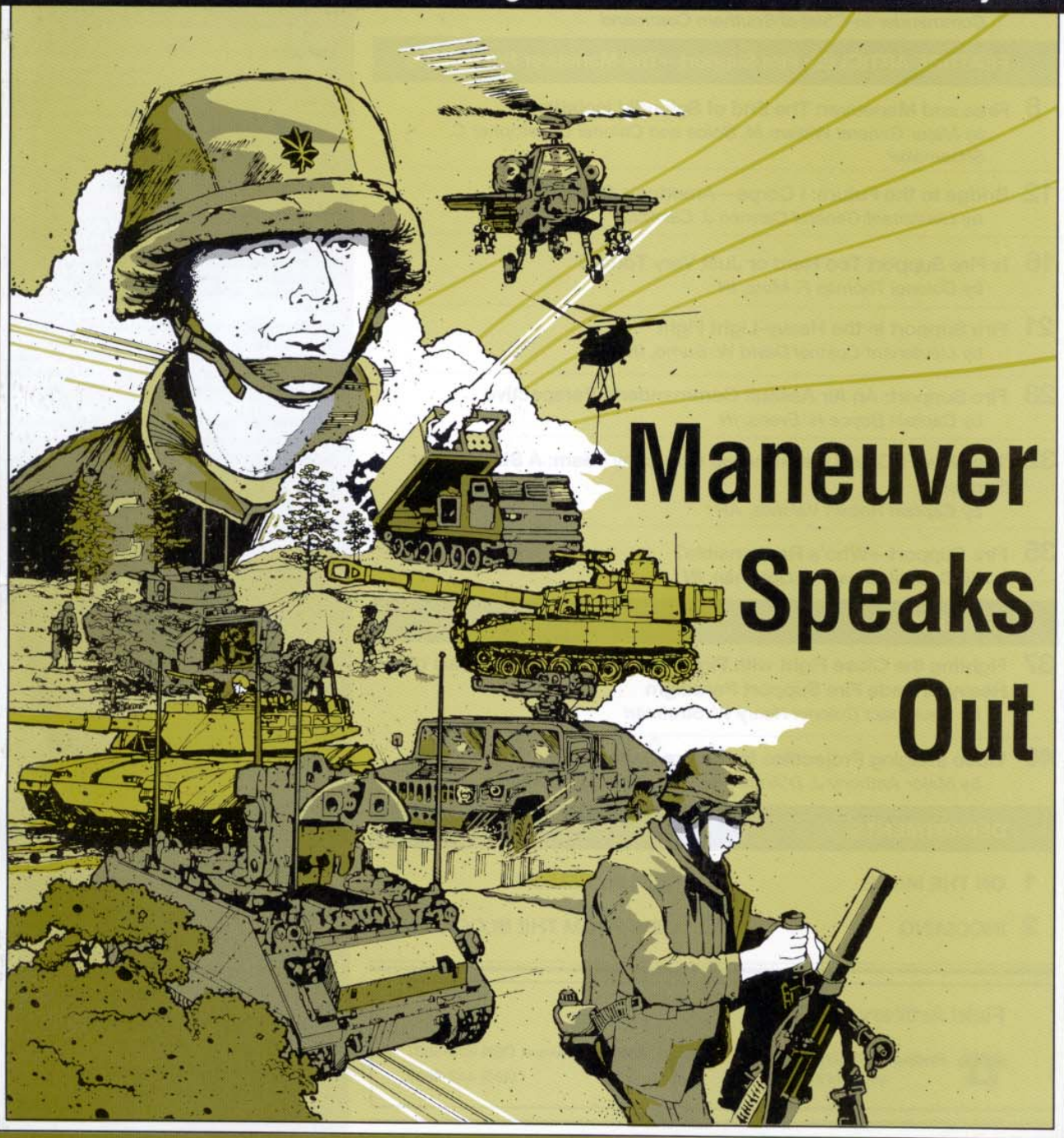
Field Artillery

A Professional Bulletin for Redlegs

February 1994



Maneuver Speaks Out

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PURPOSE (as stated in the first ***Field Artillery Journal*** in 1911): *To publish a journal for disseminating professional knowledge and furnishing information as to the Field Artillery's progress, development and best use in campaign: to cultivate, with the other arms, a common understanding of the power and limitations of each; to foster a feeling of interdependence among the different arms and of hearty cooperation by all; and to promote understanding between the regular and militia forces by a closer bond; all of which objects are worthy and contribute to the good of our country.*

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05895

MAJOR GENERAL JOHN A. DUBIA

A Concert of Combat:
Coordination and Killer Missions

The battlefield is an unforgiving place. Most engagements are won or lost in the first 90 minutes. In that brief universe of combat, brigade and battalion commanders must marshal all their forces to deliver the decisive blow. No task at this time is more difficult than judiciously employing fire support. At best, commanders can hope to execute a handful of massed, accurate fires at the decisive point of each of their battles—called "killer missions." Mastering this crescendo of fire requires the careful coordination of the combined arms team.

Recently, we revised *TC 6-71 The Fire Support Handbook for the Maneuver Commander* to highlight the commander's critical coordination points. The new manual also stresses that commanders consider available joint fire support assets when preparing for battle. Future battlefields will be "purple," a blend of the uniforms of all the armed services. Fighting jointly is not a means of combat restricted to higher level commanders. All commanders will fight with purple fires, and the new manual reflects this imperative.

To be published this spring as FM 6-71, the handbook provides brigade and battalion combined arms commanders tactics, techniques and procedures for fighting with fires. For the first time, they'll have a ready reference that addresses specific steps to coordinate killer missions.

Formulating Intent. The manual now discusses in detail how the fire support coordinator (FSCOORD) or fire support officer (FSO) helps formulate the commander's intent. The FSCOORD provides an updated estimate on fire support capabilities; the commander describes what he wants his fires to accomplish in order of priority. In turn, the FSCOORD identifies where the commander's "wants" exceed the resources available. This give and take results in a commander's intent that provides a realistic expectation of what fires can accomplish on the battlefield.

War-Gaming. The next critical point of coordination occurs when the staff war-games possible courses of action. Our doctrine has not explicitly stated it before, but we now acknowledge that the wargame may be the most critical step in synchronizing fire support. Detailed war-gaming should spell out the specifics of how the commander will fight with fires.

FM 6-71 emphasizes that the wargame is a critical component of the decide phase of the staff's decide-detect-deliver targeting process. In the wargame, the FSCOORD or FSO with the rest of the staff assesses fire support needs and translates them into precise targeting requirements.

The new manual also illustrates how war-gaming provides the foundation for the scheme of fires, considering both the execution of fires and the maneuver of fire support assets. When the results of the wargame are briefed to the commander, he should know what targets he wants to shoot, how those targets will be acquired, what fire support assets will attack them and which subordinate maneuver commander will supervise the execution of the fires. At this point, the scheme of fires and the killer missions begin to take shape and acquire detail.

Preparing. As the commander's concerns shift from planning toward execution, his focus for fires changes to the next critical coordination point: preparation. All too frequently, this is the point at which plans begin to fail. FM 6-71 offers guidance to help the commander confirm that coordination translates into synchronized execution.

In particular, the manual stresses that the commander check his reconnaissance and surveillance plan and fire support plan to ensure they work together to provide him the "eyes" to see the battle. To achieve this synchronization, the commander employs troop leading techniques—backbriefs and personal reconnaissance—to verify that subordinates have adequately considered the movement, positioning and protection of observers. He also checks to see if primary and alternate observers have been designated. His FSCOORD or FSO accompanies him to advise and assist him in supervising final preparations.

Rehearsing. As in the past, FM 6-71 stresses the commander validate his fire support plan during his combined arms rehearsal. The standards for measuring an effective rehearsal remain unchanged—they're exacting and nonnegotiable. The commander incorporates into his plan only those targets that clearly support his intent and verifies his combined arms team is prepared to execute those targets. He also must ensure that all the players are present at the rehearsal, including the aerial observer, the Air Force liaison officer and other members of the team who frequently are forgotten until time for execution.

This manual adds detailed guidance on the commander's role in rehearsing the execution of fires. During the rehearsal, he confirms each critical element of the fire support plan. While the FSCOORD or FSO is on hand to advise him, the commander describes the execution of the killer missions. He articulates each step from how the target is acquired to the execution and exploitation of fires. He also ensures the maneuver of his fire support assets is synchronized with his other battlefield operating systems.

FM 6-71 places new emphasis on procedures for the positive clearance of fires and prioritization of targets of opportunity during the rehearsal. The manual expands the definition of clearance of fires: in addition to ensuring all fires are safe, targets of opportunity must be checked to ensure they support the commander's intent and are cleared for engagement. The new definition is intended to emphasize that positive clearance procedures are an integral part of synchronizing timely, accurate fires. Commanders use rehearsals to verify all members of their combined arms team can meet the challenge of shifting fires on a rapidly changing, lethal battlefield.

Executing. Critical coordination culminates in the concert of combat. The battlefield erupts in smoke and flame. The commander, with the assistance of his fire supporters, brings the killer missions to bear at the decisive point.

If the combined arms commander has properly planned, war-gamed, rehearsed and prepared his operation using the techniques in FM 6-71, he'll achieve the synchronized symphony of execution that will help bring decisive victory on the battlefield. ***Fire Support!***

Senior Fire Support Conference, September 1994

The Senior Fire Support Conference (SFSC) will be at the Field Artillery School, Fort Sill, Oklahoma, from 12 to 16 September. The SFSC is replacing the Field Artillery Conference and will be held every 18 to 24 months instead of annually.

Army and Marine (Active and Reserve Components) attendees include: Field Artillery commanders, colonel and above, and their command sergeants major; corps and division commanders and their fire support coordinators (FSCOORDs); Training and Doctrine Command (TRADOC) school commandants; Field Artillery general officers; and invited retired general officers. Field Artillery Association corporate members are also invited.

The SFSC will be the only regularly scheduled Field Artillery/fire support conference held at Fort Sill. For more information, contact the Directorate of Training and Evaluation, Field Artillery School: DSN 639-2005 and 2002 or commercial (405) 442-2005 and 2002.

Correction to CECOM FATDS NETT Vice CECOM FSSE Telephone Numbers

Reference the notice, "Fort Sill Telephone Numbers Change," on Page 15 of the December 1993 *Field Artillery*, the office of the Communications-Electronics Command (CECOM) Field Artillery Tactical Data System (FATDS) New Equipment Training Team (NETT) is incorrectly listed as having the same telephone numbers as the office of CECOM Fire Support Software Engineering (FSSE). The correct numbers for CECOM FATDS NETT are DSN 639-4610 and 4782 or commercial (405) 442-4610 and 4782.

The confusion associated with the two totally separate CECOM organizations is a common occurrence within the Field Artillery community and the Acquisition Corps—not only their telephone numbers, but also their missions. Although both organizations are tenant at Fort Sill, Oklahoma, they do not belong to the Field Artillery Center or School. However, to accomplish their missions, they must work closely with both.

CECOM FSSE's primary mission is to provide post-deployment software support (PDSS) for fire support systems such as TACFIRE [tactical fire direction system], light TACFIRE (LTACFIRE), Firefinder, the battery computer system (BCS), forward-entry device (FED) and fire direction data manager (FDDM). FSSE also is preparing to assume PDSS for the initial fire support automated system (IFSAS), which is currently being fielded, and the advanced Field Artillery tactical data system (AFATDS), which is still being developed. The CECOMFSSE telephone numbers are DSN 639-6950 and 2742 or commercial (405) 442-6950 and 2742.

CECOM's NETT has the mission of on-site training of all National Guard, Army Reserve and active duty units that have been receiving or will receive new FEDs, BCS, FDS, IFSAS and AFATDS. The NETT works with the Field Artillery School to ensure on-site training corresponds with the institutional training new soldiers receive at the school.

Both CECOM NETT and CECOM FSSE receive substantial funding from the Project Manager of Field Artillery Tactical Data Systems (PM FATDS) at Fort Monmouth, New Jersey.

LTC D. Dale Magnin
LNO, PM FATDS
Fort Sill, OK

Air-Ground Cooperation: Response to "The AirLand Composite Wing"

Brigadier General Bobby O. Floyd's description of his unit and its operational concept in his article (October 1993) sounds a welcome note as interservice tension over roles and missions continues. The Army's leadership should take note of the potential involved in his concept and work with the Air Force to reach a common view of future air-ground cooperation in battle.

In 1943, General Rommel—the Desert Fox—made the Allies painfully aware that their system of air support command and control was lacking. The Battle of Kasserine Pass provided many opportunities for tactical air support to decisively affect the outcome. Those opportunities were lost due to the turgid system of requesting and allocating support in place at the time.

Lessons learned in North Africa helped create the air-ground system Major General Elwood R. "Pete" Quesada, Commander of the IX Tactical Air Command, and Lieutenant General Omar N. Bradley, Commander of the First US Army, used in 1944 to exploit the breakthrough after Operation Cobra and begin the pursuit of the German Army to the Rhine (*A Soldier's Story* by General Bradley). Ground controllers with the lead maneuver elements called down fighter-bomber strikes from groups of aircraft continuously on station (while flying was possible). On many occasions, the opposition was subjected to lethal combined tank and aircraft attacks within minutes of contact and quickly eliminated. Friendly casualties and delay were minimal (*Breakout and Pursuit* by Martin Blumenson).

Fifty years later, an echo of this system emerges. The key is the direct coordination and control link Brigadier General

Floyd's wing uses in a contingency. The wing is effectively in "direct support" of the XVIII Airborne Corps, receiving "calls for fire" from the divisions' or brigades' tactical air control parties to either the forward air controller (FAC) in an OA-10 over the forward line of own troops or the air support operations center (ASOC) at the corps. With the FAC in control, fighters move from airborne holding patterns or ground alert directly into action. Alternatively, the ASOC talks directly to the composite wing operations center, which generates mission taskings for its aircraft. This, versus making supplication (72 hours out) to the theater joint forces air component commander (JFACC) and hoping Army requirements have made the theater commander's prioritized list, is what the Army needs.

While Brigadier General Floyd says his composite wing reverts to the normal command and control system after the JFACC arrives in theater—what if it didn't arrive? What if there were enough wings, composite or otherwise, in theater to prosecute the air campaign and allow some to maintain the support relationship described above? While at certain phases of the campaign all air assets may need to be incorporated into the theater air tasking order, composite wings associated with corps could, when not so engaged, remain postured to be responsive to the corps commander's tactical needs.

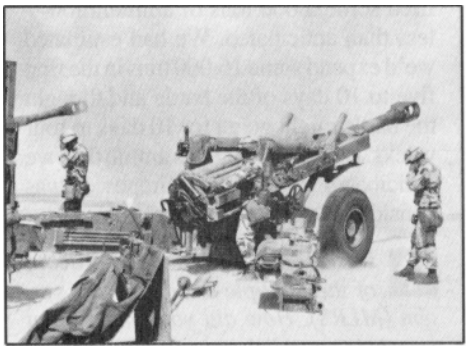
As the campaign evolved to more heavily employ the ground component, additional squadrons from conventional wings could reinforce each corps-associated composite wing—perhaps to the point of achieving the same level of flexibility, responsiveness and effect enjoyed by some of our past joint warfare innovators.

CPT Mark A. Traylor, FA
Battle Command Training Program
Fort Leavenworth, KS

Wear Your Earplugs!

In the June 1993 issue of *Field Artillery*, there are two pictures of the M198 howitzer firing (Pages 17 and 45). The M198 is near and dear to my heart because I was the project manager for the howitzer at the time it was fielded in 1979.

Each picture shows a crewman holding his ears as the gun is fired, and this action is the basis for my concern. Like many old Field Artillerymen, I retired with bad ears and hearing loss caused by being around too much firing and often failing to wear earplugs. When we were about to field the M198, the Surgeon General insisted that crewmen not only wear double hearing protection (helmet and earplugs), but also fire with a 15-foot lanyard whenever firing the top charge. Because the top charge is seldom fired in training, these severe measures are seldom necessary, but earplugs are always necessary to prevent hearing damage.



I urge all artillerymen to *wear* their earplugs at all times. They will discover when they leave the Army that the Department of Defense no longer pays disability for hearing loss except in the most severe cases. I learned the hard way. I was in charge of the final operational test of the M198 at Fort Bragg, North Carolina, when 30,000 rounds were fired by three guns in three months. That exercise probably "did in" my ears because I didn't wear earplugs at all times.

So, ***wear*** your earplugs!

COL(R) James B. Lincoln, FA
Annandale, VA

When You Get M119s, Just What Happens to the M102s?

After reading the article on the 3d Battalion, 320th Field Artillery's M119A1 fielding in the October 1993 *Field Artillery* ["NCOs Lead the Way: M119A1 Fielding in the Air Assault Division"], I was reminded of the positive effects the introduction of a new weapon system has on the Total Field Artillery.

Just what happened to those "old" M102 105-mm howitzers? Were they melted down and sold for scrap? Were the tubes filled with cement and placed in a park for children to climb on? No. They were passed on to the artillerymen of the 2d Battalion, 123d Field Artillery, 34th Infantry Division (Mechanized), Illinois Army National Guard.

Through the concerted efforts of the battalion commander, Lieutenant Colonel John S. Raschke, and state area command (STARC) personnel, this battalion procured 18 M102 howitzers from the 101st Airborne Division, Fort Campbell, Kentucky, benefitting as much as they did from the fielding of the M119A1.

On 17 April 1993 during a live-fire exercise (LFX) at Fort McCoy, Wisconsin, the artillerymen of B Battery fired the last round from the battalion's M101A1 howitzers. Battalion members anxiously awaited annual training (AT) and the fielding of the M102s.

The battalion commander and his S3 outlined a training plan for transitioning to the M102. The battalion conducted a 13B Phase II Basic NCO Course (BNCOC) with the new weapon system in mind. Graduates of the Phase II BNCOC then went back and trained their sections.

Soldiers of the battalion excelled in their training on the new howitzer during the LFX portion of AT. Using the experience of this training, the battalion is modifying its standing operating procedures to include the advantages the M102 has over the M101A1.

From tractor-towed 155-mm Schneider howitzers of World War I, to the 155-mm Long Toms of World War II, to 8-inch howitzers and the 762-mm Honest John, to the M101A1, and now to the M102, this battalion has always benefitted from evolving artillery technology.

On 22 September 1993, the 2d Battalion, 123d Field Artillery was catapulted into the leading edge of fire support technology with the fielding of the lightweight computer unit (LCU). The combination of the M102 howitzer and the LCU makes the 2d Battalion, 123d Field Artillery truly *Ready and Willing!*

SFC Daniel J. Bowman, FA
A Btry, 2-123 FA, Rock Island, IL

Lieutenant General Barry R. McCaffrey, Director of J5 (Strategic Plans and Policy), Joint Staff, and Nominee for Commander-in-Chief of Southern Command

Artillery—
The Most Important Factor on the Battlefield

by Patrecia Slayden Hollis, Managing Editor

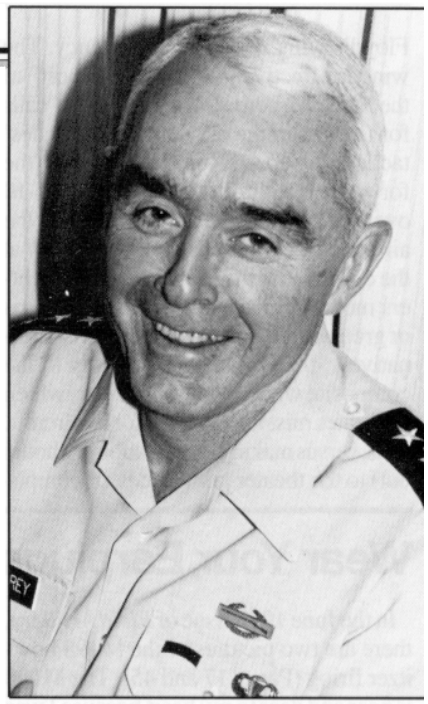


Photo by MSgt Mamie Burke

Q *As the Commander of the 24th Infantry Division (Mechanized) in Operation Desert Storm, what kind of fire support challenges did you face?*

A The most important battle we had to win was the counterbattery fight. So, at the start of the campaign, Colonel Tom Banks, the 212th Field Artillery Brigade Commander, was charged with a very important mission—not only to be the artillery force coordinator for the first key phase of the battle, but also to locate and engage the Iraqi artillery. We knew the Iraqis had a large amount of artillery, which would be their primary casualty producer. We weren't terribly concerned about their maneuver forces because our M1A1 tanks were essentially impervious to Iraqi direct fire. Our only worry was casualties caused by the enemy's artillery and, to a much lesser extent, mines.

There were some unusual aspects of that battle, the most obvious being the distance we had to move: some 400 kilometers from the line of departure to the Euphrates River Valley. Then, in the second phase of the campaign, the 24th Infantry Division took part in the VII Corps main attack to eliminate the four Republican Guard divisions in the valley. So, distance was the initial challenge—time-distance factors and POL [petroleum, oils and lubricants] logistical problems.

Then the second major challenge was to bring a large amount of firepower to bear quickly. The challenge for the corps commander and his corps artillery team was to mass artillery from across his giant 500-kilometer corps frontage and move his forces as far and fast as he did by the fourth day of the battle. To mass fires for the 24th Division, he concentrated four brigades of artillery behind us. It was an incredible maneuver of artillery forces.

And our artillery fires were tremendously effective. In 72 hours, the artillery fired some 3,600 tons of ammunition—less than anticipated. We had estimated we'd expend some 16,000 tons in the first five to 10 days of the battle and thought the battle might go on for 10 days to four weeks. But even firing less ammo than we anticipated, the artillery firepower was considerable in a such a short time.

Q *Desert Storm was the combat debut of the multiple-launch rocket system (MLRS). How did you employ that system in your division and what was the result?*

A What a *magnificent* weapon. MLRS is absolutely phenomenal—its range, flexibility and lethality on target. It's the weapon of choice for a lot of situations.

In Desert Storm, MLRS' number one contribution was to the counterbattery battle, but it also had enormous impact on the suppression of enemy air defenses [SEAD]. On the third and fourth days of the battle, we had a lot of Iraqi 57-mm anti-aircraft rounds fired at our Apache helicopters. Two of our Apaches were hit and grounded, so we had to suppress the enemy's air defense systems and right away. MLRS did the job.

But there's another aspect of MLRS that makes it so effective—the terror factor. We learned about the terror MLRS instills in soldiers who are on the receiving end by debriefing Iraqi POWs [prisoners of war]. They called MLRS "Steel Rain."

The last night, we engaged the Republican Guard Hammurabi Division with four artillery brigades, which included two MLRS battalions. Between 0100 and 0330 hours, they fired an awesome display of firepower with rockets streaking across the night. That display essentially broke the will of that enemy armored division, causing their soldiers to begin fleeing to the rear before we actually made contact with their maneuver forces. MLRS was right on the money.

MLRS is extremely effective in conjunction with the capabilities of today's intelligence systems. We can find the enemy's maneuver units with a number of systems, including JSTARS [joint surveillance and target attack radar system], which was the primary intel system giving me the grid coordinates of Iraqi battalion-sized units. The last night of the war, we had center of mass grid coordinates for seven enemy tank battalions, five mech battalions and 13 artillery battalions. Our artillery fired on those units before our maneuver forces encountered them, pounding the enemy units as they fled. So, a combination of good intel and firepower makes a big difference on the battlefield.

"The combination of Apaches supported by MLRS is the ultimate tank-killing system."

Q *Do you think every heavy division should have an MLRS battalion?*

A *Absolutely*. The Chief of Staff of the Army feels the same way and is trying to resource those battalions. The heavy division needs the flexibility MLRS provides.

The combination of Apaches supported by MLRS is the ultimate tank-killing system. The Apache is the most maneuverable direct fire weapon on the battlefield. It has the Hellfire missile with a range of eight kilometers and the ability to get on the flank of an enemy armored force and come in perpendicular to the force's line of advance. But its effectiveness is enhanced enormously if it has an artillery system suppressing the target and the enemy's air defenses. So, the Apache can attack deep at night and the MLRS or ATACMS [Army tactical missile system] can fire deep at night—a tank-killing combination.

Q *Given your experience as a division commander in combat, what advice would you give combined arms commanders on synchronizing fire and maneuver on future battlefields?*

A The thing we expected the artillery to bring to the battlefield—and it did—was technical competence. Redlegs know how to employ batteries day and night and work the technical problems combined with their target location systems—Q-36 and Q-37 radars, OH58Ds helicopters—to mass fires. What we, the Army, had to re-learn during Desert Shield was how to employ large artillery formations as part of the maneuver battle.

Today, we won't conduct division and corps FTXs [field training exercises] with the entire 60,000- to 120,000-soldier corps package out in the field. Those days are gone forever—simply because of fiscal constraints and our inability to maneuver over the distances and under the conditions required for such an exercise in the United States.

The challenge for the artillery community—in concert with maneuver—is to ensure the Army doesn't have to re-learn how to synchronize and maneuver Field Artillery fires for future division or corps battles, perhaps one in which our forces don't have the long prep time they had in Desert Shield.

As leaders develop in the Army, they're going to have to learn those skills in BCTP [Battle Command Training Program]

"The challenge for the artillery community—in concert with maneuver—is to ensure the Army doesn't have to re-learn how to synchronize and maneuver Field Artillery fires for future division or corps battles..."

and in seminars and CPXs [command post exercises] We have to make sure that, intellectually, our Field Artillery leaders have the skills to manage the maneuver of fires as Colonel Tom Banks did on the last day of the war. He had 16 artillery battalions in position and firing for the 24th Infantry Division. It was a massive concentration of artillery units.

Our Redlegs knew their business. But the same applies to our soldiers and leaders in tank and Bradley companies across the battlefield—they flat knew what they were doing. By the time we attacked, most of them had been locked in command for at least five months and up to almost two years. The Army has never had more competent NCOs and company-grade officers. That was the ultimate key to our success in Desert Storm.

I've told civilian groups I've talked to that we would have won the war if we had been using Iraqi equipment instead of our own because of the quality of our soldiers and leaders. What having better equipment ensured was fewer casualties—thank God. In the 24th ID, we miraculously only had eight killed and 36 wounded. Those low numbers don't in any way diminish the tragedy to the soldiers' families; we had soldiers who were permanently brain damaged or who lost their limbs. But I expected 500 to 2,000 casualties. The number of casualties was low because of the caliber of our equipment; the explosive velocity with which we won the war was because of the caliber of our company/battery-grade leaders and soldiers.

Let me add one point that applies to firepower. When we look at some of the magic technologies of the Gulf War, and they certainly include MLRS, OH58Ds and Firefinder radars, it's easy to overlook the contribution of one small box: the global positioning system [GPS]. The miracle of the Desert War was that for the first time in the history of ground warfare, all units in a combat division—batteries and companies, communication nodes and battalion, brigade and division command posts—knew where they were to eight-digit coordinates, day and night, in sand storms and in blinding rain.

GPS was more than a navigation tool. When we saw what we believed to be enemy forces, we could rule out blue-on-blue fires by company/battery commanders horizontally telling each other exactly where their own units were. We sustained some friendly fire casualties but none from artillery in four days of combat—firing 3,600 tons of ammunition while moving 400 to 500 kilometers. *Astounding*. A big piece of that was the global positioning system.

Q *One of the "New Era Dangers" listed in Les Aspin's Bottom-Up Review is nuclear weapons and other weapons of mass destruction. Given the potential for the proliferation of such weapons in Third World countries that have experienced hundreds of years of instability, how are we countering that threat?*

A This new administration came into office and correctly stated the principal threat facing America and nations around the globe is the proliferation of weapons of mass destruction: nuclear, chemical and biological. So they're trying to conceptualize a manner in which to address these concerns. How do we create a world in which our grandchildren won't face the probability these weapons will be employed? They will be employed if the US doesn't step forward in the international arena and counter their development and sale.

There are some very encouraging signs. One is the START II [Strategic Arms Reduction Treaty] we've signed with the former states of the Soviet Union but haven't yet ratified. The treaty commits the signatories to maintaining far fewer nuclear weapons—less than 3,500 deliverable weapons each for the former Soviet Union and the United States.

We're also, as you know, a signatory of the Nuclear Nonproliferation Treaty that

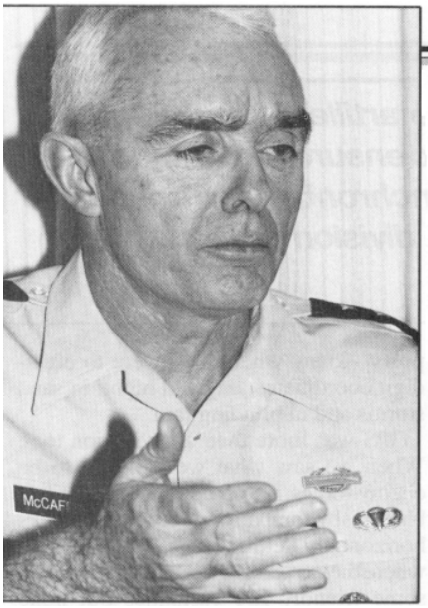


Photo by MSgt Mamie Burke, USAF

comes up for review very shortly. Many of us in the world arena, to include the permanent five members of the United Nations Security Council, are totally committed to trying to prevent the spread of these dreadful weapons.

In addition, last January I was privileged to be in Paris for the Chemical Weapons Convention. More than 100 nations came together and committed themselves to the absolute destruction of chemical weapons during the next 10 years.

Many nations understand that these weapons of mass destruction make very poor military tools. They're a terrible threat to civilian populations, but they don't contribute a lot to the security of the nations employing those weapons. When Desert Storm began, the Iraqis had biological and chemical weapons and were on the verge of possessing nuclear capabilities. We had enormous stocks of chemical weapons and the most massive and effective nuclear arsenal in the world. But these weapons were irrelevant in that battle. So, the world community is coming to understand that, for international security concerns, we're all better served by preventing the proliferation of these weapons of mass destruction.

Right now, Dr. Ash Carter, an Assistant Secretary of Defense, and I are co-chairmen of something called the Nuclear Posture Review. The Secretary of Defense charged us, in conjunction with all in the interagency community involved with the nuclear weapons program, to review the very essence of US nuclear doctrine, of the technology, of its safeguards of how we train the force. The question is what are these weapons for—what contribution will they make to our security in the decades to come? By late spring, we'll have recommendations for the Secretary and the President on the capabilities the US will maintain or destroy and our policies on weapons of mass destruction.

Q *Another New Era Danger is major regional conflicts (MRCs)—US armed forces are to fight and win two nearly simultaneous MRCs. As outlined by the Bottom-Up Review, with the number of lesser regional crises in which US forces are or could be involved increasing, will our forces be spread too thin to win the two MRCs?*

A It's definitely of great concern. We came out of the Bottom-Up Review with an excellent conceptual framework to understand and create the national defense we'll need in the years ahead. It was an unprecedented collaborative effort that went into every aspect of our national security needs, except nuclear weapons, which we held out for separate study.

