiency. Meanwhile, the FIST chief acts as a forward observer trainer/event controller at the assembly area on the offensive course.

At the assembly area on the offensive course, one FIST receives an offensive scenario fragmentary order from the battalion fire support officer (FSO) who acts both as the infantry company commander and as an evaluator. Prior to leaving the line of departure/line of contact (LD/LC), the FIST chief briefs his FIST sergeant and forward observers (FOs). The FIST chief and FIST sergeant review essential elements of information such as primary and alternate overwatch/vantage points (a FIST headquarters

13F SQT and common task training	Artillery service practice support	Fire support proficiency course with infantry involvement	Infantry battalion EXTEV	Artillery (dry) and maneuver joint training exercises
Fire support proficiency course	81-mm/4.2-inch mortar live-fire exercises	Infantry battalion training exercises	Command post exercises	Combined arms live-fire exercise

Figure 1. Fire support training spectrum.

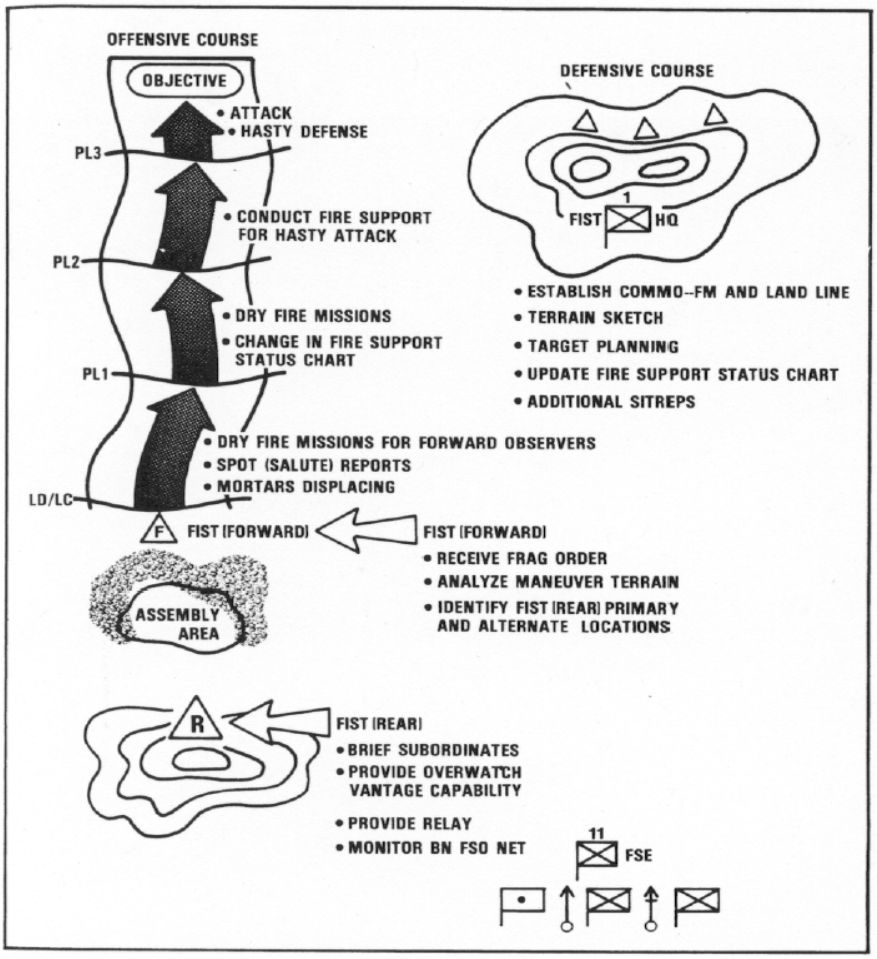

Figure 2. Fire support proficiency course.

ARTEP task), fire support coordination measures, ammunition status, indirect fire status, and unit boundaries. When the battalion FSO gives the order to move out, the FOSs lead the imaginary maneuver platoons under control guidance from the FIST chief acting as offensive event controller. Simultaneously, the FIST sergeant and his fire support specialist/driver (the so-called FIST rear) depart to the fist designated overwatch/vantage point with the FIST vehicle. The FIST chief (the so-called FIST forward) backpacks the AN/PRC-77 radio set (from the AN/VRC-160 in the 1/4-ton FIST vehicle) because the scenario requires that the vehicle not be used during maneuver. Once the objective is secured, the FIST chief can call the vehicle forward; and he will place his radio on the company mortar net to monitor the actions of the forward observers who are also on this net. The FIST rear monitors two nets — the company mortar net and the battalion mortar net — which the battalion FSE also monitors. This communication procedure allows for coordination overlap from battalion down to maneuver platoon. Should there be a need for artillery fires, the FIST forward directs the FO to the appropriate net to receive the target information and the assets available to attack the target. The battalion FSE has additional radios at his location and monitors all fire direction nets to respond to calls for fire by FO parties.

Events are generated by phase line or by a specific time period throughout the offensive course. The FIST forward cues the FIST rear to move, on call, to previously coordinated alternate positions when the maneuver platoons have advanced forward and the FIST rear overwatch positions have become useless. Upon reaching the objective, the FIST conducts a hasty defense of the objective and begins camouflaging the equipment and remoting the radios. The FIST chief and the FIST sergeant link up and review the tactical situation.

Before the offensive scenario begins, the battalion fire support officer briefs a second FIST chief on a defensive scenario during which that FIST is required to develop a deliberate defensive position. This FIST chief departs with his section to the designated location and prepares a deliberate defense. The FIST's FOs take positions separated by typical tactical distances. The FIST headquarters locates to the rear of the FOs. Personnel camouflage the vehicle and trailer and remote the radios. The FOs develop terrain sketches and identify targets and forward this information to FIST headquarters via land line communication.

Basically, the defensive scenario requires that all tasks be accomplished to ARTEP standards. The battalion FSE disseminates intelligence; and, when the battalion FSO sees that the FIST section in the offensive scenario has reached the objective and begun its hasty defense, he then journeys to the location of the FIST section which has been developing a deliberate defensive scenario. Each scenario usually lasts approximately two hours. At the conclusion of each scenario, each FIST section (to include the FIST section which remained at the FSE for training) rotates in a round-robin fashion. As each section becomes proficient in its tasks, the supported infantry battalion commanders, platoon leaders, and radiotelephone operators are invited to participate in the scenario.

The highest benefit of the FIST proficiency course is, of course, the eventual combined arms interface; however, the benefits of fire support skill training are enormous and include:

- Technical training of FIST personnel to high proficiency levels (especially in dry-fire calls for fire).
- Extensive use of communication equipment and radiotelephone procedures.
- Excellent physical conditioning.
- Frequent transmittal of intelligence reports.

The fire support proficiency course can be modified to fit any desired scenario. For example, the offensive course can be used in training for movements to contact, hasty or deliberate attacks, river crossing operations, or exploitations. The course is entirely flexible and is best utilized with innovative scenarios. The fire support proficiency course is a tremendous training asset; it has certainly added a plus in the 2-8th FA's ability to provide effective fire support training.

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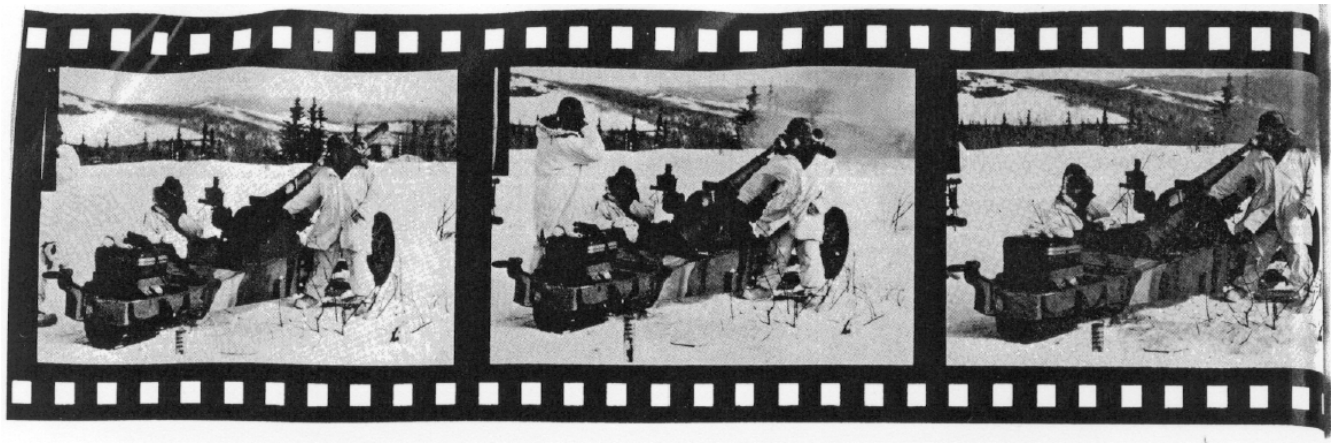


Freeze Frame

by Lieutenant Colonel Thomas E. Swain

Brim Frost '83 — sounds pretty as a picture, doesn't it? But when the soldiers of the 3d Battalion, 319th Field Artillery, 101st Airborne Division (Air Assault), were notified that they were to participate (minus one battery) in this Alaskan joint readiness exercise, little did they anticipate the extreme demands of the totally different environment and the degree to which the junior noncommissioned officer leadership would be taxed. Freeze on the following frames selected from the 3-319th's experiences and learn a little about providing fire support at 32 below.

During the tactical play, the 3-319th was in direct support of the 2d Brigade, 9th Infantry Division, which was part of a task force consisting of the following units:

- 9th Infantry Division:
  3d Battalion, 60th Infantry
  Forward Support Battalion
  B Company, 9th Aviation Battalion.
- 101st Airborne Division (Air Assault):
  3d Battalion, 319th Field Artillery (minus)
  1st Battalion, 503d Infantry.
- 3d Battalion, 130th Infantry (Illinois National Guard).
- B Company, 47th Aviation Battalion (National Guard).
- Airfield Defense Battalion (Air Force).

Before the battalion flew to Alaska, the soldiers underwent familiarization training with cold-weather equipment and clothing — most of these air assault Redlegs had never been out of the southern regions of the United States. There was also intensive leadership training for the junior noncommissioned officers. In addition, all of the hydraulic systems of the M102A2 howitzers were purged and replenished with arctic-type lubricants and oil. The battalion brought along extra nitrogen purge kits to provide the capability for keeping the fire control systems continuously moisture free. Special steel base plate stakes were manufactured since they were not available through the supply system, and plywood was cut to configure to the shape of each base plate for an insulator to prevent the base plate from freezing to the ground. Finally, once on the ground in Alaska, the battalion finished its preparative training with two weeks of winter training at Fort Wainwright. Then it was ready to deploy to Clear Creek Base for Brim Frost '83.

The task force logistics center was set up at the Clear Creek Base airstrip, which had previously been made operational by the Air Force. Early intelligence had indicated that enemy reconnaissance elements (Alaskan scouts) would be closely watching this area, and so the plan called for the 3-319th FA to deploy into the exercise area *forward* of Clear Creek Base on 26 January — with Blackhawk helicopters, the battalion could be in position quickly and undetected, ready to support the infantry assaults scheduled for 27 and 28 January.

While the battalion's trains deployed by C-130 aircraft to Clear Creek Base, the battalion tactical operations center (TOC), A Battery, and B Battery deployed by helicopter into the exercise area in the Blair Lakes vicinity (locations TOC_1, A_1, and B_1 on the sketch map, figure 1). Six lifts of UH-1 helicopters moved the advance parties, and 17 UH-60 helicopter lifts (7 lifts per battery and 3 for the TOC) moved the main body. The air assaults for the battalion TOC and A Battery went without incident; but high winds, combined with the "relatively mild" temperature (minus 36 degrees Fahrenheit), made the B Battery air assault a real challenge. Everything B Battery owned had to be staked down, and the soldiers could only operate for limited periods in the extremely harsh weather.

Consolidation of battery positions was the next order of business. While maintaining radio silence, each battery conducted local patrolling, established wire communications and logistical support requirements, and prepared to support the air assaults of the infantry battalions out of Clear Creek Base to the Blair Lake complex.

Both the TOC and A Battery were in well-camouflaged positions (their locations attest to the skill of the Blackhawk and Huey pilots who supported the air assault). Even though B Battery's position was relatively poor (it resembled the landscape of the moon), B Battery had to hold it in order to support the 1-503d air assault east of Blair Lakes into Strong Point Zulu and a company (3-60th) raid south of Blair Lake; both actions took place on the 27th, and both were successful.

A logistics supply foot path was cut to the Winter Trail from the A Battery and TOC positions. Helicopter deliveries of food, fuel, and water were initiated without incident. Both the TOC and A Battery positions remained undetected through 27 January. Enemy ground activity was limited to infrequent sightings of scout teams and enemy aircraft.

On 28 January, however, enemy ground activity in front of Strong Point Zulu intensified. Since there had been no intelligence report on the whereabouts of the enemy's mechanized infantry or artillery, no one had any idea where the enemy's main effort would occur. As it turned out, B Battery was in position to do most of the artillery firing. Numerous enemy reconnaissance flights located B Battery, but no air attack was made. Because of the communication distances, the 3-319th TOC became the principal relay and intelligence link between the forces deployed at Blair Lakes and the brigade main command post at Clear Creek Base.

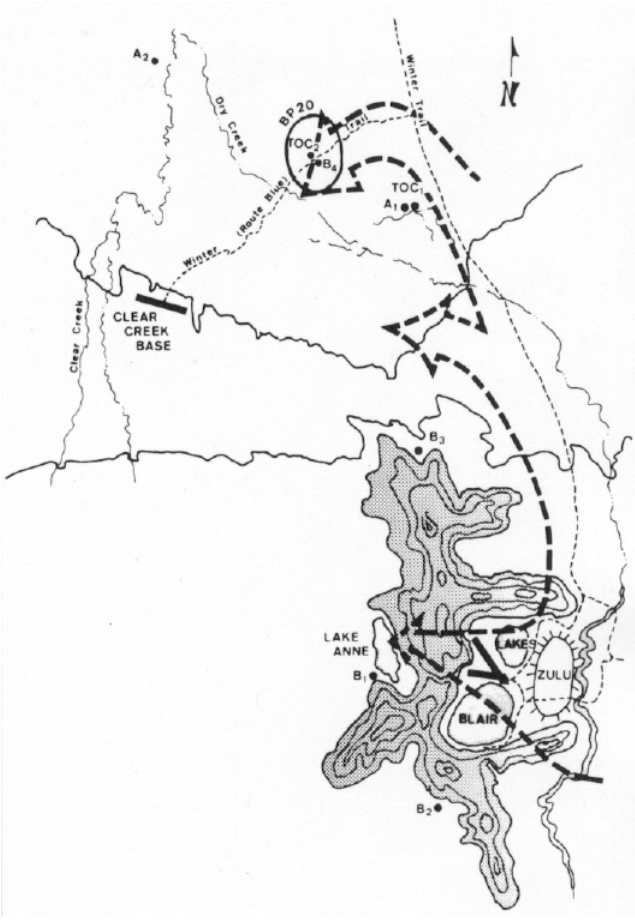
By late evening on the 28th, there was still no activity reported in the area of the 3-60th Infantry east of the A Battery and TOC locations. Meanwhile, the 3-130th Infantry's advance elements had started to arrive at Clear Creek Base. The enemy's activities continued to increase greatly above and below Strong Point Zulu, and a major attack in that area seemed imminent.

On 29 January, B Battery's position was attacked by enemy A-10 aircraft while the battery was preparing for movement; and the battery was rendered ineffective. Plans were made to air assault the battery to position B_2 in the late afternoon after B Battery had been reconstituted. The battery was again attacked during its air assault out of B_2, and two howitzers were destroyed. Nevertheless, the move was completed by late afternoon; and an air defense section moved into the B Battery position to counter the air threat.

Even though A Battery's position had not been detected, the battery commander planned to move southeast approximately five kilometers. However, the advance party was captured by the enemy during its insertion; so the move was cancelled, and the battery remained in place the rest of the day.

By 30 January, enemy activities indicated that the main effort would be in the Blair Lakes area. The Princess Patricia Canadian Light Infantry Battalion (enemy) had flanked the 1-503d Infantry which was stubbornly holding Strong Point Zulu. Unconfirmed reports indicated that enemy armor was north of Blair Lake, approximately three kilometers south of A Battery's position at A_1.

Although neither the TOC nor A Battery positions had been challenged, patrols had picked up enemy



Map by Solomon Lee

Figure 1. Brim Frost '83 exercise area.

activity; and it was imperative that the TOC and A Battery be moved. No air assets were available until darkness, and even then there would be only enough assets to move A Battery. Thus, the entire TOC was packed on Ahkio sleds and trail marched about three kilometers to the Winter Trail where battalion vehicles were waiting to transport equipment and personnel to helicopters which would complete the move to TOC_2 later that night. The movement of the TOC took less than six hours, and at no time was its operational capability lost. However, pulling all the equipment by sled totally exhausted the TOC personnel.

Battery B was again attacked by enemy aircraft, but the air defense systems prevented any serious damage while inflicting many aircraft "kills" on the enemy. Battery A continued to fire in support of the 3-60th Infantry and the 3-130th Infantry, which were both now heavily engaged. By late evening, B Battery's position was tenuous at best. The air assets for A Battery's move were diverted to B Battery which was air assaulted from B_2 to B_3 and was in position by 2100 hours. A Vulcan air defense artillery gun was placed

with B Battery. The 1-503d Infantry still held Strong Point Zulu, but it was now apparent that the enemy's main effort was to cross the plains north of Blair Lakes. The enemy units had somehow remained undetected while cutting a road and were attacking south of the east-west Winter Trail and along the Winter Trail.

By 31 January, most of the activity occurred at night. The enemy was having extreme difficulty working around the defensive efforts of the 1-503d Infantry. Intelligence estimated that the enemy would, within 24 hours, launch its main attack north along Winter Trail, turning west to Clear Creek Base. Enemy mechanized vehicles had been spotted at the intersection of Route Blue (Winter Trail) and Winter Trail.

On the evening of 31 January, the two firing batteries and a battalion of infantry (1-503d) were moved into Clear Creek Base in a nearly flawless air assault. Alfa Battery, one company of infantry, and a Vulcan air defense weapon were moved to the well-camouflaged position A_2 north of Clear Creek Base. Battery B and one company of infantry moved to position B_4 astride Route Blue. Task Force Artillery, composed of the 3-319th TOC, B Battery, an infantry company, and a Vulcan air defense weapon, was formed to hold Battle Position 20, which not only provided excellent coverage of Clear Creek Base, but also denied the enemy two high-speed avenues of approach.

On 1 February, it became clear that the enemy artillery was having considerable difficulty moving into supporting range. The 2d Brigade task force elements still had not suffered any artillery casualties. At approximately 1130 hours on 2 February, Battle Position 20 bore the brunt of an enemy armored attack consisting of 11 Canadian Grizzly armored vehicles and 18 Canadian armored personnel carriers. In the ensuing battle, Battle Position 20's infantry company and two mechanized vehicles were destroyed. But, as the enemy vehicles drove deeper into the position, they were engaged and destroyed by field artillery and Vulcan direct fire and by 90-mm recoilless rifles and Dragons. Reinforcements were requested and received. By 1800 hours, the infantry company was again operational; and an additional platoon had been provided from Clear Creek Base. The noise of mechanized vehicles filled a long night; but, eventually, all 29 enemy vehicles were destroyed. Battle Position 20 had served its purpose, and the exercise concluded on 2 February 1983.

Lessons learned

• The field artillery must be flexible; all operations in the severe cold, no matter how well planned, required more time for the execution than was initially imagined. Although the helicopter movement to TOC_1, A_1, and B_1 had been well planned, time factors for loading and unloading arctic equipment were grossly underestimated. Each Ahkio sled contained about 300 pounds of equipment (tent, food, stoves, and fuel); in their bulky clothing, the soldiers took much longer than usual to handle this material. It also took them longer than usual to recover from this exhausting work.

• Once a unit is deployed to an arctic environment, the first priority, outside of maintaning security, must go to putting up a warming tent. Security was most imperative because the Alaskan scouts acting as the enemy were at home in this environment and were capable of remaining undetected until just the right moment.

• Since the Blackhawk's doppler navigation system was not accurate in the arctic environment, the map was the most accurate means of navigation until the battalion's position and azimuth determining system (PADS) arrived. With the PADS in hand, battalion survey team members located positions under cover of darkness and even surveyed the main supply route back to Fort Wainwright.

• The Redeye section initially located with the A Battery-TOC complex should have been located forward with B Battery, and additional air defense assets should have been committed to the defense of artillery positions.

• Communications in the arctic remain a mystery. Here are a few of the highlights. During one period, the TOC was unable to communicate with A Battery when it was only six kilometers away; but, by using a relay to A Battery through the rear detachment at Fort Wainwright, which was 70 kilometers away, the TOC was able to communicate with A Battery. The new OE-254 antennas proved to be far superior to the old RC-292s. Communications seemed to be "layered," and moving antennas up and down was a technique that worked in achieving acceptable communications. The advance party, which is routinely deployed two hours in advance of the lead elements, must always take an RC-292 or OE-254 antenna with them.

• Air defense and infantry security elements must be provided to artillery units deployed in isolation to support infantry operations. When B Battery got in trouble from enemy air, it had no adequate air defense; and a planned air assault to move B Battery was disapproved because it would deprive the 1-503d Infantry of its only artillery support. It also became painfully obvious that B Battery needed some security forces with it, but none were available. Security elements, resourced by the infantry, should also have been inserted ahead of each field artillery advance party.

Photo by 1LT Michael Edrington

• The best means of fuel resupply was by 55-gallon drums which were fitted with a water faucet. Each day one logistical helicopter would visit a battery and deliver fuel carried in an external sling and water and hot food transported internally. It would back-haul the empty fuel container in the sling and the empty mermite and water cans and human waste internally. This helicopter would also transmit intelligence overlays and fire support plans.

• A book could be written on leadership techniques needed for the arctic environment. The junior leader had to ensure that his men ate, drank, and had frequent bowel movements. The color of the soldier's urine had to be checked constantly for signs of early dehydration. Soldiers were forbidden to drink boiled snow since it *did* cause dysentery. Individuals who were nonbelievers in the system of checks quickly became believers after they suffered from dehydration or heat exhaustion. Arctic operations are strenuous, and one move a day is very near the maximum. As soldiers get tired, they just sit in the snow and "don't care." Leaders must constantly be alert for symptoms of stress and fatigue.

• Regardless of the climate, artillery units must move continuously to survive; units cannot afford to stay in position for much longer than 12 to 18 hours.

• Field artillery personnel must become proficient in snowmobile use. All battery positions were two to three feet deep with snow; and snowmobiles proved invaluable for resupply, movement, and reconnaissance. Battery B would not have had to move from the B_2 position had it not been for snowmobile-mounted enemy infantry moving quickly to the flank of the Blair Lakes hill complex.

