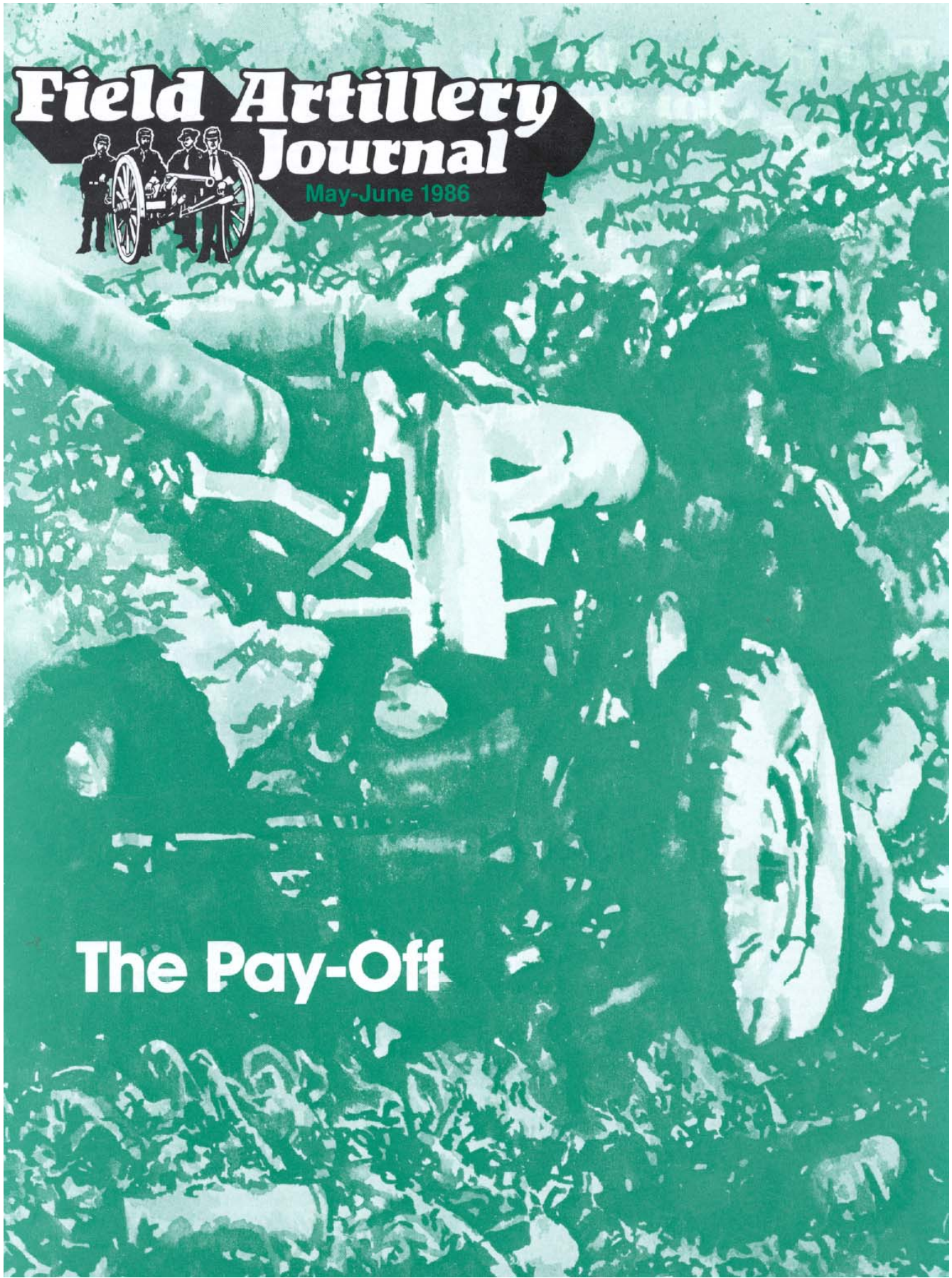


# Field Artillery Journal

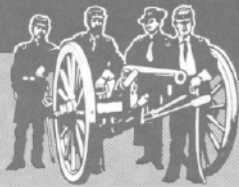
May-June 1986



## The Pay-Off



# Field Artillery Journal



Volume 54

May-June 1986

Number 3

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## Training for the Pay-Off

In 1863, Stonewall Jackson, that great Redleg and combined arms leader, noted that "to move swiftly, strike vigorously, and secure all the fruits of victory is the secret of successful war." Today, these imperatives echo through the pages of the Army's AirLand Battle manuals. In fact, many guiding principles of our doctrine are virtually timeless; but their applications manifest in tactics, techniques, and procedures have changed and will continue to do so over the years. This issue of your *Journal* focuses on contemporary artillery tactics. It looks to recent wars and training exercises to provide insights regarding how today's Redlegs should fight.

But this issue doesn't stop at describing contemporary fire support tasks. It goes on to provide some ideas on *how* to train artillerymen to be more effective tacticians and technicians. In four idea-filled articles, Colonel Creighton W. Abrams, Jr. makes "Some Modest Proposals" on how we can begin a renaissance in fire support training.

This *Journal* clearly reflects the inseparable link that binds training and tactics. It underscores the abiding truth that good training and good tactics *pay off* in victory.

*Major G. Rains*

EDITOR



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### *Today's Redleg commanders must concentrate less about controlling field artillery units and more about synchronizing fire support with maneuver.*

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**V**ince Lombardi once said "Winning isn't everything; it's the *only* thing." Although that assertion may not be valid in all dimensions of human endeavor, it is certainly true in war. That's why every member of the Field Artillery Community should be vitally concerned about the evolution of our tactical doctrine—the fundamental principles that will guide Army leaders concerning fire support. And that's why Redlegs around the world should scrutinize the forthcoming drafts of the four new tactical manuals in the 6-20 series.

The days in which artillery could live comfortably in a parochial world of battalion and battery operations are gone forever. Certainly, our artillery leaders must still oversee efficient and effective cannon, rocket, missile, and target acquisition operations; but their principal responsibility must be *to integrate all fire support assets into the commander's overall scheme of maneuver.*

This shift in emphasis derives from two significant trends in contemporary warfare.

- The proliferation of highly lethal fire support systems even in low intensity combat environments.
- The growing quantitative and qualitative capabilities of the Threat

which place a premium on the orchestrated use of our limited firepower.

To understand the magnitude of the fire support mission, we must take stock of the many "players" on the fire support team—Army aviators; Air Force battlefield air interdiction and close air support pilots and coordinators; naval gunfire organizations; intelligence and offensive electronic warfare units; mortar platoons; and field artillery cannon, rocket, missile, and target acquisition units. The potential combat power that this team can bring to the battlefield is immense. Each player adds new sensors, control systems, and weapons to our arsenal. Working together, this team can be a winner in a game that is deadly for its losers. General Omar Bradley's observation that "in war there is no second prize for the runner-up" remains all too true today.

The sobering responsibility to exploit the team's full potential rests squarely on the shoulders of the field artillery commander and his small network of fire support officers. Their efforts alone can pull together the firepower needed on today's battlefield. Of course, the key to synchronized fire support is planning. But in planning fires, field artillerymen must understand that there is a world of difference between fire support and field artillery support. They must widen their perspectives and give increasing attention to the total fire support arena. The skillful orchestration of the entire arsenal of fires is what counts. Today, this fire support concept is not totally ingrained in our doctrine or training. That's why the Field Artillery School is preparing a series of manuals to replace FM 6-20.

The new series will consist of four manuals:

- FM 6-20, *Fire Support in Combined Arms Operations*—the capstone document.
- FM 6-20-20, *Fire Support Operations at Brigade and Below (Heavy)*—a pocket-sized reference book for fire support officers in mechanized or armor units.
- FM 6-20-30, *Fire Support Operations at Brigade and Below (Light)*—a pocket-sized reference book for fire support officers in light organizations.
- FM 6-20-40, *Corps and Division Fire Support*—a guide for the operation of fire support elements.

The early drafts of these dynamic manuals embody the aggressive tone of the new FM 100-5, *Operations*. They not only underscore our tried and proven tactical precepts but also emphasize the necessity of seizing the initiative, attacking in depth, synchronizing maneuver and firepower, and exploiting our growing battlefield agility. What's more, the authors of the 6-20 series have taken great pains to champion the cooperative spirit that must be the watchword of winning combined arms teams.

According to the venerable Sun Tzu, the leader who knows his enemy and himself will never find his victory endangered, and the commander who also knows the terrain and the weather will always experience total victory. Today's Redlegs must take this aphorism to heart. They must know more than just field artillery; they must survey the entire battlefield, plan, integrate, and execute with unprecedented efficiency and effectiveness. The results will be the enhanced stature of artillerymen as combat leaders and, more importantly, *victory!*

# Incoming

## LETTERS TO THE EDITOR

### Tactics and Things

#### Taking Care of Business

In a 1924 edition of *The Shrapnel*, Major General William J. Snow wrote that "There is no other arm of the service whose efficiency is so directly dependent upon its officers as the field artillery." Recently, as I reflected on the present shortage of battery-grade officers, General Snow's earlier observation sprang to mind. Today's officers remain the keys to success in the field artillery. Our performance on future battlefields will be due in large part to how well our officers conduct their business.

One may ask: "Why is the accomplishment of the field artillery mission so dependent upon its officers?" I submit that it is not because artillery soldiers require more supervision than those of the other branches; nor is it because our mission is more technical or difficult. Rather, officers are more important in the field artillery because a good Redleg must not only apply the technical tools of his trade—gunnery, tactics, targeting, and fire support coordination—but he must also understand the tactics, techniques, capabilities, and limitations of the maneuver force he supports. In order to provide quality fire support, a Redleg needs to "be in the maneuver commander's mind." That is, he must understand the latter's tactical concept and learn to anticipate all fire support needs. The artilleryman must also be familiar with maneuver graphics, tactical formations, maneuver organizations, and the capabilities of direct-fire weapon systems. Simply stated, today's Redleg must be both a field artillery technician and a maneuver tactician.

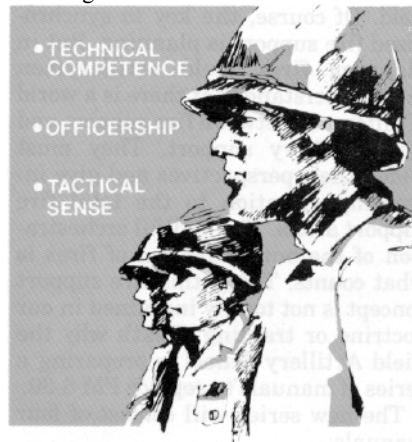
The proficiency required of artillery leaders, coupled with our current shortage of junior officers, underscores the need to take the professional development seriously. It seems to me officer development has three important ingredients—technical competence, officership, and *tactical sense*. Various Army leaders lay the foundation for these three aspects of development before an officer receives a commission, and the framework of the officer's professional edifice rises during institutional training at Fort Sill.

*Technical competence* is our stock in trade. Inaccurate fires do not serve the

supported commander. So, technical development of officers must remain our first priority. Across the board, we do such training well. The building of technical competence begins with institutional training—gunnery, field artillery tactics, and weapon system capabilities—and continues with on-the-job experience in field artillery organizations. Much institutional and unit training focuses on putting rounds "on time, on target." The result is that field artillerymen are notoriously precise.

The second aspect of professional development is *officership*. This is the first area where we need to contribute to our officers' growth at the unit level. Cadets and candidates hear a lot about ethical conduct and the duty concept before their commissioning. We must continue that development by providing experience in the areas of special trust, dedication to mission, and loyalty to subordinates as well as by providing a climate where officership can grow. Senior leaders should keep these points in mind as they plan and execute officer development programs. Good experiences and positive examples are the best teachers of officership.

The third part of the development equation—*tactical sense*—is as important as technical competence and officership, but it is the most difficult to impart. Tactical sense is the understanding of doctrinal principles, the psychology of battle, and the lessons of history with a view toward using these lessons to our advantage.



Tactics deserve study. We spend many institutional and unit training hours learning how to deliver cannon rounds to the point of decision. We will become more effective as field artillerymen only when we learn to anticipate where that point is likely to be. Historical examples and the works of military philosophers describe the context within which soldiers fight. Increased awareness of these philosophical principles and the lessons of history expand the officer's tactical sense. The problem is that these recipes for success are "sugar for some; salt for others." Many of us would rather read Wambaugh or Steinbeck than Sun Tzu and Clausewitz. The challenge faced by the commander is to generate interest in the lessons of history and to expand understanding of their underlying principles. Let me share *one* way.

The officer development program in the 2d Battalion, 78th Field Artillery used to be structured like many others throughout the Army. The unit's officers met monthly and conducted classes on everything from preparation of DA Form 2404, *Equipment Inspection and Maintenance Worksheet*, to professional ethics. These classes certainly contributed to our technical and ethical growth as officers, but we were doing little to expand our tactical sense.

Recognizing that more could be done, we decided to harness the energy of those officers who enjoyed reading history and encourage them to share their knowledge with those of us who remained "unwashed." One especially well-read officer received a simple mission: "Read Erwin Rommel's *Infantry Attacks* and present your reaction at the next officer development class." During the course of his reading, the officer and I had several discussions about his project. He recounted several vignettes from Rommel's World War I experience, but he was particularly taken by one battle in Rumania—a deep penetration of the Rumanian trenches.

It occurred to me that it would be interesting to use the principles of war to judge Rommel's performance in that action. So, I dug out the principles and then set about studying Rommel's planning and execution of



Today's leaders may develop their tactical sense by studying such quality histories as Rommel's *Infantry Attacks*.

the battle against a backdrop of the principles. The mental exercise was worthwhile. In fact, I learned a lot. I ran off copies of the principles and gave them to our officers along with guidance to look them over and be prepared to discuss them at the upcoming officer development class. On the day of the class, we heard the book report on *Infantry Attacks* and the officer's detailed description of the battle in Rumania.

After his presentation, we had an open discussion and critiqued Rommel on his employment of the nine principles of war:

- *Objective*: Direct all efforts toward a clearly defined, decisive, and attainable goal.
- *Offensive*: Seize, retain, and exploit the initiative.
- *Mass*: Concentrate superior combat power at the decisive place and time.
- *Economy of force*: Allocate minimum essential combat power to secondary efforts.
- *Maneuver*: Move and position military forces in a way that furthers the accomplishment of the mission.
- *Unity of Command*: For every objective there should be a unity of effort under one responsible commander.
- *Surprise*: Accomplish your purpose before your enemy can react effectively.
- *Security*: Never permit the enemy to acquire an unexpected advantage.
- *Simplicity*: Prepare clear, uncomplicated plans and issue clear, concise orders to ensure thorough understanding.

The book report clearly established that Rommel had won his battle in Rumania. The bottom line of our discussion was that he had not violated any of the nine principles of war. This fact led to the conclusion that the principles work, and one of the officers in the class quipped, "I wonder how Custer would have scored at the Battle of the Little Big Horn." There was genuine interest in the subject, and I believe the exercise was a positive first step in expanding the *tactical sense* of the 2-78th FA's officer corps. Before we adjourned, another officer volunteered to report on Cornelius Ryan's, *A Bridge Too Far*. At a subsequent meeting we would hear his report and critique Operation Market Garden using the same principles.

Much can be done to foster tactical awareness among military professionals. The approach described above is one way. There are obviously many others. Such efforts should not replace technical and officership subjects during professional development classes, rather they should augment them. That way, we Redlegs can better understand and anticipate the hows and whys of warfare.

Our officer corps is vitally important, and we must compensate for low manning with high quality. The key to success in that endeavor is a coherent officer development program that addresses tactical awareness in addition to technical proficiency and officer-ship training.

Tom Franks  
LTC, FA  
Carlisle Barracks, PA

## Fire Support Matrix

Having a good idea of the nonstop action he could expect during a recent rotation to the National Training Center (NTC) at Fort Irwin, California, First Lieutenant William F. Marchese approached with considerable insight the task of developing a technique to disseminate fire support information quickly and easily. Building on ideas from FM 71-2, *The Tank and Mechanized Infantry Battalion Task Force* (January 1982), and an article written by Major Nicholas G. Psaki III in *Infantry* (January-February 1984), he soon produced a fire support matrix (FSM). After further refinement by the commander of the 1st Battalion, 29th Field Artillery, Lieutenant Colonel Gill H. Ruderman, and the commander of the 1st Battalion, 22d Infantry, Lieutenant Colonel Edwin P. Smith, First Lieutenant Marchese was able to use the matrix to good effect at the NTC.

The fire support matrix describes the fire support responsibilities and allocations given to each fire support team (FIST) and explains when they apply. As shown in figure 1, the matrix lists the maneuver elements along the left side and different phases of the mission (usually designated by phase lines) along the top of the matrix.

	PHASES OF MISSION				
	AA	LD/LC	PL Red	PL Blue	PL Green
Tm B					
Tm C	X				
Tm D					
Tm A		Y			
Scts					
Atk Helo					
TF					

Figure 1. Fire support matrix.

For example, the box labeled X would contain the fire support responsibilities and allocations for the Team (Tm) C FIST while the task force is in the assembly area. The box labeled Y would list the fire support allocations and responsibilities for the Team A FIST during the phase of the mission between the LD/LC and Phase Line Red. Battle positions or other control features can be used instead of phase lines in the defense.

The most frequent entries appear in the example frame shown at figure 2.

**Priority of fires:** If priority of any indirect fire support means is allocated to a team it appears in the *upper-left corner* of the box.

**Allocation of final protective fires (FPF):** If planners have allocated an FPF, the abbreviation FPF preceded by the selected delivery means will appear in the *center* of the box. Additionally, once the maneuver commander assigns a code word for the FPF it will be included in the matrix.

**Allocation of priority targets:** If the team has a priority target, the entry PRI TGT preceded by the responsible fire support means should appear in the *center* of the frame. When a target number is available it is added to complete the entry.

**Responsibility to initiate fires:** If it is the responsibility of a certain FIST to initiate specific fires, the target number, group, or series should appear in the box. If there are any specific guidelines concerning the fires not included on the target list worksheet, they too should be included in the box.

**Airspace coordination areas (ACA):** If an airspace coordination area is to be put in effect by a certain FIST, the individual preparing the matrix should include the acronym ACA followed by the codeword designated for that control measure. Also the time the preplanned close air support (CAS) or attack helicopters are due in the area should appear.

Planners should also include any other factors which might apply to a certain team during a specific time frame in the appropriate box. Note that the matrix contains specific guidance; the operations order is the place for general instructions.

Figure 3 is an example of a fire support matrix for a deliberate attack. In the assembly area (AA), planners

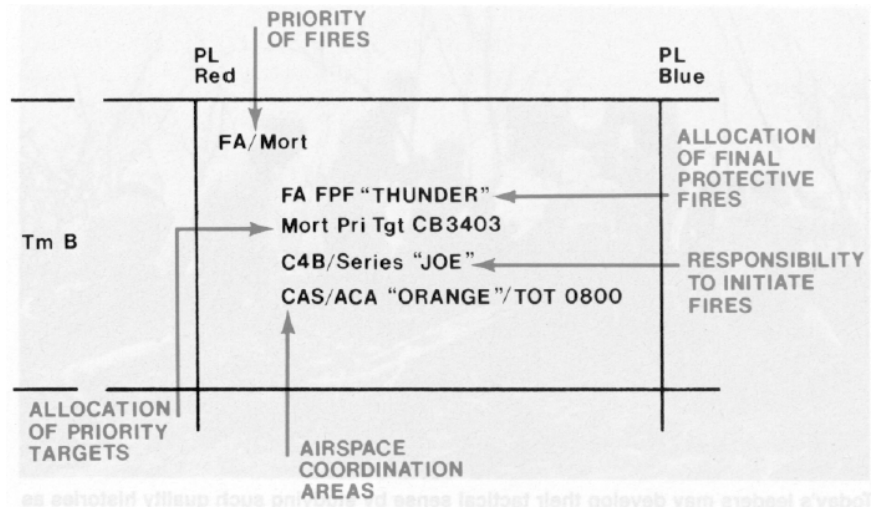


Figure 2. Example fire support team responsibilities and allocations.

	A A	LD/LC	PL Red	PL Blue	PL Green
TmTK	FA FPF "THUNDER"	FA Pri Tgt CB3002	FA Pri Tgt C3B	Mort Series "FINISH"	FA FPF
Tm B	Sec B Mort FA FPF "HOTDOG"	Mort B Mort B Pri Tgt CB3110	Mort B Pri Tgt CB3119	Mort Mort A Pri Tgt CB2125 Mort B Pri Tgt CB3225	Mort B FA FPF
Tm C	Sec A Mort Mort FPF "MOON"	Mort A Mort A Pri Tgt CB3207		FA C6B	
Tm D			Mort A Mort A Pri Tgt CB3216		Mort A Mort FPF
Scts	FA				
Atk Helo				FA / Mort ABC for JATT	
TF Cntrl	FA C4B Series "JOE"	ACA ORANGE TOT 0800	ACA APPLE TOT 0815	FA CB4102(SM) C7B/C8B/C9B ACA GRAPE TOT 0900	C12B C13B

Figure 3. Fire support responsibility matrix.

have allocated field artillery PPFs to Tm Tk and B, while Tm C has received a mortar PPF. Tm B has priority of fires from Section B's mortars, Tm C from Section A's mortars, and the Scouts from the field artillery.

As the units depart the AA towards the LD/LC, priority of field artillery fires shifts to the task force fire support officer, who initiates group C4B and series "JOE" in accordance with the guidance issued by the task force commander. If communications are lost with the FSO, the unit's standing operating procedure dictates that the lead team has the option to initiate these fires. The allocation of priorities of fire from the mortar sections remain the same as in the assembly area. Tm Tk, which is the lead team at this point, has a field artillery priority target—CB3002. Tm B and Tm C have mortar priority targets from their respective sections.

As the task force crosses the LD/LC, Tm Tk assumes priority of field artillery fires and is responsible for firing a priority target. Tm B still maintains priority of Section B's mortars, but the

priority target has changed to support the advance. Tm D receives priority of fires from Section A's mortars. Under task force control is the close air support due in the area at 0800. The task force fire support officer will place ACA "ORANGE" in effect when the aircraft are attacking their target.

The remainder of the matrix merely continues the allocation of available resources and identifies appropriate coordination measures. Although not discussed above, entries regarding the attack helicopters and family of scatterable mines (FASCAM) are also significant. The attack helicopters, which normally support the task force for several, short-duration periods during a battle, have an excellent view of the battlefield. Therefore, whenever they are in the area the air battle captain (ABC) assumes priority of fires from all indirect fire support assets. Because this was an offensive scenario, planners have used FASCAM to cover major avenues of advance into the task force's flanks. The task force leaders reserve the authority to request FASCAM, but specific

FASCAM targets, which apply at certain phases of the movement, do appear on the matrix.

The gunners of the 1st Battalion, 29th Field Artillery Regiment used this matrix in several field training exercises at Fort Carson, Colorado, prior to deployment to the National Training Center. At the NTC it received praise from the field artillery controllers as a workable time saver. They recognized its potential as an easy, concise method of explaining and clarifying the many changing factors of a complicated fire support plan and as a quick reference to enable an individual to assume the responsibilities of a particular fire support team. The matrix is a winner. It can substantially reduce the time required to prepare an operations order and help competent fire support officers do the job that must be done.

Brent B. Bredehoft  
1LT, FA  
Fort Carson, CO



## Mortar Artillerymen

About 4 years ago, our Nevada National Guard howitzer battery received word that we were being reorganized as a combat support company with heavy mortars. We discovered

that the information about mortars available in artillery publications was very limited.

Nevertheless, we learned to use our new weapons and found ourselves dealing with fire support officers who would regularly ask for something beyond

the capabilities of our mortars. This letter attempts to clarify for uninformed artillerymen some of the capabilities and limitations of heavy mortars.

A 4.2-inch (107-mm) mortar's rate of fire in short bursts is impressive—an average crew can fire a five-round fire for effect in 15 seconds. However, the associated probable errors are great, even though the round is spin-stabilized. The battalions to which mortar units are organic have no survey sections, and outside survey support is unlikely in real combat; so platoon leaders usually use map-spot locations. First round hits with the mortar are rare; therefore, their use for a destruction mission is ill-advised.

However, mortar limitations are more than compensated for by rapid response, high rates of fire, and ready availability. The mortar unit has its own communications net and does not have to monitor other nets for fire requests.

The mortar's range is adjusted by changing the charge of plastic sheets in one-eighth increments. The elevation—either 800, 900, or 1,065 mils—remains constant throughout

the mission. The low elevation gives the greatest range, accuracy, and protection from radar detection; but if the mortar is ground-mounted, the base plate becomes unstabilized in certain soils. Because of the charge system, impressive range spreads can be achieved from individual weapons. This capability is especially useful for establishing smoke screens.

Most heavy mortars are track-mounted on the M106 mortar carrier—a version of the M113 armored personnel carrier—and they fire from a revolving turntable inside the vehicle. The mortar easily traverses 800 mils right and left of center of traverse on the turntable or 70 mils without rotating the turntable. For targets requiring larger deflection shifts, the crew repositions the carrier. If the target area is broad, part of the section can be laid in one direction and part in another direction.

Each carrier has an 88-round basic load which consists mostly of high-explosive rounds but which can be adjusted for missions requiring more white phosphorous rounds such as armor formations.

Fire control for mortars is similar to that for field artillery. The tubes may be hastily laid by an M2 compass, but the more accurate procedure is to use the M2 aiming circle. The sights and aiming posts are used in the same way as for artillery. However, mortar crews have no collimators, and it is normally impractical to use a distant aiming point from a mortar's usual defilade position.

Mortar fire direction is similar to manual field artillery procedures. Mortarmen plot their targets using acetate grid sheets scaled 1:12,000 for greater precision during adjustment. They obtain firing data from an instrument called the graphic firing fan which combines the

functions of the range-deflection protractor, graphical firing table, and coordinate scale. The graphic firing fan consists of an aluminum protractor with a range arm that attaches a ballistic scale with plastic cursor and coordinate square in the angle, thus giving the chart operator the ability to announce deflection, charge, and elevation *immediately*. He may also give the range, time of flight, drift, and site factor when asked.

Crews lay their mortars on the azimuth of fire with a factor compensating for the average drift to the intended target area. This azimuth of lay can create problems when an artillery liaison officer attempts to order a direction of fire for the mortars.

Fire direction personnel may also use the M16 plotting board—a 2-foot version of the M10 and M17—in conjunction with the tabular firing table. This method of fire direction is the primary system used for 60-mm and 81-mm mortars and is a secondary or backup system for heavy mortars. Each squad leader should know the methods and should theoretically direct fire for his own tube if detached on a one-gun mission.

Mortars, unlike artillery, are usually placed in line, 50 meters apart. This arrangement gives the fire for effect a linear pattern. The mortar crew may be asked to adjust the sheaf after a registration to line up the rounds or arrange them in a diamond pattern. Mortar units in combat often displace by echelon. Usually two sections go forward while the remaining section continues the mission until the forward mortars are laid and ready to fire. Mortars are best tucked into defilade with two-thirds of their range across the forward line of own troops. The battalion commander directs the placement, but on the modern fluid

battlefield many commanders will wisely delegate subsequent moves to the platoon leaders who must keep well abreast of the tactical situation and maintain current maps and overlays.

The vulnerability of mortars to radar detection makes frequent registration unwise and frequent moves necessary. Therefore, the first target adjusted from a new position should serve as a registration. Shifts from already fired targets will give more accurate first round results than will nonsurveyed grid coordinates.

Before your next field training exercise, learn the capabilities of mortars. Some references are the 7-11C soldier's manuals, the old FMs 23-91, *Mortar Gunnery*, and 23-92, *4.2-inch Mortar*, and SC 7-270, *Tactical Employment of Mortars* published by the US Army Infantry School. The more artillerymen know about mortars, the better our fire support will be.

Leland G. Lay  
SSG, NVARNG  
Dayton, NV

*Your letter is very timely and important. In response, local subject matter experts noted that the Field Artillery School is currently teaching a three-period mortar block of instruction to Field Artillery Officer Basic Course students to prepare them to be fire support team (FIST) chiefs. They also commented that most fire support officers and FIST chiefs will not need the level of expertise suggested in your letter simply because they are users of the mortar system as opposed to operators. By the way, the Infantry School has published a new field manual, FM 7-90, Tactical Employment of Mortars, which provides additional information on the use of mortars.—Ed.*

## The Threat

### The Soviet Navy—Look at them Grow!

Since World War II the Soviet Navy has grown from a coastal defense force to a full-fledged, ocean-going Navy. Today's Soviet Navy is eminently capable of supporting ground forces. In fact, the tactics that it will use in any

future attack on the North Atlantic Treaty Organization (NATO) have been demonstrated in many naval maneuvers.

The Soviet Navy has repeatedly practiced not only the protection of the Warsaw Pact's northern flank from enemy naval and amphibious attacks, but also the power projection skills associated with gunfire support of units

ashore. In time of war, NATO planners can expect amphibious landings of naval infantry, full combat divisions, and SPETZNAZ against the Alliance's northern and southern flanks. Contrary to popular belief, the Soviet Navy's main effort will be in these areas and not in sea lane interdiction.

According to their own sources, the Soviets conducted 114 amphibious operations



during the Great Patriotic War. Nine of these were of major scale; and almost 330,000 naval infantry and ground forces participated. At the end of World War II the naval infantry declined in size and probably totally disbanded in the mid-1950s. But subsequent to 1964, the Soviet's naval infantry reemerged and expanded to its present strength of almost 16,000 men.

The Soviet naval infantry's mission, organization, and equipment differ from those of the US Marine Corps. Soviet naval infantry is incapable of carrying out independent operations. Rather these units seek to conduct specialized operations—seizing beachheads, executing major river crossings, and defending naval bases. There is every likelihood that a naval infantry amphibious force operating as an operational maneuver group will surface early in any future NATO-Warsaw Pact encounter. Also, the Soviet Navy has practiced several landings of full divisions of regular ground forces from the sea.

The Soviet Navy is now the world's largest operator of air cushion vehicles. Larger ships move these vehicles into the area of operations and then put them into the water just before the scheduled run to the beach. Such vehicles give the Soviets a very rapid across-the-beach capability. Furthermore, many Soviet merchant ships have "roll-on, roll-off" capabilities. These vessels can quickly reconfigure from commercial to military setups and would be very important assets during large-scale amphibious operations.

