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Tactics and Training

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ARTICLES

FEATURES

Front cover photos by SP4 Lori Sizemore

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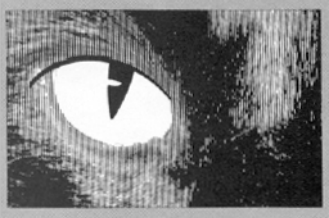

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On the Move

MG EUGENE S. KORPAL

"Nothing we do in peacetime warrants unnecessary risk of life or equipment."

These words from General John A. Wickham, Jr., the Army's Chief of Staff, underscore the Army's philosophy of caring leadership. They represent a change from the simplistic and cynical contention that "soldiering is just dangerous business." And they clearly establish the axiom of AirLand Battle doctrine that *protection* of our soldiers and their equipment is an important element of combat power.

In today's Army, soldiering can and must be safe business. Each and every Redleg, from the newest cannoneer to the most senior commander, must identify the safest method to get the job done and then use that method while training to demanding standards of excellence.

Safety is not an excuse to avoid realistic training. In fact, it is an essential ingredient in good training because safety is just as much a wartime as a peacetime concern. Whether road-marching to Graf or firing in support of a contingency force in Grenada, Redlegs must be aware of the design features of their equipment and the safety implications of our doctrinal drills. Their actions must be governed by the sixth sense of *safety*.

Institutional Training

The leaders of the School of Fire Support recognize their role in developing that *safety-conscious* frame of mind. Each department director at the School has the responsibility to identify potentially unsafe conditions created by our doctrine, standing operating procedures, and equipment. What's more, each senior leader understands that he is the safety "Guru" for his department responsible for checking and double-checking potentially hazardous operations.

Teaching directorates have a further charge to train our new Redlegs to uncompromising standards of safety. Their message is that although some of our modern weapon systems are hazardous, soldiers can use them with minimal danger if properly trained and led.

The use of lasers in Army operations offers a good case in point. At Fort Sill, we teach that the equipment can be used day-in and day-out without risk of inflicting serious personal injury when the trainers provide the necessary eye protection—and teach their soldiers the "why" as well as the "how-to" of laser operations.

Training and Fighting in the Field

Every Redleg joining the Total Force Field Artillery should come armed with a keen awareness of safety. The sustainment of that perspective becomes the unique responsibility of our leaders in the field.

Commanders throughout the King of Battle should be their own safety officer. They should establish demanding policies including stiff firing, driving, crew drill, physical training, sanitation, ammunition handling and accountability standards, and maintenance certifications and procedures that don't sacrifice safety for speed or convenience. Then they must ruthlessly enforce those standards in training and combat. Caring is a round-the-clock job, and an unprotected unit is one with profoundly diminished combat potential.

Nowhere is the need for safety consciousness more critical than in fire support operations. We simply cannot afford to endanger friendly forces through our own fuze setting, charge cutting, and gunnery errors. Military historians speak of friendly fire as if it is a fact of life. We Redlegs simply can't accept that. Our fires must be on the enemy, on time, every time.

Conditions of Visibility

Conflict	Visibility Normal	Visibility Reduced	Visibility Unknown	Total Incidents
WW II (Eur)	9	7	4	20
WW II (Pac)	18	4	6	28
Korean War		3		3
Vietnam War	2	11	34	47
	29 (30%)	25 (25%)	44 (45%)	98 (100%)

Type of Operation

Conflict	Defensive	Offensive	Patrol	Retrograde	Type Unknown	Total Incidents
WW II (Eur)	3	13	1	2	1	20
WW II (Pac)	5	21	1	1		28
Korean War	3					3
Vietnam War	16	5	3		23	47
	27 (28%)	39 (40%)	5 (5%)	3 (3%)	24 (24%)	98 (100%)

Type of Error

Conflict	Misidentification	Mechanical	Coord	FDC	Crew	FO	Type Unknown	Total Incidents
WW II (Eur)			10	1			9	20
WW II (Pac)	2	1	13				12	28
Korean War			2				1	3
Vietnam War	1	4	7	4	9	9	13	47
	3 (3%)	5 (5%)	32 (33%)	5 (5%)	9 (9%)	9 (9%)	35 (36%)	98 (100%)

Artillery Friendly Fire Incidents by Conditions of Visibility, Type of Operation, and Type of Error

Conclusion

We must provide our Redlegs with the initiative and desire to do their challenging jobs right, and that means in the safest manner possible. Safety doesn't hinder operations. If a task or operation leads to an accident, injury, or damage to property; then in all likelihood it was not done right.

Our goal remains excellence in fire support, and we can achieve it only if we protect our forces. We can put steel on target consistently only when we make safety an integral part of our daily lives.

Incoming

LETTERS TO THE EDITOR

Old Thoughts

Looking Over the Edge

Major Thomas B.L. Stanford's article "The Razor's Edge" (May-June 1986 *Journal*) provided some valuable insight on his unit's experiences at the National Training Center. In doing so, he introduced an interesting method for switching frequencies during jamming operations; but he overlooked 2 areas which need to be addressed.

First he overlooked the use of wire, messenger, or another radio net to pass a secure message to announce the "mask 1" command that initiates the CF1 frequency to the survey frequency. If the shift from the tactical operations center cannot reach all stations while being jammed, perhaps another station or communications means can.

The second area is that the nets he used at the NTC may not be available during wartime. The survey frequency is actually the corps artillery survey channel for use by all survey parties. The battalion tactical operations center is not the net control station for this radio net. The battalion administration logistics net is not a doctrinal net and may not be in the wartime communications-electronics operation instruction when deployed. An antijam frequency should be provided.

My third key area concerns the communications-electronics staff officer (CESO). He can work with the S3 and establish a dummy net on the jammed frequency. The CESO can suggest radio assets to be used in this deceptive measure. The enemy might miss the change and not even look for us on the new frequency.

Remember that changing a radio frequency during jamming is a last resort. Ensure you have tried to overcome the jamming through increasing transmitter output, adjusting or changing the antenna, or relocating the antenna for terrain masking.

Electronic counter-countermeasures training is critical and should be planned and practiced to ensure effective communications. Major Stanford provides some good ideas, but we can do even better.

Roger C. Voss
CPT, SC
Fort Sill, OK

Response to DEEP ATTACK— We Can Do It Now!

The importance of the deep battle component of AirLand Battle doctrine cannot be overestimated. The days of fighting a war of attrition across a linear battlefield are gone. To be successful today, American commanders need tactical techniques that can offset the often unequal balance of forces.

According to FM 100-5, *Operations,* 1986, the deep battle impedes the enemy's massing of forces and creates windows of opportunity for friendly offensive actions. As a former Field Artillery tactics instructor, I realize the role fire support will play in executing the deep battle. Notice I said here *play* in executing the deep battle, not in *support* of the deep battle. In fact, today fire support interdiction *is* the deep battle in most situations and the key ingredient in virtually all others.

In many cases the primary assets commanders will employ in deep attacks will be Field Artillery and tactical air. Such requirements place a tremendous burden on the Fire Support Community because there is an obvious lack of proven techniques and procedures for training and preparing for deep attack operations.

The article "DEEP ATTACK—We Can Do It Now!" by Major Steven G. Starner (May-June 1986 *Journal*) reveals that today's commanders recognize the importance of developing tactical concepts and techniques for executing deep battle operations. Specifically, the leaders of the 1st Armored Division have worked on such procedures, and their efforts warrant our praise. However, I do have several reservations and comments about the proposed employment of Field Artillery to support a division attack force (DAF).

- My first observation concerns calculated risks. Major Starner identifies the need to weigh carefully the risks associated with a deep strike. He's absolutely right. Leaders must consider and select deep operations techniques in the context of the total situation. They must ensure that the deep attack complements rather than undercuts the total force's fire support plan. Obviously, the DAF will need fire support, but the Field Artillery and other supporting organizations shouldn't be subjected to unnecessary risks.
- My second concern involves the tasks Field Artillery units need to accomplish. Major Starner identifies 5 tasks including 2 which are more properly labeled roles of the artillery—close support and counterfire. Paradoxically, he never mentions interdiction fires, yet interdiction is the name of the game in the deep

attack. As a rule of thumb, Field Artillery units should provide varying degrees of support to the 3 roles—close support, counterfire, and interdiction. Artillery leaders will also need to identify specific fire support tasks during the planning phases of the deep attack based upon mission particulars.

Of the 3 other tasks listed, 1 falls under specific mission requirements—supporting joint air attack team operations. A second task—destruction of uncovered and bypassed units—appears to be a maneuver mop-up responsibility and not a task for Field Artillery or fire support. The third task—identification of high payoff targets—is the result of the target value analysis process and will yield priority targets that when engaged will fall under 1 or more of the 3 roles the Field Artillery fulfills.

- My greatest reservations concern the techniques which Field Artillery units will employ as they support the

DAF. I understand that the author is wargaming and searching for effective procedures for employing Field Artillery. However, many of the ideas presented may not warrant adoption as standard approaches within the Field Artillery Community.

For example, Major Starner's proposal to employ firing batteries 100 meters behind the lead teams in a "battery wedge" formation is not a valid concept for employing Field Artillery. Combat developers have not designed Field Artillery weapons to do this, and such batteries cannot provide truly effective fire support. By adopting this technique, leaders place firing units in extremely vulnerable positions. Concepts such as this are unrealistic, and they promote misinterpretation of our capabilities by others.

To his credit, Major Starner has opened the debate on the need to develop standard doctrinal employment concepts for deep operations. He realizes that fire support will carry a large burden of the deep battle responsibilities and has identified many of the challenges facing the Fire Support Community. To accomplish its responsibilities, the Field Artillery, in conjunction with the other members of the combined arms team, must determine appropriate tasks, tactics, techniques, and procedures if we are to execute effective deep battle operations.

Robert Longino
CPT, USMC
Quantico, VA

Response to "Fire Support Lessons Revisited"

The May-June 1986 edition of the *Journal* made my day! The issue was shot through with ideas, arguments, and examples of how the Field Artillery Community is incorporating such resources as tactical airpower into the planning and execution of fire support for the ground combat forces.

I was particularly delighted to read Major Byron Baker's article, "Fire Support Lessons Revisited," in which he described an action at the National Training Center (NTC) where airspace coordination areas provided for concurrent Field Artillery fires and air strikes on the same target.

I was also pleased to see Mr. Vincent R. Bielinski's "In Response" letter regarding the article, "Finding the Key," by Captain Thomas A. Owen in the January-February 1986 *Journal*. Although I don't think that the battlefield coordination element (BCE) is the ultimate answer to the problems that have been plaguing Army-Air Force interaction for the past several years, I do think it is a step in the right direction.

Perhaps the best part of the May-June edition is the indication that the Field Artillery Community has picked up the Army's tactical air support issue and is running with it.

Lieutenant Colonel (Retired) C.W. Montgomery and I have been grinding this particular axe for several years. It will be a pleasure for this old Redleg to stop writing about what the fire supporters *ought to be doing* about exploiting the capabilities of tactical airpower and to sit back and read about what the younger Redlegs are *actually doing* with tactical air resources.

Griffin N. Dodge
COL(Ret), USA
Santa Fe, NM

40 Lashes

I found the September-October 1986 *Journal* interesting. It resembled *FA Journals* past, with articles on hints and suggestions on how to do one's job better; and it brought forth historical examples of the use and effect of artillery properly employed.

The Battle of the Bulge articles successfully emphasized significant features of artillery employment by historical example. However, both Major Morelock and Captain Gordon fell into an error common to amateur as well as skilled professional historians: placing too much faith in previously written histories and not checking their statements with several sources. For example:

- While the map on page 9 showed part of the 10th Armored Division at Bastogne (CCB), it omits part of the 9th Armored Division which was also there (CCR). Nor does it show part of the 9th Armored also at Saint Vith and part stopping the 276 VG Division on the southern shoulder. Only the 9th Armored Division headquarters is shown. The division fought at 3 of the 4 critical points of the campaign listed on page 10.

- Contrary to the statement on page 11, Clay's 275th Field Artillery battalion—an outstanding unit that performed gallantly—did not constitute the entire artillery support for 2 critical days at Saint Vith. The 16th Armored Field Artillery Battalion, a component of CCB 9th Armored Division, arrived at Saint Vith early on December 17th and had been counterattacking German formations for an entire day before units of the 7th Armored Division arrived.

Captain Gordon's article correctly points out that Bastogne's defense depended a great deal on the artillery, and further to the 101st Airborne Division that contributed so significantly to that battle. However, he errs again by not checking his statements. On page 17 he notes that the 73d Armored Field Artillery Battalion had lost many guns. In fact, they lost only 4 out of 18. The photo at the bottom of page 17 is captioned most incorrectly. It is actually a photo of 1st Section, Battery A, 3d Armored Field Artillery Battalion, in action on 21 December 1944, from position about 1,000 meters east of Larochette, Luxembourg. I know as it was 1 of my gun sections. A cursory examination would reveal that Glider Field Artillery battalions were not equipped with M7 self-propelled 105-mm howitzers.

Accuracy of names is a minor but equally essential point to historical accounts. Lieutenant Colonel Browne's first name was Barry, not Berry.

More significant however, is the erroneous identification key to the map on page 18. The Bastogne perimeter did change during 23 through 26 December but not as portrayed on the map. The perimeter dates are reversed. The dotted line was the perimeter as of 23 December, not the 26th; and the solid line was the perimeter as of 26 December. On the 24th, the 101st Airborne Division shortened its perimeter and regrouped the defensive forces; at the same time the Flamierge salient was eliminated by pulling the line back to Champs-Senonchamps. The Army's Office of Chief of Military History publishes a green book, *The Ardennes: Battle of the Bulge* by Hugh Cole. It is still 1 of the more accurate accounts of the Bulge.

The tendency to quote an existing source and to repeat a factual error prompts me to make these corrections. Two years ago a well-publicized book purportedly told the untold story of the Bulge, however it merely repeated incorrect statements of previous writers.

Both articles made their point and should interest today's gunners. I particularly enjoyed the uncaptioned photo on page 15, used as the lead for Captain Gordon's article. It is actually 1 of the lead tanks of the 19th Tank Battalion, a unit of CCA 9th Armored Division, in the attack of 27 December 1944 by CCA to clear the main road from Neufchateau to Bastogne. I was about 10 feet from the photographer when he took this picture.

One last comment—on page 30, Mr. Bogart unaccountably redesignates the 252d Coast Artillery as the 252d "Coastal" Artillery—an error I have recently noted of increasing frequency.

Keep 'Em Rollin'
AND DON'T YOU FORGET!

George Ruhlen
Major General (Retired)
San Antonio, TX

New Thoughts

Robert Bastedo

In the guise of a Soviet sergeant, SSG Bruce Brown, left, shows fellow "comrades" of the 4-5th FA how to search a prisoner of war.

An Enemy by any Other Name

Look out! We've got a new enemy. The genre literature tells just how bad these guys really are. They always win. They aren't the Russians or the Red Chinese. They aren't even the Cubans. They are the opposing forces at the National Training Center. Better watch out. They can't kill you, but they *can* ruin your day. Looks like everyone will finally have to learn fire support and that real combined arms operations wins. Just like they have for the last couple thousand years.

Stanley Grzybala
CPT, FA
APO NY

Making the Most of 13B NCO Leaders

In combat arms, skilled noncommissioned officers are always at a premium. To spur the professional maturation of these skilled leaders, the Army has created the primary leadership development and the basic noncommissioned officer courses. The standards of these formal schools are high, and their graduates emerge well motivated and trained. Nevertheless, we can do better.

In MOS 13B, a vacuum exists in noncommissioned officer training. Our courses stress the leadership skills appropriate for the apprentice at skill level 2. Unfortunately, the core of these programs is infantry—not Field Artillery—oriented. To learn the technical tasks necessary to be a skill level 2 gunner, a soldier must often seek outside training. This situation is particularly common among service battery and special weapons

personnel. They may be eligible in time-in-grade and time-in-service for promotion to the next higher skill level, but more often than not they lack experience on the guns.

We are doing an injustice to the Army if we promote them to the next higher skill level without being fully qualified for it. And we are doing an injustice to them by not providing the training they need.

To increase the quantity and quality of the 13B20 soldiers, the battalion-level leaders must build gunner's training into its training plans. At periodic intervals during each training year, many battalions schedule a gunners qualification test. I recommend that they use this time to train new or potential gunners in the skills they need. FM 6-50, the *Field Artillery Cannon Battery* and STP 6-13B14-sm-TG, *The Soldier's Manual,* provide all the references. The primary trainers for this should be 13B30 section chiefs. They should train all the sergeants and promising specialists regardless of duty assignment.

They should not routinely train privates except in the rare exception of cohesion and operational readiness (COHORT) units. Most cannoneers have yet to demonstrate their potential. Certainly there may be a "hot" private or 2 who are highly motivated and have the potential to be excellent gunners. By all means, train them. In any case the final decision about who gets the training must rest with the section chief, chief of firing battery, and executive officer.

Like a gunners test, this training can be conducted as a "round-robin". It should feature maximum hands-on participation. The size of rotating groups and the duration of the training should be flexible, but all training should be conducted in a strict "task, condition, standard" and "go" or "no go" fashion. A locally produced score sheet works well to capture the results and the progress of individuals.

The heart of the program should be the following tasks:

- Set and lay for deflection (task 061-266-2229).
- Lay the howitzer for initial direction of fire (tasks 061-271-2219 and 061-271-2221).
- Lay the howitzer for initial direction of fire by reciprical lay (task 061-271-2217).
- Refer the piece (task 061-266-2231).
- Align aiming posts (task 061-266-2213).
- Align collomator (task 061-266-2215).
- Boresight direct fire telescope using DAP (task 061-271-1212).
- Check boresight with M139 device (task 061-271-2225).
- Sight on target during direct fire mission (Task 061-266-2233).

Although not listed in skill level 2 references, aspiring gunners should also perform to standard on the following additional tasks:

- Prepare a range card for the howitzer (task 061-266-3313).
- Perform the gunner's quadrant end-for-end test (task 061-266-3311).

- Perform gunner's quadrant micrometer test (task 061-266-3310).
- Perform preventive maintenance checks and services (task 061-266-1605).

The tasks listed above are for the M198 howitzer. But there are comparable tasks for virtually all other weapon systems.

The standards taught must come directly from the soldier's manual, not from local "shortcuts." By teaching the soldier's manual standards, leaders improve standardization and sponsor better scores on skill qualification tests.

This approach works. It produces trained 13B sergeants, and it gives all our soldiers the opportunity they need to continue to grow in the Field Artillery.

Jon F. Dewey
SSG, FA
Fort Ord, CA

KISS Still Sweet

The increasing number of newly-fielded computer systems and their inherent complexities make it imperative that we remember the "keep it short and simple" (KISS) axiom.

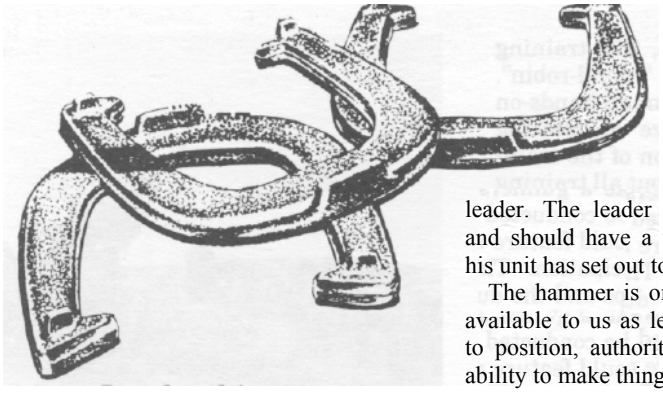
My battalion recently underwent its nuclear surety Army training and evaluation program (ARTEP) at Grafenwoehr and, as usual, preparation was meticulous as well as intense. Nothing was left to chance. Briefings were prepared, operations orders (OPORD) reviewed, and information digested and disseminated throughout the battalion staff. In fact, we briefed everyone except the most key of all personnel—the troops. This became evident during the precombat inspections (PCI).

The division artillery operations sergeant was tasked to question E4s and below on the tactical situation. The soldiers in the operations shop and the battalion fire direction center achieved about a 70 percent "go" rating. As experienced leaders know, these soldiers are far more likely to be "in the know" due to the nature of their jobs within the unit. However, the firing battery personnel—the mission executors—were at a distinct disadvantage. The information just did not filter down to their level.

After the PCIs, but before the rollout to field locations, I took the time to prepare a mini-operations order which contained the same information given to the operations section. It is a basic synopsis of the brigade OPORD and the division artillery's Field Artillery support plan. I gave every soldier in the battalion a copy. Needless to say, all our soldiers knew exactly what was going on and a key lesson was learned.

Before future ARTEP PCIs, I will prepare similar mini-OPORDs to keep our personnel informed at every step of the tactical scenario. The OPORDs will remain short and simple because in this day and age, few things are.

Stephen P. Duvall
SFC, FA
APO, NY



Leadership—Making a Good Horseshoe

Defining leadership as "be, know, do," is simple to understand, but no simple definition is going to produce a good leader. Only experience and personal dedication can do that. Most soldiers get the opportunity to practice and learn leadership through unit-level experiences, but in the Training and Doctrine Command's school system they also learn through the experiences of others. Moreover, in many academic courses warriors learn even when they are not the intended student. This is certainly the case when an officer is assigned to a school staff and faculty.

As a member of a school staff and faculty, you can learn a great deal from the hallway discussions of the instructors and senior staff members. For example, topics covered in the cloakrooms of Fort Leavenworth center around tactics, the AirLand Battle concept, and leadership. In fact, the best lesson I learned at the Command and General Staff College was about leadership. It wasn't expressed in the terms usually associated with leadership theory. In fact, it had nothing to do with the "be, know, do" concept or some form of mentoring. Rather it drew upon a theory about how to make a good horseshoe.

A former commander of mine used this intriguing metaphor as he explained the relationship between leadership and the "concept of operations." Because he had a good record, I listened attentively to his horseshoe description of good leadership.

He began by noting that you need a skilled blacksmith, a hammer, a heated strip of metal, and an anvil to make a good horseshoe. The blacksmith in this case is any leader from general officer down to a section leader. The leader should be proficient and should have a vision of what goals his unit has set out to accomplish.

The hammer is one of the many tools available to us as leaders. It's equivalent to position, authority, knowledge or the ability to make things happen.

The metal is the unit and its soldiers. In almost every situation subordinates want to do well. They're malleable metal ready to take shape under the direction of the leader.

The anvil is the key item of equipment. Without it you can bang away at the metal and get the sounds and sparks of the blacksmith, but the finished product will look nothing like the intended horseshoe. You need the firm, evaluative base of an anvil to make things go right. My excommander then observed that doing anything in the Army was much like making the horseshoe. As I looked at my assignments, I could see how the process applied to each of them.

For example, this process has been going on not only at Fort Leavenworth but at every other Army school. The blacksmith is the assistant commandant with a personal vision of what the college should be and the product it should be sending to the field as graduates. The students are the metal ready to be formed with the body of knowledge already present in the faculty. The faculty comprise the hammer. It forms the students into various types of horseshoes.

Anyone listening to the comments of students during a class break can normally tell you when the sparks have been flying and the faculty has been doing its job of hammering students into shape.

At CAS3 and CGSC the evaluation system forms the anvil, shaping the body of knowledge required from each graduate. Anyone who has gone to Airborne, Ranger, or Air Assault School or another demanding military course will have no doubt that someone hammered away at them and that they had been formed into its own unique horseshoe.

Reflecting on my troop assignments, I found that this metaphor also applies to them. In each case commanders are blacksmiths. They shape their soldiers and their units into a horseshoe of their design. The metal in some cases required heating up, but that is a normal process the minute a new commander arrives or the unit gets a new mission. The hammer varies depending on the object of the commander. In some cases sergeants were the hammer. In other circumstances an officer provided the pressure appropriate to the final product. The anvils vary too. To be sure, the Army has provided various anvils for the "blacksmith" to use:

- Officers use 67-8-1 and the officer efficiency report to form their subordinates.
- For the soldier, the SQT and the enlisted efficiency report are good "anvils" providing a durable "horseshoe."

The commander also has "anvils" for the unit. The ARTEP, AGIs, and other inspections serve as perfect examples.

Now the whole process sounds like a brutal approach, but it isn't. There may be occasions when an Article 15 is the anvil that the commander works with. But a well-deserved award is also a form of anvil.

Not all commanders fully understand this. I recall one fellow who used another metaphor. He advocated putting his subordinates in a vice to make them perform or pop their eyes out by squeezing the vice tighter. He created the associated sparks and sounds of a skilled blacksmith, but his final product could not shoe any horse.

The majority of the commanders I have come across understand the theory and are well acquainted with the hammers available; however, they sometimes take a while to find the right anvil. The majority find one, and today's units testify to the quality of their choice. That's why the commander with the vice will normally find the anvil but only after he has wasted a great deal of metal.

All of us have to do blacksmith duties, even if we only make small horseshoes. Each of us needs to know something about the process. And every Redleg must search for the appropriate anvil that will yield the results he wants.

Stephen P. Walsh
CPT, FA
Fort Leavenworth, KS

Well Worth the Effort

Like most other Field Artillery fire support team members, our observers in the 5th Battalion, 29th Field Artillery were not hitting moving targets at the National Training Center. To fix this problem we developed a simple but effective training technique using the battalion survey position and azimuth determining system (PADS) jeep. It can be tailored to fit different terrain and can incorporate tactical scenarios.

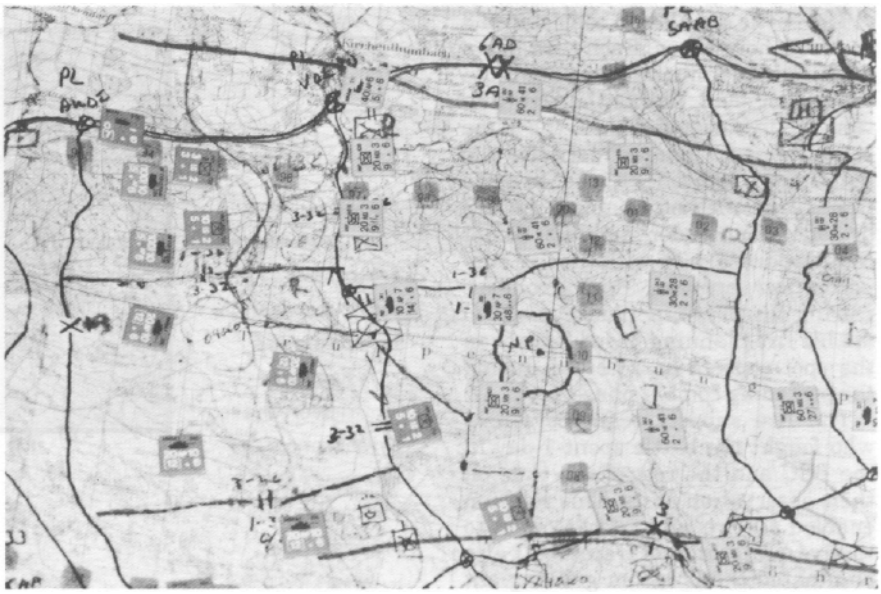
The observers occupy positions from which they can observe a PADS jeep on the move along a course at a predetermined speed. We used 30 kph. The observers send their calls for fire to a radio-telephone operator (RATELO) acting as the personnel in a fire direction center (FDC). When the RATELO receives the call, he:

- Starts timing the mission and determines mission delivery time. To keep things simple, we used 3 minutes for a fire for effect mission and 1 minute for a preplanned priority target.
- Radios the PADS jeep to determine its location when the rounds would have landed.
- Compares the grid sent by the observers in their call for fire to the jeep's actual location.

Trainers can use the different grids to identify the specific problem areas plaguing a particular observer. Our experience suggests that most observers will quickly learn to "lead" the target. They also learn how useful trigger lines are: if the jeep is going 30 kph and using the 3-minute standard for fire for effect missions, they should call for fire 1.5 kilometers in front of the jeep as it crosses the known trigger line. This training is effective as well as fun. Teams quickly get competitive, and expertise increases rapidly while espirit de corps soars.

The training described here resulted in dramatic improvements in our target location accuracy during our most recent rotation to the National Training Center. It was well worth the effort!