• Since the daylight period in the arctic is short, all operations should be night operations. The day is a time for rest and resupply.

• Adequate methods for designating artillery loads must be devised. Although 60-foot slings were used to air assault the field artillery, the blowing snow still totally obliterated the effectiveness of marking lights. One improvisation was to mark the sling load with a strobe light until the helicopter was high up, directly above the load. As the helicopter descended, a soldier moved the strobe light out in front of the helicopter to give it a reference point. This system worked, but there must be a better method.

Brim Frost '83 was the kind of exercise that gets a unit back to focusing on the basics. The 3-319th FA was able to move, shoot, and communicate because its leaders — especially the junior noncommissioned officers — trained their soldiers to survive the elements while accomplishing the mission.

LTC Thomas E. Swain, FA, who received his commission through the United States Military Academy, is a Command and General Staff School graduate, has Master of Science degrees in mathematics and operations research and statistics, and has also earned a Master of Business Administration degree. He has served in Vietnam, Panama, Germany, Korea, and Honduras. He commanded firing batteries in the 1-22d FA and the 1-21st FA. His Army staff duties have included work at the Army Concepts Analysis Agency and in the Office of the Technical Advisor to the Deputy Chief of Staff, Operations. He is currently the commander of the 3-319th FA.

A Gunner's Dale

by Major Gerald R. Akhurst

In the months since the end of the Falkland Islands War, many of the events of the war have been well documented; and most readers will be aware of them in some detail. This article concentrates on the main lessons that we artillerymen can learn from the conflict. I am writing as I saw it — very much from the gunner's point of view. Having spent two and a half years instructing at Fort Sill, I am aware of the differences in our systems; and it is inevitable that I should briefly point these out. Throughout the article I shall use British terms, with the nearest US equivalent in brackets.

The Royal Artillery system

A commando artillery regiment [battalion] has three gun batteries of six guns. A headquarters battery, as well as providing all administration requirements, fields the commanding officer's headquarters staff. At gun-battery level, the commander is a major. He has a captain as second-in-command and two captains as forward observation officers (FOOs) [FISTs]. A lieutenant is the gun position officer [battery commander/reconnaissance officer] and he effectively commands the gun position. Each battery is in direct support to an infantry battalion. The battery commander travels with and advises the infantry battalion commander. His FOOs likewise work with the infantry company commanders. A call for fire is an order, and we would expect first priority of fire for the supported battalion.

Land forces taking part

From the start, the Falkland Islands campaign (known as Operation Corporate) was a Royal Navy/Marine party, with an Army brigade tasked to reinforce the initial landing force. The land forces were centered around 3 Commando Brigade Royal Marines, which consisted of three Royal Marine commandos [battalions] — 40, 42 and 45; 29 Commando Regiment Royal Artillery [battalion], which was made up of three gun batteries (7, 8, and 79); a Royal engineer squadron [engineer company]; and various aviation and logistic units. Attached to the 3 Commando Brigade were 2d and 3d Battalions of the Parachute Regiment; two squadrons [companies] of the Special Air Service; an extra gun battery (29 Battery); and a Rapier air defence battery. Much later a complete army brigade did join the campaign.

Essentially the makeup of a Royal Artillery Commando Regiment is the same as the US equivalent. Equipment is roughly the same, but the greatest advantage we had was the 105-mm light gun, which had been in service for about 10 years and was well-proven and tried. Most importantly, it had a range of about 17,500 meters — a fact that was to be of considerable significance.

Commandos move toward Mount Kent.

Because the Falklands had virtually no roads and the ground was a marshy bog, it quickly became evident that what vehicles we had would be of limited value. Consequently, we either moved by helicopter or marched. Helicopters were, in the main, restricted to transporting vital logistic supplies, such as artillery ammunition, but were sometimes used for transporting troops. Most troops on the islands walked. Since battery commanders and FOOs had to march as well, sophisticated equipment (such as lasers, the position and azimuth determining system, and night observation devices) were, on the whole, left behind.

The campaign in brief

The recapture of the Falkland Islands began for us with the landings in San Carlos Bay. Largely unopposed, the three Royal Marine commandos and the two parachute battalions were quickly landed. A little later the artillery came ashore. The gap in fire was covered by frigates and destroyers of the Royal Navy. All battery commanders and FOOs had a previously circulated target list on which to base their calls for fire. The first artillery priority, however, was air defence — Rapiers were not set up in time to stop the first air attacks, but a combination of small arms and Blowpipe [Stinger] fires sufficed.

The land forces remained in San Carlos for a week before the breakout. Then, the 2d Battalion of the Parachute Regiment performed its heroic attack at Goose Green. The 45 Commando and 3 Para started

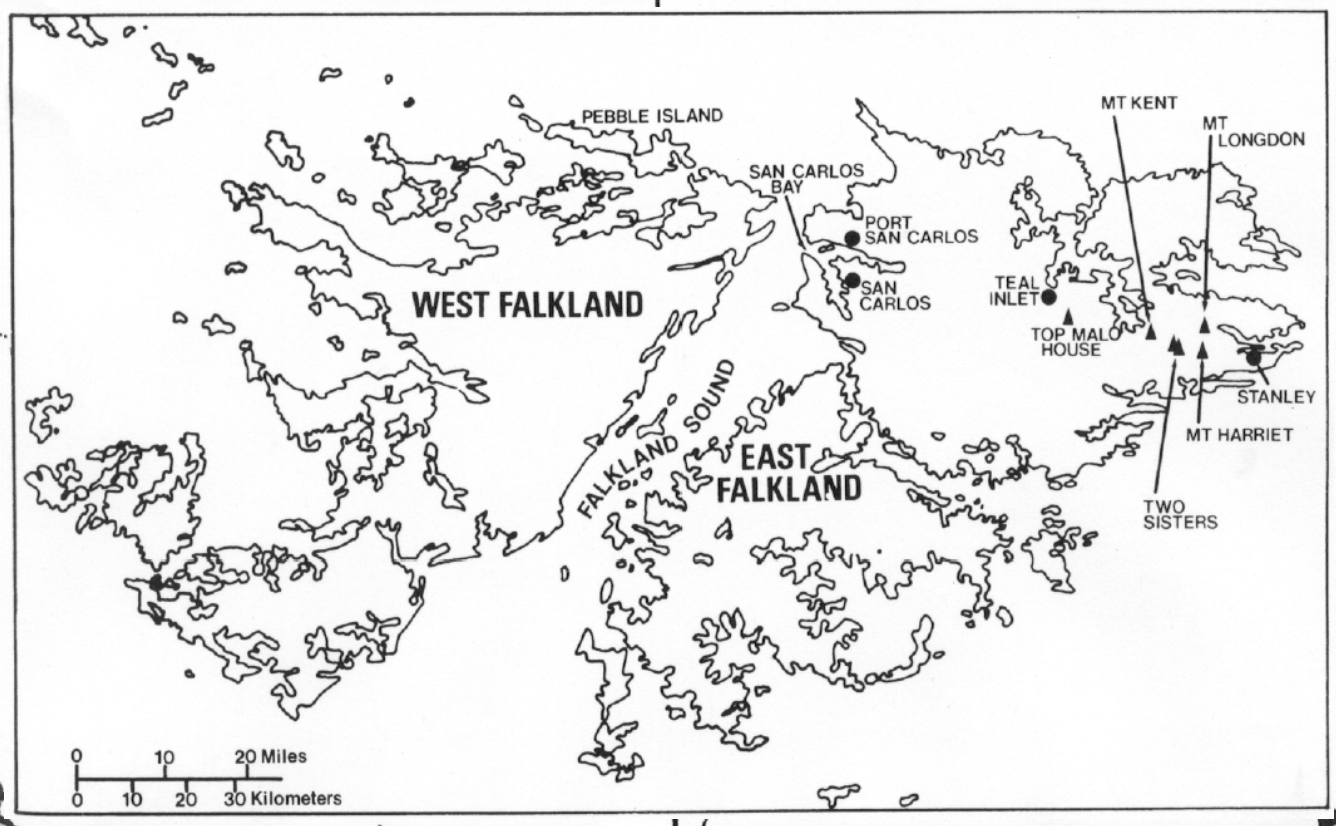
"yomping" [marching] the 95 miles to Port Stanley, and 42 Commando was flown to Mount Kent; 40 Commando remained, frustrated, in reserve. After about two weeks, sufficient forces had been gathered around Port Stanley to start the final attack. More importantly, sufficient artillery and ammunition had been flown in to support the attack. On the night of 11 June 1982, 3 Commando Brigade attacked the outer Argentinian defences. In a series of silent night assaults, 3 Para took on Mount Longdon, 45 Commando attacked Two Sisters, and 42 Commando took out Mount Harriet. The 5 Brigade attacked the next obstacle, and 3 Commando Brigade leapfrogged through them to attack Port Stanley and bring about the Argentinian surrender. That, in brief, was the campaign, although I have left out a lot, including such actions as Pebble Island and Top Malo House.

The gunner's job

The gunner's job was just as we had trained for it — namely, to support the infantry, to advise the commanding officers, and to report back information. Actually, many thought the first 24 hours after landing was not unlike an exercise; it was difficult to shake off the peacetime mentality. During the adjustment of defensive fires within the first few hours, there was a marked reluctance to bring rounds in too close. The first Argentinian air attacks were thought to be very well controlled "from the safety point of view." Not until bombs fell around us, not until we saw the sad sight of the *HMS Ardent* sinking, did we realise this was business. The infantry reacted in a similar way.

My job was to act as battery commander to 45 Commando, which entailed going everywhere the commander did. My FOOs did the same with the company commanders. Hence, we were continually with these characters. If, in our absence, there was advice sought or gunner action needed, it often had to be dealt with by my assistant, a bombadier [corporal/E3]. He quickly stepped into this role. The infantrymen would not move from their perimeter unless they had gunner support; and, since artillery officers and senior noncommissioned officers could not expect to fight all the time, they found relief by using the junior ranks. Throughout the campaign, our junior noncommissioned officers accepted more and more responsibility; I would say that 75 percent of the shooting and patrolling was done by them. (Back in the role of a peacetime battery commander, I now devote 50 percent or more of my training effort to these junior ranks.)

There was no average day during the campaign. Throughout, the guns were on call to support the infantry. Leaving aside the major attacks and the long yomp [march], the seven daylight hours were spent observing the enemy and taking on "good" targets. I emphasize "good" because ammunition resupplies were at an absolute premium, which often meant rationing! During the night there were always fighting patrols to be supported. If the guns were not firing on known targets, there was a full harrassing fire programme (depending on ammunition). I was once not a fan of harrassing fire, but have since been converted. Our fire on known enemy positions, at



79 Kirkee Commando Battery.

random, throughout the day and night, must have worn the enemy down, especially since our artillery could reach so far behind the enemy frontlines.

The major attacks were conducted as rehearsed during field exercises. Known targets were adjusted, a fire plan was developed, and the attack went in. The commander of 45 Commando desired to be right where the action was; hence I found myself with him in the middle of his lead company. Because of my fear of mines, I made sure I followed in his footprints! Fire plans, however, inevitably collapsed when the first timed serials had been fired. After that, targets became "on call." Any thought of shells landing at least 600 metres away were immediately scrapped; in order to win, artillery was brought down directly in front of, and in many cases amongst, our lead troops. Amazingly there were no casualties to our side. Because the battery commander and FOOs were right with the infantry commanders, the fire could be turned on and off at will. When the infantry commander decided that his men would go in, the fire was turned off. As 45 Commando infested Two Sisters, fighting developed into pockets of local resistance; gunners could not be everywhere, and so the infantrymen called down the fire. We made use of this technique in training and throughout the campaign. When Two Sisters was finally subdued, defensive fires and a final protective fire were planned; a counterattack did not develop, however, and so the observers were free to fire on the fleeing Argentinians and their main base of Port Stanley, which was by that time well in view.

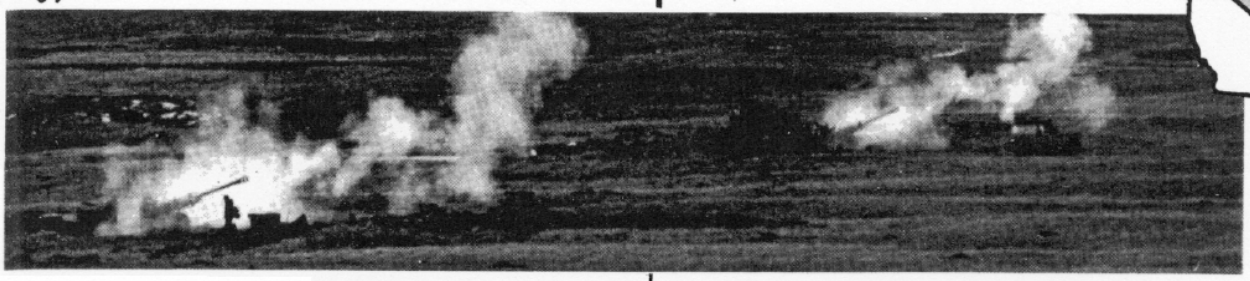
The remaining hours of the campaign were very much a gunner's benefit. All enemy defences were exposed, and anything that was considered a "good" target (we were now even tighter on ammunition than before) could be engaged. The final collapse of the enemy was directly due to the effects of artillery. Constantly harrassed, constantly exposed to accurate and lethal fire, their morale shattered and defences crumbling, the Argentinians surrendered.

Lessons learned

It is said that the soldiers in every war relearn the lessons from previous wars. The Falkland Islands War was no exception. We needed to be fit, but not fit in the sense that one could run three miles in 30 minutes! Fitness meant carrying heavy weights over long distances and still being able to fight. Fitness meant endurance and stamina. Not one luxury was allowed; on many occasions soldiers went for several days without even sleeping bags in the cold, wet, winter climate. The priority was ammunition, weapons, and food. Every man, be he a gunner, logistician, or engineer, had to be ready to accept this situation.

We learned to remember basic principles. In the case of gunnery, there were no lasers, there was no survey, and there were no good maps. Shooting was back to "Steam Gunnery" — rounds on the ground, and then adjusting to the target.

The response to a call for fire was not always as fast as it could have been. A gunner sitting in his command post several miles from the action may find it difficult to generate a speedy response; the days of so-called



Final hours of the battle.

"first-round accuracy" do not actually exist, especially in such an uncharted place. We must practice constantly to achieve the fastest service for the infantry.

Peacetime armies inevitably push responsibility upwards. The Falkland action forced it down. Hence junior soldiers and noncommissioned officers were left with responsible jobs. Not enough time in peace is devoted to training our second or third teams.

Peacetime training's inherent emphasis on safety takes away the sense of realism. Most of the troops had no idea what a 105-mm shell sounded like at 50 metres, let alone its effect. While they were getting used to it, the enemy had the upper hand.

The gunner cannot be everywhere, so the infantryman must be prepared to direct fire. Procedures do exist for this contingency, but they are rarely practiced. Once settled into, it is a marvellous way to destroy the enemy. As an example, on day two of the landings a Special Boat Service patrol destroyed three amphibious tracked vehicles by fire at 17,200 metres range.

Command and control must be understood even at low levels. Several unfortunate accidents happened as a result of junior commanders not knowing where the boundaries/friendly troops were. Again this is a difficult area to exercise in peacetime, but it is very essential.

It was difficult to banish the exercise mentality. Hard, aggressive, training helped; but it was still difficult for the first few hours. I suggest that the combination of this mentality and the shock of attack might well cripple our armies in a Northwest Europe environment.

Equipment stood up well. Sophistication does have its limitation on the battlefield, and recovery and repair were almost nonexistent. The gun position did without FACE [BCS]. Equipment that broke down had to be "bodged" [jury-rigged]. Flexibility, as always, was the key; and initiative had to be used to fix the equipment and use it well. Command posts were constructed out of old ammunition boxes, and unused charge bags were used to heat water. Everything had its use.

The old stories about fatigue on the gun position are true — it took time to unbox the ammunition, gun crews got very tired, and local defence was a constant and important requirement. All these problems, however, were surmounted. Our cooks became excellent gunners. When sergeants had to sleep, privates had to take over.

Argentinian artillery

Some mention should be made of the Argentinian artillery. They had between 25 to 30 105-mm pack howitzers and four French 155-mm howitzers. Throughout the campaign, these weapons were used piecemeal. While waiting on the side of Mount Kent, we were subjected to about 30 rounds in a week. During the attack on Two Sisters, about 400 mixed high-explosive and white phosphorous rounds were fired at us over about four hours. The fire was not effective for two main reasons: the rounds fell into peat, and a lot of the effect was absorbed; the rounds arrived in ones and twos every minute, which made them annoying, but not too dangerous.

When we captured an observation post position, it was apparent to us that the enemy had a defensive fire plan complete with defensive fires. For some reason it was not put into effect, and their artillery effort was largely wasted. Their company mortars, however, did fire in concentrations and were effective.

Finally, it was immensely difficult to locate the enemy guns. They sited their gun positions on reverse slopes, which meant that we had to rely on radar and air photos, both not too reliable in this campaign. I fired lots of rounds at suspected gun positions only to find out later it was two old tyres and a drainpipe draped with a camouflage net. At deception, the enemy was very good.

Conclusion

The Falklands Campaign showed that when it comes to artillery, no problem is insurmountable. A combination of simple equipment and procedures and good, aggressive training resulted in well-trained and efficient troops. A constant supply of good humour and the ability to use logic and initiative overcame all obstacles. The final lesson, as spoken by the brigade commander, Brigadier Thompson, is that artillery was *the* most important battle-winning factor.

MAJ Gerald R. Akhurst, Royal Artillery, was commissioned after two years at the Royal Military Academy Sandhurst. He has been stationed in Northern Ireland, Malta, Singapore, the Caribbean, Norway, Denmark, Australia, Scotland, and, of course, the Falklands. He has been a gunnery instructor at the Royal Artillery School at Larkhill and was an exchange instructor in the US Army Field Artillery School's Tactics and Combined Arms Department. At the time he wrote this article, he had been the battery commander of 7th (Sphinx) Commando Battery for two and a half years.

View from the Blockhouse

FROM THE SCHOOL

Journal notes

A random sample of the *Journal* readership will soon be receiving the *Field Artillery Journal* readership survey. This survey normally occurs only once every three years, and so it is very important that each recipient take the time to prepare a response which will set the *Journal* on a true course for the next three years. This survey is extra special for two reasons. First, recipients will be asked to list their favorite full-length articles for calendar year 1983. The author of the most popular article will receive a $200 check from the US Field Artillery Association. Meanwhile, the editorial staff will be choosing its favorite article; and that author will also receive $200 from the Association. Winners will be announced in the September-October 1984 *Journal*. Secondly, members of the US Field Artillery Association who receive and complete the survey will receive a one dollar credit on their next membership renewal.

Here is a request to the many field artillerymen who use the Redleg Hotline. When you phone your question, be sure to prefix your entire statement with your complete name, rank, mailing address, and telephone number. If you ask your questions in this manner, the Field Artillery School can guarantee that you receive a timely answer.

Get SMART

How many times have you said or heard someone say, "I know a better way to do this, but who do I tell so that something can be done about it?" The Army now has an effective tool called SMART (Supply and Maintenance Assessment and Review Team) that acts on ideas and suggestions. The goals of SMART are to reduce administrative burdens, streamline the logistics systems, effectively use new technology, and implement good ideas. In fact, the catalysts for this program are the ideas and suggestions submitted by Army personnel. SMART coordinates these ideas and disseminates them for a quick but thorough examination. Good ideas are implemented or expedited for hands-on testing through the 24th Infantry Division at Fort Stewart, Georgia. Results of the SMART program are relayed to the field in the form of action and informational messages. As of October 1983, 32 messages had been published in the *PS Magazine*.

Personnel submitting usable ideas or suggestions are eligible for cash or other awards through the Army Incentive Awards Program. SMART requests that the following topics be explained along with the new idea or suggestion:

- What is presently being done.
- What should be done or what should be changed.
- The rationale for the change.

Ideas and suggestions can be written on plain paper and sent to the US Army Logistics Center, ATTN: ATCL-S, Fort Lee, Virginia 23801.

The SMART system was implemented to improve the Army's logistics system; but future emphasis will be placed on the areas of ammunition, transportation and services. The system does work — so "write; don't gripe." (Captain David Parks, Weapons Department)

Field artillery ammunition support vehicle

The operational and organizational plan for the field artillery ammunition support vehicle (FAASV) indicates a one-for-one replacement of the M548 cargo carrier with the FAASV. Here are some pertinent facts about the M548 and the FAASV.

M548

The standard M548 cargo carrier belongs to the M113 family of vehicles. Its lack of armor protection makes its crew vulnerable and hence less effective. Adding ballistic protection would increase its weight to a point at which the vehicle performance would be reduced to an unacceptable level. It has a six-ton capacity, but non-palletized rounds must be strapped down. Loading to the maximum capacity reduces its cross-country mobility and creates engine-cooling problems. With the aid of an external lift, full pallets can be loaded down through the uncovered top; but the normal operation is a manual transfer of individual rounds from the resupply vehicle or from the ground to the M548. The on-board hoist cannot move pallets away from the vehicle center line; thus manual labor is required to maneuver them to one side or another. The M548 cannot climb hills as well as the M109 and hence lacks the mobility to keep up with its support weapons system.

FAASV

The FAASV is designed to carry a minimum of 12,251 pounds of 8-inch ammunition or 15,091 pounds of 155-mm ammunition. The cargo area will house adequate storage racks and compartments for fuzes, propellants, and projectiles, to include 93 complete rounds of 155-mm ammunition (including three Copperhead rounds) or 48 complete rounds of 8-inch ammunition and a 10 percent overage of propellants and fuzes for each type of ammunition. These racks offer an advantage over the M548 in that projectiles and powders can be grouped and stored by lot numbers. In addition, the FAASV will accept the new family of conventional rounds, including the Copperhead. Normally, howitzer crews will not stack rounds on the ground or around the howitzer; they will remove from the racks only the rounds to be fired. The crew will be able to complete projectile and propellant preparation without removing them from their compartments

and to transfer individual rounds from the bed of a cargo truck or from the ground over the FAASV's cargo area conveyor system. This method can sustain a cyclic loading rate of four rounds per minute. The automated servicing equipment can feed complete rounds to the howitzer at a rate of six complete rounds per minute for the 155-mm howitzer and four complete rounds per minute for the 8-inch howitzer.

The FAASV has an M109A2 howitzer undercarriage (extended two feet) and thus has the same cross-country traversing capabilities as the M109A2.

The FAASV has ballistic protection similar to that provided by the M109A2/A3 howitzer; the armor thickness not only protects the crew but also the ammunition cargo. The raised ballistic shield of the FAASV can afford added protection between the ammunition vehicle and the howitzer. The FAASV also affords at least the same degree of protection against chemical agents as does the M109A2/A3 howitzer. (Chemical protection for four personnel must come from a ventilated face piece system; the crew would wear protective clothing while working inside the FAASV.)