In the process of designing that national defense blueprint, we made a number of tradeoffs. But we think 10 Army divisions, more than 30 Army Reserve Component brigades, and a very powerful Air Force, Navy and Marine Corps are enough. As we look at the threat-based scenarios we could encounter, it's hard to imagine how we're going to get into trouble with those armed forces, *if* we have the money to keep them properly trained, modernized and with the transportation assets needed for a CONUS [continental US]-based military to deploy rapidly to potential regional conflicts. That's our challenge.

On a given day—and I update this every time I talk to a new group—US armed forces have more than 435,000 soldiers, sailors, airmen and Marines outside the continental United States. About 80,000 are involved in or supporting peacekeeping operations. Thirty-seven thousand are in Korea. We have servicemen in northern Iraq and Turkey and a very substantial air and naval presence in the Persian Gulf region. In Somalia, we have about 9,000 Army troops, a very powerful fleet offshore and a substantial Air Force presence supporting them. Our Air Force and Navy are heavily involved in the ex-Yugoslavian region with some Army troops: a hospital in Zagreb, a unit in Madeconia and individual officers and NCOs inside Bosnia as part of the UN Headquarters.

Our servicemen's being assigned around the world reflects the shape of the situation we're dealing with—a very messy and dangerous world, one in which the interests of America and our allies frequently will be threatened. It's going to be a tough challenge for the young men and women of our forces during the next 10 years until we sort out other ways of keeping the peace.

Q *What are the most significant lessons we've learned in multi-national operations other than war?*

A The US has excellent command and control systems and the best logistics capability in the world. We can package our forces and move them thousands of miles and do it routinely. When we get there, our joint forces speak the same language, share the same doctrine, have system interoperability and trust each other.

But when you have an operation such as Somalia with more than 14 nations involved, it's a lot more difficult—all those capabilities we have in common change. In addition, the military personnel of those countries come with different levels of readiness, and some countries have different views of what the political objective of the operation should be. Complications

"We will never relinquish combatant command [COCOM] of US armed forces to an ally or coalition partner; US units will have an unbroken chain of command from the President of the United States down to the last soldier, sailor, airman and Marine."

not withstanding, it's appropriate for America to be part of coalition or international operations in some situations—humanitarian relief, peacekeeping and peacemaking—for a lot of reasons.

But it's not something new for us. The 16 nations of NATO have put 40-plus years into developing the ability to operate with one another. One of our divisions in Germany operates frequently as part of a German corps, and we've interoperated with the Brits and others for many years.

Currently, we have US military under the authority of foreign military. For example, Lieutenant Colonel Walt Holten commands 300 US Army troops as part of a Nordic unit of 1,000 soldiers in Macedonia. He works for a Danish brigadier general. The unit plays a tremendously important role as a peacekeeping force, preventing, we hope, the spread of warfare out of ex-Yugoslavia into the Balkans.

Which brings up another point. We will *never* relinquish combatant command [COCOM] of US armed forces to an ally or coalition partner; US units will have an unbroken chain of command from the President of the United States down to the last soldier, sailor, airman and Marine. What we will do is grant tactical or operational control of our forces to another national military on a case-by-case basis, as we did for our soldiers in Macedonia.

Q *What's the impact of the US Army Forces Command's (FORSCOM's) becoming the Army component of the US Atlantic Command (USACOM), the new unified command?*

A USACOM will implement an exciting concept that's going to pay great benefits to our joint combat capabilities. Though it stood up on 1 October, its CINC [Commander-in-Chief] Admiral Paul David Miller says the real operation of USACOM is not "the day you turn the lights on," but "the day you start the rheostat turning," which will take at least a year. Our newest unified command must sort out all the new joint understandings to bring the United States Atlantic Command fully on line.

Admiral Miller is charged with developing an adaptive planning process for tailoring joint organizations to rapidly support forward combatant CINCs—the CINCs of the European Command, Central Command, Southern Command and others. FORSCOM will play a critical role in our warfighting plans and peacetime deployments as it owns, trains and prepares the Army ground component for those tailored USACOM packages.

Q *Do you see other joint organizational changes on the horizon?*

A There are a lot of options under discussion, but none have been approved. As we draw down to about 1.4 million men and women in the active forces by about 1997, we'll continue to look at ways to streamline joint organizations and operations. From a high point of well over 2.3 million military personnel a few years ago, we have a tremendously changed force with more changes to come.

We're going to withdraw many of our forces from overseas and end up with about 100,000 in Europe and 100,000 in the Pacific. In an environment of fewer military forces, we'll have to do things differently—pare down and combine functions to get the most from our smaller joint forces.

Q *There's some thought that advancements in technology—including developing longer range, precision fires and digitizing the battlefield to win the information war—will blur the distinction among the tactical, operational and strategic levels of warfare. What is your vision of joint warfare and organization in the 21st century?*

A I think your basic premise is a correct one. The explosion of technology, in particular, communications, automation and night-vision technology and the influence of space-based communications and intelligence platforms, all clearly will change how we view national security responsibilities. We're going to be a joint force operating in some very different regional environments than in the past.

Emerging technologies in Desert Storm changed our operations. I commanded a division of some 26,000 troops (when fully reinforced), 7,000 wheeled vehicles and 1,800 armored vehicles. But I did it from an assault CP [command post] of four armored vehicles and two helicopter air mobile command posts. And from the two forward CPs, I had communications systems with lap-top computers networked to allow me to talk by telephone to divisions spread out over a 200 by 400-kilometer zone of attack and download data from any of them. At the same time, I could pick up a satellite radio and call my corps commander 500 kilometers away in Rafha or pick up a satellite telephone and call Fort Stewart, Georgia, and talk to the rear detachment. I could do all of that while sitting in the middle of a horrendous sand storm in the Euphrates River Valley.

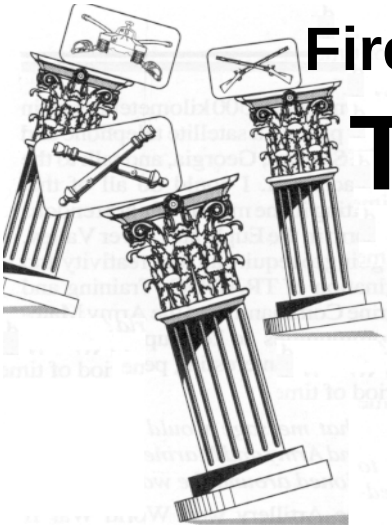
It's going to require all the creativity and imagination of TRADOC [Training and Doctrine Command] and the Army Materiel communities to keep up with technology. It's an interesting period of time we're in.

Q *What message would you like to send Army and Marine Corps Redlegs stationed around the world?*

A The Artillery won World War II and remains the single most important factor on the battlefield. The sudden violence of artillery firepower allows us to win battles with minimal casualties.

It takes a lot of hard work and a lot of imagination by the Field Artillery sergeants and the captains to ensure their fires are effective and to stay trained and ready to deploy. The Army Chief, General Gordon Sullivan, has a great line I use: "Watch your own lane." Redlegs must ensure those artillery batteries are always ready to fire when and where we need them.

Lieutenant General Barry R. McCaffrey is the J5 (Strategic Plans and Policy) for the Joint Staff in Washington, DC, and nominee for Commander-in-Chief of Southern Command and a fourth star. He commanded the 24th Infantry Division (Mechanized) during Operations Desert Shield and Storm in Southwest Asia and at Fort Stewart, Georgia. In addition, his career includes three other combat tours and command of the 3d Brigade, 9th Infantry Division (Motorized), Fort Lewis, Washington; 2d Battalion, 30th Infantry, 3d Infantry Division (Mechanized) in Germany; a parachute infantry company in the 82d Airborne Division, Fort Bragg, North Carolina; and an air assault company in the 1st Cavalry Division, Fort Hood, Texas. Other assignments include serving as Assistant to the Chairman of the Joint Chiefs of Staff; Deputy US Military Representative to the NATO Military Committee in Belgium; and Director of Strategy, Plans and Policy (Joint Affairs), Office of the Deputy Chief of Staff for Operations and Plans, Washington, DC. Lieutenant General McCaffrey also taught American Government, National Security Studies and Comparative Politics at the US Military Academy at West Point.



Fires and Maneuver: The End of Splendid Isolation

by Major General William M. Boice and Colonel Christopher C. Shoemaker

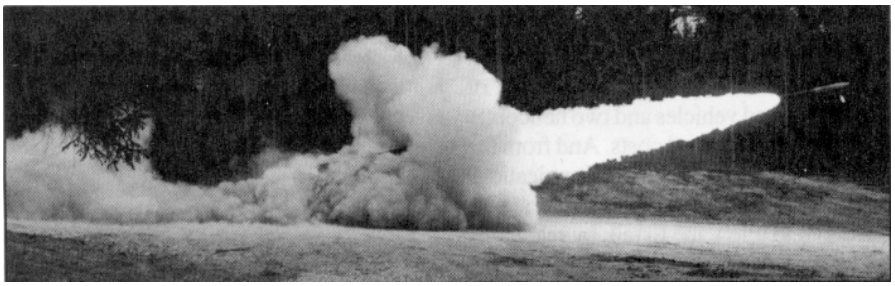
For the preponderance of the past three centuries, it has become axiomatic to assert that the Field Artillery is the greatest killer on the battlefield and, in Frederick the Great's words, is the "final argument of kings." This perspective has been persuasively reinforced in the titanic struggles of this century; from the carnage of the First World War to the "Steel Rain" of the Iraqi desert, the Field Artillery has been at the fore in defeating the enemies of our nation.

This vital role, however, has produced a certain sense of elitist isolation on the part of artillerymen—isolation that has been intensified by the attitudes of Infantry and Armor leaders and, to some extent, perpetuated by the Combat Training Centers (CTCs). Yet, in an era of fewer forces but continued worldwide responsibilities, the Army can ill afford to allow this "separation of powers" to remain the dominant philosophy.

The objective of our training programs at all levels must be to accomplish in fact what we have been long professing in theory: the Army must, as a matter of first priority, train our leaders and soldiers according to the fundamental tenets of *FM 100-5 Operations* with special emphasis on synchronizing combat power throughout the length and breadth of the battlefield. In this article, we lay out some of the programs and perspectives that were employed in the 1st Armored Division, Germany, to meet this challenge as a first step in building the Army for the third millennium.

The Challenge

Meeting the challenge is by no means a simple task. We must not only confront the pragmatic issues of tactics, techniques and procedures (TTP), but also face the even more daunting challenge of overcoming generations of parochialism and unidimensional thinking. Perhaps at no place have these attitudinal barriers been more evident than at our CTCs, described by former Chief of Staff General Carl E. Vuono as the "crown jewels of our training program." Indeed, an entire generation of Army leaders has now been raised with the perspective that the CTCs are the closest thing to real combat experience, a view reinforced by the dramatic pronouncements of combat veterans from Operations Just Cause and Desert Storm.



A Battery, 6th Battalion, 29th Field Artillery, 1st Armored Division, fires MLRS at Grafenwoehr Training Area in Germany.

Yet a closer examination of the CTC experience reveals the pervasive attitude that the direct fire battle—the close fight—is first among equals and that indirect fires have not been effective enough to prevent or significantly influence tank-to-tank engagements. This view is a microcosm of the Army's separation of powers—not a bad idea in government but a prescription for disaster in warfighting.

Ironically, this occurs at a time when the Field Artillery is on the brink of a technological revolution more profound than any since the development of the French 75-mm howitzer at the end of the 19th century. The Iraqi Army experienced a preview of "coming attractions" during the onslaught of Desert Storm; multiple-launch rocket systems (MLRS), the Army tactical missile system (ATACMS), precision guided munitions and advanced technologies in survey and position determination all facilitated the most awesome display of Field Artillery firepower since the Second World War.

Furthermore, coming on line today is the M109A6 Paladin that is turning each howitzer into a land battleship, able to operate with far greater independence and responsiveness across the battlefield. The Paladin will be followed in the early years of the next century by the advanced Field Artillery system (AFAS). Increased ranges of the ATACMS, MLRS and cannon, coupled with the arrival of the family of remotely piloted vehicles (RPVs), will allow commanders to "see" and kill the enemy out to hundreds of kilometers, fundamentally reshaping how they think about focusing their available combat power. All these systems and many others will be embedded in the digital battlefield—an environment in which the bedrock of our information flow, from intelligence through targeting to delivery of fires, will be carried by digital bursts.

This is not to say, of course, that the artillery—or any single arm—represents the sole arbiter of victory in future wars. Rather, our challenge is to redesign training programs and reshape attitudes to synchronize combat power to be a *sine qua non* for victory on the battlefields of the next century.

The first step in this process is to begin with a common premise: the outcome of battle is determined by the ability of commanders at all levels to focus the combat power at their disposal at the right place, at the right time for the destruction of enemy forces. Put more simply, commanders must synchronize at every level, and all other skills and considerations, as important

The fielding of the M109A6 Paladin is turning each howitzer into a land battleship.

as they may be, are secondary to this fundamental proposition. Or, in words credited to Confederate General Nathan Bedford Forrest, the general wins who gets there the "fustest with the mostest." In this simple concept lie the fundamentals of initiative, depth, agility and versatility and synchronization—the essence of 21st century warfighting doctrine.

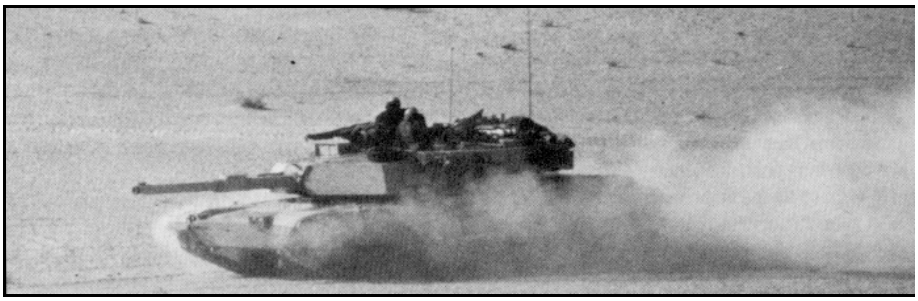
Changing the Mind-Set—Breaking the Mold

Let's begin, then, by redefining some of our most fundamental terms—terms that carry with them a certain measure of historical baggage. Forexample, we ought not to continue to speak of "fires and maneuver" as though these were separate concepts, distinct in planning and application. For, if we accept that the commander should be focusing combat power as his most basic task, the distinction between fires and maneuver disappears. Indeed, it makes no difference whether the commander is using direct or indirect fires to focus his combat power; his task is to orchestrate his instruments of organized violence to achieve victory in battle.

Today's commander has an awesome array of weapons, including the Apache helicopter with Hellfire. *(Photo by Dave Drummond)*

One of America's great combined arms commanders, General George S. Patton, reminds us that "Battles are won by fire and by movement. The purpose of movement is to get the fire in a more advantageous place to play on the enemy." The wisdom of Patton's words are even more apparent in this last decade of the 20th century. For today, the combined arms commander has an entire arsenal of killing systems at his disposal to bring to bear against the enemy—many more than Patton's commanders had 50 years ago.

Today's commander can kill the enemy from above with systems such as Copperhead rounds, sense and destroy armor (SADARM) munitions, Maverick missiles and dual-purpose improved conventional munitions (DPICM); he can kill from below, using both artillery- and engineer-emplaced family of scatterable minefields; and he can kill from all sides with Hellfire missiles, tube-launched optically tracked wire-guided missile systems (TOWS), Dragon anti-tank missiles and a number of tank-killing rounds, such as high-velocity Sabot, high-explosive anti-tank (HEAT) and armor-piercing incendiary (API) rounds, in addition to a range of other systems. In sum, the combined arms commander possesses an awesome array of weapons—a quiver of lethal arrows. When, where and how he maneuvers these killing systems is the issue. Indeed, the commander ought to be applying all these assets in a synchronized and synergistic fashion throughout the battlefield as his first order of business.



M1 Tank On the Move. A division should engage the enemy early with indirect fires, long before M1 Abrams and M2 Bradleys fire shots in anger.

The separatist mind-set is not simply limited to the weapon of choice; leaders at all levels need to consider the battlefield as a continuum of sequential engagements, each requiring a unique application of combat power. Within the 1st Armored Division, for example, we aggressively sought our first opportunity to gain control of the enemy—to seize the initiative—either through the counter-reconnaissance fight or the counterfire battle, depending on the nature of the enemy and his assets and limitations. We engaged the enemy early on and fought several engagements long before the direct fire fight was joined. Indeed, if we did this right, the division would have fought for hours before the brigades' M1 Abrams and M2 Bradleys fired their first rounds in anger.

This approach to modern warfighting ought not to be revolutionary. It is the sad truth that in the past we have tended to limit our thinking when it came to the application of the complete panoply of combat power. We now must reach out and aggressively break the mold if we are to build the Army of tomorrow and continue to operate at the cutting edge of our national power.

So as the first proposal, let us expunge the term "scheme of maneuver" in favor of the more descriptive "scheme of battle," which would include the commander's plans for the application of his available combat power. This concept should then be reflected in a new division of the "Execution" paragraph of the operations order; we should no longer have separate paragraphs for fires and maneuver. Rather, we should have separate paragraphs for the commander's intent, his scheme of battle and his plans for employing his battlefield operating systems (BOS) with primary emphasis on indirect and direct fires.

At the same time, we should purge the pejorative term "fire support," a term that invariably implies a lesser priority and a secondary role for the use of indirect fires. Fire support officers (FSOs) and fire support coordinators (FSCOORDs) at all levels should become "indirect fires coordinators"; fire support annexes also must be changed in both name and content.

Beyond semantics, we must re-examine the courses of instruction at each of our branch schools, the most basic building blocks of branch parochialism. It is significant to note that some of the most able young officers in the 1st Armored Division were those who had attended advanced courses of branches other than their own; we must expand opportunities for captains to attend other branch schools on a routine basis.

Simultaneously, we must enhance the cross-fertilization between Infantry, Armor, Aviation and Field Artillery within each resident course, making each captain more expert in combined arms warfighting, even at the expense of his own branch expertise. This heresy is necessary if we are to produce leaders who understand the synchronization of combat power in war at a visceral level and are trained and ready for the battles of the 21st century.

Even more daunting will be the alteration of the mind-sets of our collective training environments, particularly the CTCs. One example serves to illustrate the challenge. While preparing for the 1st Armored Division's Iron Star rotations to the Combat Maneuver Training Center (CMTC) at Hohenfels in spring 1992, we were presented with the "40 percent rule"—guidance that mandated the effects from Field Artillery would be terminated if 40 percent of the enemy force were destroyed by indirect fires. The stated reason for this practice was a concern that, in the absence of a direct fire fight, the task force commander's scheme of maneuver could not be evaluated.

The 1st Armored Division took powerful exception to this policy, arguing that success on the battlefield is defined by the commander's ability to win with the fewest friendly casualties possible. If he is able to achieve this through the judicious and timely application of indirect fires and other long-range systems, he should be congratulated and his performance should be extolled; if his Abrams and Bradleys roll up on the objective only to find a destroyed enemy, he has won in the most effective manner possible—precisely what we want him to do.

General Crosbie E. Saint, the former Commander-in-Chief of US Army Europe, enthusiastically embraced the division's position, and the 40 percent rule was relaxed. We note that today the senior leadership at the CMTC is fully supportive of coaching and teaching our task force commanders to be successful in their efforts to apply AirLand Battle operational concepts within the task force's tactical battle.

Yet, in a broader sense, we have not made substantial headway in the integration of indirect fires at the CTCs. The inability of the Field Artillery, as well as Apaches and close air support (CAS), to significantly influence the outcome of battle is reinforcing the separation of powers among an entire generation of young Army leaders.

This deficiency has its roots, in turn, in two major problems in the assessment of indirect fires. First, the CTCs have historically relied on the archaic fire marking system to assess kills on the battlefield. Efforts to automate the effects of indirect fires have been gathering momentum but still have a long way to go. Even now, when a commander calls for fires, they are sometimes slow and unresponsive, partly because of the current manpower-intensive fire marker system—a system particularly vulnerable to the vagaries of rain and mud.

Second, when fires are assessed, kills are awarded based on what appear to be significantly understated effects tables; it takes, for example, 54 rounds of DPICM to kill a single tank. While testing in a sterile environment may confirm the approximate number of DPICM rounds required to kill a tank, the destruction wrought on the Iraqi Army by the Field Artillery and Army Aviation presented a far different picture of the efficacy of indirect fires on modern mechanized formations. Indeed, throughout history, artillery has been the single most effective weapon in the commander's arsenal, not only for its ability to kill, but also for the panic and disruption it sows in otherwise disciplined formations.

If we are to overcome these deficiencies and place indirect fires in the proper perspective in the eyes of our combat leaders, the following actions must be taken as a matter of singular priority.

- State-of-the-art systems must be put into place at the CTCs to mark and assess fires. While no system can replicate the morale-numbing shock effects of an artillery barrage, we simply must do better than we do today. The new SAWE-MILES II (simulated area weapons effects, or SAWE-multiple integrated laser engagement simulation system II, or MILES II) is a step in the right direction, but much more remains to be done. We need to devote whatever resources are necessary to bring a more effective system to the CTCs.
- The artillery effects tables must be fixed to reflect the wide range of effects wrought by Field Artillery. Every day we waste allows yet another task force commander—many of whom will be tomorrow's division commanders—to slip through a CTC rotation with no real appreciation for the effects of artillery on the enemy or, for that matter, on his own soldiers.

Changing TTP

Even as we move to change the mindsets of our institutions and leaders, we also must be bold in changing our TTP as well, particularly as we adapt to fundamental revisions to our overarching AirLand Battle doctrine. We must move forward aggressively to harness the potential of our new technologies—especially in the business of indirect fires—in preparation for the battlefields of the next century.

As we do so, our basic purpose must remain unchanged: we must continue to devote all efforts to enhancing our ability to focus combat power and to maneuver killer systems throughout the length and breadth of the battlefield. Moreover, we must refine and improve our ability to engage target arrays both sequentially and simultaneously as the battle continuum unfolds.

Two examples illustrate this point. First, during the 1st Armored Division's Battle Command Training Program (BCTP) Warfighter exercise in January 1992, we concentrated enormous resources on defeating the enemy's artillery early in the battle in the first engagement. To accomplish this, we created an artillery combat team (ACT) built around the nucleus of the division's MLRS battalion.

The ACT was to go well forward early and take out the preponderance of the enemy's long-range artillery before it could be brought to bear against our own forces. Among the ACT's missions: to fire lethal suppression of enemy air defenses (SEAD) in support of our attack

The 1st Armored Division radically redesigned its artillery "eyes" by creating HMMWV COLTs.

helicopter battalions ordered to go deep after the enemy's most powerful artillery—the essence of counterfire. For those enemy artillery units that managed to set and fire, the ACT, with its supporting Firefinder radars, would respond with devastating counterbattery fires.

To execute these missions, the ACT was required to go in harm's way, forward of the main battle area and outside the close security umbrella of the brigade combat teams. The risk this entailed, as serious as it might seem, was mitigated by reinforcing the division's armored cavalry squadron with additional tanks and assigning the cavalry a specific responsibility to provide security to the ACT. Additionally, the ACT was buttressed by an attached mechanized infantry company that, when organized by platoons, provided enhanced point security for each MLRS firing battery. The ACT was further supported by a direct support cannon battalion, dedicated air defense capabilities and virtually every intelligence gathering asset at the division's disposal. The ACT then went forward, accomplished its tasks and, upon completing its mission, was dissolved, with each component reverting to its more traditional responsibility.

As a result of the aggressive use of the ACT, the enemy's artillery was virtually neutralized, leaving the division's brigades and their direct and indirect fires combat power to contain, control and defeat the enemy in the close fight. And this was achieved with no significant losses to the ACT or to any of its supporting elements. More importantly, the destruction of his artillery wrested the initiative from enemy and paved the way for success in battle.

The second example was at a much lower level—task force operations at the CMTC. Recognizing the deficiencies in indirect fires in these engagements—deficiencies painfully illustrated in battle after battle—the 1st Armored Division undertook a radical redesign of its artillery "eyes." We took the platoon forward observers (FOs) away from their companies and made them combat observation lasing teams (COLTs) under the command and control of the task force and brigade FSOs. For equipment, we took advantage of the drawdown in Europe and the availability of high-mobility multipurpose wheeled vehicles (HMMWVs) to create HMMWV COLTs, complete with laser designators taken from drawdown artillery units. (See the article "Fighting the Close Fight with Fires—An Operational Analysis of the Heavy Brigade Paradigm" by Lieutenant Colonel Henry W. Stratman in this edition and "Field HMMWV-Based COLTs NOW!" by the same author in the April 1992 edition.)

This initiative, developed by Lieutenant Colonel Hank Stratman, one of our direct support cannon battalion commanders, provided an immediate six-fold increase in the number of observers forward and made a significant difference in the ensuing simulated battles. Indeed, as a measure of the success of these COLTs, the CMTC opposing force (OPFOR) commander is said to have offered a substantial reward for every COLT killed. Very few rewards have been collected to date.

The ACT and additional COLTs demonstrate the versatility and kind of thinking we must adopt Army-wide. As is reflected at a more general level in the Louisiana Maneuvers initiative, we can no longer afford to accept the biases of the past; we must look forward with a new sense of imagination and daring if we are to maintain and exploit our tactical edge on the battlefields of tomorrow. And that will require each of us, as Army leaders, to abandon some time-honored prejudices, as well as to develop a new array of TTP that apply to the challenges our Army—and our nation—will confront in the 21st century. We can afford to do no less.

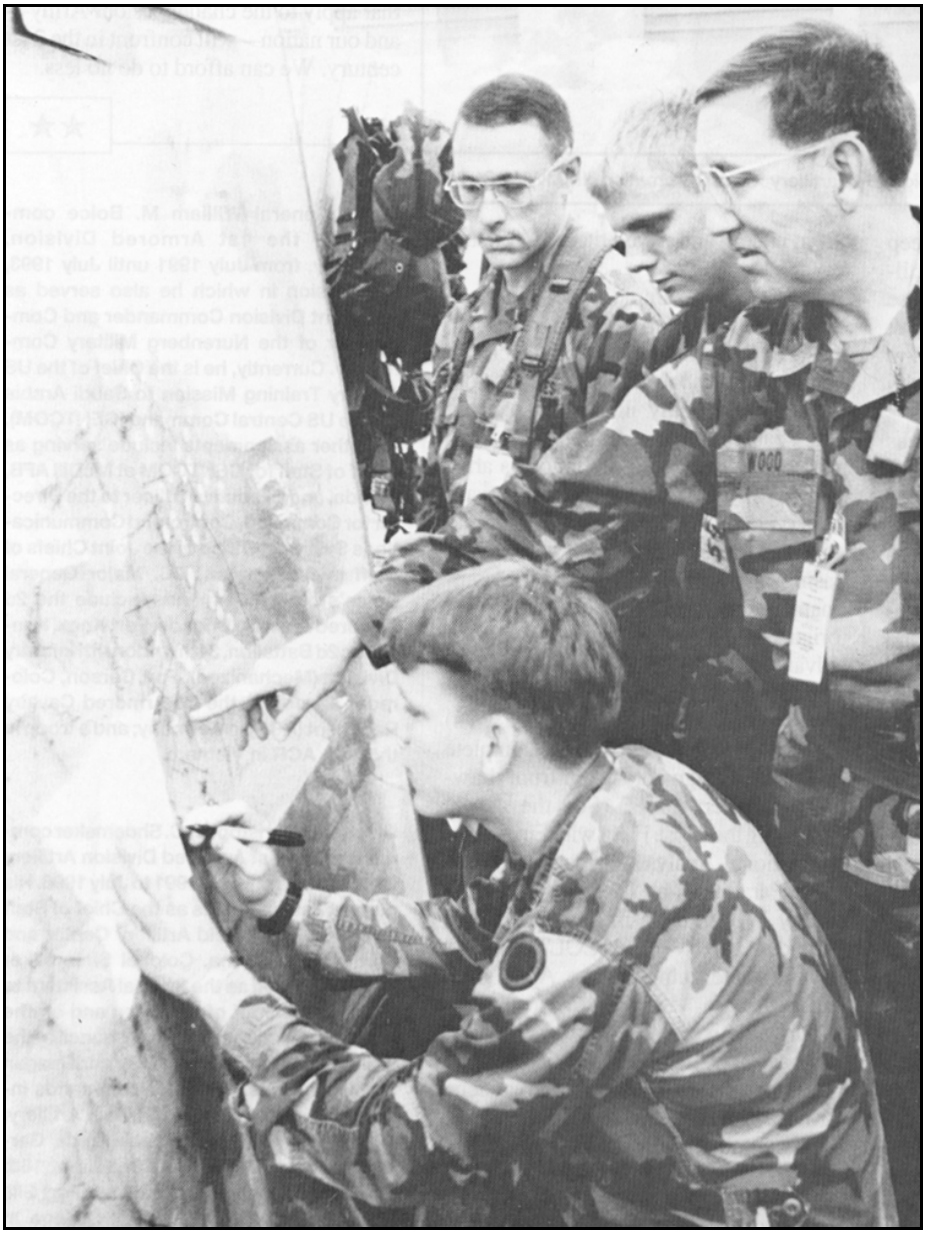
Major General William M. Boice commanded the 1st Armored Division, Germany, from July 1991 until July 1993, the division in which he also served as Assistant Division Commander and Commander of the Nurenberg Military Community. Currently, he is the Chief of the US Military Training Mission to Saudi Arabia for the US Central Command (CENTCOM). His other assignments include serving as Chief of Staff for CENTCOM at McDill AFB, Florida, and Executive Officer to the Director for Command, Control and Communications Systems, Office of the Joint Chiefs of Staff in Washington, DC. Major General Boice's other commands include the 2d Armored Training Brigade, Fort Knox, Kentucky; 2d Battalion, 34th Armor, 4th Infantry Division (Mechanized), Fort Carson, Colorado; a troop in the 3d Armored Cavalry Regiment (ACR) in Germany; and a troop in the 11th ACR in Vietnam.

Colonel (P) Christopher C. Shoemaker commanded the 1st Armored Division Artillery in Germany from July 1991 to July 1993. His current assignment is as the Chief of Staff of the US Army Field Artillery Center and Fort Sill, Oklahoma. Colonel Shoemaker also has served as the Special Assistant to the Chief of Staff of the Army and on the staff of the National Security Council at the White House for both the Carter and Reagan administrations. His other commands include the 2d Battalion, 29th Field Artillery, 8th Infantry Division (Mechanized), Germany, and A Battery, 3d Battalion, 18th Field Artillery, III Corps Artillery, Fort Sill. He is a graduate of the War College at Carlisle Barracks, Pennsylvania, and holds a master's degree and PhD from the University of Florida. Colonel Shoemaker is the author of several books and many articles on national security.

