Field Artillery

A Professional Bulletin for Redlegs

October 1994

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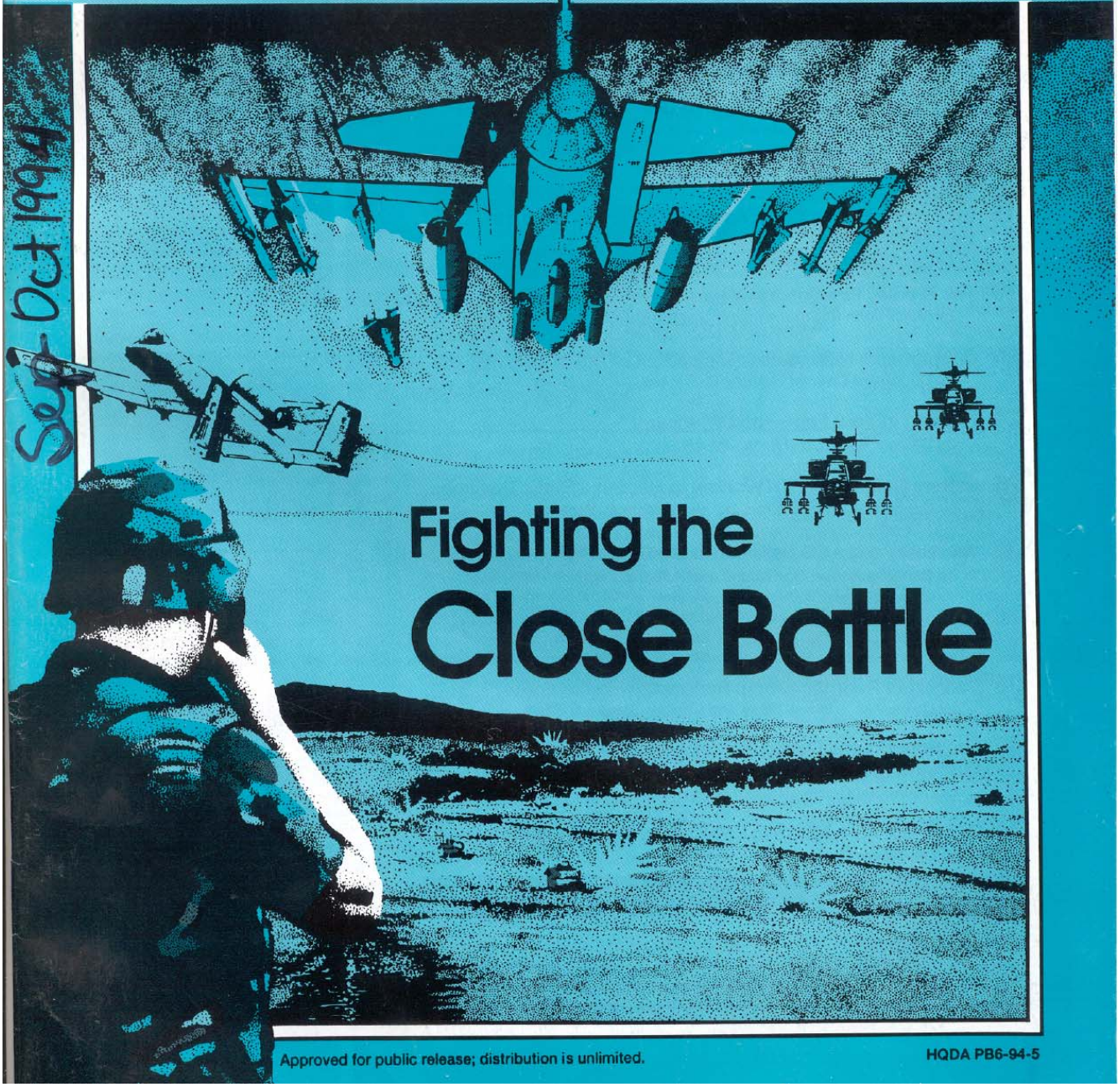

Fighting the Close Battle

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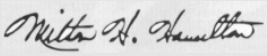

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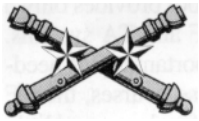

Close Battle Future

The next artilleryman who steps in harm's way must know how to fight the close battle of the future. On future battlefields, close, deep and rear operations, as we know them today, will become indistinguishable—fused into a single, seamless battlespace—one extended battlefield. Some of the dynamics creating this one zone of conflict are already here; others will emerge before the turn of the century.

A Joint Battle. One essential characteristic of close combat won't change: it will be joint. Commanders at the task force level will fight with the weapons of two or more of our armed services. In the future as battlespace becomes seamless, joint warfighting will become an even greater imperative. Commanders and fire support coordinators (FSCOORDs) at all levels must be prepared to think and fight with a joint perspective.

> *"On future battlefields, close, deep and rear operations . . .will become indistinguishable—fused into a single, seamless battlespace—one extended battlefield."*

An Integrated Battle. The potential of joint forces combined with emerging capabilities will allow commanders to dominate the enemy throughout the battlespace. Commanders will be able to exploit the advantages of a fully digitized force to extract the combat information required for rapid, accurate decisions. On a battlefield where every soldier can be a sensor, commanders also will be able to extend their ability to see the battle farther than ever before. Armed with a superior decision-making capacity, commanders will demand weapons that can exploit their decisiveness with "hair trigger" responsiveness. This dynamic is reshaping the artillery for the future.

Artillery in Close Combat. Artillerymen in the next fight will find themselves operating in proximity to Armor and Infantry. Physically grouping these forces together will enhance their ability to maneuver and protect themselves—acting as a single unified team. Artillery will be part of a moving "hornet's nest" of combat power, directly involved with clashes with the enemy.

The effects of artillery in the close fight, will extend far beyond the immediate engagement. In the future, artillery weapons with increased range, precision and responsiveness will engage a corps deep target one minute and fire a brigade close support mission the next. Weapons will be able to provide a spectrum of effects, from lethal blast to precision strike. Commanders will have the means to influence the enemy with indirect fires that can cover every corner of the battlefield—not to strike every target, but to dominate the enemy with superior fires at the decisive point.

As control of the battlespace heightens, the increased role of fire support will become evident. Some of the current fire support tasks will become transparent. The expanded situational awareness of the digitized force will allow commanders to vector fires without clearing them at each level of the fire support system. In the future close fight, a FSCOORD will spend less time executing targets and clearing fires and more time working with the commander synchronizing fire support assets to meet the commander's intent.

The dynamic of a single, seamless battlespace also will lead us to reconsider doctrinal concepts. Artillery tactical missions and their inherent responsibilities, for example, may need to be modified to adjust to a battlefield geometry where responsibility is not defined by neat black lines on a one-dimensional map. Future concepts may think in terms of allocating fires for specific tasks rather than allocating artillery forces to specific units.

Designing a Future Artillery Force. Today, as part of the Army's Force XXI effort, we are refining our vision of the artillery force of the future. Key to this effort are the advanced warfighting experiments (AWEs) designed to identify doctrinal, organizational and materiel requirements for an Army only six years away from the next century.

The Field Artillery will participate extensively in the AWEs. Experiments may include alternate structures for task force fire support with only fire support team (FIST) lieutenants organic to the company-team and the observers consolidated in a pool at the task force level. Other tests will explore establishing digital quick-fire links between individual tanks and Paladin howitzers for tactical situations that require responsive engagement without massing fires. These experiments will help design the artillery for the future close fight.

I expect concrete results from these efforts. In the short term, I anticipate new tactics, techniques and procedures (TTPs) that will increase the agility and tempo of fire support. In the long term, I expect to refine doctrine and develop new organizations and equipment that will result in a more lethal, versatile and deployable artillery.

A Team Effort. Your training today can, and should, be oriented toward meeting the requirements of close combat's future. All artillery, from direct support howitzers to multiple-launch rocket system (MLRS) launchers armed with Army tactical missile systems (ATACMS), should train as an integral part of close operations. For example, corps artillery units must be prepared to march in a maneuver brigade formation as part of a 200-kilometer operational move. MLRS platoon operations centers (POCs) must be able to obtain maneuver brigade graphics so their operational areas dovetail cleanly with the brigade's scheme of maneuver—even though their launchers may not be supporting the brigade directly.

The battlespace of the future is evolving today. This does not mean it's time to jettison current doctrine and proven TTP. But, it does require a Field Artillery team effort to assess and exploit potential capabilities for the future force.

Counterfire in the Close Fight— Are We Shortchanging Our Key Players?

As observer/controllers (O/Cs) at the Combat Maneuver Training Center in Hohenfels, Germany, we see problems with the counterfire [CF] system in the close fight. Counterfire is either an afterthought and implemented too late or not used at all. The result frequently is the enemy artillery destroys a large portion of the friendly unit's combat power.

Why don't fire supporters effectively use their target acquisition (TA) and CF systems on the CTC [Combat Training Center] battlefield? We think one of the primary reasons is the schoolhouse doesn't effectively instruct our officers and NCOs on the capabilities of those systems.

The Problem. Knowledge of the CF system is lacking because there's very little formal education on the subject. Counterfire is really just another tool we use to *protect the force.* The intent is to prevent an enemy's fire support system, including his artillery, from effectively supporting his maneuver forces. This may be in both the deep and close fights.

The CF system is made up of several parts: the acquisition systems (Firefinder radars, electronic warfare assets, USAF systems, etc.), the firing systems (cannon, MLRS, USAF aircraft, etc.), and the command and control nodes (direct support, or DS, battalion; division artillery and Field Artillery brigade CF processing cells, etc.). These systems must work together to produce the result we want—defeat enemy fire support.

Those positions that bring Field Artillerymen into contact with the CF system (fire support officers, or FSOs; DS battalion S2s and targeting officers; division artillery and Field Artillery brigade CF officers; and the NCOs working with those officers) must understand the system. FSOs must consider the effectiveness of enemy indirect fires on maneuver operations and plan to reduce that effect. If the FSO doesn't know the capabilities of weapons locating radars, how can he effectively use them to support his operations? Can he effectively plan and use "critical friendly zones," "call-for-fire zones" and other radar capabilities if he doesn't know what they are and what they'll do for his operations?

Many of the officers assigned to be FSOs, DS battalion S2s or targeting officers and division artillery and Field Artillery brigade CF officers are junior officers fresh out of the Field Artillery Officer Advanced Course (FAOAC) at the Field Artillery School, Fort Sill, Oklahoma. In a DS battalion, many of the officers are senior lieutenants and junior captains who have not yet attended FAOAC.

Current Training. In both the Field Artillery Officer Basic Course (FAOBC) and FAOAC, the school provides only a basic overview of CF and TA systems. With many other important topics needing instruction in these courses, the CF system is limited to a few hours and little detail. CF system instruction fares no better in the Basic NCO Course (BNCOC) or in the Advanced NCO Course (ANCOC) at the NCO Academy at Fort Sill. The school does present a two-week targeting course that covers the CF system, targeting and the decide-detect-deliver targeting methodology, but few officers and NCOs serving in the positions mentioned are able to attend this course.

Last year, the Army approved the implementation of a new assignment strategy for TA warrant officers that's designed to help spread CF and TA expertise to units in the field. This new strategy assigns TA warrants to several targeting officer and CF officer positions now held by commissioned officers. The TA warrants will bring experience and specialized knowledge to the jobs, but we can do more to assist our FSOs and DS battalion S2s who have not received formal training on the CF system.

Currently, the primary means of gaining an understanding of the CF system is on-the-job training (OJT). Of course OJT is an important part of any job or position, but it should not be the only source of instruction.

Solutions. How can we help the CF system better support operations in the close fight? We must start with education. The school should increase the

Course	Instruction	Duties in the Field
• Field Artillery Officer Basic Course (FAOBC) • Basic NCO Course (BNCOC)	• Basic Capabilities • Terms • Planning Considerations	• Company Fire Support Officer (FSO)/ Fire Support NCO (FSNCO) • Radar Platoon Leader • CF Target Processing NCO • Direct Support (DS) Battalion S2
• FA Officer Advanced Course (FAOAC) • Advanced NCO Course (ANCOC)	• Detailed Capabilities • Employment Considerations • Command and Control	• Battalion/Task Force FSO/FSNCO • Division Artillery/FA Brigade CF Officer/NCO • Target Acquisition Battery Commander • Radar Platoon Sergeant • CF Target Processing NCO-In-Charge • DS Battalion S2 • DS Battalion Targeting Officer
• Targeting Course	• Decide-Detect-Deliver Methodology • Detailed Planning Considerations	• Brigade FSO/FSNCO • Battalion/Task Force FSO/NCO • Division Artillery/FA Brigade CF Officer • DS Battalion S2

Proposed Field Artillery School Instruction for Counterfire (CF) by Course and Level of Responsibilities and Duties.

amount of time and detail spent instructing students on the CF system (see the figure). Officers and NCOs graduating from FAOBC, FAOAC, BNCOC and ANCOC must have a working knowledge of the CF system.

Units in the field should make better use of the targeting course by regularly sending officers and NCOs to it. At a minimum, every officer assigned as a task force or brigade FSO or as a DS battalion S2 or targeting officer should attend this course. The course may need to expand to meet this increased attendance, but the payoff is increased CF effectiveness in the field.

Until the new TA warrant officer assignments reach the field, units should take advantage of the expertise of the TA warrants assigned to TA batteries and detachments. These officers can provide a great deal of tactical and technical advice. Units can use them to teach professional development classes, help develop training plans and produce OPLANs [operations plans] and OPORDs [operations orders] that effectively employ CF assets.

Finally, we should improve the discussion of CF and TA systems in our doctrinal and tactics, techniques and procedures (TTP) manuals. *FM 6-20 Fire Support in the AirLand Battle, FM 6-20-10 TTP for the Targeting Process* and our fire support TTP manuals for every level should address capabilities and planning considerations of CF and TA. Maneuver manuals *(FM 71-2 The Tank and Mechanized Infantry Battalion Task Force* and *FM 71-3 Armored and Mechanized Infantry Brigade)* should do the same. Our manuals should give the FSO the detailed information he needs to work the system properly, and FMs 71-2 and 71-3 should give the maneuver commander a basic understanding of how the system works and what it can do for his operations.

Conclusion. The increasing effectiveness of artillery and other fire support systems worldwide makes the effectiveness of counterfire critical to success on the battlefield. Protecting the force must be a top priority of our fire support system.

Using the CF system to support the close fight is a tough mission, but if we give our soldiers the knowledge and resources to accomplish this mission, they can and will succeed.

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Problems of CAS in the Post-Cold War Era

☞ ***Editor's Note:*** *The author of this letter served with the 3d Battalion, 75th Ranger Regiment in Mogadishu, Somalia, in 1993 and was wounded in the famous 3-4 October battle in which several US servicemen lost their lives or were taken as hostages. Until his recent branch transfer to Infantry, Captain Lechner was a Field Artilleryman and served as a Fire Support Officer for four years in both heavy and light units.*

In any conflict involving US Army ground forces, the troops on the ground will need close air support (CAS). Both fixed and rotary wing aircraft can be used for this task. However, based upon its weapon systems and ordnance lethality, the US Air Force can only safely and effectively provide CAS to within a very limited proximity of friendly troops; "Table 6-4 Risk Estimate Distance (Meters)" on Page 6-7 of *FM 6-20-20 Tactics, Techniques and Procedures for Fire Support at Battalion Task Force and Below* outlines those distances. The limitations of CAS with most fixed-wing aircraft and ordnance provides the enemy a relatively large zone in which to operate unhindered by the potentially devastating effects of aviation assets.

This problem was emphasized early in the Vietnam War, but it was solved by the advent of the helicopter gunship. By their tactical application and specifically designed procedures, helicopter gunships were able to bring rocket and automatic weapons fire onto the enemy to within extremely close proximity of friendly troops—in fact, to within a few meters of their perimeter. Today, the aviation community quickly passes through CAS procedures in initial pilot training; a CAS capability does not realistically exist within the conventional US Army.

After the Vietnam War, as the focus shifted to the heavy forces of Europe and the Middle East, so shifted the tactics of Army aviation from CAS to long-range, anti-armor weapon systems and pop-up, stand-off shooting. This trend continued and was solidified by the creation of an Aviation branch and the establishment of attack helicopters as maneuver elements. While these systems and tactics remain relevant in the post-Cold War era, there existed then and continues to be a tremendous need for CAS from conventional Army aviation assets for ground forces. For its part, the fire support community neither maintains standards or procedures nor conducts any authoritative training of forward observers (FO) in regards to CAS with attack helicopters.

The result of the Army's neglect of CAS is that units attempt to work out ad hoc procedures prior to or even during training exercises. It has been my experience that if the FOs are trained and prepared to use attack helicopters (which is rarely the case), then the aviation assets are untrained or unprepared to execute CAS. When both sides are prepared to conduct CAS, the ad hoc procedures have resulted in unsound and detrimental tactical applications, such as attack helicopters maintaining a hover over ground units or attempting to fire from six kilometers away, resulting in fratricide. The manifestations of the Army's problems with CAS have not only revealed themselves in training but, unfortunately, in combat as well.

The Army's deficiency in CAS with attack helicopters has dramatically presented itself in a number of recent conflicts, but most notably Somalia. In Somalia, conventional Army aviation assets were used to ill effect against unconventional guerrilla forces in a MOUT [military operations in urban terrain] environment. Based upon the previously noted lack of doctrine or procedures, the FOs on the ground were unable to control the fires of the attack helicopters. Additionally, the AH-1 Cobra series helicopters used had mainly anti-armor weapon systems.

As per current doctrine, these gunships provide area fire or engage point targets from long ranges. Both these methods of engagement were inadequate for the situation that involved dismounted friendly troops engaged with small units or individual gunmen. The inadequacy was compounded by the fact that civilians were always in close proximity and often mixed in with the target.

When hostile fire was taken or units called for support from the gunships, either area fire was used with rockets or TOW [tube-launched, optically tracked, wire-guided missiles] and cannon were fired from long ranges at point targets. These applications provided a number of problems. Among these is that friendly troops cannot safely be within 500 meters of the target if the helicopters use their

2.75-inch rockets or 20-mm cannon. This is due to the fact that the weapon systems, as currently employed, have a large dispersion pattern.

The TOW missile can very accurately engage point targets but was designed to kill tanks. In Mogadishu, it was fired from long range and often deeply penetrated neighborhoods. The result of these applications was one of the worst examples of trying to "use a sledgehammer to kill a fly." Unfortunately, civilian casualties and collateral damage were inordinately high.

Another important problem that these applications present is that the helicopter gunships rarely have a visual fix on friendly troops when they fire at the enemy. This is one of the basic lifesaving tenets of CAS and should not be violated.

Somalia is not a unique situation as far as the tactical scenario goes. Many of the problems encountered by US troops would arise in any conflict when fire support is needed from conventional Army aviation assets. The problem is a direct result of current doctrine and procedures or lack thereof.

The solution is to first recognize the fact that a CAS deficiency exists. Also, we must acknowledge that aviation doctrine and training is oriented toward the heavy mobile threat and that those techniques and procedures *alone* are inadequate for CAS.

The interdiction of the second and third echelons of a heavy force is a critical task performed by attack helicopters. However, it does not fully satisfy the needs of a platoon in contact and has little, if any, purpose in an unconventional environment. This is especially true based upon the prevalent threats of the current era. Having come to these realizations, the conventional army must adopt and maintain the proper techniques for conducting CAS.

The Army's fire support and aviation communities should jointly amend, proscribe and publish doctrine and procedures for CAS. This jointly developed and agreed upon doctrine will provide units in the field a cornerstone upon which to begin training and the procedures to give them direction along with standards for application.

To do this the Army does not need to reinvent the wheel. The fire support and aviation communities should look to US military forces outside of the conventional Army that have used procedures for CAS with attack helicopters for many years. The most widely used and simplest technique is similar to a polar mission given to indirect fire assets. This simple technique is the standard rotary-wing CAS procedure for the Special Operations Command and the Marine Corps, which refers to it as close-in fire support (CIFS).

The basic CIFS mission requires the friendly ground unit provide the pilot with a visual mark to its location (strobe light. VS-17 panel, smoke grenade, etc.) Having identified this, the pilot is given a magnetic direction and a distance from the friendly unit to the target. A target description then is transmitted by the friendly ground unit and includes, if possible, how the target will be visually marked for the pilot. The target is marked for the pilot with a visual aid, such as tracer fire or rounds from a MK19 or M203. Given this information, the pilot flies generally over the friendly unit prior to firing, maintaining positive identification of the unit, and continues on the given azimuth to the target.

While the control of attack helicopters will require FO training, the greatest change the Army will have to make is to modify the procedures helicopter pilots use for firing runs. As previously discussed, current doctrine calls for long-range, stand-off shooting while in relatively level flight. In the performance of CAS, pilots would be required to fly much closer to the target while overflying the friendly ground unit and dive a short distance onto the target. The proximity to the target will cause a significant change in the angle of attack. When this is done, weapon systems such as the 2.75-inch rocket and 20-mm cannon will have a greatly reduced dispersion pattern and become deadly accurate.

These techniques and procedures are relatively easy to learn and implement, but they must be done habitually and executed in a realistic training environment. CAS historically has held the greatest potential for fratricide of any task performed by a combined arms team.

The adoption of these techniques and procedures is greatly needed by the conventional Army. It will always need CAS from its aviation assets when its ground forces are involved in combat. The need for effective CAS will continue to be more and more relevant as our forces are challenged more often by enemies of conventional infantry and guerrilla forces.

CPT James O. Lechner, IN
Formerly with the 3-75 Rangers
Fort Benning, GA

Video Imaging Projectiles—An Idea Whose Time Has Come

I read the article in your February 1994 issue on "Video Imaging Projectiles for Future Battlefields" [by Major Anthony J. D' Angelo and Mr. Timothy M. Kogler] with much interest because back in 1964. Project Michigan reported a study and some laboratory tests on just such an idea (Scan Shell: Institute of Science and Technology, University of Michigan). It also was reported in the *Field Artillery Journal* (March-April 1978). Probably the effort to use a bit of humor in a serious journal made the idea sound too fanciful at the time. The only reaction we got at the Field Artillery School was "What! Another type of ammunition to be supplied?"

The emphasis of the study was on optics and the required and obtainable resolution of targets using the infrared detectors and electronics available then. From the study and laboratory simulations, the idea was feasible even then, but neither the various Army laboratories nor the Field Artillery School showed any interest.

By using infrared detectors, such a scanner would operate day or night and, in addition, would pick out hot objects, such as truck engines and recently fired gun tubes, as well as craters of recently fired shells that could be used for adjustment.

It seems to me that putting a global positioning system (GPS) in the same projectile as the scanner is a bit redundant, not to mention rather expensive, because the information necessary for artillery use can be obtained from the video image in polar gun coordinates. Locations can be converted to map coordinates by conventional methods with adequate accuracy for other tactical purposes.

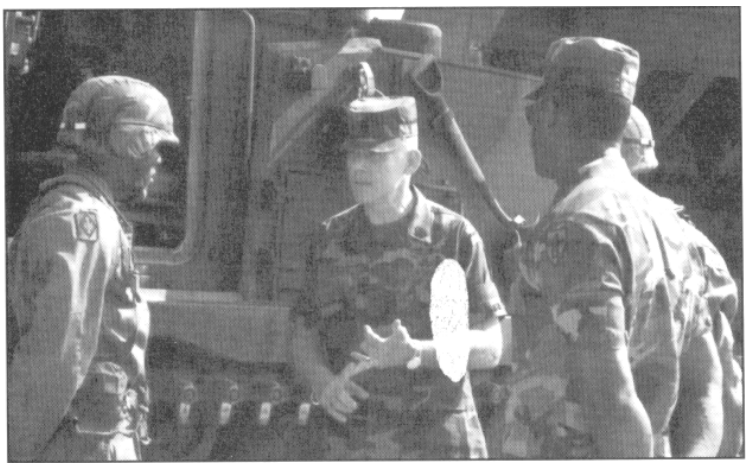
COL(R) Arthur R. Hercz, FA
Ann Arbor, MI

Sergeant Major of the Army Richard A. Kidd

The Army— *Bringing Order to Chaos*

Interview by Patrecia Slayden Hollis, Managing Editor

Q *You just returned from a trip to Rwanda with the Chief of Staff of the Army where you saw firsthand the relief operations [August, 1994]. Can you tell Redlegs briefly what our soldiers are doing over there and how they feel about their involvement in Rwanda?*



SMA Kidd (center) talks to SGT Dwayne Clopton (left) of A/6-27 FA (MLRS) as CSM James McKinney, CSM of the FA and Fort Sill, and SGT Eric Schuler, also of A/6-27 FA, look on.

A US servicemen primarily are setting up systems—food and water distribution, hygiene, medical care—to help the masses of refugees. We have some 2,000 US military personnel in Rwanda, about half of which are soldiers. Their mission is to save lives by setting up the systems for civilian relief organizations to operate and help those organizations encourage the refugees to return home.

We've had to take the large number of Rwandan refugees and break them out into smaller camps some distance from each other to establish the facilities and services they need and help stop the spread of disease. We've built the camps, and once the systems are established, we'll step out and let the civilian organizations continue the humanitarian effort.

Our soldiers feel good about their participation in the relief operations because they can see tangible results—fewer deaths and a tremendous upgrade in the refugees' quality of life. Our soldiers are working extra hard in Rwanda—pushing—because for every bit of effort they exert, they save lives and see hope return to the refugees, see the population starting to come back.

While the Chief and I were in Rwanda, we were able to drive down the roads without dead bodies lying all over the place. Now, when someone dies, they're buried very quickly and treated with dignity, preventing the spread of diseases and greatly improving overall conditions.

We were a little concerned, as a matter of fact, about how our soldiers would feel about seeing all the death and disease—the desolation of such a mass of people—and the effect it would have on them. But, perhaps, the desperateness of the situation actually inspired them to work so hard, so fast to improve the situation as quickly as possible. While we were in Rwanda, some stores were starting to reopen—a *tremendous* improvement.

Q *What makes the Army the "force of choice" for such operations?*

A We bring order to chaos. Because our primary and most difficult mission is combat, the Army is adept at packaging capabilities for any type of contingency. And we come into an area, such as Rwanda, totally capable of operating in a harsh environment and sustaining ourselves with internal logistics, command and control, communications and medical networks—they're built into all our operations. You can superimpose those capabilities over any kind of mission: peacekeeping, peacemaking, nation building, humanitarian, emergency relief and others. Without putting any additional pressure on the situation, the Army can come in and use its capabilities and organizational skills in any operation to help get an emergency under control.

Let me give you another example. During Hurricane Andrew relief operations in 1992, I talked to civilians down in Florida who said the very first thing they noticed was that the military was well-organized. The military, including two battalions from the 10th Mountain Division Artillery, brought control—right away. With the situation under control, you can start solving immediate problems and then look ahead, be proactive. The civilians said the chaos quickly decreased, and they started to become confident that things were going to get better—the military gave them back their hope.

So in Rwanda and in Florida, we brought order to chaos—just by the fact that we're self-sustaining and well-organized, have a system for doing everything. Those capabilities make us the force of choice.

Q *When do you expect the Army's downsizing to end, and how long do you think it will take the Army to normalize promotions across the NCO rank structure?*

A I'll deal with the second part first—it depends on what you mean by "normalize." Promotion rates always have varied from MOS [military occupational specialty] to MOS, even when we weren't downsizing. Though not all MOS had the same percentage of the population picked up for promotions, the numbers are pretty close. It's the attrition rate that causes

some MOS to look like they have more promotions. For example, combat arms MOS normally have a greater attrition rate, so promotion opportunities appear to be greater in those MOS.

Now what *has* skewed the promotion process is the force structure going out during the downsizing. If an MOS had a slow attrition rate and its structure was reduced, then all of a sudden it had a larger number of people than positions—more faces than spaces. It takes a while to build down because, as the spaces go away, we don't make all the people leave the Army. We let that happen through normal ETS [expiration term of service] and retirement, offers of VSIs [voluntary separation incentives] and the SSBs [special separation bonuses]—those kinds of things.

We've worked very hard during the downsizing so we wouldn't have the "fearful freeze" on promotions. We've managed that, I think, very well. We've even had several months during the three or so years of downsizing where we've had better promotion rates than when we weren't downsizing. We've been able to keep promotions moving.

Now as far as when the downsizing will be over—probably we'll "normalize" around 1997. That's the year we should reach the objective force of 495,000 soldiers. The Chief of Staff of the Army says we're about 95 percent there.

Of course, the last five percent could be very challenging because we've offered all the VSIs, SSBs and other programs; all the soldiers who wanted to get out under those programs have pretty much left the force. We're trying to encourage soldiers in overage MOS with slower promotions to consider moving over into another MOS that has a shortage. That does two things: the soldier in the shortage MOS has a better opportunity for promotion faster and his addition to the MOS shores up an Army shortage. So everybody wins.

Through the toughest portion of the drawdown, we've managed to meet the mandates without forcing enlisted soldiers out. We're hoping to be able to continue the downsizing in the enlisted ranks totally voluntarily.

Q *What guidance would you give NCOs during this last drawdown period in terms of competitiveness?*

A I'm frequently asked, "What does it take to be competitive in the Army?"

> ***"You've got to love being a soldier. Love being around other soldiers—leading, training and caring for them..."***

I can describe what it takes: You've got to love being a soldier. Love being around other soldiers—leading, training and caring for them and their families. Be dedicated, motivated, physically fit, mentally alert and morally straight. Be technically and tactically proficient. You must believe in your nation, your Army and your fellow soldier. And if you're in a leadership position, you must want the same for everyone in your charge.

Now some soldiers might complain, "But that doesn't tell me exactly what to do." And my response is, "Yes, it does." If you apply that description, live by that description, then everything you do will be to the best of your ability. You'll push yourself to the limits of your potential and look for the tough, demanding jobs to demonstrate your abilities. In doing so, you will be a person the Army will work very hard to ensure stays around. You can't just slide by in today's Army—you've got to want to be in the Army—be all you can be.

Q *What is the purpose of the SDT [self--development test] as you see it?*

A The SDT was established as the self-development pillar of the three pillars of NCO professional development, which also includes NCOES [NCO educational system] and operational assignments. The SDT was to encourage soldiers to read their manuals to ensure they were totally aware of all the tasks and equipment in their MOS.

