

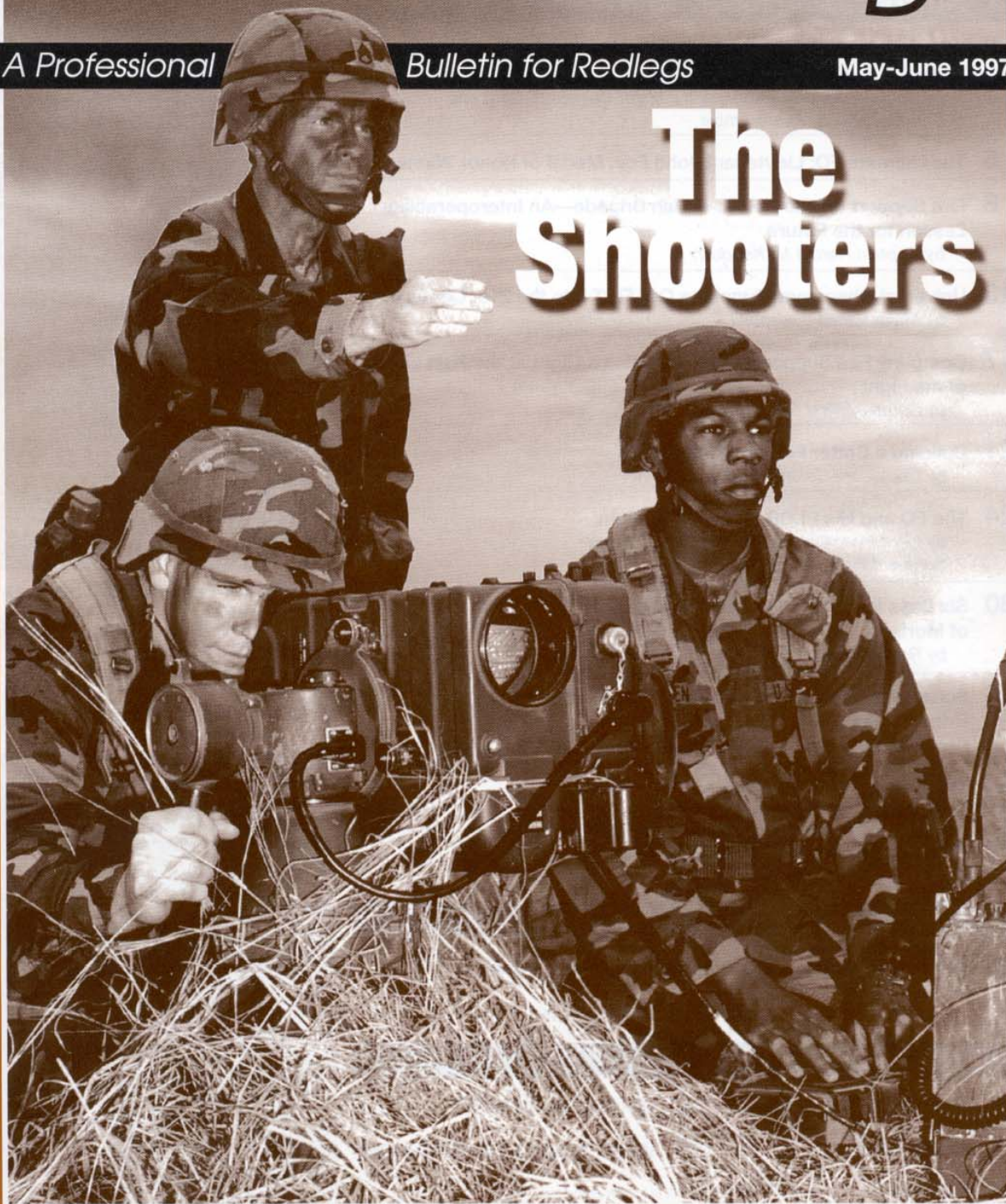
Field Artillery

A Professional

Bulletin for Redlegs

May-June 1997

The Shooters



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Front Cover: Photo taken by Linda A. Young, Fort Sill TSC, of 13F Fire Support Specialists.

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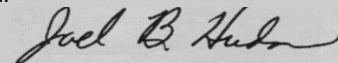
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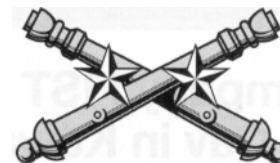
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The Lightfighter FO



Recently, I spoke with a few light Field Artillery battalion commanders regarding the challenges faced by their 13F forward observers (FOs). Not surprisingly, those challenges continue to be the amount of equipment and weight our fire support teams (FISTs) and combat observation lasing teams (COLTs) must carry to accomplish their missions.

One battalion commander went so far as to describe his FOs laden like pack mules. He described soldiers overburdened by the strain of having to carry bulky fire support equipment, awkward communications and navigation gear and other mission-essential equipment.

Right now, FOs in light units carry separate pieces of equipment to conduct target location, land navigation, night operations and communications. This equipment is in addition to a rifle and a basic load of small arms ammunition, food, water and personal clothing. Our observers carry soldier loads of 75 to 100 pounds. It's not uncommon for our observation teams to carry considerably more weight than their light infantry brethren. Reducing this burden continues to be one of our highest priorities.

Typically, light infantry and special operations forces (SOF) operate in tough conditions. They frequently conduct dismounted operations over long distances across rough, broken terrain and move at night. With less organic weaponry than mechanized and other heavy forces, lightfighters depend on their FOs for much of their lethality and firepower. The FO's ability to provide timely, effective fire support is tied to his ability to keep pace with the maneuver forces he supports.