Bridge to the Future: I Corps—America's Corps

by Lieutenant General Carmen J. Cavezza

I Corps, Fort Lewis, Washington—America's Corps—is the corps of the future, a unique and effective fighting force of more than 100,000 soldiers from 47 states serving in Active, Guard and Reserve forces. This is America's Army.



Active duty and Reserve Component members of I Corps' fire support element track target concentrations during exercise Cascade Lightning. The "Bridge" element deploys with the corps headquarters to all exercises. Shown are Marine Major Hank A. Black, Staff Sergeant Ronald L. Holmberg, Colonel Morris Wood and Sergeant Jacob M. Solouskoy.

Staying trained and ready with today's austere military silhouette requires innovative strategies. The challenge for our Army is to forge new training relationships that build a stronger Reserve Component (RC) support base to accomplish missions previously performed by Active Component (AC) units.

Truly unique among all US Army corps, I Corps has a higher percentage of RC forces than any other corps. Based on its company-sized mix, including Capstone alignments, I Corps is comprised of 38 percent Army National Guard (ARNG) forces, 35 percent AC forces and 27 percent US Army Reserve (USAR) forces. Twelve of I Corps' major subordinate commands (MSCs) are from the RC: seven are ARNG and five are USAR.

I Corps developed and implemented a program called the Corps Bridge to facilitate integrating its AC and RC forces into a trained, deployable, combat-ready power projection base to meet I Corps' contingency missions. The Corps Bridge consists of six of I Corps' 12 MSCs: I Corps Artillery, headquartered in Salt Lake City, Utah; 35th Engineer Brigade, headquartered at Fort Leonard Wood, Missouri; 49th Military Police Brigade, Alameda, California; 142d Signal Brigade, Decatur, Alabama; 82d Rear Tactical Operations Center (RTOC), Portland, Oregon; and 311th Corps Support Command (COSCOM), Los Angeles, California. These units are key to I Corps' ability to deploy and command and control US forces anywhere in the world.

I Corps Artillery is a prime example of the Bridge concept in action. The Bridge between I Corps Headquarters at Fort Lewis and the I Corps Artillery in Salt

Lake City facilitates planning and coordinating fire support and allows the corps to train and execute its plans in any scenario.

Why a Bridge

Critical to the corps' ability to conduct the deep battle are the decide-detect-deliver functions of the corps artillery's fire support element (FSE). This focus on the deep battle was one of the significant factors that led I Corps to develop the Corps Bridge concept.

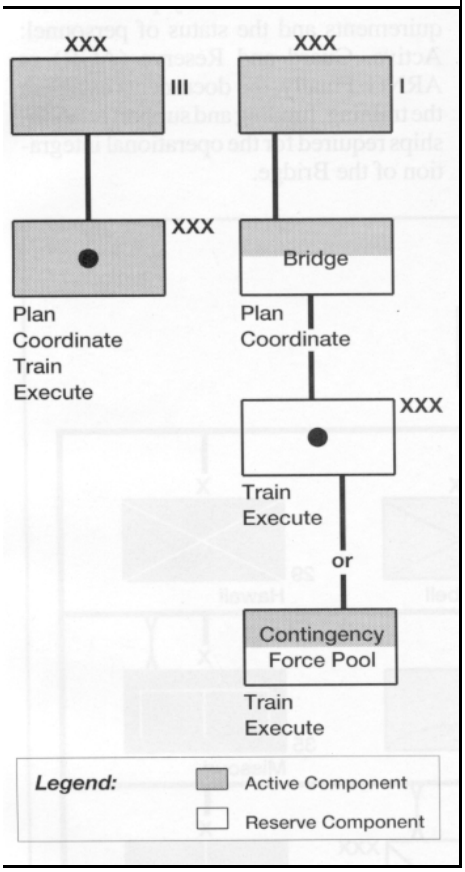
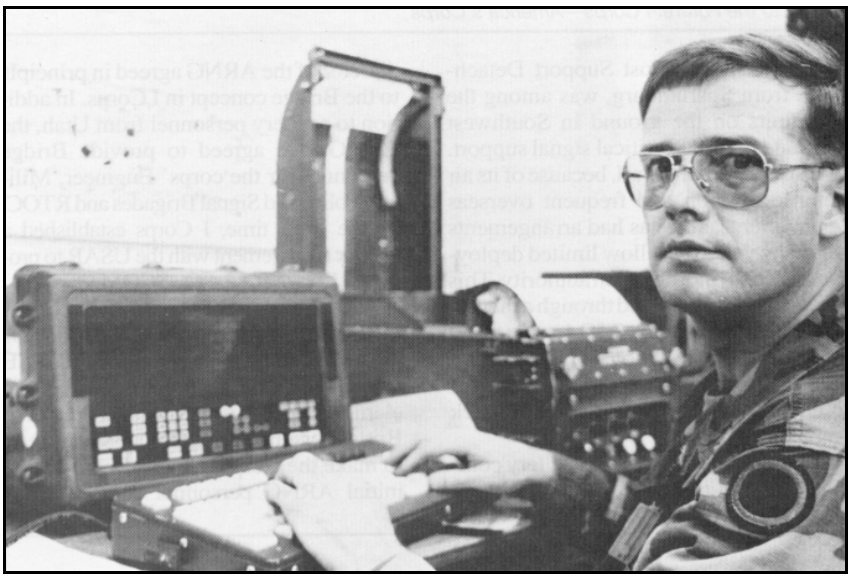


Figure 1: I Corps Bridge Concept. In an AC corps, such as III Corps (left side), when a crisis calls for units, say the artillery, its active corps artillery plans, coordinates, trains for and executes for artillery support to meet the crisis. In I Corps, the Bridge plans and coordinates for artillery (and other functions); the Bridge may call for I Corps Artillery to execute the mission or it may call for contingency force pool units to execute, depending on war plans.

The key to winning the deep battle is maintaining a highly capable FSE—a challenge with the corps artillery nearly 900 miles away. Figure 1 compares I Corps to III Corps, Fort Hood, Texas, with its corps artillery at Fort Sill, Oklahoma. III Corps Artillery units are AC and available to plan, coordinate, train and execute on a daily basis with a liaison at Fort Hood. III Corps can execute contingency missions by deploying AC Redlegs, whose full-time jobs are to stay combat ready to deploy and execute a contingency. Although relying primarily on AC units may be ideal, austere resources require the Army to rely more on RC forces to provide corps base units—a trend that only will increase in the future.



Sergeant First Class John B. Miller, Jr., an FSE operations NCO from the Utah National Guard, works with the light TACFIRE briefcase terminal.

Although Fort Lewis had an FSE cell of 18 AC personnel (three officers and 15 enlisted soldiers), the cell wasn't sufficient to execute a corps FSE mission or integrate and synchronize operations with the corps artillery headquarters. To replicate the capabilities of an AC FSE, I Corps needed a larger, more highly trained FSE staff that was rapidly deployable and directly associated with the I Corps Artillery Headquarters in Utah.

To provide that staff, a Bridge cell of eight ARNG personnel (seven officers and one enlisted soldier) is located at Fort Lewis to facilitate planning and coordination of fire support functions. While I Corps Artillery has an FSE prescribed by its modified table of organization and equipment (MTOE), I Corps Headquarters has an MTOE that includes the eight-man ARNG cell and its 18 AC positions combined into an FSE under the direction of the deputy corps artillery commander, who's assigned at Fort Lewis in a Bridge position. In terms of FSE equipment, a complete set is maintained at Fort Lewis and another set for training in Salt Lake City.

The remaining 26 members (nine officers and 17 enlisted soldiers) of the I Corps Artillery FSE, located at Salt Lake City, have "pre-volunteered" to deploy immediately and are available within 72 hours, if required. These Redlegs receive additional training with the corps and participate in exercises or deploy without going through the traditional mobilization process, should a short- or no-notice contingency occur.

A rigorous corps-level exercise schedule has proven this concept to be most effective. In the past one and one-half years, I Corps has conducted nine major exercises: Cascade Peak 92 and 93 in Washington; Ulchi Focus Lens 92 and 93 and Team Spirit 93 in Korea; two division Battle Command Training Program (BCTP) Warfighters; and two joint task force (JTF) exercises, including a one-month deployment to Thailand for Cobra Gold 93. The Corps Bridge has been tested and validated in these exercises. During Cascade Peak 93, evaluators noted significant improvements in the performance of the FSE since Cascade Peak 92. Bridges in the other battlefield operating systems (BOS) showed similar improvements.

Building the Bridge

Historically, the Army has had quick access to ARNG personnel for a wartime mission without going through the formal mobilization process. For example in Operations Desert Shield and Storm, a South Carolina ARNG signal unit, the

228th Command Post Support Detachment from Spartanburg, was among the first units on the ground in Southwest Asia and provided critical signal support. The Air National Guard, because of its air defense mission and frequent overseas deployments, also has had arrangements for many years that allow limited deployment without mobilization authority. This quick access is achieved through a memorandum of agreement (MOA) signed by the unit, state and National Guard Bureau authorizing ARNG volunteer personnel to deploy without mobilization in quick response to crises.

In early 1992, I, the corps artillery commander, Adjutant General of Utah and director of the ARNG agreed in principle to the Bridge concept in I Corps. In addition to artillery personnel from Utah, the ARNG also agreed to provide Bridge personnel for the corps' Engineer, Military Police and Signal Brigades and RTOC. At the same time, I Corps established a similar arrangement with the USAR to provide a Bridge for the COSCOM.

Assigning an ARNG colonel to I Corps in September 1992 as the deputy corps artillery commander and chief of the FSE began the building process for Bridge elements. His mission was to negotiate Bridge personnel requirements and MOAs to make the Corps Bridge effective. The initial ARNG personnel authorizations were provided in late 1992, and five MOAs were signed in August 1993.

Signing MOAs was the final and crucial step in activating the Corps Bridge. These important documents identify operating responsibilities by functional areas, three of which are key to operational effectiveness. First, and most important, is the provision allowing the corps to deploy ARNG personnel before Federalization. Next, the MOAs identify personnel requirements and the status of personnel: Active, Guard and Reserve (AGR) or ARNG. Finally, the documents establish the training, funding and support relationships required for the operational integration of the Bridge.

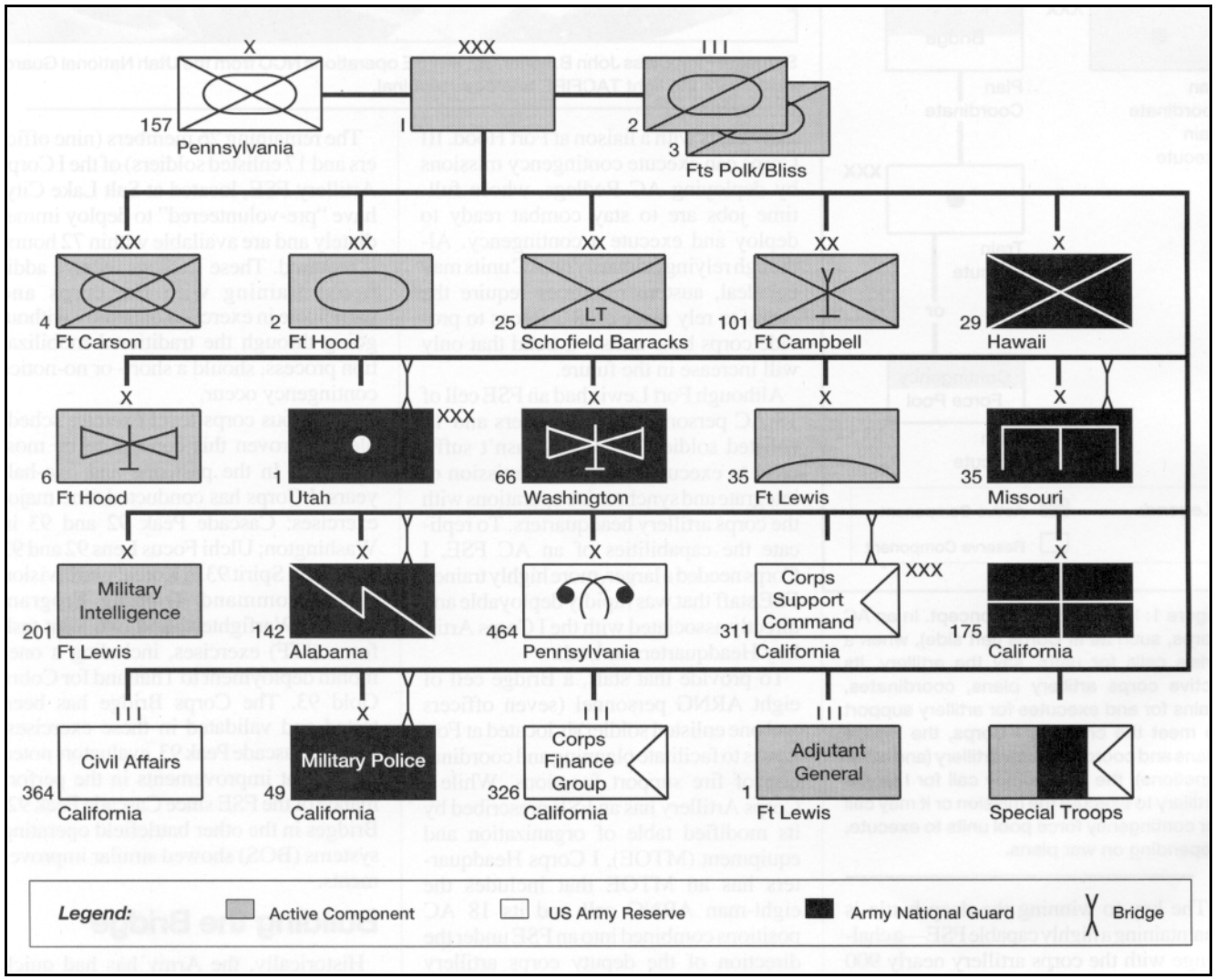


Figure 2: Major Regional Conflict with Mobilization. I Corps must deploy and be "in-country" in seven days or less from the time of notification. The Bridge concept provides operational capabilities drawn from RC units with personnel who are familiar with corps SOPs and knowledgeable about the Pacific Rim—I Corps' area of responsibility. The 82d RTOC (not shown in this figure) is also a Bridge subordinate command and would operate the rear TOC for the mobilized I Corps.

The 2d Battalion, 222d Field Artillery training at Dugway, Utah. The Corps Bridge concept used for I Corps artillery and other MSCs may well serve as an Army model for future AC-RC integration.

How the Bridge Works

I Corps must deploy on short notice to respond to a major regional conflict and be "in-country" within seven days of notification. Depending on the situation, mobilization may or may not be necessary.

In the past, I Corps Artillery personnel from Salt Lake City couldn't deploy with the corps without mobilization authority. However, with the Bridge, the corps FSE now can deploy immediately with the 26 volunteers from I Corps Artillery in Salt Lake City and the AC and AGR personnel from Fort Lewis. Simultaneously, an AC Field Artillery headquarters would deploy with I Corps. Using the Corps Bridge, I Corps can deploy within seven days with an integrated FSE and a Field Artillery headquarters as an interim until additional units can be mobilized and deployed.

Deploying Bridge personnel from the other I Corps MSCs would be accomplished in a similar manner. These MSC units would provide I Corps planning and operational functions using personnel who have worked with the corps, are familiar with its standing operating procedures (SOPs) and are knowledgeable about the Pacific Rim, I Corps' area of responsibility (see Figure 2).

If I Corps needs additional forces to execute the mission, mobilization is required. At this point, I Corps can use RC MSCs or AC or RC forces drawn from the contingency force pool (CFP), depending on war plans. In either case, the Bridge is fully functional, performing its planning and coordination mission and working to integrate whatever forces are assigned.

If the mobilization process begins, the remainder of the I Corps Artillery Headquarters and additional AC and RC Field Artillery brigades would deploy to the corps area of operations and remain until the mission is complete. The corps builds up its full complement of MSCs sequentially through the mobilization process.

The Corps Bridge also facilitates the limited deployment of units (without mobilization) if the corps is deployed as a ground component command (GCC) or JTF in response to a lesser regional conflict.

If the corps deploys as a JTF in support of the US Pacific or Atlantic Commands, the FSE will be the nucleus of the joint targeting coordination board (JTCB). Although operations in a JTCB are somewhat different than a corps FSE, the I Corps JTCB would have Bridge personnel who have trained with the corps to support the JTF commander with whom they have had a habitual working relationship. These individuals come from the AC and RC, depending on requirements.

Working for the deputy JTF commander as chairman of the JTCB, these personnel accomplish critical pre-deployment planning. Further, with augmentation from other services and nations, they would provide the broad targeting guidance required for a joint or combined task force. The Corps Bridge has been tested in the JTF, combined task force and Army Corps configurations, and it *works*.

The artillery Bridge has markedly improved FSE capabilities and execution since its formation more than a year ago. However, for the "graduate level" of operations required at the corps level, continuous training and refinement are necessary to hone skills. The Corps Bridge is economical and effective, but it requires AC and RC support to attain maximum results.

I Corps has a solution for integrating its unique mix of AC and RC forces. The I Corps Bridge may well serve as an Army model for AC-RC force integration as our AC decreases and reliance on our RC to accomplish future missions increases.

I Corps, America's Corps—The Corps of the Future.

Lieutenant General Carmen J. Cavezza is the Commanding General of I Corps and Fort Lewis, Washington. His other command and staff positions include Commander of the US Army Infantry Center and School, Fort Benning, Georgia; Commanding General of the 7th Infantry Division (Light), Fort Ord, California; Assistant Division Commander (Support) for the 82d Airborne Division, Fort Bragg, North Carolina; Executive to the Secretary of the Army, Washington, DC; and Commander of the 197th Infantry Brigade (Separate) and Chief of Staff of the US Army Infantry Center, the latter two at Fort Benning. Lieutenant General Cavezza also commanded 1st Battalion, 23d Infantry, 2d Infantry Division in Korea; and during one of his two tours in Vietnam, A Company, 2d Battalion (Airborne), 503d Infantry, 173d Infantry Brigade (Separate). He holds a Master of Arts in Government from the University of Miami, a Master of Science in International Affairs and a Doctor of Philosophy in Political Science, the latter two degrees from George Washington University.

Is Fire Support Too Hard or Just Very Tough?

by Colonel Thomas F. Metz, IN

The last battle of an FY 88 National Training Center (NTC) rotation at Fort Irwin, California, was a defense in the central corridor against an opposing force (OPFOR) attacking from the east. The brigade commander anchored the mechanized task force in the narrow part of the central corridor around Hill 876 and placed the armor task force in depth. The mechanized task force was organized with three mechanized infantry companies, an anti-tank (AT) company and an armored company. Initially, the mechanized task force had priority of fires.

With more than 30 hours to prepare and a rucksack full of lessons learned, the commander and his fire support officer (FSO) perched high on the south wall for a superb view of the battlefield. As the sun rose, all eyes in the brigade looked for the OPFOR's forward security element and its follow-on regiment on Fort Irwin's eastern boundary.

Suddenly, the division reported its cavalry squadron to the south had let a company-sized enemy force leak through, and the AT company reported its southern platoon was engaging the OPFOR moving north out of the Bike Lake Pass. The task force plan accounted for this situation but assumed more warning time to position the armored company and receive calls for indirect fire. The armored company reacted quickly; the artillery did not.

With accurate direct fires from tanks and ITVs (improved tube-launched, optically tracked, wire-guided, or TOW, vehicles), the forward security element was destroyed, but the cost was much higher than planned: a platoon of tanks and a platoon of ITVs. The task force commander wondered, "What was the artillery doing?" The FSO assured him the armored company fire support team (FIST) had called for indirect fires but could not explain why they hadn't arrived.

The fight with the forward security element seemed short; the OPFOR main force was closing rapidly. Although the situation wasn't encouraging—two OPFOR battalions in the north and one in the south—the task force was ready. A mechanized infantry company overwatched the major obstacle the OPFOR would encounter. A tank platoon and an AT platoon supported in depth. A group of artillery targets lay in front of the obstacle.

The task force commander turned to his FSO and said, "Get fires on those targets covering the obstacle, now!" Seconds

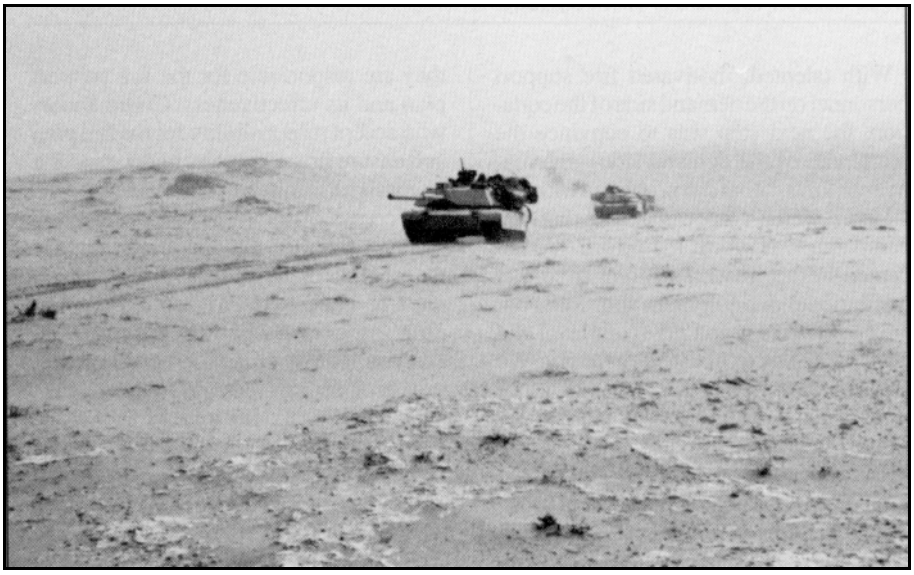
turned into minutes; *no* indirect fires fell. The OPFOR, masters of the breach, were taking losses from direct fire but not indirect fire. "Where is it?" screamed the task force commander. Under the planned target group, the second battalion was massing to pour through the lead battalion's breach... "Come on artillery, where are you?"

Frantic calls were made to the brigade and direct support (DS) artillery battalion with no success. The sinking feeling of "almost" was again setting in. Although the task force had improved with every battle, the integration and synchronization of maneuver and fires hadn't been achieved. As the task force commander, my conclusion was *fire support is too hard*. Too many maneuver commanders have experienced similar scenarios.

Forces Command (FORSCOM) heavy brigades rotate to the NTC annually. Infantry and armor lieutenants experience several rotations, seldom returning in the same position. Early in their careers, they learn and live our combined arms doctrine. Too many, however, depart for the officer advanced course lacking faith in the ability of indirect fire to kill on the battlefield.

After the advanced course, they'll likely get at least one rotation as a staff officer and one as a company commander. More often than not, earlier negative impressions of fire support are reinforced. Tragically, too many shrug their shoulders and say, "Fire support is too hard; it doesn't work."

These young leaders' view of combat power becomes skewed toward direct fire and the maneuver of those weapons systems in which they have confidence.



Direct fire systems, such as these M1s, have become for many maneuver commanders the only combat power they have confidence in. For them, fire support is too hard or doesn't work.

Although fire support has improved during the past decade, units don't kill the OPFOR with indirect fires at a rate commensurate with resources invested. If the US Army is to make combined arms operations work, we must make greater strides in improving fire support. This article outlines seven areas needing fire support improvements, discusses the campaign employed by the 1st Infantry Division **(**Mechanized) at Fort Riley, Kansas, to fix fire support deficiencies and shares lessons learned on a recent NTC rotation.

Solutions

In the 1st Infantry Division, the Assistant Division Commander (Maneuver) and the brigade fire support coordinator (FSCOORD) led the way with a simple, optimistic approach to improving fire support. (See "Improving the Demand Side of Fire Support" in the November 1993 edition of *Military Review*.) They divided the fire support equation in two: demand and supply. Demand addresses when, where and in what volume fires are brought to the battle. Supply addresses getting fires downrange to satisfy demand. Due largely to their enthusiasm and determination, I changed my earlier conclusion that fire support was too hard. My brigade joined the campaign to make fire support work.

Assigning quality officers and NCOs to fire support positions on the demand side of the equation was the first step. Brigade and task force FSOs were handpicked by the division artillery commander. The brigade FSO was a major and a recent graduate of the Command and General Staff College, Fort Leaven worth, Kansas. One task force FSO recently had commanded a battery, and the other was an outstanding artilleryman. These quality officers were the foundation upon which an impressive array of fire support talent was built.

Maneuver task force commanders placed similar emphasis on their heavy mortar platoons by carefully selecting platoon leaders who had been trained at the Infantry School's Mortar Platoon Leaders Course at Fort Benning, Georgia. Although the brigade had only half the mortarmen authorized, they trained tirelessly and achieved excellence rapidly.

The FIST (shown here preparing its vehicle) plays a critical role in synchronizing fire support to achieve the commander's intent.

With talented, motivated fire support personnel on the demand side of the equation, the next step was to convince the remainder of the demand side—the maneuver folks—that our problems with fire support weren't doctrinal and that our campaign was worth the effort. We accepted the fact we weren't going to correct institutional or equipment shortfalls, but we could solve problems at our level and train ourselves to get steel on target. We also accepted the fact that the major issues were on the demand side—not the supply side.

Each maneuver commander participated in an innovative and dynamic set of seminars, classes, displays and individual training events. These were executed at every level, beginning at the division where the senior leadership was actively involved in improving fire support.

The "Magnificent Seven"

The NTC train-up in the Big Red One is called the Gauntlet. It consists of leader validations; full field training exercises (FTXs) at the platoon, company and task force levels; and level-one task force gunnery. The simulation network (SIMNET) and battalion-brigade simulation (BBS) also provide intense training throughout the Gauntlet.

The Gauntlet's lanes, external evaluations and gunnery offer outstanding training opportunities for fire support. Our campaign took advantage of each. Throughout leader validation and lane training, fire support doctrine and tactics, techniques and procedures (TTP) were taught and executed. Successful execution of fires was a critical event in each combined arms training scenario. Proper execution of fires was rewarded, and the entire fire support system was evaluated in after-action reviews (AARs).

A unique effort in the NTC train-up was to narrow our doctrinal focus to seven key areas—"The Magnificent Seven." Critical tasks in each area were taught and evaluated. The first three areas focus on fire support planning.

1. Commander's Intent and Concept of Fires. The commander must clearly articulate his intent for both maneuver and fires. Unfortunately, maneuver commanders tend to concentrate on the former and leave the latter to their FSCOORD or FSO or forget it altogether. Maneuver commanders must realize and accept the doctrinal fact that they are responsible for the fire support plan and its effectiveness. Commanders who accept responsibility for the fire plan and ensure fire supporters understand the intent significantly improve their chances of success.

The concept of the operation includes the schemes of maneuver and fires, which must be integrated. No step in the planning process—whether it's mission analysis, course of action development, war-gaming, etc.—should be taken without integrating the fire plan with the maneuver plan.

The commander's intent for fires is his statement of the precise role fire support will play in the battle. The concept (or scheme) of fires states exactly who, what, when, where, how and why the fire support system will support the maneuver force.

In developing the scheme of fires, the commander and his staff must define the task and purpose of each target. They must determine the place and time massed indirect fire will be critical to success to maximize use of limited resources. The commander must articulate where and when the decisive point in the battle will occur and the role fire support will play. He also must convey to his staff where he's willing to accept risk.

2. Observer-Trigger Plan. A target isn't a target unless it has an observer and a trigger. A multitude of targets—a measle sheet—does not add flexibility to a plan, only volume and complexity. A properly planned target (task and purpose) has a trigger linked to a named area of interest (NAI). The trigger may or may not be a decision point on the decision support template (DST), but without a trigger, an observer has a low probability of hitting a target at the correct time. Thus, no trigger—no target. Likewise, no observer—no target. Ultimate responsibility for ensuring a target has an observer and a trigger lies with the maneuver commander assigned the target.

Observer-trigger planning must be a formal process with the plan included in the fire support execution matrix (FSEM). It must be cross-walked with the scheme of maneuver to identify the implied tasks (e.g., routes for observers, security of observers, etc.), all of which must be addressed and rehearsed.

Planning redundancy of observers is one implied task critical to success. Another is ensuring observer responsibility is placed at a level (usually the company team) that can be resourced adequately to perform the mission.

3. Rehearsal. The rehearsal is the final event in the planning process. If the process has proceeded properly, war-gaming and back briefs have been accomplished well before the rehearsal; branches and sequels have been considered; and the plan is sufficiently flexible. Rehearsals demonstrate that everyone knows the plan and battlefield operating systems (BOSs) have been integrated and synchronized.

In whatever type rehearsal time allows, fire support must be included. Maneuver and fires must *not* be rehearsed separately—all key fire support personnel must be present. Priority of fires, movement of fire support assets, focus of mortars, attack guidance, identification of critical targets and responsibility for them must be articulated clearly.

Technical fire support rehearsals are valuable tools that should be conducted between the brigade and the task force rehearsals to verify target numbers and grids, firing unit range-to-targets, ammunition availability and observer communications. With the fire support technical rehearsal before the task force rehearsal, the brigade commander can be confident his fire support plan will support his subordinates' maneuver.

4. Target Refinement. Effective target refinement, the first step in a continuous preparation phase, starts with solid top-down fire planning that focuses on quality, not quantity, of targets. This process begins with the doctrinal template. As situation templates (SITEMPs) and event templates are produced, targets are refined by higher headquarters. The S2 and FSO must work continuously to ensure target refinement is accurate and timely and the fire support overlay reflects the latest SITEMP.

Generating quality targets in a timely fashion makes the target refinement process difficult. As time permits, all echelons get involved. Targets assigned by higher headquarters are received as missions with stated and implied tasks. Lower headquarters add or refine targets to support their scheme of maneuver. Commanders at all levels must carefully monitor the time required for the refinement process to cycle through the fire support system.

The brigade FSO must work quickly during the initial planning phases to ensure the DS artillery battalion has a

workable plan regardless of when the battle starts. If initial plans are prepared in haste, too many adjustments flow top-down and little refinement occurs from the bottom-up. If the higher headquarters consumes excessive time striving for a better plan, little time is left for lower echelons. The issue boils down to when and how adjustments will occur. As with the planning process, commanders must be involved in the target refinement process.

5. **FSE and FIST Operations.** Fire support element (FSE) and FIST leaders and soldiers are the glue that binds together a diverse group of systems, personnel and resources, most of which don't belong to the commander they support. They perform a myriad of complex tasks, and rarely is their work done. These soldiers continuously articulate and assess current and future capabilities of all fire support assets, recommend how to use the systems to accomplish the maneuver commander's intent, support forces in contact and synchronize and sustain fire support. Once the battle begins and the situation changes, FSE and FIST personnel must work closely with maneuver commanders to ensure fires remain focused on critical targets. It's demanding and often thankless work but critical to success.