During Desert Shield and Desert Storm, we discovered that soldiers had become very specialized within an MOS. But a soldier can be sent to another unit or into a war zone and wind up operating MOS equipment he hasn't worked with before. So we wanted a test, a system, to require soldiers at least to be familiar with all of the equipment and tasks in their MOS.

The purpose of the SDT is valid; however, we've run into a few problems. As a matter of fact, this year the test was supposed to be "for the record"—passing it would be required for selection for promotion and reenlistment and retention. But we backed off because we've had so many changes in MOS. We've consolidated a lot of MOS, which requires you to change the tests and rewrite the manuals. We were having to waiver or defer so many soldiers in changed MOS from taking the SDT that we backed off on making it "for the record." The results of the SDT, however, will continue to be used by commanders to assess their soldiers' potential for advancement under the "whole soldier concept."

I was co-chairman of an NCOES process action team [PAT] with the TRADOC [Training and Doctrine Command] Command Sergeant Major, and the SDT was one of the areas we looked at. One of the team's recommendations to the Chief of Staff of the Army is to shelve the test for the time being. Once we've revised the tests and manuals of the changed MOS, then we can consider bringing the SDT back.

Q *What were the process action team's other recommendations about NCOES?*

A We reviewed NCO professional development as a whole to see if we're on track. The bottom line is we are—our professional development system is a good one. But there are some things we need to make happen to continue to be relevant into the 21st century.

An example is changes to the curriculum of the Sergeants Major Academy [Fort Bliss, Texas]. We're in the process of expanding the course from six to nine months. The PAT is recommending to the Chief of Staff that joint operations, coalition operations, working with the UN, humanitarian assistance and all operations other than war be inserted into the curriculum.

We're also recommending that we expand the number of student seats in some of our NCOES courses to ensure that promotions truly are tied to the NCOES courses at the various levels. The requirement is there: to make sergeant, you have to be a PLDC [primary leadership development course] graduate; for staff sergeant, a BNCOC [basic NCO course] graduate; etc. But the system isn't working—we've had to let soldiers be promoted before they go to school.

The system should be to select, train, promote and then assign. Right now, we're

promoting and assigning some selectees and then later training them. In many cases, a soldier will be assigned to a position at his new rank for up to a year before he can go to the school that's supposed to be a prerequisite to his promotion and assignment.

It's not fair to the soldier to hold his promotion—and, therefore, pay—until there are enough seats in the course to train him. But to promote him before we train him contradicts our philosophy and sequence of professional development. We want the soldier to get the NCOES training when it will do him and the Army the most good—before he has to do the job. So our recommendation to the Chief of Staff has been to expand the training seats of NCOES courses to ensure soldiers get the training when they need it. Another recommendation is to consolidate all NCOES training at the post that's proponent for the MOS—Fort Sill [Oklahoma] for all Field Artillery MOS. Right now, other installations, such as Fort Hood [Texas], also teach BNCOC.

Training all Armor MOS at Fort Knox [Kentucky] or Field Artillery MOS at Fort Sill takes the standardization of the curriculum one step further. Right now, the courses at the various locations train using different equipment. For example, the Fort Hood NCOES trains using whatever equipment Fort Hood happens to have, and in that case, the equipment is borrowed from different warfighting units on a rotating basis. If the proponent school does all the training, it will own the wider variety of MOS equipment soldiers will see in their assignments and the newest equipment that's coming on board. The equipment and all the simulations would be the same for, say, every Field Artillery BNCOC class.

Q *College credits make a difference on NCO promotions. But it's difficult for many NCOs in line units or stationed overseas to get the time for or access to college courses. Is the Army considering sending NCOs full time to college for degree completion tours like it does officers?*

A No—but that's a question I'm asked often. The reason the Army won't send NCOs full time for degree completion is that college is not a *requirement* for promotion. Having some college may help an NCO get promoted, but nothing in the enlisted ranks requires you to have anything above a high school education. Competitiveness within the enlisted ranks—soldiers striving for maximum self-development—has made college courses essential.

> ***"We want the soldier to get the NCOES training when it will do him and the Army the most good—before he has to do the job."***

Boards look at job performance as the prime factor for selecting NCOs for promotions; performance is most important when looking at the "whole soldier." But if two soldiers are equal in performance and have done exceptionally well on other factors, then college could make the difference, could be the discriminator for one being selected for promotion over the other.

College credits on an outstanding soldier's record demonstrate that he can perform well for the Army and, at the same time, organize his time to go to college. That shows initiative and self discipline—all those things the Army wants in its leaders—and demonstrates the soldier will be able to handle additional responsibilities.

Within every MOS, for the most part, the same opportunities for attending college exist. Now, someone in the Field Artillery may not have as great an opportunity to complete college courses as someone in the Adjutant General Corps because those in the Artillery spend more time in the field. But soldiers in the Artillery don't compete with those in the Adjutant General Corps for promotions—only with soldiers in their particular MOS. We've found that, within an MOS, the opportunities for college seem to be about equal. Those opportunities may appear at different times in soldiers' careers, but overall, it's fair.

And the Army works very hard to provide soldiers opportunities for college. For example, soldiers now can complete college credits while working as part of the Multinational Force in the Sinai. Every place we send soldiers, we try to have some system that allows soldiers to work on college courses—even now in Macedonia.

But I would remind soldiers that their primary mission is to lead, train and care for soldiers and their families; they should not pursue their college education at the expense of time needed for their primary mission.

Q *Force XXI will fight on a fast-paced, digitized and high-tech battlefield. How do we better develop our young NCOs to be critical thinkers capable of autonomous operations on this battlefield of the future?*

A We try to give those young NCOs responsibility for missions in a variety of situations they could face—build their versatility, flexibility and confidence in themselves. They work with the range of missions in their units, at the NCOES courses and at our Combat Training Centers. We bring the new technology in and superimpose it on the battlefields at the NTC [National Training Center, Fort Irwin, California], the JRTC [Joint Readiness Training Center, Fort Polk, Louisiana] and so forth. We recently tested the Army's current and developing digital capabilities in concert with one another at the NTC—Desert Hammer VI—to show soldiers how technology can give them greater access to real-time intelligence information for rapid decision-making and highly responsive firepower.

But to develop any leader's capabilities anywhere, you must give him the mission, the resources to accomplish the mission and then responsibility for it. The Army does that well.

Q *Do you have any final words for Field Artillerymen stationed world-wide?*

A Yes. My background is Infantry, Special Operations. Throughout my career, both in peace and war, Field Artillerymen have supported me—have supported me very well. I ask Redlegs to *keep* the "steel on the target."

Sergeant Major Richard A. Kidd became the ninth Sergeant Major of the Army (SMA) on 2 July 1991. His 32 years of service include two combat tours in Vietnam and multiple tours in Korea and Europe. His previous tour was as Command Sergeant Major (CSM) of I Corps at Fort Lewis, Washington. He also has served as CSM of the 9th Infantry Division (Motorized) at Fort Lewis and as CSM of the 3d Brigade; 4th Battalion, 23d Infantry; 9th Aviation Battalion and 2d Battalion, 2d Infantry—all in the 9th Infantry Division. SMA Kidd served as the Commandant of the 1st Armored Division NCO Academy in Germany.

Orchestrating Fixed-Wing Air in the Close-In Battle

by Major Michael W. Isherwood, USAF

As I see it, air superiority and close air support (CAS) are two core missions for the Air Force. Should we fail at these tasks, US lives are in immediate danger. As *Field Artillery* dedicates this edition to the close-in battle, I'll share my views on the Air Force's contribution to this fight: CAS—our primary job when ground forces are in contact.

Before launching into detail on the effectiveness of this integration of air and ground power, I would like to make two points. First, I prefer the unrestricted employment of airpower to destroy the fielded enemy army and prevent it from every coming into contact with our forces over allowing forces to come into contact; it's a more efficient use of airpower. Should that not be possible, then we must understand how to orchestrate the fires of fixed-wing air and artillery to function in unison.

Second, I view fixed-wing CAS as employment of air inside the fire support coordination line (FSCL). Any fixed-wing employment requires a degree of control and coordination. There is, however, a difference between CAS and troops-in-contact (TIC) CAS—but that's part of what this article discusses.

The Historical Precedence

Korea, Vietnam and Desert Storm provide valuable experiences with insights into how artillery and fixed-wing air can operate in concert. A strong historical foundation exists for understanding how we should conduct offensive air operations inside the FSCL. Past conflicts have shaped our procedures and formed our expectations.

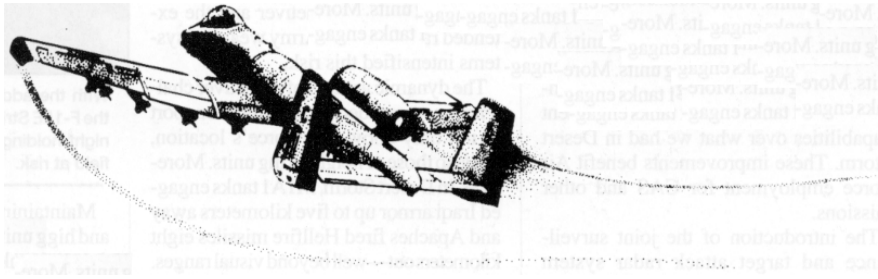
Korean War. When the North Koreans launched their surprise attack in 1950, our ground forces lacked sufficient troop strength and artillery assets. As a result, our commanders employed offensive airpower to offset their numerical disadvantages. US and captured communist commanders credited US air support as critical to defending the Pusan Perimeter and, later, routing North Korean forces after the Inchon Landing.

The procedures employed in the Korean War are primitive compared to our current integration, but they highlight the origins of our practices. For example, commanders set a "bombline" at the outer range of organic artillery assets—about five to eight miles at the time. (Today, we call this the FSCL.) Air support missions flown short of the bombline required some degree of control or coordination. These were, and still are, CAS missions.

When strikes were flown within close proximity to our troops, additional control and restrictions on the attacking flight were required. This close control dictated that we clearly mark targets, identify friendly positions and communicate them

to the attacking aircrews, ensure USAF observers (division-level tactical air control parties, or TACPs) exercise positive control of the strike fighters and deconflict the flights of the attacking aircraft and artillery fires. Another innovation of the Korean conflict was that observers flew in T-6 aircraft to locate and direct attacks against targets beyond our troops but short of the bombline.

Vietnam War. Air Force and Army CAS integration improved in Vietnam. The counterinsurgency nature of the conflict with scattered deployments of US ground forces throughout the countryside resulted in almost all of South Vietnam being inside the bombline or FSCL. In the south, every air support sortie required some level of coordination with ground units.



As part of the improvements, the Air Force extended TACPs to the battalion level in support of these dispersed ground forces. Communication enhancements permitted requests to be forwarded, approved and passed to USAF units faster. The result—faster fighter response. After serving two tours in Vietnam, a Special Forces captain remarked that the longest he ever had waited for Air Force CAS was 22 minutes.

Beyond the improved response time, air support became more critical than it had been in Korea. For example, during a three-month period in 1966, 91 percent of all Army search-and-destroy missions received CAS. Approximately a third of these missions involved a TIC situation. Looking back, I'd suggest that TICs defined Vietnam CAS.

There are no shortages of Vietnam TIC CAS examples. In October, 1967, two Vietcong battalions attacked Loc Ninh. Army artillery and USAF AC-47 Spooky gunships successfully negated the attack during the night. At daylight, additional fixed-wing air sorties helped repel five human wave assaults. Ground commanders credited air support with the majority of enemy casualties and with saving the outpost. This episode illustrated the potential synergistic effects of artillery and airpower.

The next year at Khe Sahn, the air and ground team again combined in a successful operation. The USAF flew 75 percent of the 25,000 CAS missions during the 78-day siege. Air Force aircraft supporting the effort spanned the inventory, from B-52 to A-1 to F-4. Khe Sahn demonstrated airpower's potential not only to achieve immediate results—killing the enemy—but also to inflict psychological damage on him. Incessant aerial attacks dampened the enemy's will to fight.

Operation Desert Storm. In this operation, we had no Pusan Perimeter or Khe Sahn. The unrestricted application of airpower in the interdiction role effectively prepared the battlefield, preempting a repeat of such near calamitous situations. Airpower destroyed significant numbers of Iraqi armor and artillery forces before they could engage our troops.

From my conversations after the war with mechanized platoon and company commanders, I learned they valued CAS during the ground offensive. Some stated they used fixed-wing air to locate enemy forces at their immediate objective or pin enemy forces at the next echelon, freeing the ground commander to concentrate on the immediate objective.

Offensive air support inside the FSCL has created a legacy during the past four decades. It has been effective and saved lives—from Pusan to Khe Sahn to the Medina Ridge in Iraq. In Desert Storm, its ability to quickly concentrate on a moving enemy formation—such as on the Iraqi advance to Khafji or retreat out of Basra—proved critical to destroying large numbers of these forces.

CAS will remain vital also for operations and contingencies other than major conflicts. The current international environment may find US forces deployed in humanitarian or peace operations. Light infantry forces may not have the assets to meet every challenge. Their weapons' ranges may be similar to those of light infantry units in Vietnam. Fixed-wing air's ability to rapidly cover large distances place it in demand as the equalizer, as seen in Bosnia and Somalia.

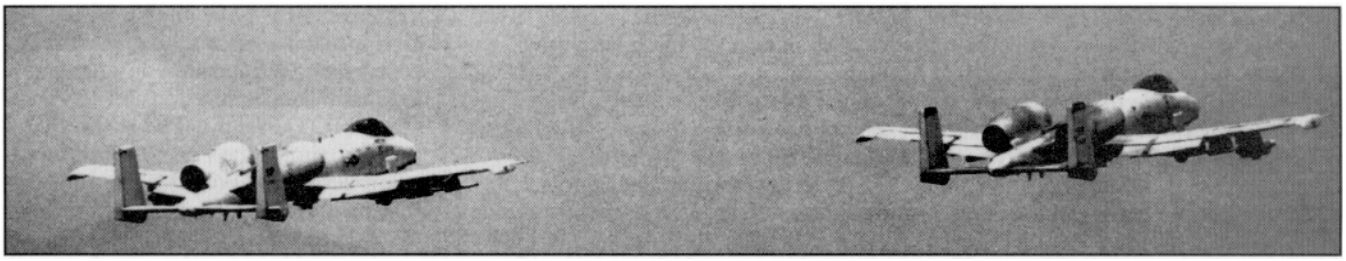
CAS Today

The lessons learned in Vietnam and Desert Storm reinforced a number of Korean War lessons and apply today to guide our employment of CAS.

Ground Control. Within the FSCL, the ground commander must exercise some degree of control—ranging from issuing clearance to the aircraft on final attack to coordinating and deconflicting the attacking flight's target location and time-on-target (TOT). With a TIC or troops in close proximity, the TACP or forward air controller (FAC) provides more restrictive measures. Future operations will demand that air operations short of the FSCL continue with some degree of ground commander coordination or control—we can't accept the fratricide risk.

Target ID. The attacking aircrew requires positive target identification. In Vietnam, target marks ranged from artillery or mortar white phosphorous, illumination rounds (day and night), smoke and direct fire observed by the aircrew. Today, with lasers employed by fire support teams (FISTs), Apache or Kiowa helicopters can mark a target. In the near future, laser spot tracking pods will be added to the F-16, augmenting the capabilities of the AC-130 and A-10 aircraft. The lasers and marking rounds

Laser tracking pods are being added to the F-16 in the near future, improving its CAS capabilities.



These grey A-10s are launching from Aviano Air Base in Italy in support of NATO's Deny Flight in Bosnia. Although additional aircraft are on ground alert, these aircraft are being "pushed forward" to provide the ground commander continuous support.

represent what ground units, in particular Field Artillery units, can use to aid USAF aircrew target acquisition.

Similarly, the Air Force has improved its ability to find targets. Enhancements with the global positioning system (GPS) and ground mapping radars on the F-15E and F-16 assist aircrew acquisition, day or night. The addition of the low-altitude navigation and targeting system for night (LANTIRN) pods to all F-15Es and a variety of F-16 squadrons significantly improves the aircraft's night employment capabilities over what we had in Desert Storm. These improvements benefit Air Force employment for CAS and other missions.

The introduction of the joint surveillance and target attack radar system (JSTARS) accentuates the potential to locate and destroy targets by the joint teams' long-range assets—fixed- and rotary-wing air and Field Artillery. Their attacks will be more effective, efficient and faster. The result may be that ground soldiers or armored vehicles are employed more to seize terrain than to engage in climatic combat. To some, this may sound like heresy. But technological innovation often leads to changes in warfare.

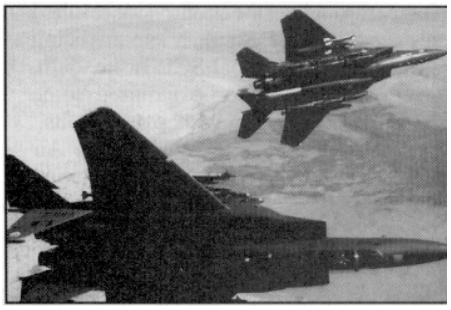
For example, the introduction of the airplane to naval warfare resulted in the "crossing the T" with surface vessels becoming an ancient art. The War in the Pacific during the World War II demonstrated that airpower had radicalized naval surface warfare beyond what many considered possible.

The vision is for JSTARS, airpower and other deep-ranging elements of the joint team to either preclude close combat or make it as easy as possible. There may be more written about armored warfare in the histories of Kasserine Pass or the Battle of Kursk than is written about armored warfare in the future—of course, there will be exceptions. But when contact occurs, the Air Force's target acquisition upgrades, from LANTIRN to JSTARS, will ensure fixed-wing air can play a critical role.

Friendly Force Locations. The toughest task facing any unit requesting CAS is positively identifying friendly forces and communicating that information to the attack aircraft. Korea and Vietnam confirmed this as the highest priority. In Desert Storm, rapid maneuver and the extended ranges of key Army weapons systems intensified this risk.

The dynamic aspects of maneuver challenges commanders requesting air support to not only know their force's location, but also those of neighboring units. Moreover, in Desert Storm, M1A1 tanks engaged Iraqi armor up to five kilometers away and Apaches fired Hellfire missiles eight kilometers out—well beyond visual ranges. Combining maneuver warfare and these extended weapons' ranges, the ground commander was "in contact" in an area dramatically broader than seen in Vietnam or Korea. Positively knowing friendlies' exact location within this expanded area is and will remain the toughest challenge.

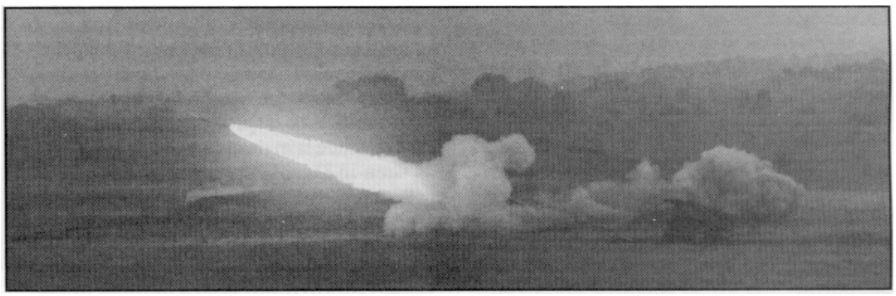
For the Air Force's part, GPS and improved data modem (IDM) will help. Electronic identification systems also will help, but they are not the singular answer. In addition, we're outfitting the F-16 and A-10 aircraft with night-vision goggles to enhance our ability to operate with ground forces at night.



With the addition of the LANTIRN system, the F-15E Strike Eagle will be able to strike at night, holding any enemy target on the battlefield at risk.

Maintaining precise target coordinates and high situational awareness of friendly forces while communicating that information to the aircrews will be fundamental to avoiding future fratricide. Timely use of target marking devices (smoke and lasers) will benefit our air-to-ground team and help minimize the risk of fratricide. We must be prepared to use any tool in the kit to safeguard friendly forces.

Airspace Deconfliction. A lesson learned in Korea and still applicable today is that aircraft and artillery must be deconflicted. During a Desert Storm night CAS mission, an A-10 located an Iraqi armor position based on the impact of a multiple-launch rocket system (MLRS) salvo. That's the good news. Unfortunately,



The "Big Sky, Little Bullet" theory is not the answer to airspace deconfliction. The fires of aircraft and long-range weapons, such as MLRS, must be carefully coordinated.

the supported brigade TACP was unaware of the MLRS firing at "its" target. The bad news is that, had the A-10 pilot initiated his target run a minute sooner, he would have been over the target when the rockets impacted.

In training, we often rely upon airspace coordination areas (ACAs) to deconflict. But these are frequently too small. Fighters need airspace to maneuver for target acquisition, to avoid threats and to gain energy for follow-on maneuvering.

And we shouldn't forget the keep-it-simple-stupid (KISS) principle. A simple deconfliction plan is the best plan. A straight timing, geographic or vertical split should be sought as the basic solution. A more complicated plan should be devised only when it's absolutely essential under the circumstances.

Whatever the plan, communication must be to all players. The "Big Sky, Little Bullet" deconfliction theory is *not* the solution.

Current CAS Issues

Fixed-wing CAS is an essential element of today's joint warfighting. At the same time, there are four CAS issues worth clarifying.

1. Air Responsiveness the Key. The defining advantage of air support inside the FSCL is its responsiveness—it's ability to quickly engage and destroy a target. We shouldn't expect every CAS mission to require support as close as 30 meters to friendly troops, as occurred at times in Vietnam. What the ground commander wanted in those circumstances (and got) was air support quickly brought to bear when he lacked the organic firepower for his needs. Air can handle it if it's 30 meters or 30 kilometers from our troops...but *responsiveness, not closeness*, is the defining quality of CAS.

Pre-planning air missions and including them in the air task order (ATO) is the efficient way to manage air assets. However, the ground commander's maneuver may not allow him to accurately predict when and where he'll need air support. Immediate requests—drawing upon airpower's flexibility—provide the needed response.

Two primary methods afford us this responsiveness. First, aircraft on ground alert can be on station within 30 to 60 minutes. This method is for situations where there are few air assets or the operations tempo is low. Second, the airborne alert or "push CAS" method ensures a continuous flow of aircraft on a shorter response time. The air and ground component commanders select the option based on the tactical situation, available resources and other demands. Also, if the situation requires, almost any interdiction mission can be diverted for CAS.

2. CAS as a Mission—Not an Airframe. *All* USAF air-to-ground aircraft can execute CAS. In the Korean conflict, some applauded the introduction of F-51 Mustang as the perfect CAS platform. Yet, the Mustang suffered more losses, had a worse operational readiness rate and generated fewer sorties than the F-80 or F-84 aircraft. Modified with external tanks and pylons, the jet aircraft matched the F-51's loiter time and ordnance loads. The F-80 and F-84 matched or exceeded the F-51's CAS contributions.

While I anticipate that the A-10 and AC-130 aircraft will remain in the inventory, they are not the platforms for every situation. The night targeting capabilities and speed of the F-16 and F-15E are positive attributes that enable them to meet unique ground commander demands. The F-16s diverted during Desert Storm to support the Special Forces team trapped inside Iraq or the F-16s that supported UN peace-keepers in Gorazde clearly demonstrate the Fighting Falcon's CAS potential. Future CAS missions will be unique—no single aircraft will be the ideal one for all CAS.

3. Defining the FSCL. We must judiciously set the FSCL and not view it as a barrier. When required, Army fires beyond it are possible and encouraged, as long as they are coordinated. Aircrews need to know about the fires to avoid them.

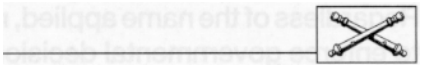
In my mind, the FSCL should be based on the predominate artillery asset, not necessarily the asset with the longest range. Basing the FSCL on the Army tactical missile system's (ATACMS') outer range is too far in most situations. The difference between MLRS' and ATACMS' maximum ranges covers considerable ground. We can expect relatively few ATACMS rounds fired into this area. The increased coordination required to employ offensive air support within the larger area decreases air's effectiveness. The net effect is a sanctuary in which the full weight of the joint force is not efficiently brought to bear on the enemy.

4. Revitalize Joint Suppression of Enemy Air Defense (JSEAD) Operations. Field artillery units are uniquely positioned to provide invaluable support to attack aircraft. Using artillery to suppress or kill known enemy air defenses, ranging from anti-aircraft artillery (AAA) to SA-6, SA-8 or SA-11 surface-to-air missiles, frees attacking aircraft to concentrate on priority ground targets, such as enemy artillery or armor. At every opportunity, we must capitalize on the synergistic effects of the joint team.

The Future

What the airman brings to the fight are qualities and capabilities that synergistically increase the Army's firepower. His rockets and bombs of the Korean War F-80s have been replaced with precision Maverick missiles, laser-guided munitions and, in the near future, wind-corrected sensor-fuzed weapons capable of killing multiple armored vehicles per pass. His speed makes the airplane responsive to the ground commander's emerging requirements. Airpower's lethality and responsiveness, combined with weapons' enhancements, will ensure CAS remains a key warfighting element in future joint operations.

The close-in battle is often unpredictable—regardless, the ground commander can count on the Air Force to provide the best aircraft to get the job done and save lives. Nothing could be more important.



Major Michael W. Isherwood, US Air Force, among other assignments, has served as the Deputy Chief of the Weapons and Tactics Division, 23d Fighter Wing (Flying Tigers) at England AFB in Louisiana, where he was responsible for developing close air support (CAS) and interdiction procedures and was the wing's key planner for exercises and contingencies. In August 1990, he deployed with the wing to Saudi Arabia and served as the Night Mission Planner for the combined A-10 Warthog wings in Central Command. In this capacity, he wrote the joint air attack team (JAAT) procedures and helped develop the CAS employment concept and offensive air plan to attack Iraqi forces in Kuwait. In addition, he flew 33 day and night combat missions during Desert Storm. In 1991, he transferred to the Deputy Chief of Staff for Plans and Operations, USAF Headquarters at the Pentagon, where he helped formulate the Air Force position on CAS for NATO in Bosnia.

MLRS in Low-Intensity Conflict

by Lieutenant Colonel John M. House

The world in which we live remains a dangerous one. Threats abound, particularly in what many call the lower end of the spectrum of war, or operations short of war or low-intensity conflict (LIC). Regardless of the name applied, military force always will be an option to enforce governmental decisions.

The multiple-launch rocket system (MLRS) is one indirect fire system available to the military commander. It has strengths to exploit and limitations to consider. This article discusses how to use MLRS in a situation where large armored forces are not locked in combat, where civilians coexist with soldiers on the battlefield, where movement is limited, where units conduct operations out of protected bases and return, and where the use of force can work to a disadvantage.

The 644 dual-purpose improved conventional munition (DPICM) bomblets in each MLRS rocket or 1,000 anti-personnel and anti-materiel (APAM) bomblets in each Army tactical missile system (ATACMS) missile make these munitions devastating against personnel and lightly armored vehicles and equipment. If enemy personnel or light armored targets need killing, MLRS is a good choice. MLRS is our deep strike indirect fire system and is a must for any force package that needs MLRS' range and firepower. However, those same strengths also have special considerations.

Bomblet Degradation. Trees and man made structures reduce the effects of bomblets. Trees will detonate some bomblets at a height that will preclude damage to the enemy equipment below. Trees also will reduce the relative uniformity of a bomblet dispersal pattern as some bomblets will detonate high in the trees and others will bounce off limbs and tree trunks as they crash through the foliage. In addition, tree trunks provide some protection from anti-personnel fragmentation.

Buildings provide a degree of protection, just as trees do. Bomblets striking a building roof will detonate and blow a hole in the roof. Undoubtedly, anyone standing under the blast of a DPICM bomblet shaped charge will have a "bad day." But anything one floor down probably won't be affected. Walls provide protection from the fragmentation of bomblets hitting the ground outside a building.

The concern about trees and buildings exists for any delivery system containing submunitions like DPICM—not just MLRS. However, the only munitions MLRS currently has are DPICM for rockets and APAM for missiles. Consequently, some targets may not be good MLRS targets because the target environment may make a successful attack difficult, extremely expensive in munitions fired or not even possible.

MLRS Positioning Options. This is a major consideration. MLRS range (especially if ATACMS is available) and self-locating ability provide great flexibility in location. A launcher can strike a target over a great range, knowing instantly where the launcher is whenever it stops to fire. As long as survey is available for accurate updates, MLRS is deadly at long range.

In the 6th Battalion, 29th Field Artillery (MLRS), 1st Armored Division, Germany, we have experimented with several positioning options during Combat Maneuver Training Center (CMTC) and Grafenwoehr Training Area (GTA) rotation. Our rotations have included an MLRS platoon attached to a direct support (DS) 155-mm cannon battalion. Instead of a platoon operations center (POC), we send a battery operations center (BOC) reinforced by POC personnel for ease in 24-hour operations. We add two lieutenants, the battery operations officer and the platoon leader. The battery commander acts as a liaison officer (LNO) to the DS battalion. We also have used the battalion LNO as the liaison to a DS battalion.

The platoons occupy some type of operations base or firebase, just as any unit in LIC does. We have positioned platoons in operating bases established by a maneuver battalion; a brigade headquarters company; the brigade support area (BSA), predominantly consisting of a forward support battalion; and by MLRS platoons themselves. A base established by a larger unit provides a platoon greater defensive strength and logistical support. However, an operating base with a large number of units faces a tremendous challenge in maintaining a viable perimeter as individual units leave and reenter the perimeter for patrolling, resupply or other duties.

Type of Base	Advantages	Disadvantages
Maneuver Unit	❑ Good perimeter defense. ❑ Consolidated life and equipment support possible. ❑ Deepest fires.	❑ Difficulty adjusting the perimeter when units leave. ❑ Firing points outside a protected area.
Brigade Headquarters	❑ Better perimeter defense than a MLRS platoon alone. ❑ Consolidated life and equipment support possible. ❑ Ease of command and control.	❑ Firing points outside a protected area.
Brigade Support Area (BSA)	❑ Better perimeter defense than MLRS platoon alone. ❑ Ease of logistical support.	❑ Firing points outside a protected area. ❑ Longer distance to likely targets, depending on the BSA location.
MLRS Platoon/Battery	❑ Firing points in a protected area. ❑ No perimeter adjustments required. ❑ Less coordination with adjacent units in the same operating base.	❑ Limited perimeter defense. ❑ Longer travel time/distance to additional logistical support.