Naval gun fire support of amphibious operations will come from destroyers and cruisers. Today, the Soviets have several cruisers with 12, 6-inch guns (152-mm) each for support of forces ashore. The Baltic and Northern Fleets have a total of 123 major surface combatants, many of which can also deliver naval gunfire to targets on shore. NATO's southern sea flank can expect to receive naval gunfire and missiles from at least 14 surface ships and 7 submarines. Also, the Soviets could employ diesel and nuclear armed submarines armed with short-range ballistic missiles to strike NATO ground forces. At least 6 GOLF II class submarines with missiles capable of achieving ranges of 700 nautical miles are presently assigned



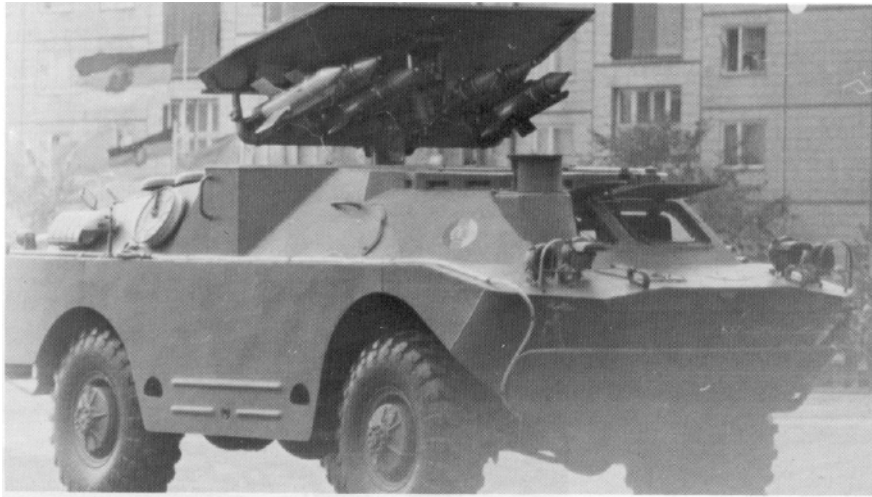
a ground support role. Moreover, the Soviet Navy has added several JULIETT class cruise missile submarines to its ground support fleet.

Currently, the largest ships in the Soviet Navy are the KIEV class aircraft carriers. From their 600-foot flight deck, the Soviet Navy can launch the FORGER aircraft. This vertical and short take off and landing aircraft can conduct tactical air strikes on ground targets. By the mid-1990s the Soviets should have yet another class of aircraft carrier similar to those found in the US Navy. Such

power projection and sea control carriers will add a whole new capability to carry out ground strikes with newer and faster aircraft.

The Soviet Navy is expanding its capabilities for support of ground forces. Such ominous events bode ill for NATO's flanks and should cause Army and artillery planners everywhere to consider the often neglected role of coastal defense during modern warfare.

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DCD, USAFAS  
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## Turning off the SPIGOT?

I have read with interest the articles in recent issues of the *Field Artillery Journal* concerning the development of new systems and the application of new technologies in the field artillery. Field artillerymen have become infatuated with gadgets and high technology. In fact, Redlegs spend the bulk of their time trying to develop better "mousetraps" for the twenty-first century instead of considering how near-term technological advances achieved by our likely opponents impact on the doctrine and training of today. In other words, we're too forward-looking. Occasionally we need to look at what's going on here and now. One particularly good example of this "far-sighted" phenomenon is our doctrinal training for the immediate suppression mission.

The immediate suppression mission resulted from the perceived need to cause the dismounted SAGGER gunner, who is tracking his slow-flying,

vulnerable missile to the target, to flinch or take his eye off the aim point. To most artillerymen—particularly those Redlegs in Europe who look the Threat in the eye—this still makes good sense. But is "Boris Ivanovich" across the wire still armed with the slow SAGGER which is vulnerable to immediate suppression missions? The answer is NO! The Soviets have replaced the SAGGER in most units with the AT-4/SPIGOT, a man-portable antitank guided missile (ATGM). While the United States has continued to develop new munitions and systems, the Soviets have also been active in updating their technology. The SPIGOT uses the same form of guidance—the semiautomatic command-to-line-of-sight—(SACLOS) system—as that employed in the tube-launched, optically tracked, wire-guided and Dragon missiles. Unfortunately, it has a rapid time of flight to maximum range of only 11 seconds. Thus, the SPIGOT gunner is far less susceptible to the

effects of immediate suppression fires than his predecessor armed with the SAGGER. Of course, the SAGGER still exists in the Soviet inventory but only in the protected, mounted configuration—BRDM-2, BMP, and helicopters—where it has been modified with the SACLOS guidance system as the AT-3C/SAGGER.

I am not saying that artillerymen should quit training on immediate suppression missions, but that training should be limited to those units who are faced with a threat that warrants it. There are some units that may face AT-3/SAGGER-equipped units, but other units should be able to train for the missions they will be required to do. Each unit has a need to develop its own tactical mission list and train accordingly.

We have equipment that is capable, a doctrine for the employment of that equipment which will win against Soviet-style forces, and a training methodology which makes it possible to put all of them together. Let's use that training to the best advantage by facing up to the realities of the Threat today rather than focusing on the esoteric mousetraps of the distant future.

George T. Norris  
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*Experts from the Field Artillery School's Directorate of Combat Developments agree. The high speed of the SPIGOT makes it very difficult to detect and limits the effectiveness of standard suppression and distraction countermeasures. The experts do, however, point out that the Israeli tactic of identifying and firing on likely ATCM locations has yielded good results in recent Middle Eastern conflicts.*-Ed.

## In Response

### Another Look at Fire Support

Fire support of the rear battle is a subject that has received little attention until two recent events.

- The publication of FM 90-14, *Rear Battle*, which provides some much needed doctrinal guidance for combat operations in rear areas.

- Lieutenant Colonel Paul Treolo's article "Fire Support for the Rear Battle" (January-February 1986 *Field Artillery Journal*) which provides considerable "food for thought."

We artillerymen must plan for rear battle. We must understand our strengths and weaknesses in this arena as well as those of our likely opponents. What follows are a few additional

ideas I believe worthy of note and discussion by all artillerymen.

Supporting combat in rear areas is really not a new task. It is just one that has received little attention. Artillerymen must be prepared to destroy the enemy wherever the fight takes place. Planners must allocate resources to satisfy all combat requirements in the context of limited

assets, the commander's intent, and priorities of support. Specific solutions will undoubtedly be situation-dependent. Using on-order missions, for example, may be the best alternative. But as the fight develops, dedicating a battalion solely to the rear battle may be necessary to defeat a significant threat.

Conducting the rear battle as outlined in FM 90-14 is also subject to force structure limitations. Today, all rear area operations centers (RAOC) are in the National Guard. Many have full-time personnel who have trained with the elements they will support in wartime. In fact, training and mission performance are not truly problematic—mobilization and deployment times *are*. To conduct rear battle as envisioned by FM 90-14, time must be available for the RAOCs to join their supported units. If this time is not available, RAOCs will have to be formed out of existing assets. This *will* lead to a training and mission performance shortfall.

Another problem is forward air controller (FAC) support. There is no tactical air control party (TACP) available for the RAOC. If this problem persists, controlling Air Force assets in the rear will be difficult. It is imperative that fire support coordinators become familiar with controlling air support. Fully trained forward air controllers will be in short supply and artillerymen may well have to carry the load.

Redlegs must expect attacks behind friendly lines and plan to react accordingly. Commanders must allocate units to fight in the rear based on resource availability and an analysis of allowable risks. We must train to conduct rear operations by including realistic rear battle scenarios in all exercises. Moreover, artillery doctrine must provide guidelines for fire support employment that allows commanders adequate flexibility to react to unforeseen events.

The combined arms team must integrate rear, close, and deep battle plans and operations to employ the forces available in a given situation. Lieutenant Colonel Treolo's suggestions may or may not be the best ones. But no idea should be discarded until better ones surface.

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## Get the Point!

Having been a Lance firing battery commander for 17 months and a custodial warhead detachment commander supporting a German Lance battalion for 12 months, I found Captain Gary Bowman's article "The Point of Lance" (January-February 1986 *Field Artillery Journal*) fascinating.

Although somewhat contradictory at times, the article did perform a much needed service for missileers the world over. It brought to the forefront the relative importance of not only the Lance missile system but also the deep strike potential of rocket and missile systems.

As an instructor at the Field Artillery School, I have always found the reaction of my students amusing when I announce that I have spent 9 years with missiles, and that my only cannon experience was in the Field Artillery Officer Basic and Advanced Courses. "Poor soul, you've been playing with electric darts your entire career," they quip.

Unfortunately, this attitude about missileers is all too prevalent in the field. I do not think that Redlegs can fully appreciate the potential use, the power, and the flexibility of our missile systems unless they have had the good fortune of being assigned to a missile unit.

A fully effective field artillery deep strike capability, as envisioned in the AirLand Battle concept, does not exist today. Only with the fielding of the Army tactical missile system (ATACMS) in the early 1990s will the corps commander be able to carry out deep strikes with organic artillery assets. But it is possible to make limited deep strikes now. Although seriously limited by the employment characteristics and availability of the system, both the nuclear and conventional Lance missiles can give good service.

Herein lies the contradiction in Captain Bowman's article. In the first half of his piece, he paints a favorable picture of the Lance system's ability to perform all of the commander's deep strike requirements. Then, in the second half of the article, he rightly points out the weaknesses of total reliance upon Lance. In the European stockpile, there are just not enough Lance bullets to hit and hit again the enemy's rear formations and installations.

The other major weakness of the Lance system is the number of launchers that exist in the inventory. There are simply not enough replacements in the event of loss by breakdown or hostile action. What's more, the signature of Lance will invariably invite counterfire.

The Lance system is very versatile. It has the capability to convert to an airmobile system and fire missions from forward locations. However, such airmobile operations are difficult at best due to weather conditions, survey problems, and communications difficulties. Nevertheless, such operations are possible. Of course, one must remember that if the Lance launcher is sent 50 to 60 kilometers forward in order to perform a mission it may not be coming back. It presents a very lucrative target, not only as a suspended load beneath a CH-47, but directly following launch near the forward line of own troops (FLOT).

Captain Bowman is absolutely correct in stating that the Lance missile is capable of rendering great assistance to the corps commander in his deep battle effort, but there are limitations. Proper planning by the corps fire support element and the Lance battalion commander can minimize even those constraints.

When all is said and done, Captain Bowman has done a great job. He has demonstrated courage in publishing an article about "electric darts." Although new cannon systems appear likely in the future, there is a general feeling here among missilemen that cannon artillery may ultimately be a thing of the past. As the deep battle assumes greater importance, and new missile systems outdistance cannon artillery, electric darts will become the mainstays of the future King of Battle.

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## A Missing Perspective

I have just finished reviewing Captain Tom Owen's fine article "Finding the Key" (January-February 1986 *Field Artillery Journal*). It is very well done, and I wholeheartedly agree with the views the author expressed. However, I must also point out that there is a significant historical perspective

absent from the article. After all, the battlefield coordination element (BCE) has been in development for several years, and its evolution provides many meaningful insights regarding joint fire support.

The forerunner to the BCE was an Army liaison element (ALE) intended to act as the liaison between the ground and air component commanders. The ALE suffered from serious difficulties including insufficient staffing and mission identity. In fact, the ALE never had a table of organization and equipment (TOE); its manning was erratic; and those individuals assigned had no way to attain any level of expertise except on-the-job training.

The BCE concept drew its life blood from the joint efforts of the Army and Air Force to deal with the threat follow-on forces. To this day, the US Army Training and Doctrine Command Pamphlet 525-45, *Joint Attack of the Second Echelon (JSAK) General Operating Procedures*, remains the definitive source for information on the BCE and its interaction with the air component commander's (ACC) tactical air control center (TACC).

Although originally developed within the JSAK framework, the BCE soon acquired a much broader chapter. For example, the BCE now plays a major role in the joint suppression of enemy air defense (JSEAD). It expresses the land component commander's (LCC) needs for Air Force suppression of enemy air defense (SEAD) efforts and also provides information to the TACC on Army SEAD capabilities. What's more, it channels Air Force requests for Army SEAD support to the proper fire support agencies.

Another area in which the BCE has a major role is the exchange of information and intelligence. Today, there are two sections in the BCE devoted to this task. The intelligence and fusion sections glean any important items of information from the Air Force's intelligence channels and quickly pass them along to the proper Army agencies.

Contrary to Captain Owen's contention that the BCE's primary mission is processing the land component commanders close air support and battlefield air interdiction requests, the *real* job of the BCE is to keep the air component commander informed on the progress of the land campaign and to interpret the land component commander's plan for ground action for

the Air Force. Captain Owen's perspective has led to an apprehension by other branches that the artillery desires to turn the BCE into a high-level fire support element.

Of course, to fulfill their real mission, BCE personnel must be knowledgeable about the application of all lethal and nonlethal fire support means, but they must also be consummate maneuver tacticians.

I believe that many artillerymen are perfectly suited to fill the positions of BCE chief, senior plans officer, and senior operations officer. Captain Owen correctly points out that in the existing BCEs *artillerymen* hold these positions. However, the TOE for the first continental United States based BCE places either armor or infantry officers in these slots. Artillerymen will be posted as assistants in the operations and plans sections.

One should also note that there may be other artillerymen with the BCE. Provisions have been made for subordinate corps to have representatives in the BCE. Therefore, it is quite likely that artillerymen from the corps fire support element or corps artillery will be assigned to the BCE.

It is imperative that artillery officers familiarize themselves with the BCE, its personnel, and duties. Fortunately, there are courses which discuss the BCE, teach its functions, and demonstrate its interaction with the TACC. The most comprehensive of these is the Battle Staff Course at the USAF Air Ground Operations School (TAC), Hurlburt Field, Florida. Officers interested in the BCE and joint operations with the Air Force should try to attend.

The BCE concept may be one of the most significant and exciting ideas around today. The expansion of the BCE's personnel, scope, and duties into other areas of joint operations will make it even more important.

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## Eliminating some Misconceptions

Lieutenant Colonel Paul Treolo's article,

"Fire Support for the Rear Battle" (January-February 1986 *Field Artillery Journal*), provides excellent insights into a major problem facing the Army today—How do we realistically deal with the rear area threat in view of our limited numbers of combat forces and the demands to support the deep and close-in battles? Lieutenant Colonel Treolo's comments help to eliminate two broad misconceptions which now exist concerning fire support for the rear battle.

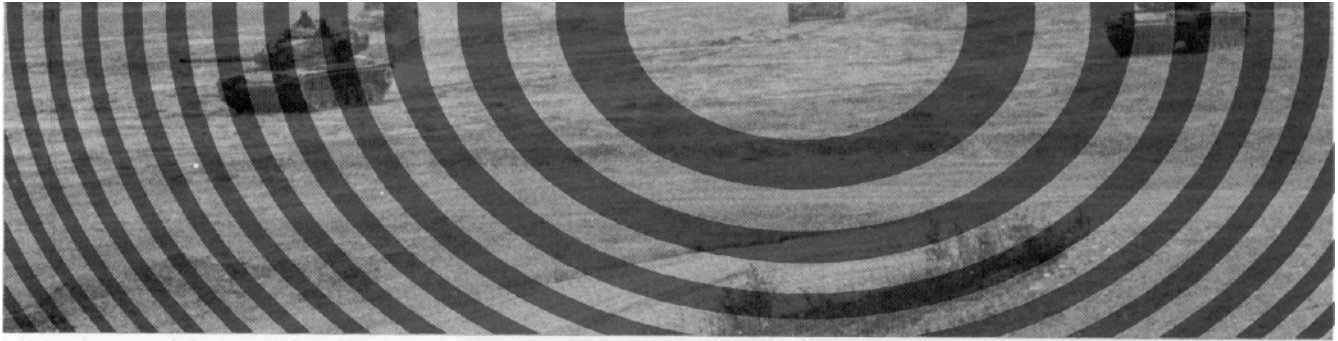
- First, he accurately addresses the fact that fire support for rear area operations requires more than simply traversing tubes 3,200 mils. When we understand the fluid nature of Air-Land Battle, especially its nonlinear characteristics, it becomes obvious that the field artillery may have to turn, move, fire, and turn again as the close battle becomes an "island of conflict."

- Second, he deflates the faulty notion that field artillery positioned in the rear constitutes a fire support reserve. In fact, such units are committed to supporting forces engaged in the rear operation. They are definitely *not* a reserve.

Lieutenant Colonel Treolo's proposal to provide a field artillery battalion in direct support of a designated combat support or combat service support element is an intriguing one, and it deserves further consideration. One possibility may be to position sufficient M198, 155-mm howitzers in Europe to arm two rear area battalions, one for each US corps. In my view, these battalions could be manned by Redlegs from the Army Reserve. In peacetime such weapons could be maintained by a cadre of commissioned and noncommissioned officers who are also reservists, living and working as civilians in Europe. The 155-mm howitzer would be the logical choice for these units because of its obvious range and lethality advantages as well as its commonality with other North Atlantic Treaty Organization 155-mm systems.

Adopting such a scheme would reinforce Lieutenant Colonel Treolo's proposal to help reduce the problem of fire support for the rear battle. It would help make the field artillery the key player it needs to be in rear area combat operations.

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# DEEP ATTACK— *We Can Do It Now!*

by Major Steven G. Starner

Given the appropriate tactical situation, an armored division using AirLand Battle doctrine can execute *mobile armored warfare*. Such operations are characterized by offensive action in which commanders seize and retain the initiative, strike quickly and violently with synchronized battlefield systems, and extend the fight over the entire depth of the battlefield.

The key to executing mobile armored warfare is the division attack force (DAF). This brigade-sized organization gives the division commander the means to strike when and where he detects an enemy vulnerability or an inviting opportunity. It allows division commanders to project appropriate combat power through the enemy's defenses and to penetrate deep behind the enemy's front lines. The ultimate objective of the DAF is to destroy the enemy's critical command and support functions. If properly employed, the force can shock the enemy to a degree far out of proportion to the amount of power projected. Thus, the tactical and operational gains to be achieved may outweigh the calculated risks involved.

Obviously, as the maneuver battle goes deeper, the successful application of fires becomes progressively more difficult. Nevertheless, the field artillery must be able to destroy, neutralize, suppress, and canalize the enemy in depth while

keeping up with a fast moving division attack force. Without the artillery the DAF's momentum will falter.

Field artillery units supporting the division attack force must accomplish five key tasks.

- Close support.
- Counterfire.
- Identification of high payoff targets.
- Destruction of soft targets uncovered and bypassed by maneuver units.
- Joint air attack team (JAAT) operations.

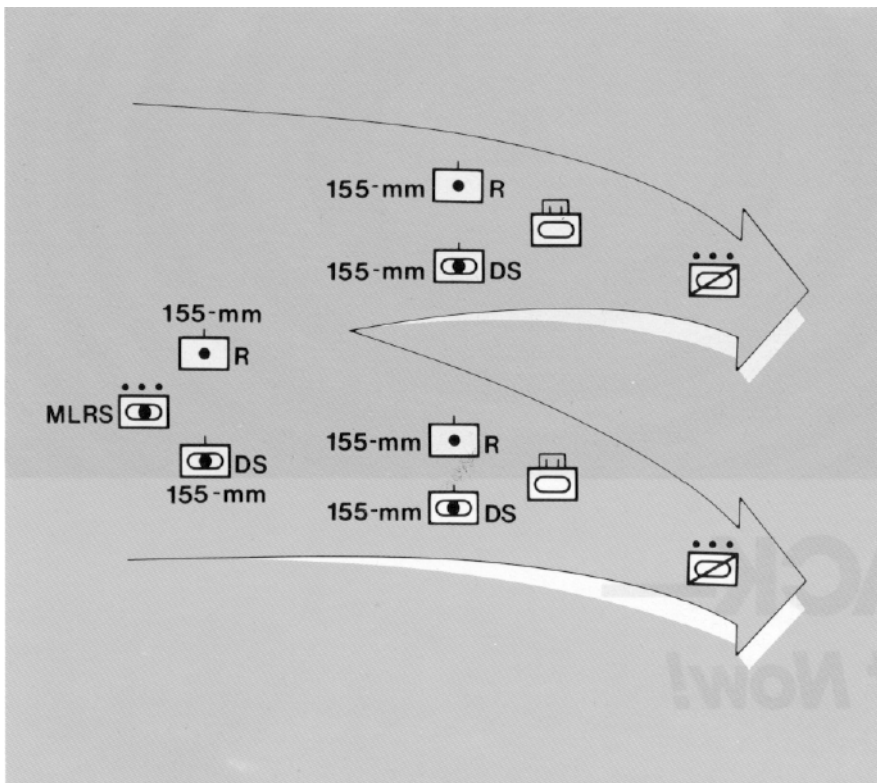
## A Scenario

To provide fire support for the division attack force, the 1st Armored Division Artillery has developed a flexible, innovative *modus operandi*. The fact that the commander can use the division attack force in a number of ways demands flexibility. For example, he might have two tank-heavy battalion task forces lead a rapid attack along parallel axes, penetrate enemy forward regiments, and attack the follow-on assets of the enemy force. Supporting field artillery units would provide continuous fire support for this attack, which might penetrate 30 to 50 kilometers into hostile territory.

One possible approach for the field artillery is to leave all or most of its wheeled vehicles behind because of the large amount of off-road movement anticipated. Although this approach

limits sustainability, it enhances crew protection and the ability of the field artillery to keep up with maneuver elements. Both howitzers and M548s would deploy cross-country in visual contact with each task force. The normal tactic of "leap frogging" firing batteries would be abandoned because it might result in firing batteries being left in vulnerable positions or never being able to catch up with the fast moving maneuver force. Battery movement would be characterized by *move—hipshoot—move* tactics. Moreover, howitzers would have to be ready to engage direct fire targets as well, and fire support officers would constantly make and update simple, quick fire plans.

The specifics of task organizing field artillery to support a division attack force warrants special discussion. The direct support battalion of the brigade acting as the division attack force might reasonably be reinforced by a corps-provided 155-mm self-propelled battalion, and an attached multiple launch rocket system (MLRS) platoon could compensate for the lack of 8-inch fires. The MLRS platoon could attack those deep *high payoff targets* recommended in advance by the division G2 and the fire support element (FSE). The decision not to take the 8-inch howitzer battalions forward in the deep attack derives from a careful weighing of two competing factors—the additional



The division attack force allows commanders to project appropriate combat power through the enemy's defenses and to penetrate deep behind the enemy's front lines.

range of the 8-inch howitzer and its less mobile and survivable nature.

The commander might also employ an AN/TPQ-37 firefinder radar to feed targets to the division artillery tactical operations center (TOC). Positioned well forward in the main battle area the radar would identify counterfire targets to be engaged by 8-inch or MLRS units positioned near the forward line of own troops (FLOT).

As the attack kicks off, an habitually associated firing battery from the direct support artillery battalion and firing battery from the reinforcing battalion would move directly behind each of the leading battalion-level task forces. Using the wedge formation, these batteries would travel cross-country about 100 meters behind the tank formation. M548s would provide flank and rear security. Traveling in the lead howitzer, the battery executive officer controls the movement of the battery wedge. He uses either hand and arm signals or the small unit transceiver. The second echelon of batteries would march no more than 300 to 500 meters behind the maneuver forces, and the third echelon from each battalion would follow some 2 to 3 kilometers behind. Their instructions would be to orient on the leading batteries and maintain visual contact with them. A battalion TOC would move on each axis to facilitate

command and control. The direct support battalion TOC would control the close support fight, while the reinforcing battalion would respond to requests for fire from the direct support battalion and coordinates counterfire.

To provide quick responses, the fire control system would be streamlined. Because speed is critical, the fire support officers and teams operating with each battalion task force would use a single radio net which supporting firing batteries would monitor continuously. At the same time, the batteries would also operate in the command net of their respective battalions. Fire support officers and teams would rely on short, concise, quick fire plans of three to five targets.

## Logistics

Of course, this type of operation places a premium on mobility at the expense of sustainability and redundancy. In this scenario, the entire field artillery support package would consist of around 92 tracked vehicles. Each vehicle requires innovative loading. Aidmen ride on M548s, and when emptied of ammunition one M548 would become an ambulance. Package petroleum, oils, and lubricants and repair parts would be mission-tailored

and carried on all M577s and M548s. Howitzers would be reamed and refueled only when they stop to shoot.

The use of "all tracks" in this operation impacts severely on ammunition hauling capabilities. A 155-mm battalion's tracks, when overloaded, can carry 1 day's required supply rate of 150 rounds per tube per day. An MLRS platoon has 36 rockets on self-propelled loader launchers. To enable the artillery to fight past the first day, the commander would have to rely on one or a combination of the following three options:

- Impose a controlled supply rate (CSR) consistent with the intended length of the operation.
- Plan for an aerial resupply at the end of each day.
- Add wheeled ammunition vehicles and trailers to the force.

Ironically, in this high speed offensive operation Class III sustainability is a lesser problem. Despite having the lowest cruising range of any vehicle in the operation, the M109A2 can operate for up to 48 hours without refueling.

## Fire Support Coordination

In its execution, this division deep attack operation poses several fire support coordination challenges. Specifically, fire support coordinators must focus on three primary considerations:

- Prevention of friendly fire support assets from striking the division attack force when it is forward of the FLOT.
- Allowing fire support assets supporting FLOT operations the maximum freedom of engagement.
- Using fire support assets to protect the flanks of the division attack force and destroy deep targets.

In practice, the division artillery less the accompanying battalions supports the division attack force from behind the FLOT. In doing so, the TOC exploits the general support reinforcing mission to the maximum extent that range limitations will allow. The division fire support coordinator (FSCOORD) also recommends the use of joint air attack team operations to strike enemy forces that may try to attack into the flank of the division attack force.

To minimize firing restrictions, the division may use a rectangular restrictive fire area (RFA) to prevent friendly fire from engaging the division attack force. The division fire support element adjusts the restrictive fire area hourly to keep it centered

over the deep attacking force. By observing this area-restrictive control measure, FLOT artillery units should be able to continue firing without endangering the division attack force or observing unnecessary restrictions in areas not occupied by friendly forces.

Battlefield air interdiction (BAI) missions also support the division attack force's operations. As enemy units begin to move against the division attack force, airstrikes against key targets—mobile bridging or lead elements in choke points—can delay the enemy's movement.

As the division attack force returns to friendly lines, the division fire support element can establish a restrictive fire line (RFL) between the division attack force and the FLOT to coordinate target engagement and prevent accidental engagements between friendly units. Moreover, the fire support coordinator participates in planning artillery strikes and joint air attack team operations to protect the flanks of the returning force as it punches through the rear of the enemy's first echelon.

Key ingredients in coordinating the fire support for the deep attack includes:

- Reliable communication links between the division fire support element, the division artillery tactical operations center, the direct support artillery battalion, and the division attack force.

- A good intelligence capability to detect high payoff, deep targets which quickly reach the Fire Support Community for engagement.

Without these capabilities, fire support for the deep attack is limited to a minor number of observable targets.

## Lessons Learned

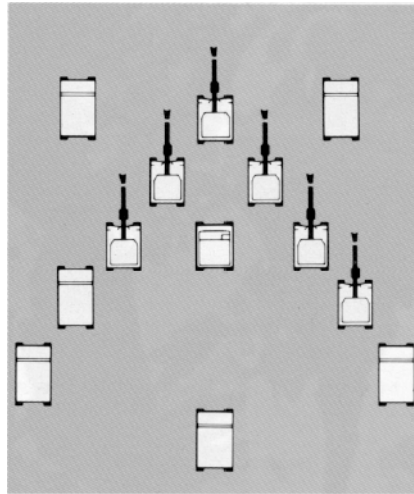
During the planning and execution of a number of command post and field training exercises, the leaders of the 1st Armored Division have learned many valuable lessons regarding field artillery employment in mobile armored warfare:

- It is possible to tailor an austere mobile field artillery support package which can adequately support a division attack force that strikes deep into enemy territory.

- Command and control will be much more difficult on the move; hence, there must be greater reliance on tactical standing operating procedures. This less than satisfactory situation will continue until the small unit radio and azimuth-gyros associated with howitzer extended life program (HELP) and howitzer improvement program (HIP) are available.

- The tactical concept of batteries maneuvering with armor is viable. In fact, such operations are essential if the field artillery is to keep up with maneuver forces.

- Although it is extremely difficult to execute, the "battery wedge" is a sound tactical formation offering advantages in responsiveness, agility, and security. Terrain and prolonged firing will often force batteries into columns and onto roads to catch up.



**The battery wedge formation offers sound tactical advantages in mobile armored warfare.**

- Field artillery support of deep attacks of less than 24-hours duration need not involve wheeled vehicles. Beyond that, ammunition could well become a battle stopper. Whenever close air support is available from the Air Force, its use will save artillery ammunition. Fuel only becomes a constraint after 48 hours of continuous operations.

- A moderate logistical tail of 40 to 50 wheeled vehicles may be desirable to stretch sustainability. Such additions place a heavy burden on maneuver forces to "protect the tail."

- Long-range communications are critical to the success of deep attack operations.

## Needs

The 1st Armored Division's experiences highlight several equipment, doctrinal, and training needs.

- A means of communicating digitally with howitzers is a necessity during both movement and firing.

- The battalion's tactical fire direction system (TACFIRE) is not mobile enough to keep up with the maneuver force. It is truck

mounted, requires 30 minutes to set up, and in a sustained operation must use a generator. Still, artillery commanders need some means of communicating with all digital devices in the task force. A battalion-level device, akin to the battery computer system mounted in an M577 and having the capability to do command and control as well as tactical fire direction would solve this problem.

- Firing batteries need a means of quickly laying all firing elements on a common direction. The aiming circle is too slow. An advanced azimuth-gyro system in each battery might do the job.

- Both the battery operations center and the battery commander's vehicle need to be hardened.

- Doctrinally, field artillery battalion and battery tactics in support of the division attack force need to be refined, documented, and institutionalized.

- Deep attack logistical operations including rearming and refueling need to be thought out and practiced.

- Fire support coordination measures during the initial deep attack and in support of the attack force when it is across the FLOT need detailed examination.

- Finally, the requirement for autonomous howitzer operations demands both technical and tactical excellence in each crew. The training implications of this situation are significant. Leaders and their sections must be capable of delivering accurate and quick direct fire.

## Conclusion

Field artillery support of the division attack force can work, but it requires detailed planning, continuous training, and vigorous execution. As the "King of Battle" addresses the outstanding needs identified above, it may become an even more capable member of the deep attack combined arms team.



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# Firepower in the Falklands Campaign

by Lieutenant Colonel Robert H. Scales, Jr.

**F**or 6 hours Lieutenant Colonel "H" Jones pushed his three companies of paratroopers southward toward the main Argentine positions protecting the settlement at Goose Green. Darkness and surprise had been his only allies. But with daylight the attack began to stall. The Argentines could now see the paras laying prone on the sodden, featureless terrain, exposed to increasingly accurate mortar and artillery fire. What was supposed to be a company or so of Argentines had now become a reinforced battalion dug into hillsides in well-prepared bunkers and trenches.