6. **Call-for-Fire.** Timely and accurate fires are directly proportional to the quality of the call-for-fire. Each element in a correct call-for-fire is important, but target location and description are critical. All soldiers on the battlefield in a position to see targets critical to the commander's intent must be able to call for fire effectively. Artillerymen on the demand side need additional training for special munitions like Copperhead, smoke or family of scatterable mines (FASCAM), but indirect fire can be initiated by anyone who can call for fire. The call-for-fire is too *important* to the fire support system to be anything but a priority effort.

7. **Mortars.** Mortars can't be an afterthought; they must be included throughout planning, preparation and execution. They can provide close fires for forces in contact or have a specific mission during any phase of an operation; they can be dedicated to support a company team or assigned against a specific threat or type of target.

With their high angle of fire, mortars are excellent against the enemy in reverse-slope positions and urban terrain. Mortars also can obscure and illuminate. Their high rate of fire makes them an outstanding asset to employ against dismounted infantry and thin-skinned vehicles.

Given the tremendous flexibility of mortars, the task force commander always must include them in his intent and scheme of fires, and the FSO must keep in mind this asset's value in supporting the commander's intent. Throughout the battle, mortar platoon leaders should ask company team commanders how mortars can help.

NTC Lessons Learned

Fire support training before the brigade's NTC rotation was intensive, but the dividends were worth the investment. We validated our training initiatives and innovations, and although we recognized there was room for improvement, we knew a firm foundation for future success had been established.

Planning. A strong, habitual relationship fostered among key fire support planners is critical to success. Before and during the rotation, the brigade commander, FSCOORD, executive officer and FSO developed into a cohesive team—so did the task force commanders and their FSOs. FSOs, S3s and S2s also worked well together and didn't hesitate to pass critical information to one another. Turf battles were eliminated as each team focused on the commander's intent.

Although the commander's intent and concept of fires was stressed in training, old tendencies sometimes prevailed. Intent often lacked focus, and the concept became too complex. Fire plans must be simple, flexible, complete and understood by all.

Too often, lower headquarters lacked sufficient time to plan, prepare and execute. The one-third/two-thirds rule should apply to fire planning. The rule says the higher headquarters can use one-third of the time available for planning, leaving subordinate units two-thirds of the time.

During the rotation, brigade fire support plans lacked sufficient detail. As a consequence, the brigades suffered reoccurring problems such as an over-reliance on special munitions, failure to consider the details of observer movement and security and inattention to command and control requirements. Commanders and FSCOORD or FSOs found they couldn't see or communicate because of poor positioning. When commanders and FSOs were tired or sleep-deprived, they often forgot fundamentals, such as the use of mortars, because they failed to employ checklists or other prompts that make such actions automatic.

The details of the observer-trigger plan also weren't mastered. Too often, the critical time or event arrived for steel on target, and no eyes were available to call the fire. On other occasions, triggers weren't calculated in detail, resulting in untimely fires. Brigade targets must be considered specified tasks, and refinement of these targets an implied task. These tasks are just as critical as any maneuver task.

Preparing. The preparation phase places enormous demands on fire support personnel. Ours were well trained and motivated, but stress, confusion and sleep deprivation cost them valuable time and efficiency. Commanders must support them and "buy" them the time to develop and coordinate a myriad of products critical to success.

Although targets were not always the quality desired, our refinement process was the weaker link. As the enemy SITEMP improved, cut-off times for target changes were vague. When the "ground truth" of a target was determined, the challenge became one of changing the grids or target numbers and adding or subtracting from files in a timely manner. Commanders must be specific in defining the tradeoffs between accuracy and timeliness in the refinement process.

Using combat observation lasing teams (COLTs) was integral to our fire support plan; however, preparation and execution of this asset needed greater attention. There was a tendency early on to overestimate the COLTs' capabilities and later be disappointed when they didn't perform to expectation. Success with COLTs must be evaluated constantly to ensure skill, not luck, is operative. The same must be done with special fire support assets, such as Copperhead and FASCAM. Relying on them can be costly if the brigade doesn't prepare for their employment in detail.

Target groups can be very successful at the NTC, but they can't be too dispersed. Generally, if targets in a group are more than 500 meters apart, they should be refined tighter. Observers should understand the commander's intent for fires, match it to the terrain and refine group targets with global positioning system

(GPS) locations. Like target reference points (TRPs) in a direct fire plan, panels can be used with large target numbers for all to see when attacking the commander's critical targets. Observers should be prepared to adjust and complete the mission before the opportunity is lost.

The number of allocated targets almost always became an issue. We have a decide-detect-deliver doctrine because our system overloads with a *detect*-decide-deliver methodology. Company commanders can gain some flexibility by using the digital message device (DMD) buffer for additional targets. This speeds up the system, but it isn't the issue—lethality is. But you can't be lethal everywhere, all the time. It's a function of accuracy (time and position), volume and concentration.

Artillery massed fire is the solution. Simple arithmetic proves that four to six massed missions on targets of opportunity are available per one-hour battle. Planned targets increase the odds of striking the enemy with massed fires more often. An important technique learned during our rotation was massing two battalions instead of one. Firing two planned battalion three-round missions requires much less time than one battalion six-round mission.

We developed effective brigade and task force rehearsals in which the schemes of maneuver and fires were covered simultaneously. We validated the technique of conducting a fire support technical rehearsal between the brigade and battalion rehearsals and found two areas for improvement.

First, maneuver commander's and (or) S3s should participate in the fire support technical rehearsal to ensure the plan is understood. Second, rehearsals need to reduce emphasis on the synchronization matrix, which depends on time. Events trigger decisions; thus, reducing the emphasis on time and increasing it on events pays big dividends.

Executing. One of the brightest stars in the fire support system was the brigade's targeting cell. The targeting cell played a valuable role in planning, but the execution of lethal and non-lethal fires to achieve the synergy of fires was its strength. Teamwork among the members of the cell kept them focused on the commander's intent.

During execution, the commander must be kept informed of asset locations and the advantages and risks associated with their movement. Constant checks on battery positions and movement are necessary to ensure the commander's intent is met.

Priority of fires also must be monitored closely. For example, we sometimes found it necessary to shift priority from one unit to another earlier than anticipated in the FSEM. If all are focused on the commander's intent, this isn't a problem. The unit losing priority can still get fires if the unit receiving priority doesn't need them at the time they're shifted.

Special munitions require special training, and we weren't as prepared as we thought we were. In some cases, our short-fall was in planning special munitions, but we also fell short in execution. For instance, smoke needs to be on enemy eyes, not on friendly activities. Minor changes in smoke can make a big difference in a smoke mission effectiveness. If the initial smoke was ill-positioned, we either didn't adjust it or adjusted it too late.

FASCAM is another commonly misused special munition. It's imperative to reinforce it with direct and (or) indirect fires. Also, as with shifting priority fires, the employment of FASCAM must not be tied unduly to the FSEM. Our success proved that employing FASCAM early was better than later.

At the conclusion of every battle, a majority of our FSOs, FISTs and COLTs had perished, often due to their location beside the commander in the close fight. If they were released to find an overwatch position, poor navigation (and the enemy bounty on them) proved disastrous. FSOs, FISTs and COLTs must find places on the battlefield where they can execute the commander's intent and survive.

We thought we were prepared to employ our COLTs. We knew what we wanted but could seldom execute it. Successfully employing COLTs in the brigade deep fight is one of the hardest fire support functions to master.

During defensive missions, observers in depth paid off. Throughout the depth of the sector, we used terrain, obstacles and indirect fire to reinforce direct fires. In the attack, accurate indirect fire at the decisive point placed tremendous burdens on enemy leaders by reducing their vision of the battlefield and receipt of accurate information. With confusing assessments, the enemy lost the initiative and, often, the advantages of the defense. When planned correctly, fire support can ensure success at the NTC.

Conclusion

Our doctrine equates combat power to the sum of maneuver, firepower, protection and leadership. Maneuver, the movement of forces in relation to the enemy, is the dynamic element of combat and always will receive the attention it merits in the US Army. But maneuver commanders frequently focus on maneuver too much. Firepower is produced by all weapons and attack systems, of which only a fraction are direct fire weapons. The fire support system produces the remainder of our firepower. To maximize combat power, we must master the fire support system.

The 1st Infantry Division hasn't mastered fire support, but it has built a sound training program to do so, a program validated at the NTC. The division emphasizes doctrinal fire support functions and tasks during all combined arms training and drills TTP at every level. Positive relationships are fostered between maneuver and fire support personnel on both the demand and supply sides of the equation. And what we've learned is—***fire support is not too hard, it's just very tough!***

Colonel Thomas F. Metz, Infantry, has commanded the 2d (Dagger) Brigade, 1st Infantry Division (Mechanized) at Fort Riley, Kansas, since July 1992. During his career, he has been on five rotations at the National Training Center at Fort Irwin, California: one as a task force executive officer, two as a brigade S3, one as a task force commander and the most recent as a brigade commander. Colonel Metz' other commands include 4th Battalion, 15th Infantry (Mechanized), part of the 194th Armored Brigade at Fort Knox, Kentucky; C Company, 4th Battalion, 54th Infantry (Mechanized), 194th Brigade; and C Company, 10th Basic Combat Training Battalion, Fort Jackson, South Carolina. Among other assignments, he has served as the G3 of the 2d Infantry Division in Korea; S3 of the 197th Separate Infantry Brigade (Mechanized) at Fort Benning, Georgia; and Executive Officer and S3 of the 3d Battalion, 7th Infantry (Mechanized), 197th Brigade.

Fire Support in the Heavy-Light Fight

by Lieutenant Colonel David W. Barno, IN

More so than ever before, maneuver and fire support have become inseparable on today's battlefield. Gone are the days—if they ever existed—where the commander could routinely develop his scheme of maneuver and then expect his fire support officer (FSO) to come up with a plan to support it. Combat today demands full integration for success—from initial concept to execution.

Fire supporters and maneuver commanders must operate as one, beginning at home station, to produce maximum synergy on the objective. We, as maneuver commanders, must come to see fire support in the same light that we see tank platoons and rifle companies. For our fire support counterparts, the challenge is to understand maneuver and their maneuver commanders more fully.

As a light task force assigned to a heavy brigade during a rotation at the National Training Center (NTC), Fort Irwin, California, we quickly learned that mastering the synchronization of fire support on an armored battlefield was critical to our success—and survival. In this article, I examine some of the challenges of integrating fire support for light-type forces at the NTC in a recent heavy-light rotation.

Task Organization

Task Force 3-505 Parachute Infantry, part of the 82d Airborne Division, Fort Bragg, North Carolina, deployed to the NTC in mid-1992 for a heavy-light rotation, the first of its kind for the battalion. The task force was attached to a continental US (CONUS)-based mechanized infantry division in a scenario with five days of brigade (-) force-on-force operations, five days of live fire and four days of full-brigade operations. Our sister maneuver units were a tank and mechanized infantry battalion, each task organized with two tank and two mechanized companies. The airborne battalion task force consisted of more than 1,200 soldiers, to include a light armored platoon of M551 Sheridans, M119 howitzer battery, air defense platoon of Stingers and towed Vulcans, light engineer platoon and various combat support (CS) and combat service support (CSS) elements.

In contrast to other light infantry units, my battalion had an organic anti-armor company of 20 high-mobility multipurpose wheeled vehicle (HMMWV)-mounted TOWs (tube-launched, optically tracked, wire-guided missiles), plus three rifle companies and a well-resourced headquarters and headquarters company. The task force additionally was supported by a 5-ton truck company, allowing 100 percent wheeled mobility, and a composite aviation task force, consisting of an assault helicopter company with attack and air cavalry assets.

Despite what was a relatively powerful task force for a light infantry unit, it quickly became apparent that our total combat power could be tripled or quadrupled by adding heavy fire support assets not normally available to light units. External fire support for our operations varied by mission, but we generally were able to call on a direct support (DS) 155-mm self-propelled battalion as well as a notional general support reinforcing (GSR) battalion of the same composition. Close air support (CAS) was periodically available at relatively fixed times. These fire support assets provided us the capability to rapidly shift combat power to distant spots on the battlefield to influence the outcome of every fight. Unfortunately, while we had trained extensively with our habitually assigned fire support element (FSE) and 105-mm battery before the rotation, we had limited opportunities to work with both the brigade FSE and supporting 155-mm battalions.

Preparation

As with most units slated for the NTC, our home-station training program reflected the realities of personnel turbulence, support and mission cycles and, in

our case, limited access to our remote heavy brigade headquarters. We had five months after I assumed command to put together our "Road to War" training plan, which would carry us through the rotation.

Early and constant integration of our fire supporters was critical to that effort. Company commanders and platoon leaders were directed never to "show their faces" at tactical events without their FSOs. An already strong mutual relationship with our DS battalion and FSE was further tightened. Our division standing operating procedures (SOPs) already aligned not only the FSEs and DS battalions with the infantry brigades, but also firing batteries with infantry battalion task forces. The battery commander and battalion FSO routinely sat in our battalion training and command and staff meetings and were full members of the task force team. This close relationship (also extended year-round to our armor, engineer, air defense and military police elements) went a long way to ensure unity of effort and mutual understanding of the commander's intent during the rotation.

Because we were limited to less than four weeks of our training cycle to prepare for the rotation, we made maximum use of the mission and support cycles to focus at the higher level on staff and leader development and at the lower echelons on small-unit NTC drills. For example, during an extended period of detail support, the battle staff plus company and battery commanders deployed as a group to Fort Benning, Georgia, to focus on offensive and defensive planning drills, using the surface navigation and observation trainer (SURNOT). The trainer provides a 360-degree panorama of dozens of key locations at the NTC. Additionally, we were able to tap a wide variety of subject matter experts among the instructors and staff of the Infantry School at Fort Benning to provide insights on fighting at the NTC.

Further, two Forces Command (FORSCOM) Leader Training Program (FLTP) visits to the NTC provided tremendous training opportunities. Our first trip with a small staff was our first opportunity to meet and work with our parent heavy brigade staff as well as our sister battalion task forces. An unexpected FLTP vacancy allowed us a second visit to get our entire battle staff with company-level commanders on the ground at the NTC. Both visits deserve special mention because they provided one-of-a-kind insights on fighting on a battlefield dominated by heavy armored forces—not a common event for units at Fort Bragg.

Of particular importance was the "graduate level" tactical mentoring provided by the FLTP instructors that forged a new appreciation of the intrinsic relationship between fires and maneuver forces in a heavy fight. We realized that only effective use of fire support would protect our force during insertions, isolating and disrupting the enemy to permit our attacks and sealing off our newly gained objectives from enemy reaction. Failure to master responsive delivery of fires at the right place and time on the armored battlefield could be catastrophic.

Finally, we exercised the whole task force at home station in the field training exercise (FTX) mode. The task force FTX four weeks before we deployed to the NTC became the graduation exercise tying together a patchwork of multi-echelon training events throughout the home-station support cycle. Leaders were bombarded with NTC orientations, 200-meter walk-throughs of the opposing forces' (OPFOR's) regimental attack, small-unit live fires, lessons learned from recent returnees and a by-mission analysis of how we would fight battles a light force would likely encounter.

The FTX lasted 11 days and covered all anticipated battlefield tasks. In fact, the FTX was developed to ensure the battalion wouldn't encounter any task at the NTC it had not practiced at least once during the exercise—from vehicle decontamination to night motor convoys to defending against massed armored attacks.

The armored company (-) assigned as our OPFOR taught us much about the speed and shock action of armor against a light infantry defense. The most powerful and flexible anti-armor weapon we had was a DS 155-mm battalion. As we rehearsed the defense against one armored attack after another, we refined the exact synchronization timing required to mass fires against a large armored force slowed in front of an obstacle. We concluded that the at-my-command method of fire control, keyed to decision points in front of critical obstacles, was highly effective and responsive. We also decided to use our organic 105-mm firing battery commander as an informal liaison to the DS battalion.

While we were able to conduct a few command post exercises (CPXs) with the brigade during our preparation, our first joint "FTX" came only in the first battle at the NTC—an undesirable but not unrealistic situation.

Members of Task Force 3-505 Parachute Infantry begin offensive operations with a successful air assault. Devastatingly effective pre-assault artillery fires assured unopposed helicopter landings.

The NTC: Offensive Operations

Our initial mission at the NTC began with an excellent video teleconference operations order (OPORD) at home station

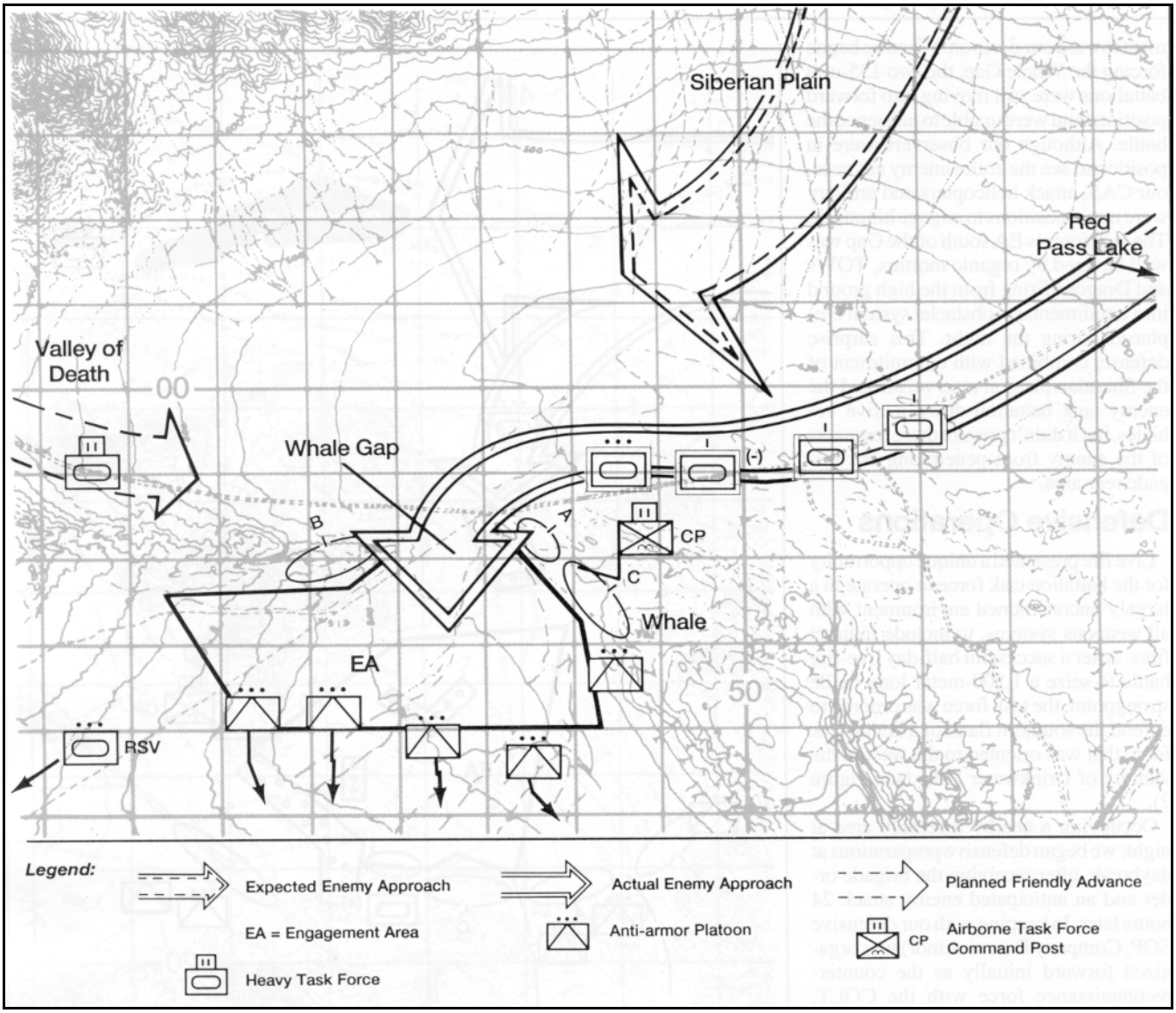


Figure 1: Task Force Offensive Operations at the NTC. The unexpected attack through the Whale Gap allowed the enemy to penetrate the brigade rear. Although observers were in position to see the attack, CAS, attack helicopters and artillery weren't yet on station or in position to engage him.

from our heavy brigade. We were to conduct a night air assault (see Figure 1) to seize the western portion of the Whale and Whale Gap to protect the right flank of an armored task force moving eastward at dawn through the Valley of Death toward Siberia. The enemy was expected to move down from the north into the Siberian Plain and be destroyed there by the armored task force in a meeting engagement. Both the DS and GSR 155-mm battalions were available to support the air assault (and our simultaneous wheeled ground advance) but were programmed to displace forward near dawn to maximize fires into the enemy's depth at the expected critical time specified in the brigade commander's intent. Consequently, neither battalion could support us during that time.

The initial air assaults went in on time, preceded by heavy volumes of fires on the landing zones (LZs), suspected manpack air defense locations and other nearby templated enemy positions. Although unobserved by friendly forces on the ground, the combined fires from two 155-mm battalions were devastatingly effective and reduced enemy dismounted forces on one templated position by 70 percent, as well as assured our unopposed helicopter landings.

As fighting ensued for the high ground above Whale Gap, our wheeled echelon with an anti-armor company, combat observation lasing team (COLT) and heavy engineer company under our operational control moved forward to create an engagement area (EA) south of the Gap in anticipation of a potential enemy breakthrough. At dawn, we secured the high ground above the Gap and established hasty defenses on the Whale and to its south with 20 TOWs and mortars covering the beginnings of an obstacle system.

The enemy unexpectedly attacked in force through Red Pass Lake where we had an unobstructed view of his movement

toward our position. When he began forcing the Whale Gap, the two 155-mm battalions were still moving into forward positions and were unable to influence the battle. Although our observers were in position to see the entire enemy advance, our CAS, attack helicopters and artillery were not in positions to engage his attack. The task force's EA south of the Gap was well covered by organic mortars, TOWs and Dragons firing from the high ground into a rudimentary obstacle system emplaced during the night. This surprise defense, combined with commitment of the Sheridan platoon reserve, attrited the enemy tank battalion down to five vehicles, but it didn't prevent these remnants of the enemy from penetrating our brigade rear area.

Defensive Operations

Live fire presented a unique opportunity for the battalion task force to operate in a largely unconstrained environment with all weapons systems, to include indirect fires. After a successful half-day live-fire battle to seize a 1,500-meter long defile strongpoint, the task force was ordered to defend the southern flank of a heavy task force that was oriented to the west in the vicinity of Drinkwater Lake (see Figure 2).

Occupying a nearby assembly area at night, we began defensive preparations at daybreak after receiving the brigade order and an anticipated enemy attack 24 hours later. In keeping with our defensive SOP, Company D (anti-armor) was organized forward initially as the counter-reconnaissance force with the COLT, Sheridans and ground surveillance radar attached.

I began my personal reconnaissance at first light to identify the decisive point to kill the enemy and design an EA to achieve that purpose. After my initial assessment, I briefed the company commanders on their roles and sent them to conduct further reconnaissance while I took the FSO and engineer in my vehicle, equipped with a global positioning system (GPS), to lay out the EA. We jointly selected critical places for obstacles, used the GPS to determine endpoints and established targets on and forward of the obstacles by type, munition and responsibility. We moved throughout the battlefield until all critical obstacles were located, marked for construction, prioritized and assigned a target to accomplish specific purposes. All this information was recorded, shared with company FSOs upon our return and published in the battalion's confirmation OPORD later in the day.

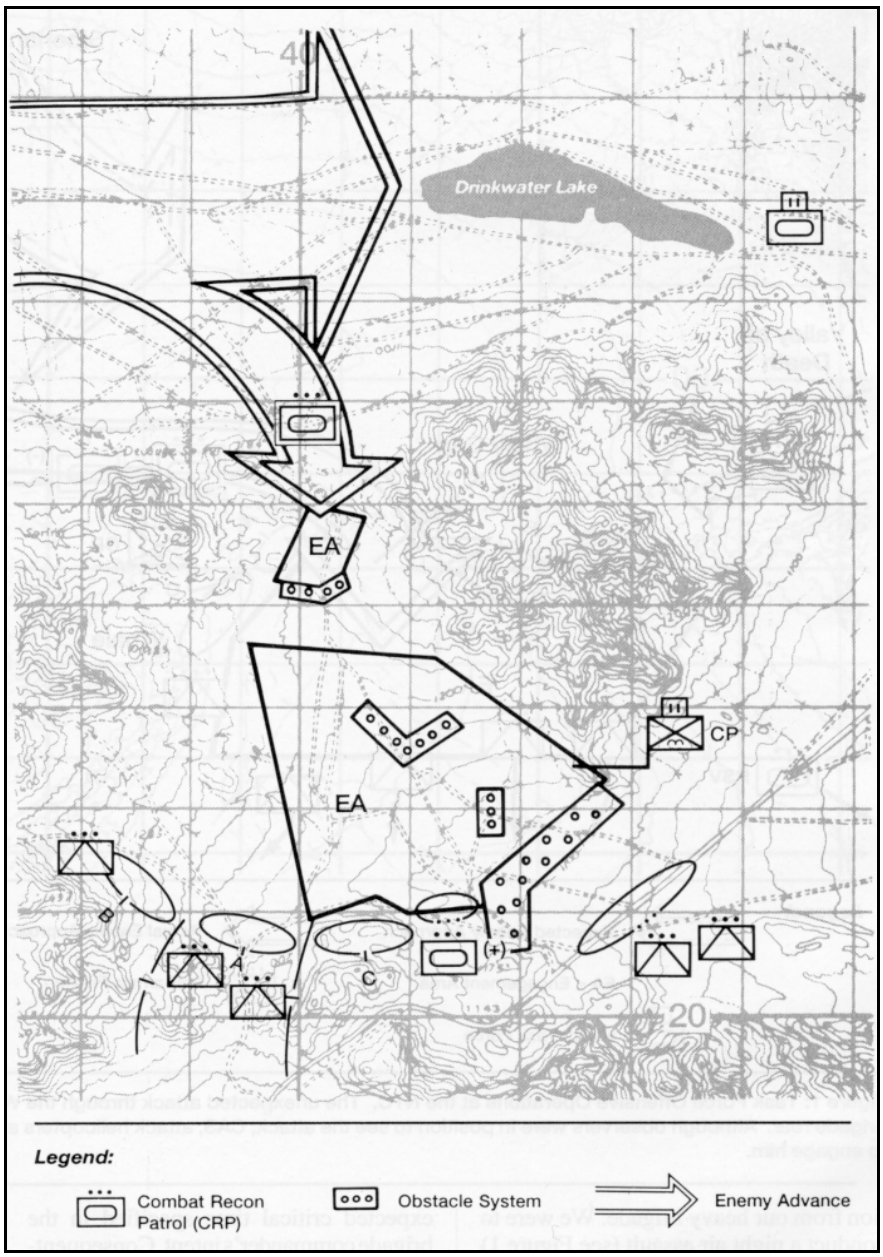
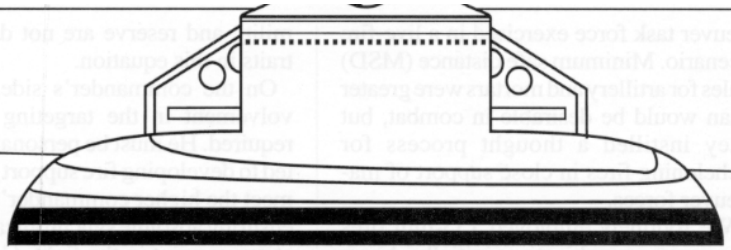


Figure 2: Task Force Defensive Operations at the NTC. The lead combat reconnaissance platoon entered the EA to the north, struck the obstacle and was completely destroyed by battery massed fires. All follow-on enemy armored forces were reduced to piecemeal by artillery before any direct fire engagements.

After meeting again with company commanders and approving their units' dispositions, I ordered the battalion to rapidly occupy positions overlooking the EA. This technique saved invaluable time and allowed maximum defensive preparation on the ground with only essential staff work up front. Orders preparation continued concurrently with digging in the defense, with specific targets and final protective fires (FPFs) fired late in the day to confirm firing data.

At daybreak, after having given the task force to our north a stiff fight during the night, enemy forces again attacked in the



Commander's Fire Support Guidance

The most essential ingredient for successfully synchronizing fire support is a clear, complete commander's fire support guidance—the critical information for the battalion FSO to do his job. Like the commander's intent, it should be crafted by the commander and, with the commander's concurrence, amplified by the FSO, as required. Both the intent and fire support guidance must combine to paint a clear picture of how the commander plans to fight the battle.

The following format for the commander's fire support guidance was used successfully by Task Force 3-305 Parachute Infantry during its NTC rotation. It provided a handy "memory jogger" menu to draw from before each operation, and every category was considered in the commander's estimate process.

- Where is the Critical Point on the Battlefield?
  - Targets: Target Area of Interest (TAI)
  - Effects: Destroy (30 Percent), Neutralize (20 Percent), Suppress (10 Percent) or Isolate/Smoke
  - When/Where is Fire Support Critical?
  - To Accomplish What Tasks?
  - Priorities for Special Munitions: Dual-Purpose Improved Conventional Munitions (DPICM), Family of Scatterable Mines (FASCAM), Smoke, Illumination and Copperhead
  - Priorities for Special Assets: Combat Observation Lasing Team (COLT), Close Air Support (CAS) and Attack Helicopters
  - Force Protection/Counterfire Priorities: No-Fire Areas (NFAs)/Restricted Fire Areas (RFAs) to Protect Scouts and the COLT and Q-36 Firefinder Radar Priorities/Direction/Critical Friendly Zones
- Task/Purpose of Fire by Type: 155, 105, 81, CAS, Naval Gunfire (NGF), Apache Helicopter, AC-130 gunship and Maneuver Unit Priority of Fire
- Priority Targets/Final Protective Fires (FPFs) and When the Fires are Shifted
- Trigger Points for Specific Fires: DPICM, FPFs, Smoke or FASCAM
- COLT Location/Employment: High-Value Targets (HVTs), such as Enemy Command and Control Capabilities, Air Defense Artillery (ADA), Engineer and Electronic Warfare (EW) Assets, and Tanks
- Task/Purpose of Specific Fires
- Fire Support for Special Units/Early Inserters: Scouts, Long-Range Surveillance Teams (LRSTs), Special Forces Operational Detachments-A (SFOD-A), Counter-Reconnaissance Forces and Patrols
- High-Payoff Targets
- Coverage of Obstacles: Which Forward Observer (FO) is Responsible for Which Obstacles and What the Trigger Points Are
- Control and Positioning of Mortars
- Preparation Fires: Duration, Location, Ordnance and FO Control
- Ammunition Guidance by Type: High Explosive (HE), White Phosphorous (WP), Smoke or Illumination
- Fire Support Coordinating Measures (FSCM): NFAs and RFAs, Restricted Fire Line (RFL), Coordinated Fire Line (CFL) and Fire Support Coordination Line (FSCL)

brigade sector. As the main effort of the enemy force struck the Drinkwater Lake area, reports from the brigade headquarters indicated several enemy elements were turning south into our defense. The task force FSO arrayed our fire support assets on our northern EA and directed "at my command" as the method of control.