The FAASV. (Photo by SP4 Dana McMahan)

The use of the FAASV requires no additional manpower spaces; in fact, with the ammunition handling equipment, the crew size might even be reduced. The ammunition handling equipment will also reduce crew members' fatigue in a chemical environment where they have to wear full protective clothing. (CPT Susan L. Gahagan)

The operational test cycle

With a great deal of amazement and frustration, a firing battery executive officer looks on helplessly as his M561 Gama Goat fire direction center vehicle and two of his howitzer prime movers sit hub deep in the mud somewhere in the Saint Barbara Training Area in Korea. Halfway around the world in Grafenwoehr, Germany, a battalion ammunition officer has similar feelings when his ammunition convoy is stopped, blocked by an M520 GOER which acquired a flat tire just as it tried to pass a disabled howitzer on a narrow tank trail.

Both of these field artillery lieutenants require recovery support. They have never worried about whether or not the recovery vehicle will be able to do the job; they assume that it will or else it would not be in the unit. They are probably completely unaware of the development process which preceded the fielding of the recovery vehicle. Perhaps they think that some anonymous ordnance engineer at some obscure arsenal devises and then fields materiel with little regard for the soldier using the equipment. The present acquisition and testing process, however, involves the efforts of many diverse agencies and testing by operational units. Solid information about the development process may serve to instill well-founded confidence in all field artillerymen that the equipment added to the inventory is guaranteed to do the job before it hits the field.

The formal operational testing process is necessarily complex and involved in order to insure that the most capable and effective equipment is provided to the soldier. The agency responsible for testing most of the field artillery's new equipment, tactical doctrine, and system improvements is the US Army Field Artillery Board, which is staffed by Field Artillery branch officers (usually senior captains or majors who have recently completed tours in active units) whose duties as test and evaluation officers provide them a unique opportunity to use their practical experience in the testing and development of equipment and tactics for the Army of the future. They know that one day they may have to stake their lives on the quality of the equipment for which they are coordinating accurate and realistic testing. In addition to their own experiences as artillerymen, the tools of the test officers are the documents and procedural guidelines of the Army's Training and Doctrine Command and Operational Test and Evaluation Agency.

The origin for most new concepts is the combat developments department at a branch school such as Fort Sill. Other sources might be a materiel developer interested in a particular equipment feature, a special study group committee, or someone in a field unit. Regardless of the origin of the idea, a proponent (in most cases a Training and Doctrine Command school) will investigate the worth of any suggestion as a projected requirement. In the case of the M578 light armored recovery vehicle, the US Army Ordnance Center and School developed a requirement to improve the M578 currently issued to mechanized infantry, armor, and field artillery battalions. The requirement stemmed from user feedback on the performance of the vehicle and from the need to enhance its proven capabilities and prolong its service life. The Ordnance Center and School submitted recommended improvements to industry along with initial funding for the production of prototype test vehicles.

When a combat development agency receives a requirement, it must produce a document called the independent evaluation plan which formally staes exactly what issues must be answered in the evaluation of the proposed equipment. It also sets the standards and criteria against which equipment such as the M578 will be measured. The test agency becomes intimately involved, of course, since the Training and Doctrine Command tasks it to prepare and conduct testing in support of the independent

evaluation plan. The test officer must meticulously examine the plan to insure that all issues can be tested within the time and resources available and that each issue can be measured against precise criteria.

Next, the test agency must produce a formal document called an outline test plan in order to notify everyone involved with the requirement of the resources (people, equipment, time, and supplies down to the proverbial "brass tacks") needed for the test. The test officer, in other words, must assign a cost estimate to the test and must predict everything that will, or may, be required over the course of the test. If a test officer does not devote full attention to the preparation and accuracy of the outline test plan and finds later on in the middle of the test that some additional resources are required, that resource may prove significantly difficult to acquire. The outline test plan receives considerable attention within the Army community. The General Officer Test Scheduling and Review Committee (TSARC) meets in June and December, and the Training and Doctrine Command working group meets a couple of months earlier; both the committee and the working group examine the plan with the TSARC approving all tests of the Operational Test and Evaluation Agency, the Training and Doctrine Command, and the Test and Evaluation Command. If approved, the outline test plan becomes a formal tasking document and is included in the Army Five Year Test Program and in the budget. The test agency then begins requisitioning supplies and assembling resources for the conduct of the test. For the M578 test, the outline test plan, first submitted in June 1981, went through two revisions (in September 1981 and April 1982) prior to the actual test.

Many additional documents are required in the planning stages of a test. The most important tools the test officer uses in his preparations are the various test support packages provided to him by the Training and Doctrine Command's combat and training developers and by the US Army Materiel Readiness and Development Command. These documents cover a wide variety of topics ranging from doctrinal concepts to the threat to the means of employment of the equipment to a complete listing of and the means for obtaining repair parts, technical literature, and any special or common tools required to support the equipment. The test officer studies these documents carefully because he must design a test to simulate, as closely as possible, the tactical conditions under which the test equipment will operate.

The next step in the operational test process is the formulation of the test design plan. In this document, the test officer states, in detail, the methodology, the data collection, and the concepts of analysis he will use during the test. The test officer specifies what data will be collected, how and under what conditions it will be collected, what reduction techniques will be used, and even how the data will be displayed in the test report. The test design plan is coordinated with the proponent, the trainers, and the combat and materiel developers prior to its final release.

The project review board is a quality control gauge used by the Field Artillery Board at various points during the test documentation process. This board, composed of senior test officers and chiefs of the various divisions within the Field Artillery Board, receives briefings from the test officer concerning the detailed test plans and the results of each test. The review board's primary objective is to assist the test officer by providing helpful guidance and suggestions concerning techniques and procedures for test preparations. The members of this board are often in a position to identify problems and offer solutions. Therefore, prior to publication, the board reviews the outline test plan, the test design plan, and the final test report.

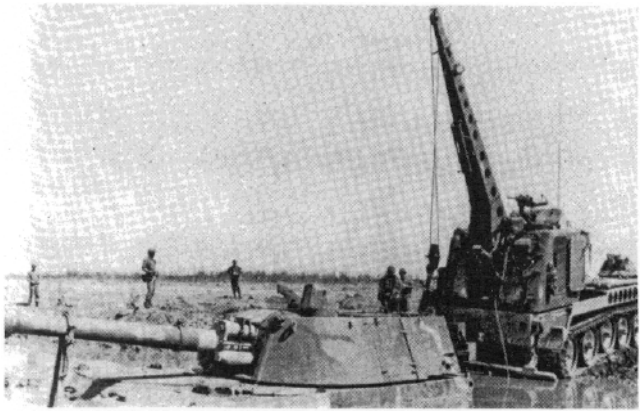
Other important documents must be obtained and considered by the test officer prior to testing. One essential working document in an equipment-oriented test involving aspects of reliability, availability, and maintainability is the failure definition/scoring criteria. As its name implies, the failure definition/scoring criteria document defines the categories of failures that may affect equipment performance, outlines levels of acceptable system degradation, and includes an incident scoring flow chart that is used by the tester to record failures or any incidents. The test officer also needs informational documents such as the operational test readiness statement and all safety releases prior to the initiation of testing. Safety releases from the Test and Evaluation Command and the Training and Doctrine Command list any restrictions on the use of equipment. The operational test readiness statement from the materiel developer states that the equipment is present in the desired condition for testing, while the operational test readiness statement from the combat and training developer states that all personnel have satisfactorily completed the training specified in the training test support package.

A final step prior to testing is the development of the detailed test plan, which is an internal working tool of the test agency and can be likened to a standing operating procedure to be used during the test. It specifies duties of all personnel, how the scenario and data collection effort will proceed, and any other detailed "nuts and bolts" guidance information.

The capstone of the test officer's efforts is, of course, the conduct of the test itself. The test officer and his test directorate must provide a fair and impartial test of the equipment concept. The test officer will follow the test design plan scrupulously (any changes must be approved in advance by the proponent, by the Training and Doctrine Command, and, in some cases, by the Operational Test and Evaluation Agency). The data is collected, analyzed, and reduced (during testing, if possible) to develop emerging results and ascertain exactly what results are being achieved.

The test process can be illustrated by a brief description of the M578 product improvement test conducted from 2 July until 19 November 1982. A total of nine vehicles were provided to the Field Artillery Board for testing (three sets of vehicles, each in three different configurations). Two of the configurations (six vehicles) were product-improved versions. The third set consisted of three rebuilt standard production M578s which were not product-improved. Six crews on temporary duty from operational units

throughout CONUS were systematically rotated among each of the test vehicles during a total of 39 separate 36-hour scenarios over the course of 13 weeks. This period was preceded by five weeks of new equipment training and followed by two weeks for conducting special subtests, administering questionnaires, and preparing the vehicles for shipment to the manufacturer for refurbishment.



The M578 recovery vehicle must succeed in real-life situations, such as this recovery of a mired 155-mm howitzer.

Each test scenario required the vehicles to perform in a role normally associated with recovery operations under simulated combat conditions. The vehicle crews towed disabled vehicles, performed lifting maintenance support, and recovered disabled or immobilized combat vehicles. One issue of the test, for example, was to determine whether or not the .M578s in all configurations could extract, within a prescribed time, an M109 howitzer that was mired in mud to fender depth.

The test involved a comparison of both the modified vehicles to the standard version and a comparison between the modified vehicles. For example, there were three different track tension adjusters, two different types of track pads and shoes, and three different hydraulic systems present on the test vehicles. The overall objective was to determine the superior version in terms of general mission performance and the important considerations of reliability, availability, and maintainability. These considerations generally determined the length and extent of the test because extensive amounts of mileage and hydraulic operational time were required to provide the requisite degree of statistical reliability. Many separate product improvements also had to be evaluated independently. The information generated from the test was used to develop reliability, availability, and maintainability tables and statistics on some separate modifications.

The result of this and any other operational test is the final test report, which is published within 45 to 60 days after testing is complete and is distributed to all agencies and commands concerned with the project. The test report lists the most important tangible results of the test and is the Field Artillery Board's most enduring and scrutinized product. Within this document, the test methods, results, and analyses are provided and organized into an exhaustive record of what did or did not happen during the test. From the operational test report, the proponent will then produce the independent evaluation report, which is forwarded through the Training and Doctrine Command to the Department of the Army. Subsequent production decisions are based largely on this independent evaluation report. If further issues surface, the whole test cycle may start again; or the decision may be made to field the equipment or implement the concept. In all cases, the formal testing process provides the detailed reliability, availability, and maintainability data and other information on which sound decisions can be based.

This involved, complex testing process may not be more than a passing thought to the two harried lieutenants mentioned earlier because they are too involved in the real-life situation at hand. However, the results of the testing and evaluation effort obviously impact on their problems. They may assume that the M578 dispatched to their assistance is capable of doing the job; but it will do the job because the Field Artillery Board, backed by the extensive Training and Doctrine Command test community, has insured that the M578 and other vehicles and items of equipment arriving at units have already proved themselves in an operational environment. (CPT Wesley L. Glasgow and CPT James M. Holt, US Army Field Artillery Board)

New firing tables being distributed

New tabular firing tables (FT 155-AM-2, dated 31 March 1983) are being distributed to applicable units in accordance with their publication accounts; i.e., DA Form 12-37 for M109A1, M109A1B, M109A2, and M109A3 units and DA Form 12-40A for M198 units. However, the graphical equipment (graphical site tables and graphical firing tables) for use with FT 155-AM-2 will not be fielded until the third quarter of FY84. Since there are significant differences between the AM-1 and AM-2 data, units should *not* mix FT-155-AM-1 and FT 155-AM-2 tabular or graphical equipment. In other words, units receiving the FT 155-AM-2 tabular firing tables should not use them until they receive the new graphical equipment.

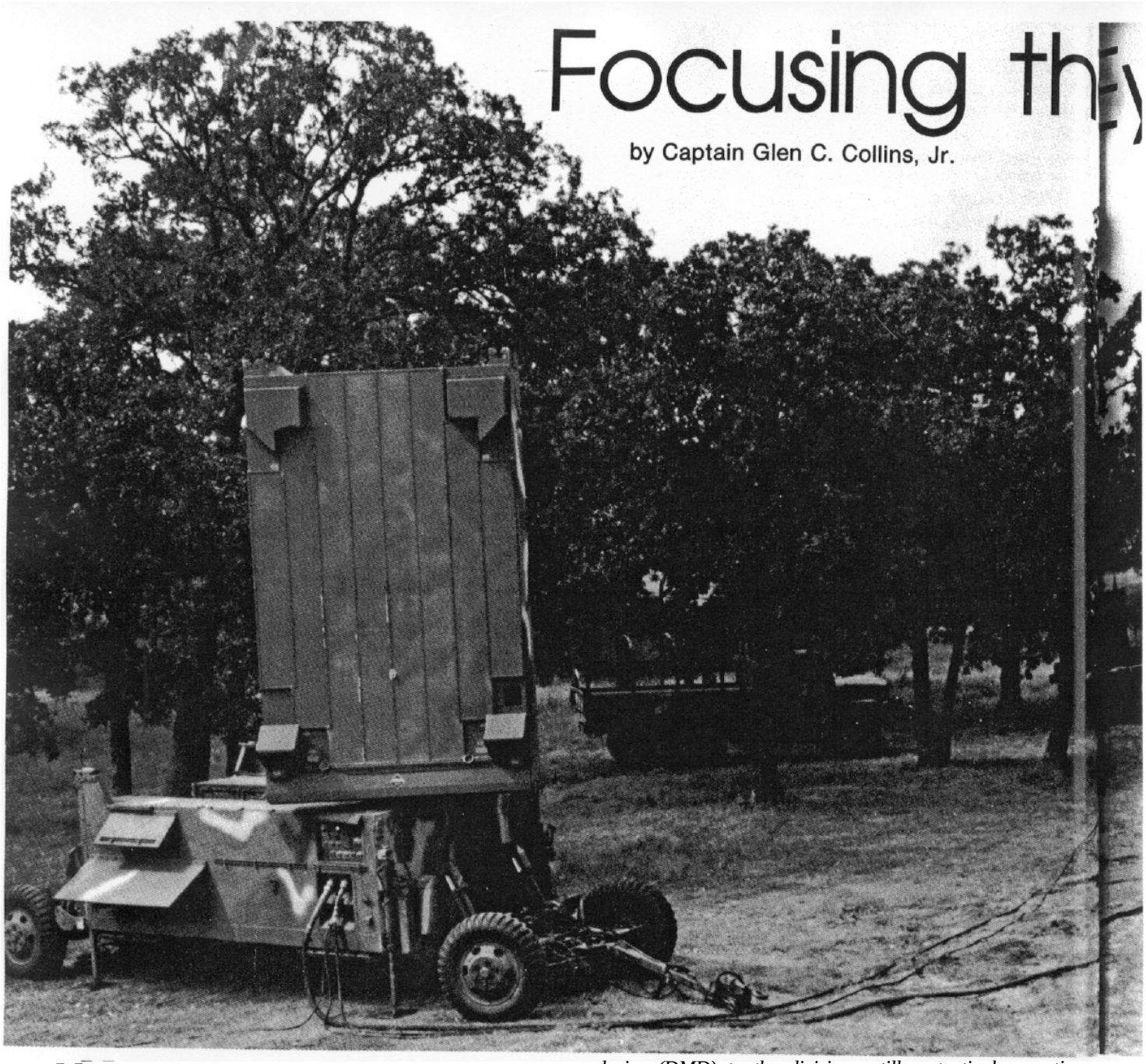
FT 155-AM-2 will replace FT 155-AM-1 with all changes. The new data in FT 155-AM-2 is based on enhanced technical computations and expanded test firings and allows users to fire M483A1 dual-purpose improved conventional munitions by using M107 high-explosive graphical firing table settings, thereby eliminating the need for 155-mm dual-purpose improved conventional munitions registrations.

Correction

A "View from the Blockhouse" article in the November-December 1984 *Journal* erroneously reported that TM 38-750 was under revision for redesignation as TM 38-L21-11. According to the Office of the Deputy Chief of Staff for Logistics, the revised TM 38-750 will be redesignated DA Pamphlet 738-750, *The Army Maintenance Management System (TAMMS),* and will appear in a publication called *The Maintenance Management Update*.

Focusing the

by Captain Glen C. Collins, Jr.



Maneuver commanders and all field artillerymen should close their eyes for a moment and reflect on how target acquisition constitutes the eyes and lead element of the fire support system. They should think about how it will help them win the AirLand Battle if only the field artillery commander will issue specific guidance on how to use those eyes. They should imagine the satisfaction in being responsible for a system so well coordinated that it would contribute to the following scenario. Imagine . . .

The specialist in his position at the sound observation post hears the whine of artillery rounds passing overhead and the "whump" as they impact in the division's area. Instinctively he clicks the toggle switch to turn on the sound base in hopes of picking up enemy locations. At the same time, his partner at the observation post sends a message over his digital message device (DMD) to the division artillery tactical operations center (TOC) that a massive threat artillery barrage is underway.

The target production section in the TOC receives the cueing message and directs the two AN/TPQ-37 Firefinder radar operators to begin their mission of acquiring artillery and rockets. Able to acquire up to 10 targets simultaneously and to store up to 100 targets, the Firefinder has no problem in filling its storage file within 30 seconds. The radar operator begins to transmit the targets to the division artillery TOC at a rate of eight targets per minute in a series of secure TACFIRE digital transmissions. Just as quickly, the division artillery TOC begins to transmit the calls for fire to its artillery battalions. At the same time as the specialist on the sound observation post takes action, the fire support teams (FISTs) repeat the

Hughes Aircraft Company photo

same process, but send their target information over the command/fire nets to their respective battalion TOCs. The direct support battalion S2s immediately notify the operators of their attached AN/TPQ-36 radars to acquire targets; and again the process of acquiring 10 targets at once and storing up to 100 is repeated, but this time the targets are primarily the mortars and 122-mm artillery supporting the enemy's maneuver elements.

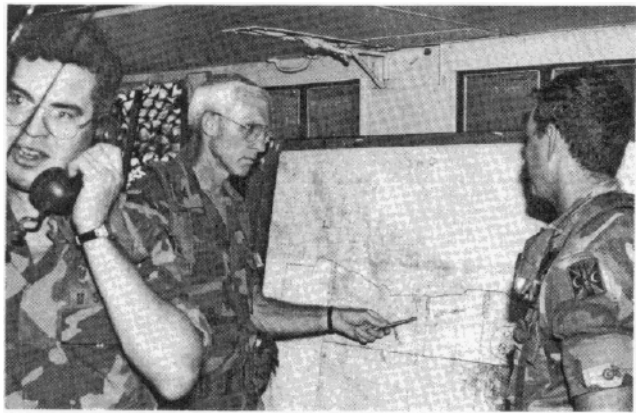
As yet, not a single direct-fire engagement has taken place. At H + 2 minutes a section chief's gun display unit comes to life on his howitzer and announces a fire mission. At H + 3, the enemy learns the awful reality of war as the massed fires of US 155-mm and 8-inch artillery units erupt on enemy firing unit positions and degrade their capabilities to continue the preparation fires. Having sustained casualties and destruction of equipment, the enemy begins calling for help on formerly silent artillery radio nets which now begin to crackle. As the enemy's electronic signatures radiate across the forward line of own troops, the military intelligence personnel go to work locating the enemy artillery command and control centers and send these locations to the division all source intelligence center where the field artillery intelligence officer sends them to the division artillery TOC. Again, within moments, thanks to the speed of digital TACFIRE traffic and automated command and control, rounds are en route to enemy locations, adding further confusion to the threat fire support effort.

At H + 30 the enemy's massive tank columns move forward to overrun what their leaders think are forward defensive positions softened by artillery fire. Instead they find a mad beehive of NATO tanks and infantry that rain destructive fires on them. And, when the enemy maneuver commander calls for supporting artillery fire to free him from his problem, there is no answer from the destroyed headquarters.

. . . just imagine. The scenario may be too simplistic — enemy fires will likely degrade the US fire support system as well. But the fire support system can work in the manner described if maneuver and field artillery commanders give adequate guidance which allows these target acquisition and weapon assets to be used to the maximum of their capabilities.

Unfortunately, the manner in which the field artillery commanders give target acquisition guidance has not been adequately defined. Generally they issue very broad guidance as part of the overall attack guidance, and then their staffs translate this guidance into positions and mission statements for target acquisition assets and express them in the target acquisition plan and cueing guidance. It is here that the problem arises. The target acquisition plan establishes command and control relationships for the various assets and briefly covers the mission of the target acquisition asset; but, because this annex is meant for general distribution, it does not have the specificity required for a mission statement. Cueing guidance is used to provide a specific mission statement, but exactly what specifics should be sent to the target acquisition asset have been poorly defined and even more poorly understood by field artillerymen in general. Cueing is, by definition, only "one sensor activating another sensor"; for example, a fire support team sees enemy artillery firing and sends information that causes a radar to activate and acquire that enemy artillery. But cueing guidance should explain how to control that process — who can cue whom, length of radiation, etc. Given the complexity and improved capabilities of new target acquisition systems such as the field artillery's Firefinder radars and joint field artillery/military intelligence systems such as the remotely piloted vehicle and the elevated target acquisition sensor, field artillerymen must know what to tell the systems operators so that the field artillery and military intelligence capabilities of the equipment are maximized. Put quite simply, mission statements must be very detailed.

The field artillery commander's target criteria message is the first step in quantifying a target



Photos by Jill Photo

acquisition mission statement. The process of generating the message starts when the division artillery or direct support battalion commander issues his general guidance on the priority of target acquisition and counterfires, the areas of importance to maneuver forces, and the types of targets to be acquired. The division artillery counterfire officer or the direct support battalion S2 translates this guidance into a mission statement for the target acquisition sensor. The completed target criteria message is then approved by the commander or his designated representative, normally his S3. The commander's total involvement in this process up to the final approval insures an integrated target acquisition/target engagement relationship. The commander's target criteria for the whole target acquisition system is depicted graphically in figure 1.

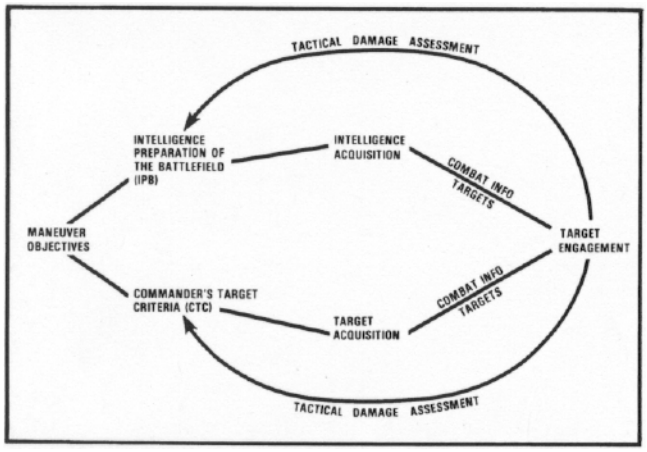


Figure 1. The target criteria/target acquisition relationship.