Jones began his attack on Goose Green with meager fire support. By daylight he had practically *none*. The frigate *HMS*

*Arrow* was to support the attack from offshore, but a mechanical failure in its single 4.5-inch gun forced the ship's withdrawal as soon as the attack began. Jones had less than one-third of the artillery normally dedicated to support a deliberate attack by an infantry battalion. Three guns of 8 Commando Battery, Royal Artillery, had been lifted by Sea King helicopters into a depression northeast of Camilla Creek House during the previous evening. A total of only 12 helicopter sorties were dedicated by the brigade to the artillery. The battery gun position officer, Lieutenant Mark Waring, could provide only one lift for his men, three for the guns, and eight for the ammunition. In all, 28 artillerymen and less than a thousand rounds of

ammunition were ready to support the attack. The early departure of *HMS Arrow* and the unexpected strength of the Argentine defense caused the artillery to fire many more rounds than expected. By daybreak, 8 Commando Battery was practically out of ammunition.

Jones also took two of his 81-mm mortars with him on his trek to Goose Green. But without transport, mortar shells had to be carried on the backs of his soldiers. What little ammunition the mortars could husband for the attack had been fired by morning.

Every moment of daylight exposure meant more casualties. Jones' companies were now fragmented into small clusters, each struggling to win the upper hand in separate, scattered firefights.



Jones huddled with his headquarters group of a dozen men just north of Darwin Hill. He grew increasingly frustrated with the lack of support and the slow progress of the attack. Just above his head a machine gun position was raking a large portion of his most forward company. Unable to call for more fire or to influence the scattered and confusing fighting around him, Jones decided to assault the machine gun using only the troops in his headquarters section. He divided his men into two small squads. Jones led one; his adjutant, Captain David Wood, led the other. The Argentines spotted their movements, opened fire, and killed Wood instantly. Jones continued the attack, but the enemy responded with murderous fire. By pressing himself close to the soggy ground, Jones managed to crawl within 3 feet of the nearest enemy position. But Argentine defenders hidden in a trench shot Jones in the neck, and he died waiting in the cold morning for an evacuation helicopter.

## Finishing Up at Goose Green

The death of Lieutenant Colonel Jones should have broken the back of the assault on Darwin Hill. Instead, within 2 hours the assault succeeded. The paras pushed the Argentines off the high ground surrounding Goose Green, and within a day the isolated garrison surrendered 1,300 men and 30 guns. The paras were successful for two reasons.

- Goose Green was the first conventional battle that they had fought since World War II, and the men on Darwin Hill were not about to lose it. As one young soldier commented after the battle, "We wanted to show the Regiment that we could fight too."

- Major Chris Keeble, second in command to Lieutenant Colonel Jones, made good use of the limited fire support remaining to the battalion.

After hearing of his leader's death, Major Keeble moved quickly to the forward position. His two lead companies were making slow progress. They needed fire support to break into and through the enemy defenses. Keeble ordered a fresh company forward to assist the two hard-pressed units. He also ordered up the three 105-mm howitzers closer behind the forward companies. Throughout the morning, high winds had been blowing the shells off course and Keeble hoped that

shortening the range would lessen the dispersion of the shells. He also instructed wire-guided MILAN antitank missile crews to take out the hardened Argentine positions. The pinpoint accuracy of the MILAN quickly demoralized the Argentines and proved just enough to tip the scale in favor of the attackers. By evening, the paras dominated the heights above Goose Green. The next day, the Argentines at Goose Green surrendered.

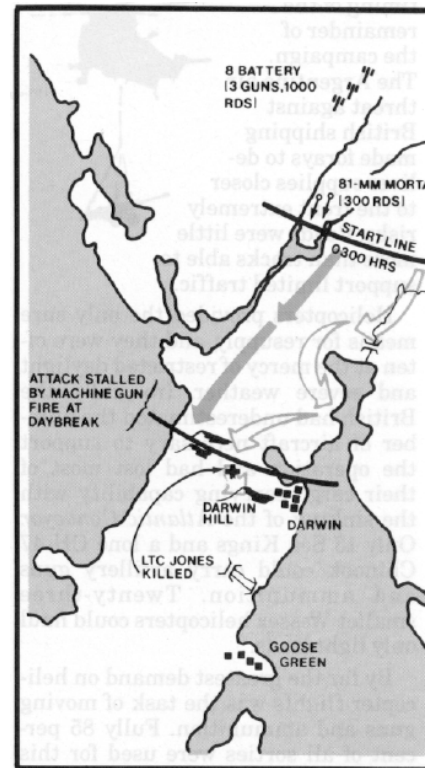
If one believes that "all's well that ends well," he would have to admit that the attack on Goose Green was a resounding success. The battle had certainly served to dispel lingering clouds of doubt and establish the psychological ascendancy of British arms. In fact, a shift in self-confidence swept through both sides immediately after the battle. The British assurance of ultimate success became absolute. Conversely, all manner of doubts began to pervade the Argentine side, particularly among the rank and file. Stories of British martial prowess and the power of their arms grew as rumor merged with inflated fact in the dugouts and trenches of the defenses surrounding Port Stanley.

## The Lessons of Goose Green

The British were quick to profit from the concrete lessons of this first encounter. British leaders and troops realized the Argentines had fought well initially, particularly when not distracted by heavy doses of firepower. But the Argentine defense lacked resiliency. After exploding shells had deflated their self-confidence and British infantry began to close with night attacks, the Argentine's will to fight quickly dissipated. This was particularly remarkable because night fighting usually favors the defender who occupies familiar ground in relatively static positions. What's more, the Argentines were equipped with high quality electronic night vision devices far superior to those carried by British troops.

Argentine fire support at Goose Green exhibited many of the same shortcomings as the maneuver arms. Artillery and mortar fires were delivered on time and with workmanlike precision as long as the Argentines themselves were not under indirect fire.

Goose Green also taught the British a valuable lesson about the use of fire



The battle over Goose Green established British dominance in the Falklands Campaign.

support in the offense. The decision to move on Goose Green silently without a heavy dose of firepower preceding the attack proved a mistake. The overwhelming consensus was that enemy strength had been badly underestimated before the attack and that two mortars, three howitzers, and a frigate were insufficient to support an assault against such a force. After Goose Green, the British resolved that future attacks would be supported from the beginning by a carefully prepared and coordinated fire plan using as many guns and as much ammunition as the supply and transport system would allow.

## Limitations on Fire Support

With the fall of Goose Green, the British turned their attention toward major Argentine concentrations at Port Stanley located at the opposite end of East Falkland Island and 50 air miles from the main British beachhead at San Carlos Water. The difficulties encountered in moving artillery and ammunition to Port Stanley would determine the pace and the

timing of the remainder of the campaign. The Argentine air threat against British shipping made forays to deliver supplies closer to the front extremely risky. Roads were little more than tracks able to support limited traffic.

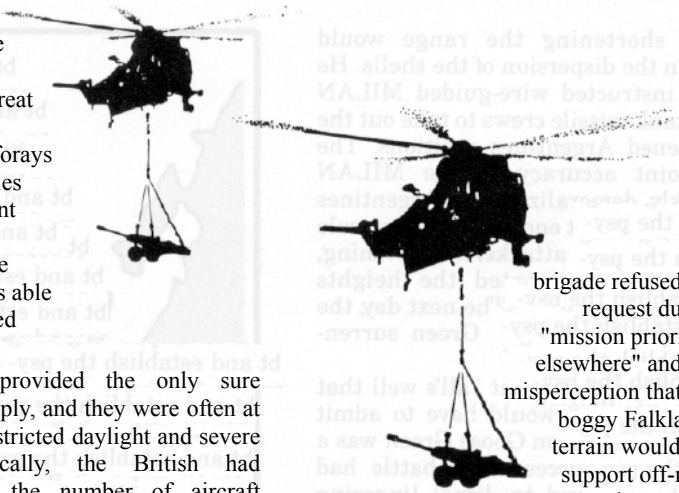
Helicopters provided the only sure means for resupply, and they were often at the mercy of restricted daylight and severe weather. Ironically, the British had underestimated the number of aircraft necessary to support the operation and had lost most of their cargo carrying capability with the sinking of the *Atlantic Conveyor*. Only 13 Sea Kings and a lone CH-47 Chinook could carry artillery guns and ammunition. Twenty-three smaller Wessex helicopters could haul only light loads.

By far the greatest demand on helicopter flights was the task of moving guns and ammunition. Fully 85 percent of all sorties were used for this purpose. To move a single battery required 45 Sea King sorties, and it took a Sea King at least 1¼ hours to fly 36 complete 105-mm rounds from San Carlos to the forward positions around Port Stanley.

Although artillery drained away most of the expedition's airlift, it remained practically the only means of proven fire support in the campaign. The British could have used the pinpoint accuracy of attack helicopters to take out Argentine strong points at Goose Green, but neither the British Army nor the Royal Marines had in service a true attack helicopter.

The experience at Goose Green had shown that close air support by the Royal Air Force would also be limited. The entire expedition had less than 40 Harrier aircraft and needed them all to defend against fanatical Argentine air attacks. Nonetheless, the Air Force did fly several effective close air support sorties to destroy troublesome Argentine anti-aircraft guns and defensive positions slowing the advance on Goose Green.

Conspicuously missing from the assault on Goose Green were any of the eight Scorpion and Scimitar light armored vehicles dispatched to the Falklands to provide mobile, protected firepower. Lieutenant Colonel Jones had requested the attachment of four light tanks, but a staff officer at



brigade refused the request due to "mission priorities elsewhere" and the misperception that the boggy Falklands terrain would not support off-road movement by tracked vehicles. Painful experience demonstrated that 2 Para could have used virtually any form of direct or indirect fire support. The Regiment would not attack without tank support again.

## Naval Gunfire and Operation Tornado

The premature departure of the frigate *HMS Arrow* from its fire support duties at Goose Green was disappointing, but the British were still convinced that if the air and ground antiship threat could be contained, naval gunfire promised to be a major source of heavy firepower for the final assault. This confidence came in part from previous successes.

Nearly a month before Goose Green, small teams of naval gunfire

spotters from 148 Battery, 29 Commando, began landing by helicopter on East Falkland Island. Their mission was to direct harassing and interdiction missions against Argentine positions. The 148th was composed and functioned very much like American air and naval gunfire liaison companies. Its officer observers were extraordinarily skilled in every aspect of fire support.

Like many of the Western colleagues, British naval leaders had considered shore bombardment to be an increasingly irrelevant "black art." Ironically, for that reason, 148 Battery was just 3 months short of deactivation when dispatched to the Falklands. Fortunately for the British, the unit was a tightly knit and cohesive team. Observers knew and worked continuously with helicopter pilots and ships' captains. Each knew the strengths and weaknesses of the other, and long and close associations led to a working relationship that required little verbal communication or lengthy written instructions.

These skilled observers oversaw a naval gunfire harassing and interdiction campaign, code named Operation Tornado. This effort sought to keep the Argentines around Port Stanley off balance while the British main force landed far to the West. Bombardment followed an irregular pattern. Rounds were scarce; each "strafe" consumed no more than 150 to 200 projectiles per night.

The British understood what the Americans had learned in Vietnam. Harassing and interdiction fires were



The British Navy's harassing and interdiction campaign keeps the Argentines off-balance at Port Stanley while the British main force lands far to the west.

counterproductive unless they were *observed* and directed against worthwhile targets. For this reason, the Navy executed a complex firepower hit-and-run program that relied exclusively on direct observation of all fires. One or two frigates would steam in quickly toward the target area under cover of darkness to avoid Argentine air attack and drop off the 148's spotters by helicopter. The frigates would then take up station along a "gun line" about 10 miles off shore. When the air or ground spotter was in position, the ship would fire a short ranging round. The observer normally made only a single correction of a few hundred meters and the ship would follow with a five round burst. The ship would continue firing under spotter control until just before daylight.

At first, ship captains questioned the wisdom of risking their vessels in such efforts, but after a few days of successful attacks they changed their minds and actually required reigning-in by the 148's observers.

Although the British had no way of knowing the effects of their efforts, the 3 weeks of Operation Tornado proved most productive. One Argentine soldier recalled after the surrender:

*We were very demoralized at that time because we felt so helpless, we couldn't do anything. The English were firing at us from their frigates and we couldn't respond.*

In a short and sharp conflict like the Falklands, the Argentines did not have time to become acclimated to harassing and interdiction fires. The novelty and terror of their early days under fire had only begun to wane when the main attack against Port Stanley began:

*I gradually got used to the shelling, because from then on they bombarded us every night . . . But there was a junior sergeant, a very nervy man who hardly slept; he was always very uptight . . . He was always awake, smoking very nervously. In the morning when everyone woke up the sergeant would be totally wired up.*

Operation Tornado brought home to the amateur Argentine soldiers the hard fact that war with Britain was real. The harrasing and interdiction program actually harmed few Argentine soldiers, but the obvious accuracy achieved by the observers of 148 Battery and their supporting ships left a lasting

impression.

## **Planning the Attack on Port Stanley**

Major General Jeremy Moore's land forces consisted of the two separate brigades described in the accompanying figure.

### **3 Commando Brigade Royal Marines**

40 Royal Marine Commando  
46 Royal Marine Commando  
45 Royal Marine Commando  
2d Parachute Regiment  
29 Commando Regiment,  
Royal Artillery  
3d Parachute Regiment

### **5 Infantry Brigade**

2d Battalion, Scots Guards  
1st Battalion, Welsh Guards  
1st Battalion, 7 Gurkha Rifles  
4th Field Regiment, Royal  
Artillery (-)

While 2 Para opened the match at Goose Green, 3 Para along with 42 and 45 Commando began a trek toward Port Stanley. Through pluck, audacity, and tactical stupor on the part of the Argentines, most of 3 Brigade soon positioned itself in the vicinity of Mount Kent on the northern axis of advance toward Port Stanley. As helicopters became available and weather permitted, the three batteries of 29 Commando Regiment joined their supported units. From these new battery positions to the West of Mount Kent the light guns could just range Port Stanley.

Somewhat to his chagrin, General Moore had the Port Stanley battle plan written for him by the audacity of 2 Para. Just 3 days after the surrender at Goose Green, Major Keeble telephoned Fitzroy settlement well to the east and discovered the southeastern approach to Port Stanley was devoid of enemy. Immediately, Keeble crammed most of one company into the expedition's worn but serviceable Chinook and landed at Fitzroy without incident.

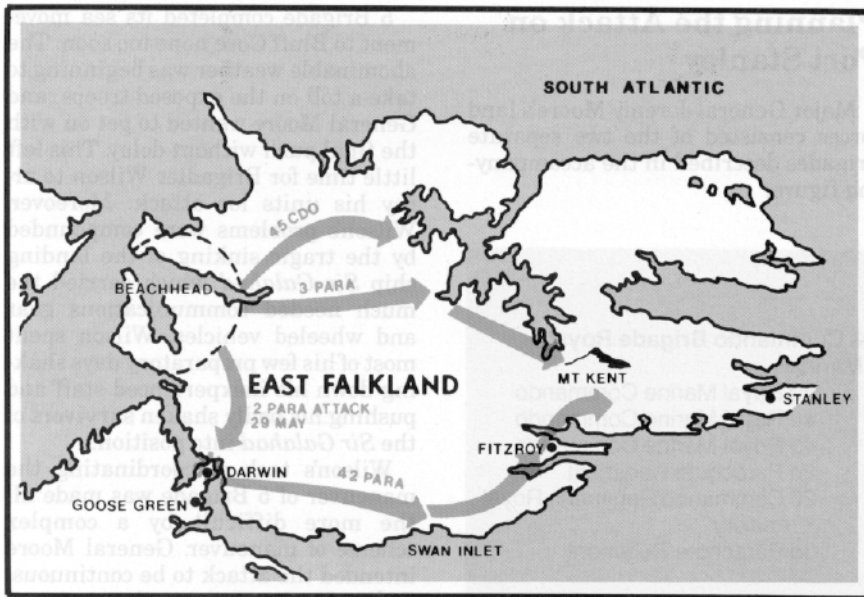
Moore now had little choice but to reinforce 2 Para with all of 5 Infantry Brigade. The plan was good in that it completed the encirclement of Port Stanley quickly.

5 Brigade completed its sea movement to Bluff Cove none too soon. The abominable weather was beginning to take a toll on the exposed troops, and General Moore wanted to get on with the final push without delay. This left little time for Brigadier Wilson to array his units for attack. Moreover, Wilson's problems were compounded by the tragic sinking of the landing ship *Sir Galahad* which carried the much needed communications gear and wheeled vehicles. Wilson spent most of his few preparatory days shaking down his inexperienced staff and pushing his badly shaken survivors of the *Sir Galahad* into position.

Wilson's task of coordinating the maneuver of 5 Brigade was made all the more difficult by a complex scheme of maneuver. General Moore intended the attack to be continuous. To do this he envisioned a series of one-two punches—alternating attacks by each brigade, beginning with 3 Brigade's effort against the outer ring of hill defenses at Mount Harriet, Two Sisters, and Mount Longdun. 5 Brigade would strike the higher ground closer to Stanley including Wireless Ridge, Tumbledown Mountain, and Mount William. Both the brigades would then alternate night attacks until resistance ceased.

The fire plan to support the offensive differed little from those British staffs had prepared during countless exercises in Europe. However, several factors were unique. The artillery would be massed in two groups—three batteries in the north supporting 3 Brigade and two in the south behind 5 Brigade. Neither adequate communications nor time were available for the two artillery regimental commanders to coordinate their efforts. The guns were too far from most objectives and too broadly dispersed to permit all 30 to mass. This situation resulted from the lack of ground mobility. Batteries could only stay and fire 3,000 rounds from where helicopters dropped them. Any movement of a gun battery, even for a short distance, was impossible.

Rear Admiral Woodward, the Commander of Falklands Task Group, allocated one frigate to each of the eight engaged infantry battalions for the forthcoming attack. He hoped that the ships would provide the firepower normally available from heavy field artillery. General Moore's artillery staff convinced him that to be effective and responsive, naval fires had to be integrated with the artillery into a single fire plan. But this proved no



**The audacity of 2 Para proves the key to success for Major General Jeremy Moore's land forces as commando and infantry brigades trek toward Port Stanley.**

simple task. When not on gun duty, ships remained 150 miles or 6 steaming hours away from the shoreline to ensure their safety from hostile air attack. Moreover, some ships performed anti-aircraft picket duty and might well be many miles farther from the land action.

During the planning phase for an attack, the artillery battery commander, who doubled as the battalion fire support officer, would receive his maneuver commander's fire request. He then had only a short time to extract those targets most suitable for engagement from the sea and transmit them by radio to Lieutenant Colonel Keith Eve, the Artillery Naval Gunfire Liaison Officer aboard *HMS Fearless*. Eve relied on a secure

satellite link to request specific ships and ammunition allotments for the coming fight. Admiral Woodward's staff made the final decisions and dispatched the gunships just in time to make the often fearsome journey through gale-force seas to arrive at the gun line on time and properly fitted out to provide heavy fire support.

Naval spotter teams assigned to support specific battalions located themselves with artillery forward observing officers. To ensure complete flexibility, they carried two high-frequency radios capable of morse and voice transmission to call for naval fire; one VHF radio tuned to Royal Air Force frequencies, and two standard army VHF sets—one to monitor the supported infantry battalion command

net and one on a common artillery fire channel.

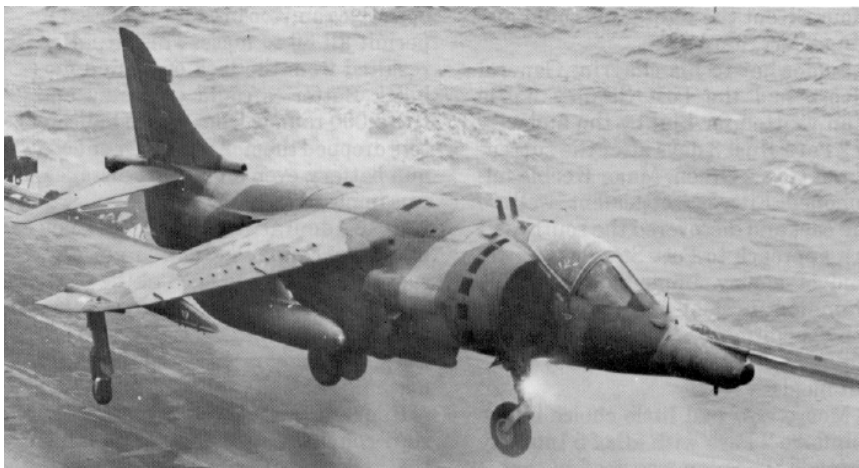
Each brigade attack also received a small allotment of close air support sorties—usually no more than four or five. Moore knew that air support would be problematic. The Harrier was a fair-weather airplane, and the weather was abominable. Moore also realized that the first priority for the Harriers was to keep the Argentine Air Force at bay. Wisely, the British planned around air strikes. If they appeared, so much the better. But just in case, General Moore's staff placed enough additional heavy naval firepower on each target to ensure its destruction.

Each spotter and observer memorized only five or six key targets. Likewise, junior leaders in the infantry battalion learned a few targets, designated by simple code words and identified by prominent rock outcroppings and hill tops clearly visible to all troops at the jump-off point. The commander of 29 Commando Regiment also dedicated fires from a single artillery battery to support each attacking infantry battalion.

The concept behind the various fire plans was simple. Friendly lives would be saved and the enemy's will broken quickly if the attack was preceded by an overwhelming and continuous wall of firepower. A traditional artillery and naval gunfire preparation would begin the fight. Scorpions and Scimitars would then engage Argentine strong points exposed by the attack. MILAN missiles would strike small, point targets such as firing embrasures and command posts. And assaulting units would reserve mortars, hand-held antitank rockets, and grenades for a last-minute crushing blast of firepower before the final assaults.

## The Beginning of the End

The final act of the campaign began with Colonel Nick Vaux's 42 Commando attacking the steep, rock-strewn crest of Mount Harriet. The normal confusion and mistakes that attend a unit's first action delayed the start of the assault, but gunners to the rear and ships off shore waited patiently for the signal to open fire. Finally, the signal came and all firing units began a systematic pasting of the mountain with thousands of rounds of high explosives. Protected by the barrage, Vaux's men pushed within 100 meters of the summit before the Argentines opened fire. By then it was too late, and after a brief



British Aerospace Aircraft Group

**Close air support proves problematic as the British Harrier battles gale-force winds off the Falklands coast.**

but sharp fight Harriet was in British hands with only a single British casualty.

45 Commando was also late in its attack on Twin Sisters. But after 2½ hours of hard fighting the commandos pushed the Argentines off the summit and dug in at dawn. As if to emphasize the dangers of naval gunfire support, *HMS Glamorgan* was struck by a ground-fired Exocet missile shortly after finishing its duties on the gun line. Thirteen men were killed and many more wounded, but the sturdy ship quickly recovered and steamed out of harm's way at a brisk 24 knots.

3 Para fought the costliest battle of the campaign as it assaulted the heights of Mount Longdon. The battalion was fortunate in that it had had a week to reconnoiter its objective. Audacious patrols had crept within yards of the enemy positions searching out the best routes of advance. In consequence, Colonel Hew Pike divided Longdon into three separate company objectives and ordered his supporting forces to remain silent until the enemy discovered the approach.

The battalion moved out according to plan and reached the foot of its objective when a soldier stepped on an antipersonnel mine. From that moment on, the fighting was continuous and intense. Captain McCracken, the forward observer, began dropping artillery and naval gunfire into enemy positions. Platoons fought their way steadily upward in a series of individual and section battles against fearsome resistance from recoilless rifles and heavy machine guns. McCracken kept the artillery close and continuous, bringing the 105s to within 50 meters of the most hard-pressed units. By first light the Argentines had abandoned the rugged, boulder-strewn heights to the paras. The all-night assault and sporadic enemy artillery bombardment cost the paras 23 killed and 47 wounded personnel.

General Moore had hoped that 5 Brigade might deliver the second blow against Tumbledown Mountain without delay. But Brigadier Wilson's Scots Guards did not move on Tumbledown until 2100 hours. An effective artillery preparation aided the attack and continued until advancing troops were within 250 meters of their objectives. Later investigation revealed that the preparation destroyed 11 out of 14 machine gun positions in the Guardsmen's path.

Artillery support for the Guardsmen became difficult at this point. Because the attack was hurried, the

naval gunfire plan was not integrated as well as it should have been. The naval spotter did not arrive at the Guard's command post until after dark and never saw the objective first-hand. Gale-force winds heightened confusion concerning troop locations and targets, and to ensure the safety of the Guardsmen, the artillery battery commander shifted the naval fire from Tumbledown to nearby Sapper Hill and ordered his guns to increase their rates of fire.

As the Guardsmen began to push toward the summit, they came under increasingly more accurate and deadly mortar and artillery fire. As companies converged the situation grew more confusing. For a few moments artillery support from the 4th Regiment's guns began to slacken. High winds blew the shells about and made the fires appear erratic. At that critical moment the battery commander lost radio contact with his observers, and an infantry platoon leader called in artillery fire too close to his position. The calm intercession of the infantry battalion commander and his artillery counterpart sorted out most of the difficulties, and by 0230 hours artillery rounds were again landing accurately in front of the stalled forward platoons. The shock of this firepower broke the deadlock, and the attack continued up the hill with trenches and bunkers taken at bayonet point.

## Problems and Solutions

The problems encountered at Tumbledown were little different than those which occurred in both brigades during the earlier rapid-fire assaults.

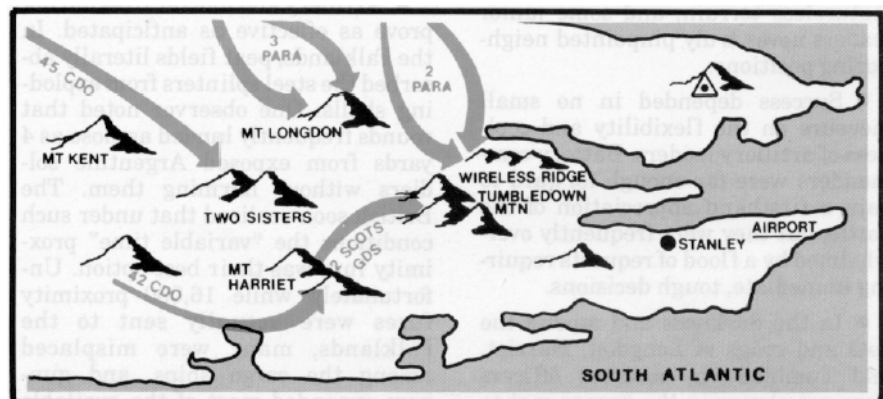
- Gunners were hard-pressed to keep up with the enormous volume of fire required of them by the infantry.

Batteries expended in minutes what would have been a year's worth of service practice ammunition on Salisbury Plain. Within the batteries young and inexperienced gun position officers worked their men frantically to tear open boxes and containers and prepare the shells for firing. Cooks, air defenders, and stray onlookers were pressed into service as ammunition handlers to satiate the appetites of the hungry guns. Frantic efforts by resupply helicopters kept enough ammunition forward with the guns so that firing was never interrupted.

- Cold weather and boggy terrain made service of the guns difficult. Stiff, numb hands made simple acts like screwing on fuzes or setting firing data on gun sights slow, agonizing efforts.

- The 105-mm Light Gun, the only artillery piece used by the British, proved to be a capable weapon with a range advantage of 6 miles over the Argentine guns. After a few days of firing, the commander of 29 Commando Regiment ordered his guns to fire at the highest charges only when necessary. He feared that the excessive pounding would eventually cause delicate gun sights to fail.

- Batteries seldom occupied positions suitable for delivering sustained bombardments. But once in position, gunners had to make the best of their spongy firing positions because helicopters could not be spared for movement of the pieces to more advantageous ground. Once firing began the guns sank into the bog. After firing 20 or 30 rounds, a gun had to be pulled out of the mire, repositioned, and reaimed. Five of six guns could be kept in action by passing a tracked vehicle up and down the gun line, continuously winching out a gun at a time.



Both commando and infantry forces assault Argentine objectives in the final stages of the Falklands campaign.



**British troops face increasing difficulty in the unfamiliar, featureless Falklands terrain. Gunners make the best of their spongy firing positions, but the cold weather and boggy ground at Tumbleweed make gun positioning and aiming a risky business for the inexperienced soldiers.**

- Artillery support suffered from the lack of technical aids. To conserve ship space, the artillery left behind all means for measuring meteorological conditions in the battle area. Under temperate conditions this decision might have had slight effect. But in the Falklands, gale-force winds were the norm during the South Atlantic winter. A proper crosswind might blow a shell as much as a kilometer or more off course. Without the means to predict and compensate for atmospheric conditions of this sort, firing close to friendly troops became very hazardous indeed. The British returned to basic "steam gunnery" to provide close support at the cost of long delays between missions and a complete loss of the ability to deliver surprise or massed fires.

- Firing close to or across the boundary between 3 and 5 Brigades was a persistent problem. On several occasions frustration levels rose among forward observers who could see targets in the adjacent brigade but could not engage them because clearance to fire came too slowly. Part of the problem derived from the difficulty in locating the exact position of friendly units in the darkness and confusion. Boundaries were also indistinct in the featureless terrain, and some junior leaders never truly pinpointed neighboring positions.

- Success depended in no small measure on the flexibility and coolness of artillery leaders. Battery commanders were far enough forward to gain a firsthand appreciation of the battle, but they were frequently overwhelmed by a flood of requests requiring immediate, tough decisions.

- In the darkness and among the cuts and crags of Longdon, Harriet, and Tumbledown, observer officers were not always in the proper spot to observe fires. In 45 Commando enlisted bombardiers did three-quarters of all shooting. All forward

observers had difficulty in the unfamiliar, featureless terrain. Usually a target was nothing more than a momentary muzzle flash in the dark. One young bombardier, when told to observe to his front, exclaimed over the radio, "I don't even know which way forward is!"

- Fires in depth proved very important. Observers from the 148th Battery secretly hid themselves in observation posts well behind Argentine defenses. From the vantage points they could see most enemy defensive positions and firing batteries. Early in the campaign, Captain Hugh McManners from the 148th occupied a covert observation post on Beagle Ridge. From there, he had a clear, but distant view of Port Stanley. While never able to destroy the Argentine guns around the port, he did manage to overturn an occasional heavy piece, set fire to ammunition and vehicles, and chase enemy gunners into cover for long periods. The considerable damage done to British infantry on Wireless Ridge and Mount Harriet by Argentine artillery might have been much worse without such effective counterfire.

- Artillery and mortar fires did not prove as effective as anticipated. In the Falklands, peat fields literally absorbed the steel splinters from exploding shells. One observer noted that rounds frequently landed as close as 4 yards from exposed Argentine soldiers without harming them. The British soon realized that under such conditions the "variable time" proximity fuze was their best option. Unfortunately, while 16,000 proximity fuzes were actually sent to the Falklands, many were misplaced among the cargo ships, and gunners expended most of the available fuzes before the final battle for Stanley began.