The lead combat reconnaissance platoon (CRP) traversed the pass at the north end of the defense and entered our northern EA. Upon striking the obstacle, the enemy was engaged by massed fire from the batteries, resulting in the complete destruction of the CRP. Aggressive artillery support further reduced the enemy armored forces entering the sector to piecemeal before any direct fire engagements.

Lessons Learned

In preparing for the NTC, we focused extensively on the experience of others, which allowed us to enter the "box" at the highest possible level of proficiency. Only a single-minded and intense effort by every leader *before* the NTC will produce the level of understanding and basic sophistication necessary for maximizing learning during a rotation. Entering the rotation with a solid understanding of how each combat function interacts in each likely type of mission avoids having to re-learn the basics during the first few days of the rotation.

Ownership of Fire Support. Company and battalion commanders must see and fight fire support as *their* system, not their FSOs'. Every commander must be able to brief his fire support plan, and backbriefs at each level should force leaders to describe the "what" and "how" of fire support in their fight. Leaders, not FSOs, routinely should cover fires in their verbal concept of the operation—just as they cover maneuver. The commander must look at his

indirect fire systems precisely as he looks at his tank, TOW and Bradley direct fire systems.

Force Protection. In the dismounted role, our greatest enemy on the NTC battlefield was enemy indirect fires. Moving across the desert at night under a full moon made us a lucrative target for the enemy's fire support systems, if we were detected. Support from the brigade's Q-36 radar system became vital to our ability to close with the enemy on foot without taking unacceptable risks. On those occasions when the enemy was able to locate our forces behind his forward positions, he was quite willing to commit heavy artillery or even rockets to neutralize them. On those occasions when we were forced to operate without a well-coordinated counterfire system, we paid a high price. Establishing and regularly updating our critical friendly zones with the brigade became extremely serious tasks.

Synchronization and Rehearsals. Most units have become reasonably proficient at developing effective synchronization matrices ("The Plan") as part of our orders drills. We're still working hard to synchronize our combat power on the battlefield ("The Execution"). Note the poor results of what appeared to be a well-synchronized plan in the offensive example already cited.

In the arena of fire support, a seamless interface must exist between maneuver commanders and fire supporters. Fire support rehearsals are essential, but they aren't a substitute for fire support integration into the task force rehearsal—be it a full-scale rock drill or only a map talk-through. We found some success with conducting a fire coordination rehearsal during deliberate planning that focused on actions at the objective (vice those actions required to deliver the force to the objective). This rehearsal was particularly effective in laying out minute-by-minute what system was shooting where, controlled by whom, with what limits and cued on what signals or events.

While the danger of "yet another rehearsal" syndrome exists, our experience was that, time permitting, a detailed direct and indirect fires rehearsal down to the platoon level paid great dividends in execution.

Complementary Fire Support. A significant benefit of the NTC was seeing all the fire support assets available to a maneuver task force exercised in a live-fire scenario. Minimum safe distance (MSD) rules for artillery and mortars were greater than would be desirable in combat, but they instilled a thought process for echeloning fires in close support of maneuver forces.

We routinely employed 155-mm fires to suppress our objectives initially. As we closed on those objectives and the 155-mm MSD, we shifted to 105-mm fires and, finally, to mortars as squads and platoons closed on their final objectives. As heavier fire support assets were shifted off the assault objectives, they quickly sealed off reinforcements and even screened the objective from the enemy's mutually supporting positions.

The task force's 60-mm mortars were highly effective in the close direct fire role to suppress and obscure enemy bunkers and fortified trench lines. Smoke rounds from all fire support assets played vital roles in protecting our infantry from enemy observation and preventing the enemy from supporting his own positions with fire.

The 155s also provided a wide variety of munitions not normally available to an airborne task force, particularly the versatile dual-purpose improved conventional munitions (DPICM) round. This munition was critical in reducing enemy armored combat power facing our direct fire systems and was used to great effect in the attack and defense. The challenge often became how to maximize the effects of mortars and 105-mm howitzers in isolating, suppressing and degrading the enemy's command and control capabilities while focusing the DS 155-mm battalion's mission to destroy or neutralize key elements of the enemy's armored force with DPICM.

Commander-FSO Relationship. The battalion commander and FSO share a special relationship. Together with the battalion S2 and S3, they form the heart of the fighting battle staff and jointly plan, prepare and execute the fight as a seamless team.

As the FSO comes to this team from a separate organization (the DS battalion), he may have to fight to be a member of this inner circle. Although often a junior captain, the FSO must be forceful in presenting his recommendations to the commander and in cornering the commander and using his limited time to pin down critical fire support decisions and guidance. Humility and reserve are not desired FSO traits in this equation.

On the commander's side, active involvement in the targeting process is required. He must be personally committed to developing fire support guidance to meet the higher commander's intent and ensuring absolute synchronization of fires at every point in the fight. Commanders must challenge FSOs—pick apart their plans, question their assurances and demand results. I was blessed with a talented, tough-skinned FSO who always stood up to be counted and bounced back for more.

The light force's effective use of fire support often is the key to victory on the NTC battlefield, as in combat. The complexity of modern fire support drives maneuver commanders today to become more involved in fire support tasks than ever before. Munitions delivered by indirect fire assets are increasingly becoming the commander's weapons of choice for precision and lethality. Particularly in the light infantry, fire support assets provide the preponderance of combat power capable of rapid, flexible application at widely dispersed points on the battlefield.

Routine contact with his fire supporters tied to habitual task organization at the lowest levels is essential for the maneuver commander to develop ownership of his FSE and total familiarity with the capabilities it delivers. Today, there's no room for the commander who can't "see" the battlefield from the viewpoint of all his combat functions. In the final analysis, today's maneuver commander must be a fire support expert in his own right.

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Certain Victory: The US Army in the Gulf War.

Brigadier General Robert H. Scales, Jr., Director, Desert Storm Study Project.
Office of the Chief of Staff, United States Army, Washington, DC, 1993, 435 pages.

Writing about the past involves the difficult task of discerning the meaning of events in terms of root causes and broad perspectives. With *Certain Victory*, the official account of the US Army in the Persian Gulf, Brigadier General Scales and his "Mailhouse Gang" of writers, editors and researchers have accomplished this task exceedingly well. In telling the Army's story, they have gone beyond reporting the facts of the Gulf War by presenting them in the greater context of the Army's post-Vietnam past and its post-Cold War future.

From this single source, someone with little knowledge of the military can gain an understanding of Army doctrine, training, organization, materiel and leader and soldier developments. Moreover, they can appreciate how the combined effects of these factors served as the basis of our certain victory.

Format and style are major strongpoints of this book. The format contains an introductory look at the Army of the 1970s and 80s, then shifts to an in-depth coverage of the Gulf crisis and ends with a summary of future implications for the Army as a contingency force. The authors have inserted personal vignettes into every chapter, bringing the narrative to life. In a style comparable to Tom Clancy at his best, the authors have created a text so powerfully vivid and intricately detailed that the reader is mentally transported to the desert and thrust into the dramatic events of the war.

Prelude. The first chapter explores how the Army healed itself from the demoralized organization of the early 70s to become a crack fighting force as characterized in the vignette of Eagle Troop, 2d Squadron, 2d Armored Cavalry Regiment at the Battle of 73 Easting. Along the way, the reader learns of training and doctrinal reforms based on lessons drawn from the 1973 Mid-East War, the emergence of AirLand Battle doctrine and key materiel developments, the establishment of Combat Training Centers and, finally, the combat preludes to Desert Storm—Operation Urgent Fury and the highly successful Operation Just Cause.

War. In the ensuing chapters, we see the war progress from the uncertain days immediately following Saddam Hussein's occupation of Kuwait to the euphoria of victory and the complex business of conflict termination. We learn of the monumental administrative and logistical tasks associated with deploying forces to Saudi Arabia, the formulation of a national strategy and an international coalition and the response from industry as the United States prepared to resolve the crisis in the Gulf. The enormity and relative swiftness of our force deployment to the Persian Gulf, where troop strength in theater reached 184,000 in the space of 88 days, come across loud and clear. In the battle planning process, we learn of the one- and two-corps options, with the two-corps plan winning out, bearing credence to our national commitment to use overwhelming force.

Certain Victory describes the opening shots of Desert Storm fired by Apache helicopters along with the use of Patriot missiles in the counter-Scud role. The 100-hour ground war, called "the great wheel," unfolds by units, by the day, and in some cases, by the hour. The narrative alternates between the various divisions of VII Corps and XVII Airborne Corps during the turning movement against the Iraqis. We see US and allied forces moving rapidly through the enemy regulars, and we also see the intense, pitched battles against the Republican Guard. We learn about the "Steel Rain" of the multiple-launch rocket system (MLRS) and the first use of the Army tactical missile system (ATACMS) in a deep strike against enemy air defenses.

The authors provide valuable insights into the operational art of war by explaining how battlefield perceptions varied at the higher echelons of command. From the vantage of his command bunker in Riyadh, General Norman Schwarzkopf, Commander-in-Chief, believed Republican Guard units were being routed and the offensive had turned into a pursuit. On the other hand, Lieutenant General Frederick Franks, VII Corps Commander, had a distinctly different view of the situation. He saw VII Corps moving toward an enemy force that was, in turn, moving toward him.

Continuity and Change. *Certain Victory* closes with a discussion of two seemingly dichotomous terms—continuity and change—both of which have had a profound effect on the Army. Continuity refers to the enduring values the Army places on leadership and quality soldiers. Accommodating change is equally important in the way we harness technology and in our general approach to warfare.

All things considered, the only negative comment about this work is the limited number of copies in print. Because *Certain Victory* is an official government publication, you won't find it in local bookstores. That's too bad—it would surely be a best-seller.

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Fire Support:

An Air Assault Commander's Perspective

by Captain Boyce H. Evans, IN

I remember thinking, "If we can only conduct this passage of lines and move 3,000 meters safely, we'll be out of this vulnerable position and prepared for an enemy attack." Suddenly, red and green tracers filled the darkness to our left as our sister company initiated a linear ambush on 20 Iraqi soldiers. The Iraqis frantically dismounted from their 2 1/2-ton truck and returned fire. I immediately heard the "thump, thump, thump" of 60-mm and 81-mm mortars as rounds left the tubes and then loud explosions as impacting rounds sent shrapnel into the enemy soldiers and their truck. Direct and indirect fires killed or wounded every soldier in the enemy platoon, and the ambush ended almost as soon as it had begun. There were no friendly casualties.

This engagement was part of Operation Raider Sword during Desert Storm in which the 2d Battalion, 187th Infantry (2-187IN)—known as the Rakassans—101st Airborne Division (Air Assault) conducted an air assault into the Euphrates River Valley in Iraq. It graphically illustrates that the most lethal and responsive asset a light maneuver commander has at his disposal are his fires—both direct and indirect. To be devastatingly effective, his fire support must be integrated totally with his direct fire and maneuver and properly planned, rehearsed and trained.

Fire support was a very important part of the plan because we were to prevent the Iraqi 49th and 35th Mechanized Divisions from using the supply route running generally east-west and parallel to the Euphrates River (see the figure). My company (Delta Company) and Bravo Company were to establish battle positions (BPs) Vulture and Panther to concentrate fires into engagement areas (EAs) Rebel and Yankee, respectively.

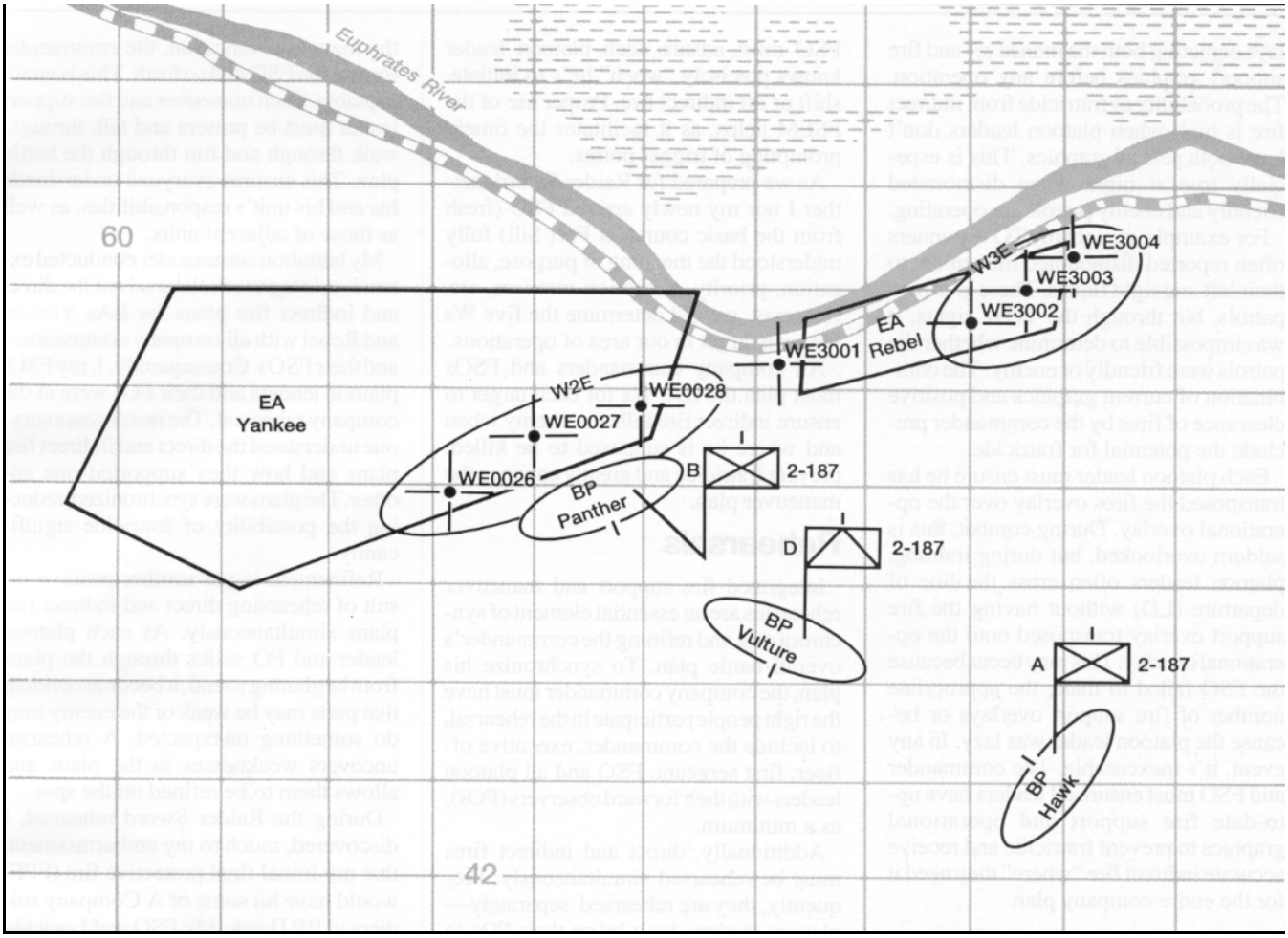
As an air assault infantry unit, we had few anti-armor weapons systems. My battalion commander explained how important my company's tube-launched, optically tracked, wire-guided missile (TOW) fires would be in EA Rebel if the enemy counterattacked with tanks. I felt our firepower inadequate and was thankful I had been given priority of 105-mm howitzer fires. Fortunately, I only had to call for fire once, but I had confidence in knowing we had trained and rehearsed a sound fire support plan.

The Five Ws

A sound fire support plan firmly synchronized with the maneuver plan is the basis for the successful use of indirect fire. This plan is much more than stating the purpose, allocation and priority of fires with an accompanying fire support execution matrix (FSEM) and fires overlay. A fire support plan must answer the "five Ws"—who, what, when, where and why—for every target in the commander's area of operations. Both the company commander and his fire support officer (FSO) ensure each of the five Ws is addressed.

Why

Purpose is the most important aspect of the plan because it explains what the desired end state is for each target. This is usually the weakest part of a fire plan at the company level. Frequently, the "why" or "purpose of fires" merely repeats the



Operation Raider Sword. Fire support was very important to help air assault infantry companies prevent the Iraqi 49th and 35th Mechanized Divisions from using the supply route parallel to the Euphrates River.

battalion commander's purpose of fires. The company commander and FSO must ensure they articulate their *own* purpose or "why" for each target.

For example during Raider Sword, the battalion's purpose of fires was to destroy the enemy in EAs Yankee and Rebel to prevent the enemy from using the main supply route. My purpose was to fix the enemy's lead elements by firing a target in the northeastern portion of EA Rebel to provide TOW gunners adequate tracking time. Simultaneously, I intended to fire a group of targets to suppress the rear of the column so the enemy couldn't return accurate tank fire. In sum, the company commander and his FSO must answer the question "why" for every target they intend to fire.

What

What are the desired effects? The commander and FSO must clearly understand and articulate the effects required to accomplish their purpose of fires. For example, "suppress" and "destroy" have completely different meanings. To destroy is to inflict 30 percent casualties on soldiers and equipment and requires a large amount of ammunition. To suppress, however, is to limit the ability of enemy personnel in the target area to do their jobs and requires much less ammunition.

The "what" tells the FSO the type of munitions and fuzes and how much ammunition he'll need. The commander and FSO must state what the desired effects are for each target based on the type and amount of ammunition available.

Who

The commander must assign primary and alternate responsibility for every target he intends to fire. This is in addition to the priority of fires (POF). The platoon with POF may be unable to observe a target that needs to be fired. This is particularly relevant in air assault and airborne operations when forces operate behind enemy lines.

In Raider Sword, my platoon with the POF (5th Platoon) was oriented on the eastern portion of EA Rebel. At approximately 0200 hours, my 4th Platoon detected enemy movement on our far left flank. This was an area that 5th Platoon couldn't see due to the terrain. The 4th Platoon called for and adjusted 105-mm howitzer fire from the 3d Battalion, 320th Field Artillery, and the mission was a success. The commander and his FSO must determine "who" has primary and alternate responsibility for each target that may be fired, and they shouldn't limit responsibility to the element with POF.

Where

The commander and FSO must provide platoon leaders current and accurate overlays

depicting both the maneuver and fire support graphics before any operation. The probability of fratricide from indirect fire is high when platoon leaders don't have both sets of graphics. This is especially true at night when dismounted friendly and enemy patrols are operating.

For example, at night my TOW gunners often reported dismounted movement to their left and right flanks. These were our patrols, but through the TOW sights, it was impossible to determine whether the patrols were friendly or enemy. The combination of current graphics and positive clearance of fires by the commander preclude the potential for fratricide.

Each platoon leader must ensure he has transposed the fires overlay over the operational overlay. During combat, this is seldom overlooked, but during training, platoon leaders often cross the line of departure (LD) without having the fire support overlay transposed onto the operational overlay. This may occur because the FSO failed to make the appropriate number of fire support overlays or because the platoon leader was lazy. In any event, it's inexcusable. The commander and FSO must ensure all leaders have up-to-date fire support and operational graphics to prevent fratricide and receive accurate indirect fire "where" they need it for the entire company plan.

When

The last of the five Ws is probably the most difficult to plan. "When" is based on pre-determined trigger points that consider the enemy and friendly rates of movement, the time it'll take to call for fire and the flight of the rounds.

During Raider Sword, my FSO and I determined we'd call for fire on target WE3001 and group W3E when the lead element of tanks was at target WE3002. We calculated this based on the enemy's moving at 30 miles per hour, a radio transmission of 15 to 30 seconds and a time of flight of 10 to 20 seconds.

I used a defensive example here, but the principle is the same in the offense. In the offense, however, the commander and FSO must determine the friendly rate of movement to enable the maneuver element to exploit the effects of indirect fires and prevent fratricide. The difficulty is shifting or lifting the indirect fire at precisely the right moment to prevent fratricide while continuing to suppress the rest of the objective. The commander and FSO must ensure each platoon leader knows precisely "when" he's to initiate, shift or lift indirect fire. Proper use of the FSEM helps, as it facilitates the timely prompting of trigger points.

As we prepared for Raider Sword, neither I nor my newly arrived FSO (fresh from the basic course at Fort Sill) fully understood the meaning of purpose, allocation, priority, execution matrices, etc. However, we did determine the five Ws for each target in our area of operations.

All company commanders and FSOs must plan the five Ws for each target to ensure indirect fire kills the enemy when and where he is supposed to be killed, prevent fratricide and greatly enhance the maneuver plan.

Rehearsals

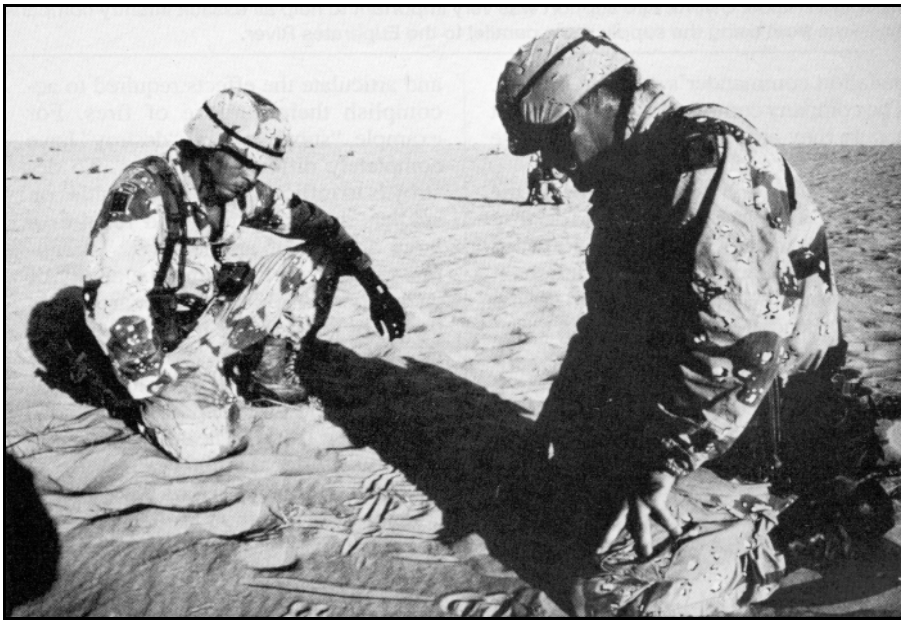
Integrated fire support and maneuver rehearsals are an essential element of synchronizing and refining the commander's overall battle plan. To synchronize his plan, the company commander must have the right people participate in the rehearsal, to include the commander, executive officer, first sergeant, FSO and all platoon leaders with their forward observers (FOs), as a minimum.

Additionally, direct and indirect fires must be rehearsed simultaneously. Frequently, they are rehearsed separately—platoon leaders don't bring their FOs to the maneuver rehearsal, the commander forgets his FSO and so forth. This is unacceptable. Each maneuver and fire support leader must be present and talk through, walk through and run through the battle plan. This ensures everyone understands his and his unit's responsibilities, as well as those of adjacent units.

My battalion commander conducted extensive, integrated rehearsals of the direct and indirect fire plans for EAs Yankee and Rebel with all company commanders and their FSOs. Consequently, I, my FSO, platoon leaders and their FOs were at the company rehearsal. The result was everyone understood the direct and indirect fire plans and how they supported one another. The plans were synchronized, reducing the possibility of fratricide significantly.

Refinement is yet another positive result of rehearsing direct and indirect fire plans simultaneously. As each platoon leader and FO walks through the plans from beginning to end, it becomes evident that parts may be weak or the enemy may do something unexpected. A rehearsal uncovers weaknesses in the plans and allows them to be refined on the spot.

During the Raider Sword rehearsal, I discovered, much to my embarrassment, that my initial final protective fire (FPF) would have hit some of A Company soldiers in BP Hawk. My FSO and I quickly



Sand Table Rehearsal During Desert Storm. There are many techniques for rehearsing, depending on the time available. The key is to conduct an integrated fire support and maneuver rehearsal.

adjusted the plan, but the learning point remains. Integrated direct and indirect fire rehearsals are crucial because they facilitate a synchronized battle plan flexible enough to deal with contingencies and free of fratricide problems.

There are many techniques for rehearsing the plan. The most effective technique is a "crawl, walk, run through" of actions and fires on the objective using live ammunition on the terrain the commander intends to fight on. This can be conducted when the mission is a defense and plenty of time and ammunition are available.

Preceding Raider Sword, my company was part of a covering force just north of An Nu'ayirah in Saudi Arabia. We had several months to prepare for a potential Iraqi attack and ample time to plan, rehearse and train. Consequently, our battalion commander talked each of his commanders and their FSOs through the operation many times. Then we "walked through" the execution using leaders and their FSOs on the actual terrain. Finally, we rehearsed the operation day and night at both the battalion and company levels with all the maneuver and fire support soldiers. There was no doubt in my mind that the operation would be successful because every soldier knew when and where direct and indirect fires were going to be employed. While we didn't have a lot of ammunition to rehearse with, we did adjust in all targets and calculated the time of flight for each.

Another effective rehearsal technique is for the commander to talk and walk each of his platoon leaders and FOs through the integrated plan on a terrain model of the objective area. The commander and FSO guide the platoon leaders and FOs through the plan by asking, "What will you do now?" and "When and where will you call for fire?" This puts the junior leaders and FOs on the spot, but it ensures the plan is synchronized and sound. My company conducted this type of rehearsal before air assaulting into the Euphrates River Valley, and it was effective.

When an FSO believes a rehearsal will be omitted or the direct and indirect fire rehearsals will be conducted separately, he should immediately recommend to the commander that the two rehearsals be conducted simultaneously to avoid potential disaster.

Integrated Training

Integrated training between the fire support and maneuver elements is just as important as having a sound plan and conducting timely rehearsals. Solid habitual relationships and fire support team (FIST) and maneuver company integrated training yield tremendous results. The bottom line is that soldiers and leaders perform in combat as they train in peace.

A solid habitual relationship between the FIST and commander is the bedrock upon which integrated training is founded. The same FIST should be attached to the same maneuver commander every time. They'll develop mutual respect for and confidence in each other that's critical in combat. Once the FSO learns how the commander plans and reacts in tactical scenarios, he can begin to anticipate problems and develop solutions. Furthermore, this habitual relationship promotes the maneuver commander's understanding of what fire support can and cannot do for him.

Training together in garrison is an excellent means of establishing that relationship and accomplishing important training objectives for both fire supporters and maneuver soldiers. To develop integrated training events, the company commander should have his FSO at his weekly training meetings.

Officer and NCO professional development classes also are excellent garrison training events. For example, the FSO can describe to the commander and platoon leaders what fire support can do in various scenarios and how they can obtain this support. Topics can range from the bursting radius of different munitions to how to use illumination.

Call-for-fire procedures is another training topic. The fire support community would be surprised at how many maneuver company-grade officers don't know how to call for fire. There are many other opportunities for fire support and maneuver soldiers to conduct team training; the payoff is definitely worth the time and effort.

Integrated field training is crucial and should be conducted whenever possible. An observed fire training exercise, for example, benefits both the FIST and the maneuver elements. Infantry platoon and squad leaders get a chance to practice observed fire procedures, adjusting live artillery and (or) mortar fire onto targets in an impact area. Simultaneously, the battery and mortar crews can practice their gunnery skills.

Multiple integrated laser system (MILES) exercises, in which observer/controllers (O/Cs) assess casualties based on indirect fire missions, provide realistic integrated training, although they are resource intensive in terms of O/Cs. Training events of this type ensure both leaders and soldiers understand how to plan for indirect fire and what the effects of that fire will be. There's nothing quite like conducting an all-night dismounted infiltration, only to be assessed an indirect fire casualty just short of the objective. MILES exercises for indirect and direct fires are effective means of training for combat—the Combat Training Centers (CTCs) have been conducting them for years.

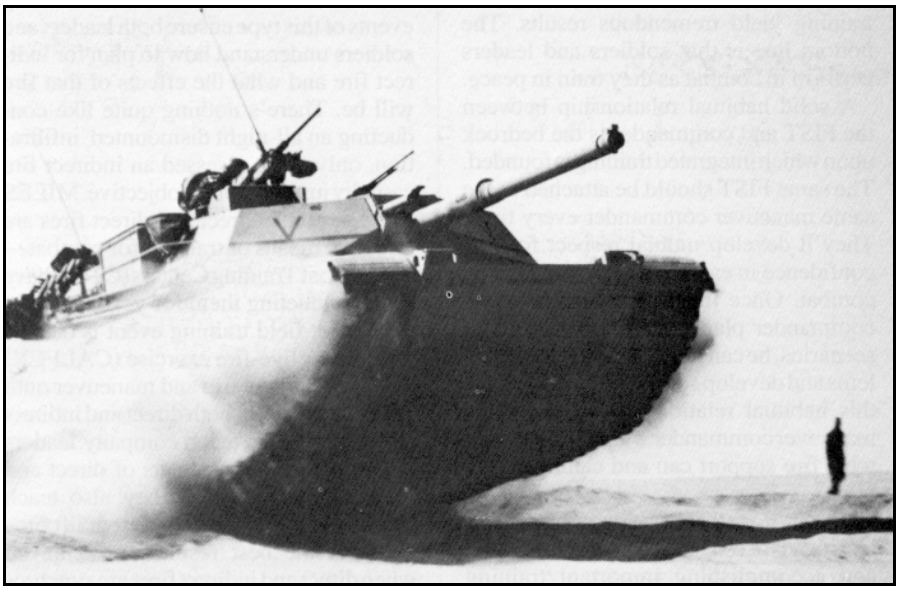
The best field training event is a combined arms live-fire exercise (CALFEX) in which soldiers fire and maneuver onto an objective using both direct and indirect fires. CALFEXs teach company leaders and FSOs what the effects of direct and indirect fires will be. They also teach soldiers how and when to shift or lift fires and that the best results are achieved when direct and indirect fires are synchronized.

CALFEXs familiarize soldiers with the sights, sounds, and smells of combat and approximate its stress—there's no substitute for this realism. The first time my soldiers and I were exposed to battlefield effects and stress was not in combat but during a CALFEX.

The successful ambush of that Iraqi platoon in the Euphrates River Valley was not by chance. Success depended on the synchronization of direct and indirect fires at the right place and time to kill the enemy. This concentrated firepower was the result of a detailed fire plan thoroughly rehearsed with the maneuver plan and months of integrated training.

Captain Boyce H. Evans, Infantry, commanded D Company, 2d Battalion, 187th Infantry, 101st Airborne Division (Air Assault) during Operation Desert Storm and, then, Headquarters Company, 3rd Battalion, 187th Infantry, also in the 101st Division, upon his return to Fort Campbell, Kentucky. Currently, he's an Officer Advanced Course Small Group Instructor in the Infantry School at Fort Benning, Georgia. His initial assignment was as a rifle company platoon leader and executive officer with the 194th Armored Brigade, Fort Knox, Kentucky.