Figure 1: Comparison of MLRS Operating Base Techniques

Even though MLRS has a greater range than most indirect fire systems, the potential location of targets affect where platoons emplace. Any of the operating base combinations mentioned could be the right or wrong choice, depending on where and how soon the supported maneuver commander wants MLRS fires. Figure 1 summarizes the advantages and disadvantages of the positioning options we've used.

Firing Points Inside. A major consideration in MLRS' use is whether launchers fire from inside the operating base or outside it. Firing from inside the perimeter provides the best security for the launchers, especially if engineer support is available. Figure 2 portrays a platoon operating base with internal firing points. Berms protect launchers not in firing points and other vehicles, equipment and ammunition. Launchers can be in single or consolidated hide positions.

Fighting positions protect the perimeter. Berms inside the perimeter act as backstops for rocket blasts. The three berms forming a "Y" in Figure 2 facilitate 6400-mil firing. The "Y" has three firing points, one in each corner of the Y. The launcher occupies the firing point that best allows target attack.

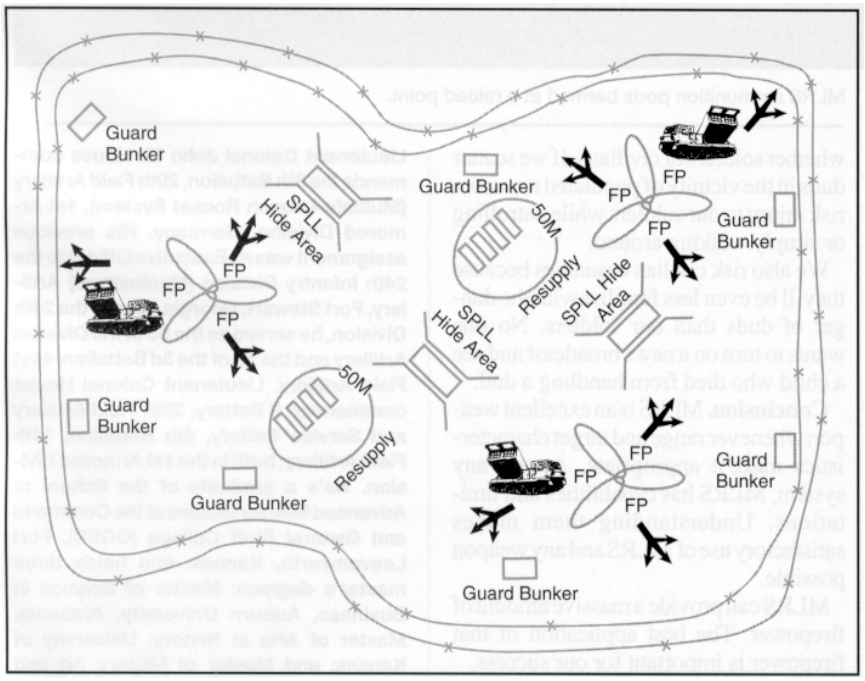


Figure 2. MLRS Platoon Operating Base with Internal Firing Points (FPs). Berms protect self-propelled loader launchers (SPLL) not in FPs and other vehicles, equipment and ammunition.

Just as in current MLRS operations area (OPAREA) locations, the launcher remains in a hide position (bermed for protection) until it receives a fire mission. It then occupies a firing point (bermed to deflect backblast) long enough to fire. After the fire mission, the launcher moves to a hide position.

Firing from an operating base requires engineer support to ensure the after-effects of firing (flame, smoke and flying dirt, rocks and blast panels) do not injure people or damage equipment. Even with the firing point berms, soldiers must occupy launchers or fighting positions for individual safety. A warning device or signal to alert soldiers of a fire mission is a must. Soldiers within 50 meters of the launcher should don masks, even if in a protected position, to protect them from smoke inhalation.

Obviously, the required protective measures while occupying an operating base with another unit is an important consideration. Coordinating warnings and protective positions with other units can be difficult. Engineer support to adequately protect soldiers and equipment may not be available. But if a platoon occupies an operating base by itself, it has little self-defensive capability. Firing points outside the operating base make sharing a base with another unit easier.

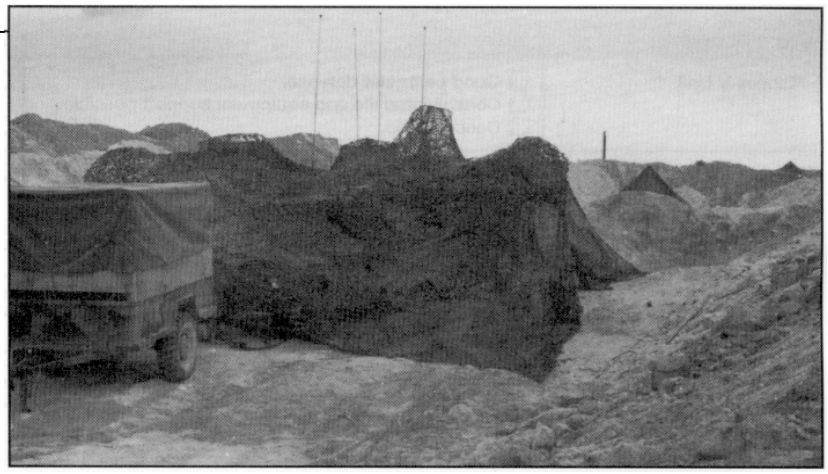
Firing Points Outside. This option for firing points eliminates the impact of rocket backblasts inside the operating base. However, security of the launcher becomes a major issue. A self-propelled

launcher-loader (SPLL) cannot defend itself. It has no defensive armament, and the three-man crew is fully employed operating the system. Additional personnel—such as military police, infantrymen in Bradleys or an ad hoc group of MLRS personnel riding in other vehicles—must accompany a SPLL if it is to have any protection.

Just as in an operating base, these security elements must protect themselves from rocket backblasts. Positioning to the side of the launcher outside the danger area is the easiest solution.

The response time for a fire mission also increases if the firing point is outside the operating base. The BOC, POC, and fire mission requester must remember this when evaluating whether or not to use MLRS. The travel time to the firing point makes successfully engaging a fleeting target less likely. The controlling BOC or POC must determine the travel times and ensure its higher headquarters understands this additional factor.

Care is also necessary to ensure such a fire mission does not become an ambush. If a pattern develops for provocations resulting in MLRS firings and the firing points are marked so an enemy can predict a route, an enemy could easily set a trap. It does not take a great deal of enemy firepower to destroy a high-mobility multipurpose wheeled vehicle (HMMWV) and a SPLL. We have not experienced this in training, but it remains a concern. Baiting rescue forces is not a new technique.



CPT Dave Scalsky

A/6-29 FA's MLRS battery operations center dug in for LIC.

CPT Dave Scalsky

MLRS ammunition pods bermed at a reload point.

Command and Control. This is another major concern for LIC operations. Friendly forces must engage *only* hostile forces. Killing non-combatants can turn survivors into enemies instead of neutrals or friends.

Tight control, based on rules of engagement (ROE), is the norm. This degrades MLRS responsiveness because some time lag after a provocation is inevitable while the decision process determines if the ROE warrant a fire mission.

Also, the size of the dispersion pattern of MLRS submunitions means it isn't a precision weapon. Consequently, MLRS may not be the best weapon to attack, say, a single mortar—even though MLRS is usually considered an excellent counterfire weapon. In certain circumstances, the collateral damage of MLRS may be too great.

Dud Munitions. One additional concern about MLRS' use is the impact of dud submunitions. Dud DPICM and APAM bomblets are a threat to people, whether soldiers or civilians. If we scatter duds in the vicinity of populated areas, we risk injury to our soldiers while patrolling or simply walking around.

We also risk civilian casualties because they'll be even less familiar with the danger of duds than our soldiers. No one wants to turn on a news broadcast and see a child who died from handling a dud.

Conclusion. MLRS is an excellent weapon whenever range and target characteristics make it appropriate. As with any system, MLRS has capabilities and limitations. Understanding them makes satisfactory use of MLRS and any weapon possible.

MLRS can provide a massive amount of firepower. The best application of that firepower is important for our success.

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Synchronizing the Close Assault:

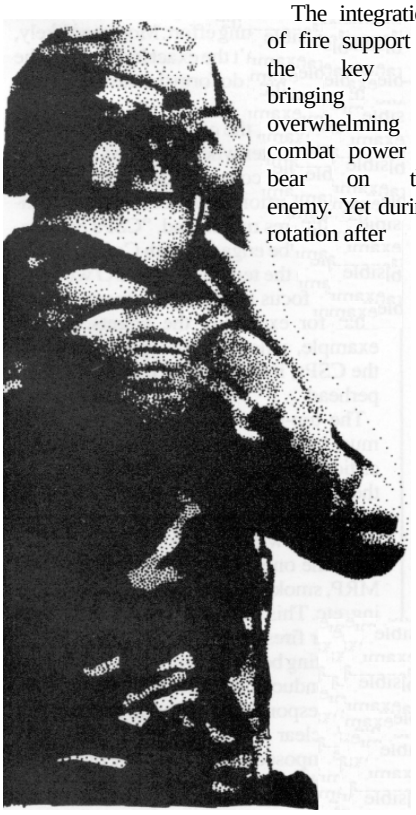
The TF FSO and the Deliberate Attack

by Major Boyd D. Gaines

"Concentration is the massing and synchronization of overwhelming combat power against an enemy weakness. Concentration is achieved by....synchronizing maneuver with combat support."

FM 71-2 Tank and Mechanized Infantry Battalion Task Force

Of the four characteristics of effective offensive operations—surprise, concentration, tempo and audacity—concentration is arguably the key to success on the battlefield. Concentration allows a mechanized task force (TF) to destroy a motorized rifle company (MRC), or its equivalent, and maintain enough combat power to prosecute tactical operations.



The integration of fire support is the key to bringing overwhelming combat power to bear on the enemy. Yet during rotation after rotation at the Combat Training Centers (CTCs), TFs fail to integrate their fire support effectively.

This article focuses on tactics, techniques and procedures for the TF fire support officer (FSO) to plan, prepare and execute a fire plan for the deliberate attack against a dug-in MRC.

Reviewing Doctrine

To paraphrase FM 71-2—

- Deliberate attacks normally include large volumes of supporting fires, main and supporting attacks and deception measures.
- The TF designates support, breaching and assault forces.
- The TF and brigade conduct rehearsals of the fire support plan.
- The TF conducts continuous reconnaissance and schedules a final intelligence update just before the attack.
- Battalion TFs penetrate enemy company defenses to isolate and destroy elements of platoon size or smaller. The TF completes the defeat of the enemy company in detail.
- A coordinated attack is usually a four-phase operation: close on the objective, isolate the site for penetration, breach or penetrate to gain a foothold onto the position and exploit the penetration.

Doctrine is also fairly specific with regard to fire support considerations for the deliberate attack. See Figure 1 for those considerations as outlined in FM 71-2 and *FM 6-20-40 Tactics, Techniques and Procedures for Fire Support In Brigade Operations (Heavy).*

Finally, FSOs need to know the threat. An enemy force capable of employing the doctrine of the former Soviet Army probably would be the most potent threat our forces could face. The opposing forces (OPFORs) at the CTCs, such as the Combat Maneuver Training

During the deliberate attack, the FSO should consider—

- ☐ **Fires for Breaching Operations.** These support the breaching forces, soften enemy forces on the objective before the assault and suppress the objective area.
- ☐ **Preparation Fires.** Preparation fires, including preplanned close air support (CAS), can suppress, neutralize and destroy enemy positions on the objective.
- ☐ **Obscuration and Screening Fires.** Fires using smoke assist breaching efforts, hide friendly maneuver forces and can aid in deception efforts.
- ☐ **Counterbattery Fires.** When manual breaching is anticipated, the FSO should coordinate for counterbattery fires.
- ☐ **Illumination Fires.** These always are planned for night attacks, but their execution usually is on-order by the task force commander.
- ☐ **Fires on Priority Targets.** Priority targets are normally allocated to weight the main attack.
- ☐ **Fires During the Assault.**
- ☐ **Suppression Fires.** These fires prevent the enemy from observing and engaging friendly elements, and they conceal the movement of friendly companies.
- ☐ **Concentrated Fires.** These destroy enemy fighting positions near the initial objective.
- ☐ **Subsequent Fires.** These fires concentrate on deeper objectives.
- ☐ **Fires During Consolidation.** These fires target likely counterattack routes or enemy withdrawal routes.

Figure 1: The TF FSO must consider the many types of fires he can provide his maneuver forces during the various stages of the deliberate attack.

Center (CMTC) in Hohenfels, Germany, or the National Training Center (NTC) at Fort Irwin. California, use former Soviet doctrine as their model. Daily, US and Allied TFs are pitted against highly trained and dedicated OPFORs at these CTCs. Having said that, FSOs need to know threat doctrine and tactics to build a successful fire support plan.

For example in preparing for the deliberate attack, the FSO should know how the MRC would dig-in. *FM 100-2-1 The Soviet Army: Operations and Tactics*, dated 19 June 1990, states:

A company normally occupies a strong-point 1,500 meters in width and up to 500 meters in depth...normally three platoons defend in one echelon. A reinforced platoon defends a frontage of up to 400 meters...gaps between platoons do not normally exceed 300 meters...distance between vehicles in the MRP [motorized rifle platoon] does not exceed 150 meters. Combat security outposts [CSPs] forward of the company defense deceive the enemy as to the location of the MRC defense...Combat security outposts are within direct fire range of the MRC and withdraw into the MRC defense upon order of the MRB [motorized rifle battalion] commander.

As shown by the black portions of Figure 2, the MRC covers its obstacles with direct and indirect fire designed to force the Blue Forces into the fire sack where concentrated fires of all weapons destroy him. They construct dummy positions for deception as to the location of their MRC. Division and regimental reconnaissance observation posts (OPs) are situated forward of the MRC defense. Finally, the MRC is supported by a combined arms reserve whose mission is to conduct counterattacks against any enemy penetration.

Planning the Deliberate Attack

It isn't enough to destroy a dug-in MRC with fire support assets if the TF assaulting the objective sustains heavy casualties and is rendered combat ineffective. Synchronization continues to be the key to minimizing friendly casualties while destroying the threat.

Targeting and the Concept for Fires. Planning to support a deliberate attack starts with the commander's concept for fires. What does he want fire support to do for the TF?

The following is a commander's concept for fires that the NTC uses as an example: "I don't care if any fires get executed as long as targets AB1001, AB1002 and AB1003 are executed as Team A moves to SBF-1 [support by fire], then target AB1004 as Team B breaches vic [in the vicinity of] NK 123456." This example shows the level of specificity needed that, when executed effectively, supports a successful deliberate attack.

Initial targeting for a deliberate attack is fairly straightforward. As shown by the gray portion of Figure 2, one technique is for the TF FSO to target the TF S2's template (the black portion). The template shows the S2's assessment of the most likely location of the defense. The FSO targets each templated OP, MRP, the combined arms reserve and the likely counterattack or withdrawal routes.

The TF engineer provides input into this template, showing obstacle locations based on threat doctrine. The FSO uses this information to plan smoke targets, as necessary, and to calculate the amount of smoke needed to support the scheme of maneuver. The engineer also plans the family of scatterable mines (FASCAM) targets, if allocated.

The FSO shouldn't spend much time on the initial targeting effort. More than likely, his targets aren't the exact locations of the MRC, but they do form the basis for a tentative plan.

Once again, the concept for fires is crucial. No matter where the MRC is on the ground, the concept for fires stays the same. A portion of the commander's concept for fires might read, "CSPs encountered will be engaged with Copperhead." Based on the template, the FSO will plan fires to focus the company/team responsible for executing the targets. In this example, wherever the task force finds the CSPs, it will engage them with Copperhead.

The top-down fire plan from brigade must be detailed enough to identify the critical phases of the battle. For example, the brigade could place one target on each MRC location that the brigade S2 templates, knowing that the TF FSOs will expand the one target per MRC to one per MRP, smoke for obscuration and breaching, etc. This lets the brigade weave a concept for fires for the entire brigade without getting bogged down in targeting that's best conducted by the TF battle staff.

The responsibilities for targets will become clear when the target overlay is superimposed over the scheme of maneuver and the concept of the operation is

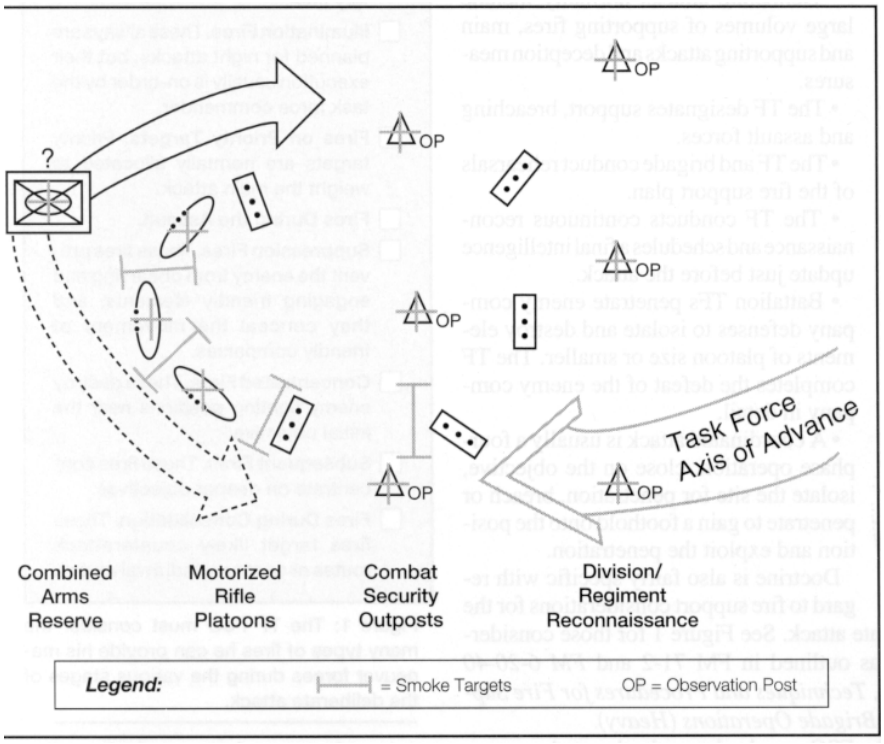


Figure 2: The gray parts of this figure are the task force FSO's targeting on the S2's template (the black).

war-gamed. Doctrinally, the TF scheme of maneuver will have a main and supporting attack. Each company/team will have different responsibilities. *FM 71-1 Tank and Mechanized Infantry Company Team* gives the overwatch or SBF element the mission of placing "destructive, suppressive fires on known and suspected enemy positions, adjust indirect fires to support the maneuver force..." The SBF is the element the TF FSO gives responsibility for controlling and adjusting fires on the objective. (The scout platoon also can do this.)

SOSR. The TF organizes to conduct instride or deliberate breaches. (*FM 90-13-1 Combined Arms Breaching Operations* is an excellent reference for TF FSOs. It addresses in detail how a TF conducts breaching operations.)

The task force organizes into breach, support and assault forces. Normally, a company/team has one of these missions. If the company/team has the breaching mission, it will *suppress* the enemy, *obscure* the enemy's view of the obstacle and then *secure* and *reduce* the obstacle (SOSR). The company/team responsible for breaching obstacles will be assigned smoke targets planned on the templated obstacles.

Smoke to screen the TF movement, for deception, for breaching obstacles and on the objective all adds up to a potentially heavy requirement. The TF FSO must plan smoke targets and estimate the number of rounds needed to support the deliberate attack; he then must coordinate with the brigade FSO for artillery smoke. Smoke generators and smoke pots need to be integrated into the plan to make up for the potential shortfall in the amount of smoke needed to accomplish the plan.

The assault force company/team is responsible for lifting and shifting fires as it assaults across the objective. The reserve fire support team (FIST) or combat observation lasing team (COLT) can augment the SBF FIST to provide redundancy (leaving the reserve company FSO and a working radio with his company commander).

Scout Fire Missions. The fire plan needs to address all phases of maneuver, starting with the reconnaissance phase. Several techniques for accessing scout fire missions have been discussed in previous editions of this magazine and are not the subject of this article. But a recommended solution is to send a reserve FIST or COLT with the scouts as a dedicated set of eyes on the objective area. If the scouts go dismounted, a forward observer (FO) team can go with them—the FIST vehicle becomes a communications platform to relay scout fire missions.

The FSO must take care to maintain contact with the scouts and ensure they can get into a position to call for and adjust fires on the MRC defense at the appropriate time. The FSO should consider retransmission requirements.

He also must plan restricted fire areas (RFAs) around the scouts' final locations to preclude fratricide. The RFAs need to be planned before the scouts depart, so if the TF loses contact with them, the scouts know the area (or areas) they can go to and be reasonably protected from indirect fire fratricide.

While the FSO plans "safe" RFAs, the final RFA depends on what the scouts find and how deep they go. This point alone stresses the need for good communications with the scouts.

Mortars. The FSO needs to position the mortars to support the scouts in the reconnaissance phase. Techniques include putting the mortar fire direction centers (FDCs) on the scout internal radio frequency to accept calls-for-fire or using a roving gun to support illumination and suppression missions. The scouts' primary mission is reconnaissance, and to survive, they need fire support.

Illumination. If the TF sends out dismounted patrols, this requires special attention. The FSO can plan illumination on a fixed, known site to provide orientation (but *not* on the dismounted avenue of approach). He also can use illumination rounds to deceive the enemy. The FSO can place it on a route that's opposite of the one the TF is going to use or shoot it early in and around the objective area. Finally, it can be used for battlefield illumination and for marking points on the ground (such as target reference points). The TF FSO should coordinate with the TF S4 for extra white phosphorous rounds, as necessary.

Preparatory Fires. The FSO has several employment considerations if preparatory fires are to be used. Preparatory fires degrade surprise and start the survivability clock for the firing platoons shooting the prep. Such fires need to be tied to a battlefield event, such as the beginning of the TF assault—as opposed to the TF just crossing the line of departure (LD) or a phase line. Finally, the FSO must strive for observed, adjusted fires (possibly as part of the reconnaissance effort).

Preparing for the Attack

Preparing for the deliberate attack boils down to two critical areas: refinements and rehearsals. Refinement of targets for the deliberate attack comes from the TF reconnaissance effort and the S2's updated situational template.

Refinement by company/team FSOs should be minimal. Company FSOs devote their efforts to ensuring their portion of the plan will be successful. They build redundancy in communications, survivability and visibility into the plan.

The TF FSO must ensure the company FSOs understand the target locations will probably change, based on the TF recon effort but that the concept for the targets will stay the same. Sometime before LD, the TF S2 will refine his situational template. The TF commander will change the TF scheme of maneuver, as needed, to attack the actual MRC location. The updated situational template and any changes to the scheme of maneuver become the basis for refining the fire plan.

Target refinement is a task critical to the success of the operation. The challenge to the TF FSO is to disseminate the refinements to the direct support (DS) battalion, mortars and the FIST in a timely manner. Time will determine how many changes the TF FSO can make.

To illustrate, company FSOs must send the changes to the FOs and platoon leaders during a very busy time—usually when the company/team is preparing to leave its tactical assembly area (TAA) on the way to the LD. After the DS battalion gets the refinements, it still has to distribute the new targets and grids to the firing batteries...and so on.

The second critical task during the preparation phase is rehearsals. Synchronization of the battlefield operating systems (BOS) is made possible through the rehearsal process. Many articles about the importance and process of conducting rehearsals have been written for this and other journals. But a few important points need to be reiterated.

- The company/team commanders responsible for executing specific portions of the fire plan must take the time to make it work.
- Company FSOs must participate in detailed company rehearsals that emphasize the integration of fires with maneuver. Rehearsals (maneuver and fire support) at all levels should focus on the critical parts of the plan. Synchronizing the BOS

for the close assault, obstacle breaching and consolidation on the objective are examples of such tasks.

• Critical primary and backup observers must rehearse. Backup observers enter the appropriate fire direction nets and check communications and fire support responsibilities before LD.

Executing the Deliberate Attack

FM 6-20-20 Tactics, Techniques and Procedures for Fire Support at the Battalion Task Force and Below states, "Synchronized, violent execution is the essence of decisive combat."

For a deliberate attack to be successful, the TF must know the location, disposition and orientation of all weapons systems in the MRC before it crosses the LD. The reconnaissance effort must get a scout or attached observer in a position overwatching the MRC defense. He becomes the eyes to observe and adjust the prep, if used. RFAs for elements forward of the LD are put into effect.

The prep is normally part of a larger brigade prep, so there could be periods when fires don't fall on the MRC (because they're being massed on the sister TF's objective). Also, any deception measures that require fire support participation (smoke, false prep, etc.) will be happening.

The enemy divisional and regimental reconnaissance observation posts encountered on the way to the objective are engaged in accordance with the engagement criteria and concept for fires. These OPs must be neutralized; otherwise, the TF will be pounded by observed fire as it moves to the objective. As the TF approaches the first obstacle belt, the company FSOs use suppressive fires and smoke to assist the breaching efforts (the suppress and obscure of SOSR).

As the TF closes on the MRC, fires are continually adjusted on the MRC by elements of the scout platoon. When the SBF element gets into position, priority of fires switches to this element and the scouts become a redundant set of eyes to control and adjust fires on the objective.

The SBF FIST (possibly reinforced by a COLT or other observation asset) continues to engage the MRC defense as the assault force gets into its position and prepares to assault. The SBF element builds a smoke screen that isolates from the rest of the MRC the single MRP the force is going to assault (see Figure 3).

The maneuver intent here is for the assault force to attack one MRP or, preferably, one BMP (Soviet amphibious infantry combat vehicle) squad at a time. This allows the combat power ratio of direct fire systems to be at least 3:1 and preferably 6:1 or 9:1. To achieve overwhelming combat power, the SBF element must isolate and destroy (with direct and indirect fires) one MRP, while suppressing the rest of the MRC. Dual-purpose improved conventional munition (DPICM) is probably not the round of choice due to the possibility of duds on the objective the TF infantrymen must clear.

The SBF element continues to call indirect fires on the isolated MRP and the adjacent MRP until the assault force signals it's ready to assault and to lift and shift fires. At this time, the SBF FIST ceases the fires on the isolated and adjacent MRPs and takes the third MRP under fire. The reason the FSO shifts the indirect fires off the adjacent MRP is to prevent the effects of friendly fire from hampering the assault force (this is obviously terrain and mission dependent). Direct fire continues to suppress the adjacent MRP.

A restricted fire line (or final coordination line) is put into effect to protect the assault force from the effects of direct and indirect fire. This "line" must be mutually understood by the SBF and assault forces and their respective fire supporters. Smoke is maintained to degrade the MRC's system of interlocking or mutually supporting fires and to allow the assaulting forces to penetrate the MRC's defense.

After the first MRP is overrun, the assault force signals "lift and shift" (using FM or visual signal), and direct fire is shifted to the third and final MRP. A new restricted fire line is put into effect.

As the integrity of the MRC defense is threatened, the location and status of the combined arms reserve becomes the TF's primary concern. At this point, the TF scouts would be in the best position to observe the reserve's activities. Indirect fire is laid on the reserve's likely counterattack route or the MRC's withdrawal route.

Smoke is continually adjusted by the SBF company/team to isolate the adjacent MRP. As the mortars expend their basic load of smoke, they switch to high-explosive (HE) rounds to suppress the enemy antiarmor systems as the artillery is shifted off the objective. The final consideration for the TF FSO is orienting his FISTs and the mortar platoon for the follow-on mission.

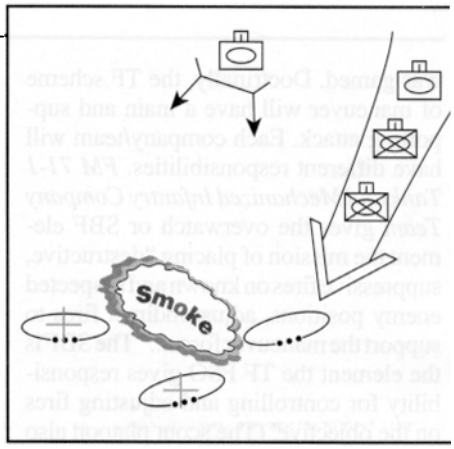


Figure 3: An enemy motorized rifle platoon is isolated by a combination of smoke and direct and indirect fire.

For the sake of brevity, this article does not discuss the roles of other fire supporters key to the success of the deliberate attack, such as the fire support coordinator (FSCOORD), brigade FSO and DS battalion S3. Discussions about close air support (CAS) and radars also were omitted for the same reason.

This article focuses on what the TF FSO does to help the commander synchronize fires with maneuver in the deliberate attack. Integrating fire support in close operations is an art and requires intensive coordination and practice. While nothing substitutes for experience, FSOs can prepare themselves by being well-grounded in maneuver and threat doctrine.

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The Bradley Fire Support Vehicle

The Bradley fire support vehicle (BFIST) under development will assist tactical commanders in Force XXI to maximize modern artillery and precision munitions to fix, turn and defeat the enemy. Force XXI envisions formations sustaining operations for three to four days at a depth of 250 to 350 kilometers. The BFIST will meet the requirements of this modern combat force and fix problems experienced by M981 fire support team vehicle (FIST-V) crews.

The BFIST is the successor to the M981 FIST-V and is projected for fielding at the turn of the century. This vehicle will integrate FIST components and technological initiatives into a Bradley chassis for operation by the FIST or combat observation lasing team (COLT). The BFIST and its crews will bring unique capabilities to increase the lethality of the company/team and brigade.

Fixing the M981 Problems. Operation Desert Storm (ODS) highlighted the shortfalls of the M981. It lacks the mobility to keep up with the maneuver force. Because it's a low-density vehicle in the company/team and Army-wide, Infantry and Armor units don't stock enough M981 spare parts and higher echelon supply points stock only a few parts.

Although the M981 has the same night sight as the Bradley, the complicated optical path from hammerhead to observer significantly degrades night vision. Consequently, the FIST team can't see at night as well as the supported combat force.

The chassis of the M981 doesn't protect the crew against anything greater than small arms fire and presents a unique signature. This is a critical shortfall because the FIST must maneuver with the company/team in battle. The M981 is vulnerable to heavy-caliber machineguns orrocket-propelled grenades (RPGs) and presents an easily identifiable high-payoff target.

BFIST Capabilities. The BFIST will solve the problems of the M981. It will be as mobile as the force it supports, use common repair parts, have equal night vision and a 25-mm chain gun, and present a common signature with the force it supports.