- No other skill was less practiced by artillerymen before the campaign nor more in demand by the infantry during the

campaign than shooting "danger close." In the long and costly battle for Mount Longdon, the enemy positions were captured only by the twofold process of calling for fire within 50 meters of pinned down troops, and then immediately engaging enemy bunkers using antitank rockets and grenades. More than one participant noted that close combat at night is not the time to learn such skills:

*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 meters, let alone its effect. While they were getting used to it, the enemy had the upper hand.*

## The Final Stroke

It was only fitting that the final act in the Winter War be initiated by the veterans of Goose Green. 2 Para's mission was to seize Wireless Ridge, located on the extreme northern flank of 3 Brigade astride the most direct route into Stanley. As he developed his battle plan, Colonel David Chaundler, the new battalion commander, applied some hard learned lessons. He gathered about him all the fire support he could muster—two batteries of light guns with plentiful ammunition, a frigate for naval gunfire support, and a troop of Scorpions and Scimitars. To ensure that his companies would not again run short of firepower at the critical moment, Chaundler detached 35 additional soldiers to carry forward mortar ammunition and extra antitank rockets.

2 Para's attack would be anything but silent. From the moment the first company crossed the start line, Wireless Ridge erupted in a volcano of detonating

shells. The few Argentine gunners who dared to return fire were immediately smothered by tank and artillery volleys. Six thousand rounds of all types eventually hit the ridge. Compared to Goose Green, Wireless Ridge was a cake walk.

At dawn the paras could clearly see the ground which the Argentines had just ceded. They were struck immediately by the strength of the position. The hasty fortifications at Goose Green had not been nearly as well prepared or as cleverly sited as those that surrounded them now. They found fewer than a dozen dead Argentines along the ridge, but there was little doubt that the enemy had left in haste. Rifles, tents, and other military flotsam covered the position. In fact, one command post dug into the hillside was left intact with radios switched on. The paras even rooted out a few soldiers from the bunkers. They discovered some cowering, zipped up in their sleeping bags, oblivious to the presence of a foe fully capable of killing them.

The British had broken the will of the Argentines on Wireless Ridge in large measure by the physical and psychological effects of firepower. Today's fire planners often tend to overlook the latter effects, but the example of the Falklands has helped to refocus attention on devastating "moral" dimension of fire support.

As a result of a series of confidential interviews conducted with nearly half of all 2 Para veterans, Dr. Richard Holmes has advanced and supported with scholarly precision the thesis that firepower steels the soldiers it supports and undermines through stress, alarm, and fear those it hits. Holmes quotes a corporal in 2 Para who restates his thesis quite succinctly:

*If it's a sniper or machine gunner it's just another man, and your training tells you what to do. But what do you do about some . . . [fellow] 4 miles away?*

An Argentine soldier on Wireless Ridge echoed these sentiments when he remarked:

*We were just targets for their artillery; lots of times I felt terribly helpless. We didn't feel like soldiers, we didn't want to make war, so we felt like prisoners . . . I felt I was on the Island of Alcatraz.*

Firepower creates a sense of hopelessness by demonstrating to a defender the overwhelming superiority of the opposition's combat power. A bombardment may harm only a few physically. But if firepower can persuade

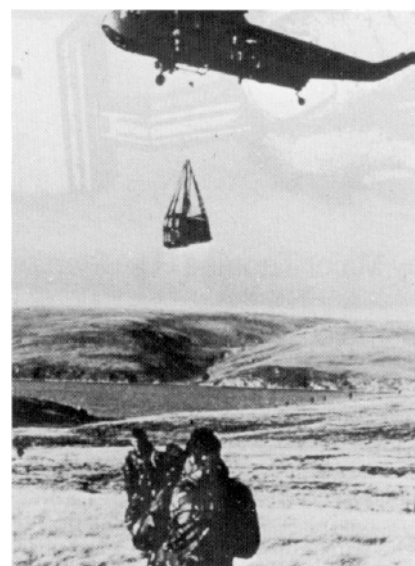
an enemy soldier to quit his position before close combat begins, it serves a practical purpose far out of proportion to the physical damage it inflicts.

Once the Argentine retreat began on Wireless Ridge it grew unchecked until all of the forward defenses had broken. Standing on the vacant ridge, the men of 2 Para could observe masses of men running without arms or equipment toward Stanley. Some were killed by the artillery which pursued them, but the mindless flight of terror-gripped Argentines told the larger story—the war was over.

## Conclusion

The limited duration and intensity of the Falklands campaign belies its importance as a laboratory for observing firepower and maneuver applied in a contemporary small war. To an American observer the events at Goose Green and the hills around Port Stanley are strikingly reminiscent of early battles in the Second Indochina War. In both conflicts leaders had to contend with inexperience and the prebattle jitters which invariably accompany soldiers into their first combat. In the American experience, dense jungle and a savvy, skilled enemy complicated the difficult process of acclimating to war. For the British, early mistakes and false starts resulted from a hostile climate and terrain, the need to fight at night, and the uncertainties of supporting the battle across tenuous lines of communication. As in Vietnam, the cumulative effect of these "frictions of war" often slowed the pace of fire support considerably. No matter how well trained, soldiers new to combat must learn to fight by *fighting*. One of the lessons the British learned anew was the axiom that *hesitation and reticence regarding the use of firepower causes more casualties*.

The campaign also revealed that effective fire support requires close cooperation between land, sea, and air services. The US Army discovered in Vietnam that the task of orchestrating aerial firepower and ground operations was particularly difficult and never completely efficient. The British faced a comparable challenge in using firepower from the sea. They discovered once more that the complete integration of naval gunfire with the tactical scheme of maneuver requires a great deal of mutual training, familiarity, and trust.



**Helicopter support proves invaluable to the British for movement of soldiers and equipment.**

The British learned other lessons common to recent small wars. Chief among these were the following:

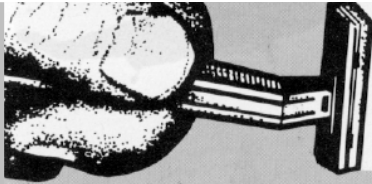
- Helicopters are of tremendous value to move soldiers and equipment and to provide permanent high ground for observation and aerial fire support.
- Elite and fit infantrymen require less firepower to be effective, and they capitalized with brilliance on the long-held belief that inept soldiers can be intimidated by the psychological effects of massive shell fire.

When all is said and done about the Falklands campaign, one stellar truth emerges—*firepower broke the back of Argentine resistance* and, in the process, saved the lives of many infantry soldiers who were obliged to take far fewer bunkers and machine gun nests than they would have had they been without the guns and ships behind them. In the Falklands, firepower was king.

*This article is a condensed version of a chapter to appear in **Firepower in Small Wars** to be published by National Defense University Press.*



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# THE RAZOR'S EDGE

by Major Thomas B.L. Stanford

**T**he razor's edge is the fine line of professional competence that makes the difference between success and failure. At the National Training Center (NTC) at Fort Irwin, California, having the razor's edge can decide who wins and who loses a game. But on tomorrow's battlefield, the razor's edge spells victory—or defeat.

The Eagles of Fort Carson's 5th Battalion, 29th Field Artillery Regiment, a six-gun M109 A3 unit, recently returned from a successful rotation at the National Training Center. They learned a variety of lessons which may prove useful to other artillerymen as they reflect on tactics and techniques suitable for NTC maneuvers and in actual combat.

The battalion's leaders made particularly significant observations and recommendations in five major areas: command and control, fire support, delivery of fires, intelligence, and survival. The lessons learned in these fields by the 5-29th FA can help you hone *your* razor's edge.

## Command and Control

At the National Training Center and in battle, subordinate leaders must respond without question to the directives they receive. Only then can units accomplish their missions. Our junior officers must expect last minute changes in the maneuver commander's scheme and must react quickly and decisively.

At the NTC, timely intelligence and changes in relative combat power drive the train. What's more, the fog of war forces junior leaders to make important decisions on their own. Battery commanders must, therefore, thoroughly understand the maneuver commander's intent and see to its accomplishment with discipline, a sense of urgency, and total flexibility.

Good communications are essential to good command and control. Battalion and battery leaders must emphasize

proper positioning of subordinate units with communications as a major consideration. They must also ensure that operators thoroughly check all systems prior to deployment. Such checks ensure proper alignment of all frequencies, proper power output, proper grounding, appropriate mounting of equipment, and long distance transmission capabilities. These efforts, along with good preventive maintenance checks and services, will pay great dividends at the National Training Center.

Rehearsals proved to be yet another way to succeed. Battery leaders and radio operators should practice antijamming procedures and minimum safe line (MSL) drills. During antijamming drills, the battalion S3 should use a matrix similar to the one shown in figure 1. When jamming occurs, the S3 decides whether to move the jammed net to one of the predesignated "mask" frequencies. He accomplishes the shift by using a net call announcing the new mask net. In the example shown in the matrix, the S3 has moved CF1 to MASK 1, the survey frequency, and moved the CF2 net to the retransmission frequency. In managing the changeover, the operations

officer normally makes several calls to ensure all stations get the message.

At the National Training Center, the S3 often had to return to the old frequency to police up stations that did not get the message. To get stations to return to the original frequency, the S3 announced "MASK ZERO." This system worked well, and jamming had little effect on battalion operations.

Another good technique is to move to a new frequency right before a battle. If you have been passing target lists all night long, you can bet that the opposing force has your frequency and is waiting to jam your communications as soon as the battle starts.

Prior to each battle, the battalion S3, the operations sergeant, the S2, and the battlefield information coordination center (BICC) planned the entire battle based on the task force commander's concept of the operation. The resulting plan included initial and subsequent battery locations, initial and subsequent tactical operations center locations, trigger points for moves, and intelligence preparation of the battlefield.

To ensure that everyone knew the plan, the S3 briefed each battery commander

	CF1	CF2	FD1	FD2	FD3	A/L
MASK 1 (SVY)	X					
MASK 2 (RTS)		X				
MASK 3 (A/L)						
MASK 4 (FA BN CF1)						

Figure 1. During antijamming drills, the battalion S3 can shift nets to ensure good battery and battalion communications.



and the battalion fire direction officer. By including the fire direction officer, he helped ensure that battery moves would not interfere with planned fires. The S3 used the operations matrix shown at figure 2 in the planning phase. It is similar to the fire support matrix used by many field artillery units in that it uses trigger points to prompt decisions. The sample matrix portrays an offensive operation and demonstrates the use of phase lines, groups, series, and check points as trigger points.

The key to making the matrix work proved to be good communication and coordination with the task force fire support officer. He must inform the battalion S3 when maneuver units cross the trigger points.

Filling in the matrix prior to the fight forced the battalion's leadership to war-game the entire battle from the line of departure to the objective and beyond. Of course, the battle never developed as planned, but the process of planning made everyone aware of what should and could happen. To deal with the "fog of war," the S3 had to alter the plan as the battle developed, but constant referral to the matrix allowed him to keep in mind the basic plan and made sure that he did not forget to move a key element during the heat of battle. It also provided some assurance that if the S3 was killed, someone else could pick up the matrix and continue the fight.

In the defense, the battalion's leaders used time lines provided by the S2 section to trigger artillery moves. For example, when the enemy's lead elements were 1 hour away, the 5-29th FA's leaders moved all support elements from the firing batteries well to the rear. At a half hour out, the S3 gave the batteries a prepare to march order. Fifteen minutes out pulled the trigger for the actual march order.

The battalion commander and S3 attended all maneuver briefings and were part of the supported commander's orders group. This single step contributed greatly to the artillery's understanding of the task force commander's intent. Artillery participation also guaranteed the receipt of maneuver graphics and face-to-face coordination with the fire support officer.

These procedures proved critical with respect to airspace coordination areas (ACA) and maneuver routes. The S3 had to know where to position batteries so they could continue to support when ACAs were in effect. He also had to find out which routes the maneuver units would take so he could position batteries out of the maneuver unit's way.

	LD	PL RED	PL WHITE	PL BLUE	SERIES DAN	COMPLETION OF GROUP DBA	CP 30	PL GREEN
ABTRY	PREP TO MARCH ORDER	MOVE TO PSN 18 AOF 4800			PREP TO MARCH ORDER	MOVE TO PSN 8 AOF-5400		
B BTRY		PREP TO MARCH ORDER	MOVE TO PSN 16 AOF 4900			PREP TO MARCH ORDER	MOVE TO VIC 3km W OF PSN 2 AOF 5500	
C BTRY			PREP TO MARCH ORDER	MOVE TO PSN 12 AOF 5000			PREP TO MARCH ORDER	MOVE TO PSN 1 AOF 5600
HBB	JUMP TOC PREP TO MARCH ORDER	JUMP TOC MOVE TO PSN 15	MAIN TOC PREP TO MARCH ORDER	MAIN TOC MOVE TO JUMP TOC LOCATION	JUMP TOC PREP TO MARCH ORDER	JUMP TOC MOVE TO PSN 9	MAIN TOC PREP TO MARCH ORDER	MAIN TOC MOVE TO JUMP TOC LOCATION
SVC BTRY		JUMP TRNS PREP TO MARCH ORDER	JUMP TRNS MOVE VIC 2km SW OF PSN 15			JUMP TRNS PREP TO MARCH ORDER	JUMP TRNS MOVE VIC 1km N OF PSN 9	
RADAR			PREP TO MARCH ORDER	MOVE TO PSN R1 AZ 4900			PREP TO MARCH ORDER	MOVE TO PSN R2 AZ 5400
ADA			PREP TO MARCH ORDER	MOVE TO PSN ADA-1			PREP TO MARCH ORDER	MOVE TO PSN ADA-2
A/6-240 (R)	PREP TO MARCH ORDER	MOVE TO PSN 22 AOF-5100			PREP TO MARCH ORDER	MOVE TO PSN 6 AOF-5300		
B/6-240 (R)		PREP TO MARCH ORDER	MOVE TO PSN 14 AOF-4800			PREP TO MARCH ORDER	MOVE TO PSN 3 AOF-5200	
C/6-240 (R)			PREP TO MARCH ORDER	MOVE TO PSN 10 AOF-4900			PREP TO MARCH ORDER	MOVE TO PSN 4 AOF-5300
INF SCOUTS		MOVE ONE TEAM TO OP BRAVO	MOVE ONE TEAM TO OP DELTA		MOVE ONE TEAM TO OP ECHO		MOVE ONE TEAM TO OP GOLF	

Figure 2. The fire support matrix is used in the planning stages of the battle. This matrix portrays an offensive operation and demonstrates the use of phase lines, groups, series, and check points as trigger points.

Attending the task force meetings also allowed the S3 to plan support for company-sized contingency missions. And that planning paid off. Every time the battalion's supported maneuver unit received the warning order for such a mission, the batteries prepared, manned, and executed preplanned two gun supplementary positions to provide the needed support.

The battalion used the jump tactical operations center frequently during offensive operations. The key was to stay up close to the battle. The communications-electronics staff officer performed the reconnaissance and selection of tactical operations center (TOC) locations. He sought positions which provided cover, concealment, and good radio communications. The jump TOC was light—one 1/4-ton truck and one of the fire direction center's M577A2 command post vehicles. Personnel from S3; S2; nuclear, biological,

and chemical; and the fire direction center; manned both the jump and main tactical operations centers.

The S3 tried two employment systems for controlling the operations centers.

- Keeping the jump and main TOC separate for survivability.
- Bringing the main TOC up to join the jump when it was in position.

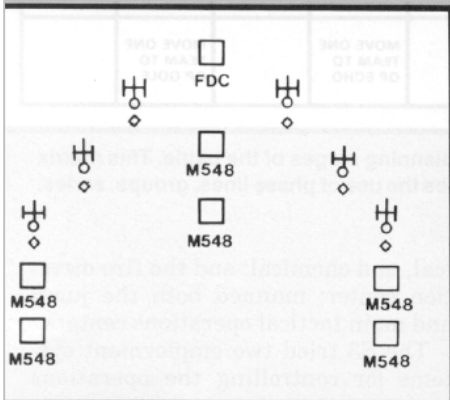
The latter method proved preferable because operating separately caused the battalion fire direction center to work understrength and also deprived the S3 of critical intelligence assets.

The battalion used wire extensively during the defense. In fact, wire lines linked all batteries, radars, the battalion fire support officer, and the maneuver brigade. This network contributed significantly to coordination and reduced the entire organization's electronic signature.

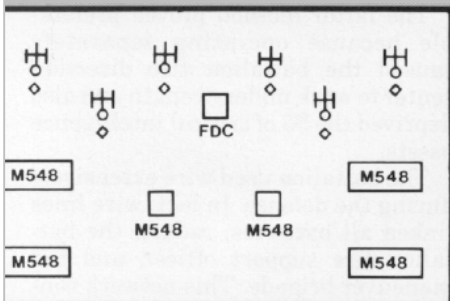
Locally purchased hand-held radios proved to be a distinct advantage. From convoy control to laying batteries in hasty occupations, they allowed far more efficient operations. They were also useful when the batteries dispersed their howitzers over considerable distances.

The battalion's leaders could not overstress the importance of the battery operations center (BOC). It must function as an alternate fire direction center and provide an intelligence center to keep the battery informed of the enemy situation. The BOC must have the same priority for support as the fire direction center in all respects—radios, personnel, and equipment.

The biggest problem artillery units experience in the offense is keeping up with their supported maneuver organizations. If the S3 does not push his batteries forward, he will find himself out of range and out of action. In several battles, the 5-29th FA had two batteries in position ready to support, and a third one moving behind the trail maneuver unit. When the maneuver units got bogged down or when the trailing battery reached a predetermined point within range of the objective, it would stop. The S3 would then move one of the other batteries.



**Figure 3. The desert wedge formation allows a battery to stop and shoot at any time.**



**Figure 4. The normal battery position can be achieved easily from the desert wedge.**

When they moved across the wide, flat terrain the batteries employed the "desert wedge" formation shown in figure 3. This formation allows a battery to stop and shoot at any time. What's more, it is an easy formation to control and provides immediate, all around security. Transition into the normal battery position depicted in figure 4 is relatively easy.

## Fire Support

The key to success at the National Training Center is *knowing your enemy*. Knowing opposing force doctrine and applying that knowledge in the intelligence preparation of the battlefield is essential in developing a good fire support plan. This is especially true in the live fire portion of the rotation. The scenario and its computer support apply opposing force doctrine without exception. Therefore, using doctrine to key fire support timing will yield good results.

Fire support planners must also remember to key firing to *events*, not *times*. Task forces miss line of departure times, and preparations fired at a predetermined time may lose their value. The same applies for firing smoke. The task force fire support officer must keep abreast of the maneuver situation and the task force commander's intent. He can then initiate fires when the task force's units are in positions to benefit.

Control and coordination measures like airspace coordination areas must be simple but adequate. All the players—fire direction officers, fire support officers, air liaison officers, and forward air controllers—must understand the coordination measures. They must know who implements them and when.

Fire support officers should take advantage of all available assets. For example, task force fire support officers can call upon the brigade fire support officer and air liaison officer when ground forward air controllers become casualties. Another example concerns electronic warfare. Given a jammed frequency, electronic warfare representatives can react quickly. On one occasion, electronic warfare personnel produced a grid within minutes. Artillery fires delivered on the grid eliminated the jamming.

Finally, *advanced training* on engaging moving targets is a *must*. The training set, fire observation and innovative techniques using the position and azimuth determining system jeep to simulate hitting moving targets proved useful.

## Delivery of Fires

*Discipline* is the key to success for delivery of fires, especially on fire nets. Fire direction officers must know and practice the standardized procedures needed for massing, read back battery, and the order of acknowledgment. What's more, the batteries should know what to do and who assumes control in the event that the battalion fire direction center is lost.

## Intelligence

The 5-29th FA discovered the importance of their S2s at the National Training Center. Upon receipt of a target overlay, the S2 checks it against the avenues of approach, target area of interest, named area of interest, and decision points produced during the intelligence preparation of the battlefield process. These comparisons can highlight some serious deficiencies in the fire plan. The S2 can also advise the S3 on whether or not groups and series of targets are aligned correctly based on how the opposing force units will be deployed in their formations. This is especially valuable in the live fire defense operations.

During battle, S3s must use all available radar and air reconnaissance assets. The S2 must also prod the maneuver S2 for information and make face-to-face contact to compare information and planning.

During the force-on-force phase, the 5-29th FA made particularly good use of a squad of infantry from a Colorado Army Reserve unit. Four two-man teams operating in 1/4-ton vehicles provided early warning and intelligence. They proved invaluable in keeping the S3 and S2 informed. When the fire support officer was swamped, it was nice to have someone out there whose only function was to tell the S3 where the task force and opposing forces were.

The jump S2 requires all the references, maps, radios, and assets required at the main tactical operations center. Prior planning and lots of practice will prevent degradation of operations during the jump.

## Survival

The National Training Center places a premium on positioning, hardening, and movement. Commanders must take the time to view positions from afar. This simple step greatly enhances their use of the

ground, and it often encourages them to make maximum use of wadis.


Units should also take prefabricated overhead cover to the National Training Center. The 5-29th FA took 4x4s, plywood, and sandbags. Once the battle begins, all position improvement stops. In the offense, survival depends on dispersion, and for any position, whether it be trains or a firing battery, dispersion remains key to survivability.

The battalion also profited immensely from preparations in the nuclear, biological, and chemical area. Chemical casualties were minimal because batteries knew the opposing force's chemical doctrine and developed drills to react to chemical attacks. This included automatic masking upon artillery attack, rapid chemical detection and identification, and strict adherence to unmasking procedures.

Practicing combat missions in mission-oriented protection posture (MOPP) level IV at home station helps tremendously. Overall, the 5-29th FA processed nearly as many fire missions in MOPP IV as in MOPP I and II. Despite the additional burden, the battalion was able to perform its mission with minimal degradation.

### Conclusion

The National Training Center provides a great learning experience. Artillery units get a chance to do all those things they should be doing but can't because of local safety or administrative constraints. The value of this experience soars for units that prepare in-depth for their rotation. That's why the planning and rehearsals recommended by this article are so important

to your success. The Redlegs of the 5-29th FA are convinced that the success they achieved is directly proportional to the quantity and quality of their preparations. And they're especially convinced that in today's artillery, the National Training Center is the proving ground for professionals. 

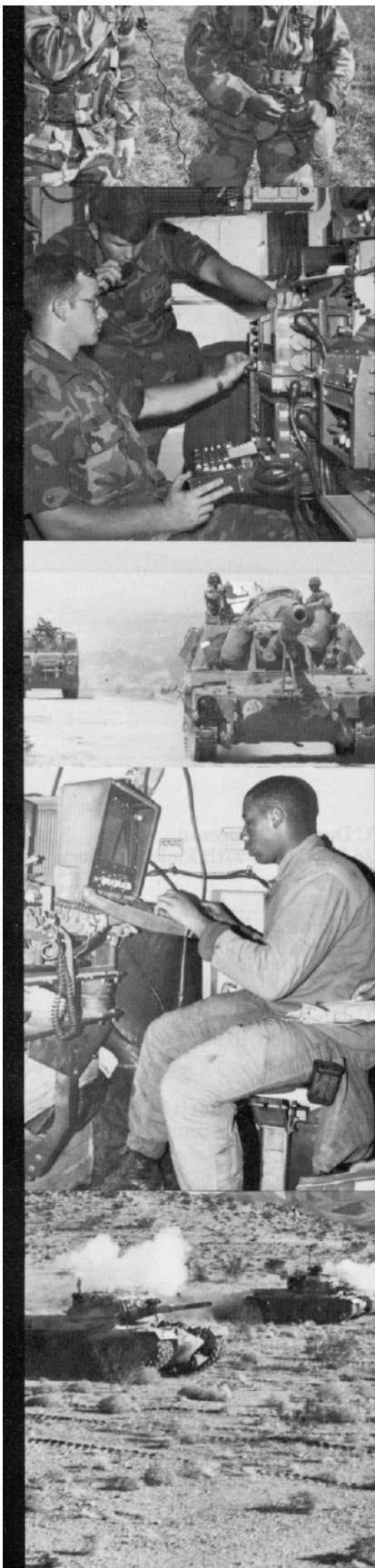
**Major Thomas B. L. Stanford, FA, is the S3 to the 5th Battalion, 29th Field Artillery, 4th Infantry Division, at Fort Carson, Colorado. He was commissioned from the United States Military Academy and is a graduate of the Field Artillery Officer Basic and Advanced Courses. His previous assignments include tours in Germany and Turkey.**

# Command Update

## NEW REDLEG COMMANDERS

COL Josue Robles, Jr. 1st Infantry Division Artillery	LTC Douglas E. Taylor 4th Battalion, 9th Field Artillery	LTC Daniel M. Ferezan 2d Battalion, 77th Field Artillery
LTC Edward J. Dewey 2d Battalion, 8th Field Artillery	LTC George J. Blanc 3d Battalion, 16th Field Artillery	LTC Dennis K. Hill 1st Battalion, 80th Field Artillery
LTC Dennis A. Phelps 3d Battalion, 8th Field Artillery	LTC Ronald R. Rollison 2d Battalion, 17th Field Artillery	LTC James E. Elliott 3d Battalion, 319th Field Artillery
LTC Thomas L. Brown 5th Battalion, 8th Field Artillery	LTC Ross L. Nagy 1st Battalion, 18th Field Artillery	LTC George H. Stinnett 512th Artillery Group
LTC Robert C. Brand 6th Battalion, 8th Field Artillery	LTC Alan H. Walter 2d Battalion, 21st Field Artillery	LTC Burt A. Vanderclute II 552d Artillery Group
LTC Thomas E. Stalzer 8th Battalion, 8th Field Artillery	LTC Gene Page 5th Battalion, 29th Field Artillery	
LTC Herbert W. Reichert 1st Battalion, 9th Field Artillery	LTC Roy L. Clark III 3d Battalion, 37th Field Artillery	
LTC David E. Bronner 2d Battalion, 9th Field Artillery	LTC Walter L. Mayew 2d Battalion, 39th Field Artillery	

In the March-April 1986 issue of the *Journal*, LTC James E. Record was listed as the commander of the 6th Battalion, 27th Field Artillery. LTC Record is the commander of the 6th Battalion, 37th Field Artillery.



# Some Modest Proposals

by Colonel Creighton W. Abrams, Jr.

**F**or as long as anyone can remember howitzer battery and battalion evaluations have driven field artillery collective training, and gunnery has driven the evaluations. Annual reductions in ammunition allocations, the addition of numerous nuclear, biological, and chemical (NBC) tasks; the integration of the battalion Army training and evaluation program (ARTEP) into the nuclear certification process; and the advent of the tactical fire direction system (TACFIRE) have challenged the traditional preeminence of gunnery. But only the nuclear tasks have achieved any kind of parity, primarily because the ARTEP report is carefully examined by the technical validation inspection team.

### Today's ARTEP

The 18 month nuclear certification timetable has also compromised the train-evaluate-train process of the ARTEP. There should be a strong link between a battalion's formal evaluation and future training; but when the last ARTEP was 18 turbulent months ago, no battalion commander can assume that his last evaluation is a proper measure of his unit's strengths and weaknesses. And if the division artillery's senior leaders have changed, even the standards may have altered. In reality each battalion needs to be "reblued" for the ARTEP, which has become a once-in-a-command-tour thrill.

In Europe even the mechanics of an 18-month cycle are problematic. Local training areas permit only the most limited dry fire training, and artillery units must compete with maneuver organizations for the same turf. Consequently, artillery battalions preparing for their live fire certification ARTEPs rely heavily on training at Grafenwoehr, the primary major training area for more than 50 maneuver and 40 field artillery battalions.

The tremendous compression of live fire training at Grafenwoehr requires tight safety controls. The buffer zone, for example, includes parts of several computerized direct fire ranges.



**Battery and battalion formal evaluations demand that field artillery commanders pay close attention to the quality of field training and readiness.**

Maintenance shuts those ranges down for 6 hours each day and reduces the available impact area. The entire training area is surrounded by German towns and villages whose authorities have won noise-abatement concessions which limit firing on Sundays, holidays, and between midnight and 0600 on all other days. Trying to shoot, move, and communicate in the middle of all these restrictions is an administrative nightmare.

Watching a division artillery headquarters conduct a full-blown, live fire nuclear certification evaluation is like watching a horse walk on its hind legs. It's not a question of how well it is done; one is astonished it's done at all. The tenets of AirLand Battle doctrine betray the remarkable eccentricity of our training approach. Our doctrine insists on agility, synchronization, depth, and initiative. But in our training and evaluations we find ourselves focused on a minuscule impact area as well as on a myriad of safety and administrative restrictions.

### Micro- or Meatball Surgery?

Remember the fictional Charles Emerson Winchester, the Harvard Medical School graduate who replaced the incompetent Frank Burns on *MASH*? On their first show together, Hawkeye Pierce tells Winchester that at *MASH* 4077 they do "meatball surgery." That is, they have to use surgical techniques which are both effective and *quick* in order to have the

best chance of saving all the casualties. That's a pretty good description of what a direct support 155-mm battalion can expect on the future battlefield—too many customers.

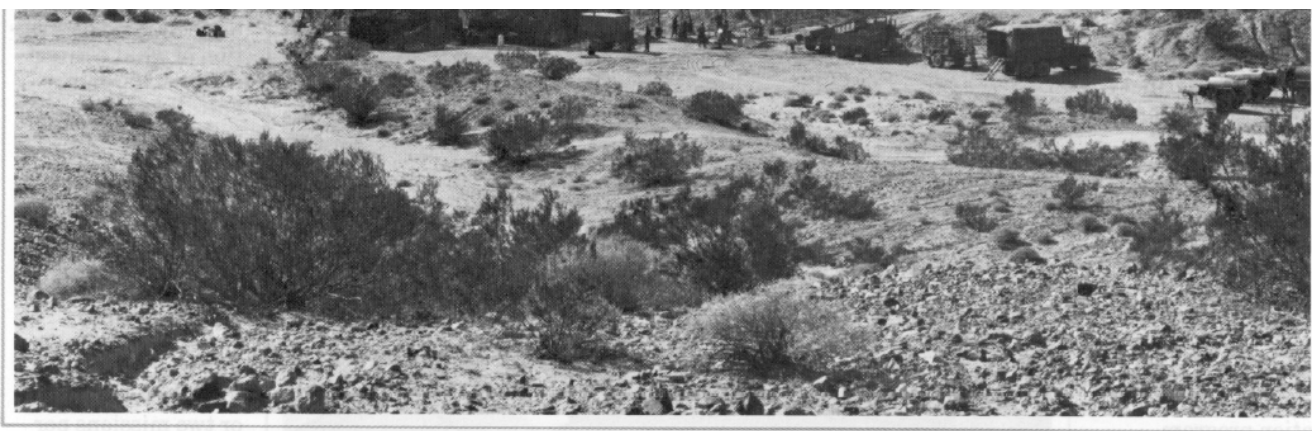
But how do we train? Our live fire ARTEP, dominated by gunnery and nuclear tasks, progresses one mission at a time. In fact, we usually average one or two missions per hour. We're training to be like Charles Emerson Winchester, who tells Hawkeye, "I do one job; I do it very, very well; and then I go on to the next."