The New FSO and the Armored Company Team:



A Strategy for Success

by Captain Robert Valdivia, AR

An assignment as a company team or troop fire support officer (FSO) will prove to be a challenging one. As the company FSO, you'll help plan, synchronize and execute significant combat power. You'll use your experience and training to coordinate and implement the fire support plan.

This article outlines a strategy for the new company FSO to achieve success, emphasizing training, troop leading procedures and integrating the fire support team (FIST) into armored company team operations.

Training

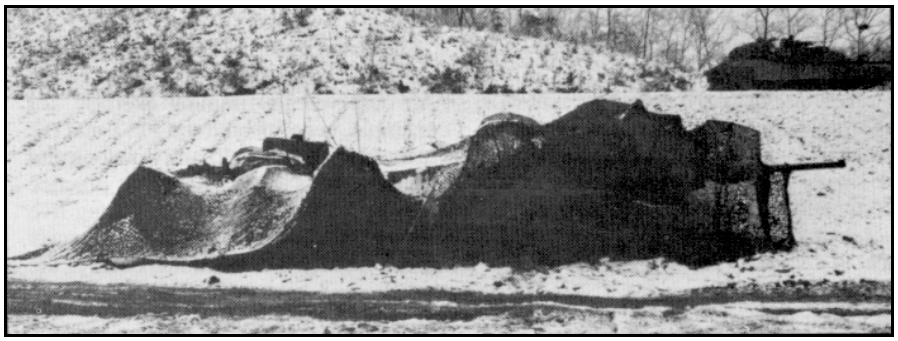
Your basic course and assignments in your parent battalion have established a solid foundation in the fundamentals of fire support planning and execution. Up to this point, much of your training has focused on the employment, capabilities and limitations of the FIST vehicle (FISTV) and its subsystems, call-for-fire procedures and fire planning for the maneuver company commander. Training conducted by your parent artillery battalion will continue to develop your expertise and sustain your level of readiness. But as a company FSO, you'll need to expand your training even further to develop an understanding of fundamental company team operations.

In addition to artillery field manuals (FMs), you must study combined arms operations manuals. *FM 71-1 Tank and Mechanized Infantry Company Team* is the best reference to study. This FM clearly outlines the company team organization and addresses operations, formations and doctrine. Another outstanding reference is *FM 71-123 Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company/Team*. This FM outlines planning, preparing and executing brigade, battalion and company operations in terms of the seven battlefield operating systems. If you have questions, ask your company team commander; he plays a vital role in your development. Once you've studied the FMs, you can begin to discuss and train the specifics of your job and clarify your role as the Field Artillery and fire support subject matter expert (SME) in the company team.

You, the task force FSO and commander share responsibility for training the company team. Therefore, you should plan to participate in company sand table exercises, operations order drills and simulation exercises conducted by the company team commander.

Observer live-fire exercises are great opportunities to integrate the company's key leaders. These events exercise combined arms operations and identify training shortcomings. They also help you learn standing operating procedures (SOPs), aspects of maneuver in the company team and your role as the company FSO. You should take every opportunity to train others on the capabilities and limitations of Field Artillery and fire support.

As the fire support and artillery SME, you'll develop and schedule training focused on the fundamentals of calling for fire, implementing the fire support plan and executing the company team fire support execution matrix (FSEM)—take advantage of all training aids available. The training set fire observation (TSFO) is an excellent device to train tank crewman



A camouflaged company command post near Wonju, South Korea, during Team Spirit 91.

to call for fire. Another outstanding training simulator is the combined arms training center (CATC), a series of computer-driven simulators linked together replicating M1 tanks and M2 infantry fighting vehicles on an interactive battlefield. CATC can simulate artillery, attack helicopters and close air support (CAS). Though not available at all Army posts, CATC is a valuable device to train fire support planning and execution if you have access to one.

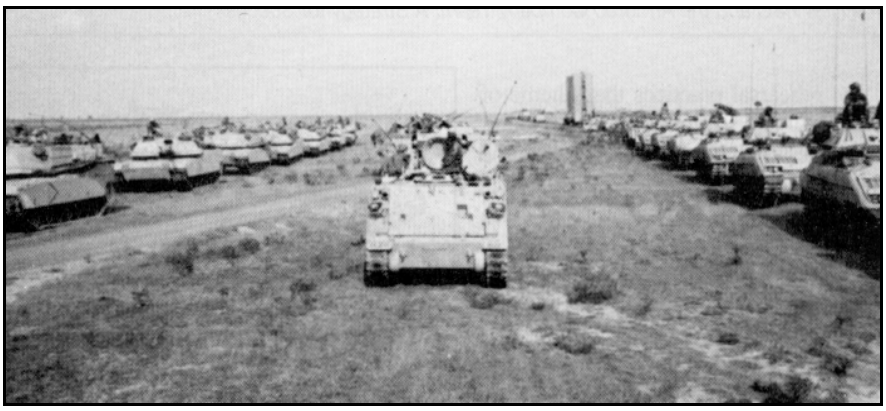
You should plan to participate in your company team commander's training meetings to identify training opportunities and coordinate for and schedule training. Complementary training is key to establishing yourself and your FIST in the company team. When it comes to training, you're only limited by your imagination and initiative.

Troop Leading Procedures

Once you've immersed yourself in training and planning company team operations, you can begin to focus on developing troop leading procedures to complement the orders process and integrate the FIST. Troop leading procedures begin with the receipt of the warning order; fire planning also begins at that time. The warning order should trigger preparation for combat checks and inspection of your FISTV and personnel. This is the time to prepare to fully integrate yourself in the orders process. More in-depth fire planning begins after the task force order briefing, which you'll attend with the company commander.

After receiving the task force order, you can begin preparing products to execute the fire support plan at the company level: FSEM, target list and fire support overlay. The fires paragraph in the task force order is the foundation upon which you'll build your fire support products. The fire support paragraph addresses the scheme and purpose of fire support, priorities of fire, allocation of resources and restrictions pertaining to special munitions.

First, you must discuss with the company commander the scheme of maneuver, guidance from higher headquarters and the purpose of fires, as they apply to the mission being planned. Once you understand the scheme of maneuver and purpose of fires, you and the commander establish who has priority of fires (POF) in the company. It's imperative you discuss and understand changes in priorities and when and why they shift. Priority usually is assigned to the lead platoon in the offense or the platoon overwatching the target area in the defense. You must include all platoons and phases of the operation when assigning priorities and developing the fire support plan.



A FISTV moving out on a tactical road march in Turkey during Display Determination.

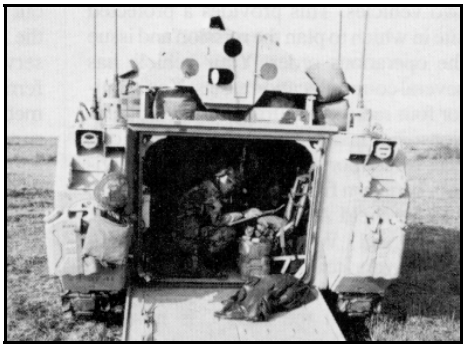
The next step is to allocate assets and assign responsibilities to execute targets, observe fires or serve as a back-up in executing targets—pay particular attention to the allocation of mortars, priority targets and final protective fires (FPFs). You need to plan the use of mortars aggressively. This under-used asset provides your task force and company team the most responsive means of indirect fires. You and your commander also must understand and consider special restrictions on munitions and address them in the operations order—an example: the impact of dud-producing munitions on dismounted infantry objectives.

The FSEM is an invaluable tool to convey the fire support plan in table form. The phases of the matrix should mirror the phases of the scheme of maneuver. This ensures synchronization of fire planning and graphically provides triggers for executing fires, POF and allocations of fires in the company team. The matrix also can include the commander's guidance for fire support; fire support command and control (C^2) requirements; ammunition status; and coordinating instructions. The instructions include fire support coordinating measures (FSCMs) and the call signs and radio frequencies of mortar and fire direction nets.

There are several effective versions of FSEMs. No matter which version you use, all leaders must understand and rehearse it. Matrices are easy to develop and tailor to meet the requirements of your unit and mission. For quick dissemination and duplication of the matrix, you can prepare packets containing five copies of the matrix with carbon paper between each sheet. This is a technique appreciated by your commander and platoon leaders.

The target list and the fire support overlay are additional products your FIST prepares. You and your team should develop SOPs for preparing overlays and target lists. Pre-cutting acetate and preparing target list work sheets are part of your pre-combat checks. It's best to keep a basic load of your documents on hand to help plan for contingencies and hasty missions.

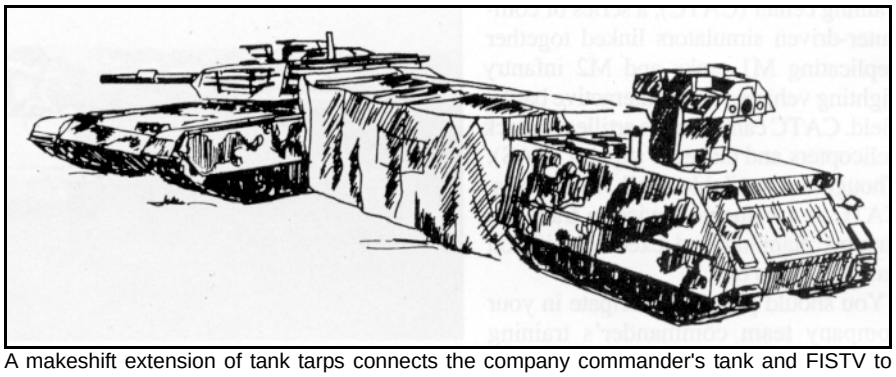
Issuing the operations order and rehearsing the plan are the next steps in your troop leading process. You and your company team commander need to develop a technique to issue the fires portion of the operations order—don't hesitate to mimic good techniques employed by the task force in issuing its operations order. A sand table or a sketch depicting the scheme of maneuver and fire support plan is one good technique to demonstrate the integration of Field Artillery and the scheme of maneuver to the platoon leaders.



A company FSO conducting pre-combat checks during the joint training exercise Display Determination.

The rehearsal practices the scheme of maneuver and integrates the fire support plan, the last steps before executing the mission. Here the FSEM demonstrates its utility and can be refined. All key company team leaders should be involved in the rehearsal, ensuring they understand their roles and responsibilities as relevant to the plan.

Types of rehearsals range from full-up rehearsals involving mounted maneuver on terrain similar to that found in the area of operations (AO), to walk-through rehearsals, to simple FM voice rehearsals over the company net. The technique your commander decides to use generally will be based on the time available. In addition to the company rehearsal, you'll also attend the task force rehearsal and conduct a digital and voice rehearsal with your parent artillery battalion.



A makeshift extension of tank tarps connects the company commander's tank and FISTV to create a TOC.

Integration of the FIST

Successfully integrating the FIST into company operations is essential to its accomplishing the mission and requires the combined efforts of the company team commander, FSO and FIST. To achieve that integration, your team completes a myriad of tasks, including command post (CP) operations, maneuver, resupply operations, pre-combat checks and inspections and those tasks in established SOPs.

CP operations are vital to the troop leading process. Establishing an effective CP with the commander enhances company team command, control and communications (C^3). One effective technique is to create a company tactical operations center (TOC) using the company team commander's tank and your FISTV. A makeshift TOC extension fabricated with tank tarps can connect the two vehicles. This provides a protected site in which to plan the mission and issue the operations order. Your vehicle has several communication assets. You monitor four radio nets during combat operations: company command net (voice), task force mortar net FM (voice or digital), battalion fire support net FM (voice) and the Field Artillery fire direction net FM (digital). When in the TOC configuration, your team also can monitor the task force net as part of CP operations.

Maneuver of the FISTV is mission-dependent. There's a tendency for the FISTV to follow the company team commander's vehicle. This is an option; however, it may limit your ability to effectively observe the battlefield and control indirect fires. When maneuvering with the company team, it's critical to position yourself where you can best observe the target area to execute fire missions—without masking the company team's direct fire. Your location and the position of the FISTV should be war-gamed and rehearsed to maximize your effectiveness and prevent fratricide and unnecessarily exposing your vehicle to enemy fire.

In the defense, you should position your vehicle so you can observe the entire engagement area to execute planned targets. When engineer assets are available, your FISTV should have priority for a survivability position (dug-in).

Resupply of the company team occurs daily, using the service station (supply point) or tailgate (unit distribution) methods. Using the service station method, each vehicle moves back to a central rearm and refuel point under the direction of the company first sergeant (1SG). At this location, the logistics package is arrayed to allow vehicles to drive up and quickly resupply. In the tailgate method, combat vehicles remain in place or back out of their positions a short distance so the resupply vehicle isn't exposed. The service station method is generally preferred by most units. Regardless of the method your company team uses for resupply, you must coordinate your supply and maintenance needs with the company 1SG or executive officer.

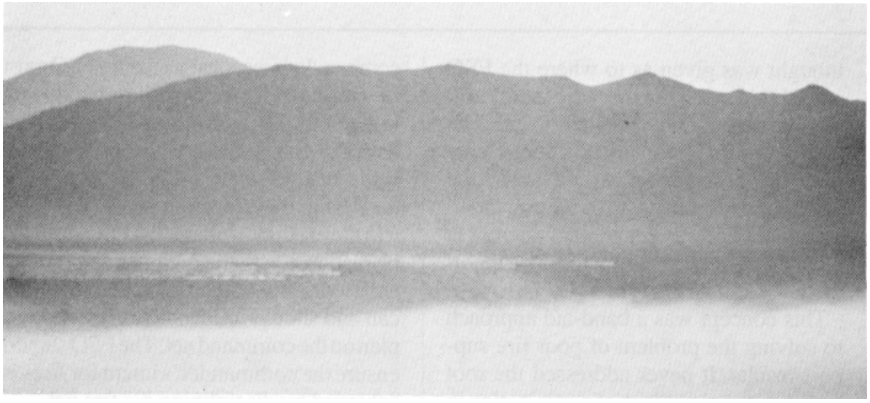
Learning and executing the SOPs of your unit is a *must*. In your first meeting with your team commander, you should request a copy of the unit's SOP. You and your FIST must become knowledgeable about radio procedures, reports, brevity codes, ready condition (REDCON) status levels, battle drills and pre-combat checks and inspections. A laminated or protected copy of the SOP should be in your FISTV for quick reference and study. You'll find adhering to the SOP helps you manage time and understand company operations.

Most SOPs contain pre-combat checklists that require you to check and inventory your vehicle, radios, equipment and kits and conduct preventive maintenance checks and services (PMCS). Strictly adhering to these checklists prevents mistakes and significantly contributes to mission effectiveness.

The impressive combat power that fire support assets can deliver to the battlefield depends on the execution of the fire plan at all levels. Your role in the armored company team is vital to delivering that combat power.

Successfully integrating yourself and the FIST into the company team—as part of the team—ensures the combat power the armored company team can't live without.

Captain (P) Robert Valdivia, Armor, served as Commander of A Company, 4th Battalion, 64th Armor in the 24th Infantry Division (Mechanized) at Fort Stewart, Georgia, and then A Company, 2d Battalion, 72d Armor in the 2d Infantry Division, Korea. He's currently assigned to the Armor School, Fort Knox, Kentucky, where he's a Small Group Instructor for the Officer Advanced Course and Doctrine Writer for the M1A2 Project. Captain Valdivia has served in several armored company positions and participated in five rotations at the National Training Center, Fort Irwin, California, including one as a company team commander. He also participated in the NATO exercise Display Determination in Turkey.



Fire Support—
Who's Responsible?

by Colonel Donald R. Lightman, IN

The sun is beginning its ascent in the morning sky. The lead elements of the motorized rifle regiment—the opposing forces, or OPFOR—are moving on the avenue of approach that the S2 predicted. They're now entering our obstacles, and their movement rate has slowed considerably. The lead vehicles are searching for a way through the obstacles, and at least one motorized rifle company (MRC) has stopped in the open. A second MRC has closed in on the lead MRC; the terrain is starting to look like a *parking lot.*

Ten minutes pass, and the lead vehicles have found a bypass to our obstacles and are going around and away from our engagement area. No artillery rounds have fallen during this time. The follow-on MRCs are also moving in the same direction. Smoke from their on-board generators is beginning to obscure the battlefield.

The Blue Force commander orders his platoons to reposition to engage the enemy. As the vehicles come out of their fighting positions, the OPFOR engages them with direct and indirect fires. The Blue Forces don't respond with a cohesive defense with massed fires, both direct and indirect. Soon Blue Force losses permit the OPFOR to get back on the high-speed avenue and exit the sector.

This scenario happens all too frequently at our Combat Training Centers (CTCs)—no one is happy with the results of fire support. The maneuver commander's intent for fire support usually isn't followed, and enemy losses to fire support are unacceptably low.

How do we fix the problem? First, we must define it. The problem lies in not accepting the fact that fire support is too important to leave to Field Artillerymen. That is to say, the problem lies in the maneuver commander's not accepting responsibility for fire support.

FM 6-20 Fire Support in the Airland Battle, states that, "Responsibility for command, control and coordination of fire support begins with the force commander. He alone is responsible for what his command does in determining the outcome of battle. The effective control of fire support is as critical as the control of maneuver forces."

There's no doubt who's responsible for fire support—the maneuver commander; what's unclear is how and what he does to accept that responsibility. All too frequently, fire support officers (FSOs) at the battalion and company levels take on that responsibility, particularly in the planning and execution phases.

The Scenario Behind the Scenes. Let's use the scenario at the beginning of this article to demonstrate what typically happens and how the responsibility for fire support ends up with the FSO rather than the maneuver commander.

The mission of the task force was to defend. The commander selected the terrain on which he wanted to destroy the enemy and then allocated the surrounding terrain to the company teams. The selection of the engagement area was based on a good intelligence preparation of the battlefield (IPB). Once the company team assignments had been made, the task force commander issued his guidance to the staff to prepare the operations order. Each staff member reviewed the brigade order to ensure the commander's intent and any special instructions were incorporated into the task force order.

The task force commander told the FSO to ensure the guidance concerning the brigade commander's intent for fire support, target engagement criteria and high-payoff targets were included in the fire support plan. He then departed the tactical operations center (TOC) to go to a brigade rehearsal.

The FSO coordinated with the staff in an effort to synchronize his plan. He made the required adjustments to the brigade fire support plan and began publishing his order and target work sheets. He then participated in the Field Artillery rehearsal.

The task force commander returned in time to read through the operations orders and participate in the orders briefing and rehearsal. During the orders brief, the FSO briefed the fire support plan and, during the rehearsal, talked through the plan. The company/team FSOs may have attended the briefing or participated in the rehearsal.

Four Mistakes. This sounds good so far—so what's the problem? The problem is the maneuver commander isn't involved enough in planning, preparing, rehearsing and executing fire support—in short, all aspects of his fire support.

First, the task force commander didn't spend any appreciable time with his FSO going over the plan. Seldom do you see a task force commander question the targeting location or rationale. With most division artillery standing operating procedures (SOPs) limiting a task force to 15 to 20 pre-planned targets per phase, it's reasonable to expect a task force commander to spend 15 to 20 minutes analyzing his plan with the FSO.

"There's no doubt who's responsible for fire support—the maneuver commander; what's unclear is how and what he does to accept that responsibility."

At the brigade level, the commander influences how his resources will be allocated during battle via his *intent*. In the area of fire support, the fire support coordinator (FSCOORD) asks the hard questions about timing, effects, etc., to develop his own plans for coverage, survivability moves, etc. This involves the brigade commander in the planning process.

We must teach our junior FSOs to ask the hard questions of the task force commanders, thereby involving them in the process and making them take responsibility.

Second, when the task force FSO briefs, rarely do the team commanders listen as intently as when the task force commander or S3 talks. The maneuver commanders assume their FSOs are already briefed and, thus by default, fail to accept responsibility for fire support.

The orders brief shouldn't be a rehash of what's written, but a discussion of how and why the intent for fires supports the maneuver plan. The company team commanders must be alerted to their critical requirements to carry out the task force commander's intent for fire support. An easy way to do this is to add target and observation responsibilities for fire support to the maneuver execution matrix. This goes along way toward synchronizing the plan.

Third, during the maneuver rehearsal, there's virtually no talk about how the fire support plan will be implemented. Targets are discussed, but not in the detail the maneuver plan is. Rarely is the commander's intent for fire support integrated into the rehearsal. Time after time, important calls for fire that meet the commander's intent are fired late or not at all because calls for fire that don't meet the commander's intent or target engagement criteria are clogging the fire support nets. Again, maneuver commanders have sidestepped responsibility for fire support.

The company FSO must ask the company commander the hard questions concerning the commander's responsibility for targets assigned to him: who observes, who calls trigger points, what the redundant systems are, etc. The FSO must make the commander part of the planning, preparation and execution phases.

One last example of the failure of the maneuver community to accept responsibility for fire support: recently, senior commanders in US Army Europe (USAREUR) tried to implement a policy that required the FSO to ride in the vehicle with the maneuver commander. Much thought was given as to where the FSO would ride and what the radio configuration and crew duties needed to be. The theory was that riding in the same vehicle with the commander would make the FSO more responsive to the commander. In actuality, it was yet another attempt at pushing the responsibility for fire support toward Field Artillerymen.

This concept was a band-aid approach to solving the problem of poor fire support results. It never addressed the root cause: maneuver's lack of participation in the planning or preparation phases of the fire support plan.

Maneuver on the Mark. Getting the maneuver community to accept responsibility for fire support won't be easy because it means getting commanders to spend a precious resource—time. It also will mean the FSO has to change the way he operates to spend more quality time with the maneuver commander.

In the planning phase, the FSO must spend time with the commander when he's developing his maneuver plan. The FSO must be on the ground with the commander, integrating fire support into the plan. He must identify observer requirements that can be articulated into a functional observation plan and then integrated into the task force rehearsal.

It's during this phase that the FSO can influence the maneuver commander's survivability plan to get a higher priority for his observers. Too many times, the priority for survivability is to tanks, Bradley fighting vehicles, M113s, etc. The fire support team vehicle (FISTV) rarely is included; quite often, observers don't get engineer support to dig in their positions and, therefore, are among the first casualties of battle.

In the preparation phase, the FSO must concentrate on getting the observers in position, establishing communications links, rehearsing the plan, discussing actions during limited visibility and ensuring all thoroughly understand the commander's intent for fire support. If you don't think understanding the commanders intent is a problem, then ask any fire direction officer (FDO) about the percentage of calls for fire that support the intent or listen to any fire support net. The majority of calls for fire don't meet the commander's intent.

Refining the targeting plan should be accomplished by the fire direction center (FDC) at the TOC via the FSO's instructions from the field. During the task force commander's reconnaissance, the FSO must be with the commander on the ground—not in the FDC. The more he understands about how the task force commander sees the battle being fought, the more responsive he'll be in the execution phase.

In the execution phase, the FSO needs to be responsive to the commander, but not tethered to him. The task force commander can and should influence his fire support plan on the command net. The FSO should ensure the commander's intent for fires is achieved by disciplining his fire net.

Once the maneuver commander is comfortable with the planning and preparation phases, his need for the FSO to be at his side will decrease, especially at the company team level. The task force commander can influence fire support much more quickly by using the brigade command net instead of the fire nets.

Accepting responsibility for fire support means devoting more time to it. Maneuver commanders must be involved in the targeting plan, resourcing the observation plan and assisting in the execution by going through command channels to achieve the commander's intent. Fire support officers must take every opportunity to involve the commander and make him accept responsibility for what he's tasked by doctrine to do.

Only when the maneuver community accepts responsibility for fire support will the results, as seen at our CTCs, reflect the real capabilities of our fire support systems. Maneuver commanders' expectations of what fire support can do for them must be matched by their involvement in the fire support system. As our doctrine states, "The effective control of fire support is as critical as the control of maneuver forces."

Colonel Donald R. Lightman, Infantry, was the Senior Task Force Observer/Controller and Deputy Commander for the Operations Group at the Combat Maneuver Training Center (CMTC), Hohenfels, Germany. He has extensive experience conducting after-action reviews (AARs) at the CMTC, including fire support AARs. Currently, he's serving as the Inspector General of the Georgia Army National Guard in Atlanta. Colonel Lightman commanded the 2d Battalion, 34th Infantry, 24th Infantry Division (Mechanized) at Fort Stewart, Georgia. He's a graduate of the Army War College, Carlisle Barracks, Pennsylvania, and holds a master's degree from Central Michigan University.

Fighting the Close Fight with Fires—*An Operational Analysis of the Heavy Brigade Fire Support Paradigm*

by Lieutenant Colonel Henry W. Stratman

Synchronized combat power, the mark of success in combat and at the Combat Training Centers (CTCs), continues to elude many competent combined arms commanders. Despite the development of doctrinally sound tactics, techniques and procedures (TTP) for integrating the seven battlefield operating systems (BOS) and extensive training regimens, the coveted goal of synchronized fire and maneuver is seldom demonstrated on the demanding CTC battlefields.

The crux of this multi-faceted, combined arms dilemma centers around the requirement to integrate and synchronize all available weapons systems, achieving massed combat power (direct and indirect fires) at the right time on the highest payoff targets. Of all the high-payoff target sets, the decisive attack of maneuvering enemy armored forces throughout the depth of the battlefield presents the combined arms commander the most demanding fire and maneuver synchronization challenge.

Nowhere is this challenge more pronounced than in the fire support mission area, which brings the lion's share of combat power to the fight and, when properly synchronized with maneuver, ensures decisive victory. It's my contention that the brigade fire support paradigm hinders close fire support synchronization because it doesn't provide reconnaissance forces enough highly capable observers or commanders a robust enough fire control structure to employ fire support assets confidently and aggressively.

These structural deficiencies are the primary cause for the disconnect between professed fire support capabilities (doctrine), and reality (performance at the CTCs or during combat). Training fixes alone can't fully compensate for inadequate resourcing of fire support execution means. Many combat observation lasing teams (COLTs) integrated with scouts and linked directly to highly robust fire support elements (FSEs) are required to execute (trigger) the commander's intent for fire support.

Until the "eyes" and control shortfalls are corrected, the overarching goal of the fighting with fires initiative "....to enable combined arms commanders to fight fire support systems" with the same skill and vigor with which they employ direct fire systems (Major General Fred F. Marty, "Fighting with Fires Initiative," June 1992) will seldom be achieved by task force (TF) and brigade commanders.

Synchronization—A Shared Responsibility

FM 100-5 Operations (June 1993) defines synchronization as "the ability to focus resources and activities in time and space to produce maximum relative combat power at the decisive point." Commanders use variants of the decide-detect-deliver methodology to integrate the seven BOS to achieve synergism and focused combat power. Doctrinally, it's the combined arms commander's responsibility to think operating systems and direct maneuver and fires with a total force perspective to achieve synchronization. Commanders must not only understand the capabilities and limitations of the BOS, but also how to maximize each system's contribution, based on mission, enemy, terrain, troops and time available (METT-T).

Although the combined arms commander is responsible for synchronizing his combat power, all combat and combat support arms play crucial supportive roles. Each branch must ensure its doctrine, organization, training and materiel support the combined arms commander's diverse warfighting requirements. For example, based on Operation Desert Storm and CTC fire support after-action reviews (AARs), the Field Artillery School at Fort Sill, Oklahoma, published a white paper in June 1992, titled "Clearance of Indirect Fires." The white paper acknowledges that "existing doctrine, tactics, techniques and procedures (DTTP) for clearing indirect fires were insufficient to meet the needs of AirLand Battle operations."

Many fire support coordinators (FSCOORDs) contend that organizational and materiel shortcomings of the brigade fire support structure also limit operational effectiveness. During Desert Storm, positive control of all indirect fires by

brigade commanders or FSCOORDs was the norm, primarily due to a lack of confidence in the clearance-of-fire system demonstrated during training exercises at the CTCs. Few FSCOORDs were surprised that the "silence is consent" fire control method was discarded and more stringent and time-consuming measures were implemented to decrease the risk of fratricide.

The Clearance of Indirect Fires white paper does an excellent job of defining the complexities of the problem, but it falls short of providing the means (the missing piece of the synchronization puzzle) to responsively and safely focus firepower. The white paper fails to recognize the dynamic nature of a fluid battlefield with an uncooperative enemy and relies too much on planning and coordination techniques to compensate for the fire support execution deficiencies caused by inadequately resourcing the gunnery team's eyes. Changes in organization and functions (the ways and means) of the heavy brigade's fire support system are required to bridge the gap between capabilities and consistent, reliable performance.

The Fire Support Synchronization Issue

"Over...Short, Left...Right, Early...Late" are spottings that too frequently characterize fire support performance at the CTCs. According to Major General William G. Carter III, former Commander of the National Training Center (NTC), Fort Irwin, California, "The issue at the NTC is not Field Artillery, it's fire support—the full integration of maneuver with fires. The Field Artillery is exceptionally good at...sending rounds down range and making them hit the right point on the ground consistent with the firing data provided to the guns. The piece we don't do well is put the rounds on a specific target at exactly the right time and event in the battle. That's fire support, not Field Artillery" (Interview, "Synchronizing Combat Power at the NTC," October 1992).

This fire control issue continues to exist even though maneuver and fire supporters have made extensive efforts to solve what is basically a timing problem—the attack of a moving enemy force at long range with indirect fires.

In 1989, the Close Support Study Group IV strongly recommended we field and employ a robust fire support observation capability (termed COLTs) with scout platoons to execute top-down fire planning doctrine. Unfortunately, due primarily to force structure and materiel constraints, this critical link of the fire and maneuver synchronization chain was resourced to a token level of one to three COLTs per heavy brigade—achieving a commensurate token impact on effectiveness.

In retrospect, the artillery community's fixation with the Copperhead munition's hard, point-target kill capability and laser technology in general obscured the more viable operational capability of COLTs: *combat observation*. The COLT's ability to overwatch a target area of interest (TAI) and trigger accurate, massed fire strikes is perhaps more in keeping with what the artillery does best—deliver timely and accurate, massed area fires. It's time to redefine the COLT's organizational and operational concept and fully field this most cost-effective synchronization capability in a high-mobility multipurpose wheeled vehicle (HMMWV).

Fire Support Doctrine/Organization Disconnect

Although doctrine calls for attacking moving forces in depth with fires (close air support, artillery and mortars), the observer assets (COLTs) required to execute the timing function aren't available at the TF/brigade levels for commitment to TAIs without shifting fire support team (FIST) assets from the companies or relying on maneuver forces. Not only are there too few observers, but also those assets are focused on the least effective part of the battlefield for indirect fires—the company level. This doctrine-organization disconnect precludes effective integration of observation and reconnaissance plans, limits operational flexibility and provides insufficient command and control robustness for clearing and executing fires in depth.