The BFIST will take advantage of three technologies being integrated horizontally across the Army: a battlefield combat identification system (BCIS), second generation forward-looking infrared (2D GEN FLIR) and digitization. Using these technologies, the BFIST will sustain the operational tempo required for Force XXI.

Combat and materiel developers envision two models of the BFIST: BFIST A2 ODS and BFIST A3. The first version will retrofit a FIST mission package onto a Bradley A2 ODS chassis, including fire support-unique items such as the laser designator, north seeking gyroscope (NSG), forward entry device (FED) and lightweight computer unit (LCU) with its components to process digital information. The BFIST A3 is the more advanced version and will incorporate a Bradley A3 chassis with the FIST mission package.

The two Bradley chassis add capabilities to the FIST vehicle not found on the M981. The Bradley A2 ODS model will have an eye-safe laser rangefinder, a global positioning system (GPS), driver's thermal viewer, BCIS and counter-missile device. The Bradley A3 model will add a core electronic architecture to the A2 ODS model to process messages on the digitized battlefield.

The A3 model will come with two 2D GEN FLIR sights, one for the gunner and an independent sight for the commander. The 2D GEN FLIR will double the combat identification range of the first generation FLIR now in use, reducing the probability of fratricide. A number of units will receive the version with the 2d GEN FLIR to ensure the US Army continues to "own the night."

Digitization will enable combat forces to move, set, attack, move/regenerate and attack in a continuous cyle. Making the most of digitization, BFIST crews will be able to anticipate the maneuver commander's plan, determine fire support availability and develop fire plans while the commander concentrates on other missions.

The BFIST will maximize technology incorporated into the Paladin, advanced Field Artillery system and precision munitions. The Field Artillery community and maneuver/combined arms commanders can look forward to receiving a vehicle that will optimize fire support for Force XXI.

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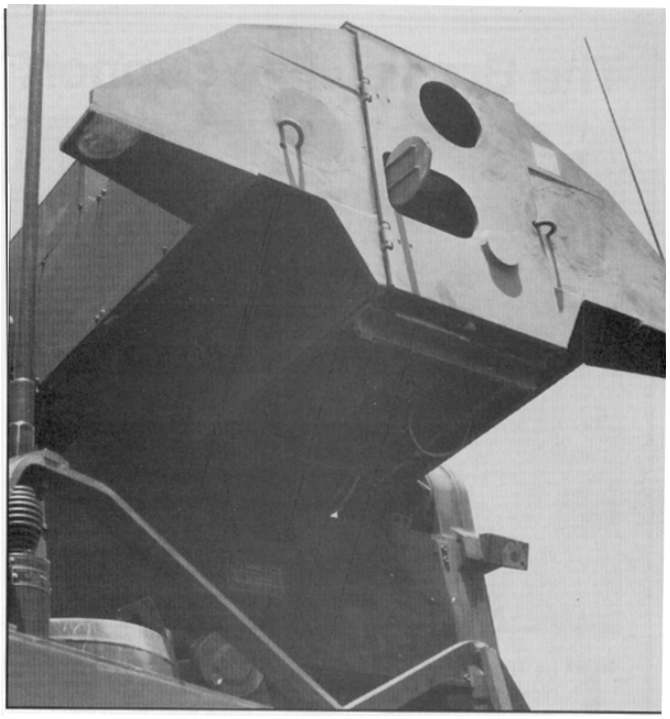
Copperhead: More than a Tank Killer

by Lieutenant Colonel
Timothy R. Puckett



This article chronicles the first combat use of Copperhead by the US Army during Operation Desert Storm. The procedures depicted are a model for planning, preparing and executing successful Copperhead engagements.

Date/Time: 071330 (Local) February 1991

Location: Saudi Arabian-Iraqi Border, 30 kilometers West of Wadi Al Batin

Unit: 1st Brigade, 1st Cavalry Division

Sergeant Roy Lee sat in his fire support team vehicle (FISTV) waiting for clearance to fire. The first target he was assigned was a 15-meter tall cement block observation tower. The second was a building adjacent to it. The tower provided a dominant view of the terrain for many kilometers in every direction across the flat, featureless desert.

Sergeant Lee's mission was to attack the buildings with Copperhead, the cannon-launched, laser-guided tank-killing munition. He then was to observe the impact of cannon-delivered dual-purpose improved conventional munitions (DPICM) and make any adjustments necessary to get the rounds on the targets.

The brigade fire support officer (FSO) had told him it was important to destroy this outpost to deny the Iraqis the ability to observe the brigade. Two days before, an AH-1 Cobra belonging to the 1st Squadron, 7th Cavalry (1-7 Cav) of the division cavalry squadron had received fire from this complex. The Cobra had returned fire with its 2.75-inch rockets, but the buildings were still standing.

The grid coordinates for both the observation tower and the blockhouse building next to it were a couple of hundred meters different than what the brigade S2 had briefed. But Sergeant Lee knew the difference would not have much effect on his "angle T." If there had been a problem, he would have been told within minutes after he had sent the coordinates digitally to the tactical fire direction system (TACFIRE). Although the distance between the tower and the blockhouse was less than 100 meters, he still called them in as separate targets.

A sudden movement at the edge of the sight picture caught his attention. Several Iraqi soldiers appeared on a walkway on the second story of the blockhouse. He directed his radio telephone operator (RTO) to call brigade and tell them there were personnel on the building. The targeting officer in the brigade fire support element (FSE) passed on the report to the FSE at the division tactical command post (DTAC). The DTAC directed engagement of the building once clearance of fire was received.

Sergeant Lee gently slewed the hammerhead containing the ground/vehicular laser locator designator (G/VLLD) over to the blockhouse and lined up the reticle on a first floor door in the center of the building.

The 1st Platoon fire direction center (FDC) for B Battery, 1st Battalion, 82 Field Artillery (1-82 FA) methodically reverified the data. On the howitzer, the section chief checked the fuze setting on the M712 Copperhead round. He then checked the sight picture and level of the mount bubbles as the gunner called out the four digits of the deflection. The assistant gunner announced the quadrant elevation as the section chief moved into position to verify the settings.

This choreographed verification of ammunition and sight settings was repeated on the remaining 23 howitzers in the battalion. The only difference was the section chiefs were "performing the ballet" with a different munition. Forty-six rounds of DPICM would be fired 30 seconds after the Copperhead round impacted.

At 1338 hours, clearance was granted to fire the mission. On the fire support coordination net, "Cancel 'Do not load'" was announced. As the command came over the land line to the howitzer, the Copperhead round was rammed, powder was loaded and the primer was inserted. Before the lanyard was hooked up, the section chief made one final check of the piece.

At 1340 hours, the breach rocketed back in recoil as the first Copperhead round fired in combat began its journey to the target. The crew swayed as the howitzer rocked back against the spades.

The platoon FDC, radioed, "Shot, Copperhead." Sergeant Lee heard the announcement

in his helmet earphones and knew the command to laser designate would follow in about 30 seconds. As the Copperhead followed its ballistic are, the seconds seemed to tick off in slow motion. Throughout the brigade and at the DTAC, breathing stopped as ears were strained and concentration was focused on the radio speakers.

The platoon fire direction officer (FDO) keyed his mike and announced, "Laser on." Just like a rifle marksman, Sergeant Lee took half a breath and held it as he lased for the last 13 seconds of the Copperhead's flight. He could hear his heart pound as things seemed to come to a complete standstill. In the center of the reticle there was flash and then the building erupted as smoke and dust shot out of windows and doors.

Seconds later, the FDC announced, "Shot, DPICM." Sergeant Lee shoved his face back up to the G/VLLD eyepiece and strained to see through the smoke. He briefly wondered if the night sight could peer through the gloom. This thought was suddenly interrupted by the twinkling flashes of DPICM bomblets going off around the building. Over the radio, he heard the FDO report, "Rounds complete, DPICM." Sergeant Lee pressed hard on the eyepiece in an effort to see better. The smoke was just starting to clear as the second volley of DPICM rained down on the target.

Before the smoke from the DPICM could settle around the blockhouse, Sergeant Lee was directed to engage the observation tower. The goal was to use artillery to destroy it and deny the Iraqis an elevated observation platform that had a commanding view of the terrain. Again, the FDO read out the grid that had been sent in digitally. The scene was repeated with the verification of the target grid and data on the howitzer. The tower crumpled as the Copperhead round impacted near the base.

As his FISTV began pulling back to the brigade main command post, Sergeant Lee began to reflect on the planning and preparation that went into this effort.

The Plan

What had been a defensive mission given to the 1st Cavalry Division as the air war started had turned into an operational deception to keep the Iraqis focused on the Wadi Al Batin. This would allow the buildup of forces and materiel for the main attack to occur to the west. With 1-7 Cav stretched out over a front 70 kilometers wide, 1st Brigade had been given the warning order that it would soon assume responsibility for security and counter-reconnaissance in front of its area on the division's western flank.

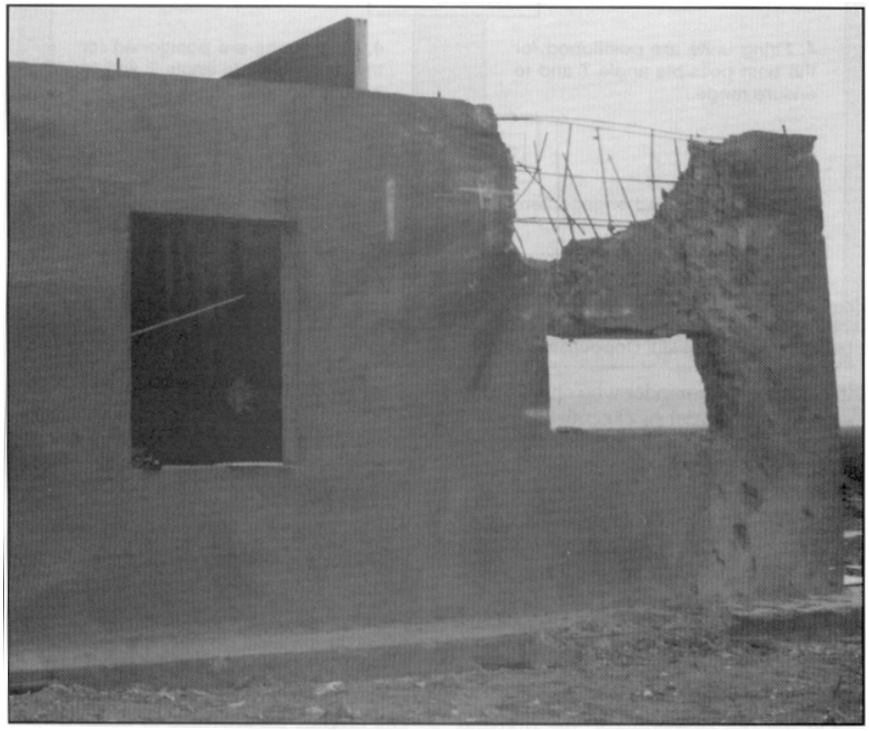
The brigade began a detailed intelligence preparation of the battlefield (IPB) of the nearly 40-kilometer stretch of the border for which it would soon have responsibility. In addition to a highly detailed template of enemy dispositions, the division G2 and his staff provided a wealth of extremely accurate information from a broad range of intelligence sources. Also, a continued dialogue with 1-7 Cav kept a stream of firsthand tactical intelligence flowing into the brigade. The brigade commander and his staff were confident in their knowledge of the enemy being developed in the continuous IPB.

As the intelligence rapidly came in and was analyzed, the brigade S2's template dramatically came into focus. The entire brigade staff targeting team was contributing to the analysis and targeting effort. Known and refined templated enemy positions were updated on the target list. Of special interest was an outpost on the border that dominated the center of the brigade's sector on the featureless desert terrain.

The brigade executive officer (XO) began leading the staff through the development of several courses of action (COAs) for a counter-reconnaissance effort. The goal of this activity was to deny the enemy any significant intelligence of the division's activities west of the Wadi Al Batin. Part of the commander's guidance was to ensure 1st Brigade soldiers were exposed to the minimum risk. The use of Field Artillery immediately jumped to the top of the queue. Initially, Copperhead was last on the list of options that included attack with high-explosive (HE) rounds using concrete-piercing or delay fuzes, DPICM and a mix of HE and white-phosphorus rounds.

The brigade FSO began coordinating with both the direct support (DS) battalion and the 1st Cavalry Division Artillery. The DS battalion commander recommended the use of Copperhead followed by several volleys of DPICM. This was a technique the battalion had refined during training at the National Training Center, Fort Irwin, California, many months before and was not in any manual.

The brigade targeting team discussed the tactic of using Copperhead and DPICM for the mission of destroying the border outpost. Some concern arose over the ability of Copperhead's shaped charge warhead to do enough damage to the complex. The brigade engineer provided



This picture shows the effects a Copperhead round has on a reinforced concrete building.

a very detailed explanation of what the effects would be. Satisfied, the targeting team declared Copperhead the best option.

Coordination continued. The 1st Cavalry Division Artillery oriented a Q-37 Firefinder radar and had the multiple-launch rocket system (MLRS) battery prepare to deliver immediate counterfire. The division artillery meteorology section would "fly Mets" to account for the effects the weather conditions would have on Copperhead and DPICM. The FSE at the DTAC would coordinate with the division cavalry squadron for air cover and early warning. It also would coordinate airspace with the Air Force.

At the brigade main command post, the targeting team determined the observer would be the combat observation lasing team (COLT). It would be positioned beyond what the S2 felt was the 3,000- to 4,000-meter maximum engagement range for any anti-tank or heavy machineguns the Iraqis may have had at the outpost complex. Several hundred more meters of standoff was added for good measure.

The 1-82 FA S3 and FDO determined the optimum range for delivering the munitions and reminded the FSE of the Copperhead geometry requirements. A tank-heavy platoon-sized force was designated as the security element.

On the target overlay, the targeting officer drew a line south from the outpost. At 4,200 meters from the target, he drew a tick mark for the observation post (OP) the COLT would occupy. Extending the line to the south to a distance of 12,000 meters from the outpost, a position area was designated for the battery that would fire Copperhead. The area within the task force sector was cleared.

The DS battalion requested a security element accompany a position and azimuth determining system (PADS) section when it established survey for the COLT and the firing battery. The purpose of this survey effort was to ensure the angle T formed by the COLT's laser, the target and the firing battery was as close to zero mils as possible. Limiting angle T in this manner would increase the probability of the Copperhead's hitting the target when it would be painted with the G/VLLD's laser.

The brigade staff war-gamed the mission. They discussed responses the brigade would make to any probable actions from the Iraqis. Satisfied that they had a workable contingency plan, they briefed it to the brigade commander who approved it, subject to his order of execution.

The planning and coordination for this counter-reconnaissance mission was as complete as the brigade staff could achieve—short of receiving the order to execute. On the evening of 5 February 1991, a 1-7 Cav AH-1 helicopter on patrol received fire from the outpost complex. The brigade XO called the battle staff together to review the plans for destroying the outpost. Satisfied, he instructed the battle staff to begin preparations.

On the 6th of February, the division commander called a meeting of the major subordinate commanders. The commanders of 1st Brigade and the 1st Cavalry Division Artillery briefed the division commander on the contingency plan.

General Mechanics

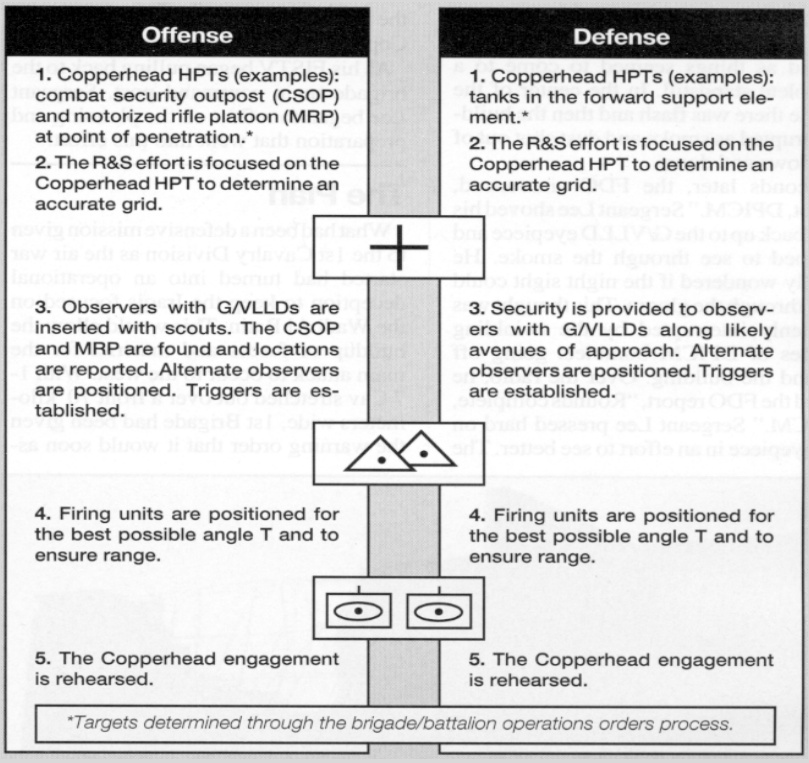
1. Targets are determined in the brigade/battalion operations orders process. The S2 produces the high-value target (HVT) list for the enemy being faced. The staff war game defines the high-payoff targets (HPTs). It also determines the HPTs best suited for attack with Copperhead.

2. The reconnaissance and surveillance (R&S) effort is focused on the Copperhead HPTs. The R&S must produce accurate target locations and intelligence. It also should nominate observation posts.

3. The ground/vehicular laser locator designators (G/VLLDs) are then positioned to designate the HPTs. This may require security support from maneuver units.

4. The firing units are then positioned to meet angle T and range requirements.

5. The engagement *must* be rehearsed.



Steps for a Successful Copperhead Mission

Preparation

The brigade fire support NCO (FSNCO) had been involved in the planning from the beginning and provided the user-level technical details that often get overlooked. After the brigade commander approved the contingency plan, the FSNCO supervised the staff briefing of the COLT crew. The brigade S2 provided in-depth detail of the enemy and his capabilities and likely responses.

The brigade engineer discussed what was known of the construction of the outpost complex and how to attack it with Copperhead. One of the assistant brigade operations officers briefed what forces would provide security and ensured the signal operation instructions (SOI) packet issued to the COLT included the necessary call signs and frequencies.

The brigade FSNCO conducted a detailed pre-combat inspection of the M981 FISTV. In addition to the targeting station and G/VLLD, the radios and M60 machinegun were checked for function. The preventive maintenance checks and services (PMCS) were then verified. The brigade FSNCO next inspected individual equipment and weapons. Finally, equipment was loaded into the vehicle according to its load plan. The bottom line was that the COLT would go into this mission at 100 percent.

The brigade FSO and DS battalion S3 had coordinated to conduct a FM radio rehearsal. In addition to ensuring that both voice and digital communications worked, the rehearsal would verify the proper technical procedures were being followed throughout the Field Artillery gunnery chain.

During the late afternoon of 6 February, the DS battalion FDO led the rehearsal. Technical players involved were the battalion FDC, COLT and B Battery's 1st Platoon FDC. Monitoring were the brigade FSE and DS battalion tactical operations center (TOC). The DS battalion S2 gave an intelligence summary. The FM rehearsal was short and concise. It demonstrated that all players knew the script and the actions they would take.

On the morning of 7 February, the division commander gave the go-ahead to destroy the border outpost. The division artillery commander ordered the DS battalion to move forward and occupy the positions. The PADS section linked up with the COLT FSNCO and the security team and went forward to conduct survey at the OP. Once survey was complete, the COLT FISTV came forward and occupied the position, oriented the targeting head and worked up the data to the outpost.

Additionally, other elements of the 1st Cavalry Division were smoothly brought on line to support the operation. The 1-7 Cav positioned its air cover. Radars, MLRS and reinforcing cannon units were moved into position and readied for action.

It was 1240 hours. All the links of the gunnery chain were set. Everyone anxiously waited for the approval to fire.

Epilogue

From the completion of the mission, the 1st Brigade owned the border in its area of responsibility. The border outpost was kept under constant surveillance. Amazingly, the Iraqis did not attempt to retake the complex. More surprising, yet consistent with the barbaric disregard Saddam Hussein displayed with his own forces, was that the 1st Cavalry Division did not observe any Iraqi efforts to evacuate wounded soldiers who may have survived the attack or to remove the dead. Spanning the division sector, there was an immediate increase in the number of Iraqi soldiers coming south to surrender.

The 1st Brigade was to repeat this process by firing four more Copperhead rounds to destroy two other observation facilities inside Iraq before the formal start of the ground war. All four hit the targets that were laser designated.

Conclusion

This examination of the first combat use of Copperhead demonstrates the basics for successfully employing the munition. The lessons that can be derived are applicable to its use against any target on the battlefield. A following short discussion looks at these basics from a ground maneuver brigade standpoint.

• The IPB is critical to setting the stage for COA development. It must be continuous. In this case, the IPB determined the border outpost complex as a high-value target (HVT). Based on the mission the brigade was given, the battle staff converted the HVT into the brigade's high-payoff target (HPT) for this counterreconnaissance mission. The focus of intelligence-collection efforts (reconnaissance and surveillance) was then directed to support the attack and destruction of this HPT.

• The staff war game determines how the HPTs should be attacked. Input from the targeting team is essential.

• Employing Copperhead is not a trivial endeavor and has significant overhead. As a minimum, the cost is one platoon out of a firing battery. Additionally, a Copperhead engagement might well be the brigade's critical mission against the most important HPT and can absorb the attention of the brigade commander, fire support coordinator (FSCOORD), battalion FDO and brigade FSO at the expense of other missions. The bottom line: due to the large investment of resources, Copperhead should only be considered for use against the commander's HPTs.

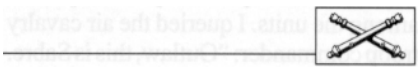
• It takes a lot of coordination to get the observer with the G/VLLD into position. The first concern is security to ensure survivability because a dead COLT can't shoot anything. Second, positioning the G/VLLD and firing unit must be deliberate to control the geometry to optimize angle T and ensure the delivery unit has sufficient range. Third, survey may be necessary if the observer does not have a reliable global positioning system (GPS). Additional considerations may include radio retransmission or the use of alternate observers to maintain surveillance of the target area.

• The destructive effects of Copperhead can be increased by employing complementary munitions, such as DPICM.

• Rehearsals and technical excellence ensure success.

• Lessons learned at our Combat Training Centers do have application in combat.

The 1st Cavalry's employment of Copperhead during Desert Storm was not only the Army's first use of Copperhead in combat, but it was also the first ground combat of conventional US Army forces in the campaign. The 1st Cavalry's Desert Storm procedures for planning preparing and executing Copperhead engagements serves as a model for Field Artillery units worldwide.



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Fighting in Your Face—and Winning

by Colonel Robert W. Mixon, Jr., AR

"Sabre Six, this is Sabre Redleg. Have lost commo with all Redleg elements. Over." As my M3A2 Bradley fighting vehicle lurched along the desert floor in the pre-dawn blackness, I swore loudly, knowing full well no one could hear my frustration. As I turned in the hatch to see if my FSO [fire support officer] was close by, I realized almost immediately it was too dark to see—just as it was too loud to hear anything but the roar of my command vehicle and the rush of the radio. After several more futile radio calls, I shifted my focus to the armored cavalry units, monitoring their movement by bounds.

Light came, breaking slowly over the jagged mountain range to the east. Now without artillery, my cavalry troops continued their movement-to-contact, using organic mortars to fire screening missions along the flanks. The tank company moved from one position to another on a prearranged schedule, never stopping long enough to be targeted.

Suddenly, reports began crackling over the nets as enemy artillery fire exploded among the units. I queried the air cavalry troop commander: "Outlaw, this is Sabre. Sitrep [situation report]. Over." A few moments later, the reply buzzed in my helmet: "This is Outlaw. Enemy COPs [combat outposts] at NAIs [named areas of interest] 2 and 3—one T-72 tank, two BMPs dug in at 2, same at 3, platoon of three BMPs refueling vicinity of NAI 7, six mortars dug in at WA 127447. Thirty mikes of fuel left in Alpha Team, then need to rotate to Bravo. Over."

As we moved on to the objective, a ragged outcrop of ridgeline shrouded in smoke, we began to take more casualties. I peered through the dust, watching my "hot" [lead] troop struggling with a determined defender on the finger ahead.

"Have got them [Redlegs elements] up now"—the voice of the FSO interrupted my thoughts.

"Roger, *fire* QA 12," I responded immediately. But it was too late—the decision support template made that all too clear. Synchronization was out now. The artillery and I were no longer in harmony.

The battle intensified...

"Outlaw, did you copy firing QA 12?" I waited for an answer. Agonizing minutes passed. I was so tired I felt my eyelids move when I blinked, but my heart pounded.

"Roger. Be advised, cannot observe QA 12," Outlaw finally responded. "Had to rotate birds. Am now receiving heavy small arms fire vicinity of DP [decision point] 3."

"Shot. Over," the FSO announced tersely.

"Fox Troop now black on tanks; need to pass guidon to Eagle," the S3 broke in to tell me my hot cavalry troop had taken too many casualties to continue fighting.

"OK," Ireplied, "let's push Heavy Troop right up with Eagle to overrun the objective before there's more daylight."

In a sinking moment, I realized my beloved armored cavalry squadron was fully committed to an attack without adequate fire support, an attack that would succeed only at great cost, and it was no one's fault but my own. I was now only a spectator.

In the minutes that followed, the leaders and troopers did exactly as they were trained to do: they overran the enemy rapidly, consolidated and prepared for counterattack. The costs in terms of dead and wounded were tremendous, and I agonized over them.

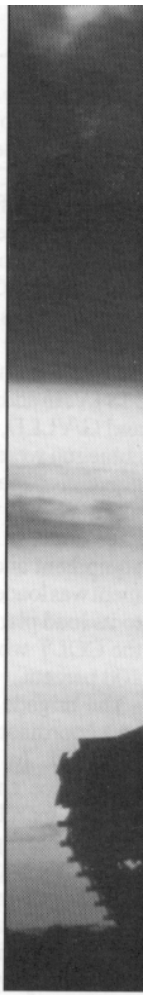
"*Thank God* this is the NTC [National Training Center, Fort Irwin, California]," I thought. My dejected mood was momentarily broken as a compact figure strode up to my side.

"Basically, Sir, we lost a good 50 percent of the squadron taking this lousy piece of desert," the command sergeant major stated bluntly. "There's no reason we should have been beat up like this taking one platoon position. Where the hell was our artillery? We could have suppressed the enemy and put more smoke out there.

"It looked and sounded to me like you got yourself into a maneuver fight instead of a combined arms fight. If you lose commo with the artillery, you have to have an alternate plan. We can't afford not to, Sir." My principal advisor and friend looked away from me and then said. "I'm going to go keep the casualty evac operation moving." Then he walked away dejectedly down the rocky path toward his vehicle and the busy soldiers below.

"Now I know what a Pyrrhic Victory is," I thought to myself bitterly as I reflected on the lecture just received.

The fundamental lesson I learned that dark morning in the fall of 1991 was that fire support is more than artillery, and the combined arms commander must be able to put it all together at the right place and time. And if he doesn't put it together, he won't win the close battle...or at least *win* in terms Americans can accept.

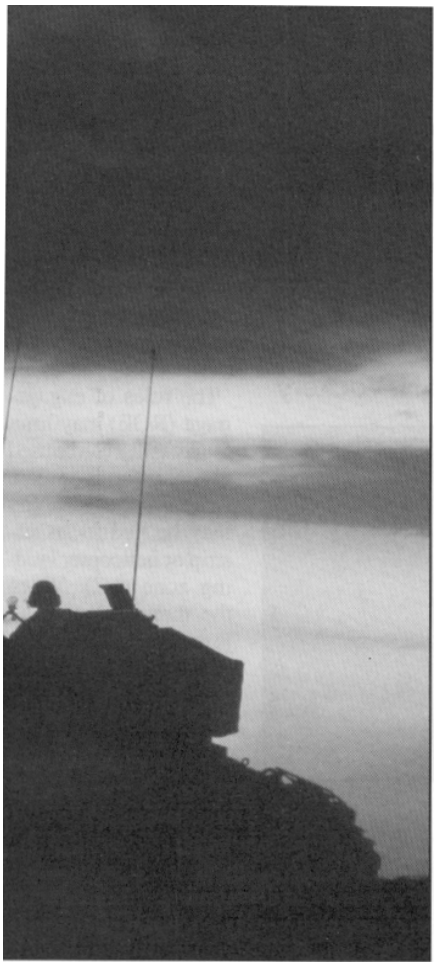


Putting It All Together

Okay, so how do you make fire support fit with the other elements of synchronization at the right place and time? Based on my experience and the wisdom of many leaders who have coached me over the years, I offer a few suggestions in the paragraphs that follow.

Perform a commander's preparation of the battlefield (CPB). I dispensed with the term "*intelligence* preparation of the battlefield" years ago because I'm convinced IPB is not encompassing enough. The *commander* drives the preparation for battle; no one else fully understands the many intricacies and facets of his vision. If you study how Napoleon prepared the battlefield for his stunning victory at Austerlitz, you'll see a classic example of how this process works. (See the figure for the CPB process.)

Apply the KISS principle. Nowhere is this tenet more important than when planning and executing fire support. For example, I wouldn't allow my troop commanders to plan more than six targets because I knew they couldn't execute



more than that and do all the other things they must do to fight their units. I also used two or three target groups at the battalion level for each mission to simplify planning and executing the close fight. And the process of grouping identified more clearly how supporting fires fit into my intent. From concept through rehearsal until the operation ends, using the KISS principle keeps everyone focused on what I call the "realm of the possible."

The commander must constantly focus on stating clearly and concisely his concept for fire support to the fire support coordinator (FSCOORD) early in the planning process. I think a good example would be, "I intend to channel the enemy into EA [engagement area] Spur and kill him there. The trigger will be DP 3."

Fire support and maneuver must rehearse together—they must rehearse on the ground upon which they'll fight, actually putting a stake in the ground at the center of EA Spur.

Avoid too much dependence on technology. For example, don't rely solely on the tactical fire direction system (TACFIRE) to target and execute—be prepared to backup TACFIRE. I can recall a number of times when TACFIRE failed in the course of an operation.