The most recent example of the illogic of this training approach is the ARTEP for the multiple launch rocket system (MLRS), the precursor of automated, autonomous systems. The MLRS self-propelled loader launcher needs only meteorological data, the grid of the target, and the number of rockets required to solve the gunnery problem. The onboard computer, navigation system, and three-man crew take care of the rest. Even though the MLRS can be fired into a small impact area like Grafenwoehr's, a live fire MLRS ARTEP would be almost pointless for two reasons.

- The first is *safety*. The fire control instruments are virtually inaccessible to external view. Trying to safety all nine battery launchers throughout an ARTEP would be a ludicrous waste of time and energy.

- But the overriding reason is that a live fire MLRS ARTEP would *focus* too much on the easy part—gunnery—and too little on the tough parts—command, control, movement, and logistics.

The MLRS challenge is not gunnery but rather trying to keep up logistically with the very agile launchers and to integrate them into the division or corps battle. Ideally, the MLRS battery evaluation should occur in conjunction with a division or corps command post exercise (CPX) played over great distances on terrain which will challenge the battery's ability to resupply itself and still be able to attack the array of targets generated by the command post exercise game board.



The ideal MLRS battery evaluation should occur in conjunction with a division or corps command post exercise played over great distances on terrain which challenges the battery's performance abilities.

## Who's Wagging the Tiger's Tail?

Formal, live fire evaluations of battalions equipped with TACFIRE have similar problems. This automated fire support system is supposed to give us the agility to hit the enemy before he hits us—or to upset his timetable. It promises the ability to synchronize—via digital nets and a central computer—the many different pieces of the close-in, deep, and rear battles. In theory, it should enable the fire support elements at every level to advise the maneuver commander how he can take the initiative away from the enemy. The addition of the Firefinder radar, easily the fastest and most accurate radar in the world, should enhance the potential of TACFIRE even more. But almost none of this capacity is effectively evaluated on a live fire ARTEP.

TACFIRE is a technological tiger. We can either master it or it will consume us. When I joined the Army, we had equipment "made by geniuses to be used by idiots." TACFIRE was *made* by geniuses to be *used* by geniuses. It's like original sin; we get to pay for what someone else did. TACFIRE presents an unprecedented training challenge, not just because of its complexity and "user-hostility," but because it pervades *every aspect* of a fire support system which must be able to function in the heat of battle, what Clausewitz called the friction of war.

Just consider this example. On a certifying battalion ARTEP last summer, the 3d Infantry Division Artillery had just finished dry fire and was about to crank up with real bullets. The units routinely do

not register, but Grafenwoehr requires a check round from each battery before shooting begins in earnest. The fire support team and the guns were ready for the check rounds, but suddenly the TACFIRE shelter's 15-kilowatt generator went down. It was a "catastrophic failure"—not of the system, but of our *people*. We had become so mesmerized by the necessity to use TACFIRE on the ARTEP that we could not even come up on a voice net and shoot three check rounds while the TACFIRE shelter dealt with the generator problem. The tiger was eating us.

## It's Time to Act!

The time for reform is *now*. We need a training renaissance, a concentrated, evaluative system for:

- Training at our real job—fire support and combined arms orchestration.
- Mastering TACFIRE and other technology.

The National Training Center (NTC) at Fort Irwin, California, has begun such a renaissance for the mechanized task forces in the continental United States. It is a superb laboratory which demonstrates how well units have mastered the synchronized application of combined arms operations against an enemy who thinks, practices, and plays only home games. The hot, arid NTC is our Carnegie Hall, but what we need is a good way to have sections, batteries, and battalions practice before they get there.

The closest thing to that rehearsal hall today is arguably the TACFIRE park the 9th Infantry Division Artillery built at Fort Lewis, Washington. It fosters training that

is repetitive, results-oriented, reviewable, sparing of resources, and reasonably realistic. More significantly, it brings a school-house approach to *collective* training. In that regard it's also revolutionary. Unfortunately, it won't work in Europe where battalions are all spread out. What's more, it doesn't integrate the other six major Army systems, and it doesn't fix what I call the "ARTEP problem."

In the three modest proposals which follow, I outline some ideas which I hope will contribute to a collective training renaissance. These pieces embody two major themes:

- **Bigger is not better**—Good training usually comes in small enough chunks to ensure a firm grasp of essential skills from section level to fire support for a maneuver brigade. By training and *evaluating* these skills frequently, we can tap the real strength of the ARTEP. Both the ARTEP manuals and the training-evaluation-training-evaluation cycle they espouse combine to yield an excellent system. We have simply focused too much on the formal *battalion* evaluations and too little on our *sections and systems*.

- **Getting enough out of dry fire training**—Live fire training is primarily gunnery training. Dry fire work can benefit any kind of training, including gunnery. It has the best potential for preparing us for AirLand Battle. If we work at it, dry fire training can give the field artillery the lead in combined arms training. We should pursue that goal because we have a vested interest in making synchronization work.

# A First Proposal

## The Five

# Rs

**O**ne formula for good training is what I call the five Rs—**repetition, results, review, realism, and resources.** Almost every successful athletic coach uses them. For example, no self-respecting football coach would stand up in front of his team on the first day of the spring workouts and say, "OK, half of you put on blue jerseys; the other half put on white ones. Let's scrimmage!" Scrimmaging is certainly *realistic*, but to be meaningful it should follow repetitious conditioning and drills. Good coaches check each player's progress or *results* at each practice and *review* with them what they're doing right or wrong. Furthermore, at the end of each practice, the coaches also review the whole team's progress and what will happen at future training sessions.

Even after the season has started, players must practice, sustain, and improve their basic skills. Good coaches also carefully manage resources—time, energy, and player health. To do this they plan practices that provide a balance between scrimmaging and fundamental drills.

That's the way Army units should train, but we don't. Instead we've concluded that the only realistic training is live fire. That's a mistake. Our live fire Army training and evaluation program (ARTEP) is a unique combination of gunnery, artillery safety, real ammunition handling, movement, occupations, logistics, maintenance,

and hundreds of other complicated tasks. It is probably the most realistic ARTEP in the Army and certainly the most demanding. But as my earlier article suggests it may not be the best training or evaluative tool available.

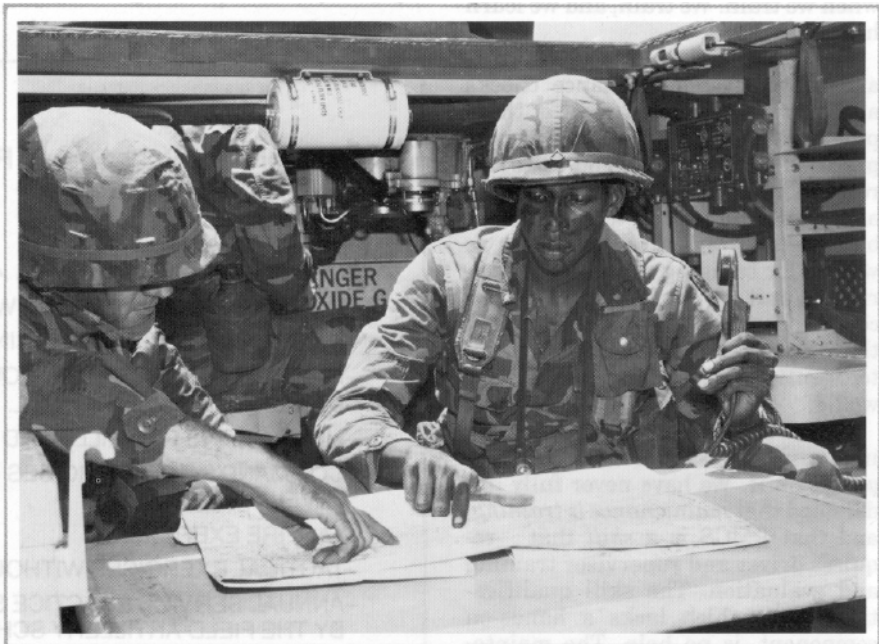
## Repetition and Results

Most training should be in small enough chunks to permit the kind of repetition and results we get from physical training (PT) and preventive maintenance checks and services (PMCS). Physical training takes place three or more times a week and is evaluated every six months. Preventive maintenance checks and services occur daily and weekly, and we evaluate them quarterly or semiannually through technical inspections, scheduled services, and maintenance evaluation team inspections. Field artillery collective tasks, on the other hand, are *primarily* validated via the ARTEP, which for a battalion is every 18 months.

Imagine what our operational readiness rates would be if we ran our maintenance programs the way we

conduct collective training. I believe our equipment would be in shambles. Remember, we don't track collective training results the way we do maintenance—unit status reports, prescribed load list zero balances, oil analysis completion rates, and maintenance evaluation team inspection reports. We have deluded ourselves into thinking that collective skills are harder to train and evaluate than maintenance and individual skills. Not so! Howitzer section and fire direction center tests in particular have been with us a long time; we just haven't exploited their potential.

To ensure that there is some connection between training and evaluation—between repetition and results—we need to measure the results of our collective training as regularly as we do the results of our maintenance—weekly, monthly, or quarterly at battery and battalion levels. We are already doing this in individual training in conjunction with the commander's evaluation portion of the individual training and evaluation program. Why not adopt the good coach's approach in the collective arena as well?



**Concentrated training, evaluation, and competition builds excellence at battery and battalion levels. The competitions measure not only results, but also establish higher standards.**

Specifically, our battalions and division artilleries need to conduct better tests and competitions not only to measure results, but also to set better standards. These formal tests and competitions should probably occur quarterly or semiannually. More often than that can detract from training itself; less often than that breaks the link between training, evaluation, and follow-on training.

Of course, how often training should be repeated depends on the skills addressed. Fort Sill's guidance on the tactical fire direction system (TACFIRE) training calls for an inordinate but oftentimes necessary 20 hours a week. Each commander must assess his unit's abilities and requirements and then set realistic goals.

Concentrated training and evaluation builds excellence. Ranger battalions have some variety, but mostly they stick to the basics—lots of basics. And because of their attention to the basics they are very good. The point is that we will not do well those things which we do not practice regularly.

## Review

Review, the third R of training, is what separates smart trainers from dumb ones. Without review, repetitive training can be mindless and even counterproductive. Review should include not only checking the results and discussing ways to improve, but also examining the training process itself. That is, we always do two things when we train. We train, and we learn how to train.

To return to the physical training and preventive maintenance checks and services examples, most of these programs tend toward mindlessness precisely because they tend to go unreviewed. The new PT manual, for example, has numerous techniques for building different kinds of fitness as well as for bringing much-needed variety to unit PT programs. Yet too few commanders take the time to review the manuals and their programs intelligently. Most soldiers wish they would.

PMCS is even worse. We know it's important, so we put command emphasis on it. We have never fully understood that *maintenance is training*, and that PMCS is a *skill* that requires driver and supervisor training and evaluation. The skill qualifications test, which lacks a hands-on component, is no help. The maintenance evaluation team (MET) inspections contribute a bit, but they are too infrequent.

The command emphasis and measurable standards of the maintenance evaluation team cause most commanders to rely on "experts," and "murder-pits" to get ready. The experts and the equipment do well, but the operators and first-line supervisors' maintenance skills are never tested. Because the demands on the experts to inspect and repair are so great, their ability to train soldiers suffers. The standard test equipment-internal combustion engine provides us an unprecedented diagnostic capability; but we don't use it because we don't train or test our mechanics' *ability* to use it.

The root of this training shortfall is that we review equipment readiness via statistics but not the maintenance skills of the soldiers who are supposed to know how to check, inspect, service, and repair the equipment. Our materiel readiness statistics tell us that the Army Maintenance Management System works well—and it does—in peacetime. But at the National Training Center we have learned that when isolated on the battlefield, our drivers, first-line supervisors, and organizational maintainers don't know or do their maintenance business as well as they should. The bottom line is that repetition without results and review does not lead to good training or good maintenance.

## Realism

What may be "new" in the five Rs is my concept of *realism*. In general, the

fourth R is the most misunderstood element of training in the field artillery. How many times have we said, "If it isn't real bullets, preferably live fire RSOP, it just isn't training"? Demanding too much realism, like that, defeats the other three Rs. It is like scrimmaging on the first day of practice.

Realism is not the meat and potatoes of good training. Repetition, results, and review are. Realism is the spice that keeps training interesting and that captures soldiers' imaginations. But like all spices, it should be used in sparing doses. Instead of enhancing the flavor, it can disguise something spoiled. All we really need to do is to get over the soldier's threshold of credibility and persuade him that he is acquiring needed skills. Moreover, we have fallen behind our maneuver brethren by not recognizing that dry fire training is usually *more realistic* than live fire, especially in the combined arms arena. The accompanying figure captures some examples of good training adequately flavored with realism.

## Resources

Resources, the fifth R, often threatens to become the *only* R that counts when decisions are made. Commanders already think there is not enough time, money, training ammunition, and land. But then they plan the most costly training imaginable.

Reconnaissance, selection, and occupation of position (RSOP), for example,

### Examples of Reasonably Realistic Training

- MASK DRILLS.
- SHOOTING A PENCIL WITH A .45 CALIBRE PISTOL.
- POINTING A CLEANING ROD WITH AN M16 RIFLE.
- MOST COMMON TASK TRAINING.
- FIRE DIRECTION CENTER, HOWITZER, AND RADIOTELETYPE, DRILLS IN THE MOTOR POOL.
- MOST OF THE PT DRILLS AND GAMES IN THE NEW FM 21-20
- COMMAND POST EXERCISES DONE AT BATTALION OR HIGHER LEVEL.
- TACFIRE EXERCISES.
- TACTICAL EXERCISES WITHOUT TROOPS.
- ANNUAL SERVICE PRACTICE STYLE GUNNERY, AS PRACTICED BY THE FIELD ARTILLERY SCHOOL AT FORT SILL, OKLAHOMA.



is often resource intensive; but it doesn't have to be. The key to RSOP is a well-trained advanced party and a good occupation plan; the main body simply does as it is told. Using the first of the four Rs—repetition—a good battery commander will initially spend a lot of time training his advanced party. A good battalion commander will not only conduct an advanced party tactical exercise without troops for all his commanders, but he will also direct them to watch other batteries RSOP. This approach to training conserves resources and is more effective than letting battery commanders go out with their entire units and RSOP on their own.

The fact of the matter is that the American Army in general and the American field artillery in particular have been spoiled by the great "Arsenal of Democracy." We waste resources. Live fire training too often is used to discover good gunnery techniques rather than to confirm them.

Battalion commanders are hesitant, particularly if they believe in "power down," decentralized training

rather than direct repetitive, results-oriented, consolidated, and reviewed training. In this sense, resource constraints may be a blessing in disguise. They may force us to train more effectively as well as more efficiently. By using our heads we should be able to train *better* and cheaper.

Training devices, which usually promise more than they deliver, are not always the best avenue to better training for less resources. The best training device is the trainer's imagination. It is the one training resource we have in great amounts but don't often use.

## Conclusion

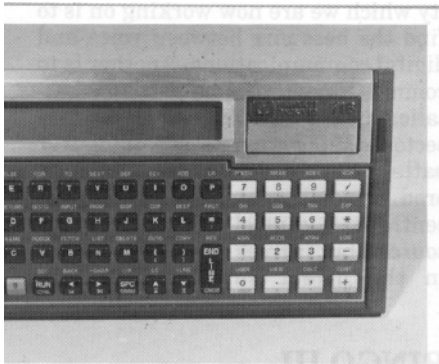
One of the lessons of military history is that between wars the officer corps which best conceives how the next war and training accordingly will be fought has the best chance of winning in actual battle. Whenever we encourage officers to plan training which really wrings out not only collective skills but also the new technology being fielded, we are making

them think about that future battlefield. And whenever we use the five Rs we are taking a giant stride toward ensuring that such training occurs.

### Using Some of the 'Rs'

Here's one small example of how the first three R's should work. While preparing for its battalion ARTEP, one of our units determined that its biggest weakness on TACFIRE fire mission processing was time spent sending the mission by digital message device. One lieutenant decided that what was really needed was concentrated drilling on the digital message device. In a few hours he reduced his team's times by two-thirds. Review and results were critical to determining the problem; and repetitious, dry fire drilling was the necessary corrective action. Review, repetition, and results are an old formula, but they remain the guts of all performance-oriented training. We simply must practice what we preach.

# A Second Proposal



In the fourth voyage of *Gulliver's Travels*, Lemuel Gulliver visits the land of the Houyhnhnms—an intelligent, highly civilized race of horse-like beings. After a series of lengthy discussions with the Master Houyhnhm, Gulliver realizes that the Houyhnhnms are superior to the humans back home. In fact, when he returns to England, Gulliver can't stand to be with his own, inferior kind. He prefers instead to spend hours with the ordinary, dumb horses in his stables. To the eighteenth century reader this was an image of subverted reason—of the dumb horse riding the rational man.

The battery computer system (BCS) and its predecessor—the field artillery digital automatic computer (FADAC), are a lot like those horses. They're fast and accurate, but they need to be understood and controlled or they will control us. Every fire direction officer who does not have a firm grasp of how the BCS solves the gunnery problem and what data goes into the BCS risks becoming another

Gulliver. Whenever a fire direction officer or battery commander says that the brains of the fire direction center are in the BCS, he's probably right. If we do not understand *how* and *why* these and other technical marvels—the position and azimuth determining system (PADS), the backup computer system, the gun display unit, and the M90 chronograph—give us the most accurate fires we have ever had, then that technology will gallop off without us. Training to master that technology—with the implied mission of mastering all elements of the gunnery solution—is hard work. Technology is no free lunch.

BINGO was conceived as a way to help master this technology. It began as a competitive dry fire gunnery exercise conducted, like most bingo games, every Wednesday. Instead of using a 14.5 range or the training set, fire observation, we put the fire support teams on real hilltops across the German countryside. PADS jeeps, because they could provide an excellent check on target location errors, were

the targets. At least three tactical fire direction system (TACFIRE) shelters linked to battery computer systems computed the same firing data. Forward observers competed for accuracy and time on each mission. To ensure that the firing data could be checked for accuracy, the same target location was sent to all three shelters, who then began their competition. A scoreboard on the hill and another at the TACFIRE location kept track of time, accuracy, procedural errors, and the winners. The fire support teams got an extra dose of realism because they were practicing on terrain similar to where they could expect to fight.

This initial concept evolved by the simple mechanism of requiring the division artillery's battalions to rotate the responsibility for planning and executing each BINGO exercise. As the complexity of the exercises increased, their frequency decreased to once or twice a month. That meant that each of the four battalions and division artillery headquarters sponsor a BINGO about once a quarter. Battalion exercises last 1 or 2 days; division artillery BINGOs take 3 or 4 days.

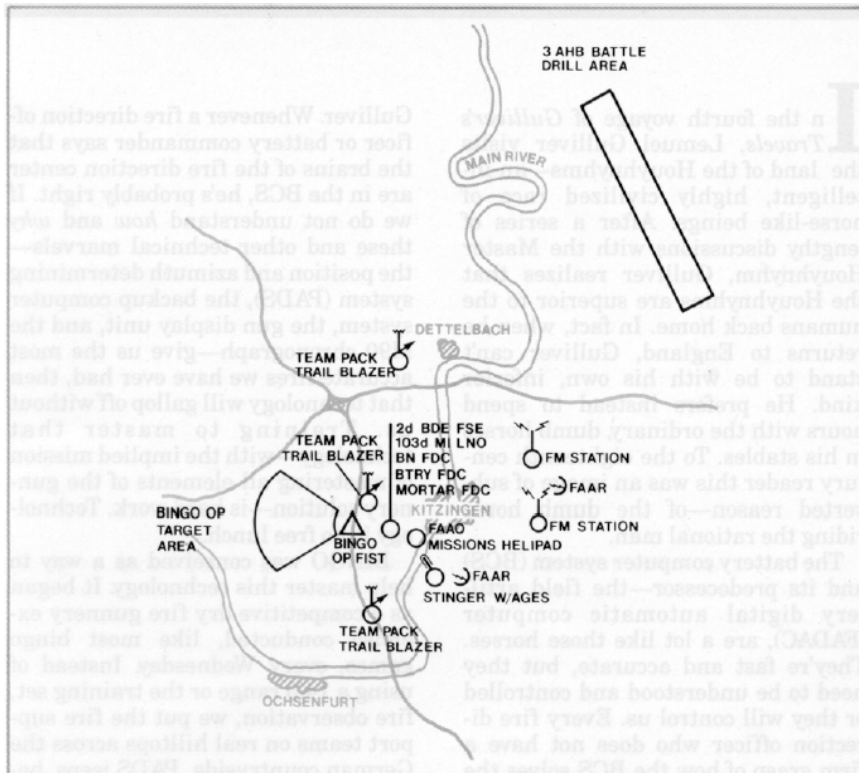
Four sample exercises will show the variety of BINGO exercises as they have evolved and are still evolving. The only requirement is that in each exercise we measure output or keep score in some way.

## BINGO I

One of the early exercises which was both flashy and fun had a lot of players. The set-up looked like the figure below.

The radar-seeking Teampack flashbase from our divisional military intelligence battalion tried to locate the surveyed positions of the Firefinder and air defense radars in the maneuver rights area. The radio-seeking Trailblazers looked for stationary jeep radios at surveyed locations. Both intelligence systems benefited from our survey and our TI-59 calculators for doing the intersection problem. More significantly, we learned how to acquire and use their data.

The PADS jeeps were targets for the fire support team, and a truck convoy provided the divisional attack helicopter battalion its target. The battle captain called for family of scatterable mines (FASCAM) and then engaged the convoy with the Cobras lurking on station. The FASCAM was late the first time. The Stinger teams equipped with air-ground engagement system-air defense were there to keep the aviators honest. Instead of a FIST, one battalion used armor and infantry platoon leaders as forward observers.



**BINGO I** was one of the early exercises. It was both flashy and fun and used a lot of players.

## BINGO II

The second BINGO didn't look like much; it consisted of just a bunch of TACFIRE shelters, battery computer systems, variable format message entry devices, and digital message devices gathered together on a hill. Each pair of battalions was run through two surge scenarios as shown in the figure at right.

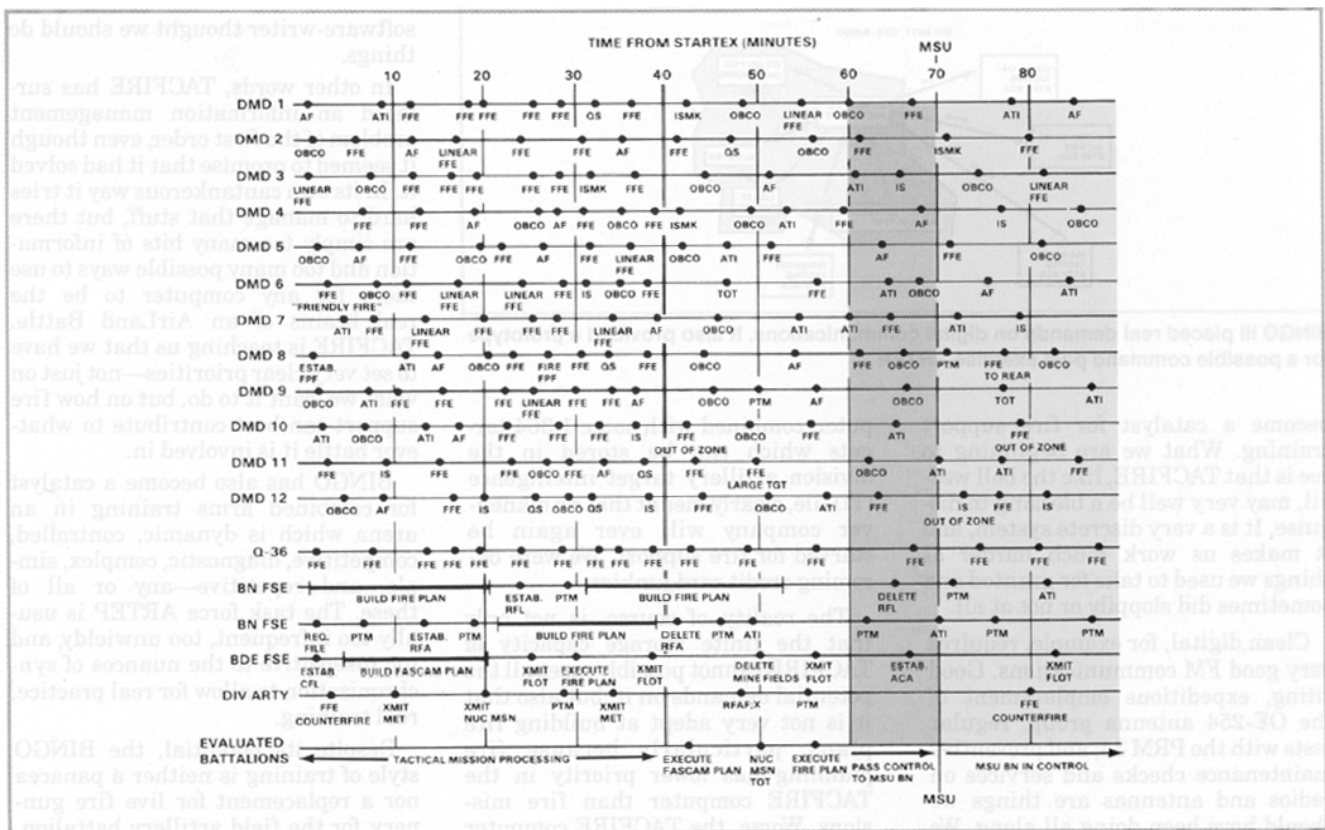
Note that at the 60-minute point the battalion had to transfer control to the mutual support unit. It was a very revealing exercise. In fact, it was the first time we were involved in an exercise which measured firing battery missions fired by the battery computer systems against a reasonable facsimile of what we can expect at the direct support level on the AirLand battlefield. Our best unit processed only 70 percent of the more than 100 fire missions and ignored several tricky events. This "surge BINGO," created by Captain Don McGraw, produced a complete take-home package for each participating battalion. With these results, the battalions' leaders would repeat the entire exercise in their own trackpark.

With lots of practice we should be able to improve on that 70 percent. Remember what *MASH's* Hawkeye Pierce could claim about *MASH 4077*—it did a lot of business and enjoyed a 97 percent success rate. To approach even 95 percent, however, means that we may have to practice some meatball surgery. One possibility which we are now working on is to find the best mix between voice and digital communications. Another is to commit every available artillery battalion in a given maneuver brigade sector to supporting its own maneuver battalion. This violates the time honored principle of maximum feasible centralized control of artillery resources, but it frees up the bottleneck in the direct support battalion

## BINGO III

A third BINGO was the first to place real demands on our digital communications. It was also the first effort to establish a prototype for a possible evaluated command post exercise to Army training and evaluation program (ARTEP) standards. Schematically, it looked like the figure on page 34.

BINGO III was our first successful attempt at running our exercise from a game board. Specifically, the division G3 plans officer used a 1:50,000 map and Dunn-Kempf pieces. Although



**BINGO II** consisted mainly of TACFIRE shelters, battery computer systems, variable format message entry devices, and digital message devices gathered on a hill. It focused on this scenario.

we didn't do a good job of keeping score, we learned three important lessons.

- We were not practicing FM digital communications over realistic distances.
- Game boards have tremendous potential for driving and assessing the fire support system.
- Fire support organizations need maneuver folks at the game table.

## BINGO IV

The latest BINGO was one of our simplest in concept, most difficult to coordinate, and most rewarding overall. It was essentially a game board-driven, fire planning exercise, but the kicker was the participation of an armor S3, two of his company commanders, an air liaison officer, and an engineer. This group drove the exercise. The set-up appears on the following page.

The rewards of BINGO IV accrued chiefly from the interaction among the different combined arms players. At first, the tankers thought they were supposed to request only the kinds of fire support that were acceptable to TACFIRE. They soon learned that sometimes a simple suppression mission on an enemy armor

element can take 20 minutes or more to process. This was some lesson. At the after-action review we determined that the armor target should have been initialized in the TACFIRE computer to be handled as a "volleys" target, not an "effects" target.

Discussing this problem in front of our maneuver brethren revealed that the operators of TACFIRE sometimes do dumb things. Such painful honesty is necessary if we are going to bend the idiosyncrasies of TACFIRE software to fulfill the intentions of the maneuver commander. We also learned that the specialized language of "TACFIRE-ese" must be readily translatable into the simpler language of fire support.

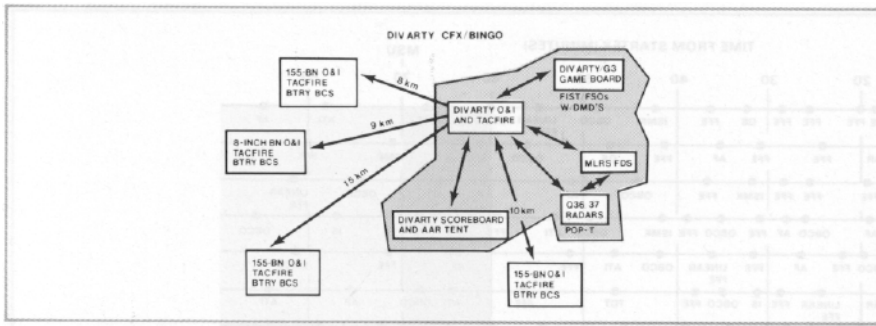
Most important, we saw that we must practice, no matter how harsh the initial sessions, fire support and combined arms synchronization with as many pieces of the seven systems that fight the AirLand Battle—maneuver, intelligence, air defense, logistics, engineer, aviation, and fire support. And we must do so in a rehearsal hall setting, so that as soon as leaders hear a bad note, they can correct it. The ARTEP—maneuver or artillery—is not a good training vehicle for this. BINGO is.

## Some General Observations

In the truest sense, BINGO is nothing more than a catalyst to make things happen. First, it forces our operations people to plan and execute dynamic fire support training as well as grapple with that TACFIRE tiger as it stalks about in the fire support-combined arms jungle. To make a BINGO exercise work, you first have to decide how you think some part or all of that jungle should work. Then you figure out how to practice it and check the results. BINGO is thus an excellent catalyst for learning how to train.

Clearly it is also a catalyst for TACFIRE training. In fact, BINGO was created in large part because, 1½ years after fielding TACFIRE, our skills were atrophying. Combined with our TACFIRE working group, which meets periodically to assess our TACFIRE expertise and hammer out standard procedures, BINGO provides a wide range of data, exercise experiences, and foul ups. Because of BINGO, our TACFIRE group has a fair grasp of what works and what doesn't.

Because TACFIRE permeates our fire support system, BINGO has also



**BINGO III placed real demands on digital communications. It also provided a prototype for a possible command post exercise ARTEP.**

become a catalyst for fire support training. What we are beginning to see is that TACFIRE, like the boll weevil, may very well be a blessing in disguise. It is a very discrete system, and it makes us work much harder at things we used to take for granted and sometimes did sloppily or not at all.