Andrew S. Napolitano
CPT, FA
Colorado Springs, CO



The Battle Simulation Center

Integrate a realistic intelligence scenario with an artillery battalion external evaluation? Some say it's impossible! Others note that tankers never combine gunnery and maneuver training, so why should the Field Artillery.

More often than not, these are the sentiments of artillerymen who have been frustrated with intelligence scenarios written to provide only intelligence play. Such scenarios normally bear no relationship to the battalion's moves and fire missions. And when they do, frequently they get off schedule due to the myriad of changes which occur during an external evaluation.

The 3d Armored Division Artillery created the Battle Simulation Center (BSC) to expand intelligence training beyond the S2 section and to create realistic intelligence input for evaluations. BSC personnel train the fire support teams, the fire support officer (FSO), and S2 personnel on Soviet as well as US maneuver tactics. It also drives an intelligence scenario, giving tactical "sense" to administrative constraints which may affect live fire evaluations.

The BSC employs a combination of civilian and military wargaming techniques to achieve the training goals. The maneuver battle is fought on a game board of 9 to 12 1:50,000 scale map sheets. BSC experts use markers from commercial war games to designate US companies and batteries as well as battalion-sized Soviet units. Soviet reconnaissance companies and US antitank companies are the only platoon-sized elements played. Blank markers can be purchased from most hobby shops to create specific units. In a battle scenario, a US armored brigade composed of 3 or 4 battalions was pitted against the first and second echelons of a Soviet motorized rifle division.

To expand the scope of tactical and intelligence play, BSC personnel use the game board to generate reports giving the battle situation on the brigade's and division's flanks. These nonplayer reports reach the Field Artillery battalion S2 via normal situation reports. The actions of notional flanking units caused many firing batteries to move to new positions.

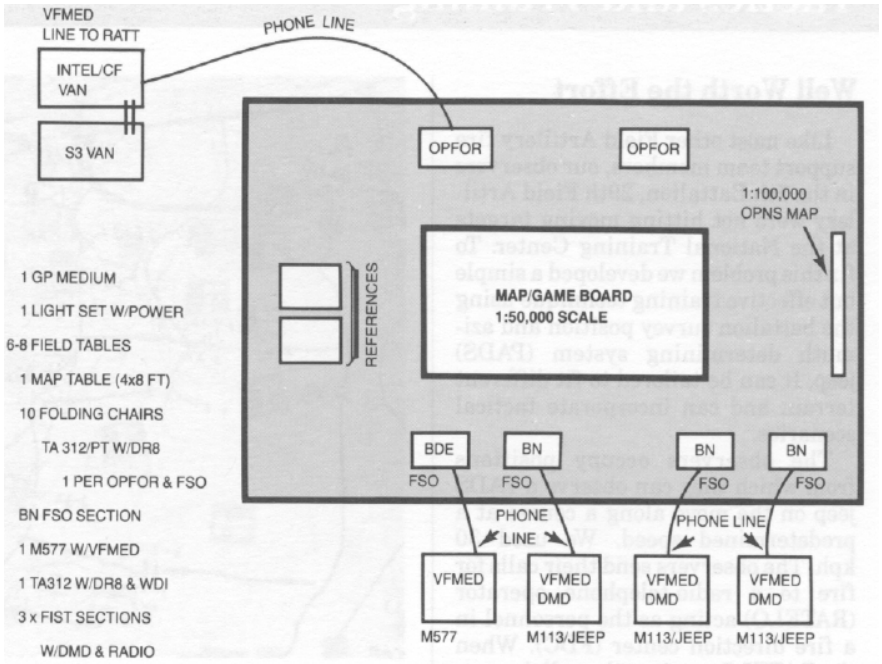
A senior captain from the brigade the evaluated artillery battalion habitually supported played the US brigade commander. He provided the battle plan and normal fire planning guidance for the FSOs to execute. The "commander" also explained the tactics employed and what factors influenced his choices. This helped the battalion FSOs to understand his tactics and specifically how fire support could support them.

The Division Artillery S2 section controlled the Soviet forces which advanced using standard doctrine.

The battle simulation consisted of 3 days of 1-hour turns. Each turn had a 30-minute planning and a 30-minute combat segment. Rather than shifting from US to Soviet and back, the game turn segments rotated between the battalions engaged on the brigade front. This method enabled the US brigade commander and his Soviet counterpart to work with the fire support officer separately during combat. During the planning phase, the FSO did his fire planning based largely on the spot reports he received during the preceding combat phase.

The fire support team personnel who fought the battle spent 1 day in the BSC and the rest of the time on their observation posts. This rotation enabled all fire support personnel to receive a full range of training. It also eliminated the boredom growing out of the same fire support team fighting a semistatic battle for 3 days.

The resources for the BSC were readily available at the battalion level. The basic setup appears in the accompanying figure. The FSO provides his M577 with the variable format message entry device (VFMED) linked by landline to the BSC. The fire support teams provide a digital message device with radio to support the submission of spot reports. The Division Artillery counterfire



VFMED also entered data to check the battalion's standing request for information files. Situation reports went out via radio-teletype communication to the battalion S2. These multiple sources of information provided the battalion S2 with the information he needs to track and analyze the Soviet attack. What's more, threat maneuvers precipitated friendly movement and changes in mission just as they would in combat.

The BSC met its goals in training all participants in the information gathering and intelligence production chain. It also provided meaningful, realistic training for the fire support team and the FSO in conjunction with their battalion's external evaluation.

Frank R. Shirer
CPT, MI
Washington, DC

Command Update

NEW REDLEG COMMANDERS

In the January-February issue of the *Journal,* the Commander of the Army National Guard 138th Field Artillery Brigade should have been listed as **LTC Thomas B. Ice;** and the Commander of the 1st Battalion-623d Field Artillery should have been listed as **LTC Michael F. Gantt.**

LTC Joe W. Trimble
1st Battalion, 3d Field Artillery

LTC Thomas E. Culling
2d Battalion, 5th Field Artillery

LTC James E. Cunningham, Jr.
3d Battalion, 9th Field Artillery

LTC Glenn G. Lackey.
2d Battalion, 10th Field Artillery

LTC James D. Crabbe
6th Battalion, 11th Field Artillery

LTC Geoffry D. Miller
5th Battalion, 15th Field Artillery

LTC James H. Jackson
2d Battalion, 29th Field Artillery

LTC Albert Sleder, Jr.
3d Battalion, 29th Field Artillery

LTC Charles E. Persyn
1st Battalion, 82d Field Artillery

DECIDE, DETECT, DELIVER

Tactics and Training in VII Corps Artillery

by Lieutenant Colonel Richard D. West and Major Charles E. Motson III

Decide, detect, and deliver—easy words to preach, but difficult actions to execute. The Commander of VII Corps tasked his Corps Artillery to *decide, detect,* and *deliver* in support of the deep fight. However, this proved nearly impossible before the Corps Artillery received the full staffing that comes with a headquarters and headquarters battery (HHB). Now with this important unit in place, VII Corps Artillery is ready to provide quality fire support throughout the depth of the AirLand Battle.

A Corps HHB

Our new table of organization and equipment (TOE) not only increased personnel authorizations from 44 to 156, but also increased the size and capabilities of the operations section. It also added a full communications platoon, 6 liaison sections, and additional tactical fire direction system (TACFIRE) operators. The new organization also boasts full S2 and S4 sections to provide increased abilities in garrison as well as in combat.

However, this growth in overall strength while going a long way towards solving the deep operations problem was not the complete solution. We had to look at our major problem areas and devise new ways to develop the deep battle plan. Formerly, Air Force-provided battlefield air interdiction (BAI) was the only weapon system responsive to the commander to fight deep operations. Our other deep attack weapons were not effective for many of the following reasons.

• *Command, Control, and Communications Shortfalls*

The old 44-man Field Artillery section did not provide adequate control of our general support artillery assets—multiple launch rocket system (MLRS) and Lance organizations. Both Lance and MLRS units were left in the hands of a Field Artillery brigade commander and remained relatively unresponsive to the corps commander.

Moreover, the Corps Artillery Commander lacked the direct communications links required to control his Lance and MLRS assets. The great distance separating the general support units and Corps Artillery headquarters precluded the use of FM radios for tactical fire direction systems. And the Field Artillery section did not possess the internal communications assets to accomplish the mission on its own.

• *Centralized Planning Group Problems*

Delivering deep fires required a long lead time because the Corps Artillery lacked a centralized planning group. By the time a target of opportunity was found, evaluated, sent to the fire support element, reevaluated, identified as a Field Artillery target, passed through the Field Artillery Section to the controlling Field Artillery brigade headquarters, assigned and passed to a Lance launcher, the enemy on the ground was long gone.

Even BAI operations placed us "outside" the enemy's decision cycle. Although the Corps Commander could rely on BAI for deep attack, this asset was unable to respond quickly enough to alter the enemy decision cycle. This inability to get "inside the enemy's decision cycle" left the Corps in a reactionary mode.

• *Poor Use of Fire Support Coordination Line (FSCL)*

Division planners could neither look nor attack beyond the 40 kilometer FSCL. Their only recourse was to call on Lance or very limited battlefield air interdiction assets to strike targets out to their maximum sensor range. Paradoxically these same sensors

and planners often were too busy with the forward line of own troops (FLOT) battle to do even minimal deep targeting effectively.

For these reasons, the corps deep strike system was impotent. Even with battlefield air interdiction it was reactive, not proactive. To fix this, Corps Artillery leaders needed to use the additional assets of Headquarters and Headquarters Battery to command and control the deep attack and to analyze and plan the battle before it happened.

The Solution

• *Command, Control, and Communications*

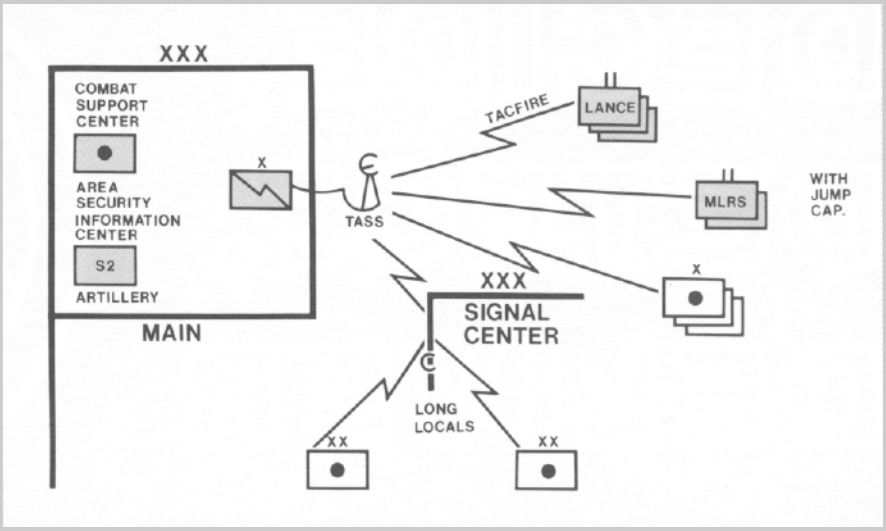
A couple of "quick fixes" established direct communications links to the Corps' general support artillery units. Provided by the corps signal brigade, the communications assets shown at right give fire support planners direct links to Lance and MLRS units. They provided the Corps Artillery Commander with real-time command and control capabilities to manage deep attack systems. What's more, the automatic-relay capability through the brigade TACFIRE computers now provides a back-up system to the direct links.

To enhance the responsiveness of Lance and MLRS, VII Corps Artillery leaders also developed a system of "hot" launchers and MLRS self-propelled loader launchers (SPLL). The artillery planners "footprinted" the Corps area for both Lance and MLRS. In doing so, they identified target areas, firing positions, and azimuths of lay. Under the program, specific Lance launchers and SPLLs stay on hot status with weapons loaded and laid on a predicted azimuth for a response within 15 minutes of fire mission request. Although this presents significant challenges to Lance and MLRS commanders in terms of crew rest and unit moves, in a crunch the Corps Commander could call on 18 Lance launchers and 27 SPLLs within 15 minutes.

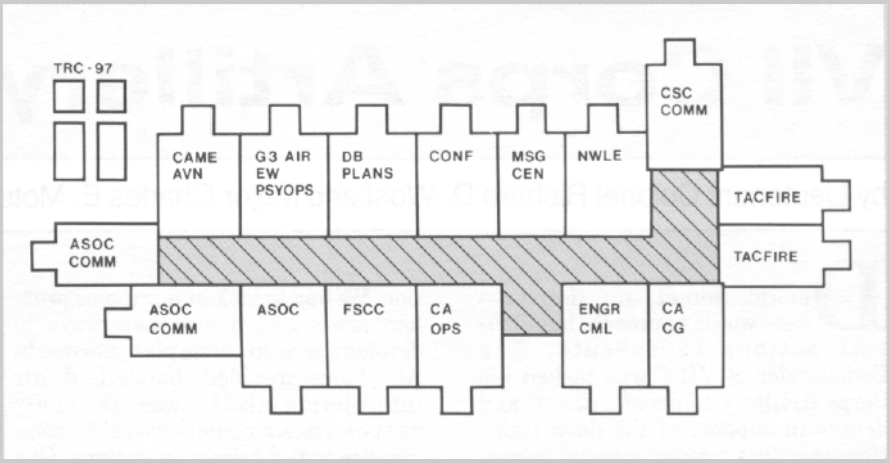
• *The Planning Cell*

Upon alert notification, the Corps Artillery deploys a separate module of the corps main tactical operations center (TOC) to the combat support center (CSC).

This cell carries with it the command and control links necessary to talk to Air Force battlefield air interdiction planners. It also provides



Provided by the Corps signal brigade, the communications assets shown here give fire support planners direct links to Lance and MLRS units.



The communications assets provide the Corps Artillery Commander with real-time command and control capabilities to manage deep attack systems.

channels to the reconnaissance, Army aviation, electronic warfare, psychological operations, Lance, and MLRS units. In the not too distant future, it will communicate with Army tactical missile system (ATACMS) organizations.

To speed up mission processing time, we also positioned the Corps Artillery S2 Section in the all source intelligence center (ASIC)—another module of the Corps Main TOC. The S2 has a variable format message entry device (VFMED) tied directly to the Corps Artillery TACFIRE computer. This location in the ASIC has many advantages.

- It provides the Corps Artillery Commander a direct link to the intelligence assets available.
- It provides information to the ASIC regarding counterbattery activity from file searches performed in the Corps Artillery S2's van.
- It improves our peacetime preparation for combat by establishing habitual working relationships between the Corps Artillery S2, the Corps' collection manager, and the Field Artillery intelligence officers (FAIO).

• *Fire Support Coordination Line*

The fire support coordination line (FSCL) as a general rule was withdrawn to within 15 to 20 kilometers from the FLOT, so the divisions can now plan in the area within their sensors' range.

Decide, Detect, Deliver

The Corps also made significant improvements on the first half of the *decide* phase of the deep attack formula by completing the terrain-related intelligence preparation of the

battlefield (IPB). As was described in the November-December 1986 issue of the *Field Artillery Journal,* this "upfront" analysis will continue with an in-depth examination of which targets will provide the highest payoff, of what these targets will look like to our array of ground and airborne sensors, to what accuracy we must locate them, and with which weapon systems we will achieve the desired effects.

With this analysis completed, the deep battle planning cell consisting of representatives from each of the deep attack agencies takes the intelligence and combines it with the commander's guidance. They then arrive at a priority listing of high payoff targets to engage.

Training

The artillery of VII Corps *trains as it will fight*. Twice a year the Corps Artillery takes advantage of major Corps-level exercises to field every level of TACFIRE from the Corps computer to the digital message device (DMD) at the fire support team (FIST) level. We use scenario-driven exercises to integrate the target production process from the ASIC to the TACFIRE world of artillery command and control.

By combining these TACFIRE command post exercises with major Corps-level exercises, we can also ensure that each and every deep attack weapon system and major command is represented. With the Corps deployed—if only in home station motor parks—the Corps' communication web is already strung. All we need do is plug into it.

Pre-exercise walk-throughs ensure that new Corps and Corps Artillery TOC personnel are familiar with the processing of deep operations missions. In addition, the Corps staff and Corps Artillery TOC frequently participate in division-level exercises to ensure that deep operations are an important part of every exercise within the Corps.

Conclusion

The organizational, procedural, and training changes that have evolved following the activation of Headquarters and Headquarters Battery, VII Corps Artillery and the formation of the Combat Support Center enable the Corps Artillery Commander to accomplish his assigned mission of fighting deep operations for the Corps. These changes place VII Corps in position to take advantage of promising developments in sensor hardware, direct communications down links, and the Army tactical missile system. In the future as now, we will endeavor to *decide* upfront, and both *detect* and *deliver* quicker, deeper, and more accurately.

Lieutenant Colonel Richard D. West, FA, is the S3 of VII Corps Artillery. He is a graduate the US Military Academy and holds a master's degree from the University of Colorado. He is a graduate of the Command and General Staff College and has served as a battery commander of an 8-inch unit in Germany; an instructor at USMA; a battalion S3 in Korea; and as the test director for fire support teams at Fort Riley, Kansas.

Major Charles E. Motson III, FA, is the Assistant S3 for VII Corps Artillery. He is a graduate of the United States Military Academy and holds a master's degree from Northeastern University. He has served in an 8-inch battalion in Germany, commanded a firing battery in the 2-320th Field Artillery, and taught ROTC at Suffolk University in Boston.

Fragments

FROM COMRADES IN ARMS

What Redlegs Should Know!

The major objective of every large Air Force operation is target destruction with force survival. Such operations place a tremendous premium on planning. The tool most Air Force crews use to coordinate and develop their operations is the target area mission plan.

Such plans have 6 major elements: target, threat, ordnance selection, weapons delivery tactics, initial point-to-target tactics, and deconfliction. Targeteers and weaponeers in the numbered Air Force's tactical air control centers use these elements as they generate air tasking orders for distribution to executing fighter bomber wings. Air crews at the wings use the same conceptual process to develop their specific attack plans.

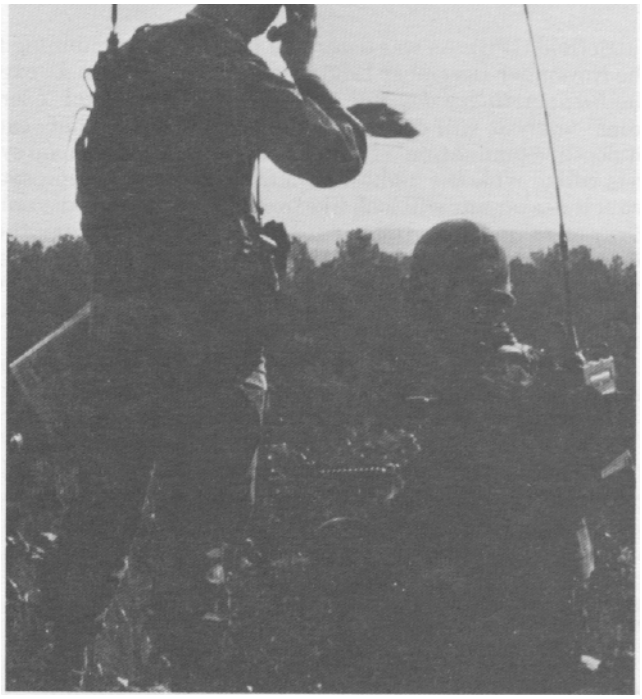
The first step in the process is to analyze the target. Targeting experts use available information to assess target vulnerability and appearance. They then determine the weapons suited to obtaining the desired level of destruction. In doing so, they rely heavily on the joint munitions effectiveness manuals (JMEMS). Targeteers also consider the effects of weather and terrain. They understand that weather conditions influence release altitudes, achievable slant ranges, target acquisition distances, and aircraft formation options.

After considering the target, Air Force planners then analyze the threat—specifically, enemy air defenses. Calling upon all available intelligence organizations including the Army's battlefield coordination element and ground liaison officers, they select an attack axis that minimizes aircraft exposure. Planners then work to limit exposure time and achieve an acceptable probability of target kill. Once again they examine the effects of terrain and weather. Terrain can provide direct and indirect maskings from the threat, but weather conditions such as poor visibility may require closer formations and decrease available target acquisition time.

Although planners will continue to consider the threat during the remainder of the planning cycle, they now turn to the selection of the specific ordnance necessary to attain the desired level of target destruction. The air tasking order (ATO) usually dictates the munitions for the mission. However, there are some instances when the ATO will not prescribe the most effective ordnance. Aircrews then must perform the necessary analysis. Their first step is to determine the munitions available. Then the crew refers to JMEMs to select the munitions that fulfill the destruction criteria. In doing so, they consider aircraft performance and range, the need for a minimum of exposure time, and the ceiling or visibility in the target area. Under adverse conditions they look for munitions that provide a relatively short slant range and a liberal release envelope.

The ordnance, release parameters, and delivery options will also influence the crew's selection of delivery tactics. They must decide the altitude, air speed, and delivery mode—dive, level, or loft—they will adopt. The next step is to match munitions with release parameters. For instance, the type of fuse to be used with the ordnance will influence the altitude required for arming and safe escape. Release parameters must satisfy the requirements for target acquisition, fuzing, weapons effects, safe escape, accuracy, minimum exposure time, and limitations imposed by terrain and weather.

The most difficult part of target area mission planning sequence is the determination of initial point (IP)-to-target tactics. Best accomplished by a reverse planning process from the target area to the IP, this step involves determining an attack axis, plotting selected weapons delivery maneuvers on the axis to determine an action point, and plotting backwards to locate a definable initial point. After completing the IP-to-target routing, crews determine the specific aimpoint or the desired mean point of impact for each aircraft.



Having dealt with the action over the target, crews then turn to their ingress and egress routes. They decide on airspeed, altitude, and formations. Airspeed must be as high as possible within carriage limits and fuel constraints. Ingress altitude must account for threat, weather, and potential inflight refueling. Selected formations balance defensive requirements and offensive potential.

The final planning element is deconfliction—the coordination necessary to prevent ingress route, target area, and egress route congestion. Crews work closely with other flyers to resolve problems regarding attack axis, altitude, standoff, and timing.

If all this sounds complicated, it is! But delivering air support is something every Redleg needs to know!

TACAIR Changes Control

The Marine Corps is losing exclusive control of its tactical aircraft (TACAIR) in joint service operations. In a 4 March 1986 message, the Joint Chiefs of Staff approved doctrine giving the joint force commander final authority on how Marine TACAIR may be employed. The Marine air ground task force (MAGTF) commander will continue to be the Marine air commander.

Marine TACAIR is devoted mainly to supporting ground forces. This includes precision bombing missions close to friendly lines.

Anticipating resistance to the change, Marine Corps Commandant P.X. Kelly strongly emphasized his support of the new policy which recognizes the MAGTF concept as a working doctrine and reaffirms Marine aviation's *primary* mission of supporting Marine ground forces.

Cobra—A Counterbattery Radar

The Cobra counterbattery radar is a weapon detection concept under consideration by France, West Germany, and the United Kingdom. Designed to locate enemy fire delivery systems rapidly and with greater accuracy, the system will require 8 men to install but only 1 to 2 soldiers for stationary operations.

The radar's intelligence system will help European Field Artillery units accomplish their mission and gain fire superiority by massing friendly artillery systems against the enemy. Cobra's capabilities should include detection of mortars, rocket launchers, and guns.

Major companies involved in the project include:

- Thorn EMI Electronics.
- Siemens.

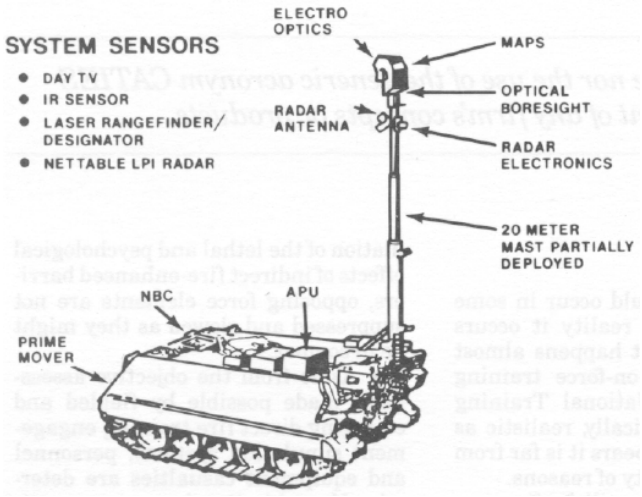
- Thomson-CSF.
- General Electric.
- Aeutelefinken.
- Marconic Command and Control Systems.

Hughes Aircraft, the primary contractor, accumulated extensive experience in this field when they produced the AN/TPQ-36 and AN/TPQ-37 for the US military and other nations.

They envision the Cobra as an improvement over these widely acclaimed existing US artillery radar.

ETAS Gives Army Treetop Perspective

Discovering what's over the next hill or beyond the third hedgerow is an important tactical requirement on today's battlefield. A new acquisition device, the elevated target acquisition system (ETAS), promises to fulfill that need. In fact, ETAS will be able to find, track, and designate targets—day or night. It will do all this with a telescoping mast and sophisticated sensor suite.



ETAS will be a brigade-level target acquisition and surveillance system which employs mutually supportive, passive and active sensors to provide timely targeting and combat information to the maneuver brigade fire support element (FSE) via the tactical fire direction system and the Army Field Artillery tactical data system. This information is then automatically and simultaneously passed to all elements within the brigade tactical operations center through the Army tactical command and control system.

ETAS will have 3 major components—a sensor suite, a telescoping, 20-meter mast that holds the suite, and a tracked or wheeled vehicle. The sensor suite will consist of the following sensors:

- A high resolution daylight television and an infrared sight for passive operations out to 10 kilometers.
- A rangefinder and designator to provide range data for targets located using the television and infrared sensors, and a designator for use in attacking these targets with laser-guided munitions.
- A low-probability-of-intercept radar to provide an all-weather capability and target acquisition up to 20 kilometers.

Forecasted product improvements planned for ETAS will give the system laser detection and an increased range capability, increased automation, and the ability to use only passive sensors.

The Army awarded contracts in August 1986 to continue ETAS developments. Martin Marietta, Orlando Aerospace, and Texas Instruments will build 1 model each within the next 2 years. The Army will test the designs in September 1988.

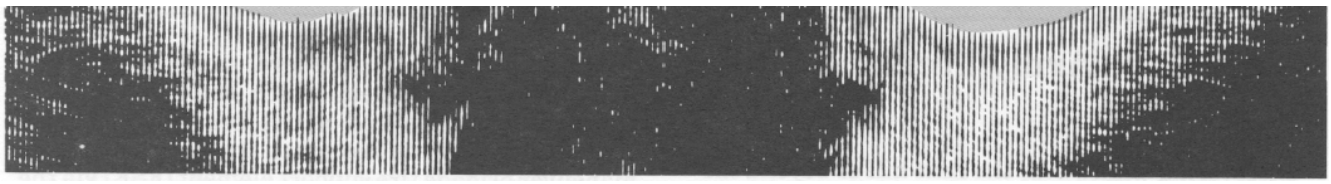
Anniston on Call!

Anniston Army Depot in Alabama has a hotline to help soldiers and units with maintenance problems on combat vehicles, small arms, and missile guidance and control systems.

The hotline is available 24 hours a day, 7 days a week. However, from 1530 until 0700 central time, an answering device will record messages. Anniston's equipment specialists will research questions on maintenance and repair problems and provide responses as quickly as they can.

Authorities stress that the hotline should be used only after all local resources are exhausted. When they call, soldiers should be prepared to provide their name, AUTOVON number, unit identification and location, and a complete description of the maintenance or operational problem.

The hotline number in Anniston is: **AUTOVON 694-6582** or commercial **(205)235-6582.** The depot regularly deals with land combat support systems including ground tube-launched, optically-guided warheads (TOW), TOW Cobra, TOW 2 Dragon, Lance, and Shillelagh missiles.