More importantly, I remember many operations when combined arms commanders (myself included) planned fires that only could be accomplished under *ideal* technological circumstances. Technology tends to lead us in that direction. But we get paid to resist the temptation of overreliance on equipment.

There are exciting developments on the horizon that take advantage of American technology; the Force XXI Battle Command system recently tested at the National Training Center is one example. We would be fools not to exploit such developments. However, when technology does fail, you need an alternate plan—a plan for when the screen goes blank or when you speak into a radio microphone and get no reply.

Know your people and equipment. Finally, the commander and his staff must understand the capabilities and limitations of their people and the systems available. We discuss the first category frequently (and justifiably so), but the second gets less emphasis than it deserves.

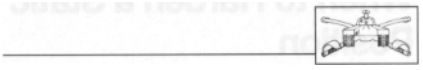
An FSO for an armored cavalry squadron (or any maneuver unit) must know the effective range of an M2/M3 Bradley fighting vehicle as well as he knows the range of 155-mm artillery. He must train "hands on" with the systems he lives with. The best artillery lieutenant I ever met once described the capabilities of the armored combat earthmover (ACE) as well as any engineer officer could.

All too often, I see officers without a professional library or with a collection of manuals that have never been opened. An artillery officer doesn't have to be a scholar, but he must be comfortable in his environment. That "comfort" comes from the intellectual study of the profession of arms as much as from technical competence and experience.

Arming the Fire Supporter

Armed with the tools of a clear commander's intent, CPB, appreciation of the KISS principle and understanding of technology (avoiding overreliance on it), the artillery leader will be well-equipped to help the maneuver commander win the close battle. With true awareness of the role of fire support in the combined arms battle, the FSO can support the commander in the manner our soldiers deserve.

The future battlefield will be vast in many ways, reaching far beyond what we've seen before. Nonetheless, it still will be the leadership of men and women who plan thoroughly and execute violently that will carry the day. One can't prepare too much or too soon for that challenge.



- ❑ Assemble all players to review the intent as early as possible in the planning process.
- ❑ Conduct a leaders' reconnaissance. Include "all the guys": maneuver, fire support, engineer, logistics, chemical, etc.
- ❑ Build a decision support template that's clear and understandable. Keep it simple—rarely will a complex plan work, especially in the close battle.
- ❑ Insist on rehearsals at every level. Discourage fire support rehearsals by themselves; they need to be integrated with maneuver rehearsals.
- ❑ Remember that the CPB process is continuous. That doesn't mean you change the plan five times as the situation develops, but it does mean you constantly check the preparations of your combined arms players to ensure they're ready to mass combat power at the decisive moment.

Guidelines for the Commander's Preparation of the Battlefield (CPB).

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Battery Defense in OOTW: How to Harden a Static Position

by Captains Julio L. Alvarez, Jr., and William N. Vockery

With the emphasis on operations other than war (OOTW) in the new *FM 100-5 Operations*, it's beneficial to revisit the unconventional threats we've already faced. In Vietnam, the enemy looked, spoke and acted like members of the indigenous population, and the threats were mortars and attacks by dismounted infantry who struck quickly at the time and place of their choosing. The Field Artillery countered the enemy by building hardened firebases. In Somalia, the same threat model applied, although an occasional mounted terrorist attack also occurred.

Except for the sheer numbers of enemy soldiers and civilians on the battlefield, Joint Readiness Training Center (JRTC) training scenarios at Fort Polk, Louisiana, are remarkably similar to those faced in Vietnam and Somalia. This article discusses when and how to harden a static position—battery defense tactics that worked in Vietnam, work at the JRTC and will work in future OOTW.

When to Harden a Static Position

When maneuver elements conduct search and destroy operations, protect convoys or conduct local air assaults on the nonlinear battlefield, the artillery may not always follow to provide support. Firing batteries may remain in dispersed, hardened positions for long periods of time—perhaps days—to provide fires over a large area.

The defense of this static battery is quite different than a move-and-shoot battery. Because it's stationary, it's most likely going to be detected—the fundamental difference between the two survivability techniques. The threat on the nonlinear battlefield is not one of armor or aircraft attacks or even heavy artillery fire; rather, the threat is dismounted soldiers and mortars. (See Figure 1 for a comparison of OOTW and conventional battlefield factors for the Field Artillery.)

This threat is not necessarily less than that in a conventional conflict; it's simply different. In a world so dominated by technology, it's easy to forget that our enemy may be a few thousand soldiers armed only with rifles, machineguns, rocket-propelled grenades (RPGs) and mortars. An enemy of this kind will attack when and where he feels confident of victory at minimum cost, and a poorly defended firing battery provides a lucrative target.

There are many reasons to occupy a static position. Field Artillery units could occupy a static position when maneuver units conduct operations to secure a limited terrain objective. For example, when a brigade secures an airfield, its soldiers probably won't walk beyond the range of artillery deployed on the same airfield. In less inhabited areas, an airfield may be the only terrain suitable for artillery to occupy.

The rules of engagement (ROE) may limit the areas that can be used to support an operation. Ammunition resupply may be tied to an airstrip or helicopter landing zone (LZ). When the threat is not from just one direction, the battery will have to position itself to fire in all directions.

Commanders and planners must first analyze the factors of mission. enemy, terrain, troops and time available (METT-T) to help them decide if the Field Artillery position should be static and whether or not the firebase should be hardened.

Mission. Does leaving a firing battery in a static position support the maneuver commander's intent? Is there a requirement for 6400-mil coverage of the battlefield? Are there tasks implied that require a hardened position—for example, protecting the Q-36 Firefinder radar or task force tactical operations center (TOC) or projecting US artillery deep into enemy

Factors	Conventional	OOTW
Enemy Threat (In order)	Artillery, Armor, Air, Dismounted	Dismounted, Indirect Fire, Terrorist Attacks
Enemy Missions	Defend, Attack, Maneuver	Cause US Casualties, Involve Media, Involve Civilians
Friendly Missions	Defend, Attack, Maneuver	Search and Attack, Protect Convoys, Defend
Terrain Considerations	Linear, Multiple Positions	Restrictive, Limited Positions, 6400-Mil Firing
Field Artillery Survival Techniques	Movement, Dispersion, Avoid Detection	Hardening, Defense

Figure 1: Comparison of Conventional and OOTW Battlefields Factors for the Field Artillery

territory? The latter example is particularly important in the context of clear-in-zone missions. The force can use the firebase as a protected, centrally located headquarters to control its operations and, perhaps, lure the enemy into a decisive engagement.

Enemy. Is the enemy capable of air or armor attacks, counterbattery fire—how will he attack? In what numbers? How sophisticated is the enemy—what weapon systems will he use?

Dispersion of friendly equipment within a position is determined by the threat. Tight positions work better against a ground threat. The opposite is true against more conventional threats.

Terrain. Are positions with open, clear fields of fire (300+ meters) available or engineers available to create these positions? Are there any restrictions as to where the position can be situated, such as ROE or terrain too rocky to allow hardening? Will the soil support the type of weapon being emplaced? Will resupply occur by air or ground? Will the position support other assets, such as a radar? Are there sufficient positions to provide mutually supporting fires? What is the climate (particularly rainfall)?

Troops. Are engineer assets available? Have we factored in the additional demands on the troops when they have to harden a position? Firing units need to be at full strength to occupy and operate from a hardened position effectively. This is due to the demands of perimeter security and position improvement, which exceed the abilities of a depleted battery.

How many missions are going to be fired and what will the operations tempo (OPTEMPO) be? A standard modification table of organization and equipment (MTOE) battery can support 24-hour operations, if firing is sporadic and limited in number of rounds per mission. However, the daily controlled supply rate (CSR) for one battery on a firebase late in the Vietnam War was 2,000 rounds.[1]

Are additional troops available to support the defense of the position? Generally, Field Artillery units must not count on infantry support for survivability as infantrymen will be involved in other manpower-intensive operations.

Time. Are the priorities of work defined for each situation and the support available to make hardening feasible in the given time? Hardened positions are not occupied in 10 minutes or even one hour.

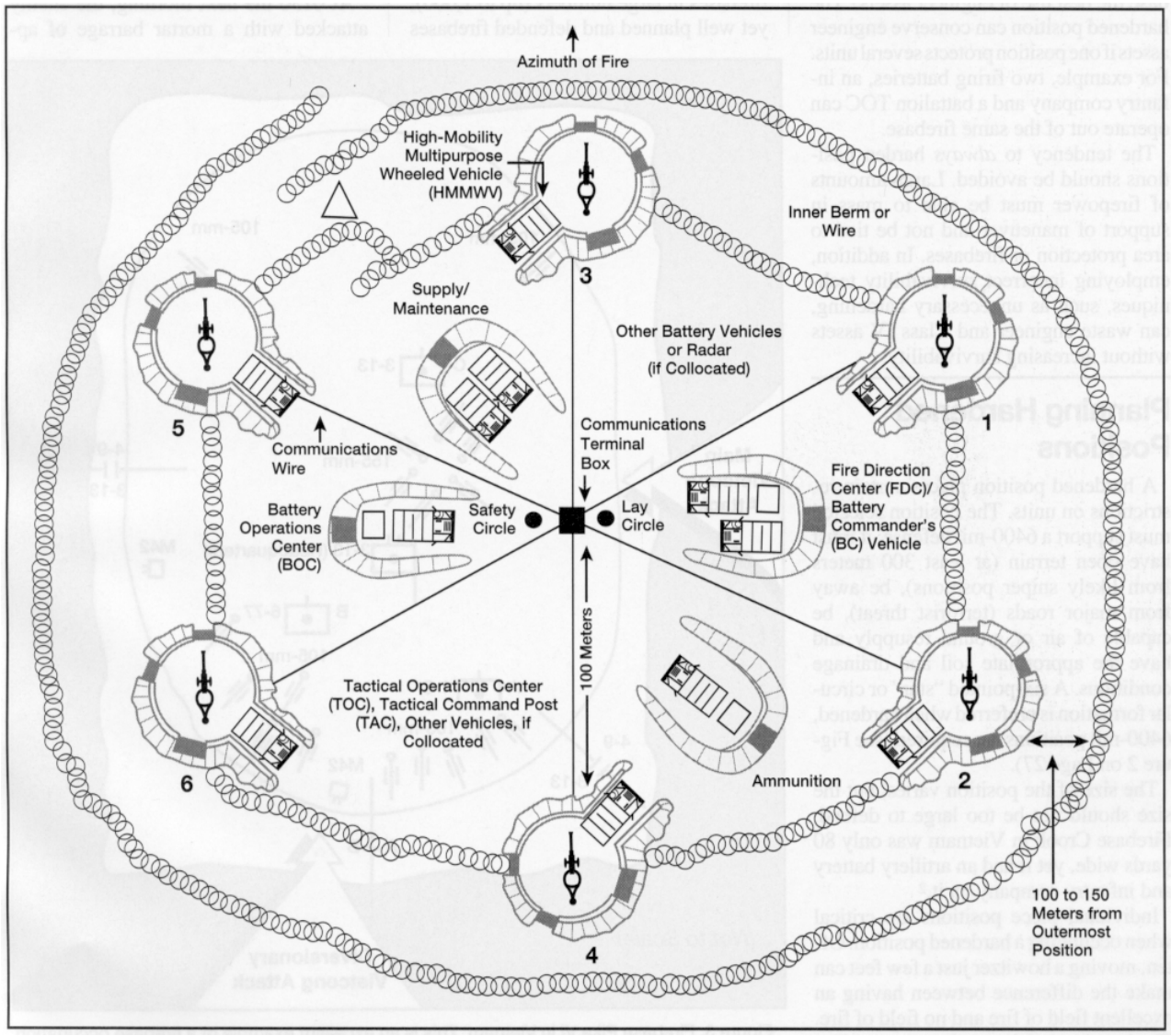

Figure 2: Hardened Battery Position in the Star Formation

Each takes a different amount of time to construct, depending on the quality of the position and the amount of hardening necessary. The length of time it takes to occupy and harden a position is directly proportional to the number of soldiers occupying the position and the availability of engineers and Class IV (building materials).

As you analyze METT-T, you must be sure the decision to harden a static position *best* supports the maneuver commander and consider several critical factors. Will maneuver forces move out of artillery range if the position is static? Will the hardened site facilitate the defense of maneuver forces when they aren't conducting operations? Is hardening the firebase the best use of engineer assets? The hardened position can conserve engineer assets if one position protects several units. For example, two firing batteries, an infantry company and a battalion TOC can operate out of the same firebase.

The tendency to *always* harden positions should be avoided. Large amounts of firepower must be able to mass in support of maneuver and not be tied to area protection or firebases. In addition, employing incorrect survivability techniques, such as unnecessary hardening, can waste engineer and Class IV assets without increasing survivability.

Planning Hardened Positions

A hardened position places certain restrictions on units. The position selected must support a 6400-mil defense; it must have open terrain (at least 300 meters from likely sniper positions), be away from major roads (terrorist threat), be capable of air or ground resupply and have the appropriate soil and drainage conditions. A six-pointed "star" or circular formation is preferred when hardened, 6400-mil positions are required (see Figure 2 on Page 27).

The size of the position varies, but the size should not be too large to defend. Firebase Crook in Vietnam was only 80 yards wide, yet it had an artillery battery and infantry company on it.[2]

Individual piece positions are critical when occupying a hardened position. Often, moving a howitzer just a few feet can make the difference between having an excellent field of fire and no field of fire. The locations of the section crew-served weapons are crucial. In terms of survivability, a machinegun position is more important than a howitzer position when a battery isn't augmented by infantry. This is because the crew-served weapon can be manned even during heavy shelling while the howitzer cannot. The howitzer and other crew-served weapons *must* be well-positioned—and if that takes an hour to accomplish, it's time well spent.

The availability of engineer equipment and Class IV is also extremely important. A position that will be occupied for an extended time requires a large amount of Class IV for success.

If properly planned, a hardened artillery position can survive against overwhelming odds. The enemy in Vietnam attacked firebases in large numbers (up to 1,000); yet well planned and defended firebases survived with minimum losses. Firebase Pike VI in Vietnam is an excellent example of a firebase occupation and defense against an enemy attacking in human waves and with mortars (see Figure 3).

Three batteries (one 155-mm and two 105-mm) entered the Pike VI fire support base early in the afternoon, and a bulldozer began constructing berms for the six 155-mm howitzers. By nightfall, only the turrets of the howitzers were exposed. The 105-mm batteries were carefully positioned to allow maximum use of Beehive rounds. Two 105-mm howitzers (one from each of the 105-mm batteries) were placed at strategic points along the perimeter some distance from the rest of the battery positions.

At 0130 the next morning, the enemy attacked with a mortar barrage of approximately

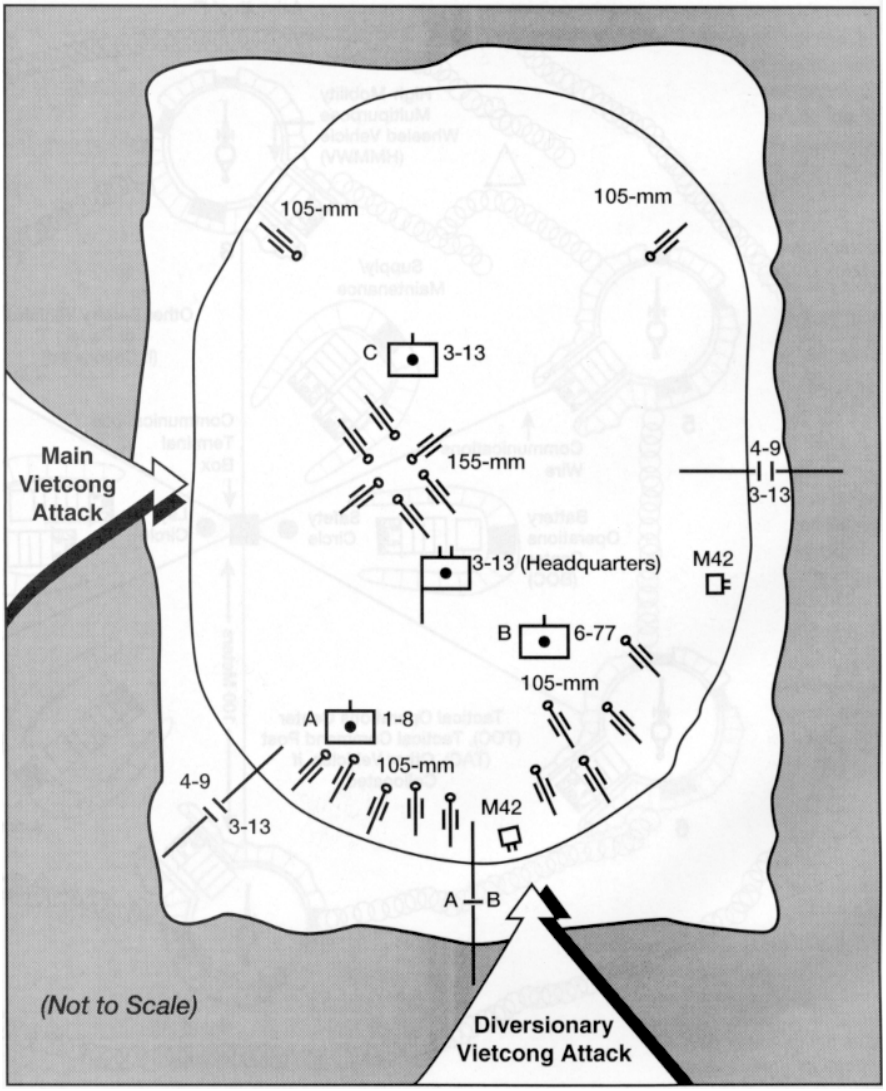

Figure 3: Firebase Pike VI in Vietnam. This is an excellent example of a firebase occupation and defense against an enemy attacking in human waves and with mortars.

400 rounds, all falling within 60 minutes. The enemy was repelled by small arms and the devastating use of multiple 105-mm Beehive rounds. Friendly force losses amounted to five killed and 30 wounded, of which one killed and five wounded were artillerymen. No equipment was lost.[3]

Advance Party

1. Select a defensible site that will support maneuver forces yet does not require massive engineer effort (300+ meters fields of fire).
2. Scratch out positions for howitzer and equipment berms, bunkers, vehicle positions, critical equipment positions, machinegun sectors of fire, howitzer direct fire sectors, etc.
3. Construct individual hasty fighting positions.
4. Lay out the defensive perimeter (interlocking fields of fire).

Occupation

5. Site/emplace the crew-served weapons.
6. All personnel dig individual hasty fighting positions.
7. Determine the final locations for defensive fighting positions and howitzer sectors of fire.
8. Finalize the perimeter.

After Occupation

9. Emplace wire obstacles, mines and early warning devices.
10. Improve individual positions from hasty to two-man foxholes.
11. Harden/dig-in critical materiel and equipment (in priority): overhead cover for all personnel, radar, TOC or other critical nodes, fire direction center/battery operations center (FDC/BOC), howitzers, ammunition and the remaining support vehicles and equipment.
12. Identify and plan defensive targets (verify with the global positioning system, or GPS).
13. Improve the perimeter wire (triple-strand concertina, tanglefoot).
14. Assign direct fire sectors.
15. Verify the siting of defensive weapons and the preparation of range cards.
16. Coordinate with adjacent units for areas of responsibility, mutual support, communications, etc.
17. Rehearse defenses (including test fires and ranging rounds).

Figure 4: Priority of Work for Hardening a Firebase (*FM 5-15 Field Fortifications*, 1972, Pages 2-15 to 2-19)

How to Establish a Hardened Position

After a decision to occupy a hardened position is made, the success or failure of the position (like every other position) is a direct result of the preparation and training the unit conducted at its home station. Keys to successful preparation are having a detailed but flexible battery defense standing operating procedure (SOP), the right tools and materials, experience working with engineers, knowledge of the capabilities and limitations of unit defense weapons and basic combat skills honed to standard.

Battery Defense SOP. A good SOP on battery/unit defense entails much more than rewriting Chapter 3 of *FM 6-50 Tactics, Technique and Procedures for the Field Artillery Cannon Battery.* The SOP must delineate standards for constructing equipment and personnel positions within the battery perimeter. It should address priorities of work, time standards and use of materials.

When establishing construction standards in a battery defense SOP, the writers should provide pictures, diagrams and measurements to explain the positions. Soldiers can get step-by-step instructions on how to build their positions from the SOP, and leaders can use it as a guide for checking and enforcing standards.

The SOP should outline exactly what soldiers and leaders do and when they do it. Figure 4 shows the priority of work to improve battery survivability.

The SOP also should establish time standards. The hardening process calls for soldiers to begin by constructing hasty positions and then improving them to hardened fighting positions to the standard of a minimum of 18 inches of overhead cover. With the right materials, it's realistic to expect all soldiers to build standard positions within one to four hours of occupation. Time estimates for constructing various positions are available in FM 5-15 and *FM 5-34 Combat Engineer.*

Equipment positions are constructed next and usually start as berms. Care should be taken to ensure each berm is as high as the people working inside. If possible, command and control centers should be remoted inside a bunker with overhead cover.

Ammunition then receives attention, depending on the quantities on hand and likelihood of enemy mortar attacks. When berms are constructed around the equipment, the berms also should protect the ammunition. An additional ammunition storage point may be constructed to store bulk ammunition temporarily. In the unlikely event an enemy round strikes ammunition, the explosive effects of burning powder will be contained within the berm.

A priority for establishing the perimeter should be to extend concertina wire around the firebase. The first belt should be at least 50 to 75 meters from the outermost equipment. FM 5-34 provides guidance for emplacing triple-strand concertina. Wire obstacles, mines, booby traps and early warning devices should be emplaced within the first six hours of occupation. Even a single-strand layer of concertina

Section/Vehicle	Plywood Sheet 3/4-Inch	Long Steel Pickets	Sandbags	Concertina Wire (Rolls)
Battery Commander/M998	2	6	500	3
BOC/M1038	4	12	500	3
FDC/M1038	4	12	500	3
Supply/M998	4	18	2,000	8
Ammunition/M925 (x 2)	20	60	8,000	20
Howitzer Section/M1038 (x 6)	24	72	3,000	18
Chief of Firing Battery/M1038	6	12	500	3
Advance Party/M998	6	12	500	3
Totals:	**70**	**204**	**15,500**	**61**

Figure 5: Class IV Basic Load for a Light Artillery Battery

wire can establish a perimeter and provide a basis for adding subsequent layers.

The priorities established for position defense must be as deliberate and methodical as those used to emplace a howitzer. The "Unit Defense Checklist" in Appendix H of FM 6-50 provides an outline for establishing a unit SOP. The SOP must be specific and detailed yet allow the flexibility to account for changing threats. A copy must be available for every soldier—they can't meet the standards if they don't know what they are.

Tools and Materials. To harden a position, soldiers must have adequate tools and materials. Many units assume that Class IV will be available automatically soon after arrival in theater—which is not the case. To facilitate both training and deployment, units should maintain a unit basic load (UBL) of Class IV at their home stations for use in the early stages of operations. (See Figure 5 on Page 29 for the Class IV UBL for a light artillery battery.)

Commanders can make the unit accountable for its Class IV UBL by placing it on section hand receipts as additional authorization list (AAL) items. Leaders should inspect the materials during layouts, thus preventing their use for other projects in garrison. These materials are easily replaced when damaged, and having them on hand will save soldiers' lives.

Besides materials, soldiers must have the appropriate tools to construct their positions to standard. Vehicle and howitzer basic issue items (BII) simply aren't adequate for sections to maximize their hardening efforts. Units should buy and maintain section construction kits, consisting of the hardware and tools necessary to expedite constructing positions. The following should be considered for each section's kit: two long-handled shovels, one additional mattock, one claw hammer, nails, one cross-cut saw, one roll of binding wire, one spool of rope (1/2 to 3/4 inch), 550 cord, two pair of wire handling gloves, one sledge hammer (a 10-pounder), two machetes and one swing blade. Commanders also can add the construction kits to section hand receipts as AAL items. The supply section can maintain materials that are bulky or shared throughout the battery, such as four locally fabricated picket drivers and a chain saw.

Training with Engineers. This training is extremely important as constructing a hardened position requires extensive engineer support. Although engineers can construct a multitude of positions (as outlined in *FM 5-103 Survivability*) there's no standard established for constructing a hardened position for a light towed artillery piece or firebase. Units must design their own positions for the various contingencies they could face (see Figure 6). Then they must validate the construction plan with the brigade's engineers.

The Field Artillery battalion must plan and coordinate early to ensure the brigade gives priority to fire support assets in its engineer support matrix. The firing batteries and radar should receive engineer support as early as four to six hours after occupation. The Field Artillery support plan must list in detail the times and places for linking up with engineer equipment, security responsibilities, fuel requirements and the number of engineer equipment "blade hours" allocated.

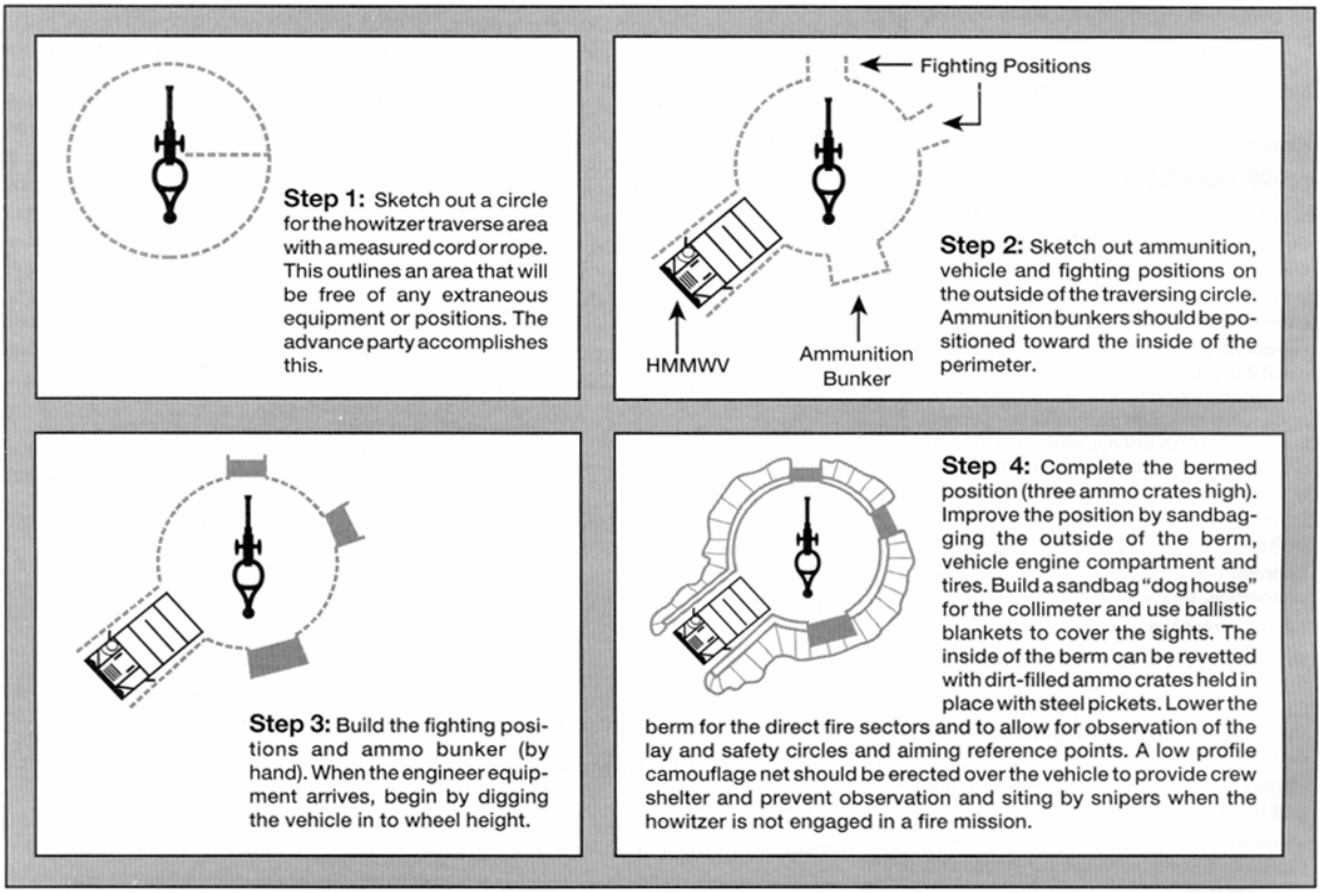

Figure 6: How to Build a Hardened Howitzer Position

Howitzer and equipment berms are constructed by either pushing dirt from the inside out, by pushing dirt up from the outside in or a combination of the two. Berming from the inside out allows for a lower equipment profile and creates a less spoiled outside appearance. This is best for critical nodes, such as ammunition, a fire direction center (FDC)/battery operations center (BOC), any tenant TOCs or the radar shelter. However, this method creates an uneven firing platform for howitzers, which requires time and effort to level. It also negates the howitzer's direct-fire capability because the firing platform is lowered. Berming up from the outside creates a "messier" position, but it's quicker and provides a thicker layer of earth for protection and a better firing platform.

Prime movers can be dug-in to wheel height and bermed up from the outside to cargo canvas level. In this way a vehicle presents a low profile, allowing the howitzer to provide 6400-mil fires over its top.

Some engineer units provide squad-sized elements to not only operate small emplacement excavators (SEEs) and dozers, but also to augment the battery's defensive position preparation. With assistance from battery personnel, these engineers can quickly erect triple-strand concertina wire, tanglefoot and other wire obstacles, mines and early warning devices. Their expertise is invaluable to the battery's survivability.

Knowledge of Weapons Systems. An important aspect of a successful perimeter defense is a thorough knowledge of the battery's weapons and their capabilities. The reality is that most soldiers (and sadly their leaders) do not know how to employ their own crew-served weapons. Training on all these systems—rifles, machineguns, grenade launchers, light antitank weapons (LAWs), mines and early warning devices—is often nonexistent because Redlegs tend to think of the howitzer as the only weapon required for battery defense. Assuming that no enemy will attack the firepower of several well-positioned howitzers leads to complacency about employing an integrated battery defense. The battery defense plan should be based on small arms, crew-served weapons and planned direct fire.