The commander's target criteria message (figure 2) is designed to permit its use with or without TACFIRE. In future TACFIRE versions, portions of this message will appear in the artillery targeting intelligence target criteria message (ATI; TCRIT). At the present time, however, the target criteria message is filled out in two copies (preferably with pencil) with one copy attached to the target acquisition annex and given to the appropriate sensor. The upper right-hand corner shows to whom the target criteria is directed. As conditions change, the target criteria message can easily be updated in frag order fashion by giving the line number, the column letter, and the new information (be sure to observe proper operations security for certain information such as position grids). For example, "D25 this is H18, target criteria message line one alfa, 2537, over" — this transmission tells the sensor operator the location of the new position with a minimum of FM communications. With TACFIRE, this transmission would be a simple plain text message.

The first two categories — sensor criteria search zone and cueing — are for sensor management. The search zone entries establish where the sensor will be positioned and where it will search. This search zone can be modified for commander's guidance through the use of counterfire reference grids, differing widths of sector of scan (300 to 1600 mils for Firefinder radars), and priority or censor zones (designated by three to six grids). The Firefinder radars can input six priority or censor zones in the radar, and other sensors should designate these areas on their maps. The section on cueing is also very important. If only the artillery headquarters is to cue the asset (centralized control), then either "no" can be entered on the form or the block on the form can simply be left blank. If direct cueing is desired (decentralized control), then "yes" and the priority of that source are entered. The priority designation provides for a way of resolving cueing conflicts. The threat electronic warfare (EW) level and maximum radiation information are there for the protection of the sensors, notably the radars. A "confirmed/effect" entry next to the threat EW level category means there are known enemy electronic warfare assets in the area with observed effects on friendly target acquisition assets. The maximum radiation time, in seconds, is another method of delineating threat capabilities — normally the radar warrant officer determines this value after weighing the enemy threat against the mission requirements. The "confirmed only" and "required reliability" entries allow sensors (especially moving target locating radars) to establish the value of cueing information and thereby determine how long they should search for targets. The two categories on the commander's target criteria form establish the criteria for targets. The target development section determines the type and number of targets desired. The number of targets/cue is a direct reflection of the commander's counterfire priorities — that is, how many bullets he wants directed against counterfire targets. Required accuracy, reliability, and target type are all ways of controlling the quality of incoming target information. The "hostile impact predict" entry is for the AN/TPQ-36 radar only, because this radar not only can tell where a round came from but also can tell

APPENDIX_____TO TA ANNEX _____
SENSOR:_____

Line	Category	Column A	Column B	Column C	Column D	Column E	Column F	Column G
	SENSOR CRITERIA							
	SEARCH ZONE							
1.	Position	PRI:_____(1)	ALT:_____					
2.	Primary zone	MIN RG:____KM	MAX RG:____KM	L-AZ_____	R-AZ_____	CRG_____		
3.	Secondary zone	MIN RG:____KM	MAX RG:____KM	L-AZ_____	R-AZ_____	CRG_____		
4.	Priority(P)/Censor(C)-1	_____	GD1_____	GD2_____	GD3_____	GD4_____	GD5_____	GD6_____
5.	Priority(P)/Censor(C)-2	_____	GD1_____	GD2_____	GD3_____	GD4_____	GD5_____	GD6_____
6.	Priority(P)/Censor(C)-3	_____	GD1_____	GD2_____	GD3_____	GD4_____	GD5_____	GD6_____
7.	Priority(P)/Censor(C)-4	_____	GD1_____	GD2_____	GD3_____	GD4_____	GD5_____	GD6_____
8.	Priority(P)/Censor(C)-5	_____	GD1_____	GD2_____	GD3_____	GD4_____	GD5_____	GD6_____
9.	Priority(P)/Censor(C)-6	_____	GD1_____	GD2_____	GD3_____	GD4_____	GD5_____	GD6_____
	CUEING							
10.	Direct source/priority	FIST:_____(2)	S/R_____	Other___/___(3)	Other___/			
11.	Threat EW level	_____(4)	MAX RAD:___(5)					
12.	Confirmed only	_____(6)						
13.	Required reliability	_____(7)						
	TARGET CRITERIA							
	TARGET DEVELOPMENT							
14.	Number of targets/cue	MIN:_____	MAX:_____					
15.	Required accuracy	MIN:_____(8)	MAX:_____					
16.	Reliability	_____(7)						
17.	Target type	SYS:_____(9)	S-SYS:_____					
18.	Hostile impact predict	_____(6)						
	TARGET PROCESSING							
19.	Target reports (ATI;CDR)	SYS:_____(9)	S-SYS:_____	To:_____(10)	GD1_____	GD2_____	GD3_____	GD4_____
20.	Target reports(FM;RFAF)	SYS:_____(9)	S-SYS:_____	To:_____	GD1_____	GD2_____	GD3_____	GD4_____
21.	Intel reports (ATI;CBTI)	_____(6)						

Legend:

(1) 4-to 8-place grid.
(2) Yes/no and priority — 1, 2, 3, etc.
(3) Other cueing sources; e.g., G2/4
(4) Unconfirmed/no effect, confirmed/no effect, or confirmed/effect.
(5) Seconds, not to exceed 25 for Q-4 radars and 120 for Q-36/37 radars.
(6) Yes/no.
(7) Excellent/good/fair (E/G/F).
(8) 50-meter increments.
(9) Target type is a description of targets. SYS = system; input such as artillery, maneuver, armor, etc. S-SYS = subsystem; e.g., heavy, light, wheeled, all, high angle, or low angle.
(10) Unit (or destination) for target information.

Figure 2. The commander's target criteria format.

where it is going; and this information allows further prioritization of the counterfire efforts. The final section, target processing, indicates where the target information should be sent. This information can be designated by either target description or by zone. This guidance is a very important consideration, especially with TACFIRE. A TACFIRE coordinate report (ATI; CDR) can be actioned only by the division artillery targeting element, whereas the fire mission request for additional fires (FM; RFAF) is used by the direct support battalion or by the division artillery fire control element. In the case of a AN/TPQ-36 radar attached to a direct support battalion, for example, the battalion will want fire mission requests for additional fires from areas near to the forward line of own troops; other target information would be put in an artillery target intelligence coordinate report (ATI; CDR) to go to division artillery. The "intel reports" entry tells sensors (especially sound observation posts and moving target locating radars) whether information of a nontargetable nature is to be reported.

Since this form may be used to record information for all field artillery target acquisition assets, not all lines require entries; and all entries are not the same. Even though parameters have been set for information input, the format should not interfere with the transmission of guidance; as long as the commander and the sensor operator know what is meant, they should drive on. Further discussions on the commander's target criteria will be in the next version of FM 6-121.

The successful accomplishment of the close support, counterfire, interdiction, and suppression of enemy air defense missions requires the coordination of all the fires in support of the maneuver forces. When, based on his understanding of the maneuver commander's needs, a field artillery commander issues his target criteria, he sets in motion the only sure way of guaranteeing that the field artillery acquires and attacks the high pay-off targets. Focusing the eyes of the field artillery ultimately results in the combined arms team shaping the battlefield so that the threat simply cannot survive. Imagine!

CPT Glen C. Collins, Jr., FA, received his commission through Officer Candidate School. A graduate of the Field Artillery Officer Advanced Course, he was a reconnaissance and survey officer and battery fire direction officer and executive officer in the 1-36th FA in Germany. He was the senior instructor in the Target Acquisition Department's Employment Branch at Fort Sill and is currently a battery commander in the 2-12th FA.

Alexander Hamilton occupies a gun trench at Yorktown, 1776.

3-inch guns from 1-5th FA crossing Medicine Creek at Fort Sill, circa 1912.

Faithful and True

by Captain John A. Hamilton, Jr.

Many field artillerymen will have the privilege of being affiliated with the senior regiment in the United States Army. Two hundred and seven years after its founding, the Fifth Field Artillery Regiment remains "faithful and true."

The 1st Battalion, 5th Field Artillery, has served almost continuously with the 1st Infantry Division since the division was formed. The new 2d Battalion, 5th Field Artillery, the former 1st Battalion, 7th Field Artillery, serves with the 1st Battalion in the First Infantry Division Artillery at Fort Riley, Kansas. Together, these two battalions provide the CONUS rotational base for the regiment. The 1st Battalion is a 155-mm self-propelled unit in direct support of the Big Red One's 1st Brigade. The 2d Battalion is also a 155-mm self-propelled unit that provides direct support to the division's 2d Brigade. The only other stateside member of the regiment is the 5th Battalion, 5th Field Artillery, a US Army Reserve unit stationed at Fort Tilden, New York. Although the United States Army Reserve and United States Army National Guard participation in the regimental system has not been officially mandated, the 5-5th FA has indicated its desire to participate in regimental activities in any way it can in order to promote the total Army concept. The 4th Battalion, 5th Field Artillery, the former 2d Battalion, 33d Field Artillery, is the 155-mm direct support battalion for the 1st Infantry Division Forward. The 3d Battalion, 5th Field Artillery, is an 8-inch self-propelled unit stationed in Nuremburg, Germany, and assigned to VII Corps Artillery.

The Fifth Field Artillery Regiment's tradition began when the regiment was first formed by then Captain Alexander Hamilton. Hamilton's cannoneers, the Provincial Company of Artillery of the Colony of New York, fired their first shots at two British ships in the harbor of New York. A long list of American Revolution campaigns were to follow: Long Island, Trenton, Princeton, Brandywine, Germantown, Monmouth, Yorktown, New York, and New Jersey. When Hamilton was promoted to lieutenant colonel, the New York Provincial Congress authorized the transfer of the unit into the Second Regiment of Continental Artillery. As part of the Continental Army, these Redlegs took part in the artillery duels at the decisive Battle of Yorktown. Of interest to modern artillery surveyors is the fact that the definitive map of the investment of Yorktown was surveyed by Major Sebastian Bauman of the 2d Continental Artillery.

Hamilton's successor was Captain John Doughty, who led his unit into Manhattan when the British finally evacuated New York. This unit was the first American force to reach Fort George; so Doughty posted the American flag there. Although the British had cut the halyards and greased the flagpole, one of the Continental gunners was able to nail an American flag to the top of the pole. Then the battery fired a salute in the wake of the withdrawing British fleet. Thus, Doughty's artillerymen fired the last shots of the war from the same place they had fired their first shots of the war.

After the war, Doughty's gunners were selected to remain on active duty — the unit's mission was to guard the stores at West Point and Fort Pitt. Its retention on active duty means that today's Regiment can trace an unbroken historical line directly back to the Revolutionary War. The unit remains a part of the Regular Army to this day, and it continues to return to its home state of New York. New York still retains a unit of citizen soldiers from the Fifth Field Artillery Regiment within its boundaries — the modern-day 5-5th FA.

Fighting as part of the 1st Sub-Legion, Legion of the United States, elements of the regiment helped crush the Miami Indians. Earlier at Vincennes, the Miamis had killed all of the officers and two-thirds of the men in the unit. The regimental crest of the Fifth Field Artillery Regiment portrays five arrows which represent the five Indian campaigns in which the regiment participated — one arrow is broken to commemorate the action at Vincennes.

Between the Indian campaigns, the unit fought with General Andrew Jackson during the war of 1812. Prior to the Battle of New Orleans, its guns prevented the British fleet from sailing up the Mississippi River to attack Jackson's forces.

Subsequently designated as part of the Fourth United States Artillery, the unit fought in the Seminole Wars, often as infantrymen. In one engagement, companies of the Fourth Artillery attacked across a river; one company mounted a four-pounder on one of the boats and effectively used this interesting form of naval gunfire.

During the Mexican War, the unit found itself again fighting as infantry; and it captured several field pieces from the enemy and dragged them across Mexico on foot. The "Faithful and True" cannoneers helped scale the walls at Chapultepec and also attacked across the causeways leading into Mexico City.

Both Battery A and Battery D of the present 1-5th FA fought in the Civil War, although under different designations. Battery D fought in the Shenandoah Valley campaign against Stonewall Jackson, while Battery A fought with distinction in the Peninsula Campaign at the battles of Fair Oaks, Mechanicsville, Gains Hill, and Malvern Hill. Battery A helped to ward off the Confederate pursuit of General Porter's forces at the Second Battle of Manassas. Battery A also fired at Antietam and Fredericksburg. Both Battery A and Battery D participated in the Chancellorsville battle, once again covering the retreat of the defeated Union Army. After both batteries were assigned to 12th Corps Artillery, they moved with General Meade's Army to Gettysburg.

Colonel T. N. Dupuy, noted historian and former commander of the 1st Battalion, 5th Field Artillery, wrote of the batteries' participation at Gettysburg:

> *On the afternoon of 3 July, after bitter fighting in the early part of the day, the batteries found themselves in the middle of the thrilling climax of one of the most decisive battles in world history. They took part in the artillery duel which preceded Pickett's famous charge and, with all of the other Union artillery, directed their fire against Pickett's Division. Ripped to shreds by the concentrated artillery fire, the flower of Lee's Army sullenly withdrew down Cemetery Ridge as the tide of the Confederacy receded.*

After the Civil War, Battery D participated in the Powder River expedition which resulted in the defeat of the same Sioux Indians who had wiped out the United States Seventh Cavalry at the Little Big Horn. Returning to Fort Columbus, Governor's Island, New York, Battery D was uniquely honored. The Secretary of War approved a request to allow Battery D to carry a non-regulation, distinctive guidon. On 1 March 1882, Alexander Hamilton III, grandson of the regiment's founder and first captain, presented a guidon on which was inscribed, "For one hundred and six years, faithful and true." This event was the origin of the regimental motto: Faithful and True. Today, Battery D carries a replica of that distinguished flag, while the original guidon hangs proudly in the conference room of the 1-5th FA.

The unit landed at Santiago during the Spanish-American War, although it is not recorded whether or not any of the batteries actually fired there. The Fifth Field Artillery would soon become involved in the subsequent Phillipines Insurrection.

On 31 May 1907, the 5th Field Artillery Regiment was organized. The 1st Battalion was posted to Fort Leavenworth, and the 2d Battalion was posted to the Phillipines. When the 1st Battalion deployed to the Phillipines to relieve the 2d Battalion, an officer of the regiment composed "The Caisson Song." The author, First Lieutenant (later Brigadier General) Edmund Gruber wrote the song to celebrate the 1-5th FA's relief of 2-5th FA. "The Caisson Song" was first used as the regimental march. General Gruber's tombstone retains the original refrain: "For it's hi-hi-hee in the Fifth Artillery . . . ." Later the song was adopted by the entire Field Artillery Community, and now it belongs to the entire Army. (The upshot is that the Fifth Field Artillery Regiment does not use its own march at parades. Normally, when the Regiment parades today, it marches to the introduction of "The Caisson Song" as composed later by John Phillip Sousa. The members of the regiment take consolation in the playing of their regimental march at the end of every Army parade.)

The 5th Field Artillery Regiment left for France as part of the 1st Infantry Division in the summer of 1917. World War I was very much an artilleryman's war, which meant that the demands upon the Fifth Field Artillery were challenging and constant. The first American artillery round of the war was fired from a 155-mm howitzer from Battery C, 1-5th FA, on 25 October 1917. The regiment fought with the division at Cantigny, where the 28th Infantry Regiment would so distinguish itself. After shooting for the 1st Division at Soissons, the regiment remained in action to support the relieving force from the 15th (Scottish) Division. The commanding general of the 15th (Scottish) Division, Major General H. L. Reed, wrote that "the guns of your division [1st Infantry Division] denied themselves relief in order to assist us in an attack; this attack was only partly successful, but the artillery support was entirely so."

The regiment received numerous other citations and commendations for its efforts and especially for its participation in the Saint-Mihiel operation in which the regiment fired a four-hour preparation in support of the force capturing the Saint-Mihiel salient. The 1st Division was relieved by the 42d Infantry Division after the Saint-Mihiel incident, but

the 5th Field Artillery remained to support the fresh division. The regiment returned to the 1st Infantry Division in time to support operations during the Meuse-Argonne campaign. The 5th FA at one time or another supported the 1st, 2d, and 42d United States Infantry Divisions; the 15th (Scottish) Division; and numerous French Army units. The regiment was in action almost continuously from the time it landed until the time of the armistice. The regiment concentrated primarily on counterbattery fire since United States units would often receive 5,000 to 15,000 enemy rounds daily. The 5th Field Artillery Regiment created a niche in history in the "war to end all wars."

Yanks swab out their 155-mm howitzer in France, 1944.

Just prior to World War II, the artillery regiments were broken up into battalions. After the 5th Field Artillery Regiment joined the newly reunited 1st Infantry Division at Fort Benning in 1940, the regiment was broken up and redesignated as the 5th Field Artillery Battalion. When the 2d Battalion of the regiment was deactivated, Battery D transferred to the 5th Field Artillery Battalion. Thus, the 5th Field Artillery Battalion of 1940 was composed of batteries A, B, and D — the same organization of today's 1-5th FA.

The 5th Field Artillery Battalion landed in North Africa with the 1st Infantry Division in 1942. The three firing batteries lost their "Schneider" 155s after being overrun by German armor at Kasserine Pass. In Sicily, equipped with M1 155s, the battalion fired in support of the 26th Infantry Regiment and a force of US Rangers under Colonel Darby to defeat an Axis counterattack on the beaches at Gela. On D-Day, the battalion landed on the Normandy beaches with the rest of the 1st Infantry Division. As the unit moved swiftly to keep pace with the rapidly advancing Big Red One, the preponderance of their fires were general support, counterbattery, and antitank missions. The 5th moved with its division into the north shoulder of the famous "bulge" on 16 December 1944. It crossed the Rhine over the Remagen bridgehead and with the rest of the division was driving east through Czechoslovakia as part of Patton's Third Army when VE day was declared. The last artillery round of the war was fired by Battery B from positions near Hof, Germany.

The 5th Field Artillery Battalion remained in Germany on occupation duty and did not participate in the Korean War — the first American conflict the unit had ever missed. The unit returned to Fort Riley with the rest of the 1st Infantry Division upon the completion of occupation duties and later was redesignated as the 1-5th FA.

When the 1st Infantry Division deployed to Vietnam, the 1-5th FA deployed with it. After arriving in Vietnam as the 1st Brigade's direct support 105-mm battalion, the 1-5th FA fired in support of numerous operations. In Operation Junction City, the battalion was one of the 17 artillery battalions that fired to support the operation.

In 1968, then Lieutenant Colonel Charles C. Rogers was commanding the 1-5th FA. Headquarters Battery and Battery B were located at Fire Support Base Rita, as was Battery C, 8-6th FA (155-mm self-propelled). Lieutenant General David E. Ott later recounted the action:

> *On 1 November 1968 at 0330, the west-northwest perimeter of Fire Support Base Rita was attacked by a North Vietnamese Army force of an estimated 800 men. The attack immediately followed a "mad minute" reconnaissance by fire by the friendly forces. The enemy, initially surprising the friendly forces with the intensity of his attack, penetrated the defensive perimeter and was inside the position of the 155-mm howitzer battery. A counterattack was mounted, and the bunkers were retaken. A second attack and penetration was made at 0515 by the enemy against the southwest perimeter. Again the enemy was beaten back by an aggressive counterattack, and defensive positions were reestablished. When the enemy attempted to regain the initiative by attacking the northern perimeter with a third charge, the 105-mm howitzers were swung to the north; and lethal barrages were fired into the massed assaulting enemy.*

It was impossible to determine the enemy casualties, but losses were estimated to be in excess of 200 dead. Lieutenant Colonel Rogers directed the defense with such heroism that he was awarded the Congressional Medal of Honor. A 155-mm self-propelld howitzer from that action is displayed on the grass behind the Field Artillery School's Snow Hall. The 1-5th FA returned to Fort Riley after the conclusion of the Vietnam conflict.

The 1-5th FA has been entrusted with the maintenance of the regiment's long and distinguished lineage. Although the newly redesignated sister battalions gave up distinguished histories and traditions when their colors were transferred or cased, they can now be a part of the special esprit of the 5th Field Artillery Regiment. Plans are underway to institute a roll of honor of distinguished members of the regiment. The roll will be formed, maintained, and integrated by the battalion commanders; and the 1-5th FA is anxious for its sister battalions to help in the restoration of the large amount of history and tradition in the unit, as well as in the extension of the special élan of Hamilton's cannoneers.

CPT John A. Hamilton, Jr., FA, a member of the 5th Field Artillery Regiment, is now a battery commander in the 8-8th FA in Korea. A recent graduate of the Armor Officer Advanced Course and the Field Artillery Target Acquisition Course, Captain Hamilton served in the 1st Battalion, 5th Field Artillery, as the S4, S1, and Headquarters and Headquarters Battery commander. He received a B.A. in Journalism from Texas Tech University in 1979 and an A.A. from the New Mexico Military Institute in 1977.

Fragments

FROM COMRADES IN ARMS

Looking for a better tent

Twenty soldiers spent a large part of last year's Alaskan winter looking for a better tent — a tent that will have 25 percent less weight, will be just as durable, and will have improved heat retention and blackout capability.

Product improvement testing on 5- and 10-man tents took place at Bolio Lake, the US Army's coldest subpost.

Located at the Army's Cold Regions Test Center in Fort Greely, Alaska, Bolio Lake has temperatures as low as minus 70 degrees Fahrenheit and is billed as "The Home of the Rugged Professional."

On the coldest days, the soldiers readied the tents for transport and moved out from the subpost to begin their routine of erecting and striking the tents. Other days were devoted to the testing of heat retention, snow loading, and water repellency.

During the heat retention testing, a standard Yukon stove heated the tent to a certain temperature or until the temperature stabilized. Thermocouples were then placed in the tent to determine how long the tent remained within a safe temperature.

Testing could not be accomplished in a cold chamber because Army testers were interested not only in the materiel they were testing, but also in how the soldier would interact with that materiel. The harsh weather and terrain of Bolio Lake made it an ideal test site.

Small unit support vehicle

Soldiers at the US Army Cold Regions Test Center, Fort Greely, Alaska, conducted technical feasibility tests last year on the small unit support vehicle (SUSV) in temperatures down to minus 50 degrees Fahrenheit.