CATIES—

The Key to Realism at the NTC

by Lieutenant Colonel (Retired) James E. Ferguson and Mr. John E. Bjornholt

Editor's Note: *Neither the substance of this article nor the use of the generic acronym CATIES constitutes a Department of the Army endorsement of any firm's concepts or products.*

An American mechanized infantry battalion-sized task force digs in to stop an expected assault by a Soviet motorized rifle regiment. The task force commander makes good use of the terrain and integrates his defenses with those of adjacent forces. He plans for the reinforcement of natural and artificial barriers by responsive and well-placed direct and indirect fire assets, and he arranges for timely close air support.

Suddenly, massive fires rock his task force. The intensity of the artillery attack is surprising, and the effects are far more demoralizing and disruptive than he anticipated. The casualties escalate. Elements of one company reel from a chemical attack; elements of another are completely pinned down, unable to reinforce by fire the barriers to their front; and counterfire forces 2 of the supporting artillery batteries to move, reducing firepower at a critical time. Fortunately, helicopter gunships and Air Force aircraft are able to reinforce barriers with effective fires and the situation stabilizes.

The Problem

This situation could occur in some future war, but in reality it occurs even now. In fact, it happens almost daily during force-on-force training exercises at the National Training Center (NTC). Ironically, realistic as the NTC setting appears it is far from complete for a variety of reasons.

- The disruptive artillery fires are frequently notional. At best, they are simulated by manpower intensive and less than timely fire marker teams tossing outdated artillery simulators that seldom represent the coverage and never the suppressive effects of indirect fire munitions.
- Chemical attacks are seldom a surprise at the NTC, and because they are usually notional, there are no objective methods to sense and penalize failure to meet accepted chemical defense postures.
- Employment of barriers in a training environment is often notional and does not delay or canalize the opposing force realistically. And because of a lack of realistic simulation of the lethal and psychological effects of indirect fire-enhanced barriers, opposing force elements are not suppressed and slowed as they might be in combat.
- Aside from the objective assessment made possible by fielded and emerging direct fire training engagement simulation systems, personnel and equipment casualties are determined by subjective, inconsistent estimates, usually well after-the-fact.

All of this leads the objective observer to conclude that our current training environment is gravely flawed. We lack a system that not only portrays the contribution of fire support to the combined arms effort, but also represents the devastating effects that enemy fire support will have on our combat operations.

The Ramifications

The absence of a means to simulate objectively the effects of indirect fires produces at least 3 specific training deficiencies:

● Maneuver unit commanders often underemphasize indirect fires because of the unrealistic, subjective, and time-consuming nature of our simulation systems. For example, in a letter in the March-April 1986 *Infantry* magazine an Armor Squadron Commander stated:

> *We have been on more than a dozen REFORGERs over the past 10 years and can tell you that artillery is virtually worthless to the tactical commander in these exercises. This is because the cumbersome system used to allocate credit for artillery is unworkable. Many commanders stop using artillery because they know they will never get credit for it, and there are other things they can do with their time.*

● Combat arms, combat support, and combat service support elements train in an environment devoid of the suppressive effects of the enemy attacks they are most likely to experience in combat—air and surface-delivered indirect fires.

● The individual soldier cannot experience the surprise, destruction, and disruptive and suppressive effects of combat indirect fires.

What is Needed

To train effectively, the Total Force needs a realistic indirect fire simulator. To quote from *The Posture of the United States Army for Fiscal Year 1987:*

> *While the multiple integrated laser engagement system (MILES) has provided unparalleled opportunities for realistic, 2-sided, tactical training worldwide, true combined arms tactical engagement training is being sought. Efforts to incorporate the simulation of Field Artillery indirect fire; mines; and nuclear; biological, and chemical (NBC) area weapons effects into MILES exercises will improve tactical engagement training.*

An Approach

To simulate the indirect fire contribution of Army, Navy, Air Force, and Marine fire support to the AirLand Battle, our Army needs a system which:

● Complements existing and developing MILES-type direct fire engagement systems.

● Provides realistic battlefield effects.

● Provides realistic training for the total combined arms force.

The past 10 years have witnessed several attempts to get beyond the old fire marker and subjective assessment operations. But technology and safety restrictions have limited the development of cost-effective solutions. However, recent advancements in microchip and radio frequency technology—particularly the miniaturization, increased capacity, and reduced cost of key electronic components—promise fulfillment of this pressing need through the use of a combined arms team integrated evaluation system (CATIES).

The Solution

CATIES, also called SAWE-RF—simulation of area weapons effects-radio frequency—will simulate the effects of conventional and tactical nuclear indirect fire support, NBC contamination, and mine warfare. With CATIES, Army and Marine armed forces around the globe will be able to train in a more realistic indirect fire environment.

The system will include simulation of the lethal and suppressive effects of Naval gunfire as well as Army, Air Force, Navy, and Marine Corps munitions that are delivered indirectly during Field Artillery close air support and air interdiction missions.

How It Works

Currently, the MILES system can judge the effectiveness of direct fire weapons on an opposing force. When laser energy activates the MILES sensors, they indicate either "near miss" or "hit." A hit can be further categorized as resulting in damage or destruction. The system also analyzes the weapon type, tracking requirements, and the nature of the target.

In a parallel manner, CATIES employs radio frequency (RF) energy to activate a target sensor known as an applique. Like MILES, it takes into account weapon and munition characteristics as well as the nature and disposition of the target. Dust, smoke, or foliage have little affect on the RF signals.

CATIES has 3 primary components:

● A master station initiates and controls the system through the transmission of attacking weapons and timing data to selected actuators.

● The actuators transmit or relay weapons and timing data between the master station and target appliques.

● The appliques sense actuator transmissions and indicate the effects on the targets.

The master station will consist of a microcomputer, transmitter-receiver, display screen, and the necessary communications equipment to link with the unit's fire direction facilities and fire support elements. Based on the target location, the method of fire, and the time, the master station will compute the data required to cause at least 3 RF energy pulses. They will then transmit these signals through actuators to intersect over the target location at precise time intervals. The maximum range of the master station to the actuators should be greater than 30 kilometers, depending on line-of-sight. Using actuators as relays, the system range could extend more than 100 kilometers.

The battery-powered remote actuator will consist of a microprocessor-controlled receiver-transmitter,

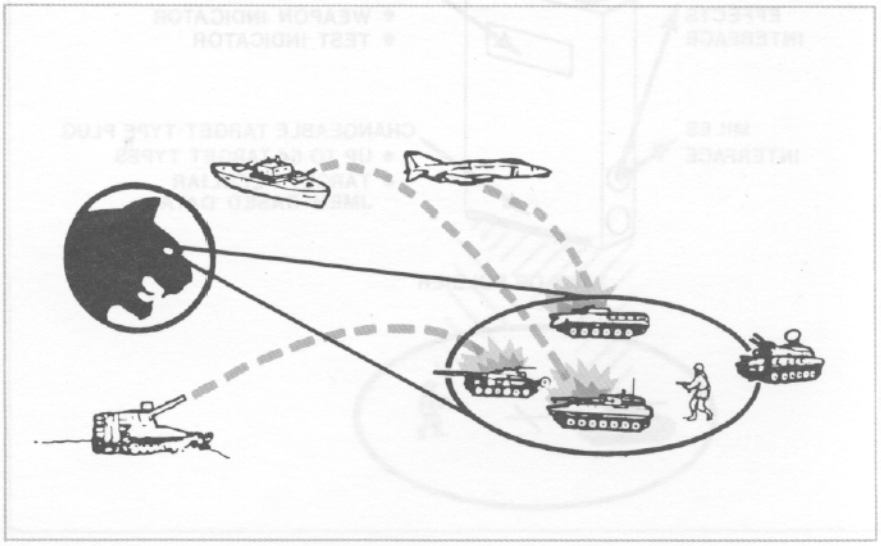


Figure 1. The combined arms team integrated evaluation system.

antenna, cabling, and an auxiliary communications device—all contained in an easily carried case. The actuator will receive data from the master station and transmit the coded radio frequency signals to the appliques. The actuator will include a keyboard and digital display to allow for inputting surveyed location data and to perform a self-test. At least 3 actuators—each with electronic line-of-sight to the designated target—will be needed to activate a target applique. The maximum actuator-to-target range should be more than 15 kilometers, and each actuator will be capable of relaying data to other actuators to extend operating range and to circumvent RF line-of-sight transmission obstacles. Once emplaced, the actuator will be capable of unattended operation. Typically, system operators will locate it on hilltops or on towers.

The applique—a receiver-decoder slightly larger than a cigarette package—will go on the individual soldier or vehicle. It will link to a flash-bang-smoke cue and a MILES-type device. The appliques activate upon receipt of decoded signals and using established probability data will determine either a hit or a near miss. A hit will actuate the associated MILES device for casualty or damage assessment.

A flash-bang-smoke device will complement the lethal effects simulation with applicable audiovisual cues to the soldiers affected by simulated indirect fires, chemical contamination or mine warfare.

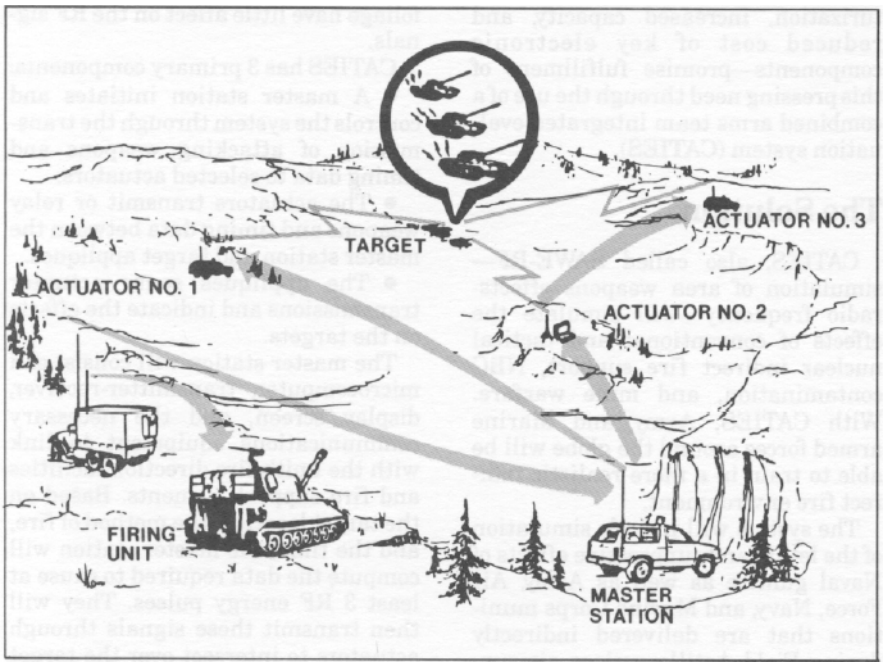


Figure 2. CATIES operations

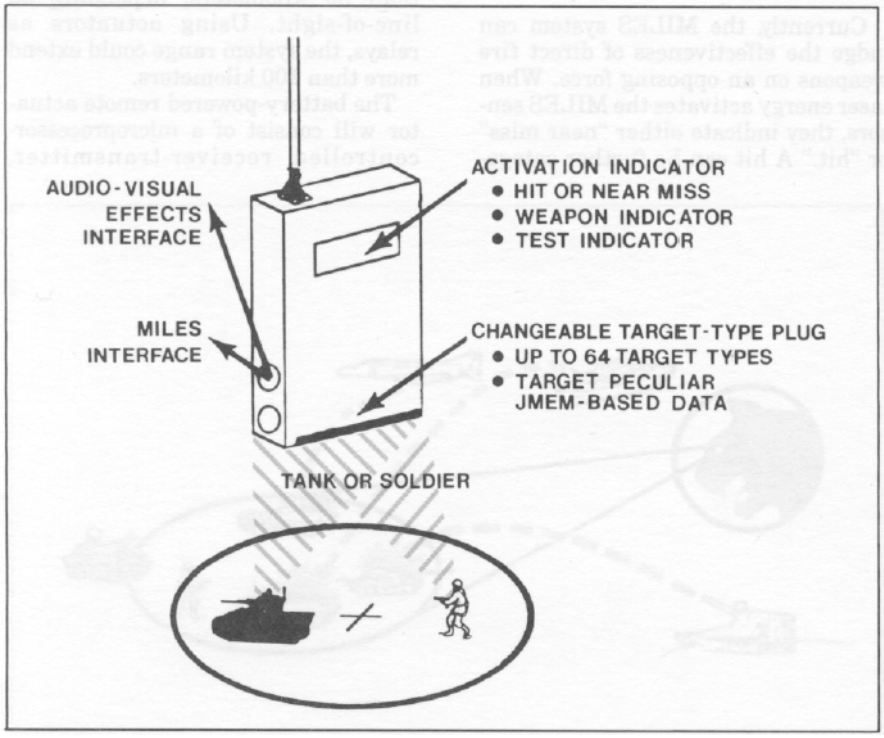


Figure 3. Applique

Conclusion

CATIES promises to reestablish the importance of indirect fire not only for maneuver and fire support organizations and personnel, but also within combat support and combat service support elements. It will do so by:

- Providing a portable, easily operated but timely and realistic simulation of indirect fire munitions and a means of assessing their effects on the battlefield through flash-bang-smoke cues and MILES-type devices.
- Simulating minefields and chemical and nuclear battlefield operations.
- Offering a measurable tactical engagement simulation for the total combined arms force.

With CATIES to help, American leaders shouldn't find themselves in the situation described in the introduction to this article. With CATIES, our troops will be well-acquainted with the total implications of modern firepower.

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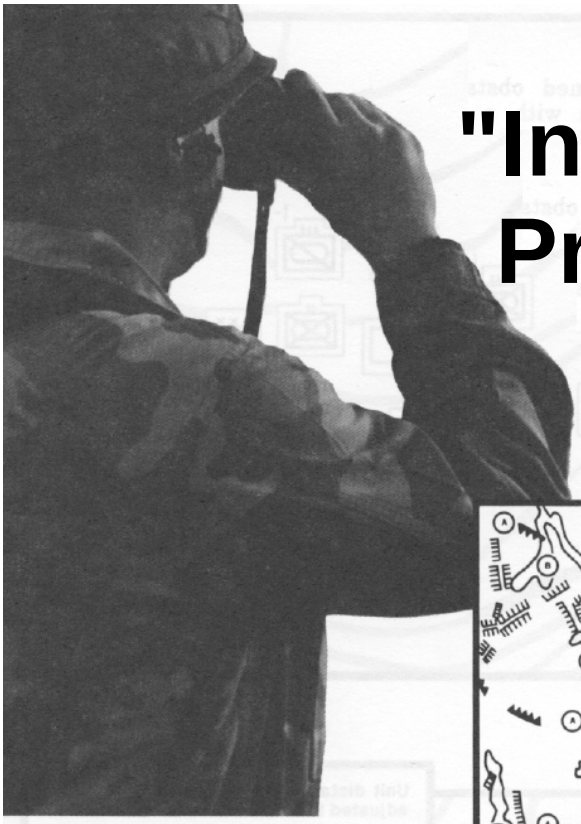
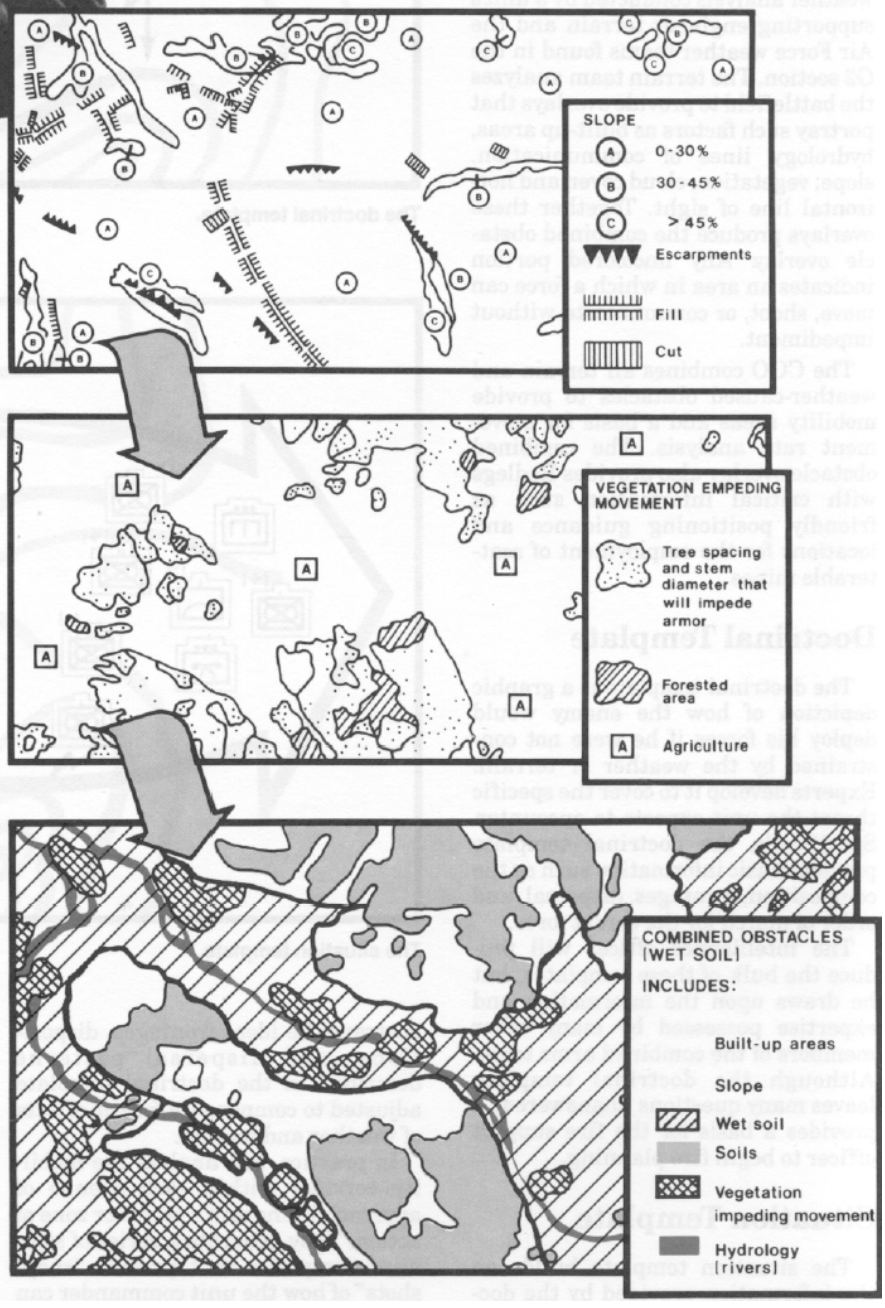
Mr. John E. Bjornholt is a member of the technical staff of a large defense contractor. He holds bachelor's and master's degrees in electrical engineering from North Dakota State University.



"Intelligent" Preparation of the Battlefield

by Major Michael C. Windham



Combined obstacle overlays portray such factors as built-up areas, hydrology, slope, and vegetation to provide mobility areas and a basis for movement rate analysis.

Artillerymen constantly seek tools which will help them deliver accurate and sufficient fires. One extremely important and relatively new tool for us is the intelligence preparation of the battlefield (IPB). In fact, experience at the National Training Center suggests that IPB products are virtually the *sine qua non* of good fire support planning.

Intelligent Preparation of the Battlefield

Unfortunately, some members of the combined arms team leave IPB to their intelligence officers. They don't understand that to make the most of this process the entire combined arms team must play key roles. In fact, intelligence preparation of the battlefield should be known as "intelligent" preparation of the battlefield.

IPB is a systematic process to determine and evaluate enemy capabilities, vulnerabilities, and probable courses of action.

Accomplished on a formal basis at corps and division levels, it is also done on an informal basis at the brigade level and below. IPB occurs at each echelon based on the best information available. Planners then send their products to subordinate units for

comparison with local data. Five of these products are of such importance to Redlegs that they warrant detailed description.

- Combined obstacle overlay.
- Doctrinal template.
- Situation template.
- Event template.
- Decision support template.

Combined Obstacle Overlay

The combined obstacle overlay (COO) begins with a terrain and weather analysis conducted by a unit's supporting engineer terrain and the Air Force weather teams found in the G2 section. The terrain team analyzes the battlefield to provide overlays that portray such factors as built-up areas, hydrology, lines of communication, slope, vegetation, cloud cover, and horizontal line of sight. Together these overlays produce the combined obstacle overlay. Any uncolored portion indicates an area in which a force can move, shoot, or communicate without impediment.

The COO combines all terrain and weather-caused obstacles to provide mobility areas and a basis for movement rate analysis. The combined obstacle overlay also provides Redlegs with critical information such as friendly positioning guidance and locations for the employment of scatterable mines.

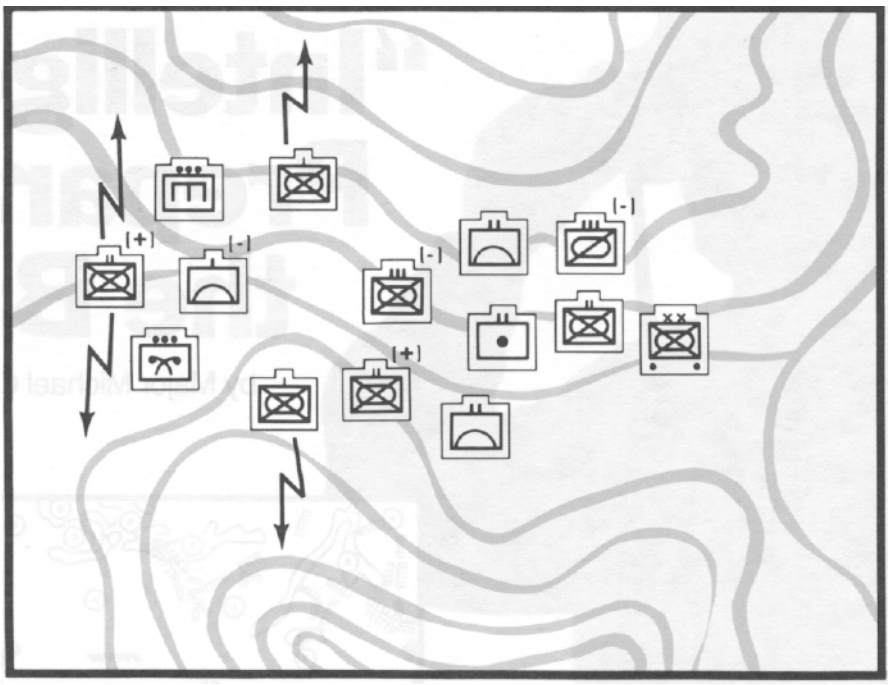
Doctrinal Template

The doctrinal template is a graphic depiction of how the enemy would deploy his forces if he were not constrained by the weather or terrain. Experts develop it to cover the specific threat the unit expects to encounter. Specifically, the doctrinal template provides basic information such as the composition, frontages, dispersal, and order of march for the threat force.

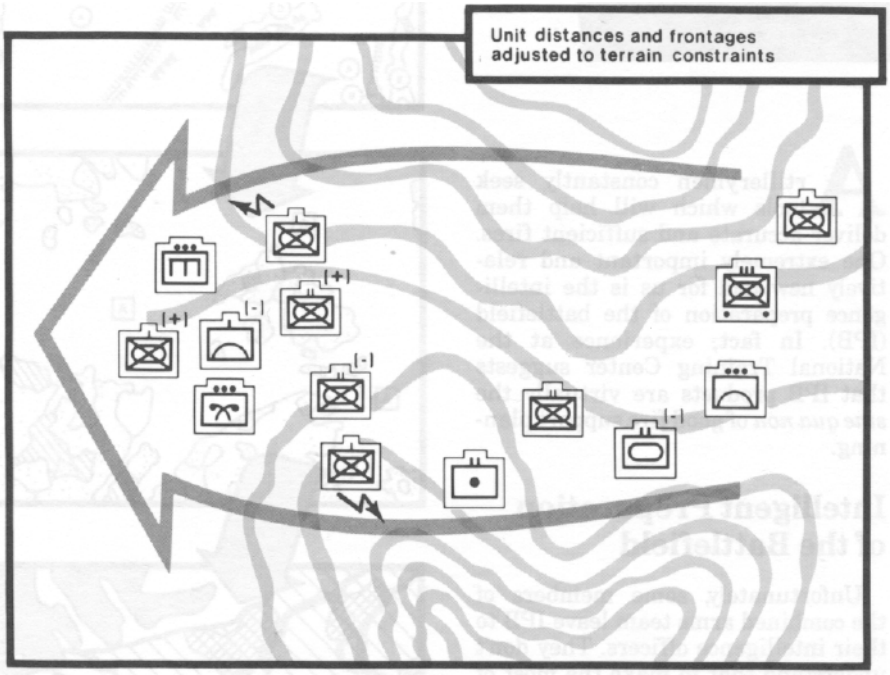
The intelligence officer will produce the bulk of these templates, but he draws upon the information and expertise possessed by many other members of the combined arms team. Although the doctrinal template leaves many questions unanswered, it provides a basis for the fire support officer to begin fire planning.

Situation Template

The situation template builds on the information provided by the doctrinal template by adding the effects of weather and terrain. The template



The doctrinal template.



The situation template.

portrays the ideal frontages, dispositions, and dispersal patterns described in the doctrinal template adjusted to compensate for the effects of weather and terrain.

In practice, S2s analyze the mobility corridor within each avenue of approach in the unit's sector or zone of action. They generate a series of situation templates that provide "snapshots" of how the unit commander can expect the enemy force to move across the battlefield.

Redlegs contribute to this template by adjusting threat fire support assets according to our knowledge of Soviet artillery. The situation template also serves as a basis for the intelligence collection plan, target acquisition plan, and the overall fire support plan.

Event Template

Just as leaders developed the doctrinal template into situation templates,

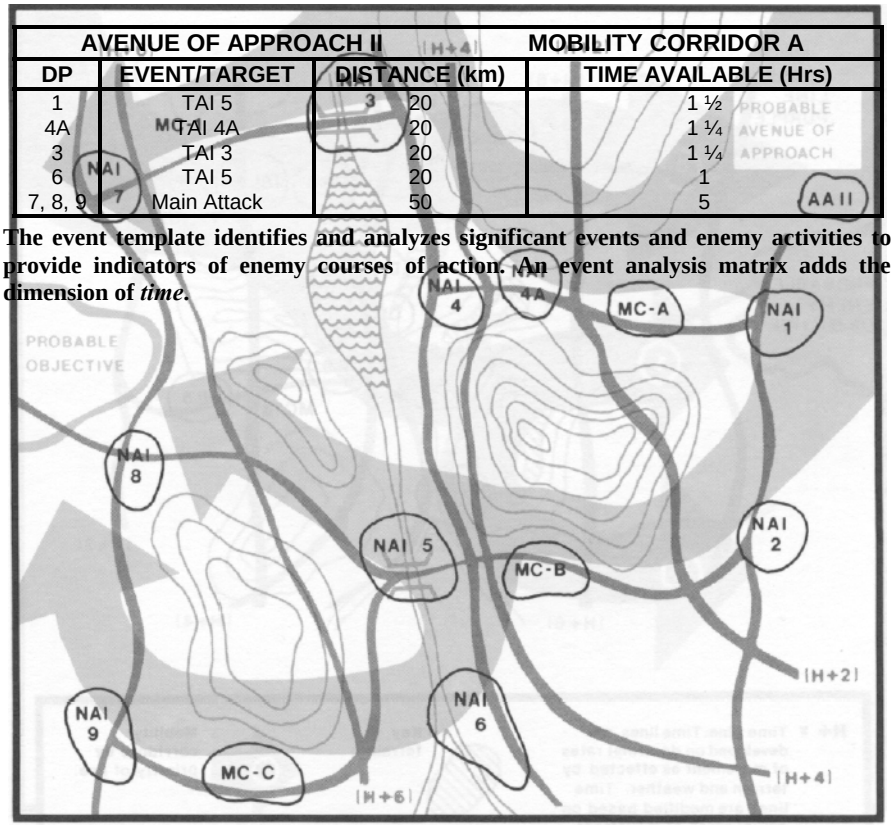
they based event templates on the situation templates. The event template identifies and analyzes significant events and enemy activities to provide indicators of enemy courses of action.