Clean digital, for example, requires very good FM communications. Good siting, expeditious emplacement of the OE-254 antenna group, regular tests with the PRM 34, and preventive maintenance checks and services on radios and antennas are things we should have been doing all along. We fudged them because FM voice—even FM secure voice—worked pretty well without too much effort, kind of like the M1 and M14 rifles before the M16.

Fire planning has always been a flaky, "check's-in-the-mail" proposition, with virtually every fire support team promising untold riches of fire support for the company commander simply by putting some X's on a map and some grids on a piece of paper. When the field artillery digital automatic computer, which stores up to 88 targets, came along each fire support team chief felt that he could tell his company commander that targets were "in the computer." The 300 targets and 30 fire plans in the direct support battalion's TACFIRE computer,

combined with some 1,364 targets which can be stored in the division artillery target intelligence (TI) file, clearly meant that no maneuver company will ever again be starved for fire support. We were becoming credit card junkies.

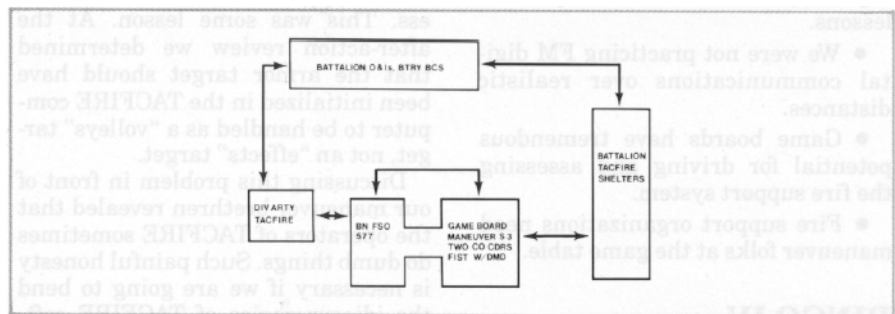
The reality, of course, is not only that the finite storage capacity of TACFIRE cannot possibly meet all the potential demands on it; but also that it is not very adept at building fire plans, particularly because fire planning has lower priority in the TACFIRE computer than fire missions. Worse, the TACFIRE computer can get downright belligerent when it is overloaded or misused. It keeps a good record of what we have put in and reacts quickly when we do something dumb or in violation of how the

software-writer thought we should do things.

In other words, TACFIRE has surfaced an information management problem of the first order, even though it seemed to promise that it had solved it. In its own cantankerous way it tries hard to manage that stuff, but there are simply too many bits of information and too many possible ways to use them for any computer to be the real brains of an AirLand Battle. TACFIRE is teaching us that we have to set very clear priorities—not just on what we want it to do, but on how fire support can best contribute to whatever battle it is involved in.

BINGO has also become a catalyst for combined arms training in an arena which is dynamic, controlled, competitive, diagnostic, complex, simple, and repetitive—any or all of these. The task force ARTEP is usually too infrequent, too unwieldy, and too insensitive to the nuances of synchronization to allow for real practice, real training.

Despite its potential, the BINGO style of training is neither a panacea nor a replacement for live fire gunnery, for the field artillery battalion, or for task force ARTEP evaluations. But it can complement all three. And it is a good arena—a skunkworks—for practicing and testing fire support and combined arms synchronization.



**BINGO IV was a game board driven, fire planning exercise made up of different combined arms players.**

## A Final Proposal

Artillerymen can learn from what tankers, infantrymen, air defenders, and missileers learned long ago—by sometimes separating gunnery from tactical training, units

can do *both* better. Gunnery suffers when it goes on in the midst of chemical attacks; nuclear fire missions; reconnaissance, selection, and occupation of position (RSOP); and a thousand other tasks. It improves when the camouflage nets are down, the guns are 10 to 30 meters apart and on line, and the fire direction centers (FDC) and tactical fire direction systems

(TACFIRE) shelters are close at hand. It gets even better when the supervisors can see and compare procedures, data, and errors. Terrain gun position corrections will be computed whether the guns are close together or far apart, but the gunnery sergeant and the chief of smoke are more effective when they can use their eyes to do most of the walking.

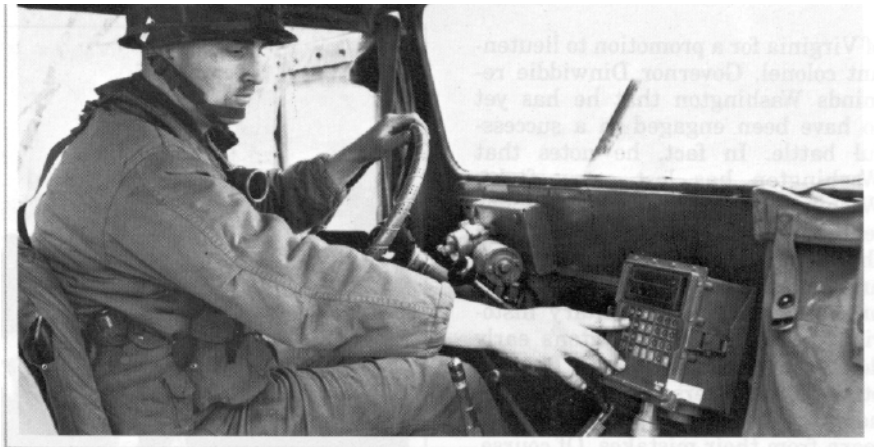
The S3s, battery commanders, and battery executive officers can also be more effective in the middle of all this. The same technique can benefit observer training. By bringing fire support teams together, a master gunner can critique every mission and act decisively when he sees good or bad gunnery practices.

A corollary to this thesis is that when our major focus is on gunnery training, we need to do less moving and *more shooting*. Even though moving the guns provides a better all around test of our skills, it exacerbates the safety problem, which is severe in US Army Europe. Moving and shooting at Grafenwoehr has become more of a safety exercise—complicated by other firing restrictions—than a gunnery one. The principle of less moving and more shooting is not, however, unique to units in Europe. The static, admittedly unrealistic live fire gunnery training I have described is essentially the same training the Field Artillery School at Fort Sill, Oklahoma, has used for decades to train countless artillery officers and soldiers. It is the most efficient and effective way to hone gunnery skills.

There is some risk that soldiers undergoing sterile gunnery training will pick up bad habits. Each commander must, therefore, decide how much "untacticalness" he can afford. In any case, static gunnery training is intended only as a means to get a fast start on live fire gunnery skills, particularly at howitzer section level.

## Competition, Standards, and Section Tests

The real purpose of competition in training is not to identify the winners, but to single out and work on the



The PADS jeep makes it possible to survey targets for the battalion observation posts.



These forward observers represent just one group of players in the section tests which hone tactical and technical skills.

losers. Combat is a competition; but it is a competition of collective strengths and wills. On game days, everybody who suits up plays. The genius of the National Training Center's instrumentation package and unparalleled after-action reviews is how they are able to identify and discuss every individual

crew engaged in a battle. There are few secrets at the National Training Center, and as a result there's a *lot of learning*.

In a recent television mini-series on former President George Washington, there is a scene in which Major Washington asks Governor Dinwiddie



On line and firing are 155-mm self-propelled howitzers from the 194th Armored Brigade during training exercises at the National Training Center, where a "lot of learning" goes on.

of Virginia for a promotion to lieutenant colonel. Governor Dinwiddie reminds Washington that he has yet to have been engaged in a successful battle. In fact, he notes that Washington has lost every fight. Washington's rejoinder is that he has learned a tremendous amount from those engagements with the French and Indians. The Governor decides to promote him. Today, military historians agree that Washington's early defeats were invaluable to him. In other words, losers can become winners when they have the capacity to learn from their mistakes. Of course, no one should revel in losing. Coaches must encourage losers and give them an opportunity to improve. Freedom to fail should never be a one-way ticket to mediocrity.

Winners, on the other hand, become our standard-setters. They represent what we *could* be, not necessarily what we *will* be. By their example, winners pull the other competitors *up*. By their expertise and leadership skills, coaches—primarily senior noncommissioned officers (NCO)—push all competitors to get better.

Officers can observe and critique the coaches, but their two principal roles must be:

- To safeguard the time and other resources the coaches need to train.

- To plan and supervise the enforcement of the rules of the competition. Through their combined ability to coach and develop tough, fair competitions, officers and senior NCOs develop quality training standards. The Army training and evaluation program (ARTEP) and other manuals from Fort Sill provide a superb menu to choose from, but only commanders and coaches can establish and enforce standards.

Section tests, which are easily extracted from the ARTEP and soldiers manuals, are a very good mechanism for establishing standards. Correctly understood and executed, section tests can tell a battalion commander things about his collective strengths and weaknesses that a battalion formal evaluation cannot. Done properly, they are a hands-on, collective training complement to the skill qualification test which too often is more of a literacy test than a skills test.

Last fall our division artillery tested 210 sections in a 3-day period at Grafenwoehr. We looked at virtually every howitzer crew, fire direction center, personnel administration center, fire support, maintenance, supply, medical, wire, medical, and survey section in the division artillery. We



**Howard Pyles modern painting shows Washington's Main Army at its lowest ebb following the loss of New York City in 1776. Military historians agree that Washington's early defeats were invaluable learning tools for him.**

also tested one radioteletype (RTT) and one mess section per battalion. The separate batteries competed in the maintenance, RTT, wire, mess, supply, and survey section competitions. NCOs wrote and administered all the tests. We awarded plaques to the winners of the 12 different section tests and a larger trophy to the battalion command sergeant major whose sections accumulated the best overall average. The statistical summaries we compiled compared the scores of battalions, batteries, and sections. These summaries, as well as summaries of strengths and weaknesses, provided an excellent tool by which battalion leaders could plan their training over the 6 months leading to the next round of section tests.

All of this sounds more squared away than it was. The grading was not completely fair. Many of the tests were too easy, too narrow in focus, or too unrealistic. Moreover, the element of competition is a two-edged sword. Most "losers" don't feel like winners, no matter what their chain of command says. Our next series will include performance standards—a score of 90 is commendable, 80 is satisfactory, and 70 is marginal—that every section can strive to meet.

Despite the shortcomings, the section tests worked. For the first time, all the senior NCOs in the division

artillery put together not only a terrific exercise but also a highly visible one. Virtually every commissioned and noncommissioned officer in the division artillery observed or took part. We saw the power of collective expertise, and we had a mark on the wall for each section, battery, and battalion to strive for.

The company grade officers who were not competing in the fire support team and fire direction center section tests were not sure what they saw, but they knew it wasn't RSOP or live fire. That made them uncomfortable.

But on the whole our experience with such tests has been *good*. This should surprise anyone. After all, the most visible section test in the Army today—the tank crew qualification course—has helped tankers to upgrade the accuracy and speed of their gunnery. They also raised their standards and, in my judgment, reinforced an old tanker bias. They are making gunnery an obsession. Fire and maneuver skills come in a poor second, and combined arms synchronization is in danger of becoming a lost art with tankers. This is less true of units which have access to the National Training Center, than units in Europe, where training land is at a premium. What we all need is to strike a healthy balance in our training between gunnery and maneuver skills.

We need to recognize that section tests and competitions are not an end in themselves. Competition can become unhealthy and counterproductive. The jury is still out on whether the statistical summaries and comparisons from our last section tests will not do more harm than good. Our leaders intended for them to generate energy and competence as well as to give the NCOs the lead in mastering those fundamental collective skills which lead inevitably to excellent batteries

and battalions. They could even produce the kind of expert "master gunners" the tankers already have—not just for howitzer sections but for other specialties as well.

### The Dry Fire ARTEP

My earlier proposals suggested that we need to look hard at what a dry fire ARTEP can do for us. Consider the comparison in the table below.

<b>ARTEP COMPARISON TABLE</b>			
	<b>LIVE FIRE</b>	<b>DRY FIRE</b>	<b>COMBAT</b>
<b>SAFETY</b>	<b>BIG PROBLEM</b>	<b>IMPORTANT, BUT NOT A PROBLEM</b>	<b>IMPORTANT, BUT LESS OF A PROBLEM THAN IN PEACE TIME</b>
IMPACT AREA	USUALLY TOO SMALL	UNLIMITED	UNLIMITED
TARGETS	LIMITED AND OFTEN	UNLIMITED	UNLIMITED
SHELL/FUZE	MOSTLY HE/PD	ALL	ALL
FIREFINDER	FRIENDLY FIRE MODE	HOSTILE FIRE MODE	HOSTILE FIRE MODE
TACFIRE	CONSTRAINED	STRETCHED	STRETCHED
AGILITY/RSOP	CONSTRAINED BY TIME/SAFETY/LIVE FIRE	STRETCHED	STRETCHED
SYNCHRONIZATION	LIMITED TO IMPACT AREA, FA ONLY	NOT FULLY TESTED	ESSENTIAL
DEPTH	LIMITED TO IMPACT AREA	UNLIMITED	ESSENTIAL
INITIATIVE	VERY LITTLE	NEEDS MANEUVER PARTICIPATION	IMPORTANT
FIST OBSERVATION POSTS	TIED TO IMPACT AREA	UNLIMITED	UNLIMITED
MULTIPLE MSNS	ALMOST NONE	ABUNDANT	ESSENTIAL
GUNNERY	GREAT HE/PD BUT LACKS DPICM, ETC.	GOOD, BUT NO PROOF	ESSENTIAL
ADJUSTMENT OF FIRES	TOO EASY AT MOST IMPACT AREAS	POOR (USE TSFO)	JURY IS OUT
AMMUNITION HANDLING	EXCELLENT, BUT LIMITED	POOR (USE DUMMY ROUNDS)	IMPORTANT

We have done three nuclear-certifying ARTEPs using this sequence:

DAY 1:	PRECOMBAT INSPECTION AND SELECTED (NO GUN) SECTION TESTS.
DAYS 2 AND 3:	DRY FIRE ARTEP WITH AN AFTER-ACTION REVIEW EACH DAY.
DAYS 4 AND 5:	LIVE FIRE ARTEP IN A STATIC POSITION.

Obviously, we hedged our bet by doing both dry and live fire; but the separation of the two gave us some great advantages. The figure below shows how we set up the dry fire phase.

Note that the battalion was on post so that they could do plenty of moving without worrying about maneuver damage. The fire support teams went off-post in jeeps and occupied seven observation posts based on the tactical scenario. Each observation post had about 50 targets presurveyed by the position and azimuth determining system (PADS). The PADS jeeps also allowed us to engage moving targets. When the target was identified, the time started. It ended when the battery sent end of mission. There were no time-outs for safety or anything else. Umpires in the fire direction centers and the firing batteries ensured that deflections and quadrants were sent and executed correctly. The ARTEP control cell used a game board to develop additional targets which they sent by digital message device to the battalion. This gave them a surge capability.

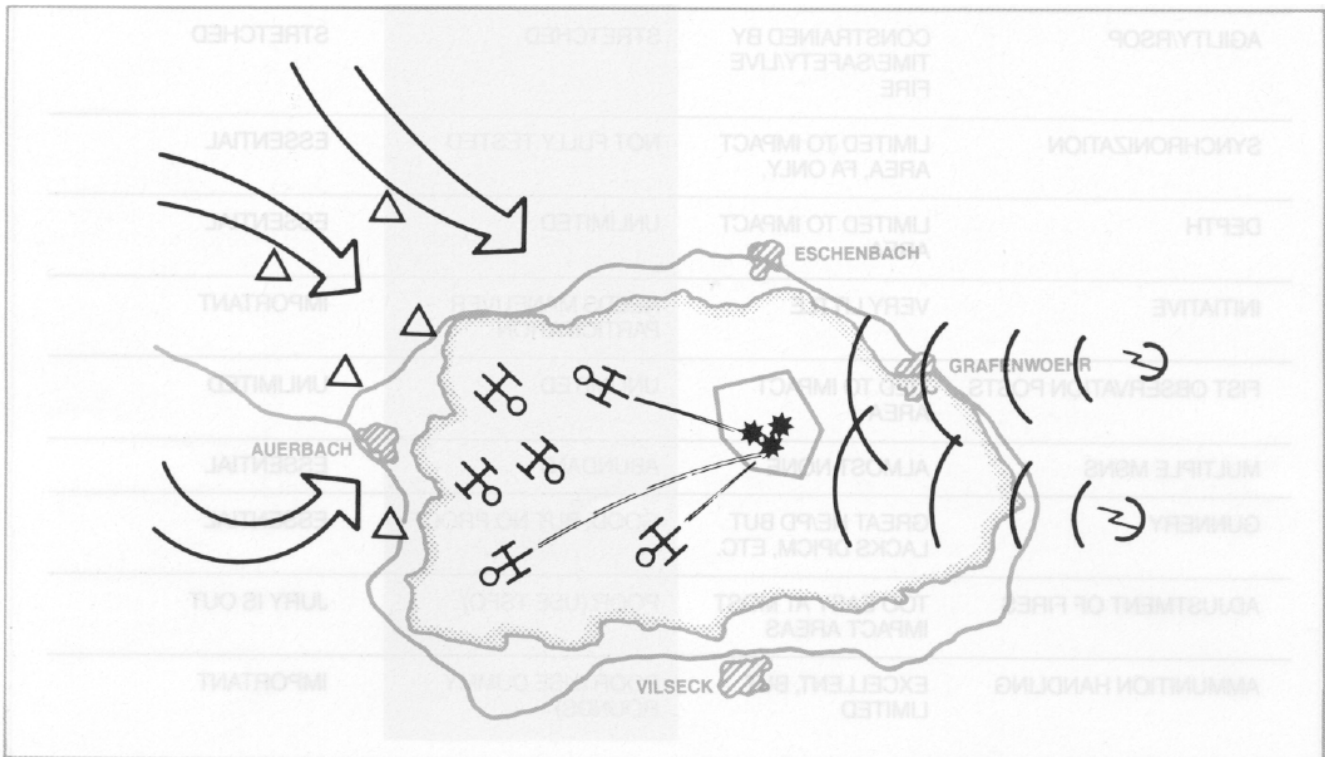
Two AN/TPQ-36 and AN/TPQ-37 radars located off-post looked west in the *hostile* fire mode. They searched for the real bullets fired by the *other known units firing* and sent the gun locations as counterfire targets. By lying

to the Firefinder about its actual location, we were able to generate targets which fit into the tactical scenario. We were thus able to evaluate the range, speed, and accuracy of the Firefinders, as well as the responsiveness of TACFIRE to the Firefinders.

The dry fire ARTEP lacked validity only because there are no real standards published for what we evaluated; but it was a worthwhile experiment. We found out that the average mission time under all conditions was about 6 minutes. This was much too slow. But we sent over 500 missions in about 36 hours, and the TACFIRE shelter folks were really stretched. On one ARTEP the computer froze up. In effect, we had designed part of an ARTEP which could not be "passed" in the same sense as the live fire ARTEP.

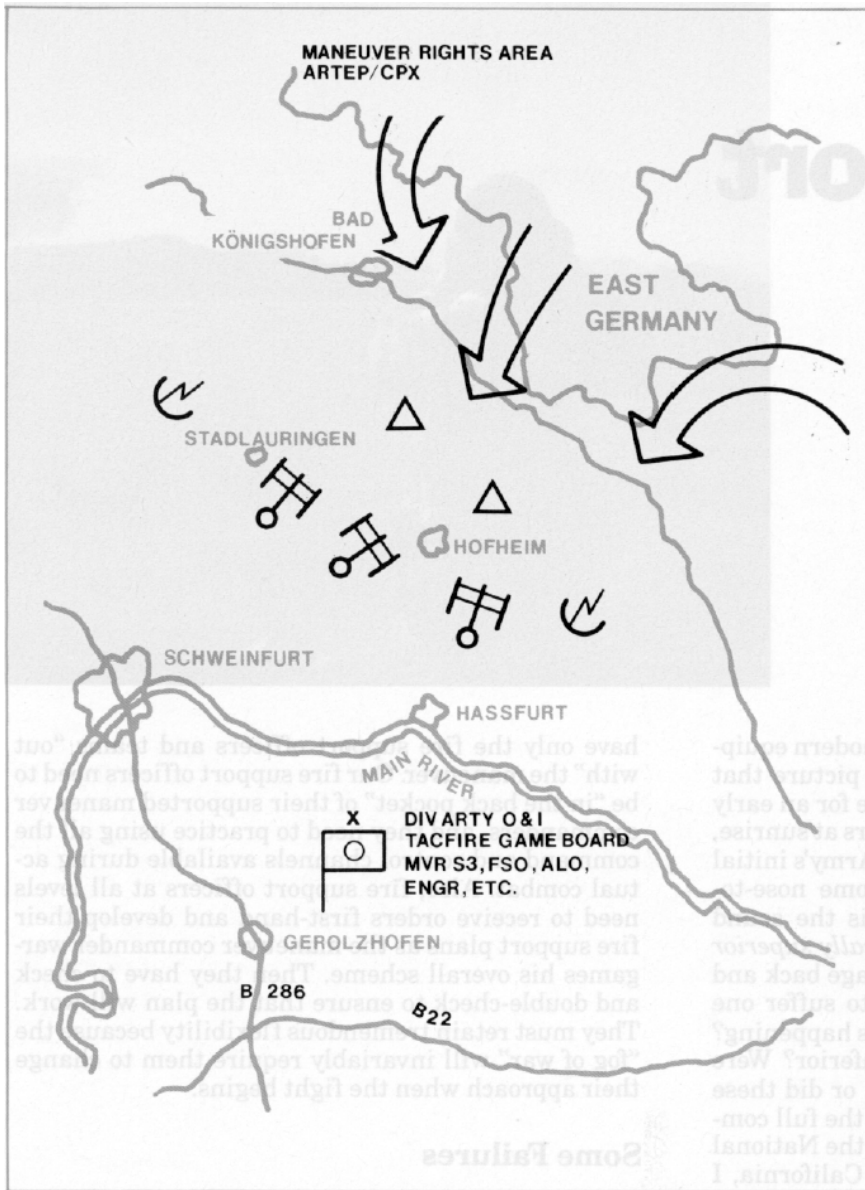
We also learned several other things.

- Our BINGO training had worked. The fire support teams consistently met their ARTEP standards.
- The Firefinder radars were invariably fast and very accurate in the hostile fire mode.
- TACFIRE will not select the multiple launch rocket system (MLRS) for counterfire targets. On the other hand, the radar itself interfaces readily with the MLRS fire direction system.



Set-up for the dry fire phase of the ARTEP. Because the battalion was located on post, the batteries could do plenty of moving without worrying about maneuver damage.





The final ARTEP in the dry fire series was done right out in maneuver rights areas.

- Mutual support unit operations worked well with one pair of battalions but poorly with another.

Our final ARTEP in this series of dry fire experiments was done right out in the German countryside; that is, in maneuver rights areas (MRA). Although it was completely dry fire, I am convinced that for direct support battalions in Germany, it should become our certifying ARTEP.

First look at the figure above. As you can see, the most significant feature of an MRA ARTEP is the terrain—the same feature which makes us an army rather than a navy or an air force. We are tied irrevocably to the ground we fight on—to using it wisely or losing it. Communications, logistics, movement, special weapons procedures—all of these are tested and stretched far more in the MRA

than in any other training area, where space is limited and positions are memorized. And there are even civilian traffic and built-up areas with which to contend. Most of all, an MRA ARTEP not only forces us to use a fire support execution matrix as suggested by the National Training Center lessons learned, but also provides us a full evaluation of our planning and execution. By using the game board in conjunction with BINGO observation posts, an opposing force of five vehicles, and a PADS vehicle in column, we were able to drive both fire planning and tested execution in a manner far beyond the capabilities of any impact area. It was, of course, necessary to have the maneuver brigade staff, including engineers and an air liaison officer, drive the scenario. But they were glad to do it.

## Conclusion

Each of my proposals is more modest than it seems. The static, live fire gunnery, for example, is not so much the best way to do live fire gunnery as it is the best way to *start*. Once the battalion commander is satisfied that his soldiers have mastered the fundamentals, then he can progress to other tactical tasks.

The section tests are already in the ARTEP. But ours are competitive and on a broad scale. Remember, on the Army's game days everybody who suits up plays; so I am opposed to all-star competitions.

The dry fire and command field exercise ARTEPs are also far from radical. We already do lots of dry fire events on the live fire ARTEP. However, putting Firefinder in the hostile-fire mode, sending the fire support team away from the impact area, and using a game board to generate fire missions are different and, I think, essential to evaluate what TACFIRE can do.

All of these proposals dissect the ARTEP into small enough pieces so that leaders can evaluate their units every 6 months or, in the case of the command field exercise battalion ARTEP, every 9 months.

In his classic satire "A Modest Proposal," Jonathan Swift presents a straightforward proposition that the English could resolve their hunger problems and the "Irish question" by literally cannabilizing the children of Ireland. My modest proposals and Swift's obvious intent couldn't be further from desiring "to consume our own." The foregoing modest proposals have as their goals to take a hard look at how we *do* train. Unlike Swift, I do not think artillery training suffers from malnutrition. We just need a better diet.



**Colonel Creighton W. Abrams, Jr., FA, is Commander of the 3d Infantry Division Artillery in Germany. He has also commanded a Sergeant Missile battery at Fort Sill, Oklahoma; a 105-mm howitzer battery in the 1st Infantry Division in Vietnam; and a 155-mm howitzer battalion in the 3d Infantry Division. Colonel Abrams has also served as S3 with a direct support battalion and a division artillery. He has participated in four REFORGER exercises.**

# Fire Support Lessons Revisited

by Major Byron Baker



Imagine an army that has the most modern equipment and the ablest soldiers. Now picture that army in battle. Its units dig in and brace for an early morning attack. When the enemy appears at sunrise, he has little difficulty penetrating the Army's initial obstacles, and the antagonists soon come nose-to-nose. The result of that single fight is the sound thrashing of our imaginary, *technologically superior* force. Over several days as the battles rage back and forth, our imaginary army continues to suffer one catastrophic defeat after another. What's happening? Was the superior technology in fact inferior? Were the soldiers not as good as we thought, or did these good soldiers simply fail to synchronize the full combat power available to them? If you visit the National Training Center (NTC) at Fort Irwin, California, I suspect you will find the latter question is the best answer.

As part of the combined arms team, the field artillery plays a vital role in support of the maneuver arms. Although the maneuver commander is responsible for synchronizing all aspects of his plan, he needs the field artillery's support to do so. But, rendering such support is not always easy. We all know the fundamental procedures for fire support, but we are human. We tend to make mistakes, especially after extended periods without sleep. One might even cautiously suggest we are not quite as well trained as we like to think.

Fortunately, most Redlegs are dedicated to doing better. That's why after-action reports from exercises such as REFORGER, Team Spirit, and rotations at the National Training Center are so important. They give us the tools we need to improve.

The primary lesson that echoes again and again through these after-action reports is that all elements of the combined arms team must *train* together in order to *win* together. It is not sufficient to have only the fire

support officers and teams "out with" the maneuver. Our fire support officers need to be "in the back pocket" of their supported maneuver commanders, and they need to practice using all the command and control channels available during actual combat. Also, fire support officers at all levels need to receive orders first-hand and develop their fire support plans as the maneuver commander war-games his overall scheme. Then they have to check and double-check to ensure that the plan will work. They must retain tremendous flexibility because the "fog of war" will invariably require them to change their approach when the fight begins.

## Some Failures

A recent battle at the National Training Center drives these points home. A task force had the mission to defend a position. The maneuver commander identified his left flank as the most likely avenue of approach, and he positioned the bulk of his force in that area. He expected an attack around dawn. He wasn't disappointed.

His fire support officer had plotted targets in front of, on, and to the rear of the battle positions. In fact, he had about 60 planned targets. The maneuver commander also instructed his engineer and fire support officer where to emplace obstacles, and the engineer worked all night to accomplish the barrier plan. Unfortunately, the obstacles they created were not where the commander wanted them, and the fire support officer failed to verify their actual locations. When the battle started the targets plotted did not reinforce the actual obstacles. The maneuver commander and his combined arms team were in trouble.

On another dark, chilly morning at the National Training Center, artillerymen hunkered down to stay warm. They wondered what the opposing force

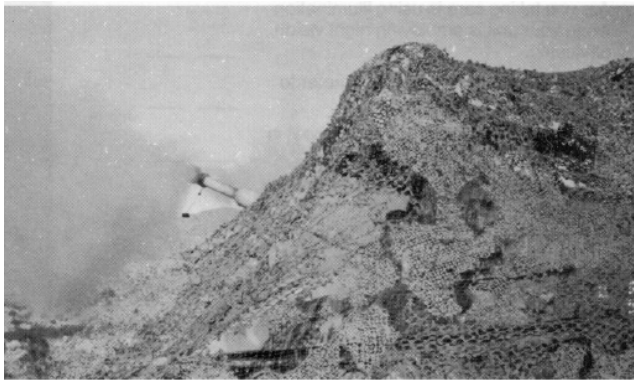
was doing. The answer to their ruminations was *scouting*. The opposing force scouts had not only infiltrated the infantry's defensive positions and reported everything they saw, but they also had penetrated even the artillery batteries' perimeters. As the battle began, opposing force shells began to rain down on the pinpointed artillery positions. Both conventional and chemical fire literally took one battery out of the battle. Fortunately, the field artillery had other units nearby that weren't hit in the attack. But they too were in for a surprise.

The opposing force commander's next move was to fire on the maneuver positions in the south to suggest an attack on the friendly force's left flank while the main attacking element swung around to strike the right flank.

The defenders tried all the tricks in the book to stop the opposing force. They put preplanned airspace coordination areas (ACA) into effect and transmitted a tremendous number of fire missions. But the fire support officer and air liaison officer had not taken care to ensure the ACA wouldn't shut down indirect fire systems. Of all the fire missions sent, only 20 field artillery and 11 mortar missions during a 2-hour period of intense fighting actually yielded fire on the target. The end result was defeat. The opposing force got through the defensive lines, bypassed much of the defending force, and struck both the maneuver and artillery tactical operation centers.

Looking at this battle and many others, the objective reviewer can draw several conclusions:

- Many of the targets planned by our fire support officers are in open areas and are not easily identified by observers.
- The observers themselves occupy positions from which they cannot really see the battlefield. They join their maneuver platoon leaders in fighting positions rather than locate themselves for optimal target engagement.
- Observers often do not use all available data to include the intelligence preparation of the battlefield. They produce too many targets of too little value. In doing so they handicap already overworked fire direction centers.




The field artillery plays a vital role in the combined arms team. The fundamentals of fire support are refined at the National Training Center, where soldiers learn to work with other members of the Total Force.

## Some Successes

Where some units have failed, others have succeeded. Take, for instance, this defensive battle. Friendly scouts located the opposing force well in front of the defensive positions. These scouts, along with the forward observer who accompanied them, avoided being seen and reported the opposing force's direction of attack and strength. Preplanned fires caused the enemy to button-up and run into an engineer-emplaced obstacle.