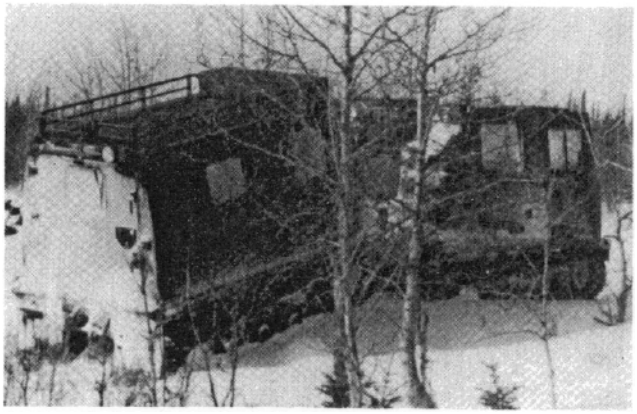
The SUSV is a four-speed, automatic transmission, lightweight tracked vehicle expected to significantly improve the Army's ability to move troops and supplies cross-country, especially in snow. Presently, Army personnel use skis, snowshoes, and sleds to move across snow — methods which are slow and tiring.

The SUSV is not new to the soldiers at the Cold Regions Test Center. The first version of the SUSV, the BV202, was tested at Bolio Lake in 1977 as part of an international materiel evaluation program. That particular model, made by Volvo of Sweden, is standard equipment in the Swedish Army.

The vehicle was originally designed as a troop mover; but the US version, which has no armor protection, is designed only to carry equipment. Troops will ski or be pulled by skis behind the vehicle.

The maintenance evaluator for the SUSV test program said that the vehicle was easy to maneuver, was easy to work on, "swam like a fish," started remarkably well even in low temperatures, and went almost anywhere. The vehicle stops automatically, even on a steep incline, when the driver takes his foot off the throttle.

The Bolio Lake test complex offers all types of terrain which makes it ideal for testing vehicles such as the SUSV. The terrain includes secondary roads, cross-country trails, river crossings, bogs, dense taiga (heavily forested areas), and snow (annual average is 38.5 inches).



A test crew at the Army's Cold Regions Test Center in Alaska takes the small unit support vehicle through a deep snow mobility test near the glacier-fed Delta River. (US Army photo)

Cold weather fuel guide

Soldiers should have an easier time keeping their diesel engines and generators running this winter, thanks to a guide entitled "Field Blending Guide for Improving the Low Temperature Properties of Automotive Diesel Fuels," published by the Army's Mobility Equipment Research and Development Command.

The guide contains information about alternative fuels that can be blended with diesel fuel to improve its low temperature performance. In addition, the guide describes a simple test that can be performed with materials readily available in the field to determine the cloud point of fuel sampled from a vehicle storage tank. (The cloud point is the temperature at which paraffinic hydrocarbons, which are natural ingredients in petroleum fuels, begin to freeze and cause clouding of the fuel. These wax crystals can clog filters and make an engine inoperable.) The test is very simple; one determines the cloud point of a fuel sample and then uses the charts included in the guide to determine how much blending component is needed to lower the cloud point to the desired temperature.

This cold weather guide on fuels is already in circulation throughout the Army. Additional copies of the guide may be obtained by writing to the US Army Mobility Equipment Research and Development Command, ATTN: DRDME-VF, Fort Belvoir, Virginia 22060.

Когти Медведя

by Mr. Edward Foskey

The last 10 years have seen the development of a succession of US battlefield concepts which affected the development of fire support doctrine, weapons, tactics, and organization. But while the US was talking Active Defense, Integrated Battlefield, AirLand Battle, and AirLand Battle 2000, the Soviets were examining their own requirements against historical precedents and technological developments and defining their own doctrinal concepts for future force evolution.

In the 1960s, Soviet strategists set the tone for future developments in an authoritative work entitled *Military Strategy*. It was a call for a totally mechanized force of tanks, infantry fighting vehicles, self-propelled artillery, and helicopters to implement a true combined arms doctrine. This force was expected to operate in conventional, nuclear, and chemical environments. When Marshal N.V. Ogarkov became Chief of the General Staff in 1977, he assessed the progress that had been made in achieving the goals outlined in *Military Strategy*. He found that the military had gone far in acquiring the requisite equipment but concluded that doctrinal and tactical thinking had not kept pace. Ogarkov therefore initiated several actions — those directly impacting on fire support were a reorganization of air and artillery assets to provide more effectiveness in combined arms operations and the implementation of improved and automated methods of troop control. An examination of trends and developments within the Soviet field artillery over the past decade may provide some insight into its current effectiveness. Now, in 1984, it is important for all US field artillerymen to see just how far the Soviets have come in developing a counter to current US concepts and doctrine. Here is the current status of "Kogti Medvedya," the Bear's Claw.

Weapons developments

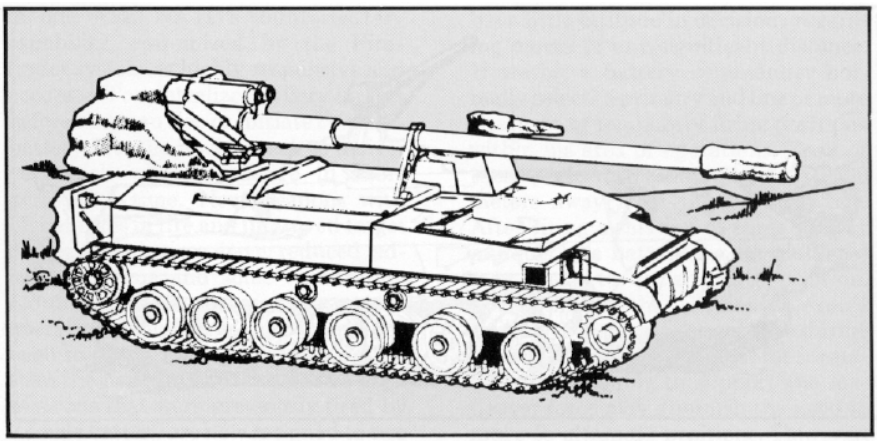
The first Soviet move toward increased fire support capabilities came

in the early 1970s with the introduction of self-propelled howitzers. The 152-mm self-propelled howitzer 2S3, designated M-1973 in the US, has replaced the towed M-1943 D-1 within the division and some of the towed D-20 152-mm gun-howitzers at echelons above division. The 2S3 has a range of 17,300 meters, a rate of fire of five rounds per minute, and an on-board crew of four. Two additional crewmen man the associated ammunition truck. The howitzer features an enclosed turret with a 360-degree traverse, 20 millimeters of armor protection, and an air filtration/overpressure system for NBC protection. Upon cursory physical examination, the design influence of the US M109 self-propelled howitzer is readily evident.

The 122-mm SP howitzer 2S1, US designation M-1974, has been deployed at the maneuver regiment level as a replacement for the D-30 towed 122-mm howitzer. The 2S1 has a range of 15,300 meters, a rate of fire of five to eight rounds per minute, and an onboard crew of four with two additional men with the ammunition carrier. Like the 2S3 it has an enclosed turret, a full 36-degree traverse, an armor thickness of 20 millimeters, and NBC protection. Unlike the 152-mm system, it has an amphibious capability which allows it to travel with attacking formations equipped with amphibious combat vehicles such as the BMP armored infantry combat vehicle.

In the mid-1970s, the Soviets also began a program to supplement their tactical nuclear missile force with nuclear-capable heavy mortars and howitzers. Heavy artillery brigades have been formed from the reserves of the Supreme High Command. Initially, these brigades were equipped with the aged M-1931 203-mm howitzer B-4M and the 240-mm breech-loaded mortar M-240. The B-4M has a crew of 14, a range of 18,025 meters, and an emplacement time in excess of one hour. The M-240 has a crew of eight, a maximum rate of fire of one round per minute, and a range of only 9,700 meters. Ostensibly, these weapons were an interim measure until a new self-propelled 203-mm gun and self-propelled 240-mm mortar could be deployed. Although little definitive information is available on these new systems, both are nuclear-capable and have marked survivability and mobility improvements and presumably equal or greater range capabilities than the towed versions.

Since 1954, at army and front level, the primary Soviet counterbattery weapon was the 130-mm towed field gun M-46 with a 27,490-meter range. Beginning in 1978, however, two new



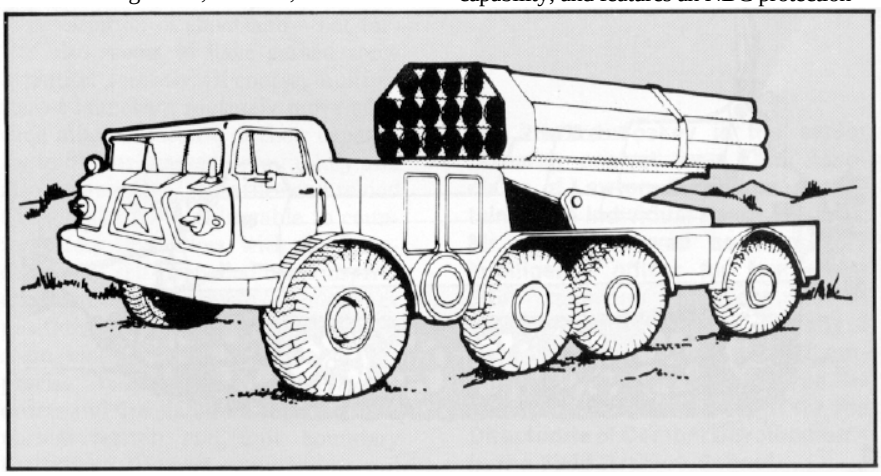
152-mm guns were fielded: the towed M-1976 and the self-propelled M-1981, both deployed with Soviet forces in Eastern Europe. As a replacement for the 130-mm system, these weapons should have a comparable range but greater lethality because of the increase in caliber. Most important, however, is the fact that these 152-mm guns are nuclear-capable and significantly increase the low-yield, tactical nuclear capability of Soviet forces in the forward area.

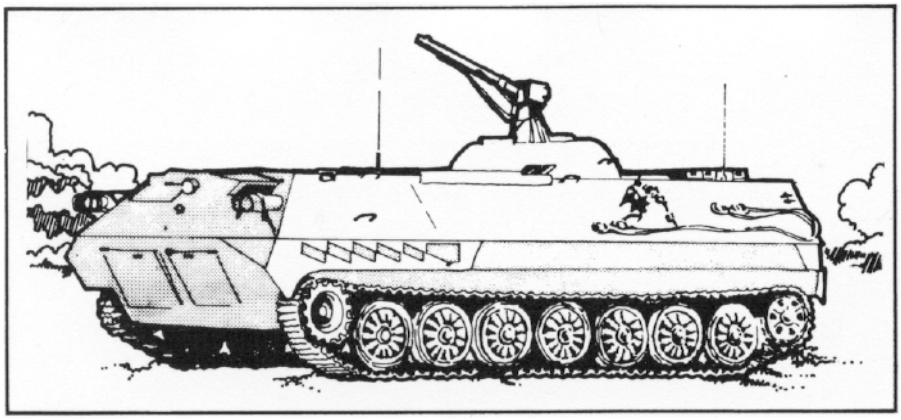
The Soviets were the first modern army to deploy multiple rocket launchers (MRLs) on a wide scale. Beginning with the Katyushas of World War II, the Soviets have continued to field simple, yet effective, area fire weapons. Perhaps the most famous is the ubiquitous BM-21, a 40-round, 122-mm MRL which was introduced in 1964. The BM-21 is found in battalions of 18 weapons subordinate to maneuver divisions. In 1978, a new large caliber (220-mm) multiple rocket launcher, designated the BM-27, was deployed opposite NATO. This rocket system, which is found in MRL brigades subordinate to front level artillery divisions, consists of a 16-tube launcher, arranged in three tiers and mounted on a ZIL 135 eight-by-eight truck. Its munitions mix includes high-explosive, chemical, and possibly mine warheads, with a maximum range of 35,000 to 40,000 meters. Additionally, a new rocket launcher, the M-1976, has been observed in the Soviet open press since 1981. Visibly similar to the BM-21, the new MRL is also assessed to fire 122-mm rockets. It differs from the BM-21 in that it is mounted on a ZIL-131 six-by-six truck rather than the URAL 375, and its launcher consists of only 36 tubes rather than 40. Although its subordination has not been specifically determined, there are indications that it may be deployed as low as maneuver regiment.

Artillery support systems

With the increased mobility of the Soviet combined arms force — artillery weapons in particular — there arose a commensurate requirement to upgrade the mobility and survivability of command, control, and target acquisition assets. To fill this need, the Soviets fielded a variety of new and specialized field artillery support vehicles in the mid-1970s. First in this series was a family of artillery command reconnaissance vehicles (ACRVs) deployed in 1974.

At least three variants of the ACRV have been detected. All use the same basic vehicle, which is 7.1 meters long, 2.9 meters wide, and 2.3 meters high. The basic vehicle weighs 14 metric tons, has an inherent amphibious capability, and features an NBC protection



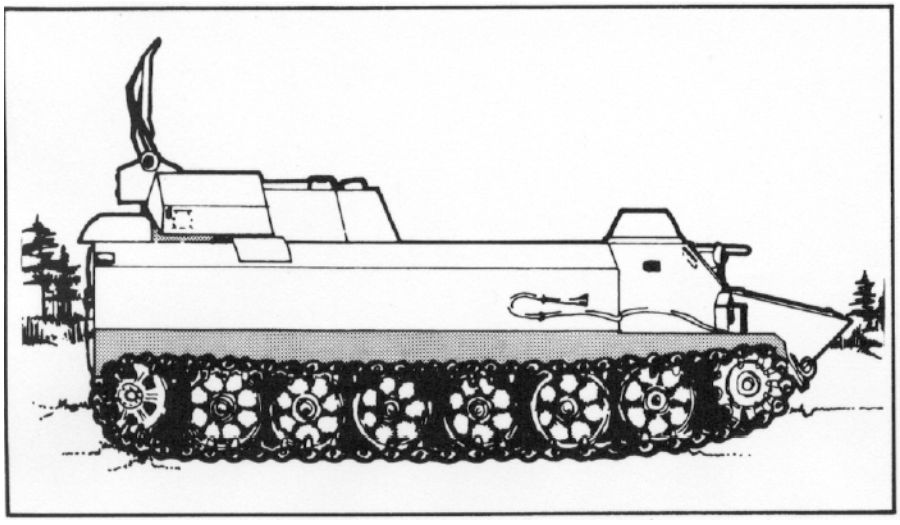


system. Armor protection is light, approximately 15 to 20 millimeters, but should be adequate against most small arms. Some, but not all, ACRV variants mount a 12.7-mm antiaircraft machinegun. Additional equipment depends on the role of the ACRV; for example, it may be used as a command vehicle, a mobile observation post, or a fire direction center. As a minimum, all will probably contain FM radios for communications, a land navigation system, and image intensifiers or other night-vision aids. When employed as a mobile observation post, the ACRV has a crew of five, to include a commander, driver/mechanic, radiotelephone operator, navigator, and rangefinder operator. This version is equipped with day and night observation equipment, rangefinders, fire direction equipment for manual computations, and topographic survey equipment. The topographic equipment consists of a gyroscopic course indicator which automatically determines the vehicle's location and plots its path on a map.

One version of the ACRV is believed to carry the electronic fire control computer being introduced in field artillery battalions. It is unlikely that more than one computer will be available to each battalion, and so fire mission computation and fire control are likely to be centralized at battalion. In all probability, battery fire direction personnel receive technical firing data computed at battalion, pass the data to the guns, and then run a manual check of the data on a routine basis. Two ACRV variants are assigned to the battalion headquarters and two to each firing battery in self-propelled artillery battalions.

In the field of target acquisition, the Soviets have historically used visual reconnaissance, sound and flash ranging, and ground surveillance and countermortar/counterbattery radars. Two new self-propelled, artillery-associated radars appeared concurrently with the fielding of the Soviet self-propelled howitzers:

• The BMP M-1975 is a surveillance vehicle based on the widely deployed BMP, and its modifications include an enlarged two-man turret which mounts a 7.62-mm machinegun in lieu of the normal 73-mm main gun. It incorporates the same amphibious and NBC protective capabilities as the standard BMP and has a maximum armor thickness of 19 millimeters in the hull and 23 millimeters in the turret. A rectangular folding antenna is mounted on the rear of the turret for a ground surveillance radar which has a nominal effective range of 20 kilometers. As a ground surveillance system, the BMP M-1975 should be able to track moving targets and adjust fires downrange. Deployment of this system is one per artillery battalion and one per target acquisition battery within the division's artillery regiment. Deployment at battalion level allows this system to be very responsive to the firing units and the needs of the supported maneuver commander.



• The second new radar is described as the MT-LB mounted artillery-associated radar. The MT-LB is a light multipurpose tracked vehicle which has been widely used as an armored personnel carrier, a command vehicle, a prime mover for certain artillery weapons, and a cargo transport. This particular version has a large turret mounted at the rear of the vehicle. The vehicle weighs 11.5 metric tons and is 6.5 meters long, 2.9 meters wide, and 2.5 meters high. It is fully amphibious and has an NBC protective system, a crew of four to six, and a maximum road speed of 62 kilometers per hour. Armor thickness is only about 10 millimeters, but a self-defense capability is provided by a cupola-mounted 7.62-mm machinegun at the front of the vehicle. The rectangular radar antenna is mounted on the rear of the turret. Several open-source publications attribute a countermortar/counterbattery capability to this system. The assessed operating range of the radar is 20 kilometers, and the current deployment is one per target acquisition battery of the division's artillery regiment.

Both of these new radars enhance the Soviet fire support capability. Their armor and mobility make them viable members of a fast-moving combined arms force, and they offer redundancy and responsiveness through their numbers and deployment at lower levels.

Organizational changes

Although development of modern weapons and support equipment certainly enhances the Soviet fire support capability, Soviet commanders will seek combat power through raw numbers. The Soviets have instituted certain organizational changes to insure the proper integration of the increasing quantity and quality of field artillery systems into the combined arms force.

As noted earlier, increased firepower has been added at the highest echelons with the institution of nuclear-capable heavy artillery brigades. Although not currently thought to be subordinate to fronts or armies, these assets of the Soviet High Command would probably be allocated to a committed front in wartime. Additionally, fronts are normally

supported by an artillery division of several gun and howitzer regiments or brigades. Some of these divisions may be augmented with multiple rocket launcher brigades, presumably equipped with the BM-27.

Army-level artillery regiments are reported to be expanding to brigades, involving an increase of 30 to 80 percent of their previous strength. Given a normal density of 54 weapons in three battalions, these increases would equate to a probable low of 72 and a high of about 96 weapons per brigade.

At division level, a minor reorganization has been undertaken in some units. The BM-21 MRL battalion which has been a separate entity within the division is being integrated into the artillery regiment. For all intents and purposes, this administrative move will have little or no impact on the tactical employment of the system.

The most significant change in artillery force structure has come at the regimental level. In the early 1970s, motorized rifle regiments were supported by an organic battery of 122-mm howitzers while tank regiments had no organic artillery. Beginning in the mid-1970s, the artillery support to motorized rifle regiments was increased to a battalion of 18 122-mm howitzers; only recently, has the tank regiment received an organic battalion of 122-mm howitzers. These additions represent an increase from 12 to 21 howitzer batteries in a motorized rifle division and from 10 to 21 batteries in a tank division over a 10-year period. Deployment of artillery to both types of maneuver regiments enhances their combined arms capability, makes fire support more responsive, and provides direct fire suppression systems at the lowest levels.

Evolving tactical concepts

The Soviets perceive NATO's artillery to be the greatest threat to their own artillery. Given the continued technological advances in weapons and target acquisition on the NATO side, the Soviets' aforementioned technical improvements and organizational changes are obviously oriented on increasing the survivability of their artillery force while making it progressively more lethal and threatening to their adversaries' fire support. Obviously, there had to be certain changes in operational norms if their improvements were to be utilized to full potential.

Much of NATO's artillery force is self-propelled and therefore highly mobile. Also, NATO's counterbattery capability, epitomized by the Firefinder system, is highly responsive and accurate. To neutralize artillery targets before they can flee or initiate counterbattery fire, the Soviets seek to deliver very high volumes of fire in short periods of time. New weapons with higher rates of fire and improved target acquisition devices have reduced adjustment time and some registration requirements; however, the apparent operational solution to the problem has been to designate the battalion, rather than the battery, as the basic fire unit. Missions that were previously fired by a single battery are now assigned to two or three battalions. With the same expenditure of ammunition, a battalion can engage a target in at least one-third of the time required by a battery, thereby increasing the effect of surprise and the likelihood of successfully neutralizing the target. The introduction of automated fire direction equipment will greatly enhance the Soviets' capability to mass fires. The use of the battalion as the basic fire unit will also contribute to survivability because it reduces the amount of time available to NATO target acquisition assets for detection and location of weapons.

In addition, the Soviets are discussing innovations in fire unit deployment such as the use of nonlinear firing positions and increased repositioning as survivability techniques. Deployment of the battery in a straight line simplifies fire direction computations because it reduces the need for individual piece corrections. Although this has been standard Soviet practice for decades, they do use formations such as the inverted V, U, and lazy W to reduce their vulnerability to counterfire and air attack. However, since they still rely largely on manual fire direction techniques, the linear formation continues to be favored for the sake of speed and simplicity. Routine adoption of nonlinear formations will probably await the availability of artillery computers within the battery.

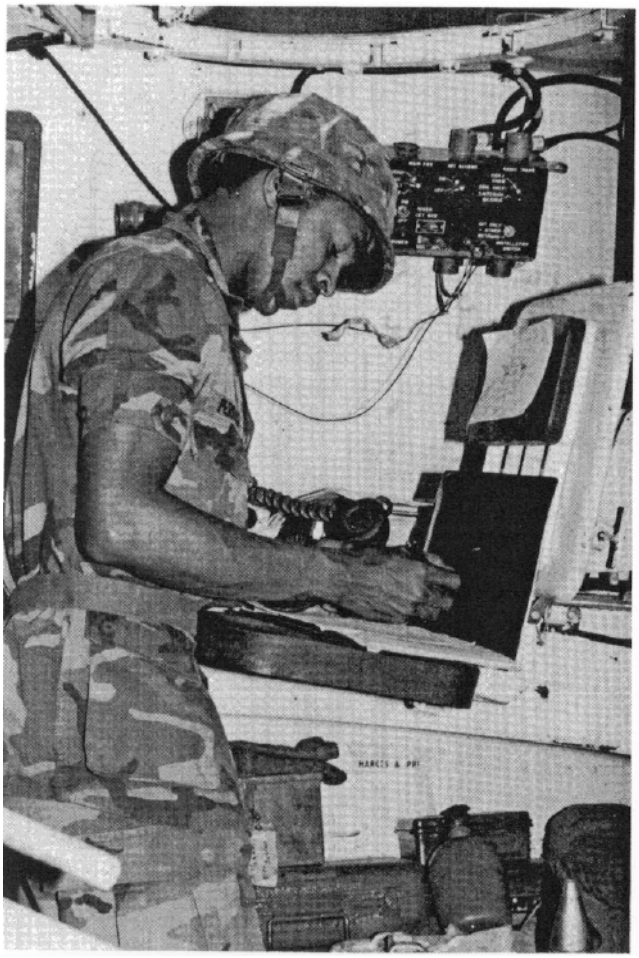
A variation of shoot-and-scoot tactics also seems to have gained some attention recently. Of course, multiple rocket launchers routinely move after each mission because of their capability to deliver massed fires rapidly and also because their signature and reload times make them vulnerable to counterbattery fires. Now, with the introduction of self-propelled cannons, frequent moves to alternate or emergency positions or even within firing positions seem more feasible. Because of the precise nature of Soviet operations orders and fire plans and because of the normal terrain and unit boundary limitations, fire unit commanders will have little latitude in decisions regarding moves of any significant distance. However, a battery commander normally selects a primary and one or more alternate or temporary firing positions within his area of operations. Each of these positions is normally 300 to 400 meters away from the previous one. After firing a mission of three to four minutes, the battery (or its platoons) may move to an alternate position. Given the fact that the Soviets expect to achieve high rates of advance during the offense, the requirement for successive repositioning to support the maneuver force may diminish the need to move to alternate positions. However, this technique would have application during long preparation fires or in a defensive situation. Again, frequent and possibly disjointed movement would complicate the targeting problem and would require automation for the effective computation of the numerous corrections in firing data.