Commanders call the areas where these events and activities will occur named areas of interest (NAI). An NAI is a location where an enemy action or lack of action will confirm the enemy's course of action. Staff officers develop event templates by wargaming each enemy course of action to the probable objectives. They add time lines showing the enemy's doctrinal movement rate adjusted by the effects of weather and terrain.

Staff officers then prepare an event analysis matrix for each mobility corridor identified on the event template. The matrix adds the dimension of time and correlates the NAIs within the mobility corridor.

The event template and event analysis matrix focus friendly collection resources against the targets and areas that will probably provide the greatest benefit. In fact, the event template tells Redlegs *where* to look, *when* to look, and *what* to look for. This focus enables the fire support officer to refine his target acquisition plan as a complement to the intelligence officer's collection plan.

AVENUE OF APPROACH II			MOBILITY CORRIDOR A
DP	EVENT/TARGET	DISTANCE (km)	TIME AVAILABLE (Hrs)
1	TAI 5	20	1 ½
4A	TAI 4A	20	1 ¼
3	TAI 3	20	1 ¼
6	TAI 5	20	1
7, 8, 9	Main Attack	50	5



The event template identifies and analyzes significant events and enemy activities to provide indicators of enemy courses of action. An event analysis matrix adds the dimension of *time*.

Decision Support Template

The decision support template is the final template in the IPB process. It integrates the event template with the mission of the friendly force and with the commander's intent and concept of the operation. It identifies critical events and threat activities in relation to times and locations which may require a tactical decision by the commander. The decision support template is a product of the wargaming portion of the decision making process.

Decision support templating identifies the areas where the attack of enemy or terrain targets support the commander's concept of the battle. Specifically, the template portrays those areas where the commander can influence the action through fire and maneuver along each avenue of approach and mobility corridor.

The staff labels those areas which usually coincide with earlier NAIs as target areas of interest (TAI). Redlegs should view TAIs as areas where fire support can destroy, disrupt, delay, or otherwise manipulate the enemy force. A TAI is where fire support officers look for high payoff targets.

The combined intelligence, maneuver, and fire support staffs develop the TAIs. The intelligence staff evaluates the enemy force and effects of friendly action on them. The maneuver and fire support staffs determine:

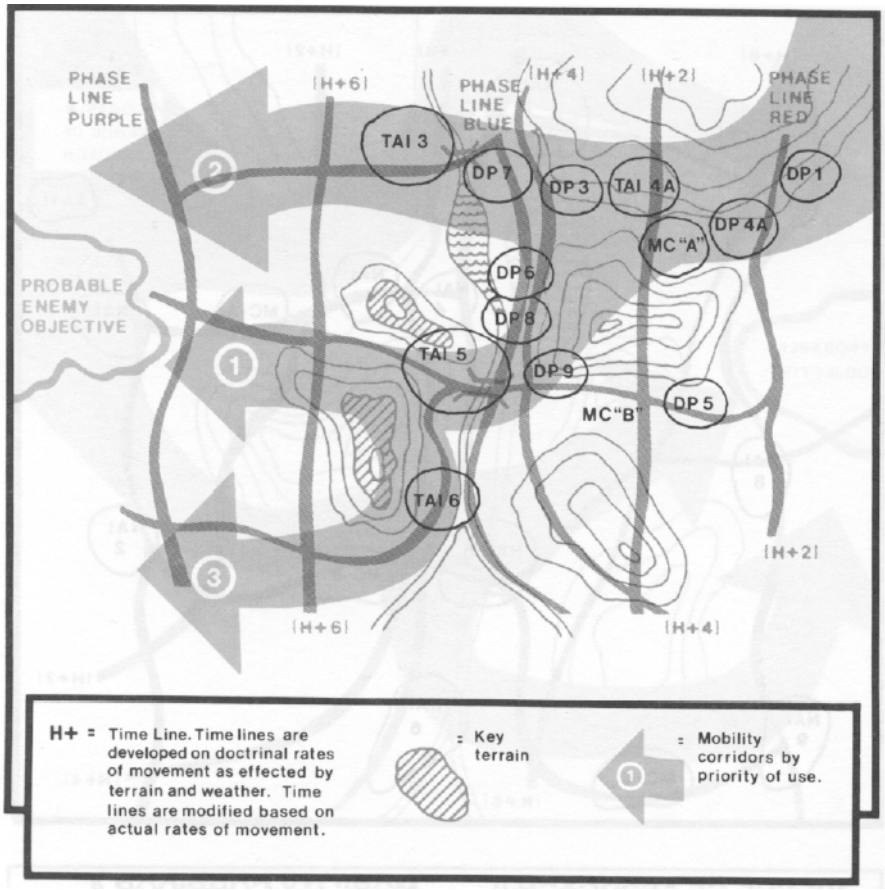
- What attack assets are available.
- What effect interdiction of the enemy at the selected TAIs will have on the accomplishment of our mission.
- What the priorities for the available attack assets will be.

Target value analysis (TVA) complements the developments of TAIs. TVA methodology yields targets set in priority ranking through an analysis of enemy doctrine. Fire support and the intelligence officers use the TVA to help determine which targets have the greatest value. High value targets (HVT) are assigned based on their function and contribution to the enemy force in a particular tactical situation.

The role of the maneuver and fire support officers is to determine which of these high value targets will provide the friendly commander with the highest *payoff*. High payoff targets (HPT) will provide the greatest return on our investment of targeting and attack resources. After approval by the commander, the priority listing of high payoff targets becomes an integral part of the unit's operations order.

The staff also use TAIs to select points which may require a decision by the friendly commander. Determined by the operations and fire support officers, these decisions figure prominently in the development of a decision support matrix.

The decision support matrix associates each decision point to its related TAI or event. The commander then can see the time and location of forces that may prompt him to make a decision. The decision support template



AVENUE OF APPROACH II — COORDINATES FM: NB 606330-NB 650333 TO: NB 462181-NB 494132

MOBILITY CORRIDOR A — FM: NB 670300 TO: NB 468158

NAMED AREA OF INTEREST	DISTANCE (kms)	RATE OF MOV (KPH)	ESTIMATED TIME	EVENT/ACTIVITY	OBSERVED TIME
NAI #1				A. RECON ELM	
NB 649288				B. ADV GUARD	
RD JUNCTION	30 KM		1.5 HRS	C.	
NAI #4A				A. RECON ELM	
NB 647264				B. ADV GUARD	
CHOKE POINT	30 KM		1.5 HRS	C.	
NAI #4				A. RECON ELM	
NB 601222				B. ADV GUARD	
RD JUNCTION	9 KM		30 MIN	C.	
NAI #3				A. RECON ELM	
NB 561220				B. ADV GUARD	
BRIDGE	40 KM		2 HRS	C.	
NAI #7				A.	
NB 480180				B.	
RD JUNCTION				C.	

The decision support template identifies critical events and threat activities in relation to times and locations. It is a product of the wargaming portion of the decision making process. A decision support matrix incorporates the times and locations of forces.

and matrix serve yet another purpose for the fire support officer. Using them, he can define trigger points by knowing the expected time of arrival of the enemy force.

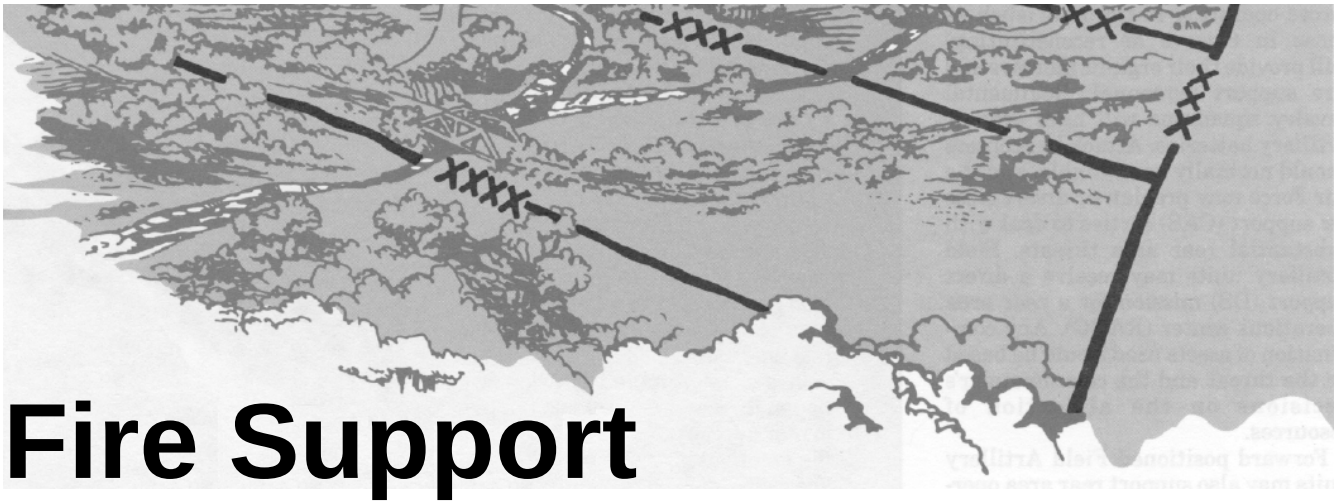
In fact, the decision support template is one of the most important documents the fire support officer can obtain. At a minimum it provides in graphic form the confirmed intelligence estimate, target acquisition guidance, target locations and priorities, and the information necessary to determine the fire support tasks for the operation. He may also use it to understand the commander's intent and concept of operation.

Conclusion

Good commanders and their staffs always attempt to visualize the enemy's capabilities and intent. They also constantly evaluate the military aspects of terrain and use the weather to their advantage. The IPB process refines these important analyses and yields usable graphics.

Successful units at the NTC and elsewhere use such intelligent analysis to prompt the effective integration and synchronization of indirect fire. As Redlegs we *must* be involved with IPB. This methodology is a winner. It allows for the truly *intelligent* preparation of the battlefield.

Major Michael C. Windham, FA, is an instructor at the Fire Support and Combined Arms Operations Department (formerly Tactics and Combined Arms Department) of the US Army Field Artillery School at Fort Sill, Oklahoma. Major Windham received his commission from ROTC at the University of Southern Missouri, and has served in III Corps as a battery executive officer and battalion S2 in V Corps, a battery commander at the Artillery Training Center, as an assistant G3 Air in Korea, and as team chief for the Field Artillery Mobile Training Team to the Sudan. He is a graduate of the officer basic and advanced courses and the Command and General Staff College.



Fire Support Tactics for Rear Operations

by Major John M. House

What should an artilleryman do when an air assault battalion lands in his division's or corps' rear area? How is appropriate fire support response coordinated? Who does it? Who owns the ground and clears fires? What control measures are used? What assets are available? Concerned Redlegs throughout the Army are asking these questions and many more as they study AirLand Battle doctrine. This article attempts to provide some answers. Although tactics are situationally dependent, the answers provided here are at least points of departure for further discussions of fire support in rear area operations.

The Threat

The Soviet Threat to the rear area will take various forms. FM 90-14, *Rear Battle,* defines 3 levels of rear threats.

- ***Level I*** threats are enemy agents, terrorists, and sympathizers.
- ***Level II*** threats are small units through company size. This includes Spetsnaz teams, regimental reconnaissance companies, and companies from divisional reconnaissance battalions.
- ***Level III*** threats are battalion and larger-sized forces. Parachute and heliborne units will attack rear areas. Also, units may penetrate the forward line of own troops (FLOT) and operate in our rear areas.

At whatever level they attack, the Soviets will seek to destroy command and control elements, nuclear delivery units, and logistics sites. Everyone in the rear—whether division, corps, or theater troops—must be prepared to defend themselves or risk destruction. American units of every description must be capable of performing rear area combat operations to ensure our commanders freedom of action to fight close and deep.

The Doctrine

Current US doctrine establishes responsibilities and structure for conducting rear operations. Because such operations are a command responsibility, the appropriate G3 must integrate them with deep and close operations. Rear area operations centers (RAOC) at division, corps, and theater army area command levels will plan, coordinate, and direct the specific execution of the rear battle. Each commander will appoint a rear operations officer to control rear operations and run the RAOC as an element of the rear command post (CP).

Combat support and combat service support units in rear areas will establish bases with well-defined perimeters controlled by a base defense operations center (BDOC). Units may also group into base clusters under a base cluster operations center (BCOC). As depicted in figure 1, the senior base commander assumes control of the cluster and establishes the BCOC to provide mutual support. The base defense operations center and BCOC staffing comes from the associated units. Base defense liaison teams (BDLT) from the supervising RAOC coordinate rear area operations with

base clusters, adjacent headquarters, higher headquarters, and host nation forces.

Available Fire Support

Fire support assets available for rear operations will vary. Maneuver forces operating in the rear (such as those in reserve or reconstituting) will provide their organic mortars and fire support personnel. Regimental cavalry squadrons will have organic artillery batteries. Attack helicopters should normally be available, and the Air Force may preplan or divert close air support (CAS) sorties to deal with substantial rear area threats. Field Artillery units may receive a direct support (DS) mission for a rear area operations center (RAOC). Any combination of assets used would be based on the threat and the commmander's decisions on the allocation of resources.

Forward positioned Field Artillery units may also support rear area operations by executing on-order missions. However, if the depth of the battlefield precludes supporting close, deep, and rear areas simultaneously, artillery organizations should be positioned to fire on targets throughout the battlefield based on the commander's priorities. The commander must consider the threat expected in each area of the battlefield and determine where risk is acceptable and where it is not.

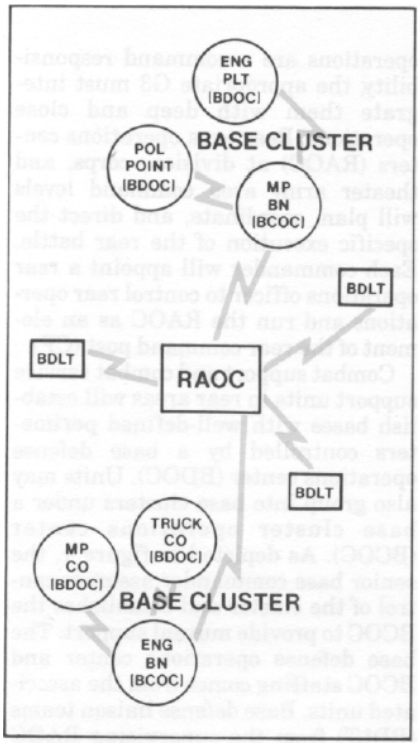


Figure 1. Rear area organization.

Old Ironsides Artillery and the Rear Battle

by Lieutenant Colonel Eric C. Deets and Major Robert G. Krebs, Jr.

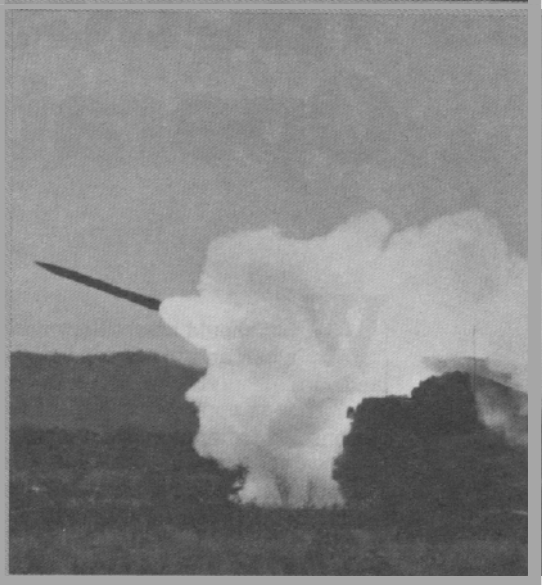
The US Army began shaping its doctrine to the tenets of AirLand Battle with the publication of FM 100-5, *Operations,* in 1982. As a part of the process, Field Artillerymen began to extend their consideration of fire support throughout the entire depth of the battlefield, not limiting themselves to the more traditional focus on the covering force and main battle areas. Redlegs reviewed many options while searching for ways to provide flexible, highly-responsive fires throughout the area of operations—especially for the rear area.

In the 1st Armored Division, we began to predict what would happen in rear areas; try to prevent it; and, if the worst did happen, keep it from interfering with our main effort. The Division Artillery defined 5 initiatives which address the need for fire support of the rear area:

- ***The Rear Area Battery.*** Battery D (M101A1), 6th Battalion, 14th Field Artillery (155-mm SP). This battery was manned from tables of distribution and allowances positions and fielded with rebuilt "display" howitzers in an effort that stretched from Vincenza, Italy, to the Field Artillery School at Fort Sill.
- ***Planning Predictive Fires.*** Our planners sought to use military intelligence, air defense, Air Force, and target acquisition assets to predict likely rear area targets.
- ***Innovative use of nonnuclear Lance.*** Division Artillery leaders sought to use the soft-target, area kill potential of nonnuclear Lance to advantage.
- ***Multiple launch rocket system (MLRS) support.*** This versatile system proved particularly effective against Level III invasions. This initiative gave depth to our total command and control systems.
- ***Division Rear Fire Support Element.***

Initiatives in Detail

Division leaders wargamed each of these initiatives and then practiced them on Exercise Certain Sentinel—REFORGER 86. Conclusive proof of the Division's ability to fight the rear battle came when a brigade-sized armored force drove into the division's rear area. Our plans and procedures allowed for its rapid destruction with neither the loss of a key rear area installation nor the commitment of main battle forces.



Tactical employment of Battery D during REFORGER included a full gamut of missions. Although initially positioned to protect key base clusters, the battery quickly crisscrossed the Division sector. On at least 1 occasion it protected the Division's rear flank in an economy of force role with attack helicopters.

In the 1st Armored Division, predictive fires are an integrated effort. Planners from the Air Force, air defense, military intelligence, and

Field Artillery join to produce a detailed projection of likely targets affecting our rear area. For example, the Division's all-source intelligence center (ASIC) can predict that an air assault is forming several hours before execution. Using this warning, the Air Force and air defense headquarters cue their assets and acquire the flight elements when they leave their pickup points. Then Air Force E-3A Sentry aircraft tracks the flight and sends the position through TSQ 91 command and control system to the Air Defense's TSQ 73 command and control system. The division tactical operation center (DTOC) fire support element (FSE) can then place all available fires on the flight as a target forward of the forward edge of the battle area (FEBA). If this fails to stop the flight, the TPS-58 of the divisional target acquisition battery and the air defense's forward area alerting radar (FAAR) then take over tracking responsibility. With their doppler radar, the TPS-58 operators can track the flight and determine when the helicopters change the pitch of their rotor blades to set down.

As the flight progresses, the DTOC and division rear (DREAR) fire support elements (FSE) work with the G2 to predict which friendly unit or installation the enemy is targeting. Battery D may then receive an alert by the Blackhawk helicopter for air displacement. Once in position, the Battery can use indirect fire beehive, improved conventional munitions (ICM), high explosive with variable time (VT) fuze, and white phosphorous (WP) to strike the appropriate targets. The Division's military police—trained in garrison on the Division Artillery observed fire simulator—and aerial observers can also direct effective fires on the landing zone.

Conventional Lance is another fire support tool well-suited for the rear battle. Because of its tremendous range, it can reach targets throughout the Division zone with its ICM munitions. VII Corps' Lance units are now much more responsive, and no-notice fire missions are achievable in 15 minutes. On Exercise Certain Sentinel, the 1st Armored Division used the Lance to destroy an air assault formation as it tried to secure one of the key bridges in the Division rear.

When a threat armored brigade began its advance to the Division rear, the multiple launch rocket system (MLRS) with its long-range dual purpose ICM (DPICM) munitions proved highly effective. The launchers can outrange any fire support means that would normally accompany an operational maneuver group (OMG). And because an OMG will not have effective acquisition radars to target the MLRS, the rocket launchers can sit in 1 position and pound the enemy formations with armor defeating DPICM. When teamed with the Firefinder radars. MLRS can strip away the OMG's fire support systems.

Although we have identified fire support systems which are both available and effective in the rear area, we do not have the final solution to questions of command and control. Inevitably, we will fail in our mission if we cannot synchronize the full array of fire support in the rear area. The 1st Armored Division created an FSE to operate at the DREAR command post. At present, this is no more than a 2-man liaison section from the Division Artillery S3 section, but the Division's leadership plans to formalize its existence. They have drafted a modified table of organization and equipment revision which identifies the personnel and equipment needed to operate the DREAR FSE. They are particularly concerned with the DREAR assistant fire support coordinator's (AFS-COORD) access to the tactical fire direction system (TACFIRE) which is essential to ensure the integration and synchronization of all fires.

Conclusion

REFORGER answered some of the questions the Armored Division Redlegs had on fire support for the rear area, but it also opened new dilemmas:

- Do we use a fire direction net or command net at the DREAR?
- How do we train soldiers occupying training, distribution, and allowances positions?
- How do the National Guard and Reserve units fit into rear area operation roles?

We Redlegs hold the key.

Fire Support Coordination

Fire support coordinators in rear areas will have to deal with a few problems not normally encountered by their counterparts in the close fight. Rear areas are, by and large, filled with combat support (CS) and combat service support (CSS) elements. By design these organizations provide better support than they do combat power. Consequently, they lack fire support personnel, equipment, and expertise. In fact, standard small arms constitute their sole weapons. Some will have MK19s and 90-mm recoilless rifles. Therefore, combat support and service support units must request artillery support through their chain of command and the rear area operations center. This can be a time-consuming process and may result in an untrained observer adjusting rounds impacting near friendly units.

Artillery units must also exercise particular care to ensure that requesting observers are really friendly and not an English-speaking enemy soldier. What's more, if artillery is not positioned in the rear, support units may have to reposition and reorient weapons to deliver the required fires. All that takes a great deal of time.

Clearing fires during rear area engagements is a particularly troublesome coordination problem. By virtue of their location at the appropriate rear command post and their overview of the rear area, the corps and division RAOC appear to be the most logical clearance authority. However, if a maneuver force responds to a rear threat, its fire support officer would be an appropriate coordinator within the unit's area of operations (AO). The RAOC would continue to clear fires outside the AO maneuver unit.

FM 90-14 makes the RAOC responsible for terrain management and much fire support coordination. RAOC leaders may establish restricted fire areas (RFA) around bases and base clusters. Such RFAs positioned around a maneuver force's AO with no fire areas (NFA) around bases and base clusters in the AO could aid in controlling fire support.

Rapid engagement of the threat is a must in rear area operations. Allowing a division RAOC to contact a corps RAOC directly for support would speed reaction if the corps RAOC has a reaction force—artillery or otherwise under its direct control. By bypassing the corps and division G3s and the division and corps artilleries, RAOCs could dramatically reduce the

time required to provide support. Of course, skipping a headquarters element does risk a loss of some control. The overall commander and rear operations officer must make the call well in advance.

Fire support coordination measures appropriate in rear battle operations include:

- Boundaries associated with an AO.
- Restricted fire areas (RFA) used to protect friendly troop concentrations and regulate the fires employed to engage the threat.
- Airspace coordination areas (ACA) used to protect air assets to fight the threat.
- No fire areas (NFA) employed to protect friendly elements, civilian personnel, bridges, and so on.
- Free fire area (FFA) used to expedite the attack against well-located threat forces.
- Restrictive fire lines (RFL) used to preclude converging friendly forces from shooting each other.

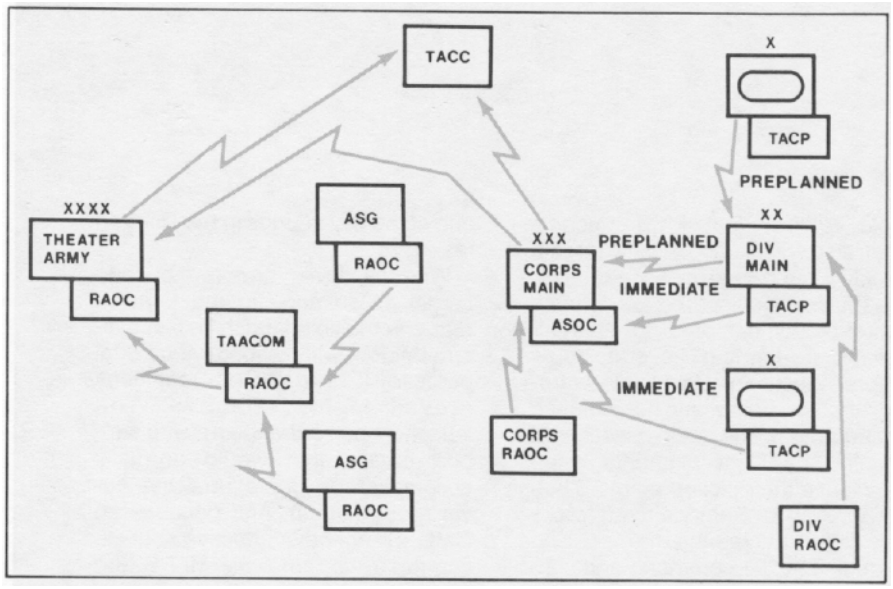


Figure 2. Tactical air control system.

Aerial Fire Support

Aerial fire support officers (AFSO) are another important asset in rear operations. Traveling in helicopters, they have the mobility to respond quickly to a rear threat. Once on station, AFSOs can locate and identify the threat, maintain surveillance, coordinate fires, and actually engage the enemy. In practice, aerial observers could well be the first friendly forces on the scene of an action. They can monitor the enemy until a maneuver force arrives with its fire support resources. Depending on the demands for aerial observers elsewhere, they might remain and assist the ground force in destroying the incursion.

TRADOC PAM 525-X, *Joint Concept and Procedures for Close Air Support in the Rear Battle* (8 Jul 86), outlines the procedures for controlling and requesting close air support (CAS) used in rear operations. Immediate and preplanned missions are possible, though the difficulty in predicting rear area actions will likely inhibit the use of preplanned sorties.

Several dimensions of rear operations will have a significant impact on the utility of close air support. These include the intermingling of combatants and civilians, a lower probability of air-to-air combat than experienced at the forward line of own troops, and a reduced enemy air defense threat.

As reflected in figure 2, CAS missions behind the FLOT are still subject to the tactical air control system (TACS). The Air Force tactical air control center will function as the planning and operations agency for the air component commander. Tactical air control parties (TACP) at maneuver battalion through division levels will actually request and coordinate CAS, and air support operations center (ASOC) personnel at corps level will ensure corps-wide integration of air strikes into the rear area operation plan. But unless the rear area operations center receives a TACP, it will have to call the main command post to enter the close air support preplanned or immediate request chain.

Preplanned CAS requests for rear area operations will follow the same procedure as used to support the "close in" fight. Operations personnel will pass requests through Army S3 and G3 Air elements to the corps-level headquarters which in turn will forward them to the tactical air control center (TACC) where Air Force and Army personnel will work together to ensure that the right airplane with the right payload strikes the target.

Immediate CAS requests will proceed from the battalion, brigade, or division TACP to the ASOC using the Air Force air request net (AFARN). The ASOC would then contact the appropriate USAF element—TACC or airborne battlefield command and control center (ABCCC)—to meet the request. In the theater Army's rear area, RAOCs would have to handle such requests much as they do preplanned requests.

Ground forward air controllers (GFAC) are available in each maneuver battalion tactical air control party. The air liaison officer in each TACP is also qualified as GFAC, and fire support officers can control CAS sorties if no FAC is available. Airborne FACs (AFAC) may be assigned by the TACC to support rear area close air support. Airborne FACs are certainly better suited than their ground-tethered counterparts to control rear area CAS due to quicker response times, larger observation areas, increased radio communications ranges, and the ability to mark targets precisely with rockets. Of course, an AFAC may not be as aware of the ground situation as the GFAC in a tactical air control party. Therefore, air-ground communication is extremely important in rear area combat.

Established joint procedures require that the ASOC tell an AFAC the frequency to use to contact the RAOC for a situation briefing and additional instructions. The RAOC in turn must inform the AFAC of the frequency to use to contact the supported ground unit. The ASOC schedules, scrambles, or diverts CAS aircraft to the AFAC's control. If there is no FAC, the ASOC and RAOC exchange information.

Other assets which may be available to a ground commander to control close air support include helicopter pilots familiar with joint air attack team (JAAT) tactics, fire support team (FIST) members, fire support officers (FSO), USAF security police, and aerial fire support officers.