The opposing force thought the obstacle had been breached the night before, but the defending force had watched the breaching party, waited until they came through the obstacle, and then attacked and destroyed them. Engineers then repaired the obstacle. The unit's fire support officer had also planned several fields of family of scatterable mines (FASCAM). When he was sure the opposing force was going to hit the obstacle he called for minefields at right angles to the obstacle. What's more, he did this early enough to be sure the FASCAM was on the ground before the opposing force got to the obstacle. When the opposing force ran into the barrier, it tried to slide right and left but ran into the FASCAM. To add insult to injury, the maneuver unit delivered murderous fires from its concealed fighting positions and the artillery continued to dump dual-purpose improved conventional munitions on the faltering attackers. The end result was a resounding defeat of the opposing force and a clear combined arms victory for the defending task force.

On yet another morning, fire supporters and their Air Force compatriots made the airspace coordination area work. They positioned the ACA along identifiable terrain to the flank of an attacking force. The pilots flew along the terrain feature and turned in along another identifiable feature to attack the defending opposing force. This ACA allowed the artillery to keep firing as the aircraft approached their target. In fact, both fire support organizations were able to attack the target at the same time, because the aircraft never crossed the trajectory of the incoming rounds. An additional benefit resulting from this technique was the effective suppression of opposing force anti-aircraft fires.

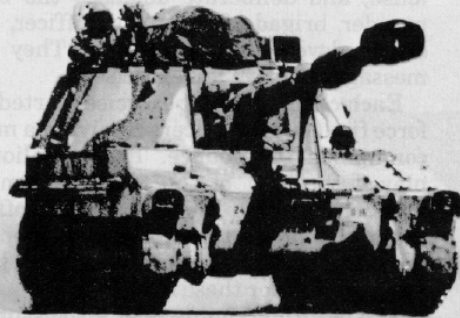
Such battlefield successes show what can happen when well-equipped, quality soldiers train and fight together. The checklist which follows this article outlines the specific dimensions of combined arms training that have produced victories at the National Training Center and elsewhere. 

**Major Byron Baker, FA, is the Chief of the Evaluation Division at the Directorate of Evaluation and Standardization at Fort Sill, Oklahoma. He received his commission through ROTC at Henderson State College in Arkansas. Major Baker has served as an executive officer, forward observer, battalion and brigade fire support officer, battery commander, and battalion and division artillery S1.**

**TASK FORCE FIRE SUPPORT OFFICER'S CHECKLIST**

	YES	NO		YES	NO
<b>INTELLIGENCE</b>			Does your plan exploit all available, lethal fire support assets?	—	—
Do you have all available results from the intelligence preparation of the battlefield process?	—	—	Have you included numbered target reference points in your fire plan?	—	—
Have you developed a position overlay and checked it on the ground?	—	—	Have you computed enemy rates of march with care so your FASCAM will land in front of him, <i>not behind</i> .	—	—
Have you linked the maneuver S2 with the artillery S2 for exchange of information and cuing?	—	—	Do you know how many CAS sorties are available?	—	—
Have you sent an observer out with the scouts?	—	—	Do you know who requests CAS and through what channels?	—	—
<b>MANEUVER COMMANDERS AND STAFF</b>	<b>YES</b>	<b>NO</b>	Are you updating your fire plan continuously as dictated by the terrain and the situation?	—	—
Does your maneuver commander know the artillery organization for combat?	—	—	<b>FIRE SUPPORT COORDINATION</b>	<b>YES</b>	<b>NO</b>
Does your commander know how much of maneuver area your artillery units can range?	—	—	Have you coordinated the fire support dimension of rearward and forward passages of lines?	—	—
Have you coordinated space for artillery units with your maneuver commander?	—	—	Have you coordinated the procedures for engaging target boundaries?	—	—
Have you spoken with the maneuver S3 about coordination and control measures?	—	—	Have you planned realistic ACAs?	—	—
Do you know where the maneuver commander wants you during the fight?	—	—	Are you prepared to replace the forward air controller when necessary? Do you know the proper frequencies and how to brief pilots?	—	—
Have you told your maneuver commander how many minutes of smoke are available?	—	—	<b>COMPANY FIRE SUPPORT OFFICER'S CHECKLIST</b>	<b>YES</b>	<b>NO</b>
Have you met the leaders in all maneuver staff elements so they know who you are?	—	—	Are your dismounted observation and listening posts away from vehicles?	—	—
Have you told them exactly what you need?	—	—	Are you informing the fire direction center when you change priority targets as the battle progresses?	—	—
Will you accompany your supported maneuver commander to receive his operations order?	—	—	Are you using the AN/GVS-5 to give TOW gunners distances to known points to avoid opening fire before enemy is within range?	—	—
Are you reporting ammunition consumption milestones—25, 50, and 75 percent of the controlled resupply rate?	—	—	Are you taking care in using illumination when your unit is employing night vision devices?	—	—
<b>FIRE PLANNING</b>	<b>YES</b>	<b>NO</b>	Are you using your vehicle odometer to aid in navigation?	—	—
Do your assistants start fire planning based on fragmentary orders?	—	—	Are you using the target list worksheet in accordance with FM 6-20?	—	—
Have you planned targets on recognizable terrain features?	—	—	Are you planning only the targets you can remember?	—	—
Have you planned targets including illumination and smoke in support of assembly areas; on routes of march; as well as short of, on, beyond, and to the flanks of your objectives?	—	—	Do your target lists indicate what you expect the targets to be—armored vehicles, etc.?	—	—
Have you targeted your own maneuver positions as well as all supplementary and alternate positions?	—	—	Are you prepared to brief CAS pilots?	—	—
Have you planned fires to reinforce all obstacles, verified the location of the barriers, and positioned night observation devices to cover the obstacles?	—	—	Do you know the laser designators codes for aircraft delivered munitions and Copperhead?	—	—

# The Road to Success at the NTC



by Captain Robert S. Boucher



Kimberly L. Carter

Armored crew members direct artillery fire upon an opposing forces armored column attempting to break through task force lines.

Articles about about tactical operations at the National Training Center (NTC). But where are articles that provide clear recommendations on how field artillerymen can best train and prepare for the NTC experience? There is certainly a need for such pieces, particularly articles focused on fire support coordination at company and battalion levels. What follows is a description of how one field artillery unit trained its forward observers, fire support teams (FIST), battalion fire support officers (FSO), and associated fire support agencies.

Following a recent REFORGER, the 3d Battalion, 3d Field Artillery began planning for the NTC challenge. Due to force modernization changes, the battalion—a direct support unit in the 2d Armored Division—had not rotated through the NTC since 1981. In fact, few leaders in the unit had ever been to Fort Irwin, California.

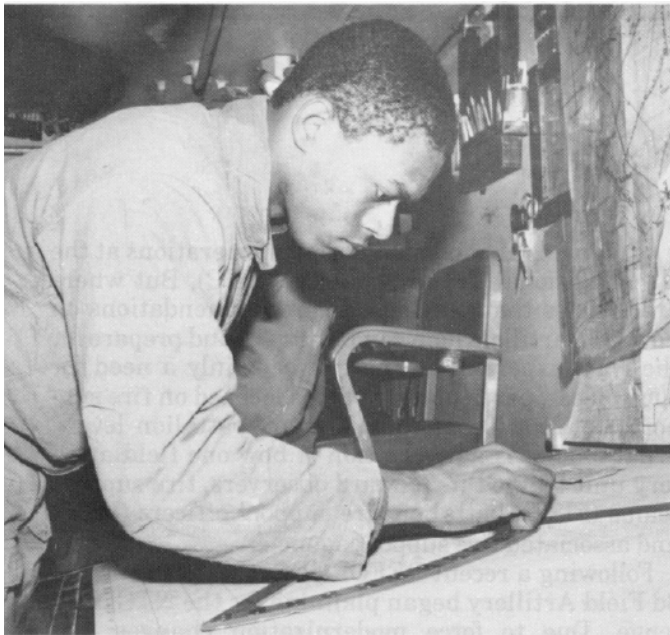
## Preliminaries

Five months prior to the rotation, the battalion's leadership conducted an in-depth training assessment. Encouraged by the new division commander's

emphasis on fire support training, they tackled difficult problems including personnel turbulence and competing priorities. They solved the turbulence issue by a modest amount of internal reshuffling and stabilization of soldiers in key positions. They refined their goals and established fire support training as a top priority. This combination of decisions resulted in a high level of assurance that people, equipment, and time would be available to conduct intensive fire support training. In fact, the battalion commander designated himself as the primary instructor for the entire fire support training program. The stage was set for an exciting training program that would prepare the "Tiger" Brigade for "the NTC War."

## The Plan

The initial step in developing the battalion's fire support capabilities was a staff study conducted by the brigade fire support officer. The study outlined a proposed requirements-based training program. Specifically, the fire support officer compared common NTC fire support deficiencies with the battalion's fire support strengths and weaknesses. The result was a recommendation to conduct a series of fire support command post exercises (CPX) designed to correct known deficiencies and to provide a unique method of training on the engagement of moving targets.



Adolph Mallory

**PV2 Steven Smith of Battery B, 2d Battalion, 35th Field Artillery plots a fire mission inside the fire direction center track.**

The battalion conducted a total of five, 72-hour fire support command post exercises at a local training area. All brigade fire support personnel including the Air Force tactical air control party, the mortar platoon leaders, and engineer and air defense representatives participated. Two battalion fire direction centers equipped with tactical fire direction systems

supported the command post exercises, thereby duplicating NTC requirements for simultaneous live fire and force-on-force operations.

Preparation for each fire support exercise started 2 to 3 weeks before the actual training. Using NTC maps and a variety of maneuver tasks—movement to contact, hasty attack, deliberate attack, hasty defense, and deliberate defense—the battalion commander, brigade fire support officer, and targeting officer developed the scenario. They also prepared messages to drive the exercises.

Each command post exercise started with the task force fire support officers receiving a mission and the commander's guidance. The battalion commander played the part of the task force maneuver commander. He gave the fire support officers a maximum of 2 hours to prepare fire support plans and provide a back briefing. Fire support team members were present for these briefings.

The battalion commander also assumed the role of each maneuver team commander. He briefed each fire support team officer on the company-level maneuver plan and then gave the company fire support officers a maximum of 1 hour to prepare their plans.

As the operation proceeded, a series of preprinted messages delivered in real-time set a grueling pace. The messages created specific training situations which required timely reactions. The rules of the game prohibited fire support personnel from moving between their vehicles and from communicating via any means except by FM radio. If fire support officers required a face-to-face meeting, they had to go to a "transportation point"—a nearby location—where they stayed for a standard 30 minutes to simulate movement time.

At predetermined points in each operation, the exercise halted for an after-action review. Soldiers moved to a tent where one battalion fire support officer and two company fire support officers presented their solution to situations posed by the messages. The remaining battalion fire support sections

**MOVING TARGET ENGAGEMENT**

**PRECONDITIONS**

- OPERATIONAL FIRE PLAN
- FIRING UNIT RESPONSE TIME KNOWN – USUALLY 3-5 MINUTES
- ENEMY MOVEMENT RATE – OPEN TERRAIN  
30-35KM per hour 500-550M per min
- ROLLING TERRAIN 20-25KM per hour 350-400M per min

**TARGET ENGAGEMENT PLANNING**

- SELECT TRIGGER POINT – 1ST POINT THAT ENEMY VEHICLE CAN BE ID'd
- SELECT 1ST POINT OF ENGAGEMENT – MUST BE FIRING UNIT RESPONSE TIME AWAY FROM TRIGGER POINT

**FIRE FOR EFFECT ENGAGEMENTS – CONSIDER USE OF GROUPS, IRREGULAR SHAPED TARGET, SPECIAL AMMUNITION**

and the other fire support teams then critiqued their cohort's solutions. As problems surfaced, the battalion's leaders corrected them on the spot, tabled them for future resolution, or temporarily halted the exercise to seek answers. The after-action reviews resulted in substantial learning as well as working out technical and tactical problems.

Fire support personnel spent a tremendous amount of time participating in the critiques—sometimes two or three times the amount of actual scenario time. But they proved their worth. In fact, the critiques were where the bulk of the learning occurred. As soldiers spoke up, many of the "whys" of fire support became clear.

With the development of on-the-spot solutions to technical and tactical problems, the battalion's leaders sought an appropriate system to capture the solutions. Without such documentations, soldiers would have to *reinvent the wheel* later. This was the genesis of the innovative battle drill cards depicted in the figure. The battalion's leaders ultimately produced 22 battle drill cards with everything from the establishment of battalion target and known point files to the elements of a maneuver commander's briefing on fire support. The cards did not reproduce information readily available in FM 6-20, *Fire Support in Combined Arms Operations*, or FM 6-30, *Observed Fire Procedures*; they showed only those items peculiar to the battalion's methods or critical reference items.

## Training to Strike Moving Targets

The one peculiar training task which could not be adapted to the fire support command post exercise was the engagement of moving targets. At present no effective training aid exists to represent the realistic movement of a target. The observed fire trainer (OFT) incorporates multiple projection screens and target pips with sounds, but it does not adequately portray the actual *movement* of targets on terrain. The solution to this training problem—a common NTC deficiency—involved the use of a prepared map sheet, 20 bags of sand, engineer tape, and 2 battery-powered toy tanks. Battalion personnel laid out a 75-meter lane including miniature terrain features. The lane represented a 4-kilometer corridor along which the toy targets moved at a relative speed of 25 kilometers per hour.

Given a map representing the terrain, the observer overlooking the lane developed a company fire plan and received further orders to keep effective fires on all enemy formations until given instructions to displace to the next company position. The observer also had to cover the maneuver unit's movements.

At first, observers commonly placed fires behind the approaching enemy. With a delay time between the request for fire and rounds impacting as represented by a disk marker, observers soon learned to pick a "trigger point." This point triggered a call for fire to hit the enemy at a particular point. The key to using trigger points is that the point must be located on prominent terrain—that is, a point that the forward observer can readily identify. Observers quickly



In order to simulate the realistic movement of a target, battalion personnel lay out a 75-meter lane including miniature terrain features.



Fire mission commands echo across the rear platform of an 8-inch howitzer of the 1st Battalion, 13th Field Artillery at the National Training Center.

identified the value of attacking the enemy in restrictive terrain such as gaps. They had to deal with a target that was *moving* and occasionally masked from observation by terrain. Furthermore, targets were real, three-dimensional, and moving.

Battalion observers used the training aid throughout two command post exercises. Thereafter, leaders set up the terrain model during each fire support command post exercise as concurrent training. Observers left the exercise for short periods to sharpen their skills on moving target engagement. During the final two fire support command post exercises, hand-held flares were used to train moving target engagement at night using coordinated illumination techniques.



Kimberly L. Carter

The glow of tank main guns lights up the live fire range at the National Training Center.

The final effort on engagement of moving targets was a live fire exercise. Exercise leaders laid out a 7-kilometer lane in Fort Hood's impact area to represent a battalion-sized, high speed avenue of approach into a company area. Company fire support officers then developed fire plans to provide continuous fires on the enemy along the avenue of approach towards the observation points. Two of the 3-3d FA's guns provided fires according to a predetermined time schedule along the avenue of approach. By firing white phosphorous rounds along the lane, the guns simulated the movement of an enemy formation towards the observation post. Based on the time sequence and location of impacting rounds, fire support teams observed the *enemy* white phosphorous

rounds moving at a rate of 25 kilometers per hour. The remaining guns of the battalion fired in support of observers who were not told when the enemy would appear. The lessons learned on the small-scale toy tank moving target course were apparent from the very start. The observers were able to place timely and accurate fires on the moving formations.

Did the battalion including its fire support elements "win" at the National Training Center? If one defines winning as flawless execution, the answer is clearly *no*. Those training objectives that received substantial emphasis went very well, even outstanding. Preparation of fire plans and their execution went well; engagement of moving targets was a high




point. During the final defensive live fire exercise, conducted as a reflex mission from a movement to contact, the battalion provided extraordinarily effective fire support.



By firing white phosphorous rounds along the avenue of approach, the guns simulate the movement of an enemy formation toward the observation post.

Training objectives which were not addressed in the prerotation program met with less success. Coordination of the fires during force-on-force showed that we needed more training emphasis in this area. There were several cases of fratricide induced by both maneuver and fire support errors. The battalion has learned that the use of 15 to 20 mile per hour tactical road march speeds at home stations will not permit sufficiently rapid displacement between positions. The NTC requirement to split the operations staff between force-on-force and live fire requires considerable emphasis in pre-NTC training. Finally, the factors of fatigue and stress can cause people to do strange things; commanders must be more aware of these factors and watch for signals of overfatigue and debilitating stress.

The question remains—did you win? The answer you'll get from any 3d Battalion, 3d Field Artillery Redleg is a resounding, YES! The battalion obtained the best possible feedback short of actual combat. The battalion learned a great deal about itself without injuring a single soldier. 3-3d soldiers believe in the NTC experience and what they accomplished. The spirit of the battalion when they left the NTC can be summed up by comments from one soldier to his opposing force counterpart: "It's going to be much tougher for you when we return next year." 

**Captain Robert S. Boucher, FA, is the Battery Commander of Battery B, 3d Battalion, 3d Field Artillery. He received his commission from Mississippi State University and is a graduate of the Field Artillery Officer Basic and Advanced Courses and the Tactical Fire Direction System Course. Captain Boucher's past assignments include staff positions with the 2d Battalion, 27th Field Artillery; battalion fire direction officer; and brigade fire support officer.**

## Attack Your Professional Development Target—Scope Out the *Journal*



Name (Last, First, MI)		Rank, Title	
Address		SSAN	
City		State	

**STATUS**

<input type="checkbox"/> US Army	I am a member of a certified US Field Artillery Association Local Chapter The name of my local chapter is
<input type="checkbox"/> US Marine Corps	
<input type="checkbox"/> Active Component	
<input type="checkbox"/> US Army Reserve	
<input type="checkbox"/> US Marine Corps Reserve	
<input type="checkbox"/> National Guard	
<input type="checkbox"/> Retired Military	
<input type="checkbox"/> Allied Military	
<input type="checkbox"/> Civilian	
<input type="checkbox"/> Industry/Office/Library	
<input type="checkbox"/> Other	

Name \_\_\_\_\_

Location \_\_\_\_\_

**RATES**

	US & APO Addresses	Foreign Addresses Except APO
1 Year	<input type="checkbox"/> \$16.00	<input type="checkbox"/> \$25.00
2 Years	<input type="checkbox"/> \$31.00	<input type="checkbox"/> \$49.00
3 Years	<input type="checkbox"/> \$46.00	<input type="checkbox"/> \$73.00

Signature \_\_\_\_\_ Date \_\_\_\_\_

MAIL TO:  
US FIELD ARTILLERY ASSOCIATION  
P.O. BOX 33027  
FORT SILL, OK 73503

# Right by Piece

## NOTES FROM UNITS

### Bright Star in the Sahara

SAHARA DESERT, EGYPT—Recently more than 1,080 soldiers of the 24th Infantry Division returned home from the Sahara Desert after participating in a combined American-Egyptian exercise dubbed Bright Star 85.

The latest in a series of rapid deployment maneuvers involving US and Egyptian armed forces, Bright Star 85 resulted from agreements reached in conjunction with the Camp David peace process in the early 1980s.

Bright Star exercises have three primary goals:

- First, to promote friendly relations between the United States and the Arab Republic of Egypt.
- Second, to expand America's rapid deployment capabilities by training in an arid environment similar to Southwest Asia.
- Third, to improve American capabilities to operate with the armed forces of Middle Eastern countries.

But for the Victory Division soldiers, the politics of Bright Star did not matter. What concerned these troops from Fort Stewart, Georgia, were the extreme desert temperatures, the lack of fresh meat or vegetables, and the sand in their weapons.

Living in a primitive environment 40 kilometers west of Cairo, the 24th Infantry Division gunners from Battery C, 1st Battalion, 35th Field Artillery, occupied an old British airfield used in World War II to defend the capitol.

The exercise started for these Redlegs when they flew out of Hunter Army Airfield for Cairo-West, an Egyptian air force base in the Western Sahara.

Joining other XVIII Airborne Corps soldiers, including the 3d Battalion, 8th Field Artillery Regiment and the 2d Battalion, 320th Field Artillery, Victory Division soldiers became part of the US Central Command task force training in Egypt with American Marine, Navy, and Air Force units.

As the only mechanized American forces in Bright Star 85, 24th Infantry Division soldiers maneuvered in the sands around Gebel Hamza and Wadi Natrun, Egypt for 25 days.

Combat arms soldiers began unit level desert training, while division and brigade staff elements coordinated and planned combined exercise with their Egyptian and Central Command counterparts.

During this first phase armored and infantry platoons and companies performed battle drills as mortar crews and artillery batteries rained shells down upon desert ranges.

The US-Egyptian combined field maneuvers comprised the second phase of Bright Star. Although the Egyptian soldiers kept a distance from American combat troops, there was some interchange of battery-level leaders.

The final big event of Bright Star was the combined arms live fire exercise held near Wadi Natrun. Egyptian and American tanks, artillery, and mortars attacked targets with live rounds as aircraft from both countries bombed and strafed the target area.



Bright Star 85 is the latest in a series of rapid deployment maneuvers involving us and Egyptian armed forces.



**PIRMASENS, GERMANY**—German and American soldiers combined forces recently in a joint nuclear, biological, and chemical (NBC) training exercise. Soldiers from the 510th Ordnance Company, 512th USAAG and the 1st Supply Company, 220th Battalion (Bundeswehr) traded places to learn how to use each other's NBC defense equipment. Their hands-on experiences included the wearing of mission-oriented protection posture gear, decontaminating skin, aiding an unconscious victim, testing areas for decontamination, and completing standardized NBC 1 reports. Training like this shows soldiers what type of support their allies have to offer. At left, an American trooper gets help from his German counterpart as he learns how to wear a German Army NBC suit. At right, an American soldier gives a German buddy first aid. (Cutline and photos by SGT Judy A. Ward)

## Honduran Turnabout

FORT ORD, CA—Almost 100 "light fighters" from Battery A, 2d Battalion, 8th Field Artillery Regiment and supporting units returned recently from a 12-day training exercise in Honduras. The deployment was the culmination of an emergency deployment readiness exercise that required the unit to assemble and move within hours of notification.

The unit began its Honduran adventure with a 1-day tactical exercise and then spent several days working side-by-side with their Honduran counterparts. During the combined training, soldiers from both countries gained valuable experience. The light fighters singled out two areas in which the Hondurans were particularly adept.

"Their strongest ability was sweeping the area. They'd stop as far as a mile away from their objective and make sure the area was clear," said Staff Sergeant William Ross, a section chief.

But what impressed the Americans the most was the Hondurans' art of camouflage. Working without camouflage nets, the host country soldiers made the most of trees, shrubs, and the natural lay of the land.



Americans and Hondurans make last-minute checks on their equipment before heading out to secure a tactical firing position. (US Army photos by John T. Dennis)

For their part, the Americans took the opportunity to pass along some tips about maintenance and safety.



**The task force rolls out of a tactical training position during its second day in Honduras.**

The job of communicating with the Hondurans fell mostly to five light fighters who spoke Spanish. Most soldiers agreed that more translators would have been helpful, but the language barrier didn't keep the Redlegs from doing the job.

"We used hand signals for the people who couldn't speak Spanish," said Specialist Four Raymond Rivera. He went on to explain that most "light fighters also carried a bilingual pocket dictionary wherever they went."

During their stay, the 2-8th FA Redlegs had to acclimate to the Central American environment. "It was hot—real hot—but midway through the day it would rain steadily and cool you down," said Private First Class Robert Jones, an assistant gunner. "You could make bets on when the rain would start," added Corporal Darryl Johnson, who said the rain would always begin between 1815 and 1830 hours.

The members of the battery task force learned a lot about protection against the climate and terrain. They also picked up valuable lessons from the support troops from the 7th Military Police Company and the 707th Maintenance Battalion. But the really significant learning on this Honduran turnabout was about combined field artillery training.

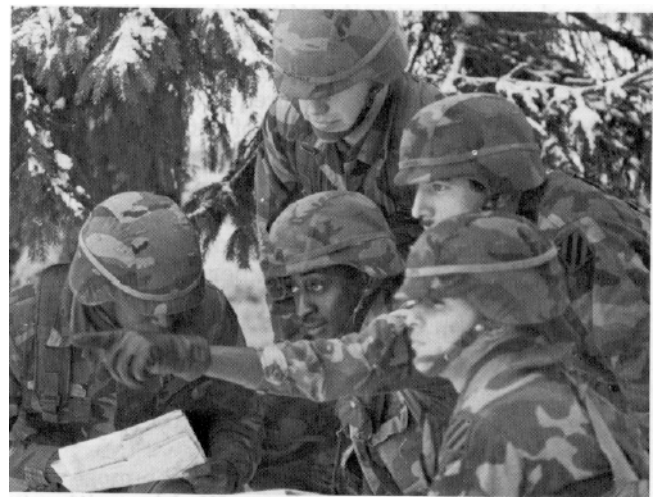
## More than a Symbol

GRAFENWOEHR, GERMANY—In the 3d Infantry Division Artillery the Hays Trophy is a symbol of hard work, dedication, and success. Awarded annually to the field artillery battalion achieving the highest score on its Army training and evaluation program, the Hays Trophy fires the enthusiasm of soldiers and fuels fierce professional competitions. This year the "Rock Supporters" of the 1st Battalion, 10th Field Artillery proved the fiercest competitors as they carried away the honors after 3 days of grueling testing.

The 1985 test involved a new section-level format. Gun crews, fire support teams, maintenance sections, aid stations, and virtually every other small organization in the Division Artillery participated in a variety of common and specialty peculiar tests. After the unit's leaders had tallied all the scores, the Rock Supporters had earned the bragging rights as best in the Division. Lieutenant Colonel Thomas J. Cannava, the 1-10th FA Commander, credits the victory to his noncommissioned officers (NCO). Although he had the lowest senior grade strength and the lowest total number of NCOs in the Division Artillery, Cannava says his leaders did more with less.

The soldiers of 1st Battalion, 10th Field Artillery proved their mettle much as their forefathers had

done years ago when they stopped a determined German attack at the Marne River in France. By winning the Hays Trophy they have not only perpetuated the 10th Field Artillery's proud tradition, but also proved they're ready to deal with any enemy that tries its hand against the Marne Division.



**The fire support team from Headquarters and Headquarters Battery, 1st Battalion, 10th Field Artillery win the Hays Trophy with a score of 100 percent in section evaluations.**

# View from the Blockhouse

## FROM THE SCHOOL

### Journal Notes

According to an old maxim, "a picture is worth a thousand words." If that's true, every *Journal* contains thousands upon thousands of important yet "unprinted" words. The labor involved in gathering and arranging these various photographs, charts, tables, and graphic devices now falls to Ms. Donna Covert, our new Art Director.

As this issue so poignantly illustrates, her 19 years of experience as an artist and visual information supervisor and her 3 years as a military photojournalist make her the perfect person for the job. Donna is well-known and respected in her field. Her extraordinary talents and her creativity have become her hallmark. Welcome to Donna—we're excited to have her as the newest member of our Redleg team!

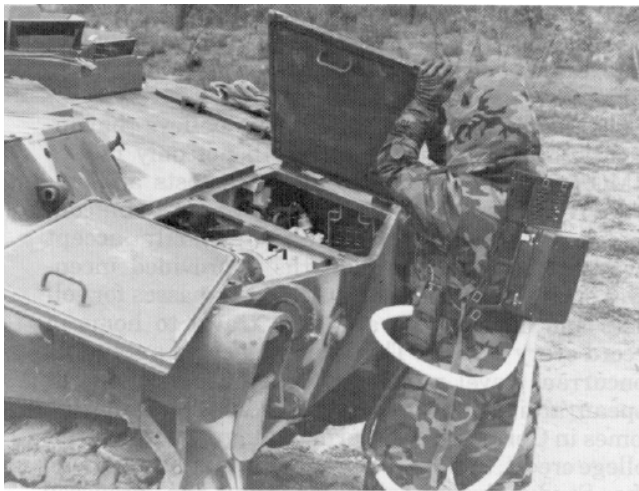
### New Branch Address

Effective immediately, the Field Artillery Officers Branch team has a new address and office symbol at the US Army Military Personnel Center:

**US Army MILPERCEN**  
**ATTN: DAPC-FA-O**  
**2461 Eisenhower Avenue**  
**Alexandria, VA 22331-0400**

The Field Artillery Enlisted Branch team is at the same address but with a different office symbol:  
ATTN: DAPC-FA-E.

All phone numbers will remain the same:  
**Field grade: AUTOVON 221-0118/7817**  
**Company grade: AUTOVON 221-0116/0187**  
**Enlisted: AUTOVON 221-8051-0304-0305**



### Measuring the Effects of MOPP

In 1984, General Maxwell Thurman, the Vice Chief of Staff of the Army, called for an evaluation of the physiological and psychological effects of extended operations in a nuclear, biological, and chemical (NBC) contaminated environment. The acronym now associated with this evaluation of combined arms crews is P<sup>2</sup>NBC<sup>2</sup>. Specifically, the P<sup>2</sup>NBC<sup>2</sup> tests sought to measure the ability of selected combat arms crews to function under the stress and confinement that would be part of fighting in various mission-oriented protection postures (MOPP).

The Field Artillery, Armor, and Infantry Centers all participated in the P<sup>2</sup>NBC<sup>2</sup> evaluation. The Armor School conducted its evaluation on M-1 tank crews, and the Infantry School evaluated NBC-induced stress on infantry rifle squads. The Field Artillery School evaluated a full nine-man, 155-mm

self-propelled howitzer section organized under the J-series table of organization and equipment (TOE). A fire direction center computed data for the gun but did not take part in the evaluation.

The United States Army Field Artillery Board conducted the artillery's P<sup>2</sup>NBC<sup>2</sup> test last year at Fort Sill, Oklahoma. The test assessed degradation in howitzer crew performance which resulted from extended operations in an NBC environment.

Because the test involved medical instrumentation and because the scenario included human experimentation under conditions which would be physically trying, only informed volunteers participated. The Board formed and trained four volunteer 155-mm howitzer sections. Each section went through the same scenario. One crew acted as a control group and did not wear protective clothing. The other three wore MOPP level IV equipment—mask, gloves, boots, and overgarment. The section that did not wear protective gear did wear the same medical instrumentation and underwent the same physiological and psychological evaluation as the other three crews. In this way, evaluators sought a valid comparison of performance degradation.

Each scenario consisted of standard Army training and evaluation program tasks administered continuously over a 24-hour period. The MOPP "O" crew shot over 150 rounds during the day-long evaluation. The other three crews fired less than 50 rounds each because their scenarios did not run the full 24 hours.