With the exception of one COLT, all fire support eyes (forward observers, or FOs, and FISTs) are organic to and normally employed at the company level where direct fire dominates the engagements. Indirect fires are most effective when brought to bear throughout the depth of the brigade's area of influence. At TF and brigade levels, resourcing observation plans with trained eyes (triggers and backups) becomes a rob-Peter-to-pay-Paul exercise in futility. What few observer assets are available at the company level (one FIST) are woefully inadequate to also fulfill the TF/brigade requirements. Without organic TF/brigade COLTs to trigger fires, reconnaissance or maneuver forces, by default, perform the fire support functions as an additional duty.

Reconnaissance and Targeting: Complementary Not Competing Roles

Scouts are an integral part of the synchronization equation, but the focus of their organizational structure, training and employment limits their utility as the eyes of choice to trigger fires. Therein lies the crux of the fire support execution problem. Because of the inadequate number of fire supporters to trigger fires, commanders must rely on already over-committed scouts to paint the intelligence picture in sufficient detail to accurately cue the brigade's indirect fires.

Scouts are excellent intelligence collectors and reporters of battlefield activities but poor FOs. Scouts, by design, gather information and then report that information. To also expect scouts to excel at executing fires, a task that frequently embodies conflicting tactical requirements, is unrealistic. Fire support experts must be integrated and employed in concert with reconnaissance forces to fully synchronize fire and maneuver.

A fully equipped COLT team should accompany every scout section to perform the fire support targeting and clearance-of-fire functions (Figure 1). Recognition of the capabilities of these two combatant forces and the complementary roles they play is essential for resolving fire and maneuver synchronization problems.

Even the technique of collocating FO parties (available in mechanized infantry battalions only) with scout sections has had very limited success. Too often, the scout's principal reconnaissance mission to find the enemy, his barriers and the best routes to the objective or to observe a given named area of interest (NAI) takes priority over the indirect fire requirements. Consequently, observers are not positioned to perform their targeting duties because they must rely on the scout section for communications, mobility and survivability.

All too often, the success or failure of fire support is contingent upon how well

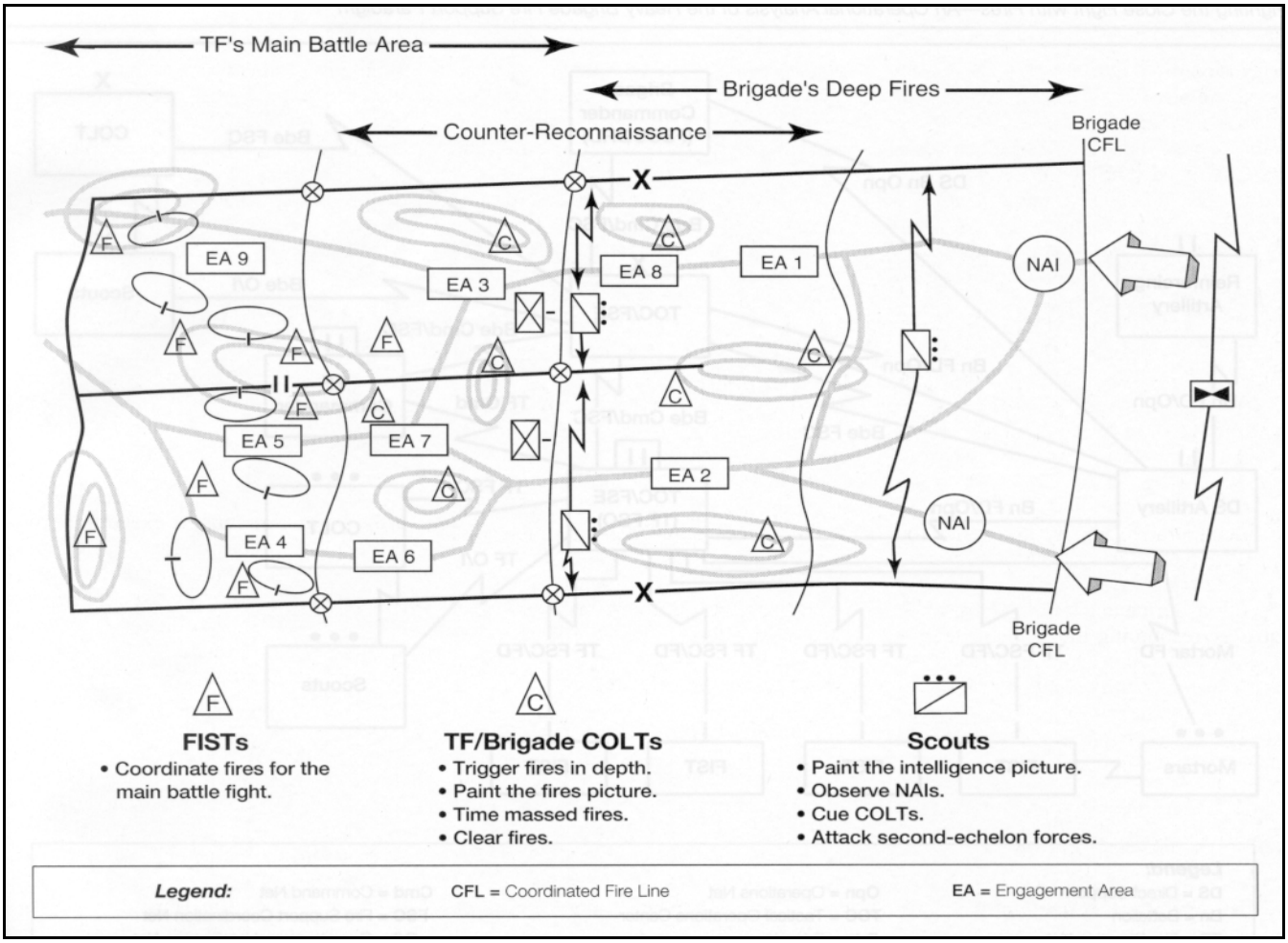


Figure 1: FIST-COLT-Scout Integration into the Brigade Area of Operations. Fire support experts must be integrated and employed with reconnaissance forces to fully realize synchronization of fire and maneuver. A fully equipped COLT should accompany every scout section to perform the fire support targeting and clearance-of-fires functions.

maneuver forces perform fire support functions as an additional duty. The current fire support structure simply doesn't provide sufficient numbers of trained eyes to execute the commander's event-driven fire plans. Until the artillery aligns capabilities with doctrine by fully resourcing the eyes requirement with robust COLTs, synchronization and effective fighting with fires at the TF/brigade levels will remain elusive.

The Fire Control Challenge

COLTs, when employed in concert with scouts, provide the TF and brigade targeting triads (S3, S2 and fire support officer, or FSO) the capability not only to provide top-down fire planning guidance, but also the means to integrate and control execution of the commander's reconnaissance and targeting efforts. Jointly, the S2 and FSO work the critical communications links between the sources of acquisition (scouts or COLTs), maneuver commanders and the artillery unit that will fire the mission. Unlike counterfire missions that rely on Firefinder radars for target acquisitions, commanders prosecuting the close fight primarily rely on visual acquisition sources (scouts or COLTs).

Because the TF FSO is clearing and prioritizing fires for four FISTs, three COLTs and scouts and coordinating with the TF commander, brigade FSO and FSCOORD, he must operate on and monitor multiple communications nets (voice and digital) to control fires (see Figure 2 on Page 40) while remaining current on tactical operations. Unfortunately, even the best FSOs can't reliably perform these demanding fire control and clearance duties while traveling with the TF commander. Communications limitations alone are prohibitive.

Pending fielding of an armored combat vehicle configured and manned for TF/brigade fire control operations, the FSO and TF commander must function via FM communications instead of physical presence, just as company commanders and primary staff officers do. FSOs must be positioned where they have the communications links required to control fires. They (and S2s) must learn to rely on COLTs and scouts to be their eyes and collectively perform their battle management functions from the tactical operations center (TOC) or tactical command post (TAC) where they have the means (communications and staff) to coordinate the commander's attack decisions.

The integrated employment of scouts and COLTs provides FSOs and commanders constantly updated fire and maneuver

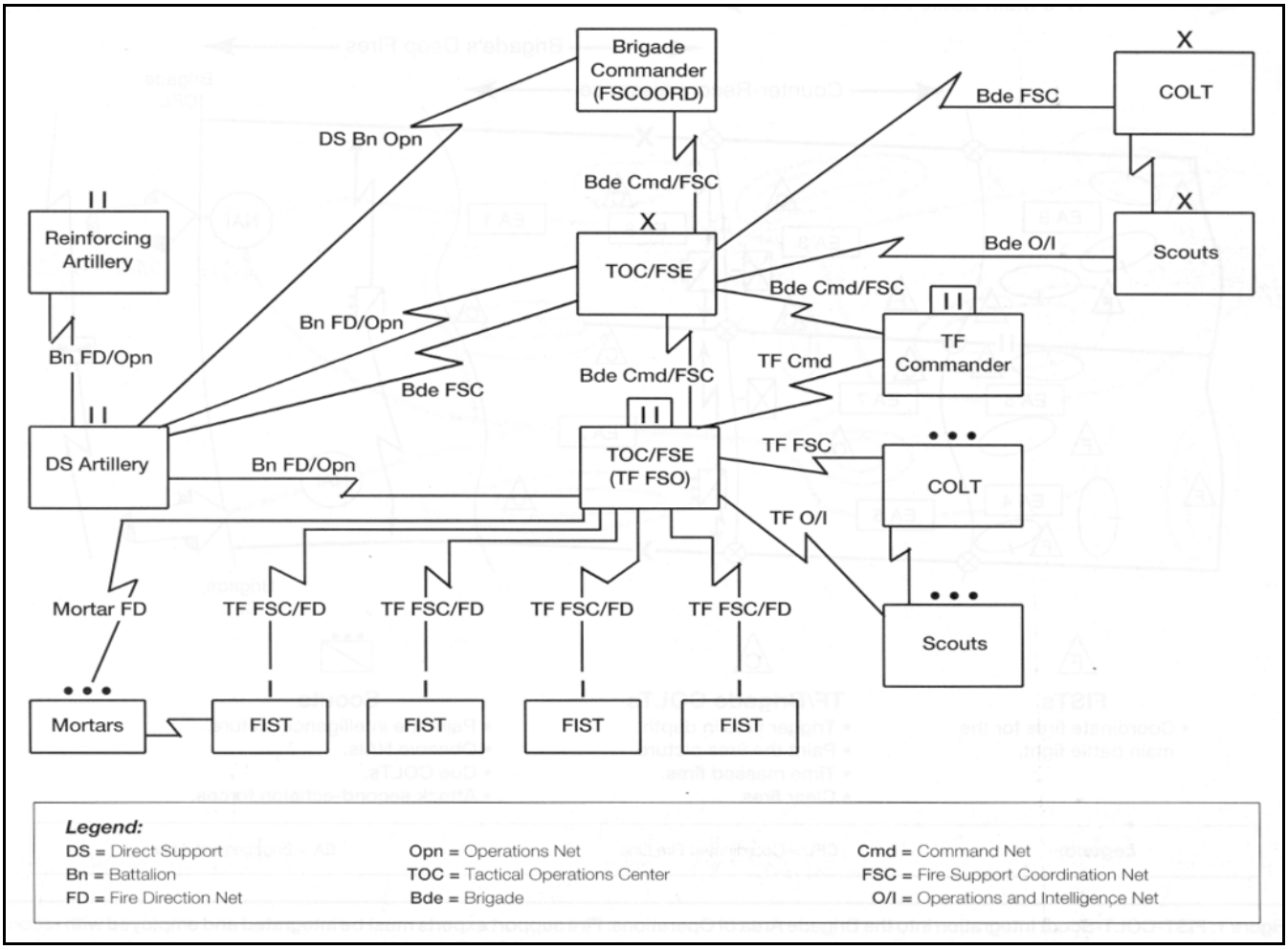


Figure 2: TF FSO's Multiple Communications Nets to Control Fires. The TF FSO must not only communicate with the FISTs, COLTs and scouts; the DS artillery battalion; TF commander; brigade FSO; and the FSCOORD, he also must remain current on tactical operations. This figure shows the communications requirements in a decentralized command and control architecture where each TF is augmented with three COLT sections.

snapshots as the battle unfolds. In a target-rich environment with limited artillery assets (one direct support and one reinforcing battalion), the FSO's and FSCOORD's challenges are to determine which targets to engage and when to shift priority of fires to best achieve the commander's intent for fires. COLTs integrated with the reconnaissance effort provide the commander a real-time capability to see and accurately target mobile enemy forces in depth.

The brigade commander fights with fires by massing and shifting priority of fire support to achieve the decisive impact on the outcome of the brigade's fight. The FSCOORD is collocated with the brigade commander not only to provide advice, but also to ensure the artillery is responsive—on time and on the right targets.

COLTs/Scouts Proof-of-Principle Field Test

The 1st Armored Division, Germany, fielded HMMWV-based COLTs division-wide with organic FO assets and validated the requirement for integrating observation and reconnaissance efforts (see my article "Field HMMWV-Based COLTs NOW!" April 1992). The highly effective TTP for COLT-scout employment developed during three very demanding Combat Maneuver Training Center (CMTC) rotations at Hohenfels, Germany, demonstrating that fighting with fires is doable.

COLTs added a new command and fire control dimension to TF and brigade fire support operations. The 1st Armored Divison's experience indicates that HMMWV COLTs are very effective when employed as an integral part of brigade reconnaissance and surveillance (R&S) plans under centralized brigade control (Figure 3). The 1st Armored Division Artillery's centralized COLT platoon consists of a platoon headquarters and four sections of three COLT teams, assigned to and controlled by the brigade FSE.

The COLT targeting officer/platoon leader functions are much like a scout platoon leader and an FSO in terms of operational and logistical responsibilities. The centralized structure provides the flexibility to weight the main effort with eyes (i.e., augment TF efforts) and facilitates the brigade commander's future operations. Figure 4 illustrates the command, control and communications architecture used successfully by the 1st Armored

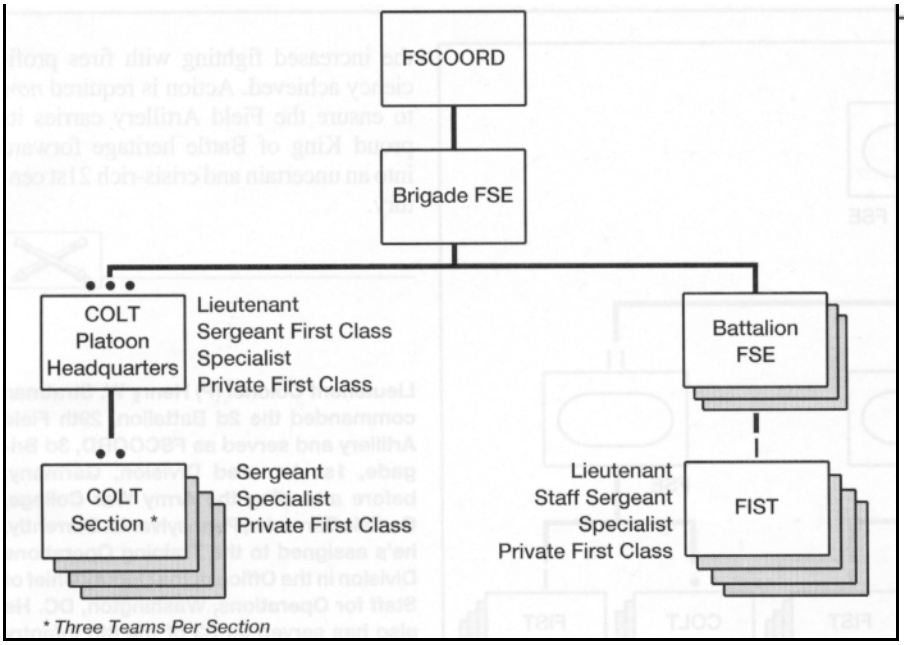


Figure 3: Centralized Brigade HMMWV-Based COLTs. In this fire support organization, the brigade FSE controls all COLTs and allocates them to the TFs on an as-needed basis.

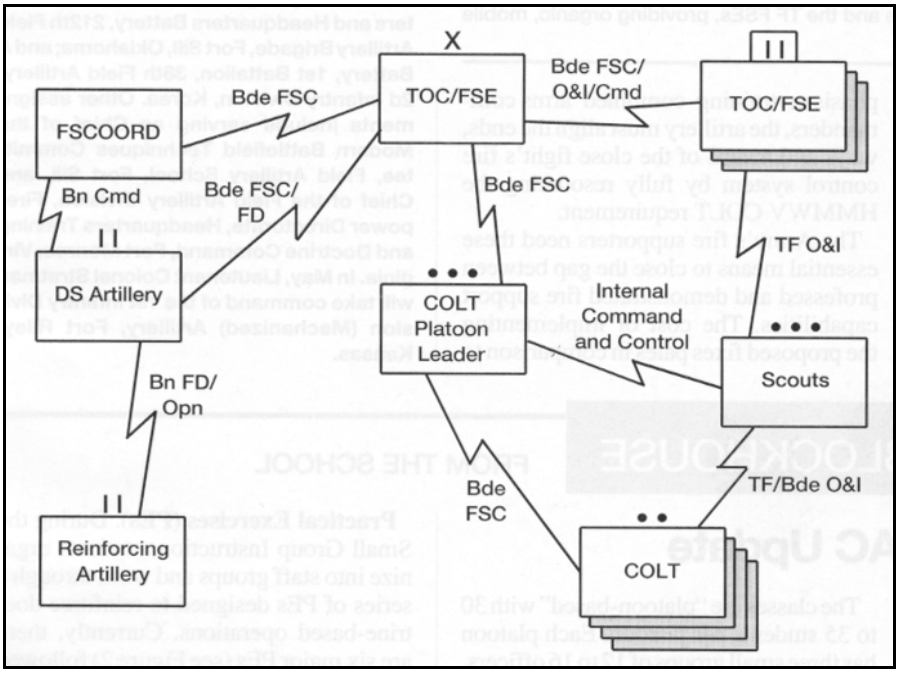


Figure 4: 1st Armored Division's Centralized Command, Control and Communications Architecture for Fire Support Assets. This architecture provides the flexibility to weight the main effort with eyes (i.e., augment TF efforts) and facilitates the brigade commander's future operations.

Division during recent CMTC rotations.

An equally viable fire control alternative would be to augment TF and brigade FSEs with organic COLT sections (three teams per section) under the direct control of the TF and brigade FSOs (Figure 5 on Page 42). This organization decentralizes command, control and communications (see Figure 2 for the architecture) by dispersing capabilities and training requirements almost equally among TFs and the brigade. It also provides the TF FSO a much needed assistant—a COLT targeting officer—to integrate reconnaissance and observation plans, interface with the scout platoon leader and accompany the TF commander during battle. Resourcing the TF targeting officer requirement reflected in *FM 6-20-40 Tactics, Techniques, and Procedures for Fire Support for Brigade Operations (Heavy)* is not only essential for efficient COLT employment, but also required for fully capable 24-hour FSE operations.

The debate over the employment method, centralized or decentralized, is best left to brigade commanders, based on their leadership styles, training readiness and METT-T. The good news is that the capability exists today to fight with fires, especially in America's Tank Division—the 1st Armored Division.

Resourcing COLT Requirements with Organic Assets

Only one, viable near-term option exists for resourcing the COLT organization—redistribution of mechanized infantry FO parties across the armor and infantry force. There are enough FO force structure spaces in a mechanized infantry battalion to field eight, three-man COLTs. Bill payer spaces for the remaining four COLTs and the targeting officer billets must come from the artillery's mission area. If force structure constraints prohibit implementation, a table of organization and equipment (TOE) requiring three-man COLTs, but a modification table of organization and equipment (MTO&E) authorizing the two-man COLT option would enable fielding of 12 teams with the existing FO force structure.

Ideally, the COLT vehicle should have comparable scout vehicle mobility and survivability features to avoid presenting a uniquely identifiable signature. Assuming the Army Chief of Staff's September 1992 decision to place all scouts in HMMWVs survives the test of time, the COLT vehicle would also be a HMMWV equipped with two VRC-46 radios, a global positioning system (GPS) and a winch for self-recovery.

Conclusion

As evidenced by Desert Storm AARs, CTC reports, Close Support Study Group IV analysis and field input, the fire support system and traditional employment concepts for the close fight require modification to better support the combined arms commander's synchronization efforts.

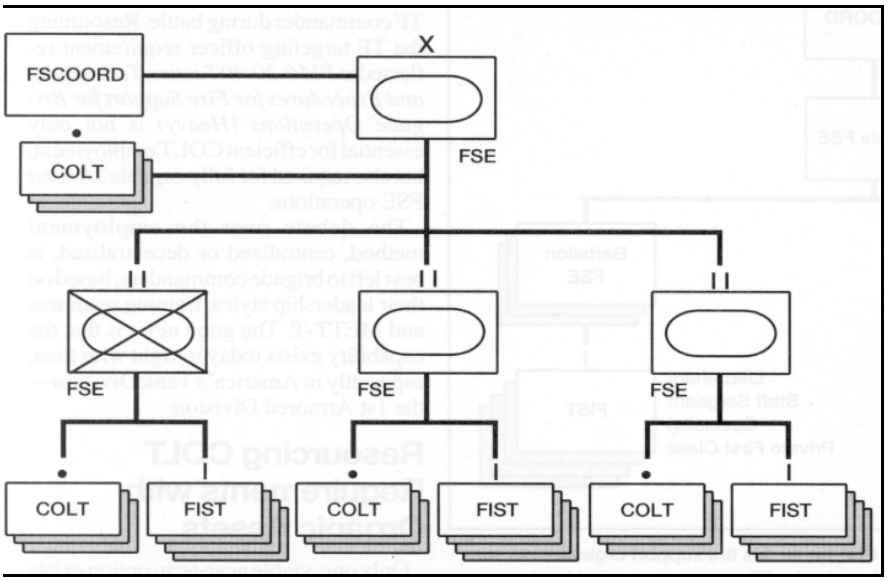


Figure 5: Decentralized Brigade HMMWV-Based COLTs. In this fire support organization, COLTs are task organized between the brigade and the TF FSEs, providing organic, mobile observation capabilities.

Fixing the close fire support paradigm doesn't require major surgery. The changes I recommend aren't radical departures from fire support's evolutionary glidepath. They're doctrinally based and support the Training and Doctrine Command's (TRADOC's) fighting with fires initiative that seeks to improve the integration and synchronization of fire and maneuver. In addition to increased emphasis on training combined arms commanders, the artillery must align the ends, ways and means of the close fight's fire control system by fully resourcing the HMMWV COLT requirement.

The Army's fire supporters need these essential means to close the gap between professed and demonstrated fire support capabilities. The cost of implementing the proposed fixes pales in comparison to the increased fighting with fires proficiency achieved. Action is required *now* to ensure the Field Artillery carries its proud King of Battle heritage forward into an uncertain and crisis-rich 21st century.

Lieutenant Colonel (P) Henry W. Stratman commanded the 2d Battalion, 29th Field Artillery and served as FSCOORD, 3d Brigade, 1st Armored Division, Germany, before attending the Army War College, Carlisle Barracks, Pennsylvania. Currently, he's assigned to the Training Operations Division in the Office of the Deputy Chief of Staff for Operations, Washington, DC. He also has served as S3 of the 8th Infantry Division (Mechanized) Artillery, Germany, and commanded three batteries: A Battery, 3d Battalion, 79th Field Artillery, 42d Field Artillery Brigade, Germany; Headquarters and Headquarters Battery, 212th Field Artillery Brigade, Fort Sill, Oklahoma; and A Battery, 1st Battalion, 38th Field Artillery, 2d Infantry Division, Korea. Other assignments include serving as Chief of the Modern Battlefield Techniques Committee, Field Artillery School, Fort Sill, and Chief of the Field Artillery Division, Fire-power Directorate, Headquarters Training and Doctrine Command, Fort Monroe, Virginia. In May, Lieutenant Colonel Stratman will take command of the 1st Infantry Division (Mechanized) Artillery, Fort Riley, Kansas.

VIEW FROM THE BLOCKHOUSE

FROM THE SCHOOL

Azimuth Check: FAOAC Update

Recently, the Field Artillery School, Fort Sill, Oklahoma, revised its Field Artillery Officer Advanced Course (FAOAC) program of instruction (POI). The revised POI, as outlined in Figure 1, went into effect with FAOAC Class 1-94, which reported in October of 1993.

Overview. The mission of FAOAC remains unchanged: to graduate officers qualified to be battery commanders, task force and brigade fire support officers and staff officers at the battalion, brigade and division artillery levels. FAOAC is 20 weeks long and is divided evenly between Total Group Instruction in Phase I and Small Group Instruction in Phase II.

The classes are "platoon-based" with 30 to 35 students per platoon. Each platoon has three small groups of 12 to 16 officers. A typical small group is composed of seven active duty, three Reserve Component (RC) and two allied officers with one Marine Corps officer and one infantry or armor officer, the latter officer's joining the group for the Small Group Instruction only. RC officers attend a compressed gunnery course three weeks before Phase II and join the rest of the class the first day of Small Group Instruction. During the Total Group Instruction, each small group meets for physical training and officer professional development classes.

Practical Exercises (PEs). During the Small Group Instruction, students organize into staff groups and work through a series of PEs designed to reinforce doctrine-based operations. Currently, there are six major PEs (see Figure 2) followed by an end-of-course CPX. Two of the PEs are run on Janus (see the article, "Janus Battle Simulation System," October 1992). In the future, the Germany PE will be replaced with a Korean scenario and the end-of-course CPX will be based on Southwest Asia terrain.

Staff Ride. The Battle of Honey Springs, Oklahoma, has replaced the Battle of Pea Ridge, Arkansas, as the FAOAC staff ride. Each small group studies the battle and travels to Honey Springs for a half-day terrain walk.

Phase I: Total Group Instruction		
Manual Fire Direction		96 hours
Automated Fire Direction (Battery Computer System)		70 hours
Cannon Battery Operations		42 hours
Multiple-Launch Rocket System Operations		10 hours
Communications (Single-Channel Ground and Airborne Radio System)		34 hours
Initial Fire Support Automated System (IFSAS)		90 hours
Miscellaneous (Risk Assessment, Branch Briefing, etc.)		25 hours
	Total	***367 hours***
Phase II: Small Group Instruction		
Fundamentals (Common Core)		35 hours
Fire Support Planning		128 hours
Field Artillery Operations		96 hours
Marine Corps/Infantry Operations		35 hours
Battery Command (Leadership)		25 hours
End of Course Command Post Exercise (CPX)		40 hours
	Total	***359 hours***
Commandant's Time		40 hours
In/Out Processing		32 hours
Capabilities Exercise		6 hours
	Total	***78 hours***

Figure 1: FAOAC Revised POI.

PE	Terrain	Focus
Task Force Defense	Fort Sill	Troop Leading Procedures/Fire Support
Task Force Defense	National Training Center (NTC)	Military Decision Making Process
Task Force Offense	Fort Sill	Task Force Fire Support
Brigade Offense	Germany	Field Artillery Battalion/Brigade Operations
Task Force Offense	Latin America	Marine Corps/Infantry Operations/Operations Other Than War
Division Offense	NTC	Field Artillery Brigade/Division Artillery/Division Fire Support Element (FSE) Operations

Figure 2: FAOAC Practical Exercises.

Writing Requirements. Each student completes several writing assignments: a philosophy of leadership paper, decision paper, battle analysis and book review. The battle analysis and book review also are presented orally in the small groups.

Capabilities Exercise. Every FAOAC student attends Fort Sill's semi-annual Capabilities Exercise. This impressive demonstration includes fire support weapons systems ranging from mortars to B1 bombers.

Leadership Symposium. The Field Artillery School hosts a leadership symposium for each advanced course. The day-long symposium includes general officer guest speakers and military and civilian leader panel discussions. This forum allows students to discuss topics ranging from battery command to family support groups. The symposium culminates with a dinner and a guest speaker at the Fort Sill Officers' Club.

Wives Seminars. The Field Artillery School sponsors a series of seminars for the wives of students. The seminars focus on such informative topics as the battery command team, the relationship between the battery commander and his first sergeant and family support groups.

Soccer. Small group cohesion is reinforced by participation in the FAOAC soccer league. Each small group fields a team that includes all students, regardless of their abilities. The season culminates near the end of the course with a tournament.

Follow-On Courses. FAOAC graduates are afforded the opportunity to attend a variety of follow-on courses, to include Armor or Infantry OAC. Airborne and Ranger Schools, as well as several Field Artillery-specific courses.

Conclusion. With these enhancements to FAOAC, the Field Artillery School remains committed to graduating officers who are technically and tactically proficient. The motto of the school is "Let Fortune Yield to Experience." FAOAC meets this challenge today by teaching the skills necessary to fight and win with fires on tomorrow's battlefields.

If readers have questions about FAOAC, they can write the Chief of the Advanced Fire Support Branch, Fire Support and Combined Arms Operations Department (FSCAOD), ATTN: ATSF-TFA, US Army Field Artillery School, Fort Sill, Oklahoma 73503-5600. Telephone numbers are DSN 639-6889/4809 or commercial (405) 442-6889/4809.

Advanced Fire Support Branch
FSCAOD
Field Artillery School, Fort Sill, OK

RC Officers' New FAOAC Option

Reserve Component (RC) officers have two avenues to complete career-level education courses. The first is to complete the Field Artillery Officer Advanced Course (FAOAC) entirely in residence at the Field Artillery School, Fort Sill, Oklahoma, by enrolling in either Course 2-6-C22 (20 weeks) or Course 2-6-C26 (15 weeks). The second option, which is new, is to complete a combination of resident and nonresident FAOAC instruction in two years. This article focuses on the new FAOAC-RC option: Course 2-6-C23.

New versus Old. In compliance with guidance from Headquarters, US Army Training and Doctrine Command (TRADOC), the new resident/nonresident RC advanced course was instituted 1 October 1993. Changes in this new course were substantive with an increased emphasis on battery command skills. For this reason, a crossover was not developed to link the old resident/nonresident RC FAOAC with the new option. Hence, students who didn't satisfy *all* the requirements of the old course by 30 September 1993 were dis-enrolled.

Before 30 September 1993, RC officers could complete the old FAOAC through

a three-phase program: Phase I, two weeks of battery command training at Fort Sill; Phase II, common core and branch-specific instruction through the Army Correspondence Course Program (ACCP) administered by the Institute for Professional Development (IPD) at Fort Eustis, Virginia; and Phase III, two weeks of branch-specific instruction at Fort Sill. A student had to complete this old course in two years with a one-year extension granted by the Field Artillery School (when the student provided justification for the extension).