The Air Force systems usable in rear area operations are numerous. The AC130 gunship equipped with an excellent air-ground communications package, sophisticated target detection systems, and extraordinary firepower can operate with or without a forward air controller. The United

The US Air Forces A10 (top photo) and the Marines AV 8 aircraft (bottom) provide close air support of ground troops in rear area operations.

States Air Force's A7, A10, F16, and the Marine's AV8 aircraft have FM radios and can communicate with ground elements. But getting the airplanes and the rear area combat forces on the same frequency may pose a significant problem.

Air defense artillery (ADA) weapons are also critical assets in preventing threat insertions into rear areas. Their objective is to eliminate the threat before it hits the ground. ADA radars can not only assist in target engagement, but also alert RAOC leaders to impending attacks.

As a minimum the RAOC should warn units in the rear. RAOC leaders will do so using the rear operations net. The RAOC should also pass air defense warnings (ADW) and the control status in coordination with the corps airspace management element.

Points to Remember

Fire support personnel should remember several major considerations regarding rear area operations.

- Consider all available fire support assets when planning for rear battle.
- Because of their mobility, firepower, and reaction time, attack helicopters are an excellent initial response force to a Level III threat.
- Close air support can be a valuable asset for rear operations. However, leaders must carefully weigh the risks associated with diverting CAS from close and deep operations before using these scarce resources.
- Plans for rear operations must address forward air controller availability. The RAOC needs a TACP because of the geographic area under its control and the complexity of rear area air operations.
- Artillery supporting rear operations is not in reserve. It merely has a mission in the rear instead of in close or deep areas.
- Combat support, combat service support, and base defense liaison team personnel must be trained to plan, coordinate, and direct fire support. They will normally have no available Field Artillery fire support coordinators.
- ADA command and control systems must provide RAOCs with warnings of significant enemy helicopter activity. The best way to preclude an effective rear threat is to destroy it enroute to the rear.
- A detailed intelligence preparation of the rear battlefield will identify potential landing zones (LZ) and air assault objectives. ADA weapons coverage of those sites may prove quite profitable.

Conclusion

The key to countering the rear threat is a comprehensive plan understood by all. Threat capabilities and available friendly resources must be defined. Commanders must ensure their command and control network is prepared to conduct rear operations. The tactics and fire support assets used to fight rear threats will vary depending on the situation, but planning can eliminate much of the confusion and reduce many of the delays heretofore common in fights in the friendly rear areas. Disaster may strike if commanders and their fire support officers ignore the fact that today's battlefield has depth both to the front and the rear.

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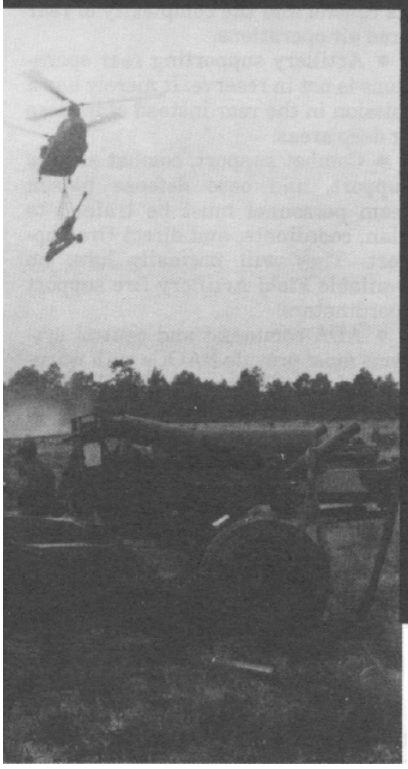


The Meaning of Cannon Artillery Range

by Lieutenant General (Retired) David E. Ott

Every jet pilot wants to fly faster and farther than any other airplane in the sky, and every artilleryman wants his cannon to shoot farther than any other howitzer on the battlefield.

But the benefits of a longer range may be deceiving. In fact, there seems to be a genuine misunderstanding or lack of appreciation about the meaning of cannon artillery range.

Common Perceptions

Let's consider some of the more common perceptions—some well founded, others not—about range.

● *It takes longer range cannons to strike targets deep in the enemy rear.*

Of course this is true, but all modern armies position critical installations so they will be beyond cannon range, whatever that range may be. Thus large command posts, logistical transfer points, helicopter re-arm and refuel sites, and many other such targets are normally just beyond cannon range. Adding to our cannon range will certainly force the enemy to consider emplacing his installations farther to the rear, but adding range to our cannons will not necessarily permit attack of these targets. The efficiency of these installations will suffer to some extent if they are moved back, but they will still remain vulnerable to attack by some means.

● *Cannon range should allow friendly weapons to deliver counterfire but stand outside the reach of enemy indirect fire means.*

While there are certainly situations where this may happen, Field Artillery cannons are normally most valuable when they are emplaced well forward, where they can deliver close support fires quickly, where their ability to reach targets on either side is enhanced, and where they can reach deeper targets. This forward emplacement is a trade off with improved survivability. An enemy who emplaces his cannons far back to evade counterfire will lose much of their value; he will be able to reach only a limited sector of the target area he must address and will be able to place counterfire on only those cannons directly to his front.

● *There is an urgent need to maximize lateral massing.*

The most mobile force on the battlefield is the Field Artillery. Combat power can be quickly shifted from 1 sector to another with effective fire coming from all the cannons in range. Obviously, the longer the range of the cannons, the greater the sector they can influence; but shorter-range cannons must be emplaced well forward to maximize their lateral massing capability.

● *Longer-range cannons can reduce displacement time and make artillery batteries operationally available more of the time*. This is a good argument for having longer range.

● *Cannons with longer ranges are more survivable*.

Certainly, vulnerability is reduced by moving cannons to the rear, by hardening positions, by spreading the guns apart, and by frequent movement; the best being to "shoot and scoot." As indicated earlier, increasing range permits more rearward positioning but with some loss in responsiveness and in other capabilities.

An Analysis

Looking in greater detail at each of the points may help clarify the significance of cannon range.

One might easily conclude that increasing cannon range will not be of much value in attacking deep targets because they will simply move farther to the rear to avoid attack. The point is that some targets move back, but the enemy may choose to keep certain activities well forward in spite of the risk of cannon attack. Increasing cannon range will not assure successful engagement of those activities now emplaced just out of range. But there is a good probability that some of the activities will stay at about the same distance from the forward line of own troops (FLOT) as they are now doctrinally emplaced, simply because they may be so much less effective if moved to the rear. A corollary benefit is that rearward movement of some enemy activities is in itself of value to our forces.

Counterfire is an emotional subject for many Field Artillerymen. The idea of going to war unable to survive counterfire—much less to win the counterfire exchange—is simply intolerable. That's why they frequently see increased cannon range as an essential objective. In reality, added range is desirable but is not necessarily the key to success. Keep in mind that if enemy guns are emplaced beyond the range of friendly guns, they are too far back to perform many artillery roles—interdiction and lateral massing for example. Even then the counterfire battle may be undecided. The enemy must acquire and locate our guns and deliver accurate, lethal fire while they are still in the position that was located. Friendly guns may shoot and scoot, open up the firing positions to reduce vulnerability, harden the positions or adopt some combination of protective measures. Meanwhile the "far-back" guns of the enemy can be prime targets for close air missions or missile attack.

For the enemy to move his guns so far to the rear that they are out of range of friendly guns is simply not a good doctrine. Too much of the value of cannon artillery is lost if guns are emplaced well to the rear.

When discussions arise on the value of cannon range, a true artillerist will quickly point out the extreme importance of being able to mass fires laterally. To many this is the strongest argument for increasing range, but it is an argument not always heard. With the ever-improving fire control systems being fielded and still better ones being developed and with communications improvements sure to come, the facility for massing fire will be improved considerably and will add to the desirability of increasing range so that more weapons can be brought to bear on critical targets. Three diagrams will help with an understanding of the value of range increase in terms of lateral massing as well as in the meaning of longer range when considering moving the guns to the rear for security, control, flexibility, or any other reason.

Figure 1 shows a 30 kilometer gun such as the M198 firing rocket-assisted projectile and an 18 kilometer gun like the M109 firing dual-purpose improved conventional munitions in a position 4 kilometers behind the forward line of own troops. There is an obvious difference in the straight ahead range capability but

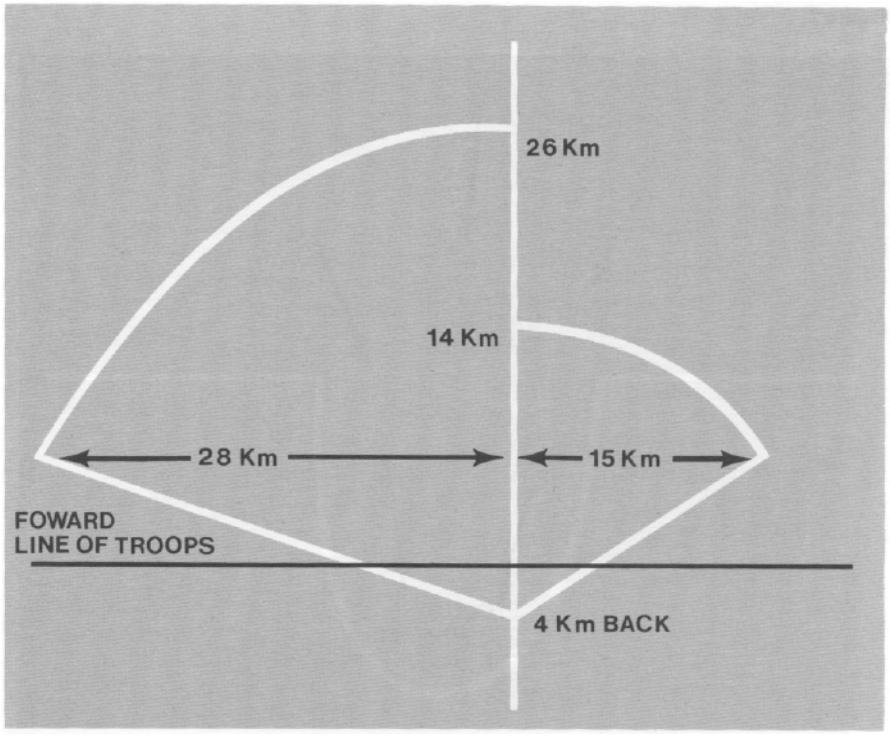


Figure 1.

also note the capability for massing fire on targets 6 kilometers deep—an important section of the battlefield. The 30 kilometer gun can mass on such targets 28 kilometers right and left; that is, it can cover a 56 kilometer sector to a depth of 6 kilometers while the 18 kilometer gun can mass only 15 kilometers right and left—a 30 kilometer sector, really just a brigade slice.

Figure 2 uses the same 2 guns, but emplaces them 8 kilometers behind the FLOT. This picture is interesting because the 18 kilometer gun can reach targets 6 kilometers deep only 11 kilometers to the right and left. Therefore, it can cover a 22 kilometer sector, while the 30 kilometer gun can mass laterally 26 kilometers right and left, a 52 kilometer sector.

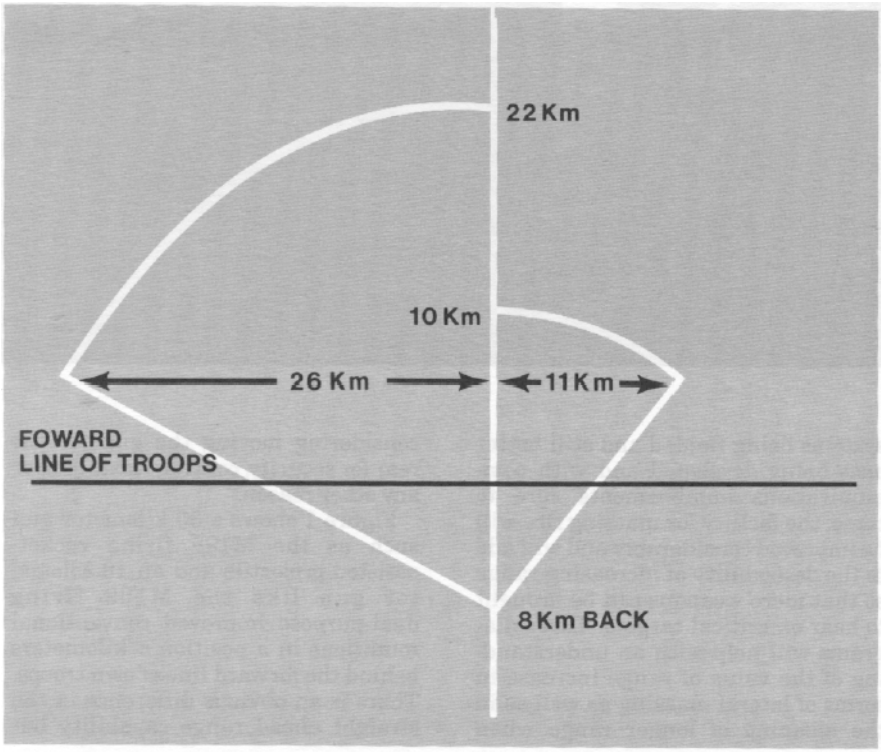


Figure 2.

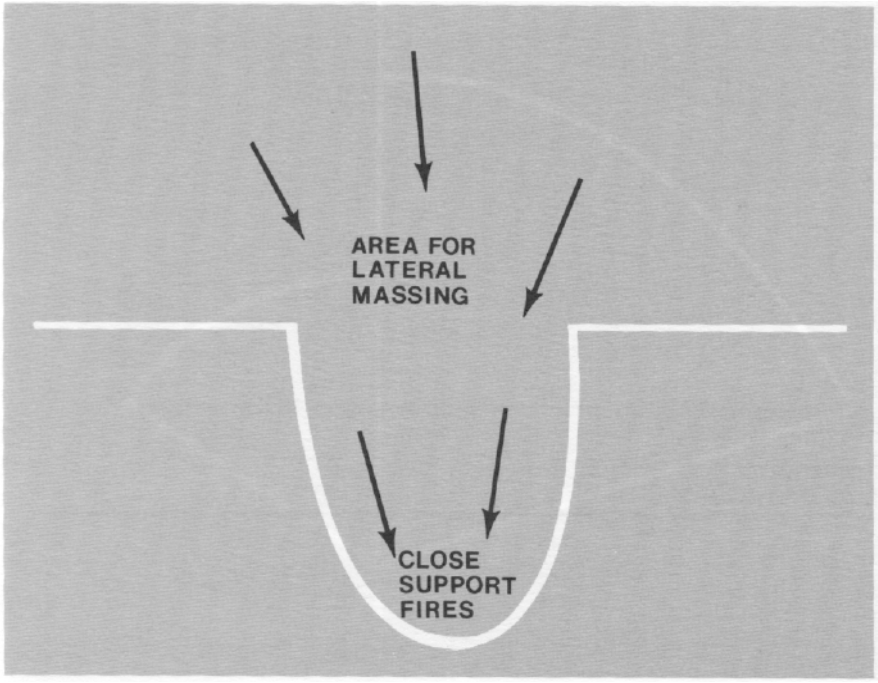


Figure 3.

Figure 3 shows the true value of lateral massing. An all-out assault threatens rupture of friendly defensive positions. Cannons supporting engaged maneuver units are totally committed to targets located by observers in the sector. But immediately behind the attacking force are follow-on forces which cannons in range can attack. This is no time for target analysis or application of the joint munitions effects manuals. This is the time to place massive fires in the threatened sector based on the assumption that something is there, and that something is bad. An all-out cannonade is in order and can have a thundering effect on the outcome of the battle. The longer-range cannons in the force can reach the sector in far greater numbers and thus add significantly to the effectiveness of cannon fire support.

Conclusions

The preceding analysis yields 3 good reasons for adding range to cannons:

More range greatly improves lateral massing capabilities and thus the ability to put heavy fires at any critical point on the battlefield.

More range adds depth to fires for interdiction, delay, and forcing rearward positioning of hostile elements.

More range allows friendly positions farther back to enhance survivability and to reduce time-consuming displacement. The relative priority of these facts is not easy to establish. In fact, it is situational, but the importance of lateral massing is always very significant.

Do we always need a longer shooter? Probably not! But we do need weapons suited to dealing with the harsh realities of contemporary warfare. In effect, we need practical weapons systems that yield the very best, balanced fire support deliverable to the combined arms team.

Lieutenant General (Retired) David E. Ott is a consultant to several major defense industries. He was commissioned in the Field Artillery and served in World War II with combat service with the 65th Infantry Division as forward observer, battery executive officer, and provisional battery commander. He also served in Field Artillery units in the Korean Conflict and Vietnam War. He was also commandant of the US Army Field Artillery School from 1973 to 1976.

THE INTEGRATED EUROPEAN ARTEP

by Captain Britt E. Bray

Imagine that you are commanding the 1st Armored Division—Old Ironsides—during the first weeks of World War III. As your well-trained and battle-ready brigades begin to stop the enemy's first echelon division in its tracks, you are already seeking to decimate the enemy's follow-on echelons. But in the back of your mind, you fear the outcome if the situation deteriorates and the President has to make that awesome nuclear decision. Will your division artillery successfully perform this important mission? How can you be sure that your Redlegs will be ready to unleash the biggest bang at your disposal? The answer is the integrated European Army training and evaluation program (ARTEP).

The Concept

When the leaders of the 1st Armored Division Artillery plan an ARTEP evaluation, they keep the scenario described above firmly in mind. They seek to develop a scenario that evaluates all tasks, conventional as well as nuclear, contained in ARTEP 6-100, *The Field Artillery Cannon Battery;* ARTEP 6-400, *The Field Artillery Cannon Battalion;* and ARTEP 6-400-1, *The Field Artillery Cannon Battalion-TACFIRE*. However, they also appreciate how important it is to mold all of those tasks into a realistic and smoothly flowing scenario that depicts the way the excluded unit plans to execute its general defense plan (GDP) mission. And, of course, besides providing a realistic training tool, the integrated ARTEP must also meet the requirements laid out in AR 50-5 to evaluate all nuclear tasks in conjunction with conventional missions.

Planning for an event as important as a nuclear ARTEP should begin as far in advance as possible. Ninety days prior is the minimum time for most external and internal coordination. For example, 1st Armored Division Artillery planners started initial planning and coordination in July for an ARTEP scheduled to kick off on 15 October. The tasks listed at table 1 were the focus of all the planning and coordination.

With realism firmly established as the highest priority, the 1st Armored Division Artillery integrated all these nuclear and conventional tasks into a demanding and believable scenario. The Division Artillery's leaders were especially concerned about the ability of each battalion to conduct sustained operations in both chemical and conventional environments while maintaining the ability to deliver timely and accurate fires using both tactical fire direction system (TACFIRE) and manual computations.

That's why they designed the ARTEP to exercise and evaluate all elements of the battalion which contribute to effective delivery of artillery fires to include cannon gunnery, firing battery, fire direction center procedures, communications, and staff and nuclear operations.

They found that a scenario 72 to 96 hours long worked best to evaluate all tasks while still maintaining the maximum degree of realism, and they placed special emphasis on integrating the nuclear tasks into sequence in a logical fashion. For example, a battery may process an emergency action message (EAM) that requires the evacuation of nuclear weapons. That, in turn, requires a ground movement of nuclear weapons and preparation for the ambush that might be lying in wait.

Getting Off the Ground

Planning for the ARTEP began with the Division Artillery S2 compiling a notional international border (IB) and giving Old Ironsides the mission of fighting a hostile force that has crossed the IB. The S2 then developed a notional order of battle for the hostile force along with a target list based on a likely enemy plan of attack.

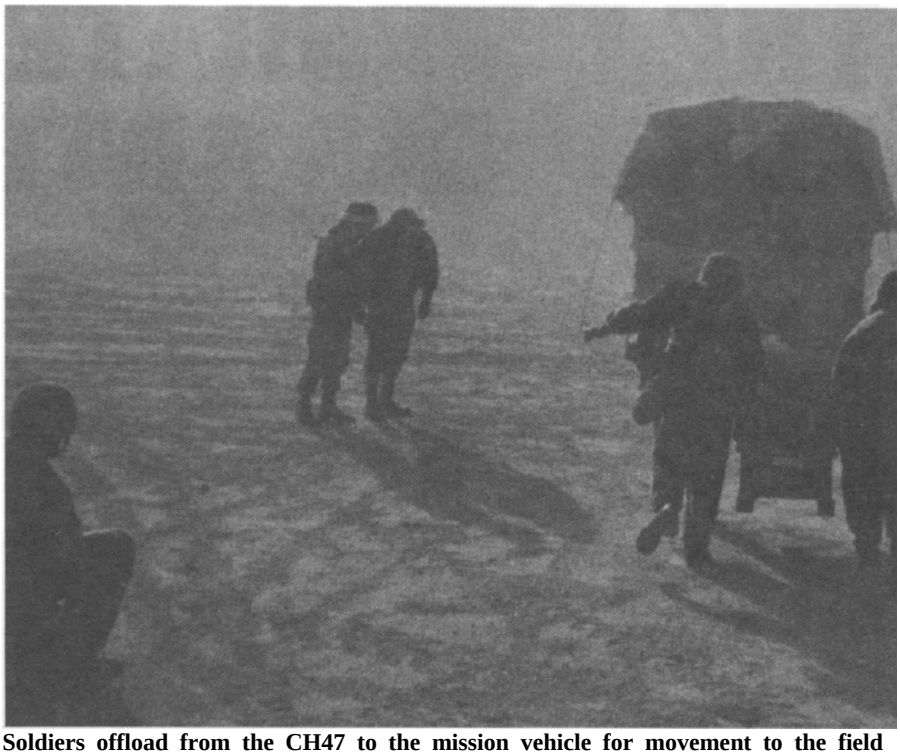
Using the data provided by the S2, the rest of the planning committee built a friendly scheme of maneuver designed to thwart the enemy's evil designs. They considered every detail from the division overlay to the daily development of forward line of own troops (FLOT). The fire control element built the battlefield geometry into a master tactical fire direction system (TACFIRE) tape. The fire support element developed all maneuver operations orders and overlays for the scheme of maneuver.

Nuclear operations and nuclear, biological, and chemical (NBC) defense became a part of each day's exercise plan. In coordination with the fire support element, the NBC officer, nuclear weapons evaluator, and the operations officer developed a draft master events list (MEL) which he staffed to ensure that:

- It included all required tasks.
- The events flowed in a logical order.
- It integrated nuclear, chemical, and conventional fires.

All sources of intelligence—forward observers, Firefinder, and the fire support element—provided TACFIRE input sheets. Realistic rates of advance and logical sequencing strictly controlled the targeting inputs and ensured that the battalion TACFIRE computer would be under considerable stress. Voice message traffic paralleled and complemented TACFIRE input data and served to spur battalion staff actions. EAM traffic and NBC reports flowed regularly throughout the exercise. They forced the evaluated battalion to take action on the incoming messages and to react as situations developed.

The overall scenario provided play for each leader, unit, and section—from the battalion commander and his staff, to the fire support element, and to the firing batteries. Message traffic, target buildup or maneuver orders prompted battalion-level decisions and responses. These catalysts kept umpire directions, interventions, and simulations to an absolute minimum.



Soldiers offload from the CH47 to the mission vehicle for movement to the field storage location.

And they ensured that the ARTEP resembled an actual wartime situation.

Once Division Artillery leaders decided on a scenario, they initiated coordination with all the external support agencies to ensure that the scenario could be executed. This included range control for land allocations, the division aviation battalion for air resupply assets, and the appropriate agencies for the ordnance support need to accomplish both ground and air resupply missions.

Land management is a critical area which planners must consider. Naturally, they are aware of the need for firing points and assembly areas. However, they must also consider land for a storage site, resupply points, and demolition areas.

Division Artillery headquarters in Europe can use their wartime support units for aerial resupply missions. To ensure aircraft availability, ARTEP planners should project the dates of the ARTEP far in advance and give a warning order to the aviation battalion operations officer. The aviation unit will then have the necessary flexibility to schedule all missions it will handle. As soon as a preliminary scenario is developed, the Division Artillery should give the air support unit the air missions time windows as well as alternate windows in case particular missions are cancelled.

View from inside the CH47 while landing at the special ammunition storage point for resupply.

In the area of ordnance resupply, the 1st Armored Division Artillery conducted numerous joint training exercises with elements of the 197th Ordnance Battalion—its wartime direct support ordnance company.

Last Minute Preparations

Approximately 1 week prior to the direct support battalion ARTEPs, the nuclear evaluators completed coordination with the VII Corps nuclear weapons logistical elements (NWLE)

to ensure that the necessary air and ground resupply missions were ready for execution. The other 155-mm direct support battalions hand-receipted their M455 trainers to the evaluated unit. This step allowed for simultaneous battery evaluations.

On the day prior to the ARTEP, the battalion delivered its prescribed nuclear load (PNL)—represented by dummy containers and trainers—to a special ammunition storage point (SASP) manned by the direct support ordnance company. The chief nuclear evaluator and the battalion special weapons officer (SWO) then completed a reconnaissance of the unit's designated convoy hide positions.

Sending Up the Balloon

Day 1 of the ARTEP begins early as the first emergency action message reaches the battalion operations center. It is 0430Z, and the battalion has just increased its alert status. More messages follow as international negotiations break down and tensions worsen.

Soon a message arrives directing the battalion's special weapons teams to move to the secure SASP and occupy their hide position. After uploading tools, water, rations and personal gear, the convoy leaves the cantonment area and roadmarches to the previously reconnoitered hide positions. Once all vehicles are in place, security established and supplies checked, another message instructs the unit to upload its prescribed nuclear load (PNL) and establish a battalion field storage location (FSL). This causes the battalion trains to deploy to its forward assembly area (FAA) where it accepts the arriving nuclear convoy. The main body of the battalion headquarters reacts to the situation by deploying to its assembly area sooner than originally scheduled.

While enroute to the battalion trains location, the battalion special weapons convoy runs into an unblocked ambush—provided by some turncoat military police—and reacts accordingly. Moving quickly to a relatively secure area, convoy leaders make an assessment of the damage and radio the appropriate nuclear accident and incident response and assistance (NAIRA) report to the battalion tactical operations center (TOC). Realizing that some of the damaged rounds present a serious radiation hazard to his men, the courier officer decides the situation warrants emergency destruction of the damaged rounds.

After ensuring that appropriate messages have been sent, and the destruction has been completed and verified, the courier marks the area for radiation, sends up another NAIRA report, and requests a resupply to replace the damaged and destroyed rounds. His request is relayed through channels to the corps nuclear weapons logistical elements (NWLE) as he closes on the trains location and establishes the fire support coordination line.

Reacting quickly, the NWLE coordinates an aerial resupply mission. As the batteries settled in and set up their nighttime perimeters, another EAM directs nonviolent disenablement of all weapons. As soon as the potential threat to the rounds passes, the units receive instructions to reenable their weapons. Approximately 2 hours later, as a strong attack threatens the division's flank, the appropriate apportionment and release instructions reach the evaluated unit and set the stage for combined nuclear and conventional fire missions.

As the batteries pull into their initial firing positions, they begin firing conventional missions in support of their supported maneuver brigade. Rapid changes in the tactical situation along with release authority given by the President result in the first nuclear fire missions. More follow at intervals dictated by the flow of the tactical situation, culminated by a battalion nuclear time on target using high explosive (HE) rounds to simulate nuclear rounds.

This mission results in the true integration of nuclear and conventional tasks. The Division Artillery tactical operations center (TOC) and FSE must perform the necessary nuclear fire planning, and battalion and battery FDCs must compute firing data for both the simulated nuclear mission and the conventional time on target. What's more, the unit continues other battery operations. Each battery submits a resupply request to replenish expended nuclear rounds, and subsequently meets the ordnance people at a transfer point specified.

Somewhere between 72 and 96 hours after the ARTEP started, it draws to a close with each battery destroying its PNL in response to an EAM, taking appropriate action for NAIRA, and requesting resupply. When the last resupply request reaches the Division Artillery TOC, the battalion receives ENDEX (end of exercise).

Keep in mind that the situations just described occurred in conjunction with a myriad of conventional tasks to include the tactical movements, fire missions, and chemical strikes that were scenario generated. Consequently, leaders under pressure at all levels had to make numerous hard decisions.