To devise an integrated battery defense plan, leaders must know the capabilities and limitations of their weapons, which is not always the case. For example as seen at the JRTC, a supervisor often stands over soldiers building a crew-served weapon's position and gives the sector of fire for the weapon. If the leader would sight the weapon at the ground level, he often would see the weapon has an obstructed view in its designated firing sector. Another example: too often a supervisor displays misguided compassion and won't tell a soldier to build a new hardened position when the one he built is incorrect or does not meet the standard. Taking care of soldiers means having them rebuild positions to ensure they can survive.

The following is a checklist for positioning and employing a machinegun: emplace the weapon first, then build the position; ensure you're able to open the feed-tray cover, change barrels and sight on targets all under protective cover; ensure the traverse and elevating (T&E) mechanism can operate; use limit stakes; and ensure the weapon has a field of fire for the entire sector.

Range cards must be accurate and usable. Soldiers need to know that range cards aren't just for the preparer but for follow-on users as well. To integrate the battery defense, the first sergeant uses data from the range cards to identify and account for gaps in the perimeter.

Howitzer range cards *must* include accurate firing data for the munitions to fire at defensive targets. This includes the planned use of Killer Junior, improved conventional munitions (ICM) in the wire, Beehive, and direct fire high-explosive (HE) rounds. It's too late to compute the data while under attack. Units can use the global positioning system (GPS), aiming circles or survey to provide distances, ranges, grids, etc. for direct and indirect fire targets.

Conclusion

Every soldier must know every aspect of his unit's defensive plan because any soldier could have to defend any part of the perimeter. Leaders should rehearse every aspect of the defense plan, from actions on the howitzer to a complete walk of the perimeter. They need to identify key areas such as observation posts, entrance and exit points, key mines and obstacles, defensive targets, mutual supporting units, casualty collection points, etc.

The old "whistle, assemble on me" reaction force is not sufficient. Too much confusion exists to assemble individuals from each section and beat back an enemy who is already inside the perimeter. Additionally, friendly soldiers moving about are often mistaken for enemy soldiers during an attack. A reaction force to augment a weakened portion of the perimeter is valid; however, by design, a mutually supporting and well-rehearsed defense plan often eliminates the requirement for its use.

The concept of fighting from hardened positions is not a new one. It is, however, an undertaking that significantly changes our training methods. History has shown we fight like we train. As artillerymen, we have trained our units to move, shoot and communicate—to be mobile. Under many conditions, this is appropriate. But during operations other than war, the conditions, the threat and the mission are different than those calling for mobile artillery.

The Army faced such circumstances in Panama and Vietnam and, more recently, in Somalia. We'll see more of the same in the future—we must be prepared.

Notes:

1. David Ewing Ott, *Field Artillery, 1954-1973* (Washington, DC: Department of the Army, 1975), 186.
2. Robert H. Scales, *Firepower in Limited War* (Washington, DC: National Defense University Press, 1990), 139.
3. Ott, 163

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Versatility and a GS Battalion in the Close Fight

by Captains Robert O. Kirkland and Adam J. Legg

FM 100-5 Operations defines versatility as "the ability of tactical units to adapt to different missions and tasks, some of which may not be on unit mission-essential task lists (METL)."

Recently, our battalion—3d Battalion, 8th Field Artillery (M198 155-mm howitzers)—tested its versatility. As part of the 18th Field Artillery Brigade (Airborne) out of Fort Bragg, North Carolina, 3-8 FA provides general support (GS) fires to the XVIII Airborne Corps. Breaking the GS mold, the battalion deployed its operations and intelligence section (O+I) to the National Training Center (NTC) at Fort Irwin, California, for a rotation in direct support (DS) to a heavy brigade. At the NTC, our O+I section was DS to the 1st Brigade, 24th Infantry Division (Mechanized), Fort Stewart, Georgia.

Why should a GS battalion be concerned with assuming a DS mission? Besides the doctrinal requirements to become more versatile, Army downsizing and increased mission requirements call for fewer units to assume more missions. These certainly can include more nontraditional missions for GS units.

To prepare to support the close fight, we developed an O+I training model. Geared to the unique aspects of transitioning a GS battalion, with its unique METL, to perform a DS mission, other units facing similar requirements for versatility can use the model.

When given the mission to deploy to the NTC in support of a heavy/light brigade task force, we analyzed our mission as compared to the mission of the maneuver brigade's DS artillery battalion (see Figure 1). The same day, we called this DS unit and obtained its METL.

With our staff battle tasks as a base, we queried various DS units to get their O+I battle tasks for comparison. By isolating battle tasks unique to a DS unit, we could concentrate our efforts in those areas to train for the NTC. What we found was that the METL task truly unique to the DS battalion is "Synchronize fire support," which has sub-tasks (see Figure 2).

We began to formulate a plan to prepare ourselves for deployment to the NTC. We divided our preparation into three areas: leader development, simulations and field exercises. The following is a discussion of what we did in each of these areas to prepare for deployment. The process could be used to increase the versatility of any GS unit when required to assume a DS mission.

Leader Development. In preparation for our NTC rotation, it became evident that our highest payoff was to invest the time to develop the leadership of the O+I section. The results of our leader development program confirmed that it was a good decision.

As outlined in *DA PAM 600-32 Leader Development for the Total Army*, leader development is broken down into three distinct areas: operational assignments, institutional training and self development. To fashion our battalion program, the key was to understand the first two areas (operational assignments and institutional

A Field Artillery Unit with a Mission of—	Direct Support (DS)	General Support (GS)
1. Answers calls-for-fire in priority from—	• The supported unit. • Its own observers.* • The force Field Artillery headquarters.	• The force Field Artillery Headquarters. • Its own observers.*
2. Has as its zone of fire—	The zone of action of the supported unit.	The zone of action of the supported unit.
3. Furnishes fire support team (FIST) or fire support element (FSE)**—	And provides temporary replacements for casualty losses as required.	No requirement.
4. Furnishes a liaison officer—	No requirement.	No requirement.
5. Establishes communications with—	Company fire support officers (FSOs), FSOs and the supported maneuver unit headquarters.	No requirement.
6. Is positioned by—	The DS Field Artillery unit commander or as ordered by the force headquarters.	The force Field Artillery headquarters.
7. Has its fires planned by—	Develops its own fire plan.	The force Field Artillery headquarters.

* Includes all target acquisition means not deployed with the supported unit (radar, aerial observers, survey parties, etc.).

** An FSE for each maneuver brigade, battalion or cavalry squadron and one FIST with each maneuver company or ground cavalry troop are trained and deployed by the Field Artillery unit authorized these assets by its table of organization and equipment (TOE). After deployment, FISTs and FSEs remain with the supported maneuver unit throughout the conflict.

Figure 1: The seven inherent responsibilities of Field Artillery in a DS mission as compared to GS mission.

Synchronize Fire Support:

- ❑ Prepare the Field Artillery support plan (FASP).
- ❑ Coordinate for mutual support unit (MSU) operations in tactical fire control and unit movement.
- ❑ Coordinate land for occupation sites.
- ❑ Rehearse fire support.
- ❑ Expand the communications structure to coordinate all fire support.
- ❑ Coordinate fire plans.
- ❑ Assist in the maneuver force intelligence preparation of the battlefield (IPB).
- ❑ Assist in the development of the maneuver commander's operations order.
- ❑ Survey the target area.

Figure 2: The battle task unique to a DS battalion is "Synchronize Fire Support." The battle task has several sub-tasks as shown in this figure.

- Krasnovian Doctrine
- National Training Center Terrain
- Target Acquisition
- Intelligence Preparation of the Battlefield
- Reconnaissance and Survey Plan
- Operations Orders Process
- Battle Tracking
- Fire Support Coordinating Measures (FSCMs)
- Targeting
- Breaching Operations
- DS Battalion Tactical Operations Center (TOC) Functions
- Fire Support Planning
- Suppression of Enemy Air Defenses (SEAD)
- Mutual Support Unit (MSU) Operations
- Joint Air Attack Team (JAAT) and Close Air Support (CAS) Operations
- Special Munitions

Figure 3: Examples of officer professional development (OPD) classes to prepare officers in a GS battalion to accomplish a DS mission.

training) of our personnel to determine where to start with the self-development program.

As we reviewed the assignment histories of the personnel in our O+I section, the differences became clear. Even though the NTC has been in existence for some time, only a handful of our unit's leadership had experienced this demanding training environment. In addition, only a few had been in a DS battalion or had worked in an O+I section. Finally, at the time of notification, the section had not worked together beyond internal battalion exercises—none of which centered on DS scenarios. All of this, coupled with a common base of institutional training (NCO and officer), laid the groundwork for the unit's leadership training.

With limited time to prepare, self development and what the unit could do to develop the entire section to the same level of professional knowledge became our focus. The challenge was not only to determine how to develop the section leaders, but also when to train, prioritizing and integrating it into an already busy training schedule.

To lay the doctrinal foundation, we set up a quality reading library for all personnel: fire support and maneuver doctrinal manuals, Center for Army Lessons Learned (CALL) newsletters, *Field Artillery* articles, Command and General Staff College student texts, "Tactical Primers" from various units ("How To" reports on combat operations), NTC after-action review (AAR) reports and the 24th Infantry Division tactical standing operating procedures (TACSOPs). We mandated time during the training week to allow for self study. Most useful were the maneuver tactics manuals and the FM 6-20 series that allowed section members to develop a better understanding of maneuver and fire support tactics, techniques and procedures (TTP).

We also scheduled a series of professional development classes that built on one another, emphasizing critical aspects of maneuver and artillery doctrine (see Figure 3). The O+I leadership were given assignments to research and present during the lunch hour twice a week.

Initial classes centered on the intelligence preparation of the battlefield (IPB) process, threat doctrine and the command estimate process. Various subject matter experts were invited to teach the classes. For example, a radar technician of the 1st Field Artillery Detachment (FAD) taught a class on employing the Q-36 Firefinder radar.

With these building-block classes completed, the emphasis shifted to honing battle staff drills. These included every aspect of the function of the tactical operations center (TOC) to writing many Field Artillery support plans (FASPs) within a time standard realistic for the compressed planning time available at the NTC.

Other professional development approaches we used were to allow several key members to take part in other units' rotations to the NTC. A great way to expose leadership to maneuver and DS fire support as practiced at the NTC is through the Ride-Along program.

To ensure leaders reviewed the pertinent part of the manuals before classes or drills, we gave them periodic written tests. The test questions pointed the section toward the coming instruction. The tests were given with and without advance notice. We found that a series of such tests yielded excellent results over time.

Finally, in conjunction with the classes and drills, the section put together a "playbook" that summarized lessons learned both from our instruction and drills and extracts of external doctrinal considerations. This playbook proved most useful because it was a handy summary external from the reading library.

Simulations. Simulations are a method of training the GS O+I section on DS operations at relatively low cost. Our battalion O+I participated in three different simulations before leaving for the NTC: battalion and brigade battle simulation (BBS), corps battle simulation (CBS) and Janus. Of the three simulations, Janus was clearly the best for practicing DS operations. The Janus simulation exercised the orders process and executed a brigade-level battle. We obtained maneuver brigade orders from the Field Artillery School at Fort Sill, Oklahoma, which were prepared by students in the officer advanced course. With each order, we produced a FASP.

The Janus system not only allowed us to simulate all planning requirements, but it also allowed us to execute our plan. We conducted fire support operations involving family of scatterable mines (FASCAM), smoke, aerial observers, combat observation lasing teams (COLTs), suppression of enemy air defenses (SEAD), counterbattery fires and the management of planned targets. Additionally, it allowed us to exercise the fire direction center (FDC) in prioritizing calls-for-fire from the maneuver forces, based on the fire support matrix.

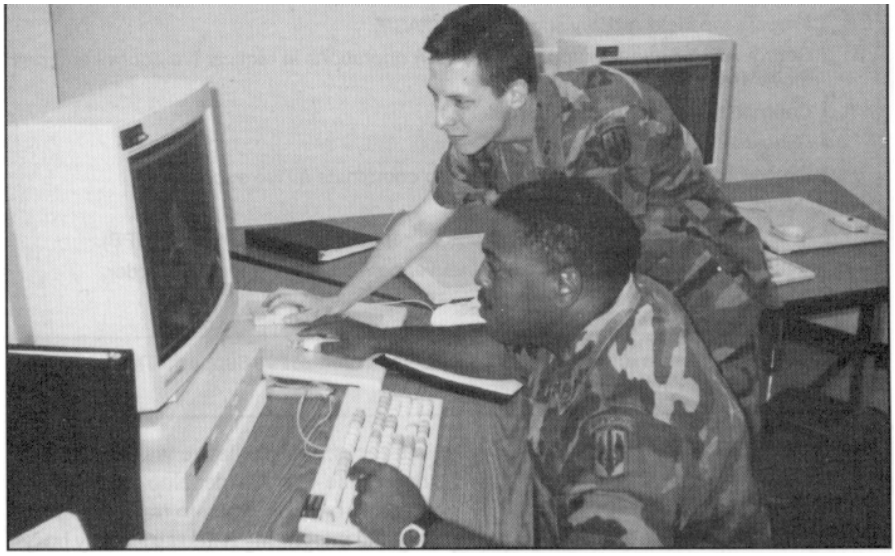
The Janus simulation gave us the ability to capture the entire battle and play it back at increased speed as an AAR tool. Particularly important to us was the ability of the simulation to show exact points in a battle where fires were or were not effective—synchronized

with maneuver. The Janus simulation can give high-payoff training results with little cost to the unit.

Field Exercises. Having our leadership development and simulation program in place, we had the knowledge base to get the most out of our exercises with the maneuver brigade we would support at the NTC. We concentrated on the O+I tasks that only could be trained by actually working with the maneuver unit. The train-ups provided practical experience that proved crucial to making the transition to a DS TOC.

Before these train-ups, we conducted field training at Fort Bragg that continued to exercise our staff METL. The Fort Bragg field training sustained our ability to control fires, manage essential tactical information, move and defend ourselves. We tailored these exercises toward what we might face at the NTC. We conducted more TOC movements then we normally might have done as a GS unit and practiced internal jump TOC operations and mutual supporting unit (MSU) operations with another battalion in the brigade.

Deploying our O+I section off post to the maneuver brigade's training area for two exercises culminated the training events. These deployments exercised the critical area we had only studied in theory up to that point: synchronizing fire support. We conducted one field exercise approximately two months after being notified of the NTC deployment and the other a month before the rotation.



3-8 FA personnel work on their Field Artillery support plan (FASP) while training at a Janus terminal.

We established clear-cut objectives that were realistic yet reasonable for each train-up. To this end, each part of the O+I section came up with a list of tasks it needed to accomplish. For example, the battalion FDC decided it needed to train on establishing digital and voice nets with the fire support element (FSE) and practicing MSU operations with the habitual DS unit and then conduct in-depth rehearsals with all FSEs.

For the first train-up with the 24th Division brigade, the O+I section concentrated on the basics. Taking lessons learned back to Fort Bragg, we continued the leader development and simulations programs. Returning to Fort Stewart two months later, the section trained the more complex tasks on its list. The field exercise portion is where units pulled it all together.

The battalion transitioned from a GS to a DS O+I section within the time constraints of an NTC deployment. A greater challenge is to incorporate the model into daily training, making it a continual process. By doing this, a GS battalion will be more versatile—better prepared to assume a DS mission any time.

3-8 FA during an AAR—A crucial part of the battalion's progression toward increased versatility.

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Captain Adam J. Legg is the Assistant S3 of the 3d Battalion, 8th Field Artillery, 18th Field Artillery Brigade, XVIII Airborne Corps. He served in Germany in both the 42d and 72d Field Artillery Brigades, where he held several battery and battalion positions, including Cannon Firing Platoon Leader and Battalion S4. While in Germany, Captain Legg also was an Aide-de-Camp to the Commanding General of V Corps Artillery and then a Targeting Officer for V Corps.

SADARM Success

The Field Artillery's first smart munition—sense and destroy armor (SADARM)—hit 11 targets with 13 pulls of the lanyard during technical testing in April 1994. The test proved 155-mm SADARM is technically mature as it approaches a low-rate production decision in the second quarter of FY 95.

SADARM is a day-night, fire-and-for-get, top-attack munition that will add a new dimension to fighting with fires and dramatically enhance our force projection Army. Years of engineering efforts have resulted in a munition that's more lethal than high-explosive (HE) or dual-purpose improved conventional munition (DPICM) and easier to employ than Copperhead.

"SADARM" is actually a submunition carried in a standard 155-mm cargo projectile body. SADARM requires no special training because it's handled and fired like any 155-mm howitzer projectile. Its max range is 22.5 kilometers with the M203A1 charge.

As shown in the figure, two submunitions eject from each projectile and descend under their parachutes in a controlled spin, searching a circular area 150 meters in diameter. Each SADARM submunition has infrared (IR) and active and passive millimeter wave (MMW) sensors.

When the sensors confirm a target, the warhead fires an explosively formed penetrator (EFP). Shaped like a large rifle slug, the steel penetrator travels at 2,300 meters per second, defeating the top armor of any known combat vehicle by kinetic energy. The submunitions that don't acquire a target self-destruct, lessening the number of duds on the battlefield.

SADARM will defeat armored vehicles, primarily stationary self-propelled (SP) artillery in counterfire missions. In this role, SADARM is seven times more effective than DPICM—it takes 102 rounds of DPICM to defeat a typical SP artillery target as compared to only 14 rounds of SADARM. It also has excellent bonus effects against tanks and other non-artillery armored vehicles, resists countermeasures and can be employed in any weather, anywhere in the world. The round's lethality significantly reduces the logistics burden for early entry forces.

Originally scheduled to enter low-rate production in the fall of 1993, SADARM experienced technical problems during testing; the results were too few hits and too many duds. Intensive efforts by the program manager (PM) and contractor have significantly improved the round.

SADARM currently is funded by the Army. A recent Training and Doctrine Command (TRADOC) Smart Munitions Study shows why: the FA needs a smart munition to defeat most hard targets—one that offers logistical and operational benefits; SADARM fits the bill and can be fielded quickly in a 155-mm projectile.

After low-rate production begins, SADARM will undergo an operational test before fielding in FY 98. In the future, improved SADARM submunitions also may be incorporated into an MLRS rocket for delivery at greater ranges.

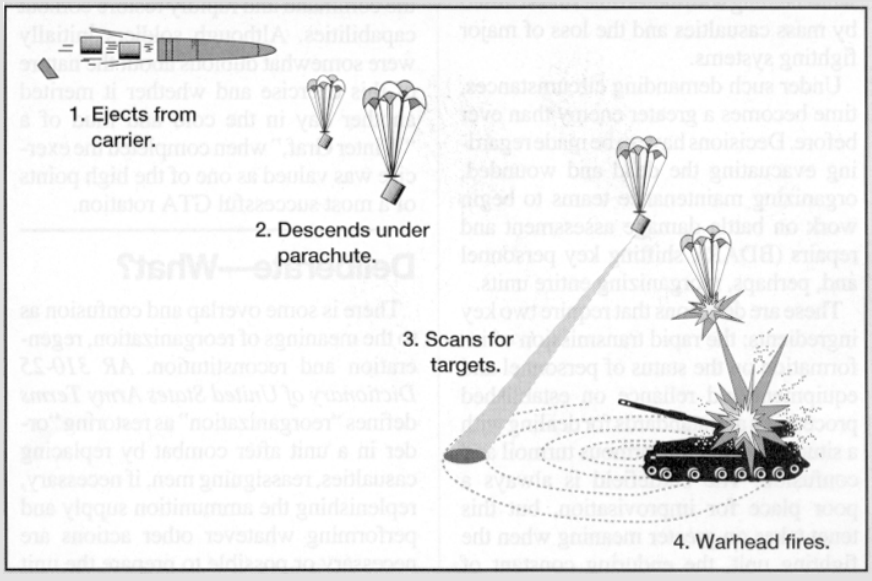
Picture this scenario—an early entry division has been inserted into a theater, much like Operation Desert Shield. An M198 towed 155-mm battalion with SADARM is to provide general support fires. This time, however, the enemy forces don't wait for the Allied coalition to build up. Their offensive is signalled by an intense artillery preparation preceding the armor assault.

As the prep begins, a Q-37 Firefinder radar acquires a counterfire target and sends it to a fire direction center (FDC). The advanced FA tactical data system (AFATDS) selects SADARM and sends the mission to an M198 platoon FDC. Down on the gun, a 13B rams home a SADARM projectile already fuzed with an M762 electronic time fuze. The chief of section calls, "Fire One," and the round heads downrange.

To end this scenario, shift to fact: the live-firing of SADARM on 16 April. High over the desert floor at Yuma Proving Ground in Arizona, a distant "pop" indicates SADARM submunitions have been expelled from their carrier. Silently, they descend toward the ground under their parachutes, rapidly spinning and seeking targets. The forward submunition fires first, striking the SP howitzer's engine compartment. Within seconds, the rear submunition fires its EFP, striking another howitzer in the turret, setting the howitzer's ammunition on fire. Smoke streams from both vehicles as more SADARM submunitions drift down toward the battery. More than 30 percent of the enemy battery was destroyed with *one projectile*—mission accomplished!

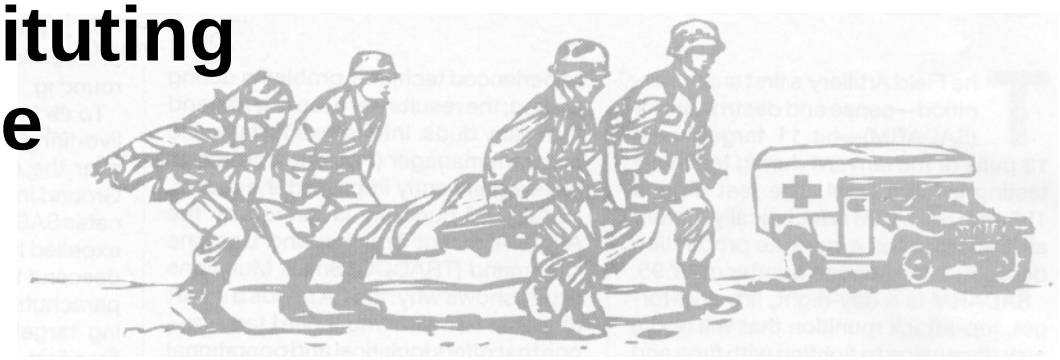
SADARM delivered excellent results in technical testing at Yuma Proving Ground, and it will deliver a major leap in lethality through more effective fires once placed in the hands of Field Artillerymen.

MAJ John R. Holland, FA
Chief, Munitions Branch
TRADOC Systems Manager-Cannon
Field Artillery School, Fort Sill, OK



SADARM's Sequence of Events.

Deliberate Reorganization: Reconstituting the Force



by Colonel M. Thomas Davis and Captain Steven A. Sliwa

"Dragon 3, this is Red 6! We've been hit with massive artillery! Can't tell yet, but probably lost all 1st Platoon—many casualties! 2d Platoon looks better but had at least one howitzer and one FAARV [Field Artillery ammunition resupply vehicle] destroyed!

"Am gathering wounded for treatment and evacuation! Will provide more details as available! Will be out of action until further notice!"

Receiving such a frantic and sobering call in the battalion tactical operations center (TOC) is every commander's worst nightmare. It not only means that soldiers, perhaps many soldiers, are dead and injured, but also that the ability of the battalion to perform its combat mission is at least temporarily degraded—perhaps even lost. Units must be prepared to get back into the fight as quickly and as effectively as possible while dealing with the terrible stress caused by mass casualties and the loss of major fighting systems.

Under such demanding circumstances, time becomes a greater enemy than ever before. Decisions have to be made regarding evacuating the dead and wounded, organizing maintenance teams to begin work on battle damage assessment and repairs (BDAR), shifting key personnel and, perhaps, reorganizing entire units.

These are decisions that require two key ingredients: the rapid transmission of information on the status of personnel and equipment and reliance on established procedures and standards for dealing with a situation of such enormous turmoil and confusion. The battlefield is always a poor place for improvisation, but this tenet takes on greater meaning when the fighting unit, the enduring constant of combat, becomes one of the major casualties of a battle.

The 4th Battalion, 82d Field Artillery (4-82 FA) and its parent organization, the 42d Field Artillery Brigade (42d FA Brigade), then stationed with the United States Army Europe (USAREUR), used a winter rotation to the Grafenwoehr Training Area (GTA) in Germany to conduct a Deliberate Reorganization Exercise. The exercise assessed the battalion's ability to recover from mass casualties, prioritize and conduct field repairs, reorganize surviving assets, incorporate a new unit into the command and rapidly restore combat capabilities. Although soldiers initially were somewhat dubious about the nature of this exercise and whether it merited another day in the cold and mud of a "Winter Graf," when completed the exercise was valued as one of the high points of a most successful GTA rotation.

Deliberate—What?

There is some overlap and confusion as to the meanings of reorganization, regeneration and reconstitution. *AR 310-25 Dictionary of United States Army Terms* defines "reorganization" as restoring "order in a unit after combat by replacing casualties, reassigning men, if necessary, replenishing the ammunition supply and performing whatever other actions are necessary or possible to prepare the unit for further attack or pursuit of the enemy."

FM 100-9 Reconstitution describes reconstitution as the "extraordinary action that commanders plan and implement to restore units to a desired level of combat effectiveness commensurate with mission requirements and available resources." The manual further describes reconstitution as a total process having as its major elements "reorganization, assessment and regeneration, in that order."

According to FM 100-9, there are two types of reorganization: immediate and deliberate. Immediate reorganization is "the quick and usually temporary restoring of degraded units to minimum levels of effectiveness." This type of reorganization is best illustrated by those actions taken by units when consolidating and reorganizing on the objective to be prepared to either repel counterattacks or continue the attack. Deliberate reorganization is considerably more extensive. It is conducted farther to the rear and may include replacement resources as available, extensive equipment repairs and cross-leveling and, perhaps, some limited retraining.

By contrast, regeneration is the substantially more involved process of rebuilding a unit. It necessitates "large-scale replacement of personnel, equipment and supplies." Regeneration is controlled by the higher headquarters distributing the replacement assets and is executed by a regeneration task force (RTF) formed by the commander directing the regeneration. This could involve replacing the chain of command and conducting mission-essential

training to restore the "new" unit to acceptable levels of combat capabilities.

As defined by FM 100-9, the exercise conducted by the 42d Field Artillery Brigade and the 4-82 FA was a "deliberate reorganization." The battalion was forced to disengage from its direct support (DS) mission, evacuate its casualties and damaged equipment to the rear, accept limited replacements and return to the fight within a day. As defined, a deliberate reorganization is the most exhaustive effort in the reconstitution process that a battalion-sized unit can execute in the absence of substantial external support.

Preparing for the Worst

Before the GTA rotation, the battalion took several steps to prepare to accomplish the various tasks inherent in the reorganization exercise to be administered by the 42d FA Brigade. First, the battalion commander and operations officer revised the mission-essential task list (METL) to add reorganization, established the conditions and standards under which the task would be performed, and determined any associated battle tasks (see Figure 1).

Second, the S3 wrote a new annex to the battalion field standing operating procedures (FSOP) describing the procedures to be used. (See Figure 2 for the responsibilities of the S1, S3 and S4, as outlined in the FSOP.) This annex defined command and staff responsibilities, established priorities of effort and, most importantly, defined minimum personnel and equipment requirements for fielding and fighting a firing battery.

Third, the battalion's existing matrix reporting system was analyzed to ensure it covered the categories of information the batteries needed to report their status after catastrophic losses. The matrix covered 26 kinds of reports the battalion might need from a battery with each report including up to 11 subsets of information. The matrix included reports on casualties and damages that would facilitate a reorganization—for example, Casualty Spot Report, Medical Request, Equipment Loss, etc.

While the battalion developed its procedures, the 42d FA Brigade staff developed an exercise to realistically, yet safely, evaluate the battalion's ability to conduct deliberate reorganization in a demanding scenario. Using related tasks from the heavy brigade Army training and evaluation program (ARTEP), the brigade staff developed a task-condition-standard checklist to evaluate the battalion's ability to execute its procedures as defined in the new reorganization annex to the FSOP.

The scenario for the Deliberate Reorganization Exercise was built around other major training events previously planned by the battalion. The 4-82 FA had planned to finish its GTA rotation with a four-day field training exercise (FTX), concluding with an offensive scenario depicting the battalion DS to the 11th Armored Cavalry Regiment (ACR). The exercise was conducted with the Howitzer Battery of the 1st Squadron, 11th ACR as part of the How Battery's rotation to GTA. The How Battery was the replacement unit used to test 4-82 FA's ability to quickly and effectively incorporate a weapons system replacement unit.

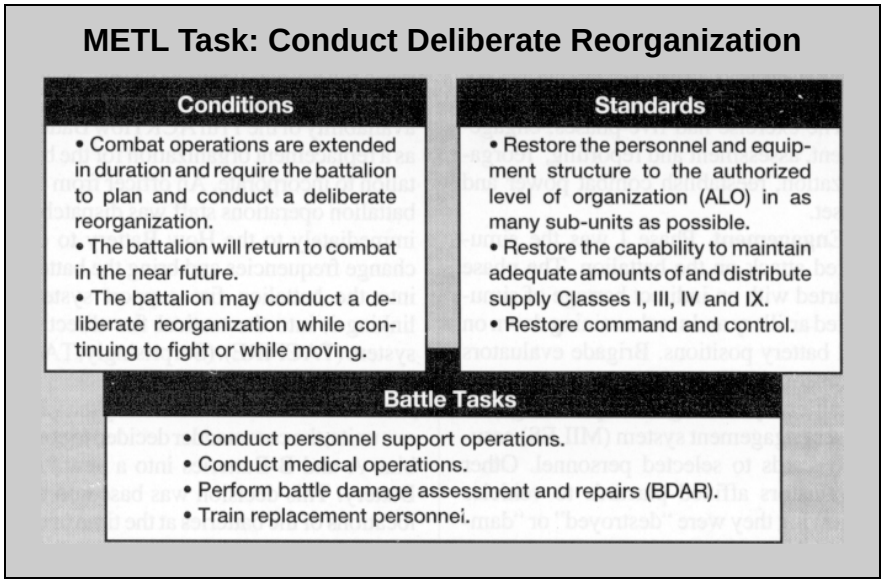


Figure 1: 4-82 FA added Conduct Deliberate Reorganization to its mission-essential task list (METL), determined the conditions and standards under which it had to be prepared to execute the task and identified the associated battle tasks.