As stated earlier, the Soviets have made great strides in improving their field artillery force. The technological leap to self-propelled, armored weapons and support systems has greatly increased the survivability of the force while enabling it to become a viable and indispensable part of the Soviets' highly mobile combined arms team. Moreover, the increased deployment of nuclear-capable cannon portends a reevaluation on their part of the feasibility of tactical nuclear warfare. Finally, the quantitative increase of artillery assets in support of the ground forces has more than doubled the assets available to commanders of tactical formations. What remains to be seen is the ability of the Soviets to implement changes to the tactics and to support those new tactics with improved and automated command and control. In any event, the US Field Artillery Community needs to view its own development in the context of the threat development which has so profoundly affected it.

Mr. Edward Foskey is the senior research analyst for LB&M Associates of Lawton, Oklahoma. A captain in the Individual Ready Reserve, Mr. Foskey served as a military intelligence officer for four years after receiving his commission through the ROTC at the University of Delaware. Prior to his current employment, he spent five years as the senior civilian threat analyst for the Directorate of Combat Developments in the Field Artillery School.

Right by Piece

NOTES FROM UNITS



Sergeant Kenneth Perkins notes details of a target received from the fire direction center. (Photo by SP4 Cheryl Drews)

Eagles soar on ARTEP

FORT CARSON, CO — The Eagles of the 1st Battalion, 19th Field Artillery, wrapped up last year's Raider Run exercise with an Army Training and Evaluation Program (ARTEP).

The 1-19th sent more than 140 fire missions downrange during the two-and-a-half-day ARTEP, which was a firm test of teamwork between the battalion's forward observers, fire direction center crews, and the gunners of the three firing batteries. The Eagles spent most of the field exercise providing close support to infantry and armor units.

Commissioned and noncommissioned officers from the 1st Battalion, 20th Field Artillery, evaluated the Eagles' ARTEP and found the unit proficient in the test areas. In addition to the live-fire missions, graders examined the unit's preparedness to operate in a nuclear, biological, and chemical environment. The evaluators also selected soldiers at random to respond to questions dealing with first aid, the handling of prisoners of war, and basic soldier skills.

FORT RILEY, KS — Major General Neil Creighton pulls the lanyard on a 3d Battalion, 6th Field Artillery, 8-inch howitzer while overseeing training at Fort Bliss, Texas. (Photo by SP4 Joseph P. Satterthwaite)

FORT RILEY, KS — Private First Class Daren Setner, Battery D (Target Acquistion), 25th Field Artillery, uses a theodolite during training exercises at Fort Chaffee, Arkansas. The battery traveled by convoy to Arkansas for the 14-day exercise. (Photo by Christina Dolan)

Army Reserve members of the 7th Battalion, 9th Field Artillery, put fire on the target. (Photo by LTC Bill Harris)

Round on target!

FORT STEWART, GA — In the muggy July heat of a Fort Stewart, Georgia, artillery training range, Army Reserve members of the 7th Battalion, 9th Field Artillery, headquartered in Pompano Beach, Florida, sprang into action as the forward observer called in grid coordinates of a target miles away. Final safety checks were made, and then came the command "Fire!"

During the 7-9th FA's annual training period, the battalion prioritized critical tasks to train the fire direction center and howitzer sections and to instruct the entire battalion in occupying a position, laying howitzers, firing, and relocating. Battery commanders and senior noncommissioned officers emphasized preventive and organizational maintenance and the need to improve all levels of field communications and enhance NBC proficiency. (SFC Ed Winn, Public Affairs Supervisior, 81st USARCOM)

Echo Battery

BUTZBACH, WEST GERMANY — They call themselves "Echo Battery." Such is the unofficial designation given to the salute battery from the 2d Battalion, 3d Field Artillery, of the 3d Armored Division in Butzbach. None of the members of this provisional unit are typical cannoneers — these 15 "expert artillerists" are from Service Battery and are assigned to the battalion's ammunition, supply, and maintenance platoons. They have formed a precision ceremonial unit which maintains its own 75-mm pack howitzers — the older and smaller brothers, so to speak, of the battalion's M109A2 self-propelled howitzers. The part-time cannoneers work after duty hours in order to maintain the 75-mm pack howitzers, practice crew drills, and fire the weapons at military ceremonies. Echo Battery, which has its own scarlet and gold guidon, consists of three firing sections of four "artillerists" each. (MAJ Rich St. Denis and 1LT Gordon Brooks)

1-22d wins gun run

FEUCHT, GERMANY — Motorists on a quiet road south of Feucht were startled on a Wednesday afternoon by the sight of six teams of soldiers pulling, pushing, and dragging 2.5-ton field artillery pieces up the road. No, their vehicles had not broken down; some of the soldiers had been training for weeks for this event.

The 1st Armored Division Artillery's units were competing against each other and the Panzer 125 Alpha Battery for the right to compete in the second annual Larkhill Howitzer Pull at Larkhill, England.

Larkhill is the home of the Royal British Artillery School, which started the howitzer-pulling contest last year as a charity event. This year the contest has been opened to international competition.

The rules are rather simple: An 18-member team, led by one coach, pulls, drags, and pushes the gun up a 10.8-kilometer course. The teams race for the best time. The winners compete at the Larkhill Pull in England.

The runners must run faster than their gun to maintain control while going downhill. On the slight uphill grades, each team member would be pulling about 300 pounds apiece.

The teams were started on the course at 10-minute intervals for safety considerations and to avoid impeding the normal flow of traffic.

Despite unusually high temperatures and a merciless sun, the 1-22d Field Artillery passed two units on the road to finish in a blistering 62 minutes, 29 seconds.

Many members of the competing units ran along with their teams to urge them on and give them moral support. One unit, 1-94th FA, came out in force to support their team as the entire battalion ran the course behind the team.

The 1-22d FA was the only unit from the US Army to win an entry in the Larkhill Pull.

Although the spirit of competition was intense during the event, the teams gathered around the water tank after the pull to cool off and to congratulate each other for a job well done. (Story and photos by Robert Moffitt)

Finishing a long, hot course, members of a howitzer-pulling team shout in triumph as they cross the finish line.

Weekend warriors

FORT CARSON, CO — Last spring, a welder from a blacksmith shop in Clark, South Dakota, laid aside the tools of his civilian trade (as did bankers, teachers, attorneys, ranchers, retail sales people, and others from towns and cities in South Dakota) and traveled to Fort Carson, Colorado, to participate in an artillery Army Training and Evaluation Program (ARTEP).

These "weekend warriors" of the 2d Battalion, 147th Field Artillery (8-inch), South Dakota National Guard, arrived at Fort Carson on a Sunday, drew equipment and ammunition Monday morning, and then put steel on the target early Monday afternoon.

On the first attempt, the unit met or exceeded 87 percent of the ARTEP missions. They finished with a 100 percent score, counting refires.

Three-time recipients of the Kerwin Trophy as the best National Guard battalion in the nation, the 2-147th FA is headquartered at Webster, South Dakota, and is commanded by Lieutenant Colonel Leon J. Vander Linden, an attorney and part-time rancher. Batteries and detachments are located at Webster, Clark, Watertown, Redfield, Miller, Britton, Sisseton, and Aberdeen, South Dakota.

Site evaluator Lieutenant Colonel Tony Kuykendall said the battalion did well because they planned in detail, set goals which were attainable, and then established objectives supportive of those organizational goals.

Colonel Gary L. Brown, FA, commander of the 4th Infantry Division Artillery and senior evaluator, attributed much of the success to ties of families and

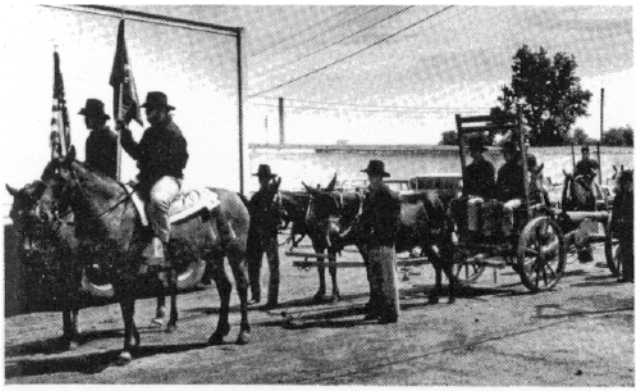
Soldiers from 2-147th FA don masks for chemical exercise.

Soldiers from 2-147th FA prepare howitzer for firing.

friends from small rural communities that have made up the battalion over the years. He said that this friendship among battalion members led to pride, esprit, and high morale, which, when properly developed, led to more effective training, increased willingness to perform duties, and a desire to surpass existing standards. Brown also attributed the battalion's success to a willingness on the part of individuals within the unit to volunteer their personal time to practice tasks of the ARTEP.

"It is a way of life to us in small-town, rural America," said Vander Linden, who has commanded the battalion for three years. "We live the artillery the same way we live our civilian life. We place the same importance on artillery we place on civilian occupations. Americans are born competitors, and we Americans love to be on a team. When we leave high school, there are not many teams left; so the National Guard gives us an opportunity to belong to a new team throughout our working years. Once on the team, other members demand excellence from you, because the 2-147th FA is as fine a team as has ever been put together to shoot artillery." (Story and photos by CPT Les Stadig, Communications Officer, 2-147th FA)

The 2-147th FA fire direction center — facing camera are (top to bottom) Sergeants James Olson, Randy Becking, Lance Johnson, and Jim Lewandowski, all from Webster, South Dakota.



The Half-Section parades for Oregon Trails Day at Gering, Nebraska.

Nebraska Army National Guard Half-Section

SCOTTSBLUFF, NE — The 1st Battalion, 168th Field Artillery, of the Nebraska Army National Guard has its own Half-Section. A volunteer, non-profit group, the Half-Section was created in 1976 to promote the historical heritage of the 168th and to enhance community relations in western Nebraska and surrounding states.

The Napoleon 6-pounder in the Half-Section is an exact replica of the weapon used during various war campaigns by the Nebraska National Guard during the Indian campaigns and the Spanish American War. The cannon has a three-inch bore, weighs 885 pounds, has a maximum effective range of 1,000 yards, has a rate of fire of one round per minute, and uses black powder as propellant with various types of shot. The cannon carriage of the Half-Section is the carriage that was displayed during the Nebraska Centennial in 1976. The limber which carries the ammunition is pulled by two to six horses or mules and is preceded by outriders. The limber was reproduced to the exact dimensions by Chuck Gehl, a volunteer of the Half-Section. The mules are owned by the Half-Section and are driven by Ron Winchell, who also provides the saddle horses that accompany the Half-Section.

The friction primer, which is an exact replica of the one used during the 19th century, ignites the powder charge. The success rate of the primer is about 70 percent; therefore, it is not unusual to have misfires. The crewmembers are trained in misfire procedures; so, if the cannon cannot be fired, they will go through appropriate procedures to disarm the weapon.

The cannon drill requires a minimum of four individuals and a maximum of nine. Duties of the crewmembers are as follows:

• Number 1: Swabs the bore with water; rams powder and charge.

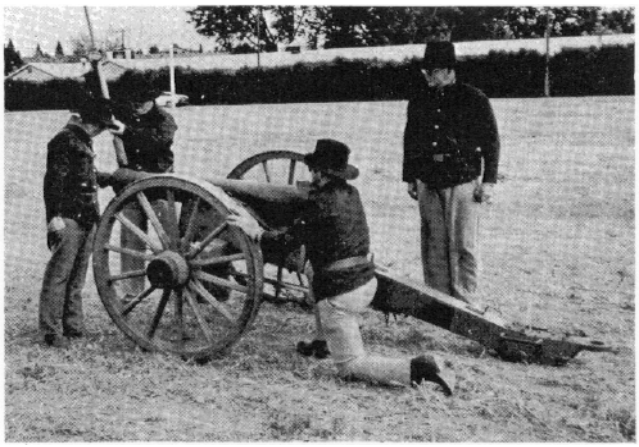
• Number 2: Places powder and charge in the bore.

• Number 3: Prepares primer; pulls lanyard.

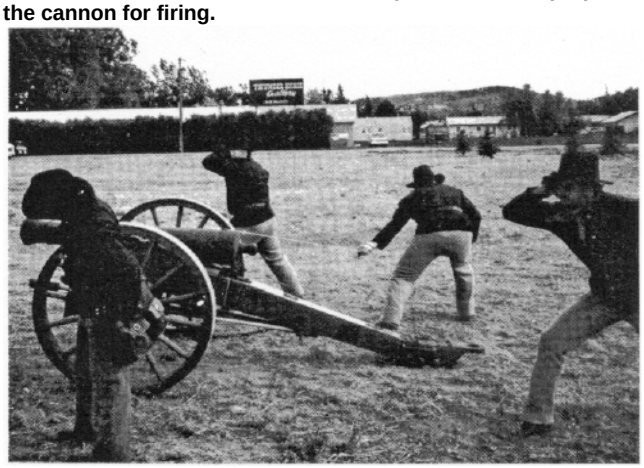
• Number 4: Prepares powder; transfers powder to Number 2 cannoneer.

• Chief of section: Gives all commands; is responsible for correct sight, training of crew, and safety procedures.

During 1982, the 1-168th FA Half-Section traveled approximately 7,000 miles to participate in 13 different events.



The crew of the 1-168th Field Artillery Half-Section prepares the cannon for firing.



The 1-168th Field Artillery Half-Section crew fires the cannon during a ceremony at Cody, Wyoming.

WUERZBURG, GERMANY — The 2d Battalion, 39th Field Artillery, was one of many units taking part in the 3d Infantry Division's "Marne Thunder" gunnery density exercise last summer at the Grafenwoehr Training Area in Germany. A 3d Infantry Division soldier radios a report on the fire engagement of a howitzer belonging to Battery A, 2-39th FA. (Photo by SP4 Gary E. Lindsley)

FORT CAMPBELL, KY — During an intensive nine-day field training exercise which stressed air assault techniques and basic soldiering skills, the "Top Guns" of the 1st Battalion, 321st Field Artillery, practice rapelling from a helicopter, calling in and adjusting fires, and camouflage techniques. (Photos by CPT Jerry Sullivan)

Reserve Component field artillery ARTEP

FORT STEWART, GA — Field artillery's reputation as the greatest killer on the battlefield has been made possible, in part, by a system of decentralized control which allows the rapid massing of one or more battalions on a single target. However, the field artillery's ability to mass quickly and accurately depends on how well those control functions are performed at battalion level. Thus, it is essential that field artillery battalions train the way they will fight. The battalion-level Army Training and Evaluation Program (ARTEP) represents the most effective means for a field artillery commander to assess the training status of each element in his unit.

Because of its close association with many nearby Reserve Component field artillery units (the Georgia National Guard's 48th Brigade is the division's roundout brigade), the 24th Infantry Division (Mechanized) Artillery operations section recently undertook the task of devising an ARTEP scenario with parameters tailored for Reserve Component field artillery battalion use during either annual training or the intensified training period which would be required in case of mobilization. In past years, the operations section had in fact modified the standard ARTEP administered to its own battalions so that it was also most beneficial to the Reserve Component battalions conducting annual training at Fort Stewart. However, the scope of this new project was much broader because this ARTEP package had to conform to specific parameters, to include the limitation of the evaluation to a maximum of 50 hours and the incorporation of all battalion-level delivery of fire tasks, all nuclear-related tasks not encompassed at battalion level, and as much tactical play as possible. Furthermore, ammunition expeditures were limited to 250 rounds; and the manning of the evaluation group was minimized.

Each of these provisions, taken individually, was not difficult to meet. Yet, when viewed in conjunction with the 24th Div Arty's previously used ARTEP design parameters (a duration of 72 to 96 hours, ammunition expenditure of 350 rounds, focus on battalion-level delivery of fires with the integration of additional tasks, evaluation of all nuclear tasks in each battery, and inclusion of all tactical play necessary to have a realistic scenario), the task proved to be more difficult than originally envisioned.

To further complicate the situation, the base for the scenario was ARTEP 6-445 (Field Artillery Battalions, Non-Division), which had just recently been distributed to the field; and so the members of the operation section had to thoroughly review the mission, tasks, and sub-tasks listed to determine which should be included in the scenario and what relationship existed between section-, battery-, and battalion-level tasks. As a result of this analysis and the constraints imposed, the scenario was designed to focus on the two battalion-level missions — field artillery support and

command and control. The field artillery support mission could be adequately evaluated within the stated bonds. Evaluation of the command and control mission, however, would be limited to a defensive situation with the battalion assigned a general support or general support reinforcing tactical mission. The analysis further revealed that most battery-level missions, including those involving certain special teams, could be satisfactorily evaluated. However, there was insufficient time and/or assets to evaluate section tasks other than those in the areas of fire direction, operations, nuclear operations, survey, and communications.

The final scenario, which was of necessity based on the terrain at Fort Stewart, envisioned a 50-hour exercise which encompassed five moves of between 5 and 15 kilometers for firing batteries and at least one move for the headquarters and service elements. A total of 25 fire missions were incorporated, to include all battalion-level missions and those battery-level missions (priority targets, quick smoke, immediate suppression, and so forth) which do not fall under battalion control. The number of fire missions and the amount of moves clearly indicated that this would be a continuous operation. There were no scheduled slack periods; so the evaluated unit would have to adapt its normal routine to the situation just as it would in combat.

The actual play in the scenario focused on those operations necessary to evaluate the unit's capability to survive. An active threat chemical environment caused the unit to spend a considerable portion of time in mission-oriented protective posture (MOPP) 2. Six hours of operations, broken into one- and two-hour blocks, were planned for MOPP4. Opposing forces activity was limited to squad level and was designed primarily to allow defensive perimeters and ambush procedures to be evaluated. Electronic warfare was also included in the form of low level jamming of the command/fire 1 net. The intent here was to expose the unit to an electronic warfare threat without totally disrupting the flow of the ARTEP.

All nuclear operations, with the exception of emergency action procedures, were exercised in each battery. Nuclear tasks were often coupled with conventional tasks already programmed — for example, an emergency destruction mission was included in a blocked ambush of a battery during its movement to a new firing position. The inclusion of the nuclear task with conventional requirements was viewed as a prime goal since a field artillery battalion must be prepared to accomplish both actions simultaneously.

The most difficult obstacle to overcome was to retain all necessary fire missions with an ammunition constraint of 250 rounds. In fact, the initial ammunition requirement totaled 358 rounds; but a judicious reduction of the number of rounds used in fire for effect and the specification of a platoon to fire for effect on selected missions combined to reduce the

(Left to right) Specialist four Larry D. Foreman and Staff Sergeant Arnold L. Sullivan, both of Battery A, 1st Battalion, 230th Field Artillery, 48th Infantry Brigade (Mechanized), and Sergeant Quentin M. Sampson of Battery C, 1st Battalion, 35th Field Artillery, 24th Infantry Division (Mechanized), check the howitzer before live-fire annual training at Fort Stewart, Georgia. (Photo by PFC Wanda Lea Torrey, 24th Inf Div Arty)

requirement to 251 rounds. The designated platoon would not fire until fire for effect was requested, and then all guns in the battery were required to follow the mission; thus, firing battery procedures could be evaluated completely.

The main points of the ARTEP scenario were drawn out in a 125-element master events list which included the ARTEP task evaluation each event would trigger. The overall flow of the ARTEP allowed sufficient opportunities to evaluate all aspects of battalion operations, to include casualty evacuation, personnel assistance center operations, and resupply procedures.

After completing the design of the ARTEP scenario, members of the 24th Division Artillery operations section investigated its cost in terms of personnel and training resources. Two of the biggest factors to overcome were the time limitation (50 hours) and the limited artillery ammunition (251 rounds). Personnel requirements for the evaluation group were quite close to those recommended by the ARTEP; the requirement was reduced by three for a total of 21 evaluators. In addition to the evaluators, 12 personnel were needed for the opposing forces. The organization to control the ARTEP was to be provided by the battalion's higher headquarters, normally a field artillery brigade. The overall cost for the ARTEP, including maintenance and fuel expenses, was approximately $15,000.

The end product represents a comprehensive package which can be used by a field artillery battalion during its annual or post-mobilization training. With a well-developed evaluation methodology, the evaluated battalion can truly profit from the training. Meaningful comments which pinpoint the reasons why a task was not performed to standard will focus the evaluated unit on the state of its training and the areas requiring additional training. (Major Joseph A. Roszkowski, XO, 1-35th FA)

The Lance missile is being transported to White Sands Missile Range for the 1st Battalion (Lance), 12th Field Artillery, annual service practice.

Minuteman Concept

FORT SILL, OK — Anticipating the Central Command's early need for Lance fire support in the suppression of enemy air defense and suppression/counterfire roles, the 1st Battalion, 12th Field Artillery (Lance), 212th Field Artillery Brigade, developed a system for the rapid deployment of firing units and the accompanying mission-essential command, control, and communications assets. Called the Minuteman Concept, this system reduces the number of aircraft required to transport these assets to only 14 C-141 sorties.

As recently as 1980, the approved loadout requirements for a CONUS-based Lance battalion consisted of one C-5 and 55 C-141 sorties. This rather consequential requirement was primarily due to the oversized vehicles peculiar to a Lance battalion. Yet it was quite obvious to Lance field artillerymen that this significant commitment of aircraft might not be available in the event of a real emergency.

The Minuteman load plans insure that the most mission-essential equipment — a resupply capability, a command and control element, two fire direction centers, and three launchers — are carried on the earlier sorties so that Lance fire support can be delivered as quickly as possible. The Minuteman package provides the corps commander with over 67 percent of a Lance battalion's firepower, 47 percent of its personnel, and 35 percent of its vehicles — all with 75 percent fewer aircraft requirements. Also, it takes 12 less hours (from 72 to 60) to go "wheels up," which ultimately means more responsive firepower to the corps commander.