Feedback

Feedback is essential if the ARTEP is to be a useful training tool. Evaluators and unit leaders must point out strengths, identify deficiencies, program retraining, and freely provide suggestions for improvement. The best technique for accomplishing this goal is frequent after-action reviews (AAR).

During the Old Ironsides ARTEPs, for example, the nuclear evaluators conducted AARs with the battalion and battery special weapons officers at the completion of each major task. The Division Artillery team then reevaluated deficient areas at a later point in the scenario. At the conclusion of the ARTEP, the evaluated unit received an AAR by the Division Artillery and a formal written report.

Continuing to Improve

With feedback running unanimously in favor of this type of integrated scenario, the 1st Armored Division Artillery continues to revise its ARTEP scenario. The 72- to 96-hour ARTEP is hectic and forces the unit to make tremendous demands on its personnel and equipment. But the full integration of tasks is worth it. The integrated ARTEP not only provides a realistic peacetime simulation of a high intensity combat environment, but also forces the unit to manage nuclear and conventional assets simultaneously.

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The Effects of Terrain on Fire Support

by Lieutenant Colonel Peter S. Morosoff, USMC

Several steep-sided wadis creased the desert sand ahead of the American armored troops of Lieutenant Colonel James D. Alger's 2d Battalion, 1st Armored Regiment. In fact, the dry streambeds forced tanks to seek the few places where the gullies could be crossed.

At the first great wadi, they discovered several paths across. The rest of the command converged on them, crawled into the depression and slowly climbed out, only to form a skirmish line as they proceeded.

But as the first vehicles reached the far side of the wadi, a dozen German dive bombers and a German antitank battery pounced on the columns stacked up to the rear. Another flight of dive bombers jumped the tanks as they crossed the second large wadi. And as the leading elements nosed into a third gully, German artillery fire came in from Sidi Base Zid.

General Heinz Ziegler, the German commander, planned his defensive fire support with an acute sense of terrain. He had anticipated that the wadi's would delay and disarrange the American formation, and he had prepared a firepower ambush. He was terrain wise, and the American tank battalion was annihilated.

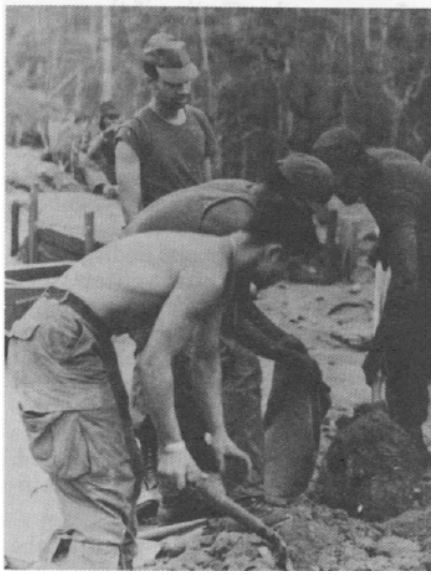
Ziegler understood that a Field Artillery unit's ability to provide fire support is largely determined by the terrain. That axiom remains true today. Unless Redlegs study the influence of terrain on fire support, their plans will be frustrated at every turn by the unexpected. The ability of observers to adjust fires, the suitability of firing positions and ammunition resupply routes, and the effects of fires on targets are all influenced by the terrain. This article reacquaints contemporary Redlegs to many of these considerations. It seeks to make us more aware of the same considerations that made Ziegler a victor.

Terrain and the Fire Mission

Terrain and observation are inseparably linked. History makes it clear

that those who hold the high ground can rake their enemy with fire. Those who don't hold it must endure effective enemy fires and are unable to inflict similar damage on the enemy. We see proof of this lesson in World War I, when a series of hills provided observation over much of Flanders. These vantage points proved so important that the British and the Germans expended divisions to seize and hold the hills. During World War II, a rise of as little as 3 feet was of great importance to the forces operating in the flattest areas in North Africa. In fact, some of these rises were the objectives of fairly substantial German attacks.

Lessons learned in World War I and II point to the clear advantage of terrain awareness. Even the smallest rise in the ground could prove the difference between victory and defeat.



It Is no secret that soldiers used the terrain in Vietnam to degrade the effects of fires. That is why these Redlegs built bunkers (top) and protected their artillery pieces with parapets (bottom).

The value of terrain that provides observation is increasing. Laser target designation devices allow observers on the high ground to hit virtually anything they can see with terminally-guided projectiles. Think of the damage that can be done by Copperhead rounds that hit full fuel storage tanks, boxes full of ammunition, and the doors of command posts or communications centers. What would happen to the tanks of an enemy battalion if they were caught during refueling and rearming by 3 or 4 Copperhead projectiles that hit the refueling and rearming vehicles? These few Copperhead rounds could lead to the destruction of 10 or 20 tanks by secondary explosions and fires.

Terrain also influences the effects of fires. During my 2 tours in Vietnam, I observed these effects firsthand. In 1968 the rifle company to which I was assigned as a forward observer occupied a hilltop overlooking Khe Sanh. The North Vietnamese Army (NVA) had previously held this ground as they had so many other high spots surrounding the airfield. And like the other heights, this hilltop had been the target of intense American firepower. There was one very large and deep bomb crater inside our new perimeter. Anyone close to that American bomb had obviously been killed by the explosion. Otherwise, American firepower appeared to have given little account.

A typical bunker close to my position had been made by digging a hole about 6 feet deep. Logs placed in this hole in an inverted V formed a an A-frame. The NVA then shoveled dirt over the entire structure. This bunker provided its occupants with complete protection from US fires. I doubt that anything but a direct hit by an 8-inch round or a bomb could have penetrated the bunker's roof.

It is no secret that terrain can be used to degrade the effects of fires. That is why soldiers dig fighting holes and trenches and why artillery pieces are often protected by parapets. I was amazed, however, to see how completely a simple structure could protect its occupants while in sight of our firebase and under our concentrated firepower.

From 1972 through 1973, I served in Quang Tri Province with the Vietnamese Marines. There the NVA used conventional artillery that included 122-mm and 130-mm pieces as well as 120-mm mortars. The fires of these weapons sometimes had dramatic effects; they threw barrels of gasoline into the air and destroyed trucks. Yet, the fires from the NVA artillery had surprisingly little effect on those of us behind the front lines. Why? Because after the first rounds had exploded, we altered our activities to deal with the fires.

Usually the enemy artillery caused us to seek refuge in fighting holes or in bunkers. However, we were particularly innovative when on the beach. The beach fronted on the South China Sea and was our main supply route to several infantry battalions and artillery batteries. Every day scores of trucks went up and down the beach using it as a highway. In consequence, the NVA frequently shelled this stretch of sand in an apparent effort to hit our resupply vehicles. Although the shells hit the beach, I never heard

of any shells hitting a vehicle. When the drivers saw the NVA shells exploding on the beach in front of them, they would stop outside of the effective radius of the exploding shells. It was as if the NVA had installed a stoplight.

Many Marines walked through or around NVA artillery concentrations during the Eastern Offensive in April and May of 1972. As I contemplated their stories I realized that artillery fires are only effective if the enemy cannot avoid them. Clearly, with the exception of terminally guided munitions, interdicting artillery fires will achieve their purpose only when they are precisely on target, unavoidable, or both.

That is why artillery fires should be planned with an eye to obstacles—natural and man-made. Redlegs must seek to bring fires on the enemy when he is in a defile, is dismounting to attack, is trying to get through a mine field or tactical wire, or is crossing a river. Sometimes it may be best to let an enemy force cross an open space and save your ammunition until his freedom of movement is restricted. That is when firepower can truly reinforce an obstacle.

Consider this case-in-point of the French 3d Colonial Division described in General George C. Marshall's *Infantry in Battle*.

> On August 22, 1914, this unit blithely advanced across the Semoy (a stream that was fordable in only 1 or 2 places) and plunged into the forest north of Rossignol. To its right front the ground was open and completely dominated the bridge on which the division was crossing. The location of the enemy was unknown but some of his cavalry had been encountered.
>
> The terrain fairly screamed that machine guns and artillery should be emplaced to cover the division and that every means of rapid reconnaissance should be used to search the ground commanding the defile. This mute warning was either ignored or not seen.
>
> The divisional artillery, once across the Semoy and approaching the forest, found itself on a road flanked on both sides by swampy ground, hedges, and ditches. If they encountered the enemy, the artillery would be practically useless; and they did encounter the enemy, both to the front and the right front. The artillery, unable to leave the road, was helpless. That part of the division which had crossed the Semoy was cut off and captured or destroyed.
>
> The French had had ample time to occupy the key points beyond the river, but they failed to do so. They had been afforded an opportunity to select their battlefield but had let the opportunity slip by. They neglected the possibilities of the terrain, and for that neglect they paid dearly.

Terrain and the Projectile

The nature of terrain can also change the effectiveness of individual shells. As the Iraqi's found during their defense of the Faw Peninsula, muddy or marshy areas will dramatically decrease the effectiveness of point detonating rounds. In fact, such projectiles often explode below ground level, and many of the shell fragments are absorbed by the mud. Variable time (VT) fuzes tend to explode higher over marshy areas than over dry areas because water reflects radio waves better than dry ground.

As the Germans found out in World War II, arctic or cold weather environments also take their toll. Just consider the following extract from the Center of Military History's *German Report Series* "Effects of climate on combat in European Russia."

> The effectiveness of artillery projectiles, particularly those of small caliber and of mortar ammunition, was seriously hampered by deep snow. Snow dampened and reduced lateral fragmentation of artillery shells, and almost completely smothered mortar fire and hand grenades. Heavy artillery weapons such as the German 210-mm mortar remained highly effective. Because of the cushioning effect of snow, mines often failed to detonate when stepped on or even when driven over by tanks. To keep

Experienced Redlegs can match the characteristics of individual shells to the nature of the terrain to yield maximum effectiveness.

detonators effective in extremely cold weather, gun crews often carried them in their pockets.

On the other hand, rocky and frozen ground enable point-detonating rounds to explode at ground level. Such ground also encumbers the defensive efforts of soldiers in target areas.

Shells impacting in jungles and forests usually explode in the treetops. The fragments may rain down on all below and lose part of their effectiveness in an extremely high canopy. In close combat, friend and foe alike can be hit unless they have overhead cover. And because defenders usually have such protection, friendly artillery fires may well help the defender and hinder the attacker.

Terrain, Positioning, and Transport

Terrain affects the availability and nature of good firing positions and the resupplying of ammunition. In open terrain such as the plains of Europe and the deserts of North Africa and the Middle East, there are many flat areas. However, placing an artillery battery in the middle of a flat area may be unwise. Level ground makes the battery easy to see and easy to attack. Tanks and armored personnel carriers can quickly overrun a battery that is unprotected by natural cover. Fortunately, most flat areas are not completely flat. They are cut by streams that have banks too steep and high for vehicles to climb. They have indentations where artillery pieces can hide from view.

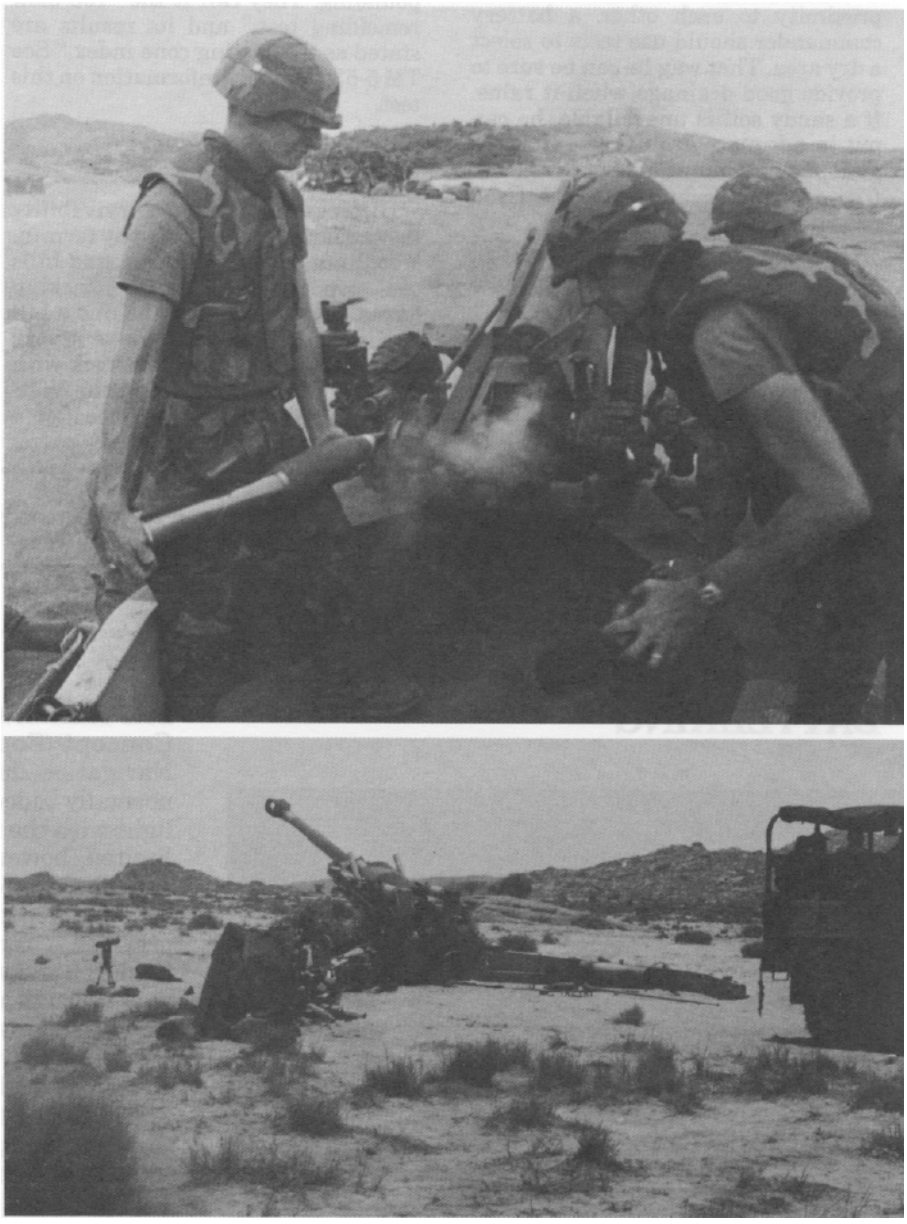
As the ranges of our artillery weapons increase and our pieces become self-locating and laying, they will become progressively easier to position for survival. Battery leaders down to the chief of section level will need to develop an acute sense of terrain as they search for positions with strong natural defenses such as urban areas, deep streambeds, and thick areas of vegetation.

In jungles and forests, good firing positions are often difficult to find or make. While the vegetation may provide protection from enemy observation, it also inhibits the displacement of artillery batteries. Indeed, experience shows that in jungles and forests artillery units have a slower rate of advance than infantrymen on foot. This is because there are few roads suitable for the movement of equipment. While the infantry may move forward at 2 or 3 miles per hour, the *forward* movement of an artillery battery stagnates as units await engineers to prepare tracks or corduroy roads. Such unavoidable delays make the displacement of batteries one of the most important considerations in fire planning and in the execution of fire plans.

What's more, in jungles and forests it is very difficult to determine the exact location of enemy positions except by reconnaissance or actual attacks. The defender digs in and awaits the enemy on terrain of his choosing. The fire of each machine gun and recoilless rifle is held until it can have the desired effect, usually at close quarters. Such realities make large artillery and close air delivered preparations inefficient and ineffective. In these circumstances, artillery fire planning may focus largely on things like groups and series of targets which enable Redlegs to react promptly when the enemy is located by the advancing infantry.

Thus far in this article, I have concentrated on the effects of landforms and vegetation. However, now I turn my attention to the ways surface materials can affect fire support.

Sediments are classified by their particle size. For instance, if sediment particles are .004-mm or less, the sediment is called clay. If the particles are between .004-mm and .062-mm, they are silt. If the particles are between .062-mm and 2.0-mm, the sediment is



Terrain affects Field Artillery positioning and the resupply of ammunition. Open desert terrain present a particular challenge to Redlegs at Fort Irwin.

sand. If the particles are between 2.0-mm and 64-mm, it is gravel. Each of these materials has different characteristics when wet.

Water cannot penetrate clay. Therefore, if a crew digs a gun pit in clay, it will fill with water when it rains unless the crew has provided a drain. Silt absorbs water and holds it. This can cause a terrible mess, bogging down trucks and slowing walking troops to a virtual standstill. Of course, water drains rapidly through sand. Indeed, sand becomes firmer and provides better trafficability when wet than when dry.

Technical Manual 5-530, *Materials Testing,* explains several soil tests useful for field commanders. Because several types of soils can exist in close proximity to each other, a battery commander should use tests to select a dry area. That way, he can be sure to provide good drainage when it rains. If a sandy soil is unavailable, he can put in adequate drainage so that his gun pits, ammunition bunkers, and fire direction centers do not flood when it rains.

An interesting but little known fact is that while some damp soils get stronger when hit repeatedly, other soils get weaker. This affects:

- The ability of the floor of a gun pit to stand up to the pounding of a recoilling artillery piece.
- The ability of a road to withstand the pounding of passing ammunition trucks.
- The ability of a target area to stand up to impacting artillery rounds.

During World War I, some preparation fires chewed up the earth so badly that they impeded the attacking forces. In fact, both sides learned to employ geologists to provide advice on the probable effects of preparation fires on the soil. For instance, the fact that the enemy's strongpoint was located on soil that weakens with repeated pounding frequently proved to be helpful information.

Contemporary engineers can perform similar tests to determine the ability of soil to stand up to repeated pounding. They call it the "100-blow remolding test," and its results are stated as the "rating cone index." See TM 5-530 for more information on this test.

Conclusion

History tells us that survivability may be largely determined by terrain. Woodlines, rivers, marshes, and hills can stop the vehicles of attacking forces. Placing a battery behind a hill or cliff or in a gully can make it very difficult for the enemy to attack with artillery or rockets. During the Vietnam War, Marine leaders located a battery at Conthiem in a gully. Every rocket the NVA fired at the battery either went long or hit the rise in front of the unit.

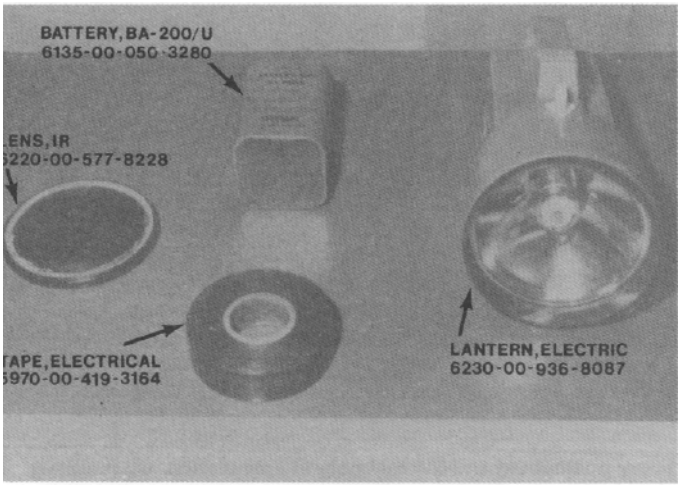
Those who are interested in learning how terrain affects fire support should read military history about operations in various regions of the world. Probably the 3 best books to begin with are Martin Blumenson's *Kasserine Pass,* Brian Garfield's *The Thousand Mile War* which covers World War II in Alaska and the Aleutians, and Charles B. MacDonald's *The Battle of the Huertgen Forest*. Each provides details and describes fascinating examples unavailable in doctrinal manuals.

Lieutenant Colonel Peter S. Morosoff, USMC, is assigned to the G1, 1st Marine Amphibious Brigade. He is a graduate of Marlboro College in Marlboro, Vermont; and he received his commission through the Officer Candidate School. He is a graduate of the Field Artillery Officer Basic and Advanced Courses and the Marine Corps Command and Staff College. Lieutenant Colonel Morosoff has served as a forward observer, fire direction officer, battery executive officer, battery commander, and S3. He also served as an artillery officer, NBC officer, and electronic warfare officer in a G3 section.

View from the Blockhouse

FROM THE SCHOOL

BATTLEKING



BATTLEKING BK 33-86, Infrared Flashlight Concept (Source: 5th Battalion, 11th Marines). Navigation during periods of reduced visibility is normally aided by using the standard Army flashlight with the red lens. The range of the flashlight is limited, however, and cannot be shielded from outside observation. The 5th Battalion, 11th Marines have developed a hand-held infrared flashlight that provides a remedy for the problem. The improved flashlight may be assembled with components available through normal military supply channels. See the accompanying photo for specific requirements.

When used with the AN/PV5-5 night vision goggles, the flashlight greatly improves navigation. The Marines also trained communicators in Morse code so that during periods where electronic jamming intercepts normal radio communications, the infrared flashlight is an alternate means of tactical communications. The flashlight has proven successful at ranges up to 2 kilometers.

Message to the Maneuver Commander

Editor's Note: *Major General Eugene S. Korpal of the Field Artillery School recently sent a copy of this letter to the commanders of Armor and Infantry Divisions, and to the assistant commandants at the Infantry, Armor, and Aviation Schools. The word on the combined arms battle is getting out at the senior Army leaders' level; now the Redlegs in the trenches need to "make it happen!"*

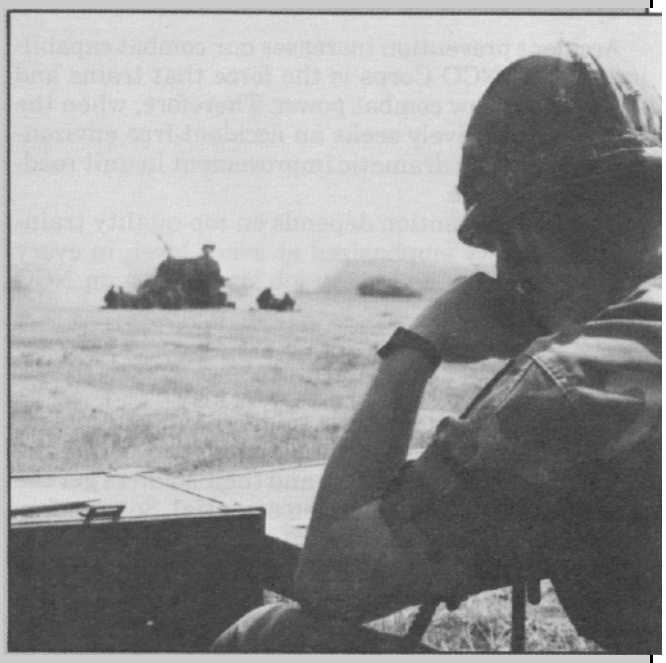
Over the last several months fire support execution at the National Training Center (NTC) has received increased attention. The problems with fire support at the NTC are not new and in some cases solutions are not readily apparent. For instance, the company and task force fire support officers have a heavy burden to shoulder to ensure the success of the close battle, but they are among the most inexperienced officers in the Army. The NTC provides a realistic battlefield for them to gain valuable experience, and there is no better place for them to apply their trade under stressed conditions.

At the Field Artillery School we have established a Combined Arms Training Center Task Force to get a handle on fire support at the NTC and to find solutions to problem areas. Some solutions are found in the near term but some require more fundamental changes in how we envision training at the NTC. The purpose of my letter is to solicit your assistance in focusing our collective attention on training and success of the combined arms team.

A significant contributor to NTC success is the train-up the brigade and direct support artillery battalion go through prior to their deployment. In order to improve fire support training and execution at the NTC I would suggest the following:

First, your brigade and task force commanders should be strongly encouraged to include fire support training and execution as a significant part of their NTC training objectives. This will help focus on fire support and will play significant dividends once they deploy to the NTC. The Field Artillery School sends a prerotation operations team to each direct support battalion prior to deployment to the NTC. This would be an excellent opportunity for task force and company/team commanders to talk fire support and hear the latest fire support lessons learned from the NTC.

Second, your encouragement to conduct more intensive combined arms training at your installation will ensure that the maneuver and artillery staffs work closer together to become a more cohesive team. Successful brigade commanders at the NTC indicate that the more time they spend working with their supporting artillery at home station, the easier it is to successfully plan and execute fire support when planning time is minimal and stress is high at the NTC. Ultimately the maneuver commander is responsible for fire support execution. Like any other task in the Army, those areas that receive command attention are usually the areas that shine in the command.



Lastly, I solicit your comments and recommendations on how we at the Field Artillery School can do more to send you qualified fire supporters that are eager to contribute to your success on the battlefield.

I stress to my precommand course students that the Field Artillery commander must put his highest quality officers in the fire support officer billets and then he, the artillery commander, must diligently fulfill his critical duty as fire support coordinator (FSCOORD) to the supported maneuver commander. The Field Artillery is a significant component of the combined arms team, and we will endeavor to live up to the expectations the maneuver commander has for our contribution to the AirLand Battle.

Thanks for your time and I wish you success in all your endeavors.

Army Safety: NCOs Make it Happen

The names and units are different, but the details are dangerously similar. A soldier gets a hand or a foot smashed while he's moving the trails of his howitzer, or he gets tangled in the camouflage net and falls from the vehicle, or the gunner is struck by the recoiling weapon or burned by backblast. Tents and equipment are also vulnerable, and may be destroyed by fires ignited by heaters, candles, or battery sparks.

These accidents put soldiers and equipment out of action. However, they can be prevented by improved training and improved supervision—in other words, by better noncommissioned officers.

Safety is NCO Business

Accident prevention increases our combat capability, and the NCO Corps is the force that trains and sustains our raw combat power. Therefore, when the NCO Corps actively seeks an accident-free environment, we'll see a dramatic improvement in unit readiness Army-wide.

Accident prevention depends on top-quality training with safety emphasized at every level, in every training session, and every job site. That's an NCO responsibility.

NCOs Make the Difference

Many units protect their soldiers and equipment. In those units, NCOs set the example. They follow the rules in everything they do, and their soldiers get the message that safety is mission essential. Soon, safety becomes a habit.

As first-line leaders, it's the NCOs' job to teach soldiers what they've learned along the way. They must make sure their soldiers are prepared to do jobs safely. Good NCOs can spot accidents before they happen

and take steps to eliminate or reduce the hazards. They speak out immediately if drivers, in either wheeled or tracked vehicles, fail to slow down for terrain, traffic, or weather conditions. They make sure they know not to drive through a bivouac area without ground guides. Their corrections of unsafe acts or shortcuts are swift and certain.

Keeping soldiers on the job requires us to "think safety" off duty too. NCOs have to let their troops know they're serious about eliminating drunk driving, using seatbelts in privately owned vehicles, and wearing helmets on motorcycles.

Safety Supports the Mission

The Army has a number of units where accident prevention pays big dividends in unit efficiency, morale, and readiness. When every unit joins that safety team, the Total Army will enjoy an even greater payoff in increased readiness. NCOs can make it happen!

How to Win with TACFIRE

Estimating the Situation

The tactical fire direction system (TACFIRE) is a commander's tool for fighting and winning on the modern battlefield. This thought may seem as scary as a Stephen King novel on a stormy night to most commanders, but it doesn't have to be. What a commander has to learn is how to *use* this tool to achieve the desired results. And to do that he must make an honest estimate of his TACFIRE situation.

Step 1:

The first step in making TACFIRE a truly effective instrument is to assess the following areas:

- *State of training of the unit's personnel*—Not just the overall capability of units, but the specific abilities of each section including observers, fire direction centers, operations and intelligence, and fire support elements.
- *State of reliability of the battalion computer*—Does it have a history of generator or other equipment problems?
- *State of reliability of remote devices*—Again, each device in the system must be considered. Is there a variable format message entry device (VFMED) that is consistently a problem? Is there a digital message device (DMD) that can never communicate?