The new FAOAC-RC is a two-phase course that prepares officers for battery commands. It must be completed in two years with a one-year extension granted by the Field Artillery School when the student provides written justification. Phase I (nonresident) is branch-specific and is completed by correspondence. Enrollment is accomplished through unit approval authority to IPD. Phase I includes manual gunnery refresher sub-courses, a prerequisite for Phase II. *Students must complete Phase I before enrolling in Phase II.*

Phase II (resident) consists of two weeks of active duty for training at Fort Sill. This phase includes approximately 21 hours of Military Qualifications Standards (MQS) II common tasks; 31 hours of fire support and battery command topics, to include brigade offensive and defensive doctrine; and 58 hours of automated gunnery.

Enrollment. To be eligible to enroll in Course 2-6-C23, an officer must be at least a first lieutenant (not waiverable) and a graduate of an officer basic course.

ACCP enrollment information can be found in *DA Pam 351-20 Army Correspondence Course Program Catalog*, 1 April 93. After completing Phase I, officers must use the Army training resources requirement system (ATRRS) to request training seats in Phase II. The FY 94 course dates for Phase II are 10 to 23 April and 10 to 23 July.

Officers in-process at Headquarters and Headquarters Battery, 3d Battalion, 30th Field Artillery Regiment, in Building 210, Gaffey Hall, Fort Sill on Sundays, with training starting on Mondays. Duty uniform is BDU. Billeting reservations may be requested by calling DSN 639-5000 or commercial (405) 442-5000. Additional information may be obtained from the remarks section in ATRRS or by calling Mr. John Broom or Lieutenant Colonel Jack Carr at DSN 639-3300 or commercial (405) 442-3300.

Reserve Component Programs
Directorate of Training and Evaluation
Field Artillery School, Fort Sill, OK

FAOBC Enhancements

During FY 93, the 20-week Field Artillery Officer Basic Course (FAOBC) was significantly enhanced as the result of input from field commanders. Enhancements included incorporating multiple-launch rocket system (MLRS) instruction, expanding fire support team vehicle (FISTV) and fire support instruction and adding digital message device (DMD) and forward-entry device (FED) training.

FAOBC continues to evolve to improve instruction and, ultimately, the qualifications of lieutenants going to units. During FY 94, FAOBC is undergoing additional changes designed to enhance student comprehension, improve the learning atmosphere and increase student opportunity to succeed through early intervention.

The revamped FAOBC is divided into three phases, grouped in logical sequence and designed to reinforce the three parts of the gunnery team: forward observation, fire direction and delivery unit operations. This phased approach helps students achieve course goals more readily and allows greater flexibility for remediation, when necessary. Additionally, the course has been changed to reduce duplication, cut outdated topics and expand time for extra instruction and professional development.

Phase I: Foundation. This phase is nine weeks and presents the fundamentals of manual gunnery, communications, observed fires, land navigation and leadership. The phase is capped by a one-day live-fire exercise that incorporates all aspects of the phase.

Phase II: Pillars. For six weeks, students focus on automated gunnery, equipment and maintenance and basic fire planning and are introduced to combined arms operations. This phase concludes with a one-day live-fire exercise and demonstration of the combined arms team.

Phase III: Capstone. During the last five weeks, students study combined arms and joint service capabilities, platoon leader skills and automated gunnery. They exercise their skills through several command post exercises (CPXs) in the Janus Battle Simulation Center and the Fire Direction Center Command and Control (C^2) facility. The phase and course climax in a week-long field firing exercise that includes pre-combat inspections; heavy, light and medium artillery firing and movement in both the battery and battalion environments; fire planning and execution in a company mechanized team; and post-combat inspections.

Students and instructors benefit from the new course structure. This translates into better trained officers reporting to their first units, motivated and ready for duty.

Questions regarding FAOBC should be addressed to the Chief of the Officer Instruction Branch, Cannon Division, Gunnery Department, ATTN: ATSF-GC, US Army Field Artillery School, Fort Sill, Oklahoma 73503-5600. Telephone numbers are DSN 639-6224 or commercial (405) 442-6224.

Cannon Div, Gunnery Dept
Field Artillery School, Fort Sill, OK

The Targeting Production Section: 13R Contrasts with 13F

Beginning in FY 95, the senior Radar NCO (13R40) will see his role in the targeting process greatly expanded. Along with his current responsibility as the radar platoon sergeant of the target acquisition battery (TAB) or corps target acquisition detachment (CTAD), he will be eligible for assignment to the target production section (TPS) as a targeting NCO.

The table of organization and equipment (TOE) has been modified to eliminate a 13F30 from the TPS and replace him with a 13R40. This change will greatly enhance the TPS' ability to employ Firefinder radar systems in executing the counterfire battle. Implementation of this change began with advanced NCO courses (ANCOCs) in FY 94, which now prepare graduates for duty in the TPS of a

13F40

- Supervises the targeting elements of the division artillery or Field Artillery brigade TOC.
- Supervises the fire support element (FSE) at the battalion level or above.
- Supervises liaison personnel.
- Evaluates subordinate fire support sergeants in fire support planning and coordination.
- Drafts fire support plans for tactical operations.
- Coordinates plans for company, battalion and brigade fire support and integrates them with the scheme of maneuver.
- Recommends the employment of fire support means, to include naval gunfire and close air support (CAS).
- Recommends combat observation lasing team (COLT) employment.
- Recommends target selection standards.
- Recommends employment of target acquisition assets.
- Supervises the TPS.
- Assists in fire support planning in the battalion, brigade, division or corps FSE.

13F30 Targeting NCO (New Additional Duties for 13R40)

- Supervises the TPS.
- Recommends changes in coverage of Field Artillery target acquisition resources.
- Monitors all target acquisition operations and helps the counterfire officer.
- Develops targets from targeting information and target indicators.
- Maintains the target production map.
- Requests, obtains and disseminates tactical damage asssessments.
- Maintains the tactical fire direction system (TACFIRE) or light TACFIRE artillery target intelligence (ATI) files on the basis of the counterfire officer's guidance.
- Enters translated commander's guidance for ATI into TACFIRE.
- Operates and maintains the counterfire variable-format message entry device (VFMED), electronic tactical display (ETD) and electronic line printer (ELP).

13R40

- Supervises operations of the Firefinder radar section.
- Conducts map/ground reconnaissance of general position areas for radar sites.
- Coordinates survey data.
- Constructs radar visibility diagrams.
- Prepares a target acquisition annex to the operations order.
- Recommends employment of target acquisition assets (radars).

Individual Skills for 13F40 and 13R40. 13R40s will be assigned to target production sections (TPSs) along with 13F40s, starting in FY 95. The 13R40 in the TPS will be responsible for his tasks and the additional tasks now performed by the 13F30 targeting NCO.

division artillery or Field Artillery brigade tactical operations center (TOC). TOE implementation is scheduled for FY 95.

The addition of a radar NCO to the targeting team at the division artillery or Field Artillery brigade level complements the fire support background of the 13F40 NCO (see the figure). The combination of learned fire support lessons and technical expertise will create a more effective TPS with personnel who fully understand the targeting process.

Questions concerning implementation can be addressed by writing to the the Fire Support and Combined Arms Operations Department (FSCAOD), ATTN: ATSF-TW, US Army Field Artillery School, Fort Sill, OK 73503-5600 or by calling DSN 639-5323 and 5194 or commercial (405) 442-5323 and 5194.

SFC Raymond E. Cooley, FA
FSCAOD
Field Artillery School, Fort Sill. OK

MLRS: The Training Gets Better

The newly revised multiple-launch rocket system (MLRS) cadre course prepares leaders (sergeants first class, lieutenants and captains) for the multitude of challenges and responsibilities inherent in their MLRS duty positions. The 23-day course teaches students the basic system components and MLRS tactics, techniques and procedures (TTP).

The primary change was to reduce the time allotted to operator skills and increase the time for TTP. The course still provides technical instruction on fire direction, fire control and maintenance operations. Additionally, students learn materiel readiness reporting procedures and combat service support in a new comprehensive logistics block of instruction.

The decentralization and flexibility of MLRS units require a complete understanding of logistics at all levels—corps down to platoon—as there's neither a formal logistics support structure nor assets available at the battalion level to assist batteries and platoons. The course now addresses the MLRS logistical requirements and structures for *all* MLRS units.

Another significant change is the addition of a command post exercise (CPX) in which instructors and facilitators evaluate students while they perform leader tasks. The CPX facility includes M577 command post vehicle mock-ups, radios, lightweight computer units (LCUs), complete standing operating procedures (SOPs) and an array of map boards supporting the tactical scenario. A control cell serves as the higher headquarters.

During the CPX, each student functions in four duty positions, from battery commander down to reconnaissance sergeant. Instructors and facilitators continuously evaluate the student's performance in each position for a day. The daily eight-hour scenario begins with the operations order (OPORD) briefing to the student battery commander.

The scenario progresses as students address the requirements of the OPORD as well as additional situations and problems. These include everything from minor maintenance problems to complete mission changes. Students also prepare a platoon operations area (OPAREA) briefing encompassing unit positions, routes and related considerations for reconnaissance, selection and occupation of position (RSOP). This approach tests the students understanding of all previous instruction and their specific duties and responsibilities.

The cadre course will continue to change, based on field input, including surveys sent to students and their supervisors four months after the course. The charter of the course remains to prepare leaders to make informed, competent decisions to maximize MLRS' potential on future battlefields.

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Gunnery Dept, FA School, Fort Sill, OK

Video Imaging Projectiles for Future Battlefields

by Major Anthony J. D'Angelo and Mr. Timothy M. Kogler

The Field Artillery School, Fort Sill, Oklahoma, in concert with national and Army laboratories, is developing real-time over-the-hill target location, identification and battle damage assessment (BDA) capabilities for brigade and division operations. The technology capitalizes on advances in video imaging and global positioning and has resulted in the initial development of two projectile-based systems capable of providing highly reliable and accurate target information.

Both closed-loop, real-time systems—the video imaging projectile (VIP) and target verification and BDA system (TV/BDA)—were recently demonstrated at Fort Sill. The VIP is a spin-stabilized 155-mm artillery shell used as a terrain video imaging platform. TV/BDA is a 155-mm artillery submunition that contains a radio-controlled parafoil and video transmitter.

VIP or TV/BDA will allow the Field Artillery to provide more responsive, effective and synchronous indirect fires to support the battle plan. By giving the division and maneuver brigade commanders the capability to verify and attack the enemy with greater precision at extended ranges and then to accurately assess damages before continuing the attack, VIP and TV/BDA greatly improve their ability to influence battle space.

VIP and TV/BDA address the critical need for real-time, near all-weather, day and night, targeting and BDA. Experiences in Operation Desert Storm confirmed that we're improving our ability to acquire targets at operational depths, but targeting within the division area, particularly in the brigade area (even just over-the-berm) is virtually nonexistent. More importantly, BDA capabilities in any part of the battlefield are extremely poor.

From the artillery standpoint, there are several interdependent, but separate, problems with current target acquisition (TA) and BDA systems. Due to the lack of forward observation capabilities during Desert Storm, most artillery fire missions were conducted using the predicted fire technique instead of the more accurate adjust fire technique. Also, there was no *timely* BDA feedback on the effectiveness of artillery fires.

Timely TA. Under certain scenarios, the resources to provide real-time target location and identification are unavailable. Ground observers can't always be in positions near enough or ahead of the forward line of own troops (FLOT) for targeting and BDA. Currently, artillery depends on long-range surveillance units (LRSUs), patrols, scouts or aerial observers (fixed-wing aircraft, helicopters or unmanned aerial vehicles, called UAVs) to detect over-the-hill non-firing targets. LRSUs, patrols and scouts can't always maintain eyes on target across the depth and width of the battlefield. Aircraft are weather sensitive and may not be available when required. These aerial targeting resources are in high demand and have competing mission priorities.

Timely BDA. Timely BDA is a *must* in the high-tech era of smart munitions. When we begin to fire our high-cost stockpiles of smart munitions on future battlefields, we need to know whether or not another volley is required. The Army is developing a close-range UAV (CR-UAV) to support this type of targeting and battle management decision-making and will begin fielding it in 1998. However, due to its ability to carry several types of mission payloads, the CR-UAV will have many demands placed on it from electronic warfare (EW) planners, intelligence analysts and targeting cells at the operational and tactical levels. Planning time lines and payload requirements may mean they aren't immediately available to the brigade commander, who needs to know the effectiveness of his artillery on the enemy before making decisions on how to proceed.

The problems of-accuracy and timeliness manifest themselves in several different ways to the Field Artillery.

The Field Artillery uses AirLand operations doctrine. Therefore, we must optimize target effects with every round fired. If more rounds than necessary are fired, the firing unit is more vulnerable to counterfire while wasting expensive munitions and burdening the resupply system. The unit also becomes unavailable for other missions. If too few or the wrong rounds are fired, targets will reappear on the battlefield. Potentially, this will require additional artillery engagements and negatively affect the outcome of the commander's overall battle plan.

The VIP System

The concept for VIP exploits two new technologies developed at two laboratories. The first is the VIP, which was first devised and fired by the Sandia National Laboratories (SNL), Livermore, California, in 1989. The second is the global positioning system (GPS) transponder developed by the Army Research Laboratory

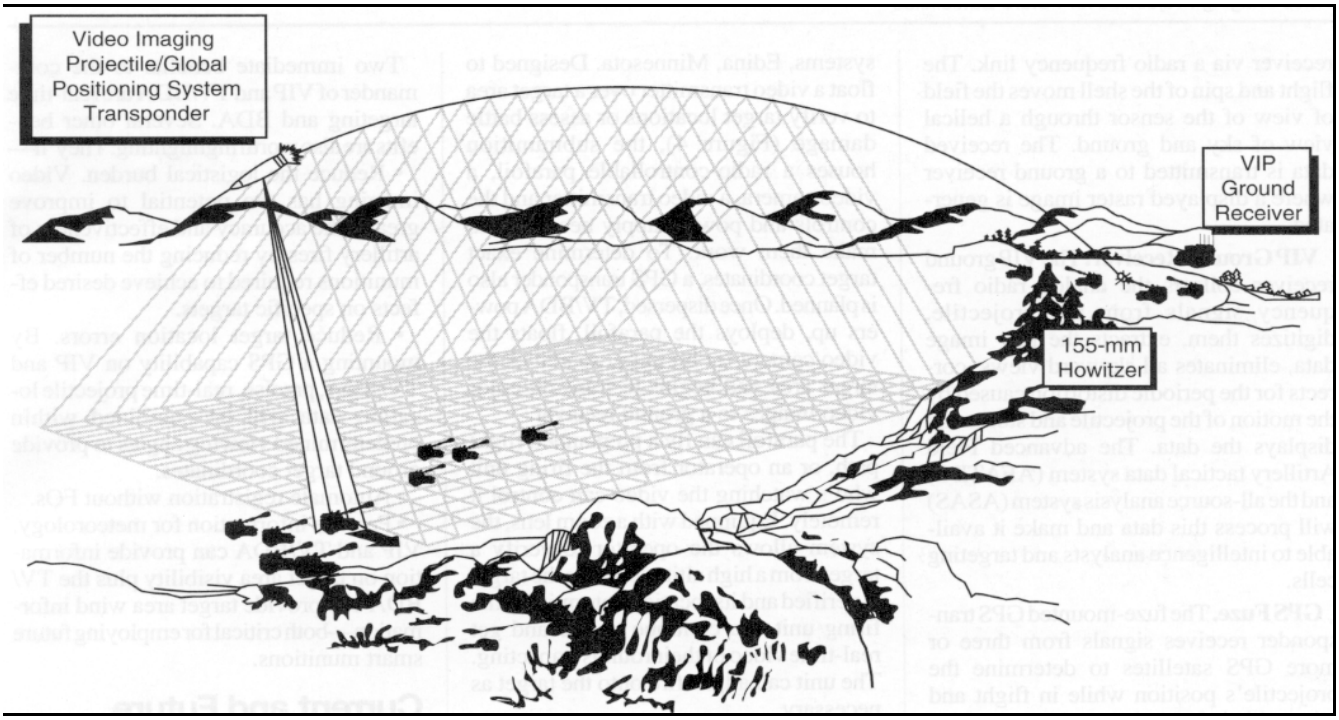

Figure 1: Concept for VIP System. The VIP collects images of the terrain over which it flies and relays them to the ground receiver. The GPS transponder receives signals from three or more GPS satellites and determines the projectile's location. Then, in concert with projectile's dynamics, the transponder determines the location of the target. The ground receiver collects the raw data, processes it and relays it to intelligence analysts and targeting cells.

(ARL), Adelphi, Maryland, as part of its GPS registration fuze system.

The transponder is in the fuze of a projectile and acts as a remote antennae for a GPS receiver. The signals allow the trajectory of the projectile to be computed and compared against the one predicted, thus providing registration data without the need for a forward observer (FO) and allowing corrections to be computed to put future rounds on the target. Four proof-of-concept rounds with GPS transponders in their fuzes were successfully fired in 1991 and 1992. ARL is scheduled to fire an additional 20 rounds fitted with miniaturized fuze-mounted GPS transponders in August.

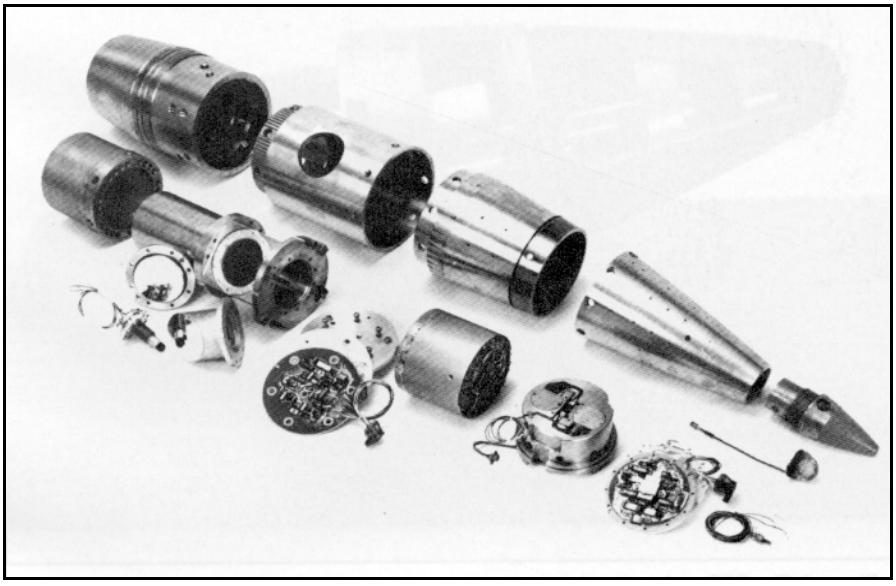

Figure 2: VIP consists of a 155-mm projectile body and the mechanical, optical and electronic sub-assemblies necessary to collect video images of the terrain over which the projectile flies.

The combination of these two technologies is in the early stages of development; however, we anticipate the VIP system's final configuration will consist of a video imaging projectile, a GPS fuze and a VIP ground receiver (Figure 1).

Video Imaging Projectile. The VIP round is a spin-stabilized, fire-and-forget, 155-mm artillery projectile. As currently configured, it consists of a 155-mm projectile body containing the mechanical, optical and electronic subassemblies necessary to collect images of the terrain over which it flies and relay these images back to a ground receiver (Figure 2). A photo diode assembly senses changes in the brightness level of light collected by an optical system that views through a "window" in the side of the projectile. The forward movement and the spin of the projectile allow the VIP to scan the terrain over which it flies. The footprint of the area scanned is a function of altitude, angle of fall, terminal velocity and sensor capabilities. Information on changes in light intensity is transmitted to the ground

receiver via a radio frequency link. The flight and spin of the shell moves the field of view of the sensor through a helical view of sky and ground. The received data is transmitted to a ground receiver where a displayed raster image is generated.

VIP Ground Receiver. The VIP ground receiver collects the analog radio frequency signals from the projectile, digitizes them, extracts the raw image data, eliminates all skyward views, corrects for the periodic distortion caused by the motion of the projectile and stores and displays the data. The advanced Field Artillery tactical data system (AFATDS) and the all-source analysis system (ASAS) will process this data and make it available to intelligence analysts and targeting cells.

GPS Fuze. The fuze-mounted GPS transponder receives signals from three or more GPS satellites to determine the projectile's position while in flight and relays this information to the ground receiver. A precise track of the projectile is provided as it flies its trajectory. The GPS location information then is combined with the VIP dynamics to provide an accurate description of the projectile's location and the "look angle" of the window. This information can, in turn, be used to determine the location of targets or other objects of interest displayed in the video output.

To perform this task, the fuze-mounted GPS transponder (Figure 3) contains an antenna to receive GPS signals, a translator to convert the GPS information to another frequency, a transmitter and antenna to relay this information to the ground receiver and a battery to power the electronics.

The final configuration of the VIP system will integrate the electronics of the VIP and GPS fuze technologies into a single package, maximizing common use of components (i.e., battery, radio frequency ground link, etc). Similarly, the ground receivers will be integrated, not only to minimize the duplication of hardware, but also to simplify the system's operation. Also, the sensors on the projectile would be redesigned to enhance image resolution and provide low-light and all-weather capabilities.

The TV/BDA System

TV/BDA is a 155-mm artillery shell submunition developed by Alliant Tech-systems, Edina, Minnesota. Designed to float a video transmitter over a target area to verify target locations or assess battle damage (Figure 4), the submunition houses a radio-controllable parafoil, a video camera, a video transmitter and the controls and power supply necessary to make them work. To determine exact target coordinates, a GPS transponder also is planned. Once dispersed, TV/BDA powers up, deploys the parafoil, floats the video camera for an initial search of the target area and begins to transmit color video images to a ground receiver.

The parafoil can fly a preplanned flight path, or an operator from the firing unit who's watching the video can control it remotely. Equipped with a zoom lens, the system allows the operator to verify a target from a high altitude. Once the target is verified and its location determined, the firing unit can continue to fire and get real-time video of their rounds impacting. The unit can adjust fire onto the target as necessary.

The TV/BDA system is able to float for up to five minutes, allowing the operator to fly the video camera over the target for low-altitude BDA. Capable of transmitting up to 60 kilometers, TV/BDA can send images not only to the firing unit's fire direction center (FDC), but also to the targeting cell and intelligence analysts in the maneuver commander's tactical operations center (TOC).

Two immediate benefits to the commander of VIP and TV/BDA are real-time targeting and BDA. Several other benefits are also worth highlighting. They'll—

•Reduce the logistical burden. Video imaging has the potential to improve greatly the accuracy and effectiveness of artillery fires by reducing the number of munitions required to achieve desired effects on specific targets.

•Reduce target location errors. By mounting a GPS capability on VIP and TV/BDA, precise, real-time projectile location data will be combined within predetermined viewing angles to provide ground target coordinates.

•Automate registration without FOs.

•Provide information for meteorology. VIP and TV/BDA can provide information on target area visibility plus the TV/BDA can provide target area wind information—both critical for employing future smart munitions.

Current and Future Actions

In July 1992 ARL; SNL; the Armament Research, Development and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey; and the Field Artillery School created a VIP Working Group to develop real-time targeting and BDA assets for the Field Artillery through video imaging technology. This cooperative effort led to

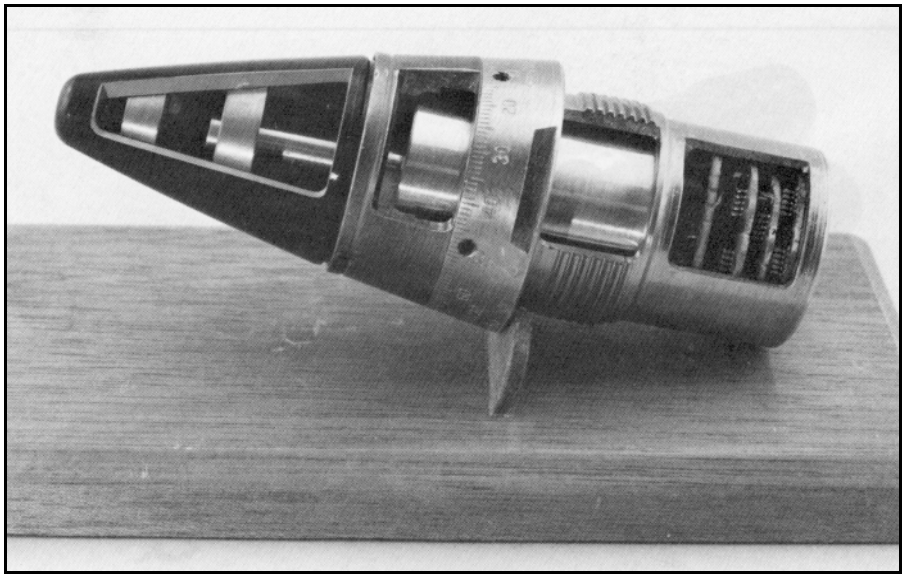

Figure 3: The GPS registration fuze, with transponder, exploits GPS satellite signals to determine the projectile's position while in flight. The GPS location information is combined with VIP dynamics to determine the location of targets or other objects of interest.

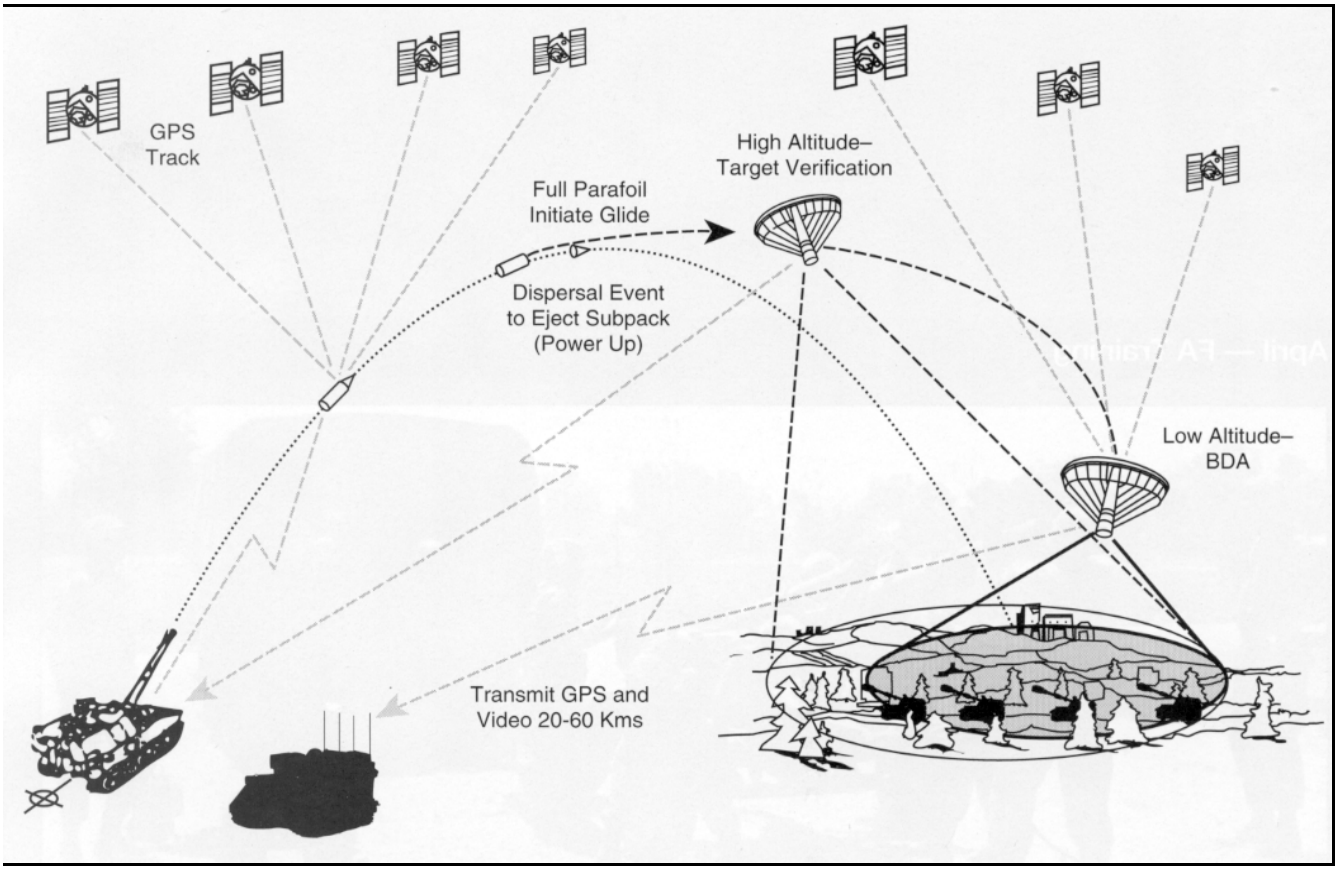

Figure 4: Concept for TV/BDA System. Using a parafoil, a video camera (with zoom lens, video transmitter and GPS) floats over the target area and transmits color video images to a ground receiver. Once a target is verified and its location determined by the GPS, it can be engaged by indirect fires. The TV/BDA system can float for five minutes, allowing for adjustment of fires and (or) low-altitude BDA.

an initial tactical demonstration of video imaging capabilities at Fort Sill 12-16 July 1993. The objectives of the demonstration were to determine the capabilities of the VIP and parafoil to observe high-contrast and tactical targets and to establish resolution requirements for target identification and BDA.

With the assistance of III Corps Artillery at Fort Sill, two 155-mm VIP rounds were fired on Quanah Range. Their trajectories traversed approximately 9,500 meters. Four high-contrast targets and five tactical targets were placed under their estimated trajectory for VIP viewing. For the purposes of the demonstration, the parafoil wasn't fired but was released by helicopter.

Concurrent with the demonstration, the VIP Working Group began conducting a system trade-off analysis. This analysis compares VIP and TV/BDA capabilities with current and developmental targeting and BDA systems. The study also addresses resolution requirements and capabilities, accuracy, effectiveness, BDA capabilities, vulnerability and cost. Real-time targeting and BDA jointly comprise one of the four major operational requirements of the Army's Depth and Simultaneous Attack Battle Lab, located at Fort Sill. The mission needs statement for a video imaging projectile system was approved by the Training and Doctrine Command (TRADOC) in July 1993 and validated by Headquarters, Department of the Army in December.

The goal of the VIP Working Group is to provide combined arms brigade and division commanders a reliable tool for real-time targeting and BDA within the range of their indirect fire systems. This tool will complement the capabilities of the CR-UAV and other sensors to allow commanders to better project lethality forward on the battlefield. The group will continue to work to solve the technological and operational issues associated with VIP and TV/BDA to make its goal a reality.

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Mr. Timothy M. Kogler is an Operational Research Analyst with the System Performance Branch of the Weapon Concepts Division in the Weapon Technology Directorate of the Army Research Laboratory (ARL) office at Aberdeen Proving Ground, Maryland. He's the ARL Project Officer for the Video Imaging Projectile Program. He was previously assigned to the Fire Support and Target Acquisition Division of the Human Engineering Laboratory and the Firing Tables Branch of the Launch and Flight Division, both part of the Ballistics Research Laboratory, Aberdeen Proving Ground.