The resupply capability comes from the headquarters and service battery which provides logistical support in the areas of POL, mess, maintenance, and ammunition. (The ammunition section provides only initial supply of missiles at the arrival airfield and limited resupply thereafter.)

The command and control element is a combined fire direction and tactical operations center which contains additional radioteletype communications to link the firing battery and the corps in the event of the loss of the radioteletype capability located with the battery fire direction center.

The firing battery is comprised of three firing teams, a battery headquarters, a fire direction center, a mess section, a maintenance section, a supply section, and four survey sections which conduct operations with either the survey instrument (azimuth, gyro) or by directional traverse. Each firing team has its own limited resupply capability and the ability to mate, transport, and fire Lance missiles and to perform on-call airmobile missions (although only after a rather lengthy conversion operation).

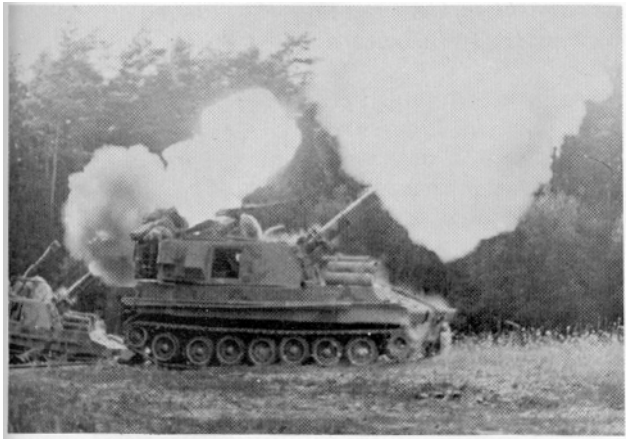
As additional aircraft and surface transportation become available, they carry the additional equipment and personnel to bring the battalion up to full table of organization and equipment strength.

An extensive field testing of the initial Minuteman package (to include battalion- and brigade-level training in emergency deployment readiness exercises) resulted in appropriate refinements in command and control, personnel, and maintenance procedures. The most recent refinements of the concept increased the Minuteman firepower while further reducing the required number of aircraft sorties from 14 to 12. The addition of a launcher, zero length (an airmobile launcher) and ground support equipment and crewmen gave the package a constant airmobile capability. Representatives from the XVIII Airborne Corps evaluated the Minuteman package during one such emergency deployment readiness exercise and found that it was the right deployment concept for a CONUS-based Lance battalion in the rapid deployment force.

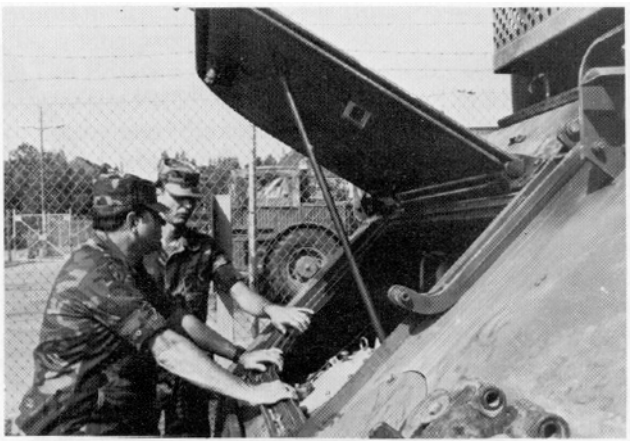
During the 1-12th FA's annual service practice at White Sands Missile Range in April and May 1983, B Battery became the first Lance battery to tactically lift and then fire a live missile. The "First Lance" battalion's officers, noncommissioned officers, and enlisted soldiers continue to meet the challenge of rapid deployment through innovative techniques, as the Minuteman Concept demonstrates so well. (CPT Stephen C. Love)

Bundeswehr interoperability

BUTZBACH, GERMANY — The gunners of 2d Battalion, 3d Field Artillery (155-mm, self-propelled), and Redlegs of 3d Battery, 135 Panzer Artillery (155-mm, self-propelled), joined forces at the Grafenwoehr training area for two weeks of very successful field artillery interoperability training. The partnership training period began with a guidon presentation and designation of 3d Battery as F Battery, 2d Battalion,



Partnership 155-mm nowitzer crews fire charge 8 from Firing Point Ranna, an off-post firing position.



Staff Sergeant Scott supervises maintenance of his fire direction center.

3d Field Artillery. (The 2-135th Panzer artillery holds the D Battery designation, and E Battery is the designation of the battalion salute battery.) Battery F participated for the next two weeks as an integral part of the 2d Battalion and trained as a full member of the unit. Battery and battalion field training exercises tested and reinforced methods of joint operations between a TACFIRE-equipped US direct support battalion and a Bundeswehr artillery battery.

Digital message device transmissions were successfully made on German radio equipment, and TACFIRE fire missions initiated by US soldiers were processed by F Battery using a battery display unit from the 2-3d FA. Firing data differences between TACFIRE and the German computer were negligible and required only conversion of deflection to azimuth. The Bundeswehr RATAC radar quickly registered the batteries of both nations on their own fire nets with an efficient three-round mean-point-of-impact technique. F Battery howitzer crews joined A and C Battery sections in firing charge 8 at extended ranges from Firing Point Ranna, an off-post firing position. This exercise provided valuable calibration data and increased crew confidence and international camaraderie.

The Grafenwoehr MOUT (military operations in urban terrain) site was the scene when the gun platoons participated in a joint leader tactical exercise to practice artillery urban occupation and planning techniques. Maintenance and logistics were also jointly shared, including an F Battery howitzer power pack replacement by US mechanics. The highlight of the training venture was the exchange of US and German artillery ammunition. Each battery successfully fired complete 155-mm rounds belonging to its partnership unit, just as it would do in combat. (Appendix G-1 of FM 6-50 was the guide for allowable training ammunition exchange.)

The joint training success added new meaning to the partnership motto "Zu Gleich," which translates to "all together, at the same time." With the success of joint battalion massed fires, the 2-3d FA Redlegs and their brothers in F Battery now cheer "Zu Gleich" and mean "all together, at the same time, *and at the same place.*"(MAJ Matson L. Gray)

2-78th FA NCO named to Morales Club

BAMBERG, GERMANY — Staff Sergeant Porter C. Scott of A Battery, 2d Battalion, 78th Field Artillery, has been selected to become a member of US Army, Europe's Sergeant Morales Club. The club was conceived to capture the spirit of pure leadership in the noncommissioned officer corps in hopes that all would follow the example set by this outstanding soldier. Sergeant Morales developed himself through education and physical fitness and passed this desire to excel on to his soldiers. He woke his soldiers at reveille and remained with them until after taps at night. He trained his soldiers in the basics; and, once those areas were mastered, he trained them in the areas of their choice. He was given soldiers who others thought were untrainable, and he succeeded where others had failed. The Sergeant Morales Club inducts only those noncommissioned officers possessing the qualities displayed by its namesake — those who go one step farther toward superior performance and high motivation.

Staff Sergeant Scott met all the criteria. His fire direction center section played a very important role in earning the 1-78th FA the highest accolades in its recent ARTEP and in other 1st Armored Division training events.

Correction

The ability of our target acquisition units to acquire a moving target is a fact to which I can now attest. I have been informed at great length that the radar shown on page 32 of the January-February 1984 edition is a Q-37, not a Q-36. So to Battery F, 29th Field Artillery, I send an end of mission, editor destroyed. — Ed.

Goin' Froggin'

by Captain Scott R. Gourley

Since their introduction in the 1950s, tactical battlefield rocket systems have been an integral part of all of the world's major artillery forces. During the last two and a half decades, the Soviet Union has fielded and improved seven versions of one of these rocket systems and has exported some of them to the Third World nations. In the vernacular of NATO, they are all called FROGs — Free Rockets Over Ground. The FROG, which can engage targets in friendly rear areas before US targeters can even determine the FROG's location on tactical operations center map sheets, enables the Soviet division commander to engage targets out to 70 kilometers with his choice of high-explosive, nuclear, or chemical munitions. Too few western military personnel truly understand the FROG threat. Field artillerymen, in particular, need

to know the capabilities of these weapon systems so that they can bring home a sackful when they go frogging.

In the Soviet Army, FROGs belong to the division commander. One FROG battalion, consisting of a headquarters battery and either two or three firing batteries, is organic to both the motorized rifle division and the tank division. The batteries themselves each have two transporter erector launchers, and each transporter erector launcher is accompanied by a support vehicle which carries three additional rockets. Thus, a battalion with three firing batteries would have six FROGs immediately available and 18 additional rockets ready for reloading. The division commander normally uses the FROG battalion to engage critical targets deep in the enemy's rear area. Specific missions include the destruction of the enemy's nuclear delivery means, the neutralization of the enemy's rear assembly areas, and the destruction of rear area supply depots and communications centers.

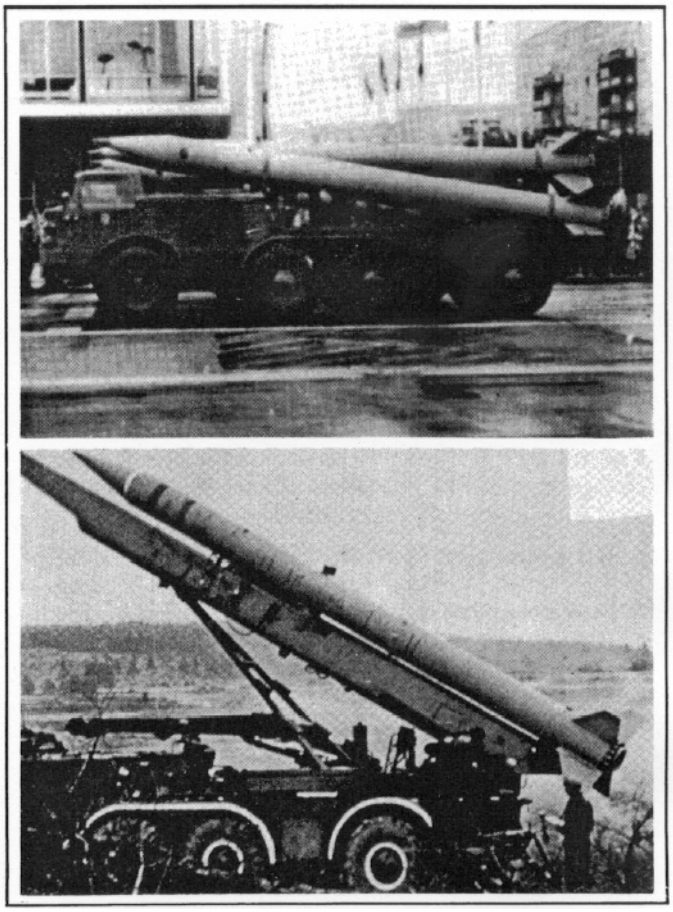
The most recent addition to the FROG family, the FROG-7, has an interesting genealogy; in fact, many of its ancestors are still around. The FROG-1 rocket system first appeared before the public on 7 November 1957 during the October Revolution Parade in Moscow. Carried on a modified JS-3 heavy tank chassis, the FROG-1 seemed to emphasize mobility. Many contemporary observers compared the Soviet system with US systems, to include the Corporal missile and later the Honest John. These comparisons were difficult to make and also proved to be of questionable value. Whereas the FROG-1 was tracked, solid-fueled, and mobile, the closest US systems were either semimobile or required liquid fuel. The two most striking features of the FROG-1 were its large bulbous warhead and a huge housing wrapped around the body of the rocket. The housing served the dual purpose of protecting the rocket and regulating the temperature of the solid propellant. The FROG-1 had no guidance system and was stabilized during flight by spin provided through seven nozzles. The maximum range of the system was placed at between 24 kilometers and 65 kilometers by various sources.

The FROG-2 also made its public debut on 7 November 1957. Mounted on a modified PT-76 tank chassis, the FROG-2 probably possessed excellent mobility characteristics. At 9.4 meters, it was almost a full meter shorter than the FROG-1. In addition, both the diameter of the motor body and the diameter of the warhead were smaller than those of the FROG-1. But, due to its smaller size, its maximum range was only about 28 kilometers.

Both the FROG-3 and FROG-4 first appeared during the 1960 May Day parade in Moscow. The modified PT-76 chassis which carried them had been further altered by the addition of two track support rollers. Both of the rocket systems were new in that they consisted of two stages mounted in tandem. Another big change from earlier models was the further reduction in size of the bulbous warhead. The FROG-3 warhead is only slightly larger than the second stage, while the diameter on the FROG-4 warhead is the same as the second stage casing. Additionally, the FROG-4 is tipped with what resembles a long probe.

The FROG-5 appeared shortly after versions 3 and 4. Like the FROG-4, the warhead on the FROG-5 has about the same diameter as the second stage casing but lacks the nose probe evident on its predecessor. All other features seem similar to those in models 3 and 4. Analysts credit all three systems with a maximum range of 45 to 50 kilometers. In addition, some sources have claimed that FROG-4 and FROG-5 have some form of north-seeking gyro which increases weapon accuracy by making the lay of the weapon more accurate.

The FROG-6 is an inert or dummy rocket which is mounted on a training vehicle. Very little has been reported about this vehicle, but there is some speculation that the training system was required because of the north-seeking gyro. Another possible explanation might be that the training vehicle was designed to assist in exporting the FROG-5 outside the Warsaw Pact.



FROG-7

The FROG-7, the current Soviet model, was first displayed for the public during a Moscow parade on 7 November 1965. The FROG-7 differs from its predecessors in some significant ways. First of all, it is mounted on an eight-wheeled transporter erector launcher ZIL-135 rather than on the earlier modified PT-76 chassis. Secondly, the design of the rocket itself has reverted to the original single-stage design. It is spin-stabilized by 18 nozzles located around the main nozzle of the rocket motor and has a maximum range

of 70 kilometers. Like its predecessors, the FROG-7 is capable of delivering high-explosive, chemical, or nuclear warheads.

In addition to their major Warsaw Pact allies, the Soviets have exported several versions of the FROG system to countries beyond Eastern Europe. In 1958, one year after the FROG's first public appearance, Egypt's President Nasser tried to purchase some of these weapons from the Soviet Union; initially, this request was denied — perhaps because the Soviets were afraid of losing control of the arms race in the Middle East or perhaps because they did not have any conventional warheads for the FROGs at that time. However, after several years the Soviets demonstrated their resolve in the area of arms sales and, sometime between the Six Day War and 1969, sent the Egyptians a limited number of FROG-3 rockets. Although they received no additional shipments of FROG-3s, the Egyptians began to receive some of the newest FROG-7s during 1972.

The Syrians were also clamoring for surface-to-surface missiles. While they did not receive the long-range SCUD rocket system that they wanted (some SCUDs had been provided to Egypt in early 1973), they did receive some shipments of FROG-7s from the Soviets during 1972.

Egypt and Syria were not the only countries outside of the Warsaw Pact to receive FROGs. Various versions of the rocket system were also exported to Iraq, North Korea, and Cuba; and these clients have shown little hesitation about using the FROG systems in combat.

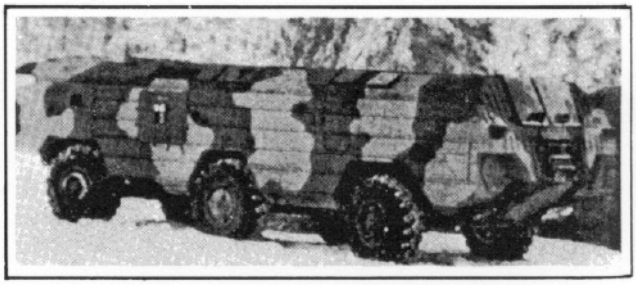
The Syrians used FROG-7 rockets with high-explosive warheads during the October 1973 War against Israel. On 6 October, the Syrians fired the first three FROGs into Israel. They followed this attack with seven more rockets on 8 October and six more FROGs on 9 October. It was the attack of 9 October that prompted the following official Israeli communiqué at 0930 on 9 October 1973:

> *During the past two days, the Syrians fired about 20 rockets of the "Mazdij" type on civilian settlements in the north of the country. The settlements hit were Migdal Ha'imik, west of Nazareth, and Kibbutz Givat.*
>
> *Some rockets also fell in the Kfar Baroukh and Nahlal areas. There were losses among civilians. In Migdal Ha'imik, some houses were damaged, in addition to a children's playground. A school was hit, but there were no children in it at the time.*
>
> *Our correspondent says the rockets are of Russian make. They are fired ground-to-ground and have a range of 70 kilometers. The warhead weighs 500 kilograms.*

The civilian casualties were limited only because the adults and approximately 270 children of Kibbutz Givat were sleeping in underground shelters. But, with their range of 70 kilometers, the FROG-7s could be fired from behind Syrian lines and reach into the center of northern Israel. Predictably, the FROG-7 attacks against civilian targets prompted immediate retaliation by Israeli forces. A communiqué issued later in the day noted that, following the FROG attacks on civilian settlements, Israeli jets had attacked "strategic positions inside Syria."

In addition to their employment in the October 1973 War, FROGs were used in the recent conflict between Iran and Iraq. The Iraqis first used FROG-7s against Iran in early October 1980. In the first attacks, Ayatollah Khomeini reported that rockets killed 180 Iranians and injured 300 more. The second attacks took place on 26 October 1980, when as many as five FROG-7s with high-explosive warheads plowed into the town of Dezful, killing an additional 100 Iranians. The Iraqis followed these attacks with more rocket barrages on 21 November 1980, when they killed a number of civilians in the border town of Gilan; on 27 October 1982, when they killed 107 more Iranians in Dezful; on 20 December 1982, when Dezful was hit again, resulting in the destruction of 120 houses and the deaths of 67; and on 22 October 1983, when hundreds of people were killed at Marivan, Masjid-e Solaiman, and Dezful.

With the FROG-7 in service since 1965, many analysts have been waiting for the replacement system to be fielded. Rather than continuing the FROG family with another relatively unguided rocket system, the Soviets appear to be bringing the FROG series to a close. According to the 1983 US Secretary of Defense publication, *Soviet Military Power,* the FROG-7 is being replaced in the Western Theater by the SS-21 missile system. The SS-21 has a six-wheeled transporter erector launcher which is unlike that of any earlier FROG; and its extended range of 120 kilometers gives the Soviet division commander the added flexibility of improved range for deep strikes. In October 1983, the Soviets delivered a number of SS-21 launchers and missiles to Syria — the first documented deployment outside the Warsaw Pact.



SS-21

While the Soviets may have begun replacing the FROG family in their divisions, the system will certainly remain a potent threat for many years to come. In fact, the introduction of the SS-21 could serve to free additional FROG-7 units for export to the Third World nations. These rockets already have wide distribution, and countries outside of the Warsaw Pact have shown little hesitation about employment. Luckily, their combat use has been limited to high-explosive warheads; but, with their chemical and tactical nuclear weaponry, the FROGs are deadly participants on any future battlefield; and Redleg targeters ought to bag them early in the fighting.

Tactics

Some of the Soviet tactics for unguided rockets and missiles can be ascertained from *The Offensive* by A.A. Sidorenko. Colonel Sidorenko was on the faculty of the Frunze Military Academy when his book was published in 1970, and it was listed as recommended reading throughout the Soviet Army.

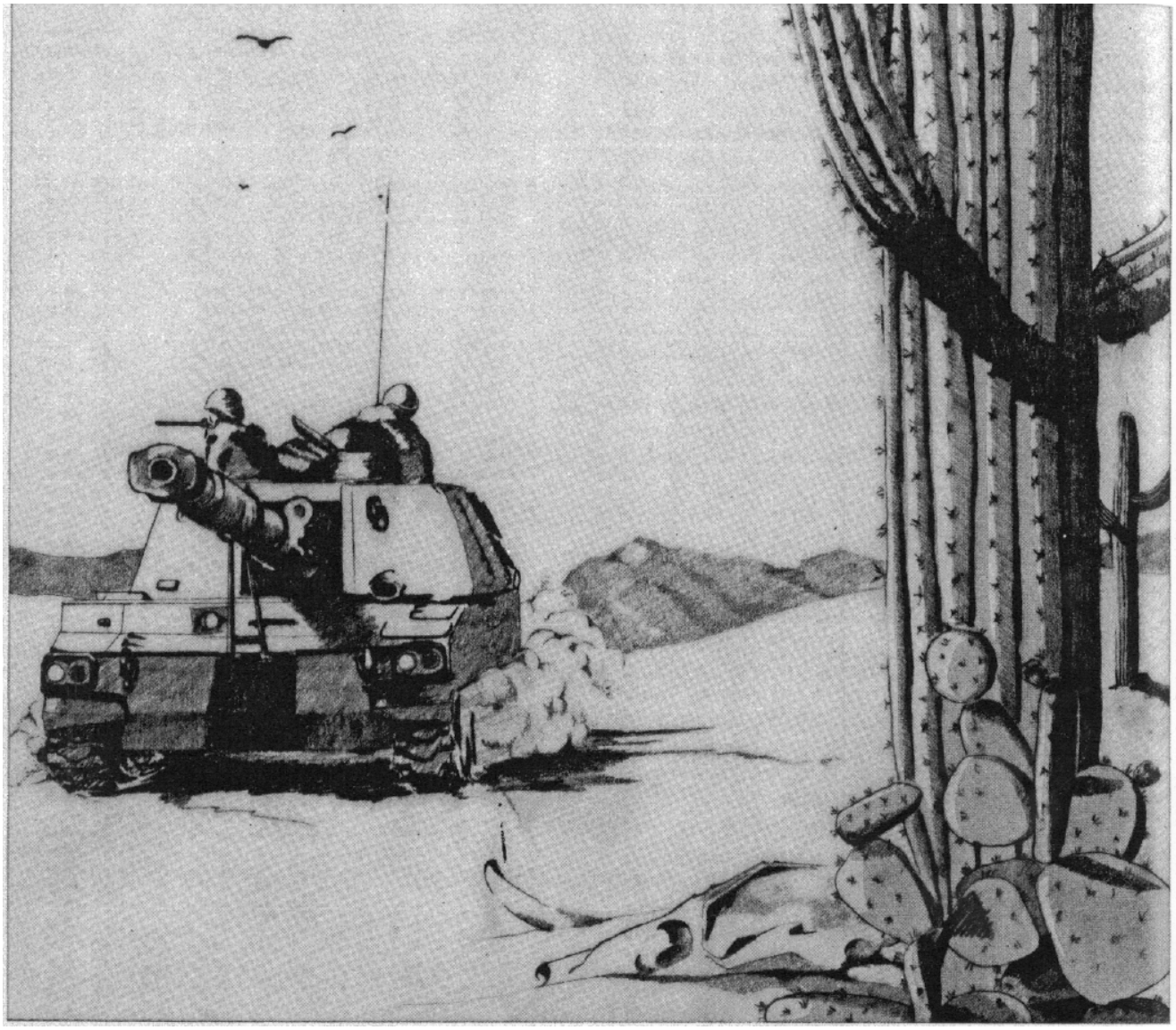
Sidorenko states that simultaneous command and control over both cannon artillery and rocket/missile units are difficult for a number of reasons. First, due to their greater range, missiles are often positioned much farther to the rear than cannon artillery. Secondly, in combat the rocket units move considerably less frequently than do cannon artillery units. Finally, the rocket/missile units have peculiar requirements for fire control, maintenance, and munitions resupply. All of these reasons support the use of rockets as a detached, independent element of the combat formation.