S1

- Establish a graves registration point.
- Assess personnel shortages.
- Request replacement personnel by rank and military occupational specialty (MOS).
- Prepare a personnel distribution plan to ensure a minimum manning level for sub-units.
- Coordinate with the S4 for transportation assets to take personnel to the sub-units.

S3

- Select the sites for the deliberate reorganization.
- Issue movement orders, as necessary.
- Prepare the critical equipment distribution plan to ensure minimum equipment is allocated to each sub-unit.
- Transmit the critical equipment distribution list to the S4.
- Direct the control of the battalion ammunition section to the S4.

S4

- Receive and consolidate information using the battalion's Equipment Status Report format.
- Requisition lost or destroyed equipment from brigade.
- Inform the battalion tactical operations center (TOC) of the status of the critical items of equipment and requisitions.
- Determine the transportation assets available, consolidate them under centralized control and use them according to the priority list.

Figure 2: Responsibilities of battalion staff members when conducting a deliberate reorganization (taken from the battalion's field standing operating procedures, or FSOP).

Conducting a Deliberate Reorganization

The exercise had five phases: engagement, assessment and reporting, reorganization, reestablish combat power and reset.

Engagement. Phase I was the simulated attack on the battalion. The phase started with an indirect barrage of simulated artillery and smoke raining down on all battery positions. Brigade evaluators immediately fanned out to assess the casualties by issuing multiple integrated laser engagement system (MILES) casualty cards to selected personnel. Other evaluators affixed placards to vehicles showing they were "destroyed" or "damaged." The placards indicated the nature of the damage and the length of time the vehicle would be unavailable, assuming the battalion had the appropriate parts, dispatched a mechanic or evacuated the vehicle to a maintenance collection point for higher-level repairs.

The simulated attack was indeed devastating. Of the 450 soldiers participating in the exercise, 169 were casualties of the barrage (37 percent). Fifty were killed in action (KIA) with the remainders' injuries ranging from superficial to more extensive, requiring evacuation to the battalion aid station.

On the equipment side, 10 howitzers were destroyed in the attack and two more were damaged. Nine ammunition carriers were destroyed and one damaged, along with 13 trucks, including a position and azimuth determining system (PADS) vehicle and one of the M577 command posts at the battalion TOC.

Assessment and Reporting. Phase II began almost immediately as the battalion TOC was flooded with reports describing the damage at the various battery locations. Simultaneously, the batteries began treating the wounded, arranging for evacuation and assessing equipment damage. It was quickly evident that the battalion had been rendered temporarily combat ineffective.

Reorganization. During Phase III, a report was sent to brigade asking for authority to conduct a deliberate reorganization of the battalion. This request was approved and the brigade staff (notionally) began drafting plans to address the immediate loss of fire support while the reorganization was executed.

As a picture emerged regarding the scale of the losses, the battalion commander and his S3 began considering how best to reorganize the remaining assets. At this point, the brigade staff announced the availability of the 11th ACR How Battery as a replacement organization for the battalion to incorporate. An officer from the battalion operations staff was dispatched immediately to the How Battery to exchange frequencies and bring the battery into the battalion fire support system, linking it into the tactical fire direction system (TACFIRE). (Surprisingly, TACFIRE had survived the attack.)

Based on the losses suffered by the various units, the commander decided to combine A and B Batteries into a new "A" Battery. This decision was based on the locations of the batteries at the time of the attack, the losses they had suffered and the availability of key leaders. Because the A Battery commander had been KIA, the B Battery commander was directed to assume command of the new unit.

This leads to a comment on an administrative technique used during the exercise. Because the A Battery commander was KIA, he became responsible for the soldiers and equipment being evacuated to the battalion trains area for "medical assistance" or "repairs." This freed the Service Battery commander and other staff officers to fully play their roles during the exercise. This "D" Battery commander coordinated the return of soldiers and equipment to their parent unit at the end of the exercise.

At the battery level, the focus was on treating the wounded, arranging for evacuation and collecting and processing those "killed." Having previously established a policy of having two combat lifesavers per section (double the corps requirement), we soon discovered how valuable lifesavers were.

As the reorganization progressed, the battalion trains area became the focus of activity. The battalion physician's assistant (PA) and his medics established a triage area and began "treating" those needing immediate care and arranging for further evacuations of the more seriously wounded.

Simultaneously, the battalion maintenance technician assessed vehicles to determine which needed new parts and which were either donors or recipients of carefully controlled cannibalization. The battalion motor officer spent his time supervising and prioritizing the evacuation of equipment.

Within a few hours, the battalion field trains were heavily loaded with "wounded" soldiers and "damaged" equipment.

Throughout the reorganization, leaders must focus on putting the battalion "back in business"—if at all possible.

Reestablish Combat Power. In Phase IV, the battalion completed its reorganization. At the TOC, the S3 continued efforts to return as much of the battalion as possible to combat capability. The new A Battery and C Battery had regained a firing capability and How Battery had been incorporated into the battalion fire control system and was up on the fire nets.

To check the effectiveness of the reorganization, a battalion time-on-target mission (live fire) was received from the 11th ACR. When the mission was fired, the results indicated the battalion was "back in business" after a very intensive 10 hours of deliberate reorganization.

Reset. In Phase V, we unscrambled the equipment and soldiers and returned all to their parent units.

Exercise Analysis

During this exercise, we learned several lessons about conducting deliberate reorganizations.

SOP Procedures and Criteria. There must be a portion of the battalion SOP that establishes procedures for reorganization reports and the criteria for determining when units will continue and when they will be combined. The criteria must define the minimum manning and equipment

that must be on hand for a unit to retain viability. We determined, for instance, that a unit had to have at least five howitzers with a firing capability to be a battery and that each howitzer had to have at least a seven-man crew.

Obviously, the criteria can be adjusted based on many competing and, perhaps, some enabling factors. Many people have argued that an M109 howitzer section can operate effectively with less than seven people and cite operations at the Combat Training Centers (CTCs) with four-man crews. While this is true, one must not forget to factor in the demands of 24-hour operations, security requirements, preventive maintenance and the inevitable stress induced in a unit suffering heavy losses. The commander must choose between having a greater number of less capable guns or a smaller number of more capable guns.

Rapid Reorganization Reporting. A simple reporting format, amenable to digital transmission, is a *must.* Everyone must clearly and easily understand the format and the information required in the format—confusion inevitably will cloud an already cloudy situation.

When disaster strikes, battalion staff members will be eager for information, often calling for that information from opposite points of view. The S3 and battalion TOC will focus on what has survived while the battalion logisticians focus on what has been lost. Under the level of stress generated in such a disaster, it's incredibly easy for "three howitzers destroyed" to *become* "three howitzers operational."

Having a hard copy reporting capability will minimize the potential for errors with digital the best communications method. A key decision that must be made early is whether to place a variable-format message entry device (VFMED) or a battery computer system (BCS) at the battalion administration and logistics operations center or with another command and control node operating in the battalion field trains.

One lesson that was particularly useful and a bit surprising was the limited utility of communicating casualties using battle roster numbers (BRNs). Although using BRNs expedited reporting, it did not provide the information necessary for the battalion personnel section to requisition replacements immediately. The BRNs had to be cross-referenced with other lists to determine the skill levels and military occupational specialties (MOS) of the casualties. At the end of the exercise, we determined that the raw data of MOS, skill levels and grades was more useful for personnel requisition, which is the immediate concern. The BRNs are more useful in "cleaning up the battlefield"—preparing notification information, evacuating remains and processing awards.

Support Assets. Several assets and items proved to be particularly valuable in dealing with heavy losses of personnel and damage to equipment. As previously mentioned, having two combat lifesavers per section minimized casualties and maximized personnel availability. There will never be enough medics under such demanding circumstances, so large numbers of lifesavers are the best alternative.

Vehicles to be used to evacuate the wounded need to be identified quickly. This is a priority mission. Each howitzer platoon should have two heavy tow bars, and every vehicle should have, as a minimum, a tow cable to facilitate vehicle evacuations—which can simultaneously become casualty evacuations.

There will never be enough recovery vehicles so FAASVs may have to be pressed into service to either evacuate howitzers or become "prime movers" for the howitzers that can still fire. Throughout such a disaster, a battalion should never forget that its firing capability is what allows an artillery unit to do its job.

Leader Decisions. At the battery level, the commander (or his successor who suddenly finds himself in charge) needs to make several quick assessments.

- What is the "larger" problem: equipment, people, senior leadership and supervisors, ammunition, firing capability, fire direction computation or communications? This assessment needs to be passed forward immediately as it will be vital input for major decisions the battalion or, perhaps, brigade commander must make.
- Are the key leaders identified? Those who find themselves in charge need to *know* they're in charge. This is especially true for the smaller sections, such as ammunition or fire direction centers (FDCs).
- Can a firing capability be maintained? The battery needs to report its ability to deliver fires and with what limitations to the battalion S3 as soon as it's feasible.
- Are additional attacks likely? At all levels, but especially at the firing battery level, leaders need to decide whether or not to relocate the unit. This decision will be based on the type of attack received (artillery or aircraft) and if additional rounds are landing. Leaders must factor into the decision that relocating will magnify the difficulties of fully assessing the unit's capabilities and complicate personnel and equipment evacuations.

If the unit is still receiving fire missions and if the supported unit is in contact, firing elements should remain in place—if at all possible. The decision to stay or move under such circumstances is a tough one the unit leader must face.

There can be no question that operating under the adverse conditions of major personnel and equipment losses will be difficult. But units can accomplish the reorganization tasks while under great stress if they have prepared for such an eventuality during demanding, realistic training. Units must temper the ideas and observations offered in this article to apply to their circumstances in different environments.

Deliberate reorganization—potentially a complete reconstitution—is a tough mission, but peacetime training will help protect soldiers and keep the unit in the fight if the commander's worst nightmare becomes reality.

Colonel M. Thomas Davis commanded the 4th Battalion, 82d Field Artillery, part of the 42d Field Artillery Brigade in US Army Europe. Currently, he's Chief of the Army Program Development Division of the Program Analysis and Evaluation Directorate, Office of the Chief of Staff of the Army, Washington, DC. His other assignments include serving as a Senior Army Fellow at the Atlantic Council of the United States; Chief of the Nonstrategic Nuclear Forces Branch, Joint Staff J8 at the Pentagon; and Fire Support Program Analyst in the Office of the Chief of Staff of the Army.

Captain Steven A. Sliwa was the Assistant S3 of the 4th Battalion, 82d Field Artillery, 42d Field Artillery Brigade. He currently commands A Battery, 3d Battalion, 7th Field Artillery, 25th Infantry Division (Light) at Schofield Barracks, Hawaii. He also has served as a Company Fire Support Officer, Fire Direction Officer, battery Executive Officer and battalion S2 in the 1st Battalion, 320th Field Artillery, part of the 101st Airborne Division (Air Assault) at Fort Campbell, Kentucky. During Operation Desert Storm, he was a Liaison Officer and Assistant S3 for the 3d Armored Division Artillery.

Fire Support and Desert Hammer VI—

The Advanced Warfighting Experiment

by Lieutenant Colonel William M. Bransford

In April, the 3d Brigade, 24th Infantry Division (Mechanized) from Fort Benning, Georgia, went to the National Training Center (NTC) at Fort Irwin, California. In many ways, it was an ordinary rotation. The brigade's training objectives were derived from its mission-essential task list (METL), and the scenarios supported those training objectives. The 3d Brigade Combat Team (BCT) fought the same world-class opposing force (OPFOR) that every other unit fights at the NTC.

But in other ways, NTC Rotation 94-07 was extraordinary. The units participating employed and experimented with a vast array of new equipment and used digital communications to an unprecedented extent.

By now, everybody in the Army has heard something about the NTC Rotation 94-07, also known variously as "Desert Hammer VI," the "Advanced Warfighting Experiment" (AWE) and "the digital rotation." It was an incredible assemblage of personnel and equipment from all over the United States, involving nine different unit patches and trains, planes and helicopters arriving from Fort Lewis, Washington; Forts Benning and Stewart, Georgia; Fort Sill, Oklahoma; Fort Bragg, North Carolina; and Fort Knox, Kentucky.

Along with the equipment in the units' modification table of organization and equipment (MTOE) came an alphabet soup of systems identified by acronyms—IFSAS, BCV, BFIST, IVIS—with subsystems identified by other acronyms and hordes of technicians to monitor their performance in the hands of ordinary soldiers.

Individually, each of the new systems is of vital interest to the future of the Army. They'll influence the way we collect, analyze and pass information, the way we protect soldiers from friendly fire, the way we see the battlefield from our command posts and the way we target the enemy. Some systems are already being fielded. All have implications that reach across the battlefield operating systems (BOS), and all will challenge every professional in the Army to find the tactics, techniques and procedures (TTP) to make the most of their digital capabilities.

My intent in this article is to share some fire support lessons we learned during the rotation and the training that preceded it. The AWE was as much about assessing potential as demonstrating capabilities, and we came away from it with two strong impressions. The first is that we've barely tapped the reservoir of potential offered by digitized systems. The second is that Field Artillerymen will play a major role in defining the parameters of digital systems for a couple of very good reasons; we have more experience using digital communications than any other segment of the Army, and we must routinely exchange information with all other BOS to do our jobs as fire supporters. In other words, we have a great need to know what's happening across the entire spectrum of combat operations, and we have a pretty good idea of just what we need to know.

Digitizing the Army

Digital communications is not new to the Field Artillery. We have employed the concept since the fielding of digital communication's "first cousin," the analog-based tactical fire direction system (TACFIRE) some 15 years ago and then with the fielding of the first digital-capable light TACFIRE in 1985. Used properly, digital has enhanced our ability to manage and transfer the huge masses of data generated by our target acquisition radars, intelligence systems, fire support elements (FSEs) and forward observers (FOs) to produce executable fire plans well integrated with supported units' schemes of fires and maneuver.

Digital had a downside, though, with the TACFIRE system and the old VRC-12 series radios. Any fire support coordinator (FSCOORD) who has tried to use voice radio to fire the single most important target the brigade commander needs shot—*Right Now!*—only to find that TACFIRE quietly has become clogged with adjust-fire missions from diligent, digitally equipped fire support teams (FISTs) knows that downside. So does any S3 who has tried to keep up with the status of fires over the remote communications monitoring unit (RCMU) while the fire direction officer (FDO) actually did the fighting from the TACFIRE shelter. So does any FSO who has wrestled with the variable format message entry device (VFMED) to get his fire plan into TACFIRE.

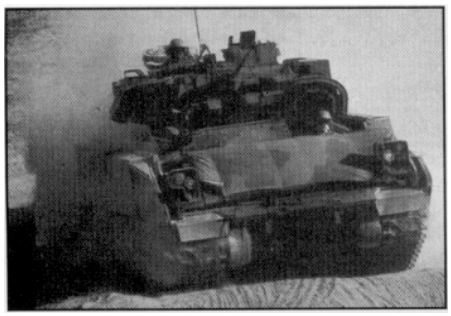
Rotation 94-07 AWE looked into the future. What follows is a user's status report on performance and the potential of some of the systems most immediately important to the fire support BOS.

Initial Fire Support Automation System (IFSAS). IFSAS works today. Built around inexpensive, commercially available lightweight computer units (LCUs), IFSAS already has replaced TACFIRE in the 24th Infantry Division Artillery and has been fielded to a number of Reserve Component units.

My unit, the 4th Battalion, 41st Field Artillery began the three-week IFSAS new equipment training (NET) on 4 January, successfully completed our IFSAS external evaluation (EXEVAL) in early February and deployed with it to the NTC in late March. We used it throughout the three weeks of training in the maneuver box without a single catastrophic computer failure and fired more than 5,000 rounds with it during live-firing at Fort Benning and the NTC.

The system offers several features that must be considered improvements over TACFIRE. All the FSEs and the battalion fire direction center (FDC) use common hardware and software. The LCU in the platoon FDC (called the battery computer system, or BCS, as was its predecessor) has the same hardware but a different software configuration to do technical fire direction. IFSAS replaces the VFMED in FSEs at all levels with an LCU.

The battalion FDC has a dual-terminal IFSAS station: one LCU for planning and another for fire direction. The operations



The BFIST will have the same mobility, survivability and signature as Bradleys in other units.

ASAS is the intelligence electronic warfare (IEW) subelement of the Army tactical command and control system (ATCCS). It gives combat leaders battlefield intelligence from joint strategic and tactical sensors.

and intelligence (O&I) section also has a terminal; the redundancy of common computers makes it easy to work around equipment failures and offers unprecedented options in planning tactical operations center (TOC) movements.

The system was fielded with Version 10 software, so it's compatible with the newest upgrades to the Q-36 and Q-37 Firefinder radars. The many work-arounds of earlier versions have been corrected, including M825 smoke computations.

Finally, IFSAS puts the FDC back into the M577 command post track and makes it part of the TOC again. The S3 can more easily keep up with the execution of the fire plan and apply his personal emphasis where and when it's needed.

IFSAS is compatible with other TACFIRE-based systems and the single-channel ground and airborne radio system (SINCGARS). To prove it, we trained with the FDC and O&I section and the A Battery FDC of the 2d Battalion, 17th Field Artillery (Paladin), 212th Field Artillery Brigade, III Corps Artillery out of Fort Sill during Exercise Victory Focus at Fort Benning. We also worked with the FDC for B Battery, 2d Battalion, 8th Field Artillery (M119) and the FSE for the 3d Battalion, 9th Infantry out of Fort Lewis. By the end of a week, we were sending digital traffic between IFSAS systems throughout the 3d Brigade and Task Force 1-70 Armor (Fort Knox) and TACFIRE, light TACFIRE, BCS and miscellaneous observer devices—and we were using frequency hopping to do it.

When we fielded IFSAS, it came with a restriction on operating on the move because of fears that the hard drive would be damaged if the vehicle hit a big enough bump. During the NTC rotation, we constantly operated the system on the move without losing a single hard drive. The rotation was a *test*, and IFSAS passed it. As a result, FDCs didn't have to wait seven to 10 minutes for the system to initialize and could input initial firing point data while driving to the position. My two fastest platoons consistently attained ready-to-fire times of under five minutes, and all six routinely met day and night occupation standards.

The major problem we found with IFSAS is that we don't yet know how best to use its enormous potential, especially in the fire planning arena. The system gives the FSO a tremendous capability beyond that of the VFMED, but a number of issues remain to be resolved before that potential can be realized.

Bradley Command Vehicle (BCV). The BCV is a modified Bradley fighting vehicle chassis with an elongated shelter mounted on it. In the AWE configuration, it contained an all-source analysis system (ASAS) collateral enclave (a computer tied into the system), a battalion/brigade command and control (B^2C^2) terminal, an enhanced position location reporting system (EPLRS) situational awareness terminal.

The BCV shelter has four seats for the battalion or brigade commander, the FSCOORD or FSO, the S2 and the S3. An intercom allows them to talk to each other and selectively monitor a variety of radio nets.

The various terminals provide downlink for information coming from the joint surveillance and target attack radar system (JSTARS), unmanned aerial vehicles (UAVs) and helicopters, as well as other sources of information and intelligence. Linked digitally to external sources, the terminals allow the command group to create, modify, exchange and disseminate plans and overlays, both vertically within a BOS and horizontally across the BOS.

For those of us accustomed to thinking of "seeing the battlefield" as going to the high ground and looking through binoculars, the BCV is revolutionary. The communications system lets the FSCOORD (or FSO) listen to what the brigade commander hears on his nets. The FSCOORD can anticipate his orders and execute them almost simultaneously on the FSCOORD's own command/fire (CF) nets. The EPLRS showed where friendly elements were all the time. The collateral enclave gave up-to-date intelligence, and all viewed the same set of graphics. Rather than bouncing around in the vehicle looking for a better place to see from, the FSCOORD can focus on the plan as the fighting develops and the enemy reacts.

Bradley Fire Support Team Vehicle (BFIST). This vehicle is key to increasing fire support responsiveness. During the AWE, in the hands of fire supporters from Task Force 1-70 Armor, it proved its reliability, its advantage in set-up time over the M113 FISTV, the utility of its forward-looking infrared system and the benefit of its logistical compatibility with the Bradley family of vehicles in the task force it supported.

UAVs and ASAS. The UAV and ASAS are two more systems ready for use now. We used UAV overflights to select final targets for preparations with outstanding results. The targets were accurate (within 200 meters) and timely. After we learned to trust the data and used it to confirm or deny our templates, our fires became much more effective.

The ASAS collateral enclave provided current intelligence that fed into the targeting system at two locations. In the brigade TOC, where the S2 track and the FSE track were side-by-side, ASAS supported IFSAS in the planning function. In the tactical command post (TAC) in the BCV, ASAS supported the commander and FSCOORD as they fought the battle.

Paladin (M109A6 Howitzer). The Paladin proved its worth, especially in the counterfire battle. In one brigade deliberate attack, the Paladin battalion was given control of the Q-36 radar section and the mission of shooting counterfire. At the end of the battle, the OPFOR regimental artillery group had lost nearly an entire battalion and had never gotten decisively involved in the fight. The 2d, Battalion, 17th Field Artillery (Paladin) lost no guns and had freed the direct support (DS) battalion to concentrate on supporting the close battle.

Lieutenant Colonel Sidney E. Riley had the superb article, "Paladin NET Lessons Learned for Those Who Follow," in the April edition. Most of his observations in the article were demonstrated during the NTC rotation, and his conclusion that employing Paladin will require flexible thinking is right on the mark. In many ways, Paladin offers the greatest opportunity for rethinking Field Artillery tactics since Gustavus Adolphus gave each regiment its own accompanying artillery piece.

The combat trainers at the NTC prefer to talk about reducing "out-til" times rather than merely achieving quick ready-to-fire times. "Out-til" is the period from the time a unit is incapable of shooting from its old position until it's able to fire from a new one. Paladin's characteristics and method of operating make out-til times almost irrelevant.

The M109A6's speed (both of movement and firing when called), ability to communicate digitally with the platoon operations center (POC) and reduced reliance on survey coupled with its increased range and survivability make it an incredible combat multiplier.

Paladin frees other systems to do what they do best and compensates for their shortcomings. With a reinforcing Paladin battalion, my M109A3 battalion was able to move with the maneuver forces in the offense because the Paladins could stop and fire quickly in an emergency. In the defense, the Paladins allowed my 155-mm self-propelled battalion and the M119s of B Battery, 2d Battalion, 8th Field Artillery to lie in wait to mass fires on critical, high-payoff targets. The Paladin could shoot a family of scatterable mines (FASCAM) minefield, respond to the enemy's Phase II fires and still have time to move and join in the massed fire missions.

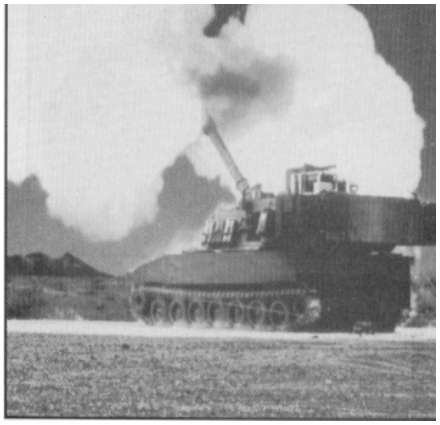
The AWE revealed that we have only begun to tap the potential of the Paladin and its successor. Several other systems offer help in doing so.

M1A2 Abrams Tank/Inter-vehicular Information System (IVIS). Task Force 1-70 Armor was a focal point for the AWE. It had IFSAS in the FSE, a BFIST, the BCV outfitted comparably to the one at the 3d BCT headquarters and M1A2 tanks with IVIS.

The primary function of IVIS is to keep the maneuver commander informed about the location and status of all his vehicles—right down to the number and types of rounds in the racks. It's tied into a state-of-the-art laser range finder and a positioning system. Verified against our position and azimuth determining system (PADS) on a trip down the Central Corridor at Fort Irwin, the positioning system on IVIS tanks proved to be very accurate. A resulting capability is the tank can generate calls-for-fire, and the IVIS program, like the B^2C^2, has a call-for-fire function.

One of the objectives for the AWE was to demonstrate the sensor-to-shooter digital link from the IVIS tank to Paladin. The IVIS successfully passed digital fire missions from the tank directly to the battalion FDC (where the mission was cleared) and digitally from the tank to the FIST via the digital message device (DMD-5) to the FSE via IFSAS to the battalion FDC. In the latter case, the call-for-fire went out over FM-voice to the FSO for clearance. We didn't make the link from IVIS directly to Paladin, but the potential is clearly present.

For most artillerymen, questions of massing and clearing fires come up immediately when someone mentions a single gun shooting for a non-artillery observer. Those are valid questions, but they aren't without answers. In addition, there isn't a shortage of scenarios where a direct sensor-to-shooter link might be the right choice; suppressive fires during a movement-to-contact, employment of precision/terminally guided munitions against high-payoff targets or adjustment of smoke at a breach site come immediately to mind, as do several potential applications in operations on the low end of the intensity and tempo scale.



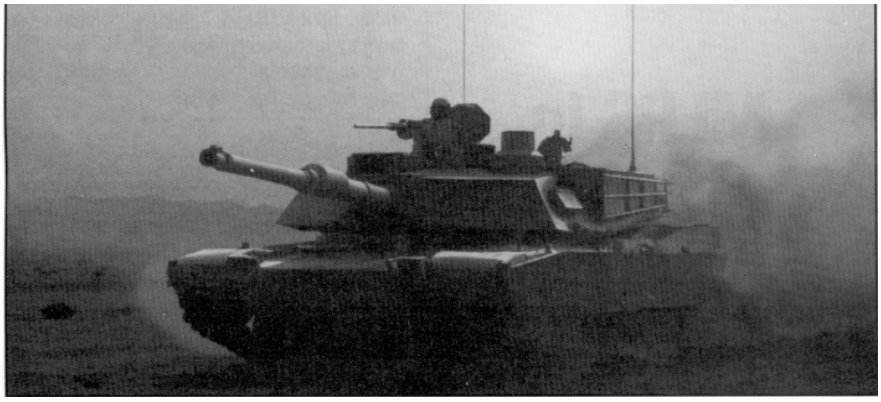
The Paladin (M109A6) proved its worth at the NTC-especially in the counterfire battle.

Systems on the Drawing Board. Some of the concerns that arise from the limitations of current systems become less bothersome in light of technologies demonstrated in April and on the drawing board at Fort Sill and other Training and Doctrine Command (TRADOC) installations. For example, the integration of EPLRS and B^2C^2 can solve the problem of fratricide and clearing fires by making commanders constantly aware of the location of friendly forces. The advanced Field Artillery system (AFAS) will have the capability to deliver multiple rounds on a target, all arriving simultaneously from a single gun. Emerging UAV systems can accurately locate targets and confirm they're still there just before an operation. More precise and lethal munitions can kill targets with fewer rounds.

IVIS has features that can help provide more responsive fire support today. One of the most difficult parts of executing a fire support plan is getting observers into survivable positions. Increasingly, we recognize that the maneuver commander has an implied or specified mission to help us make that happen, and the IVIS tank gives him one more tool to help us execute the plan. At the same time, IVIS forces him to know the scheme of fires and has the potential to promote better integration of fires and maneuver.

One technological feature of IVIS with immediate use is the laser rangefinder. Not only does it range to a fixed point, but it also has a movable icon the operator can position accurately in relation to the target. Its potential for use as a trigger point to synchronize attack of moving formations with indirect fires and air support is immediately obvious.

Already, we're having to change the way we fight to respond to technological



The new M1A2 Abrams main battle tank was a major weapons system that participated in Desert Hammer VI.

improvements. For example, Rotation 94-07 was the first time we used the new version of the Q-36 radar software that can acquire individual guns firing within an enemy position. If that position is within a call-for-fire zone, the radar will generate a priority mission for each gun and each volley. We found we had to modify our procedures to end zone coverage after a volley or two and to target either the center-of-mass gun or the last gun to fire. In effect, enhanced technological capabilities increased, rather than reduced, the need for intelligent human analysis and decision making.

Looking to the Future

We must meet several pressing needs to take full advantage of digital capabilities vertically within our BOS and horizontally across the other BOS. The following require resolution at various levels. Some call for hardware solutions, others for training and doctrine changes. Many are new variants on old themes, but collectively they underscore the need for cooperation, forethought and focus as we modernize and digitize the Army of the 21st century.

• We need new FO devices. Currently, the IFSAS can transmit at a 16,000-BAUD rate, but it has to use the slower 1200-BAUD rate if older TACFIRE components are in the system. The 1200 BAUD forward entry device (FED) and DMD reduce IFSAS to the lowest common denominator in terms of efficiency.

• SINCGARS is a great radio, but we need more. Our experience suggests the right answer calls for separate nets for fire support and fire direction and for both voice and digital versions of each.

The command/fire net 2 at the DS battalion is absolutely overcrowded with six platoon FDOs, the battalion FDO, the FSCOORD, FSOs, combat observation lasing teams (COLTs) and some FISTs trying to talk at the same time. A separate digital net for fire support would get much of the voice traffic off the net and into IFSAS where it belongs.

• The FSCOORD is under-resourced. Right now, he has two radios in a high-mobility multipurpose wheeled vehicle (HMMWV). He has a FED but can't use it because he can't dedicate a radio to digital and still operate in all the voice nets he has to. He also needs an armored vehicle to accompany the brigade commander. The same resourcing needs apply to the battalion FSOs.

• We need better training for FSOs. Commander's criteria and attack guidance are dynamic. With the IFSAS and other systems that made up AWE, we can develop a better feel for where we are in the battle and update guidance as the battle moves from phase to phase and high-payoff and high-value targets change. We must prepare our FSOs to deal with the dynamics of the battle as it unfolds and react most effectively to those changes.

• We need to simplify fire mission processing, getting rid of those multi-page calls-for-fire in the FED and DMD (they're also in the B^2C^2 and IFSAS). We need to eliminate time-consuming "finesse" fire missions that require management-by-exception techniques.

We need to use platoons for immediate smoke or immediate suppression missions, not two guns. Continuous illumination with two pieces provides great effects with night-vision devices. Four-gun coordinated illumination is pretty and gives the FDO a great sense of accomplishment, but it wastes a lot of time and ties up communications nets.

• We need to resist the argument that higher rates of fire and shorter out-til times justify further cuts in artillery battalions or tubes per battalion. The proliferation of sensors that can cut across channels and send calls-for-fire directly to the guns argues for more, not fewer guns, and the cost of precision weapons means we'll need to mass fires as an area target system of systems for a long time to come.