During the test, medical evaluators recorded each volunteer's heart rate, core body temperature, and brain waves. A medical team continuously monitored the telemetry from the crew. As expected, the heat stress in MOPP IV on an August day in Oklahoma proved horrific. In fact, each crew met at least one of the three criteria established for terminating the test:

- The crew was reduced to four members.
- The chief of section or both the gunner and assistant gunner were rendered ineffective.

- 24 hours had elapsed from the start of the test.

The Army Research Institute and the Army Research Institute of Environmental Medicine are now evaluating the medical data produced during the test, but there are some indicators of performance degradation from Fort Sill's P<sup>2</sup>NBC<sup>2</sup> test that could help Redleg leaders now. Those indicators are:

- Section personnel become listless about their duty performance.
- Section areas become sloppy and crew members disregard neatness. There is no attention to detail.
- Ammunition handlers become careless. Rounds are handled improperly; fuzes and powders are stored incorrectly.
- Section personnel require prompting to render a response when communicating over the battery "hot loop" system.

- Section personnel continually stumble, trip, or fall during operations.

- Section personnel do not respond to voice commands.

- Section personnel require extended periods of time to perform simple tasks.

- Section personnel refuse to drink enough water to replenish that lost through increased sweat rates.

- Section personnel refuse to eat.

The final results of the Army's P<sup>2</sup>NBC<sup>2</sup> effort are still some years away. But field artillery leaders can use the information provided in this article *now*. They can learn to recognize the indicators of MOPP IV degradation and estimate what to expect from long-term operations in protective gear. The application of this information in NBC training can contribute to a more able, effective fighting force.

## Pershing Study Group

In May 1985, Lieutenant General Robert M. Elton, the Army's Deputy Chief of Staff for Personnel, established the Pershing Study Group (PSG) to develop a personnel support system that would decrease the costs and increase the efficiency of the Pershing Force. The need for such a review derived largely from a significant space imbalance (SIMOS) in Pershing specialties and the growing strategic significance of the Pershing II (PII) system.

A space imbalanced specialty occurs when 55 percent or more of all authorized positions in a military occupational specialty (MOS) are overseas. Pershing associated skills including MOSs 15E, 21G, 21L, and 46N habitually fall into that category. The costs associated with this situation are staggering. In fact, the Army spends an estimated \$64 million annually as the result of the Pershing Force imbalance. Soldiers caught up in these specialties experience significant personal hardships. SIMOS soldiers are often limited in the assignments they can receive, and they are frequently malassigned. The result is eroded morale and competence levels.

Ironically, as Pershing's space imbalance problem has increased, so too has the system's importance. PII has become an integral part of the North Atlantic Treaty Organization's nuclear deterrent. Its increased range and accuracy have made it a visible counterweight to the Soviet's growing arsenal of medium-range nuclear weapons. Such a pivotal system requires the very best, most highly trained personnel. Yet, because three-quarters of all Pershing spaces are in Europe, the Army was hard-pressed to support the system as it should.

The Study Group published its final report on 31 December 1985. Its major recommendation called for

the development of a force alignment concept featuring overseas home basing, reversed rotational procedures, and significant benefits and incentives.

The members of the Study Group believe that increased overseas tour lengths will not only reduce SIMOS problems, but also decrease costs and improve readiness. Specifically, the 14-man team concluded that soldiers would voluntarily accept increased overseas tour lengths if provided incentives such as: additional pay, EURAIL passes for soldiers and dependents, and paid travel to home of record every 2 years. They also suggested automatic concurrent travel, provisions for rental cars upon European arrival and departure, help in purchasing homes in Germany, free German language classes for college credit, and job preference for family members. The Study Group estimated that the proposed changes could save approximately \$45 million annually and free up 975 man spaces for other Army needs.

The Pershing Study Group recently presented its final report to the Commander of the US Army Training and Doctrine Command who in turn passed it to the Army Staff for additional study and implementation. Given Department of the Army level approval, many of the Pershing Force initiatives may take effect quickly.

## BATTLEKING

• **BK 20-86, Powder Thermometer (Source: MSG James O. Havens, ID, FA Team, Fort Benjamin Harrison).** Howitzer TMs no longer list powder thermometers M1 or M1A as an additional authorization list or basic issue item. Nor do these

thermometers appear as a separate item on current tables of organization and allowances. In consequence, many units are having a hard time finding the powder thermometers. Without the thermometer, units cannot incorporate the proper data in the battery computer system or backup computer systems.

The powder thermometer, M1A1, NSN 6685-00-344-4603, is listed in the common table of allowances (CTA) 50-970, Expendable Durable Items, January 1982, page II-222. This CTA is the authority to order the thermometers. The thermometer is also identified in TM 9-1015-243-10, *Operator's Manual, M102 Towed Howitzer*, page B-15. The US Army Field Artillery School's Weapons Department has initiated action to have the thermometer listed in all other howitzer system operator manuals.

- **BK 7-84, 1:100,000 Map for TACFIRE (Source: 3d Armored Division Artillery).** The standard 1:50,000 scale map used by the tactical fire direction system (TACFIRE) coverage-equipped division artillery units does not allow cover of most division zones of operations. The 1:125,000 scale map is simply too small to allow the digital plotting map or the electronic tactical display to show fire units, fire support coordination measures, and targets in a readable format. However, the 1:100,000 scale map allows both the

plotting of easily read measures and covers most division zones.

The 1:100,000 scale map evaluated is an enlarged portion of a 1:250,000 scale joint operations graphics sheets. It proved most useful and BATTLEKING analysts have concluded that:

- An enlarged 1:250,000 scale map would be detailed enough to support operations in division artillery TACFIRE units.
- The current software for TACFIRE will support the use of any scale map without change.
- Each unit should use the scale map that best fulfills its mission.
- The 1:100,000 scale map is best suited to a fluid, fast-moving, AirLand Battle environment that encompasses a division zone.

Geological survey 1:100,000 scale maps for continental United States (CONUS) and Korean based units are available from the Defense Mapping Agency. Artillery units can obtain an index of US maps from the Branch of Distribution, US Geological Survey, 1200 South Eads Street, Arlington, VA 22202. All 1:100,000 scale maps for Europe, the Mid-East, and other areas outside CONUS are out of date and not stockpiled.

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## A STEP Up for FSOs

Because many lieutenants are not familiar with the operation and capabilities of the variable format message entry device (VFMED) prior to assuming duties as battalion fire support officers (FSO) in tactical fire direction system (TACFIRE)-equipped units, the Field Artillery School has developed a self-teaching exportable package (STEP). The packages self-paced, self-administered, and self-evaluated modules consist of:

- An introduction to TACFIRE.
  - An introduction to TACFIRE message formats.
  - Brigade and battalion fire support element message formats and output report fundamentals.
  - Operation of the variable format message entry device.
  - Operation of the electronic line printer (ELP).
- Additional required materials including TMs 11-7440-253-1 and 3 are available through normal publication channels.

Requests for the FSO STEP may be made by writing to Department of the Army, Commandant, US Army Field Artillery School, ATTN: ATSF-DNF, Fort Sill, Oklahoma 73503-5600; or by calling AUTOVON 639-3159 or commercial (405) 351-3159. The point of contact is Captain Ralph Kwong, Nonresident Training Division, Directorate of Training and Doctrine.



SGT Rebecca Sheldon

**CPT Francis L. Mayer, a TACFIRE instructor in the Gunnery Department at the Field Artillery School, silences the alarm mechanism on the variable format message entry device.**



## Linked Observer Concept

During Fire Support Team Force Development Testing and Experimentation II (FIST FDTE II) testing at Fort Riley, Kansas, the average doctrinally conducted Copperhead mission required 4:15 from target acquisition to shot. That's not fast enough. Experts at the Field Artillery School have developed and published in FC 6-30-20, *The Linked Observer Concept*, new techniques and procedures to reduce response times—measured from target acquisition to impact—to 1 minute plus time of flight.

The concept involves:

- Centralized planning and decentralized execution.
- The use of target types instead of target locations.
- Direct association of an observer with a specific weapon system.
- Use of preformatted fire request messages.
- Reliance on "when ready" as opposed to "at my command" missions.
- Dependence on the ground/vehicular laser locator designator (G/VLLD) for precision target location.

The planning phase starts with the maneuver commander, who defines high payoff targets by type and determines engagement priorities. The fire support officer then establishes a temporary linkage of an observer with a specific battery computer system as a quick fire channel to support the scheme of maneuver. He determines the number and duration of the linked observer relationships necessary to comply with the commander's guidance. The observer preformats a Copperhead mission in the offline buffer of the fire support team's digital message device and continually updates his position data. Cannon crews prepare Copperhead projectiles in advance. Their efforts range from a minimum of removing the projectile from the container and setting the observer's G/VLLD code to placing the prepared round on the loading tray between normal fire missions.

When a target of opportunity appears the observer recalls the stored fire request, lases the target to generate an accurate location, and transmits the request directly to the linked battery computer system. The battery computer system solves the gunnery problem and transmits firing data to the designated weapon which fires the round when ready. The observer then lases the target for the final 20 seconds of the projectile's flight to complete the mission.

The first live fire testing of the linked observer techniques will take place in the fire support digital message device follow-on evaluation scheduled for Fort Stewart, Georgia. As preparation for the test continues, the Field Artillery School welcomes any comments from the field pertaining to experience with the linked observer concept. Fort Sill's experts are particularly interested in how units have integrated the concept into their standing operating procedures. Address your comments to Commander, USAFAS, ATTN: ATSF-SD (Mr. Kraft), Fort Sill, OK 73503-5600, or call AUTOVON 639-3688/3974 or commercial (405) 351-3688/3974.

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# Fragments

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## FROM COMRADES IN ARMS

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### Automation On the Way

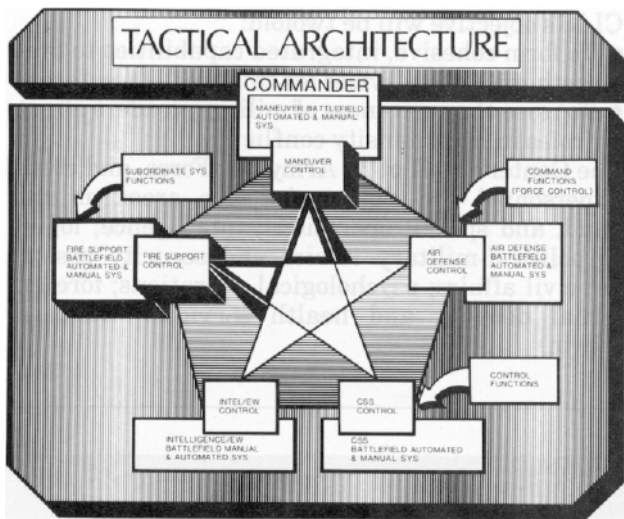
The maneuver control system (MCS) will provide maneuver commanders and their operations officers at corps level and below the automated assistance they need to execute precise, real-time command and control of combat forces. As shown in the accompanying figure, the maneuver control system is a key component in the Army's tactical architecture system. It will communicate with each of the other functional

elements—fire support, air defense, intelligence and electronic warfare, and combat service support.

In July 1982 the US Army Communications and Electronics Command (CECOM) awarded Ford Aerospace & Communications Corporation a contract for MCS system integration; software design, development, refinement, and testing; and field support.

Program managers are exploiting three major concepts to execute the MCS acquisition.





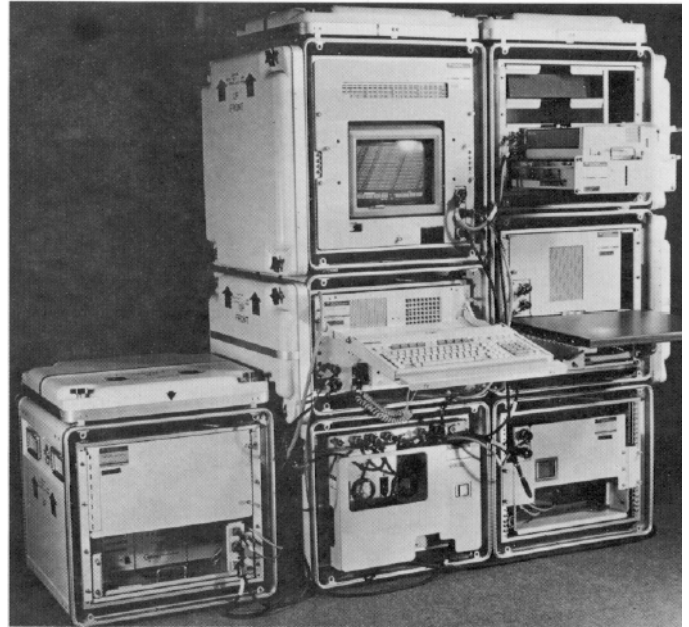
computer terminal (TCT) built by Singer Librascope, Glendale, CA; and the NDI AN/UYQ-43(V) tactical computer processor (TCP) assembled by Ford Aerospace, Colorado Springs. All these devices are interactive and expandable over a variety of transmission media, modulation techniques, and data rates. And the system can use both secure data and voice communications channels. Field artillerymen should get ready to hear more and more about MCS and its fire support companion—the advanced field artillery tactical data system.

- The first concept is *evolutionary development*. MCS is being built using continuous field-user testing and feedback. This approach allows incorporation of newly founded technologies to enhance capabilities and reduce cost.

- Second, the MCS software is the first major Army system incorporating *Ada*, the standard software language of the Department of Defense. *Ada* provides for structured maintainable software that is easily transportable between different computer systems.

- The third concept is the use of the *nondevelopment item* (NDI) approach which uses commercially available equipment to satisfy military requirements and thereby shortens the development cycle.

The baseline MCS hardware consists of fully militarized tactical computer and NDI equipment. The computer equipment includes the MIL-SPEC AN/UYQ-30 tactical



The maneuver control system will communicate with each of the other functional elements of the tactical architecture — fire support, air defense, intelligence and electronic warfare, and combat service support.

## Center for Low Intensity Conflict

During a recent ceremony at Langley Air Force Base, Virginia, the Army and Air Force opened a joint Center for Low Intensity Conflict (CLIC). Lieutenant General Robert E. Kelley, Vice Commander of the Tactical Air Command, noted that the Center "probably should have started a long time ago."

CLIC's commander, Air Force Colonel Frederick C. Bosse, elaborated on the specifics of the Center's operation and the nature of the low intensity conflict.

"What we find today is that one out of four countries is at war. This warfare does not attack a nation's military forces . . . . Instead it is the populace, agricultural, and medical assistance teams, teachers, judges, priests, their clinics, classrooms, power, and transportation systems which are the targets."



The Army defines low intensity conflict as a limited political-military struggle to achieve political, social, or economic objectives. Such conflicts are usually confined to one geographic area and characterized

by terrorist tactics, insurgency, and violence. "Low intensity conflicts are known by many other names— low intensity warfare, insurgency, guerrilla war, and wars of national liberation," said Bosse.

Colonel Bosse also noted that "We have the capability to train others to provide for their own defense. We also have the ability to assist through civic action. We must also realize that there is a place for power in responding to low intensity conflict, not only from our special operations forces, but also from capabilities within our conventional forces—both Army and Air Force."

CLIC's objective will be twofold:

- To form cohesive, integrated capabilities to prepare both military services for this type of warfare.
- To raise the awareness of military leaders about their roles in low intensity conflict.

The Center's staff of 27 Army, Air Force, and civilian personnel are experts in such areas as air, ground, and special operations; intelligence; logistics; political-military affairs and security assistance; civil affairs; psychological operations; foreign internal defense; and health services. (Barbara Baldwin)



## A Tilt in CAS

Bell-Boeing's V-22 Osprey will be the first operational tilt rotor aircraft in the American inventory. Scheduled to make its maiden flight in 1988 and reach Marine Corps units by mid-1992, the V-22 offers the advantages of both a helicopter and an airplane. On one hand it will be able to take off vertically and hover at zero airspeed; on the other hand it can climb to 28,000 feet and cruise efficiently at 300 knots. With ferry tanks installed, the Osprey will have an unfueled range of over 2,100 nautical miles and be self-deployable worldwide.

The Bell, NASA, and Army XV-15 military development research aircraft proved the tilt rotor concept in 1977. In fact, two XV-15 prototypes have logged over 500 hours flying time with 100 different pilots. This exhaustive developmental testing yielded many improvements which will appear in the V-22. For example, the Osprey promises increased hover efficiency, enhanced controllability, and greater cruise speed.

Its cabin will accommodate 24 troops or it will carry external loads of up to 10,000 pounds. By using a short, rolling take-off, pilots can achieve even greater payloads and range.



**Bell-Boeing's XV-15 tilt rotor research aircraft can convert from helicopter to airplane in just 12 seconds.**

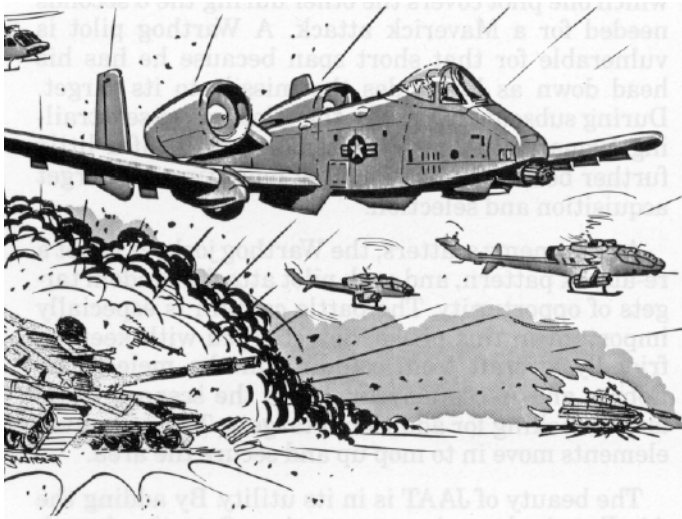
The Navy seeks 50 Ospreys with a 460 nautical mile radius of action for combat search and rescue. The Marine Corps envisions using the vertical takeoff and landing (VTOL) Osprey for a wide range of missions. In fact, the Marines require 552 Ospreys capable of a 200 nautical mile radius of action with 24 troops after a vertical ship-board take-off. Air Force special operations units have a requirement for 80 Ospreys configured for a high, hot hover and a 700 nautical mile radius of action with 12

troops on board. The Army projects a requirement for 231 aircraft in the Marine Corps configuration for medical evacuation and medium cargo lift.

Because of budgetary constraints, early versions of the Osprey will not be armed. However, there are plans for a nose-mounted gun and possible points for air-to-air and air-to-ground missiles. Supporters of armed Ospreys note that such airplanes would decrease the need for escort aircraft, freeing them to perform other essential tasks.

Bell-Boeing officials are quick to point out that the tilt rotor concept promises increased readiness because rotor and airframe loads are minimal in wingborne flight. This factor alone should increase the life expectancy of the aircraft and decrease unscheduled maintenance time. Experts anticipate the purchase cost of the tilt rotor aircraft will be 10 to 15 percent greater than that of a conventional helicopter. However, Bell-Boeing believes the direct operating costs are going to be 50 to 60 percent lower than those of a helicopter. Thus, the total life cycle cost for the Osprey should prove much less than that of an exclusively rotary wing aircraft.

In austere times, the multimission Osprey looks like a winner. It combines the advantages of fixed and rotary wing aircraft into a versatile bird which, like its namesake, can fly over land and sea.



## And Then Came JAAT

The Soviet General could hardly believe what he was hearing. He asked the officer to *repeat* his report: "I was calling fire support for a tank advance against the enemy's northern flank," he began. "Our tank column had breached their line, and we were moving into their weak point. Then a single aircraft appeared."

The junior officer went on to explain that the plane had dropped from 2,500 feet to attack the column. The crack of

cannon, a flash, and a crash gave way to the acrid smoke belching from a burning tank. But the attack wasn't over. The pilot struck again. And tank after tank went up in flames.

"Twelve tanks," said the observer, "went up in flames. "Then the enemy counterattacked and overran them."

The General marveled that a single Luftwaffe Stuka dive-bomber could so disrupt his armored forces. That Stuka, and its pilot, Lieutenant Colonel Hans Ulrich-Rudel, were to become very familiar to Soviet commanders during the battle of Kursk. Rudel's Staffel, or combat wing, of obsolete Stuka dive-bombers used their 37-mm antitank cannons for a lot of tank-busting.

Rudel survived to the end of the war. In fact, he holds two world's records as the man who has flown the most combat missions—2,530—and the man who has destroyed the most tanks—519.

Rudel and other Stuka "drivers" on the Eastern front didn't know it, but they were the forerunners of what American warriors now call the joint air attack team, or JAAT. Specifically, Rudel did some significant things.

- He conceived the idea of mounting antitank weapons on an aircraft and formed the first dedicated antitank flying unit. In doing so he proved the concept beyond a doubt.

- He went on to become a celebrated author, writing the book *Stuka Pilot* and a number of treatises on aerial warfare. As the undisputed world leader in aerial antitank warfare, Rudel worked as a consultant



The AH-1S Cobra attack helicopter (top photo) and the A-10 Thunderbolt II aircraft (bottom photo) join forces in the joint air attack team training.

for aircraft manufacturers and also went on lecture tours to talk about *tank-busting*.

American developers learned a lot from Rudel's experiences, concepts, and guidance during the design period of the A-10 Thunderbolt II aircraft, the single most deadly antitank weapon system on earth. Affectionately known as "Warthogs" because of their magnificent ugliness, the A-10s recently visited Fort Lewis, Washington, for joint air attack team training.

This year, Warthogs from the US Air Force Fighter Weapons School, Nellis Air Force Base, Nevada, worked closely with 9th Infantry Division soldiers to make JAAT work.

Just as the name implies, JAAT does not rely on a single weapon system. Rather, Army and Air Force units work together to become a smooth running, tank-killing team. Such teams have four major components, the A-10s, Army aviation, field artillery, and ground maneuver elements. Working in close coordination under control of a heliborne air battle captain, they can be more lethal than Rudel *ever hoped* to be. The battle captain uses four radio nets not only to monitor and direct the actions of each major element but also to stay in contact with his commander.

A typical JAAT scenario begins when friendly maneuver units make contact with a threat force. The armor or infantry leaders quickly develop the situation to determine enemy strengths and positions. They call for artillery support to soften-up and button-up enemy vehicles. Their fire support teams may also begin to kill selected enemy vehicles by using ground laser locator designators to pinpoint targets for Copperhead artillery shells which can home in on a single target.

As the maneuver and field artillery elements continue

the engagement, AH-1S Cobra attack helicopters move into the area undetected, hugging the terrain to remain masked from visual and radar search. Arriving in position, they fire bursts of 2.75-inch rockets, either indirectly from defilade or directly as they pop up for quick shots and drop back into cover. The Cobras attack from several directions, disrupting air defenses and drawing fire. They look for opportunities to employ their lethal tube-launched, optically tracked, wire guided (TOW) missiles and 20-mm cannons. As soon as the enemy is completely distracted, the Warthogs blast in.

The Cobras fire rockets to mask the A-10s from enemy radar, and the A-10s switch on their electronic countermeasure systems to confuse enemy air defenses. The Warthogs wade in with television-guided Maverick missiles. Missile after missile—TOW and Maverick—take a heavy toll and the enemy formation becomes sizzling scrap. Firing from the sides, Cobras attack, harass and decoy while leaving an air corridor for the Warthogs to exploit the confusion with gun runs. The fighter's 30-mm Gatling gun grinds armor and troops at the rate of 3,000 explosive rounds a minute. Sabot subprojectiles perforate the heaviest armor like cheese while high explosive shells splatter anything else.

The A-10s begin their attacks in line or wedge formation, bringing their full firepower to bear. They may employ "shooter and shooter" cover tactics in which one pilot covers the other during the 5 seconds needed for a Maverick attack. A Warthog pilot is vulnerable for that short span because he has his head down as he guides the missile to its target. During subsequent passes, the pilots may use a trailing formation as each aircraft spaces itself a little further behind his lead, giving more time for target acquisition and selection.

As the enemy scatters, the Warthog jockeys adopt a re-attack pattern, and each pilot attacks random targets of opportunity. The battle captain is especially important in this phase; he's charged with keeping friendly aircraft from colliding in the melee. The Cobras and A-10s may linger on the scene a while longer, looking for additional targets. The maneuver elements move in to mop up and secure the area.

The beauty of JAAT is in its utility. By adding the Air Force's close air support aircraft to the Army's combined arms team, JAAT provides the commander with a complete package of fully integrated weapon systems which can work in virtually any locale. Whether he be in the desert or the mountains, the arctic or the jungle, an imaginative tactician can employ his JAAT resources to meet his offensive or defensive needs.

Hans Ulrich-Rudel's concept has certainly matured. Close air support has evolved into a highly effective joint service team which, like Rudel's *Staffel*, should cause Soviet commanders considerable dismay. (Bob Rosenburgh)



## The German Artillery— *An Integrated Approach*

by Lieutenant Colonel Dietmar Hoffmann

Over the centuries, the artillery has played an important role on past battlefields, but it has proven particularly useful in the modern era. Major Jerry Morelock's recent article "Rolling Caissons—A Legacy of Doctrine, Organizations, and Materiel" (September-October 1985 *Field Artillery Journal*) makes the decisive role of the massed American firepower in World War II abundantly clear. He points out that for the artillery of the mid- and late twentieth century, an innovative integration of maneuver and fire support is necessary before the action commences. Such synchronization of effort gives the artillery the opportunity to fulfill its mission with unprecedented effectiveness. Unfortunately, not everyone recognizes the important role of fire support.

In wartime, infantrymen habitually rejoice when they hear the cry, "Make room, the guns are coming!" But such reverence is often lost in peacetime when it is difficult to demonstrate the importance of fire support in combined arms operations.

The German Army believes that its artillery force

structure and its modern operational concept helps bridge that knowledge and appreciation gap. It actually integrates artillery into maneuver organizations and makes it possible to deliver fire support in combined arms operations without delay.

An appreciation for the value of integration in peacetime should pay off handsomely during war.



Marching to its firing position, an M109 155-mm howitzer battalion rattles across the German countryside.

Integration promises to span the void of understanding that has separated artillery and maneuver. Through day-to-day contact with their organic fire supporters, maneuver leaders will finally learn that artillery is in fact the King of Battle.

## The German Approach

In the early 1960s when the German Army reorganized its divisions under a brigade system, its force designers created three nearly autonomous mechanized or armored brigade types. They tailored and organized each of the brigades to conduct prolonged, independent combined arms operations. Besides its main body composed of four maneuver battalions, each brigade had its own antitank, armored engineer, supply, and maintenance companies. The brigade also boasted an organic artillery battalion of 18 155-mm self-propelled howitzers. Fully integrated into the brigade's command, control, and communications system, this battalion's commander is the senior artillery advisor and fire support coordinator for the brigade.

## The Artillery Battalion of the Brigade

As an organic organization within the maneuver brigade, the artillery battalion will generally be in direct support of the brigade's maneuver battalions. Under exceptional circumstances the artillery battalion might receive a different mission from the division artillery commander, but on the norm the battalion commander is usually the fire support coordinator for his maneuver commander and establishes his fire support cell at the brigade tactical operations center. Along with his battery commanders, who double as fire support officers, the battalion commander is responsible to coordinate all fire support means including mortar and close air support. At the brigade and battalion levels, these artillery commanders advise their supported maneuver commanders on fire support, and they also coordinate the actions and fire execution of forward observers including mortar observers at the maneuver company level.

The Germans believe the key to success in the combined arms team is a permanently established relationship between artillery and maneuver leaders. Such links foster confidence and reliability at all levels. By training together and sharing barracks, maneuver and fire support organizations become as one.

The artillery battalion is an integral part of the brigade units. The artillery battalion commander participates as an equal of the maneuver battalion commanders. Artillerymen from lieutenant to lieutenant colonel participate in conferences, meetings, and officer developmental periods together with their brigade peers. For example, artillerymen are players in combined arms training events such as map exercises, terrain evaluations, as well as command post and field training exercises. Participating



The division artillery commander is the division commander of an artillery regiment composed of a composite cannon battalion, a composite rocket battalion, and a target acquisition battalion.



The German artillery possesses a full range of artillery weapons including this general support 203-mm self-propelled howitzer.

artillerymen are often asked to draw upon their expertise regarding fire support and to propose better maneuver schemes that capitalize on fire support.

The result is a better artilleryman. The commissioned and noncommissioned officers of the brigade artillery learn more about tactical operations than they ever could in a strictly artillery unit. The leaders of the German equivalent to the Combined Arms and Services Staff School often observe that the officers who have served in an artillery unit organic to a maneuver brigade have a far more comprehensive understanding of combined arms operations.

## Division Artillery

When confronted with this decentralization scheme, American Redlegs often ask, "What's left at the division level? And more importantly, what is the role of the division artillery commander?" The German response is quite simple—The division artillery commander is the commander of an artillery regiment composed of a composite cannon battalion, a composite rocket battalion, and a target acquisition battalion. His main task is to plan and conduct the fires of all artillery units under the command and control of the division including organic brigade artillery units. He is the fire support advisor of the division commander, and he deals in particular with the use of nuclear ammunition and mine rockets. He uses the division artillery staff to form a fire support cell at the division tactical operations center and contributes to decisions regarding new operations and nuclear employments.

Following the division commander's decision, the division artillery commander develops the artillery paragraph of the operations order. He also issues the "How to Conduct the Fire Fight Plan," which includes all details and identifies missions, main efforts, organizations for combat, target acquisition tasks, and ammunition allocations. If required by the division's operational concept, he can use the brigade's artillery battalions to optimize fire support for the division as a whole. For example, following the principle that "artillery should never be kept in reserve," he normally will give the organic artillery battalion of the reserve brigade a general support or reinforcing mission.

## Results

Over 25 years of experience have proven the effectiveness of the organization of the German artillery with its organic direct support artillery battalions within maneuver brigades. This decentralization has never prevented the centralized prosecution of a fire fight at division level, but it has helped to increase the Army-wide understanding of the role of the artillery and to build trust in its weapons.

At first glance, the German system might *appear* to have yielded total control of direct support battalions to maneuver. But in practice, the scheme has *enhanced* the

relationship between artillery and maneuver units and underscored the importance of fire support. By integrating the artillery into the maneuver brigades, the Bundeswehr has developed in peacetime better combined arms teams.




The German 110-mm light artillery rocket system is just one component of the fire support available to maneuver commanders.

## A German Look at Field Artillery

Fire support in combined arms operations is the principal task of the artillery. But the artillery does much more. For example, it provides additional support through reconnaissance. The range of modern artillery weapons, the versatility of today's reconnaissance systems, and the flexibility of contemporary command and control systems allow Armies:

- To establish unexpected main fire efforts.
- To shift the fire efforts quickly.
- To influence combined arms operations directly and often decisively.

That's the gist of the German Army's field manual FE 700/108, which differs only slightly from the American treatment of *firepower* in FM 100-5, *Operations*. 

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