In an effort to neutralize the threat, the US Field Artillery must turn to the resources that it has available. Target acquisition batteries receiving the AN/TPQ-37 Firefinder radar have the capability of locating FROG firing units. Unfortunately, this capability is of limited value since the Q-37 will only assist in finding a rocket unit that has already fired. Fortunately, thanks to Sidorenko's work, we can spot certain vulnerabilities in rocket employment. These vulnerabilities can be exploited, enabling the acquisition of rocket units before they fire.

The two primary vulnerabilities of the FROG system are its visual signature and the fact that it will not move as often as other artillery assets. The FROG transporter erector launcher, the resupply vehicles carrying additional rockets, and the special FROG position security preparations combine to provide the FROG with a unique visual signature on the battlefield. Although the FROG-7 has a maximum range of 70 kilometers, in order to reach deep targets it may be positioned within range of the remotely piloted vehicle (RPV). The RPV section could relay real-time intelligence to the appropriate unit within minutes. In addition, since the rocket units will not move as often as cannon artillery units, they may remain in one location long enough for intelligence fragments from several sources to reach the order of battle officer in the division artillery tactical operations center.

The increased range and improved accuracy of the SS-21 could eliminate some of the vulnerabilities inherent in the employment of earlier FROG systems. The fielding of this new system will require an increased target acquisition effort, to include new ways of locating and neutralizing this destructive threat on any future battlefield.

CPT Scott R. Gourley, FA, USAR, received his commission from the University of California at Los Angeles. He is a graduate of the Field Artillery Officer Advanced Course. He has served in both cannon and missile Field Artillery assignments in USAREUR and is a former threat instructor at the Field Artillery School. He is currently a member of the Individual Ready Reserve.



DESERT DEATH

by Captain Stuart G. McLennan III

Attention all Redlegs who expect a beefed-up ARTEP when they deploy for a training cycle at the National Training Center (NTC) at Fort Irwin, California. Attention all Redlegs who expect something vaguely familiar to the normal training environment found at most Army installations. Now hear this — these Redlegs are all sadly mistaken. What they should expect is death in the desert unless they properly prepare for this most realistic and demanding training challenge.

Training units must first come to grips with the nature of the NTC environment. Training at the NTC is the Army's closest facsimile to war. There are explosions, extensive smoke, a trained opposing force (OPFOR), and terrain (the dimensions of Rhode Island) which complicates reconnaissance, selection, and occupation of position (RSOP); convoys; camouflage; and communications.

The elite OPFOR comes from the 7th Infantry Division — it maintains and maneuvers a motorized rifle regiment with strict adherence to threat doctrine and tactics. There are also evaluators — a staff of officers and NCOs considered to be the most doctrinally proficient people in the Army today. Since the battalion task force is the primary unit trained and evaluated at the NTC, the task force fire support officer (FSO) is the only fire support representative to be fully evaluated and critiqued by a field artillery officer. Infantry and armor personnel evaluate the fire support team (FIST) — company and platoon after-action reviews produced after every operation provide the FISTs their most important feedback. While there were once no evaluators for the field artillery battalion, the

Combined Arms Center at Fort Leavenworth and the Field Artillery School have recommended fielding such evaluators from the training unit's division artillery. If Redlegs are doing something incorrectly, they will quickly know it and will receive doctrinal references for their deficiencies.

With FORSCOM's approval, a maneuver brigade deploying to the NTC could bring these supporting field artillery units: one complete direct support field artillery battalion (TOE 6-365J); one 8-inch battery (TOE 6-397J); one multiple launch rocket system (MLRS) platoon (TOE 6-398J); one division artillery command, control, and communications cell; and appropriate target acquisition assets to support the brigade. The command, control, and communications element provides a self-evaluation capability for the direct support field artillery battalion; and so maneuver brigades are strongly urged to field this cell.

The field artillery battalions which deploy to the NTC do so with their organic equipment. There are two exceptions. Maneuver brigades must draw various "instrumented" vehicles upon arrival at the NTC. "Instrumented" vehicles are vehicles equipped with transponders which relay reports on unit locations and actions to the NTC master computer. For its part, the field artillery battalion draws three "instrumented" M577A2 command post carriers which function as the firing battery fire direction centers. A position and azimuth determining system (PADS) is also available for issue, but the vehicle in which to mount it must be brought from the home station.

Given this environment, how can field artillery units prepare themselves to gain the maximum training benefit from their time at the NTC? Perhaps the best way is to profit from the training cycles already observed and from the many lessons learned. It goes without saying that these same lessons have wide applicability to other field artillery units throughout the world. What follows, then, is a presentation of what the first field artillery units to visit the NTC learned the hard way.

Task force split-TOC operations

FM 71-2 (final draft), *The Tank and Mechanized Infantry Task Force,* dated June 1983, offers this guidance to a task force commander organizing the command group of his tactical operation center (TOC):

> *The command group is that element which the commander has forward with him to help command and control the battle . . . . The command group will generally consist of the commander, air liaison officer (ALO), a representative from [both] the fire support element (FSE) and S3 section, and the crews from their respective vehicles and the TACP [tactical air control party] tracked vehicle . . . . The FSCOORD [fire support coordinator], if forward, should be in a position to coordinate indirect fires; however, with proper planning, he may be of greater assistance to the commander by remaining at the CP [command post] and coordinating the efforts of the fire support teams (FISTs) and the overall fire support mission.*

This guidance highlights the FSO's primary dilemma — when the maneuver commander splits his tactical operations center in order to fight forward, the FSO must likewise split his fire support element. But the fire support element is not currently designed to permit split operations for an extended period of time. The FSO, who normally moves forward with the maneuver commander, usually has insufficient radios with which to control the execution of the task force fire support plan. He is away from his other radio and from his variable format message entry device. Yet he is still expected to monitor the command fire net and the fire direction net and to integrate heavy mortars into the fire plan. Additionally, with the FSO forward in the split configuration, the fire support sergeant has become responsible for the bulk of concurrent fire planning and fire support coordination. But as the fire support sergeant has attempted to run a 24-hour operation, he has encountered the real-world problem of providing a fair share of the TOC security force. (The TOC is a frequent target of the OPFOR unconventional warfare team.)

Obviously, current table of organization and equipment authorizations for the fire support element are inadequate for the mission. Cognizant of that fact, instructors at the Armor and Infantry schools are stressing to maneuver commanders that they do not need to spend all of their time at the forward line of own troops (FLOT) with their staffs, but should go forward only as long as necessary.

Live-fire versus dry-fire training

The tactical scenario used at the NTC places one direct support field artillery battalion in support of one committed maneuver brigade consisting of two notional task forces and one real task force. During Phase I (days 1 through 5) the maneuver brigade (named the 1st Brigade) deploys into the force-on-force area and conducts operations against the OPFOR motorized rifle regiment. At the same time, a notional 2d Brigade is conducting defensive and offensive operations in the live-fire area; and the notional 640th Field Artillery Brigade provides it with direct support fires. (The 640th consists of four battalions of artillery.)

On day 4, the mechanized infantry task force is attached to the notional 2d Brigade and given the mission to move north to the live-fire area; meanwhile the 2d Brigade sends one of its notional task forces south, along with the notional 2-640th FA battalion. The mechanized infantry task force is accompanied by the direct support field artillery battalion, and together they fill the positions vacated by the notional task force and the notional 2-640th FA. During Phase II, days 6 through 10, the maneuver brigade's assets are deployed in a split configuration, conducting separate operations in both the force-on-force and live-fire areas.

On day 8, the armor task force is attached to the 2d Brigade and given the order to move north to the live-fire area. It spends two days preparing for deployment into the live fire area and deploys once the mechanized infantry task force has accomplished its mission. (The mechanized task force is reattached to the 1st Brigade and moves south back into the force-on-force area.) The direct support field artillery battalion remains in the live-fire area and provides support to the armor task force. Phase III, days 11 through 14, is thus another instance in which the maneuver task force brigade conducts operations in a split configuration.

The dilemma for a field artillery battalion commander is one of weighing the support given to the force-on-force and live-fire areas. The training value for the field artillery battalion is at its peak in the live-fire area, for there is where the artillery supports both offensive and defensive missions in a live-fire environment. Each task force, however, has only three operations evaluated in the live-fire area. The force-on-force area, on the other hand, features eight evaluated missions and most of the evaluators' observations on the capabilities of the fire support system. If the field artillery battalion commander takes all of his assets north during Phases II and III, field artillery available in the force-on-force area consists only of a command, control, and communications element and some notional firing batteries. To derive the maximum training benefit from both areas, the field artillery battalion commander must seriously

consider how many firing batteries and support elements he wants to allocate to each phase and each area.

Fire marking

One element of training which falls short of what is desired is the marking of indirect fires on the NTC battlefield. Currently, observer/controller and fire-marker personnel are responsible for marking and assessing the effects of indirect fires, while the NTC's Training Analysis and Feedback computer section collects this data. Due to the limited number of fire markers, the many duties performed by the observers/controllers, and shortages in pyrotechnics, fires which are marked represent only a fraction of the rounds actually fired by indirect fire support assets. At present, field artillery indirect fires are not included in the multiple integrated laser system (MILES) technology. Systems are in development [most notably the simulation of area weapons effects (SAWE)] and, when completed, will interface with the NTC computer and allow the computer to control casualty assessment. In the meantime, fire support personnel should continue to deliver timely and accurate fires in support of the task force — evaluators are more intent than ever on giving a field artillery battalion full credit for a well-conceived and well-executed fire plan that fulfills all doctrinal considerations for the maneuver mission.

TACFIRE

More and more field artillery units are appearing at the NTC with automated command and control equipment such as TACFIRE, the battery computer system, the digital message device, and the variable format message entry device. What these units have discovered is that terrain, distance, and event sequencing combine to require them to bring additional equipment in order to support completely all phases of their brigades' operations.

Here is one example. NTC evaluators, wishing to determine accurate battle damage assessment and mortar effects and realizing that they cannot monitor field artillery digital transmissions, are developing the capability to read these transmissions through the development of new hardware and software which will permit an interface between the battalion fire direction center's TACFIRE and the core instrumentation systems of the NTC. Until these developments are realized, field artillery units must provide a variable format message entry device and its operator to the NTC operations group headquarters. All missions and planned targets are transmitted to this device by the battalion TACFIRE; then this information is manually entered into the NTC computer system. This process is obviously much slower than a fully automated interface; but, if automated command and control equipment operators thoroughly understand all aspects of field artillery tactics and operations and if the unit has trained on a well-conceived standing operating procedure, the system has the capacity to process targets and assess battle damage in close to real time with little manual interface by NTC fire support analysts.

The recent experiences of the 1st Infantry Division Artillery suggest the following equipment as the minimum necessary to support all phases of NTC operations: two TACFIRE sets for the battalion fire direction center/tactical operations center, one variable format message entry device for the brigade fire support element, one variable format message entry device for each battalion fire support element, one digital message device for each FIST headquarters and each forward observer, and one variable format message entry device at the NTC operations group headquarters. The second TACFIRE for the battalion takes into account the terrain and distance separating the northern and southern maneuver corridors in which the FISTs and FSOs operate and the terrain and distance between the maneuver elements and the Training Analysis and Feedback computer.

Target acquisition assets

One of the key ingredients for success at the NTC is the attack of OPFOR units as far forward as possible. The task force S2 and the FSO must be fully aware of the target acquisition assets available to them. Aerial observers and scouts, ground surveillance radars of the maneuver units, and the moving target locating radar (AN/TPS-25A) of the target acquisition battery must be effectively coordinated. They give the task force a powerful target acquisition capability which enables the FSO to execute the task force fire support plan at the maximum distance forward, thereby causing the attrition of the OPFOR before it closes on the task force at the forward line of own troops.

Adjustment of fires

The task force FSO must insure that the scouts and armor platoon leaders and sergeants are well versed on how to call for and adjust field artillery and mortar fires. In the absence of these calls for fire, too heavy a burden is placed on the armor company FIST chief; for he must now provide all of the observation capability for the company as well as all of the fire support coordination.

Heavy mortar assets

The integration of the battalion heavy mortar assets into the execution of the task force fire support plan has been most unsatisfactory. Task force commanders must make a conscious decision on how to integrate these assets and then insure that it is done. The S3, the 4.2-inch mortar platoon leader, and the FSO must coordinate the movement, resupply, and employment of these assets. The Field Artillery School recommends that a mortar representative be collocated in the fire support element to insure proper integration of these critical assets, especially given a split fire support element. It is, of course, the task force commander's prerogative to put the mortar representative in the fire support element; but in any event, the fire support officer must take the lead in heavy mortar coordination and employment.

Close air support

United States Air Force units provide both OPFOR and friendly close air support at the NTC, and the procedures for requesting preplanned close air support are in accordance with doctrine. However, there is no corps-level air support operations center which can receive immediate close air support requests from the task force air liaison officer. The task force air liaison officer can notify the Air Force representative in the Training Analysis and Feedback section, who has the ability to call up aircraft which are standing by on strip alert. FIST personnel do not control the aircraft in the absence of a ground forward air controller; instead, the task force air liaison officer controls most close air support aircraft. Since some of the close air support aircraft do not have an FM radio capability, the air liaison officer and the air forward air controller should act as the interface between the FIST chief and the aircraft. The FIST chief is brought in when the air liaison officer has been "killed". Even when aircraft have an FM radio capability, the FIST chief is not always allowed to bring them in "hot."

Mines/smoke/illumination

Field artillery delivered scatterable mines are now being realistically portrayed in both the live-fire and force-on-force areas. Since these munitions

have proved very effective in the canalization and attrition of OPFOR armored formations, FSOs should anticipate their use and thoroughly understand the mine employment considerations found in appendix H of FM 6-20.

The smoke used in the force-on-force area is provided by smoke generators, and employment considerations should follow tactical operational needs such as obscuration and screening. The smoke employed in the live-fire area must be timely and accurate, and fire support coordinators are best advised to use multiple target engagement techniques.

Forward observers should adjust illumination at dusk to insure a 20-meter high burn-out; if they wait until darkness falls, they may not place the illumination in the right place. If the rounds burn out lower than 20 meters, weapons systems crews of the task force may be blinded by the light. Once the OPFOR has closed to within direct fire range, the burden for illumination should be shifted from the field artillery to the 4.2-inch mortar platoon.

Moving target engagement

Both in the force-on-force and live-fire areas, the OPFOR maintains a movement rate of between 350 and 500 meters per minute. The shortcomings of the NTC's current indirect fire simulations system and the FIST's lack of experience in moving target engagement means that FIST personnel generally have been unable to engage moving targets with any degree of effectiveness. Most fires employed by the FIST are judged to have hit behind the advancing OPFOR units. FIST personnel must generate a fire support plan which incorporates appropriate movement factors. Unfortunately, training facilities which currently exist at Fort Sill (the BT-33 and the Training Set, Fire Observation), although they are excellent simulations, simply do not replicate the smoke, fast pace, and movement factors of both targets and forward observers on the battlefield.

In addition to the above areas of concern, field artillery units have derived these conclusions about NTC training:

• Fire support personnel are not consistently using multiple target engagement techniques. Groups, series, and schedules of fires ought to be in every fire plan to guarantee timely, massed fires.

• The FSO and task force S3 should develop the scheme of maneuver together to insure that there are sufficient fire support assets to support the mission.

• The FSO and FIST chiefs are junior officers and are not very aggressive. The focus for the field artillery system at the NTC is on the fire support coordinator. The FSO receives close scrutiny, and it simply is not advisable to place inexperienced officers in these critical fire support slots. The Field Artillery School teaches that these positions should be filled, even in peacetime, with quality, experienced officers.

• Relying on the command fire net for the bulk of deliberate fire planning is inadvisable. In a nondigital environment, target lists must be generated and submitted rapidly in face-to-face meetings, over FM secure radios, over wire, or by messenger.

• FSOs must insure that coordination has taken place with the engineer representative and the S3 to insure that all obstacles are covered by direct and indirect fires.

• Fire support coordinators should plan final protective fires on all battle positions and perform fire planning continuously during the battle.

• Fire support personnel require additional training in fire planning under desert conditions. The attack of targets that lack distinctive terrain features from which to shift must be addressed in depth.

• Field artillery commanders are not always positioning their combat service support assets after a thorough consideration of the tactical situation.

• Spot reports to the maneuver and field artillery command elements are essential.

While the NTC is not a test of preparedness as much as it is a test bed for training, the maximum benefits from the training cycle for the field artillery battalion can be attained by realizing the limitations of, and constraints on, the facilities located at the NTC. Field artillerymen, by learning the fire support tasks for every type of maneuver mission and by properly positioning fire support personnel so that they can see the battlefield and anticipate fire support requirements, can support the ground-gaining arms and not just "beat the NTC." Training programs re-forged in the heat of the NTC will more than likely produce more confident and more technically and tactically proficient Redleg units.

CPT Stuart G. McLennan III, FA, received his commission through the ROTC program at Texas A&M University. A graduate of the Field Artillery Officer Advanced Course, he served with the 2-6th Field Artillery as a FIST chief, battery fire direction officer, battery executive officer, and battalion fire direction officer. He was most recently an artillery tactics instructor in the Field Artillery School's Tactics and Combined Arms Department, and was one of its primary NTC subject matter experts. He is currently a firing battery commander in the 2-34th Field Artillery.

Command Update

NEW REDLEG COMMANDERS

BG Dennis J. Reimer
III Corps Artillery

COL Roger A. Bernardi
1st Armored Division Artillery

LTC James R. Siket
2d Battalion, 3d Field Artillery

LTC Thomas E. Cameron
3d Battalion, 3d Field Artillery

LTC Garret D. Bourne
3d Battalion, 5th Field Artillery

LTC Edward T. Counts
8th Battalion, 8th Field Artillery

LTC Felix Peterson, Jr.
6th Battalion, 9th Field Artillery

LTC John S. Michitsch
1st Battalion, 15th Field Artillery

LTC H. Stephen Hammond
3d Battalion, 21st Field Artillery

MAJ(P) Dean H. Nichols
1st Battalion, 32d Field Artillery

LTC John T. Lawrence II
1st Battalion, 39th Field Artillery

LTC Jay D. Johnson
1st Cannon Training Battalion
Fort Sill, Oklahoma

LTC Charles J. Williams
8th Training Battalion
2d Basic Training Brigade
Fort Jackson, South Carolina

MAJ(P) Carl A. Schott
294th Artillery Group

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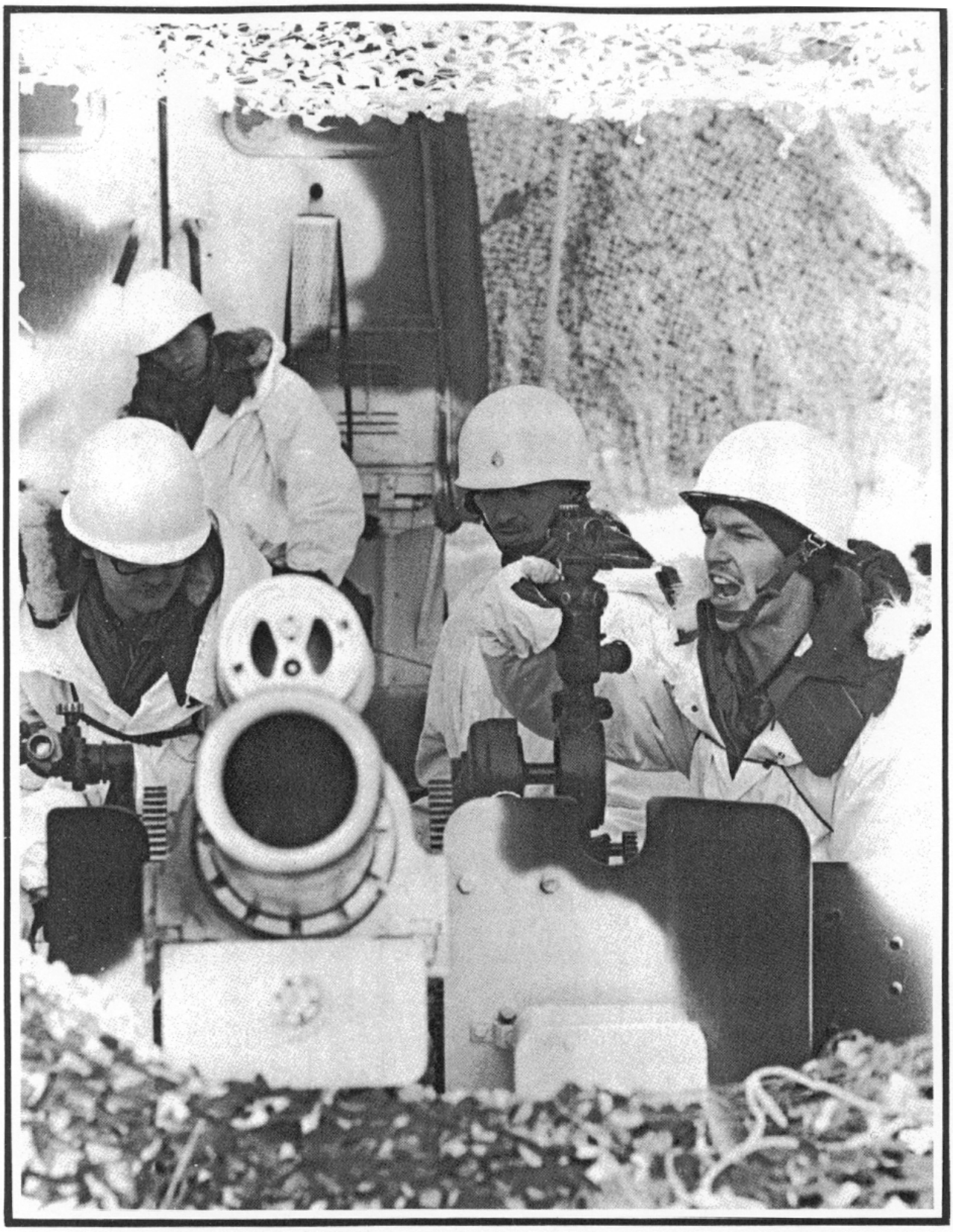

Photo by 1LT Michael Edrington

GET HOT FOR THE MARCH-APRIL ISSUE:
The cold war is warming up.