Step 2:

The next step is to determine how well a unit performs in these 5 specific TACFIRE team areas:

- *Maintenance of the system*. Can operators repair 90 percent of the faults within 30 minutes? Is the direct support maintenance unit responsive?
- *Technical and tactical fire direction*. Is the maneuver commander's criteria kept updated?
- *Fire planning and execution.*
- *Fire support coordination*. Is there confidence that the battalion fire support elements are in fact clearing fires using message of interest processing? Are they able to keep the fire support coordination measures updated in the computer?
- *Command and control*. Can digital traffic be used effectively to execute fire plans and conduct fire mission processing?

Step 3:

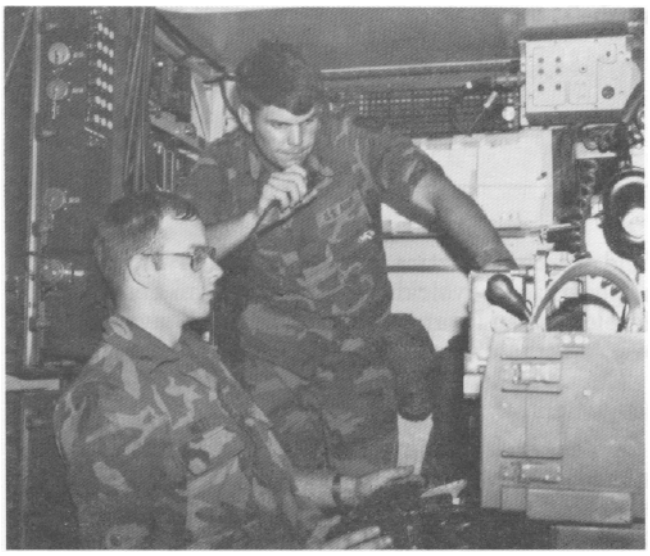
Once the commander has determined what his unit can do with TACFIRE, he has some important decisions to make.

Deciding on a Plan

Let's face it! A forward observer looks across the forward line of own troops (FLOT) at the "red horde." He sends in a mission by DMD to stop some of the oncoming enemy. The mission doesn't get through with a clean acknowledgment. From the observer's perspective, TACFIRE is *broken,* but he must still accomplish the mission. The commander must make several decisions before the observer and his fellow Redlegs are to take the right actions.

Decision 1:

The smart commander must assume at least some of his fire missions will be voice. So he must ask himself if his fire direction center (FDC) can handle voice and digital fire missions simultaneously. If not, then he'll have to have everyone shoot fire missions by voice. If the unit can handle them both, then the standing operating procedure must establish alternate voice nets for fire mission processing. Also the commander must decide who will issue the voice fire orders and who will enter the mission into the computer.



He may decide that the tactical operations center (TOC) can handle voice fire mission processing and take that burden away from the FDC, or he may rely exclusively on his FDC. Finally, he must ensure that the unit rehearses simultaneous voice and digital fire missions.

Decision 2:

Next the commander must ask if fire plans can be executed with the TACFIRE system. If not, he'll have to rely on voice. If the unit is capable of digital execution then the commander must ensure that ammunition fire unit (AFU) files are up to date and the gun display units (GDU) are operational. Under some conditions, the commander may decide to execute a part of the fire plan automated and the remainder by voice. For example, the FSO forward with the maneuver commander executes an on-call schedule by voice to the battalion fire direction center. The FDC then executes the fire plan digitally down to the fire units. If the GDUs are not operational in the fire units, the battery FDC too must execute by voice. In fact, battery leaders may decide to send data to all sections by voice if several have inoperative GDUs. Whatever system a commander chooses, he must ensure rehearsal and fine tuning of specific procedures.

Considering the Tactical Variances

There are different considerations for employing TACFIRE in the offense and the defense. Experience at the National Training Center (NTC) suggests that in the offense roughly 50 percent of a unit's DMDs will not be able to communicate with TACFIRE. Range, terrain, faulty equipment, or poor training are all reasons for such lapses of communications.

It is also difficult to enter boundary changes into the support files, and fire support coordination measure entries always fall behind the action. Of course, the front line trace will be changing much too fast to have a realistic representation in the computer. The commander must consider all these things in determining whether to fight voice, digital, or both.

In the defense, commanders can enjoy several advantages. They can:

- Plan locations where all digital equipment can communicate.
- Conduct a rehearsal of the plan to make sure it is sound.

If the observer is not able to establish digital communications from his proposed location, he may elect to change his location, or he can conduct fire planning and fire mission processing by voice. If he decides to go voice, then he tells his fire support officer and fire direction center. They will know this before the battle starts and prepare accordingly.

Lessons Learned from Successful Units

Lesson 1:

Successful commanders habitually conduct at least 20 hours of TACFIRE sustainment training per

week. During this training, they use exercises that stress the system enough to test their unit's SOP.

Lesson 2:

What's more, they include the whole combined arms team in their training plan. That is, they seek maneuver unit participation and include their mutual support and direct support maintenance units frequently. They also establish an alternate voice fire net and rehearse its use.

Lesson 3:

Successful commanders also do fire planning with TACFIRE and execute the plan digitally with voice back up. They emphasize both techniques in their field training.

Lesson 4:

In successful units the battalion commander, as the fire support coordinator positions himself so he can see the battlefield. He uses the combination of his own eyes, the eyes of the brigade commander, and the reports he receives from his fire support and operations officers. Because he lacks a digital device, the successful battalion commander uses voice procedures to supervise and revise the execution of the fire support plan. He's never afraid to intervene to get steel on target.

Conclusion

Remember, TACFIRE is a tool. It should be used to make the operations faster and more effective. To realize this goal, good commanders honestly estimate their TACFIRE system, make sound decisions on the use of the system under the prevailing tactical situation, train their units accordingly, and then supervise the execution of the mission to demanding standards of excellence. When they've done all that, they win with TACFIRE. It should not be a burden to the extent that it becomes a detriment of mission accomplishment. (Lieutenant Colonel Bill Ott and Captain Charles H. Erwin)

TCAD Gets a New Face

The School of Fire Support has a new vision, and the School's leaders have renamed the Tactics and Combined Arms Department to accomplish the mission.

The new Fire Support and Combined Arms Operations Department reflects the shift at Snow Hall from a focus on Field Artillery technology to the tactics of the combined arms fight. The department's director, Colonel Roger L. Bernardi, said the challenge will be to create a coherent block of instruction for the Field Artillery Officer Advanced Course that effectively will mesh maneuver and fire support tactics. The School will no longer teach "a sterile maneuver course here, then a sterile threat course there, and finally a very sterile Field Artillery course," he said.

The challenge extends to fire support officers, who will be required to learn the doctrine of infantry, armor, and aviation tactics—as well as to master fire support tactics. This will produce the kind of first-rate Redleg students we have always turned out, but these will have the advantage of being able to think in armor and infantry tactics.

Colonel Bernardi acknowledges that there is no ready acronym for the new department, but that's another challenge we Redlegs can meet. "Don't say it fast," he says, "say it slow. Fire Support. That's what we do."

Light Leader Training

Leaders at the School of Fire Support understand that light leader training is a vital part of professional development training for all commissioned and noncommissioned officers and particularly for those bound for light infantry divisions. The Military Personnel Center (MILPERCEN) agrees and is identifying personnel enroute to light units. These soldiers will attend special training that includes field exercises, tactics for a light maneuver unit, and a specialized physical training program designed to develop the endurance needed to carry heavy weights over long distances.

The light leader training strategy has 3 major components:

- Leader training for the advanced noncommissioned officers course, officer basic course, officer advanced course, and the cannon system qualification course.

● The New Manning System Cadre Training Course for leaders of cohesion and operational readiness (COHORT) units.

● The assisted small artillery unit leader training (ASSAULT) package.

Institutional Training

Under the first initiative, the Field Artillery School modified the program of instruction for a wide variety of courses.

For example, the noncommissioned officers course is now tracked by weapon systems. All officers basic course (OBC) students receive instruction on the differences in the tactics, techniques, and procedures employed the light firing batteries and fire support teams.

Beyond their normal academic exposure to light artillery doctrine, selected officers advanced course (OAC) students receive assignments to the tactical officer program designed to train them to lead specialized physical training with OBC students.

Captains bound for light division artilleries will also attend the light cannon system qualification course. This 2-week and 2-day follow-on course provides specialized training including a 3-day field training exercise with C130 deployment to Altus Air Force Base, and a mock air assault raid back to Fort Sill using CH47 aircraft.

The second dimension of the School's light initiative is the COHORT cadre training. Designed for units just before or just after they form, this 3-phased effort brings all cadre members to a standard level of training.

● Phase 1 training is an exportable cadre training package Fort Sill sends to a COHORT unit. It includes a 3-day leadership orientation workshop followed by up to 3 weeks of individual task training.

● Phase 2 occurs at Fort Sill. Known as the new manning system cadre training course, it also trains the unit cadre. The first week of instruction covers common core tasks (individual and collective training, communications, etc.) The second week consists of instruction on specialty specific tasks (cannon, supply, maintenance, etc.), and the final week involves a major field training exercise where CHOHORT soldiers work with their future cadre. The course uses Fort Sill equipment, instructors, and ammunition. The unit incurs only the cost and TDY of its cadre.

● Phase 3 training occurs at the unit's home station and is 4 to 6 weeks long. It brings the gunline to Army training and evaluation program (ARTEP) standards. This package is applicable to both heavy and light artillery units, COHORT and non-COHORT units alike.

Fort Sill has trained 6 individual firing batteries and 2 battalion-sized units so far. The first battalion to receive this training was the 3d Battalion, 7th Field Artillery, 25th Infantry Division, located at Schofield Barracks, Hawaii. Due to the cost of sending the entire unit to Fort Sill for the training, the instructors travelled to Hawaii. The receiving unit paid all costs.

The first battalion to receive the resident course was the 1st Battalion, 7th Field Artillery from the 10th Mountain Division at Fort Drum, New York. This organization was the first unit to request the entire package and the outstanding results proved the value of the overall program.

Assault

The third and last division of the School's training strategies is the assisted small artillery unit leader training. This school-developed package consists of 2 parts—a collective training program and a collective evaluation package. The unit training package is a 1-week program that includes an individual and leader evaluation; a section evaluation; and a firing battery field training exercise.

The evaluation portion of ASSAULT uses ARTEP standards and is applicable to both COHORT units and non-COHORT units. There are 3 options for administering the evaluation:

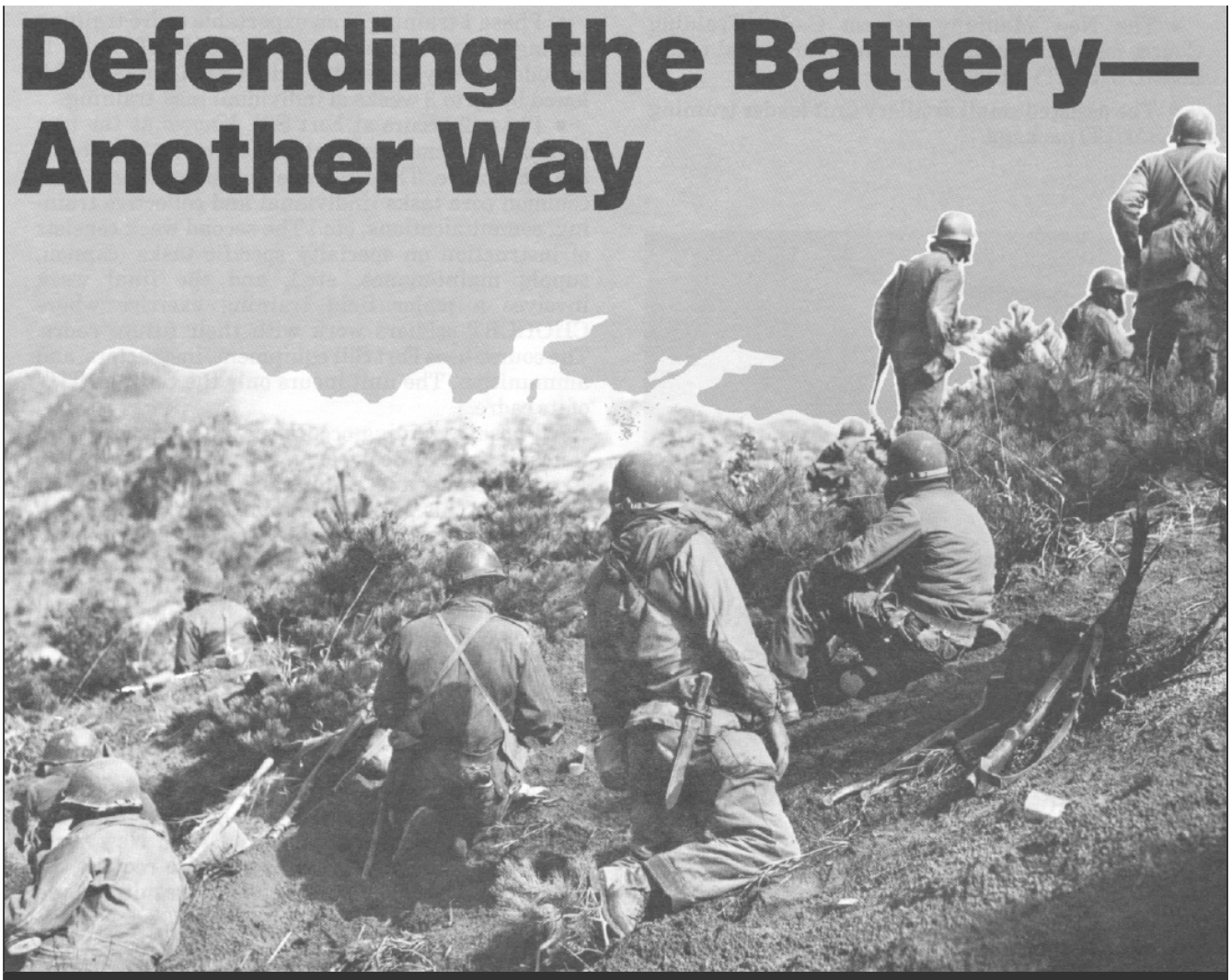
● Fort Sill provides materials and the unit administers the evaluation.

● Fort Sill provides the materials and administers the evaluation.

● Fort Sill provides the materials and the unit administers the evaluation with on-the-scene guidance from Fort Sill experts.

The 25th Infantry Division and the 10th Mountain Division Artilleries are currently evaluating this program.

Defending the Battery—Another Way



by Sergeant Ward Wright

The art of perimeter defense, often neglected by artillerymen, must be better understood and practiced to solve the riddle of protecting the extended battery.

Today's doctrine of frequent moves has rendered obsolete former ideas of defending the battery from ground attack. After years of moving from site to site and leaving behind partially dug and often poorly-sited machine gun and rifle positions, I feel that some kind of change is in order. We must stop trying to defend today's highly mobile battery with the survivability methods we used in World War II.

Artillerymen are too busy working at the firing point to use perimeter defenses that won't yield maximum protection for a minimum payment of manpower and effort. Only by modernizing our thinking and by trying to bring new methods of defending the conventionally sited battery—either towed or self-propelled—can we achieve the levels of protection that will enable us to survive on future battlefields.

Commanders' dependence on FM 100-5, *operations,* is not necessarily bad, but it has led them to believe that the war of movement it outlines means that artillery officers can either shoot and carry out the mission or defend the battery. However, correctly interpreted, FM 100-5 and its companion work *FM 90-14, Rear Battle,* forecast a battlefield of every conceivable hazard.

Our global commitments in the East, the African and Central American theaters, and our forces in the Republic of Korea face threats ranging from night infiltration by guerilla or regular forces to direct assault by "human wave," conventional infantry, or combined arms tactics. A false impression of some youthful commanders holds that carrying out the mission is so important that their batteries will stand firing while being cut down like Wellington's squares at Waterloo. We must defeat this kind of thinking wherever it is found. No battery can entertain a philosophy of annihilation for the sake of the mission.

The Science of Artillery

All too often, artillery officers and NCOs get bogged down trying to apply

some vaguely understood concept of a rigid defense line. The defense line is more suited to an infantry rifle company tasked with holding an isolated position than a firing battery. Redlegs cross into the sometimes recondite world of infantry tactics without realizing it. Their resultant confusion is only natural.

The artilleryman's world is an orderly one defined by physics and expressed by mathematics. If the fire direction center (FDC) computes correctly and the gunners sight correctly, then shell "A" should fall on target "B" (subject to some minor variables). Artillery, then, is a science.

The infantry mission is another matter. We can teach some fundamentals such as fire and maneuver and retrograde operations, but we cannot tell the soldier exactly how to use these methods in any given situation on any given terrain. Indeed, 2 infantry leaders given identical attack or defense problems could arrive at 2 totally different solutions and both could succeed—or both could fail. Infantry success is characterized by many judgment calls and a certain talent for abstract thinking. Therefore, infantry tactics is an art.

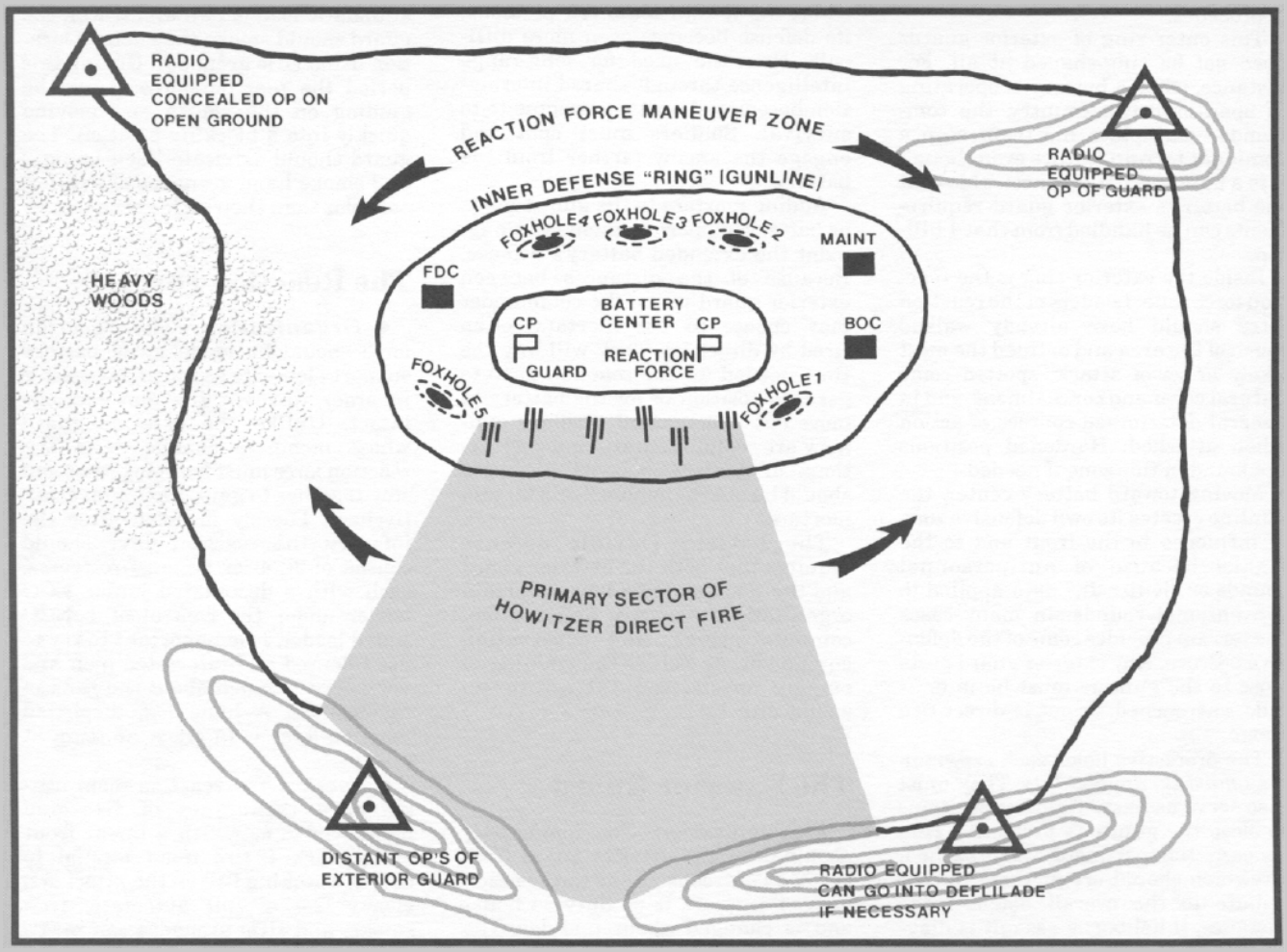
Unfortunately, the Army does not make it easy for artillery leaders to become skilled in the art of defense. Soldiers glean the knowledge needed to defend an artillery position in bits and pieces from field manuals on guard duty, the machine gun, field fortifications, mines and booby traps, infantry tactics, map reading, and patrolling and signals. Actual service with an infantry unit is also helpful as is outside reading on the subject.

Even after reading from these sources is complete, something still seems lacking. That something is an overall philosophy—not a set of rules. It's a defensive system for the artillery battery which must move frequently and has few men to spare for the defensive role, and it also has a mission other than self-defense.

The Flexible Defense

Though it sounds paradoxical, I believe the best way to defend a perimeter with minimum resources is to *expand* it by placing an exterior guard in carefully chosen positions to maximize their field of vision. These guards must develop individual self-discipline, scoutcraft and nerve; there is no room for smokers and jokers in this kind of exterior guard. Properly executed, a large rather loose perimeter allows the reaction force enough maneuvering space to buy time. Then the battery commander can decide whether to fight the threat and shoot his cannons, or to extricate the battery while there is still time. I call this the *expanded perimeter, flexible defense*.

This kind of defensive philosophy emphasizes the use of natural cover and concealment and downplays the importance of fixed entrenchments. However, flexibility is the keynote, and if a particular site cries out for a



The expanded flexible defense theory is based on a series of loose rings. The outer exterior guards may be emplaced as much as 1 mile away. The gunline comprises the battery perimeter.

few hardened positions—then the commander must construct them.

Within the concept of an expanded perimeter and a flexible defense, it is important that all Redlegs from commander down to lowest cannoneer understand fully the battery defensive assets and his role in it. Let us say that the battery center is not the gunline, but rather the twin command posts of the exterior guard and the reaction force. They are the guard commander and his radio or phone under 1 tree and the reaction force leader under another tree with a whistle around his neck. These leaders are within shouting distance of each other. We can now reduce the defensive picture of the battery to a schematic of a series of concentric rings; some complete, some not.

The outermost "ring" represents the carefully chosen exterior guard outposts and their zone. Where this ring does not close with human senses, it is fortified by trip flares, trip mines, single-strand tanglefoot, and cut brush across likely approaches.

This outer ring of exterior guards need not be ring-shaped at all. For instance, when a battery is operating in open or brush country, the commander may place his team atop a dominant terrain feature even though it is a mile away. It is conceivable that the battery's exterior guard requirements can be handled from that 1 hilltop.

Inside the exterior ring is the reaction force zone. Leaders of the reaction force should have already walked much of the area and defined the most likely areas of attack, spotted some natural cover and concealment, and in general determined courses of action when attacked. Hardened positions are found in this zone if needed.

Moving toward battery center, the gunline creates its own defensive zone of influence to the front and to the flanks because of antipersonnel rounds or "Killer Jr." data applied to conventional rounds. In many cases the terrain provides some of the defensive posture. Any exterior guard posts close to the gunline must be in defilade, entrenched, or out of direct fire range.

The protective holes each crewman digs *must do double-duty*. They must also serve as hasty fighting positions to close the gunline's protective ring in case the perimeter is breached. Crewmen should orient them to contribute to the overall defense. For instance, if heliborne assault is diagnosed as a major threat and a potential landing zone (LZ) exists to the immediate rear of the gunline, then guards should arrange these holes in a fan looking rearward from each gun to cover the LZ. This arrangement would also be effective against night infiltrators in a guerilla environment. However, if frontal human wave attacks are the likely threat, then they should orient the positions toward the front and placed between the guns. Tracked units should also consider placing this kind of defense.

The battery commander's troops have 1 final obligation to fulfill. If the reaction force responds to a feint or if the battery is being overrun by a conventional force, then every section—even the FDC—must have enough minimal infantry training to be capable of laying down a base of fire with their small arms under the supervision of their NCOs. We must expect that from every artilleryman, and we must train for it.

So far we have applied the expanded flexible defense concept to a conventionally sited battery. When the commander extends the battery laterally or breaks it into scattered platoons, its defense becomes even more difficult. Now the need for long-range intelligence through shared information becomes almost a prerequisite to survival. Soldiers must spot and engage the enemy farther from the battery.

Adding mortars to the gun sections or battery support elements can augment the extended battery's defense. Because of the distances between exterior guard posts, the commander may choose to use mortars—often fired by direct lay. They will buy the time needed for the reaction force to get into position or for the battery to move out. Mortar and artillery gunnery are complimentary, and gun sections or battery support elements should be able to handle 2 or 3 60-mm mortars.

The battery flexible defense requires that both the exterior guard and the reaction force have a certain organization, weapons, ammunition, communications, and observation equipment, as well as the training to employ specialized tactics in an enemy attack.

The Exterior Guard

● ***Organization.*** The commander should draw the exterior guard from the body of troops minus the reaction force. The guard is on duty 24 hours and is changed about mid-day. The number of guards is flexible and may change from site to site, but leaders should identify the men by roster in advance.

● ***Disposition.*** These are designed as listening and observation posts, not walking posts. The guard must arrive quietly, set his traps, then seek out a concealed position and lie quietly until recalled. They should report to their command post every half hour by phone or radio. The key here is stealth and silence, therefore entrenchment is not called for, nor should NCO's inspect or visit these posts after placing them.

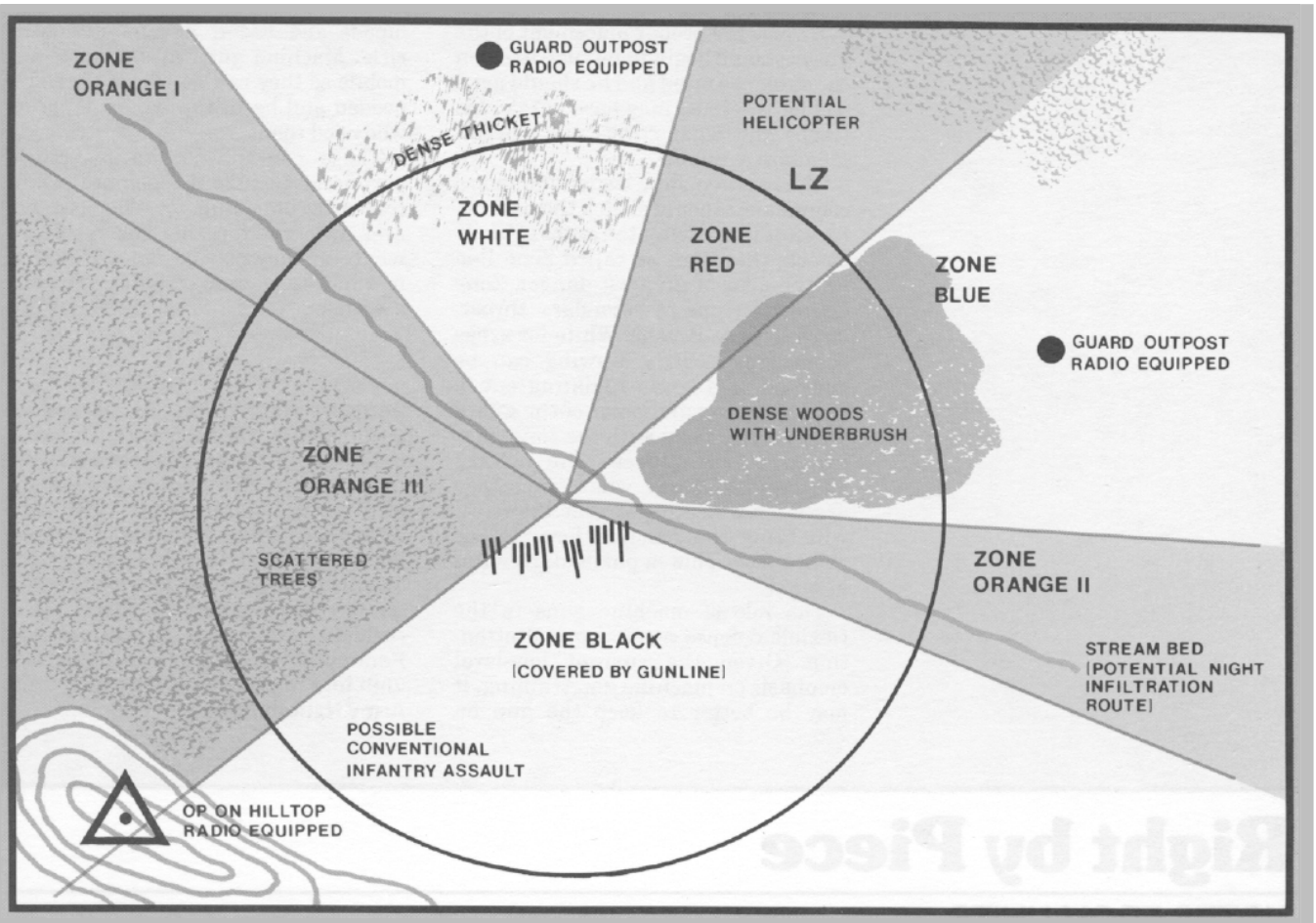
● ***Tactics and Weaponry.*** Since the guard must fire upon the attackers as soon as he sees them, the situation tests the nerve of the individual guard. The shots will hear the enemy as well as the reaction force. Therefore, the guards should be armed heavily. The weapons of choice for a 1-man post is the M203. If it is a 2-man post, an M203 and an M16 or later a SAW (squad automatic weapon) with lots of ammunition are the weapons of choice.