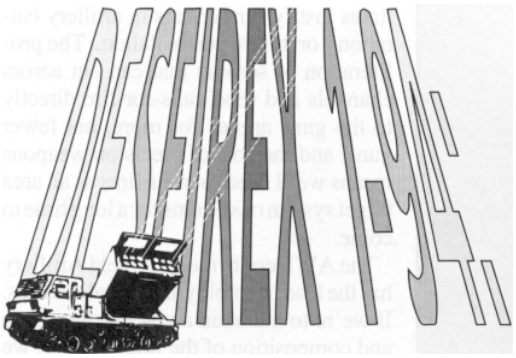
The AWE confirmed the Field Artillery has the lead in employing digital systems. If we're to maintain a voice in the shape and composition of the future Army, we must energize ourselves to embrace the new technology and maximize its potential.

We need good ideas from the field and from the Artillery School. We need soldiers and leaders who know their craft—from interior and exterior ballistics of cannon fires to fire support coordination to communications equipment—so we can solve problems. We need increased cross-talk in our branch and with our peers in other branches so we understand needs and share ideas.

Most of all, though, we need to remain focused on METL-based training, on staying combat ready with the equipment we have and on taking care of the superb soldiers who operate that equipment. The AWE was a success because the 3d BCT focused on training, allowing the assessment of new equipment against a doctrinal, realistic standard and a tough enemy. As a result, we got a good look at the potential of digital equipment to support our doctrine.

The future looks bright.

Lieutenant Colonel William M. Bransford commands the 4th Battalion, 41st Field Artillery in direct support of the 3d Brigade Combat Team, 24th Infantry Division (Mechanized) at Fort Benning, Georgia. He also commanded Headquarter and Headquarters Battery, 75th Field Artillery Brigade, III Corps Artillery, Fort Sill, Oklahoma. Lieutenant Colonel Bransford was the S3 and Executive Officer of the 2d Battalion, 77th Field Artillery, part of VII Corps in Germany and then served as Deputy Fire Support Coordinator for the 3d Armored Division during Operations Desert Shield and Storm. Just prior to his taking command of his battalion, he was the Director of the Department of Joint and Combined Operations at the School of the Americas at Fort Benning. Lieutenant Colonel Bransford holds a Master of Arts in English from Emory University in Georgia.



MLRS in USMC Operations

by Lieutenant Colonel Robert A. Cline

Desert Fire Exercise (DESFIREX) 1-94, Marine Corps Air/Ground Combat Center (MCAGCC), Twentynine Palms, California:

"Incorporating MLRS was a resounding success...During our 17 firing days, we expended more than 12,000 rounds and 156 MLRS [multiple-launch rocket system] rockets....an Army MLRS unit can quickly and compatibly fold into our organization and support us."

Colonel J.C. McAbee
Commander, 11th Marine Regiment
Memorandum to Commanding General, 1st Marine Division

In joint operations, various armed services will support each other in combat operations; however, there's an expectation for a service component's forces to be supported by its own combat support (CS) and combat service support (CSS) elements. Given the paucity of strategic lift assets and the need to be able to rapidly deploy continental US (CONUS) forces anywhere in the world, one can envision many contingency scenarios in which most of the logistical support for the joint force would have to come from only one service component, at least initially.

DESFIREX 1-94 tested that concept by integrating Army MLRS into Marine regimental combat operations—totally integrating MLRS.

Desert Fire Exercise

From 15 September until 6 October 1993, an MLRS battery-plus, the battalion tactical operations center (TOC) and administration and logistics operations center from the 6th Battalion, 27th Field Artillery (6-27 FA), III Corps Artillery, at Fort Sill, Oklahoma, became part of the 11th Marines. The "Cannon Cockers" of the 11th Marines, Camp Pendleton, California, folded 6-27 FA into its operations with each MLRS platoon of the enhanced battery representing an MLRS battery.

DESFIREX is the regiment's premiere training exercise, conducted semiannually at the MCAGCC. What made DESFIREX 1-94 particularly rewarding was the integration of joint air and Marine maneuver with Active and Reserve Marine cannon artillery—in addition to MLRS—in a realistic, live-fire maneuver exercise. (See Figure 1 for a list of forces participating in DESFIREX 1-94.)

The 1,000 square miles of the southern Mojave Desert that the MCAGCC encompasses is very realistic for training—arguably, the best artillery training area in the world. Of the 156 MLRS rockets fired in that desert, 48 were the Army's new M28A1 reduced-range practice rockets

- 11th Marine Regiment (Division Artillery)
- 1st Battalion, 14th Marines (Reserve Artillery)
- 6th Battalion, 27th Field Artillery (MLRS)
  - Composite Battery (9 Launchers)
  - Battalion Tactical Operations Center (TOC) and Administration and Logistics Operations Center
- 1st Marine Division Forward/Fire Support Coordination Center (FSCC)
- 5th Marines Combat Operations Center (COC)/FSCC (Infantry)
- 7th Marines COC/FSCC (Infantry)
- 1st Tank Battalion (USMC)
- 3d Remotely Piloted Vehicle (RPV) Company (USMC)
- Aviation
  - USMC Fixed- and Rotary-Wing Aircraft
  - USN Fixed-Wing Aircraft
  - USAF Compass Call
- Combat Service Support Detachment (CSSD)-17

Figure 1: Units Participating in DESFIREX 1-94

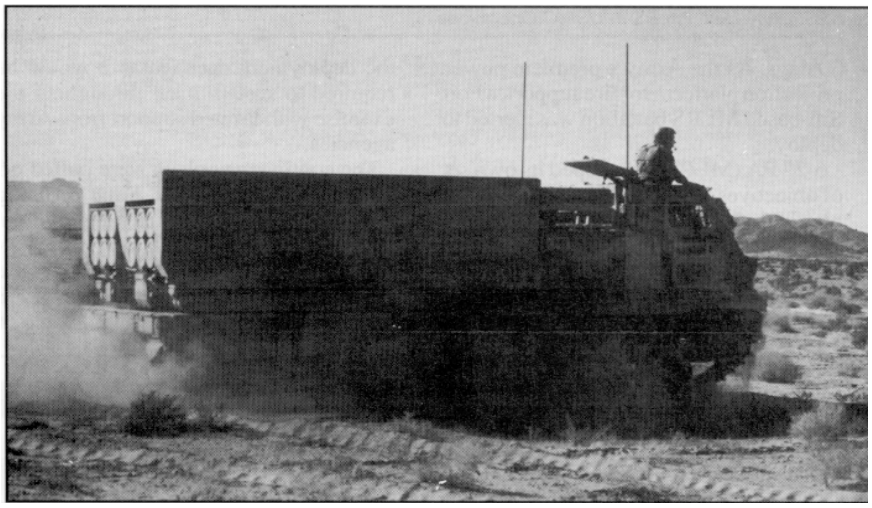
(RRPRs), the first time the M28A1 was fired by a tactical unit in a tactical environment.

Objectives and Scope. The exercise objectives for DESFIREX 1-94 were developed during the "hot wash" immediately following DESFIREX 2-93. The objectives listed in Figure 2 were selected to complement DESFIREX 2-93, training specified and implied tasks in contingency plans. The 11th Marines accomplished all objectives with the added benefit that joint units enhanced their combat readiness with no substantial increase in exercise overhead—ammunition, funding and time.

- ❑ Incorporate MLRS.
- ❑ Integrate the division FSCC.
- ❑ Conduct a live-fire fire support coordination and maneuver exercise with maneuver forces.
- ❑ Integrate a Reserve artillery battalion.
- ❑ Field standardized battalion and regimental fire direction centers (FDCs) in accordance with USMC quad-division standing operating procedures (SOP).
- ❑ Evaluate the alternate division command post concept.
- ❑ Conduct a regimental digital command post exercise (CPX) during the battery and battalion phases.
- ❑ Conduct a helicopter raid and tactical displacement for each firing battery.
- ❑ Employ RPVs to locate targets and adjust artillery fires.
- ❑ Operate (not just communicate with) the Marine Corps fire support system (MCFSS).
- ❑ Increase the use of all types of lasers.

Figure 2: Training Objectives for DESFIREX 1-94

Architecture. The exercise's training became progressively more complex as it moved from the battery to the battalion and regimental phases. During the battery phase, battery commanders had the flexibility to train to individually selected Marine Corps combat readiness evaluation (MCCRES) standards. Each battery conducted a helicopter-borne displacement, worked with the Q-36 Firefinder countermortar radar and conducted an emergency occupation of position (hip shoot). Concurrently, the battalion and regimental fire direction centers (FDCs) conducted a daily Marine Corps fire support system (MCFSS) command post exercise (CPX) while the 1st Marine Division fire support coordination center (FSCC) conducted a communications exercise



A 6-27 FA MLRS launcher moves across the desert on the MGAGCC at Twentynine Palms during DESFIREX 1-94.

and managed the airspace through a collocated direct air support center (DASC).

Progressing to the battalion phase, the regiment continued the daily MCFSS CPX while the division FSCC expanded its communications exercise to include maneuver regiment and separate battalion FSCCs sequenced to arrive during this phase. Air was expanded to include US Air Force compass call and close air support (CAS) from the Marine Corps and Navy for maneuver and the artillery regiment's quick-fire requirements.

More significantly, the artillery battalions trained in those areas selected by the battalion commanders or mutually developed with their maneuver counterparts. Each cannon and the MLRS battalion worked with an "attached" Q-36 radar and a "dedicated" remotely piloted vehicle (RPV) to exercise sensor-to-shooter linkups. The organic battalions participated in both direct support (DS) and reinforcing (R) missions in a live-fire and maneuver fire support exercise with their habitually associated maneuver regiments.

The regimental phase incorporated all participants in a 48-hour live-fire exercise in support of simulated maneuver. The focus was on real-time fire planning (top-down planning and bottom-up refinement), target attack and fire support coordination.

The exercise was administratively controlled by a master events list driven by the 1st Marine Division's "Red Cell" while tactical control was under its forward command post deployed for this phase. Essentially, the division's capabilities to fight with fires and support maneuver in the close battle was replicated using real-time parameters.

By the end of the exercise, all units had displaced at least once (most three or more times); maintained reliable digital and voice communications on the command and coordination nets; and integrated cannon artillery (Active and Reserve), MLRS, air and maneuver over a 300-square-mile impact area.

Joint Training. When the 11th Marines requested a III Corps Artillery MLRS battalion to incorporate into DESFIREX 1-94, many worked long hours to not only maximize the off-post training event, but also create a model for future joint exercises.

In January 1993, 6-27 FA had spent a significant amount of time planning for a real-world contingency. This included developing deployment packages of various sizes. Although never executed, the plans remained "on the shelf" for future use.

DESFIREX 1-94 provided the opportunity to resurrect, update and validate these contingency deployment plans. Thus, III Corps Artillery could quickly add an Army MLRS unit to this predominately USMC exercise.

The scenario was a simple one. The 1st Marine Division was deploying to a combat zone to defeat an enemy there. No other ground combat forces were required, but the 1st Marine Division Commander requested additional, long-shooting fire support assets from the Army. Limited strategic lift aviation assets would be available initially, but follow-on support wouldn't be available for approximately

30 days. As the Army's premiere power projection platform for fire support, a Fort Sill-based MLRS battalion was alerted to deploy.

6-27 FA (MLRS) developed its own set of objectives for the exercise. The MLRS plan included exercising a full cycle training model from alert, to deployment and combat operations (the training exercise at Twentynine Palms) and then redeployment. Great care had to go into planning the deployment package as it would be required to sustain itself throughout the exercise with limited support from Army agencies.

The contingency plans were pulled off the shelf and dusted off. Final planning resulted in three possible deployment packages for MLRS: platoon-plus, battery-plus or battalion. These packages are now the III Corps Artillery standard MLRS deployment packages for any outside of CONUS strategic deployment. Given the scenario and other training constraints, the battery-plus package was chosen. (See Figures 3 and 4 for the personnel and equipment in the battery-plus option.)

As shown in Figure 3, this option just as easily could have been labeled a battalion-minus package. While the firepower was that of an MLRS battery (nine launchers), the organization was a template for the battalion.

Command and Control	
Battalion Headquarters	8
Headquarters and Headquarters Service (HHS) Battery Headquarters	2
Operations and Intelligence Section (O&I)	6
Liaison Section	2
Retransmission Section	2
Battalion Supply	4
Ambulance Team	2
Battalion Mess	4
Battalion Maintenance	6

Delivery	
Battery Headquarters	6
Battery Maintenance	8
Position and Azimuth Determining System (PADS)	4
Fire Direction Center (FDC)	18
Firing Platoon	33
Ammunition Platoon	14

Support	
133d Maintenance Support Team (MST)	10
226th MST	6

Summary

Total Passengers = 135 Total Wheels = 43
Total Tracks = 14 Total Trailers = 14

Figure 3: The 6-27 FA Battery (+) Personnel Package Deployed for DESFIREX 1-94

Command and Control	
Battalion Headquarters	4 HMMWVs
HHS Headquarters	1 2.5-Ton Truck 1 M149 Trailer
O&I	1 M577 Track 1 M105 Trailer
Liaison Section	1 HMMWV
Retransmission Section	1 HMMWV
Battalion Supply	1 HMMWV 1 HEMTT Fuel Tanker
Ambulance Team	1 HMMWV
Battalion Mess	1 2.5-Ton Truck 1 Mobile Kitchen Trailer (MKT)
Battalion Maintenance	1 HMMWV 1 M88 Wrecker 1 HEMTT Wrecker

Delivery	
Battery Headquarters	3 HMMWVs
Battery Maintenance	1 HMMWV 1 2.5-Ton Truck 2 5-Ton Trucks 1 M105 Trailer
PADS	2 HMMWVs
FDC	3 M577 Tracks 3 HMMWVs 3 M105 Trailers
Firing Platoon	9 M270 Launchers 3 HMMWVs
Ammuntion Platoon	6 HEMTTs 6 HEMATs 1 HMMWV

Support	
133d MST	3 HMMWVs 1 M109 Van
226th MST	1 HMMWV 2 2.5-Ton Trucks 1 5-Ton Track 1 Flat Bed Truck

Legend:
HMMWV = High-Mobility Multipurpose Wheeled Vehicle
HEMTT = Heavy Expanded-Mobility Tactical Truck
HEMAT = Heavy Expanded-Mobility Ammunition Trailer

Figure 4: The 6-27 FA Battery (+) Equipment Package Deployed for DESFIREX 1-94

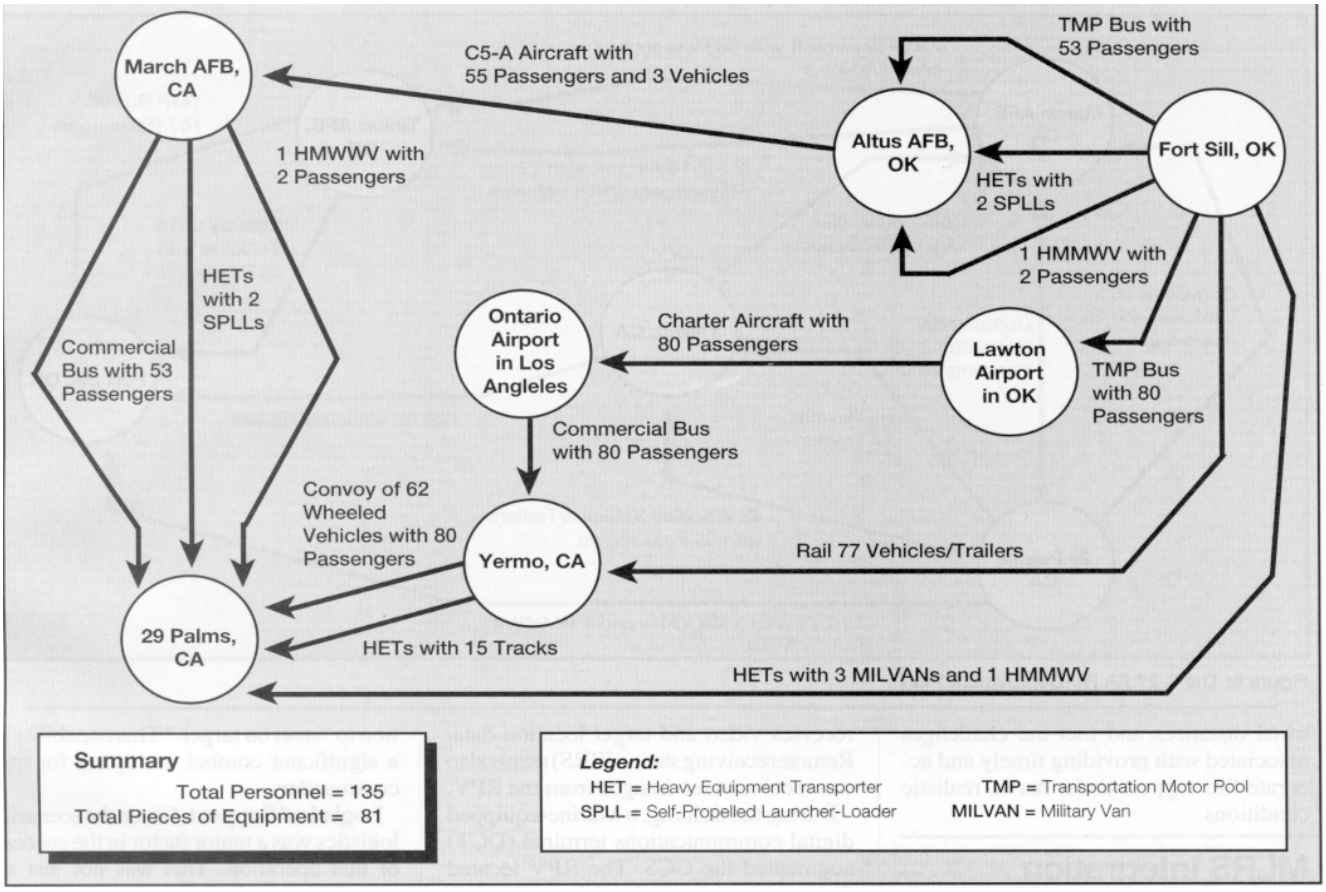


Figure 5: The 6-27 FA Plan for Deployment to Twentynine, Palms, California.

With the battalion command, control and communications (C^3) element included in the package, direct interface existed between the MLRS firing unit and the force Field Artillery headquarters. Each delivery element, while only three launchers, functioned as and had the flexibility of a battery and could operate with limited independence, if the situation required. Moreover, regardless of what elements of the battalion arrived in theater next (i.e., additional launchers, ammunition vehicles, platoon operations centers, etc.), they easily could be incorporated into an existing battalion C^3 structure with no disruption of fire support. Any other organization would ultimately require C^3 restructuring and the inherent problems associated with it.

•Alert and Deployment/Redeployment. The exercise started with an alert and complete processing for overseas movement (POM). Deployment and redeployment operations were a combination of commercial air, rail, tactical air (two MLRS launchers in C5-A aircraft) and ground haul operations (see Figures 5 and 6, the latter on Page 48). During these phases, the soldiers received an alert, marshaled, prepared for movement in terms of personal matters, prepared the battalion's vehicles for movement by air and rail and deployed to the objective area. At the conclusion of the DESFIREX 1-94, the unit redeployed in a similar fashion. The battalion's movement skills were reinforced, but a substantial by-product was exposure to a different USAF aircraft and its peculiarities.

•Combat Operations. Immediately upon arriving in the objective area, the battalion marshaled all personnel and vehicles in a staging area and moved out to a tactical assembly area (TAA). After a short period of acclimatization, the MLRS unit went immediately into accomplishing its training objectives in support of the 11th Marines' objectives.

Having just completed an intensive battery-level training cycle at Fort Sill that culminated with battery annual external evaluations (AEEs), the MLRS battalion was ready to hone its skills in collective training. The training was overlaid on the building block approach of the 11th Marines.

In the initial phase, command and control and digital interface with the regiment were affected to ensure interoperability of the MCFSS and the MLRS fire direction system (FDS) for the MLRS battalion's general support (GS) mission. Because 6-27 FA had trained and rehearsed for the connections at home station, the learning curve was significantly shorter.

During the battalion phase, the MLRS battalion trained two days with each of the four Marine artillery battalions in the R mission, again verifying the interoperability of the battalion MCFSS and MLRS FDS. A side benefit of this phase was the professional exchange of information as Marine and Army Redlegs exercised side-by-side and trained each other on the capabilities of their weapons system.

The capstone event of the exercise was the regimental phase that pulled all previous training together in support of Marine maneuver forces on realistic terrain. For the first time in nearly two years, the MLRS battalion was deployed over doctrinal

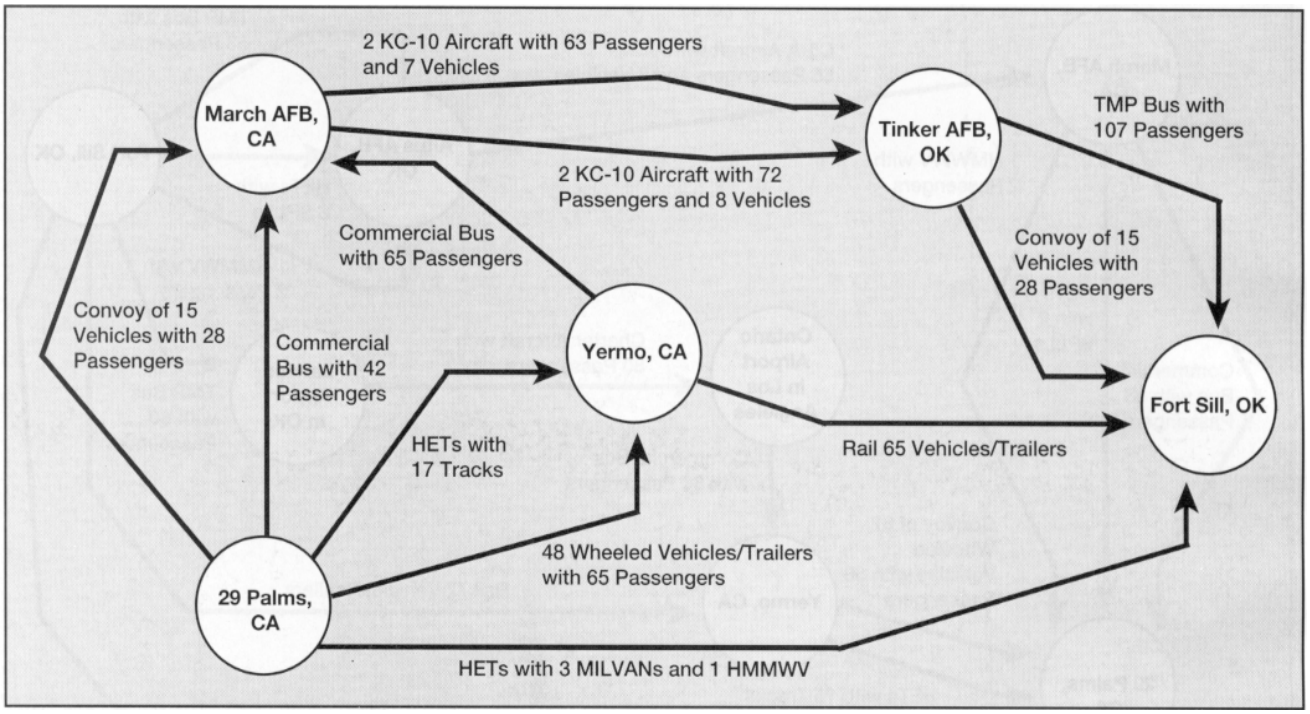


Figure 6: The 6-27 FA Re-Deployment Plan

distances and met the challenges associated with providing timely and accurate fire support under harsh, realistic conditions.

MLRS Integration

"From Day 1, we integrated 6-27 FA into Regimental C³, to include our MCFSS architecture. From my perspective, 6-27 FA was another 11th Marines battalion....we had compatible artillery doctrine/TTP [tactics, techniques and procedures], combat service support and communications."

Colonel J.C. McAbee

RPVs. To truly exercise the sensor-to-shooter concept, the MLRS battalion trained with the 1st Marine Division 3d RPV Company. The Marine RPV, while not state of the art, provides the means to see the deep battle.

The RPV has a flying time of about 4.5 hours and a cruising speed of 60 knots. Using its on-board camera, it can scan in all directions and locate targets with extreme accuracy. The RPV uses line-of-sight C-band/UHF up-link and down-link with its ground control station (GCS). This station controls the RPV's flight and receives video and target location data. Remote receiving station (RRS) teams also can receive video images from the RPV.

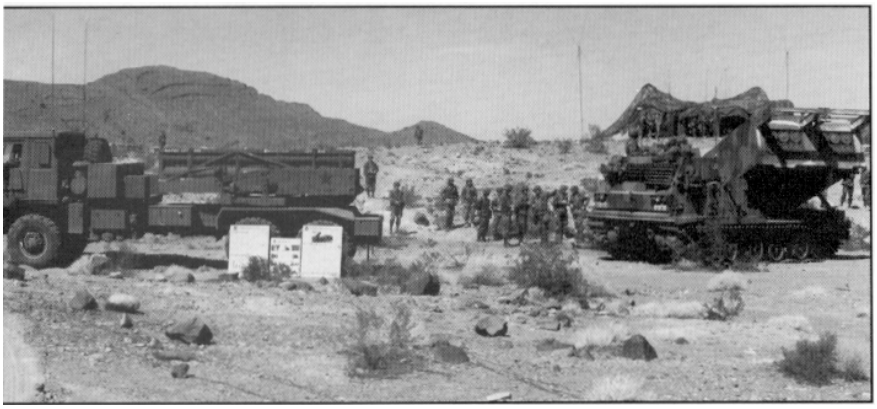
During the training, a Marine-equipped digital communications terminal (DCT) augmented the GCS. The RPV located the target and transmitted the target data to the GCS; the target data manually was input into the DCT with the data transmitted digitally to the MLRS battalion FDC; and a fire mission was conducted and battle damage assessment recorded by the RPV—all done in real time.

Using these procedures, three missions were fired for the joint fire support team during one 30-minute period. The maximum wait for any fire mission was four minutes and 40 seconds from target location to "steel on target." This capability is a significant combat multiplier for any commander.

Logistical Support. Given the scenario, logistics was a major factor in the success of this operation. This was not just an exercise with the Army supporting the Marines, but an Army MLRS unit being fully integrated into a Marine regiment. When the MLRS unit deployed, it had to be able to sustain itself for 30 days (20 actual days). The battalion deployed with a very robust logistic and maintenance support package (See Figure 4 on Page 46) as well as a tailored prescribed load list (PLL) and authorized stockage level (ASL) of parts for organizational and DS maintenance.

During DESFIREX 1-94, 6-27 FA MLRS live fires as part of the 11th Marines.

The 11th Marines prepare to fire their M198 howitzer during DESFIREX 1-94.



6-27 FA Redlegs setting up an MLRS orientation for their Marine brothers. The high-mobility artillery rocket system (HIMARS) prototype is on the left.

From start to finish, the Marines provided almost all support for the MLRS unit during the exercise. The DS maintenance logistical section was collocated with the 11th Marines rear command post and operated with them throughout. Combat Service Support Detachment 17 (CSSD-17), the Marine equivalent of an Army forward support battalion (FSB), was GS to the 11th Marine Regiment. It provided primary forward support to the MLRS battalion as well.

Supplies were routinely brought forward to the artillery battalions by the CSSD in what was called a "Jiffy Mart" (similar to a logistics raid). The supply packages were tailored to meet the battalions' needs and provide ammunition, fuel and supplies in an austere field location. One such package was organized for the MLRS battalion and delivered at night during a battalion *move*.

The Jiffy Mart from CSSD-17 delivered meals-ready-to-eat (MREs), water, fuel and M28 rockets. Organic haul capability limited the quantity of fuel and ammunition the CSSD could deliver at a time, but its equipment was fully compatible with MLRS.

Maintenance of an MLRS battalion's equipment became a major challenge. The Marine system was fully capable of supporting compatible pieces of equipment, but the tracked vehicles were another matter. The key to effective operations was preventive maintenance checks and services (PMCS) and the deployed PLL and ASL. The rugged terrain was harsh on tires, track pads and suspension systems. The effects of sand, dust and heat required the battalion pay special attention to its vehicles and, especially, communications and computer equipment. While the unit successfully completed the 20-day exercise with no major failures of combat equipment, 30 days appeared to be the maximum amount of time an MLRS unit would be able to sustain itself without a planned resupply.

Communications. The significant communications challenge in the desert terrain was digitally communicating in channelizing terrain and over long distances. The MLRS battalion was linked to the regiment on a separate MLRS fire direction net. However, were it not for Marine retransmission communications capabilities and their skilled communicators, 6-27 FA could not have conducted operations over the distances required.

An MLRS battalion only is equipped with one retrans capability. When a retrans is required, the unit must choose between digital fire direction or voice command and control nets. The Marines provided the additional retrans capabilities, allowing all nets to function effectively.

Conclusion

"...RPVs, digital communications, automated fire support systems, Q-36 radars, Army MLRS and Marine cannon artillery....Clearly, the whole is much greater than the sum of its parts."
Colonel J.C. McAbee

DESFIREX did more than validate that two services can conduct joint operations—integrate their operations. It showed that a unit from one service can *become part* of the organization of another, even if only for a short time.

Marine forces need the enhanced firepower and lethality that rocket and missile technology provides to incorporate into their fire support structure if they're to win on the next battlefield. But until the Marines have their own MLRS, that support must and *will* come from the Army.

Lieutenant Colonel Robert A. Cline commands the 6th Battalion, 27th Field Artillery (Multiple-Launch Rocket System), 75th Field Artillery Brigade, Fort Sill, Oklahoma. His previous assignment was as the Fire Support Coordinator for the Joint Special Operations Command at Fort Bragg, North Carolina. Among other assignments at Fort Bragg, he served as Executive Officer of the 18th Field Artillery Brigade, S3 of the 82d Airborne Division Artillery and Fire Support Officer for the 82d Aviation Brigade. While assigned at Fort Bragg, he participated in Operations Urgent Fury in Grenada, Just Cause in Panama and Desert Storm in Southwest Asia. Lieutenant Colonel Cline commanded the 88th Field Artillery Detachment, Drama, Greece, and B Battery, 3d Battalion, 34th Field Artillery, 9th Infantry Division at Fort Lewis, Washington.