After delivering a heavy full-automatic load of ball and tracer, the guard should smoke the enemy's location using rifle grenades. During this period the reaction force should be guiding on the smoke and moving quickly into a blocking position. The guard should extricate itself using 2 or 3 smoke hand grenades of a different color than their rifle grenades.

The Reaction Force

● ***Organization.*** The reaction force should be made up of battery support elements as much as possible in order to leave the gun sections intact. Unlike the exterior guard whose members change daily, the reaction force must train together and stay together to gain maximum effectiveness. Loosely modeled after the infantry, the reaction force should consist of 2-, 4- or 5-man fire teams; each with a designated junior NCO leader under the control of 1 NCO squad leader. It is important to try to use talented and interested men and not worry so much about the rank of the leaders. A hang-dog, dispirited reaction force is in effect no team at all.

● ***Tactics.*** The reaction team uses standard techniques of fire and maneuver to establish a linear front or to work 1 fire team around to deliver flanking fire on the attackers. Heavy use of full automatic fire, smoke, and rifle grenades can maximize their effort. The goal here is stop the attack then gain the offense by



The reaction force leader and the guard commander identify areas of likely attack and depict them as a circle radiating from the twin command posts.

fire. If the attack is too strong to be stopped, then the reaction force must give the battery time to move to another location. They conduct the difficult retrograde operation, then extract themselves and rejoin the battery later. Again, a few mortars could be of great use in this situation. The reaction force—the attackers—require numerical superiority and great supporting firepower to be successful. They are also hig casualty producers. Assaults will seize and hold ground, and this is not the role of the Field Artillery.

All too often, reaction teams train to rush headlong at an opposing force. Unfortunately, this practice will only help the enemy annihilate our batteries. Reaction teams should learn more sophisticated tactical maneuvers and should then train against a realistic and aggressive opposing force using multiple integrated laser engagement system (MILES) devices.

Perhaps the greatest challenge to the artillery leader is learning how to defend. Analyzing the ground threat, its strength, direction, method; and learning where to defend, where to place the guard, deciding whether to dig or not to dig; and then relating all of this to the terrain at hand seem to present more mystical combinations than Rubik's Cube. Fortunately, we can reduce this puzzle to some order by taking a few concrete steps.

The student of defense must first flush out any preconceived ideas on the size of the perimeter, distance from the gunline to guard posts, placement of machine guns, or on anything else that looks like a formula. He must get his ideas from the land itself. The student must keep only 2 principals in mind:

- *The perimeter has to stop an attack before it can bring the gunline under direct fire.*
- *It must be man-stingy and at the same time effective.*

The next step involves quickly walking around the battery *well out of sight of the gunline.* Planning a defense too close to the gunline is often the mistake battery leaders make.

The student of defense must also apply up to date intelligence to the land. To oversimplify, defending a perimeter from helicopter assault by conventional forces would be a very different problem than defending the same perimeter against night infiltration by guerilla forces operating in a Third World environment.

The former situation might call for increased emphasis on directional entrenchments looking toward a likely landing zone and placement of a very distant early warning team on some high terrain feature. The latter would call for inward-looking fighting holes with attention toward guarding, trip wiring, and mining inward leading infiltration routes such as drainage ditches, ravines and stream beds.

While walking around the battery keeping the threat in mind, the student should imagine how he would attack his own battery. Here, 2 or 3 heads are better than 1. After the guns are laid, the men responsible for perimeter defense should take time to walk the perimeter and discuss all the ramifications of the defensive problem. After developing 1 or more ideas of how an enemy might attack, they can plan to counter it.

By now the proper placement of the guard should begin to intrude itself on the student's mind and he should get a feel for where he may have to take his troops and what cover and concealment are available.

The reaction force leader and guard commander should sketch the perimeter after identifying the areas of likely attack; these can be called Zone Red for the area of greatest danger, Zone Orange for one of secondary threat, down to Zone Blue or White for areas deemed safe. This drawing can be depicted as a circle radiating out of the twin command posts of the guard and reaction force with the zones portrayed as pie-wedges. The outpost guards must know what zones they are in or watching so that their call will bring the reaction force to the right place. This is particularly vital at night.

The role of machine guns in the flexible defense merits special attention. Given the current low-level emphasis on machine gun training, it may be better to keep the gun on bipods and use it as an automatic rifle. Machine guns also have to be mobile so they can go where they are needed and be in the hands of those who need them.

These concepts of an expanded perimeter flexible defense are easily tested by both unit or school troops over different terrain. The results—whatever they may be—may lead to a new how-to manual on battery perimeter defense.

Sergeant Ward Wright, FA, served as a rifleman in the 1st Marine Division In Korea. He has an associate degree from George Washington University, and from 1960 through 1966 was Associate Editor for *Aviation Week* and *Space Technology*. For the past 11 years, Sergeant Wright has been a gunner with Battery B, 108th Field Artillery, stationed in Gettysburg, Pennsylvania. Battery B is part of the 28th Infantry Division (Pennsylvania Army National Guard).

Right by Piece

NOTES FROM UNITS

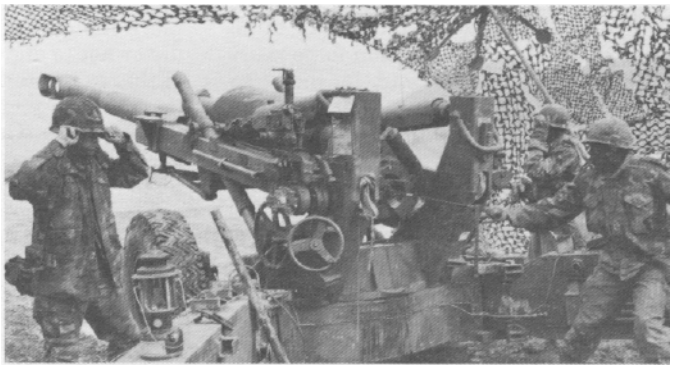
Team Spirit Changes the Pace

SCHOFIELD BARRACKS, HI—The Redlegs of the 25th Infantry Division rarely encounter knee-deep mud, bone-chilling temperatures, and narrow, crowded roads. So their participation in the 1986 version of Team Spirit in Korea presented them a challenging training environment and put a premium on airmobile moves.

The division's gunners understand that 1 of the quickest ways to move an artillery piece to a new position is to lift it by helicopter. "Called a sling-load air assault mission, it is well suited for helping artillery units meet the demands of a changing battlefield situation," according to First Lieutenant Scott Sajer, Executive Officer of Battery C, 1st Battalion, 8th Field Artillery Regiment.

"In an environment like Korea where the road conditions are unpredictable, air assault is one of the most effective ways to travel," Sajer said during a live fire exercise at Saint Barbara Range. "It really improves our ability to react to a changing tactical situation."

The prime movers of the battalion's 155-mm howitzers are 5-ton trucks, but Sajer said it's nice to know the guns have air assault capabilities. "The biggest advantage of the towed howitzer is that it can be lifted, whereas the tracked, self-propelled howitzer can't be."



SGT Darrell Knight fires a 155-mm howitzer while SSG Robert Beale and SGT Leroy Duncan prepare for the blast.

"Normally, we air assault the howitzers, the commander's jeep, and our equipment and ammunition," Sajer said. "The only things we don't lift are the 5-ton trucks. They usually convoy to the next position. We drop our guns in, and they start firing. The trucks catch up later."

It takes a powerful CH47 "Chinook" helicopter to lift one of the heavy 155-mm howitzers. The lighter 105-mm guns of the 2d Battalion, 11th Field Artillery, however, give a commander more options.

"The Chinooks can haul a lot more," said Captain Leslie Belknap, Commander of Battery C, 2-11th Field Artillery. "If we wanted to we could dual-rig 2 howitzers underneath and put 1 inside. The UH60 Black Hawk can't lift as much as a Chinook, but it's faster and more maneuverable. It can get in tighter places; so it's better for direct support artillery."

Soldiers accustomed to the warm climate of Hawaii may find the low temperatures of Korea a bit uncomfortable, but Specialist Four Calvin Colbert, a cannoneer with Battery C, 1-8th Field Artillery Regiment, said the cold weather is a definite plus when it comes to training.

"My battalion has to be ready to deploy anywhere in the Pacific at anytime," he said. "Being able to come to Korea and get adjusted to the cold weather is good for soldiers who are used to a tropical climate. Over here, vehicles get stuck more often because of the mud, and sometimes the hydraulics freeze up. That doesn't happen in Hawaii."

"But it's exciting over here," Colbert added. "This is something you can go home and talk about years from now."

SP4 David Gold, of Battery C, 2d Battalion, 11th Field Artillery, hooks up a vehicle to a CH47 Chinook during an air assault mission.

Brigade Stakes Bolster Pride

HERZO BASE, GERMANY—How do you evaluate all the different types of training done by individuals, sections, and batteries across an entire Field Artillery brigade? How can commanders see how their soldiers and their training measures up to that of other units?

The 210th Field Artillery Brigade answered these questions with their annual "Brigade Stakes." The Brigade recently held its 4th annual Brigade Stakes at Herzo Artillery Base. The competition encompassed 19 different areas of soldiering skills. The units' cooks, medics, communications personnel, and maintenance personnel even participated in an Army training and evaluation program-based testing designed to support the Brigade's standardization program.

Soldiers and sections competed for plaques and certificates. Individual or section-level achievements garnered points for their unit. At the end of the week the unit with the most points received the Commander's Trophy—an imposing 3-foot high brass statue.

Training for Brigade Stakes began directly after REFORGER. Each of the battalions and the headquarters battery held its own competitions to choose their representatives. Each unit could send their 2 best sections or individuals to the "Stakes" to compete in their particular event.

The Brigade Stakes competition also proved a great morale booster for the Brigade. Competition makes things interesting for the soldiers. As 1 soldier said, "It gives us a different aspect for our training."

THE BEST THERE EVER WAS - SGT Chester Ciudad (left), Stinger Team Chief, directs his gunner, PV2 Steven Schaarsschuh during the recent 210th FA Brigade Stakes Competition. Representing the 3d Battalion, 37th Field Artillery, Ciudad and Schaarschuch took first place honors in the Short Range Air Defense event.

At the end of Stakes week the 3d Battalion, 5th Field Artillery walked off with the trophy for 1986, but right behind them were the others, already talking about what next year would bring. 1987 should witness be a real battle for the coveted title of "the best" in the brigade.

Observing Friendly Fire

The combined arms team is demonstrated by these forward observers from the 7th Battalion, 9th Field Artillery. From left are SSG Kenneth Croy, a 10-year military veteran from Harbor Heights, FL, B Battery; 1LT Gray Steelman, Winter Park, FL, C Battery; and 2LT Alexander Smith from Vero Beach, FL, A Battery. (US Army Reserve photo by LTC Bill Harris)

Reservists from Battery B, Port Charlotte, FL, practice parking their howitzers by driving in circles and backing into position. (US Army Reserve Photo by LTC Bill Harris)

Direct Fire!

FORT CAMPBELL, KY—Under the best-case scenarios, Redlegs don't need to train for direct fire missions. However, combat regularly metes up some worst-case situations and places a premium on the Field Artillery section's abilities to shoot over "iron" sights.

The men of the 2d Battalion, 320th Field Artillery understand that fact all too well. That's why they conducted direct fire training after their Army training

and evaluation program-based qualification test recently.

Confidence and morale were already high when the 3 firing batteries rolled onto the observation point. The Battalion had just concluded a demanding evaluation by their division artillery and had done exceptionally well. All battery and battalion fire missions were successful, and 98 percent of all operational tasks had been graded as a "GO" on the initial attempt.

When the exercise was over, the cannoneers of the 2-320th Field Artillery were even more sure of their ability to provide the necessary support their maneuver forces need. Whether they can or can't see the target, it is all the same for those air assault gunners—it's steel on target.

Combined ARTEP—A Delight for Young and Old

RHEDE KROMMONT, Germany—The British are coming! The British are coming! No, it's the Americans! Wait! It's both!

US and UK military forces converged on the Rhede Krommont area last fall as the 570th US Army Artillery Group participated in its annual Army training and evaluation program (ARTEP).

Designed primarily for the 570th, the ARTEP emphasized the communications network between the 2 North Atlantic Treaty Organization countries and included play with the British 8th Regiment Royal Corps of Transport.

The rigorous ARTEP standards provided performance measures and gave American and British commanders critical assessments of the Group's readiness to accomplish its critical wartime mission.

Besides practicing wartime tactics, the Americans and British also achieved better interoperability and enhanced community relations with the local German population. In fact, farmers throughout the area provided cover and concealment with their land and buildings. American and British soldiers in turn took time out to get to know and even help out the farmers.

Alphon Volks' 1,000-acre pig farm, for example, became the logistics headquarters and center of attention for his grandchildren. For these local youngsters, it was the first time they had seen American and British soldiers and all their equipment. The children arrived like clockwork everyday after school to check out equipment and to talk with the soldiers.

"This is what an ARTEP is all about," said Specialist Four Anthony Vito, the 570th's S2 clerk. "We're working with the British and are getting cooperation from the local Germans. I've admired pictures of American soldiers giving candy and presents to the German children during World War II; and now, I'm carrying on that tradition."

SP4 Darryl Taylor, 22d US Army Field Artillery Detachment, lies face down while a British soldier proceeds with an interrogation during the 570th US Army Artillery Group's recent Army training and evaluation program. (US Army Photo by SGT Phil Prater)

Field Artillery Support for the Aviation Brigade

by Captain Robert W. Gargett

An aerial fire support officer may work in the OH 58 "office".

Editor's Note: *The School of Fire Support is developing the doctrine to coordinate fires for the aviation brigade. Therefore, this is only 1 concept of support operations*.

Modern warfare demands that combat leaders fully integrate the flexibility and combat power of the Field Artillery with all maneuver forces. Combining the lethality of the Field Artillery with the mobility, agility, and firepower of Army Aviation creates a potent weapons mix for the division commander to fight and to control his area of operations.

The use of Field Artillery assets in conjunction with attack helicopters is an important, if sometimes elusive, goal. Often, division and brigade fire support elements (FSE) receive late notification of attack helicopter operations or are unfamiliar with attack helicopter tactics and employment. This limits the ability of the FSE to coordinate artillery fires with the attack helicopters and yields an unconscionable loss of combat power. Experience at the National Training Center shows that we simply cannot afford to continue this misuse of our limited combat assets.

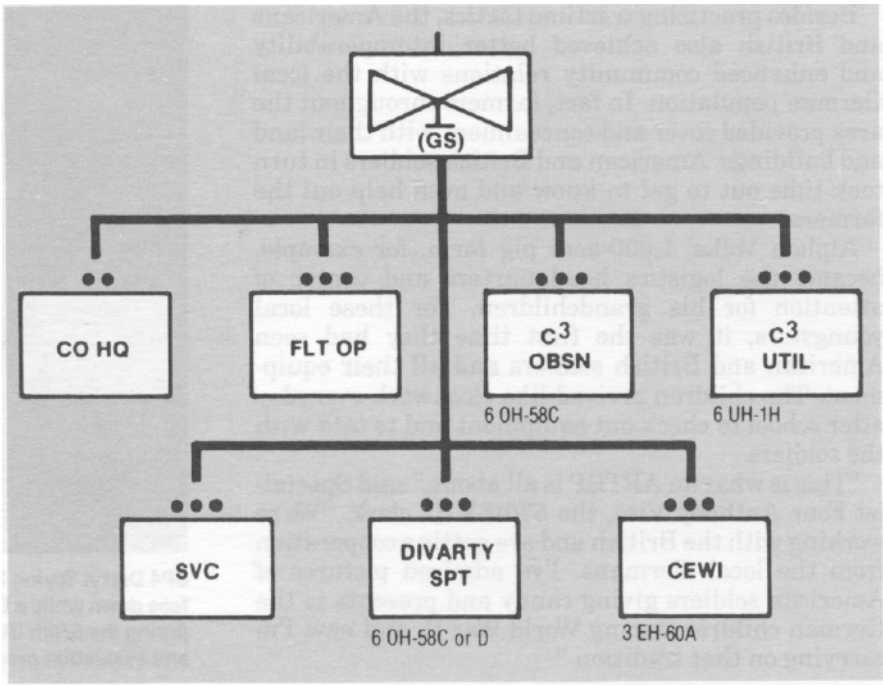
Improved Fire Support Planning

With the advent of the aviation brigade under the Army of Excellence (AOE) design, fire support planning for attack helicopter units should greatly improve. The Chief of Staff of the Army approved a liaison section consisting of a captain and a noncommissioned officer. The liaison section will be organic to the division artillery and attached to the aviation brigade. It will be subattached to the attack helicopter battalion (AHB). These Redleg leaders must not only be skilled in the employment of Field Artillery assets but also be knowledgeable in attack helicopter, air cavalry, air assault, infantry, and armor tactics.

The Aviation Brigade Fire Support Officer

The FSOs within the aviation brigade are responsible for planning and coordinating all fire support operations for their respective elements. They will integrate the use of Field Artillery, close air support (CAS), and mortar assets when available. The aviation FSO must also be familiar with joint air attack team (JAAT), localized suppression of enemy air defense (SEAD), and fire support coordination measures such as airspace coordination areas (ACA) and air corridors. Moreover, the FSO must serve as advisor to the commander on capabilities of both friendly and enemy Field Artillery and Air Defense Artillery systems.

Coordination of SEAD fires is particularly important for aviation operations. Commanders cannot realize



Wiring diagram of a command aviation company, aviation brigade, or a heavy division.

the full potential of attack helicopters unless enemy Air Defense Artillery weapons are suppressed. Localized SEAD targets in Soviet-equipped forces will include the SA-7 and SA-14 missiles at company level and the ZSU-23-4 gun system and SA-9 and SA-13 missiles at regimental level. Working closely with the S2, Army Airspace Command and Control (A^2C^2), and the division artillery FSE to coordinate SEAD targets, the aviation FSO can ensure that adequate fires in sufficient volume on proper targets are available to support cross-forward line of own troops (CROSS-FLOT) operations.

The brigade FSO will also train AHB scout pilots and aeroscout observers on observation-fire techniques. These aviators, in their OH58 helicopter platform, will be the primary source of fire mission requests during attack helicopter missions. Scouts may complete their training through aerial adjustment of artillery fires during division artillery field training exercises or by using the observed-fire trainer.

Aerial Fire Support Officers

Under the AOE design, heavy divisions will have 6 Redlegs at the division artillery headquarters and headquarters battery to serve as aerial fire support officers (AFSO). They will provide the division with an extremely mobile leader for target acquisition, target attack, battle damage assessment, and real time intelligence collection. His heliborne mobility allows the AFSO to be diverted from 1 mission to another on-call mission anywhere on the AirLand Battlefield.

With the fielding of the OH58D Army helicopter improvement program beginning in 1987, the role of the AFSO will become even more important. The OH58D carries a laser target locator-designator, a target sighting system, an inertial navigation and location system similar to the position azimuth determining system (PADS), and a built-in airborne target handover system (ATHS) similar to the digital message device. This suite of systems will allow the AFSO to serve as a target designator for Copperhead and Hellfire precision-guided munitions, as a forward observer for conventional artillery fires, and in a secondary role for route and area reconnaissance officer. The AFSO's OH-58D aircraft will belong to the division artillery support platoon of the aviation brigade command aviation company. Assignment as an AFSO will require the officer to become an expert on his aircraft and systems. Aerial fire support coordination will no longer be an additional duty. In fact, the certified OH-58D AFSO will attend special schooling at both Fort Rucker and Fort Sill and meet minimum flight standards for a flight crew member. These minimums will include 70 hours semiannually of flight requirements, completion of oral, written, and practical flight evaluation; and successful completion of a Class II flight physical. Training ammunition allocations for division artillery units have been increased with the addition of 110 rounds per year per AFSO to the division artillery standards in training commission for support of AFSO training.

The AFSO can designate artillery fires on the AirLand Battle using the advanced command and control and target acquisition equipment on the OH-58D.

Unfortunately, these officers may be employed at division artillery headquarters as assistant S3s or unit motor officers. Such assignments may well limit their training time at their TOE posts. The division artillery and aviation brigade commanders must place emphasis on AFSO training. This will improve the division's ability to conduct the battle based on the AFSO's increased familiarity with his equipment, procedures, and duty requirements.

The Aviation Commander

The aviation commander is the senior controller of all attack operations for his unit. This officer is responsible

for coordination of all Army aviation, CAS, and Field Artillery assets during a JAAT mission. Experience at the National Training Center has shown that the most successful JAAT operations are conducted with an AFSO available to assist in coordination for artillery support.

The AOE organization allocates an air liaison officer (ALO) at the AHB. He would normally be located at the battalion tactical command post and could effect liaison for the aviation commander. The combined efforts of the team will ensure that targets are properly identified, communication nets are established, and ammunition is available to support the mission.

To assist brigades and battalions in Europe, the Air Ground Operations School (AGOS) and the Joint Combat Operations Course (JCOC), taught by the US Air Force at Sembach Air Force Base, are available to train personnel in JAAT and CAS employment techniques and considerations.

Testing the Aviation Brigade Concept

In August 1986 the 308th Attack Helicopter Battalion from the 4th Brigade (Aviation) of the 3d Armored Division deployed to Hohenfels Training Area for an Army training and evaluation program (ARTEP). This training event provided the first opportunity for the 3d Armored Division to test the aviation brigade FSE concept under realistic conditions.

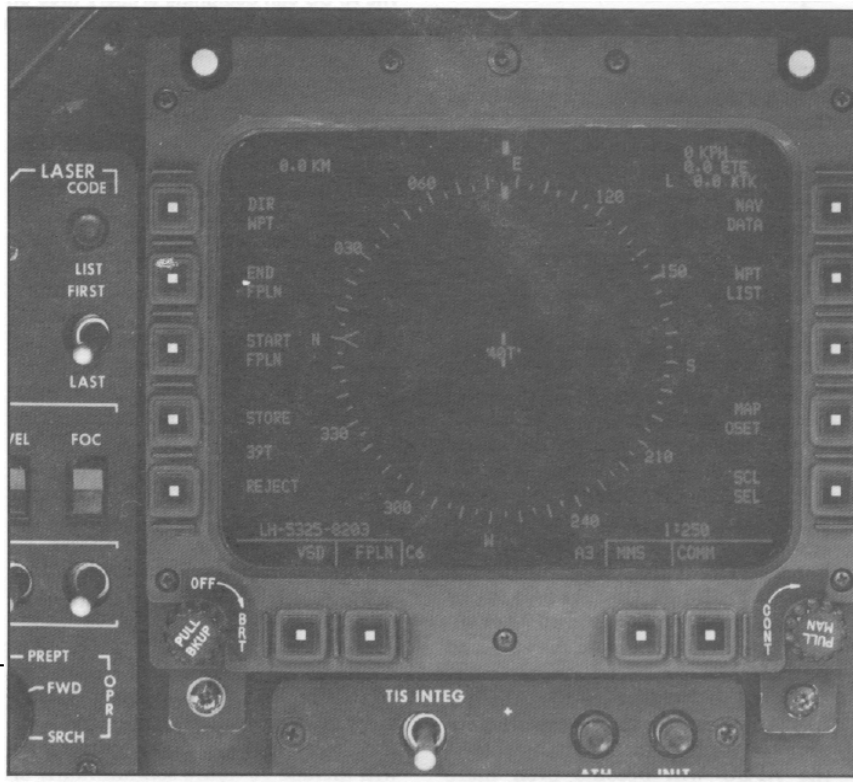
During the ARTEP, the attack helicopter battalion OPCON to the 1st and 2d Brigades conducted attack operations during force-on-force problems. The attack helicopter battalion assisted the maneuver brigade FSEs by providing technical knowledge and experience in coordination of attack helicopter operations. This prevented serious tactical and technical errors in the employment of Field Artillery assets in support of the attack helicopter operations.

The operation revealed a general lack of understanding of the special needs and requirements facing the Field Artillery in support of attack helicopter operations. This lapse results from an education system that stresses the ground force requirements for fire support while touching only briefly on the 3-dimensional aspect of fire support.

The unit experienced 3 major problems in planning the use of artillery support.

Bell Helicopter

The mast-mounted sight on top of the OH-58D — the Army Helicopter Improvement Program (AHIP).



Bell Helicopter

The FAAFO console in the AHIP.

Bell Helicopter

The OH58D's multi-function operator's screen.

- It failed to protect the attack helicopter battalion as it went across the forward line of own troops (FLOT). One flank of the air corridor was left fully exposed with no suppression of enemy air defenses (SEAD) fires planned.
- Planners also erred when they developed targets inside the engagement area where, if the missions had been fired, the smoke and dust would have screened the target and prevented the attack helicopter battalion from acquiring the enemy.
- What's more, no one planned for an egress route for the attack helicopters after they had expended most of their ammunition. The attack helicopter battalion fire support officer detected the initial planning errors with sufficient time to correct them and prevent a needless waste of equipment, ammunition, and personnel.

Still more problems surfaced in the communications arena. Communicators have developed doctrinal communication nets for the interaction between the AHB FSE and the direct support and general support battalions and division artillery. However, unit leaders had not tested the liaison and communication channels required to ensure that the brigade FSE, the OPCON attack helicopter battalion, and the supporting division artillery direct support battalion were coordinated in their actions.

The ARTEP participants learned that the attack helicopter battalion's FSE should monitor the brigade fire support net, the fire direction net for the direct support and general support unit supporting the unit, and the attack helicopter battalion command net.

Coordination during the Hohenfels exercise also showed that the use of a voice fire direction or fire support control net, while possible, slowed the response time for the attack helicopter battalion's calls for fire. The aviation commanders normally used unsecured radios to contact the brigade FSE, thus forcing the fire support element to switch radio modes on the secure devices for response. Combined with the volume of fires already generated by the maneuver battalions, this produced an average 5-minute lag before a mission was acknowledged by the brigade FSE. In addition, the lack of sufficient TOE radio equipment for the attack helicopter battalion FSE made it difficult to monitor the fire direction net and to provide appropriate clearances.

Conclusion

Currently, both the 4th Brigade and the division artillery FSEs are working together to solve these important fire support coordination problems. Providing quick, devastating response on the battlefield is one of the most important abilities of the combat aviation brigade. Through the coordination of Field Artillery fires Redlegs can greatly improve the overall level of fire support to the division and provide a better opportunity to destroy the enemy throughout the covering force, main battle, and rear areas.

Captain Robert W. Gargett, FA, is assigned to the 3d Armored Cavalry Regiment and Fort Bliss, Texas. He is a graduate of both the Field Artillery Officers Advanced Course and the Combined Arms and Services Staff School. He has served with 3d Armored Division aviation units and the 2d Infantry Division Artillery.

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