Currently, our light fire supporters have two pieces of equipment that slow them down considerably. The ground/vehicular laser locator designator (G/VLLD) slows them physically, while the forward entry device (FED) slows their fire planning and execution time.

Replacement for the G/VLLD: LLDR. The G/VLLD's greatest drawback is its weight. When fully assembled, the G/VLLD weighs more than 107 pounds—far too much to ask our FO

teams to carry. It's not surprising that many lightfighters operate without it. Only COLTs use the G/VLLD on a regular basis. They tend to move less frequently or have G/VLLDs mounted on high-mobility, multipurpose wheeled vehicles (HMMWVs).

The best alternative to the G/VLLD for light fire supporters is the lightweight laser designator rangefinder (LLDR). The LLDR offers more capabilities than the G/VLLD at about one-third the weight. The modular design of the LLDR also allows the light FIST to tailor its capabilities to the mission at hand.

In its target location configuration, the LLDR can locate targets accurately out to at least 10 kilometers, provide observer location and see the battlefield with a near all-weather capability. An integrated thermal night-sight provides continuous day/night operations and the ability to see through battlefield obscurants. In this configuration, the LLDR's total weight of approximately 35 pounds can be reduced to about 20 pounds—15 pounds for the target location capability and five pounds for the tripod.

If necessary, the LLDR also can be configured with a separate laser designation module. This allows the observer to "paint" both moving and stationary targets for engagement by all sorts of precision-guided munitions.

The projected date for the first unit equipped (FUE) with the LLDR is the



LLDR

second quarter of FY 2001. As a Force XXI initiative, it's competing for additional funding under the Warfighting Rapid Acquisition Program (WRAP). Hopefully with this accelerated funding we can field one brigade of the 82d Airborne Division at Fort Bragg, North Carolina, a full year earlier, getting it into our FISTs' hands by FY 2000.

Replacement for the FED: HTU. The current version of the FED is another piece of equipment that has simply outlived its usefulness as an effective fire planning tool. The FED worked well with the tactical fire direction system (TACFIRE), but we need the next generation of the FED, something more compatible with the advanced Field Artillery tactical data system (AFATDS). The lightweight FED, or hand-held terminal unit (HTU), fits that need.

At just under four pounds, the HTU is half the weight of the FED and small enough to fit in the cargo pocket of the battle dress uniform (BDU). With its 486-based computer processor, 32 megabytes (MG) of RAM and a 260-MG internal hard drive, the HTU can process, transmit and receive entire fire plans and battlefield graphics.

When connected digitally, the LLDR and HTU give our observers a "point-and-click" capability for fire mission processing. We eliminate the need for them to manually type and transmit missions on a keyboard. The FO simply locates a target with the LLDR and determines its range, and a call-for-fire appears on the HTU's digital screen. With the push of one button, the fire mission can be on its way to the fire direction center (FDC).

Thus far, our Army has done much to modernize and improve the effectiveness of today's heavy forces. We need to continue this effort by focusing on our light forces—including increasing the mobility and effectiveness of light fire supporters. Developing and fielding the LLDR and HTU are great starts.



Company FIST in the Desert—1st Cav in Kuwait

Desert operations are the most challenging of any for company fire supporters—the featureless terrain makes navigation and distance judgment extremely difficult while affording few good observation posts. During the 2d "Black Jack" Brigade (1st Cavalry Division, Fort Hood, Texas) deployment to Kuwait for Operation Intrinsic Action, we learned many valuable lessons specific to fire support execution in the desert. With the possibility that the desert may well be the stage for a future major conflict, we hope these tips will help other company fire support teams (FISTs) deliver "indirect destruction."

- *Use the precision lightweight global positioning system receiver (PLGR) to report the forward line of own troops (FLOT).* Desert navigation often involves traveling long distances in relatively straight lines. Because the FIST vehicle (FISTV) travels a set distance behind the lead element in a company formation, use the FISTV's PLGR grid, adjusted to reflect that distance, to report the FLOT to the battalion fire support element (FSE). This takes the guesswork and map spotting out of movement.

- *Use company way points as triggers.* Because they're much more frequent than phase lines (which vary widely, depending on who copied the graphics), PLGR way points make excellent triggers. Using PLGR-to-PLGR data transfers allows every vehicle to have the exact same way points; we commonly integrated PLGR transfers into the company



SGT Kirchoffer with the FIST's ground/vehicular laser locator designator (G/VLLD) in Kuwait.

troop leading procedures. During execution, the fire support officer (FSO) can execute fires by monitoring the lead platoon as it reports successive way points to the company commander.

- *Use ground burst illumination to mark target reference points (TRPs).* This technique is effective both at night and during the day, allowing the maneuver unit to quickly orient its direct fire weapons in an environment with few natural reference points.

Fire ground burst illumination targets as a group, timing it to land just as the company is rolling into position and

preparing to engage. End the mission as soon as all platoons are set. This aids the commander both in orienting his platoons and controlling the direct fire fight.

- *Use the targeting head to define triggers in the defense.* Because the desert has so few prominent terrain features, triggers for brigade and task force targets are often imaginary—for example, "the lead MRC (motorized rifle company) crosses 17 Easting." The FIST can use its vehicle's targeting station control display (TSCD) with its range, direction, vertical angle and azimuth ring features to quickly identify triggers on the ground and observe them. This takes the guesswork and map spotting out of defense execution.

- *Use mortars aggressively.* Because mortars are more responsive and controllable than Field Artillery, commanders can fire them "danger close" in the attack. Ceasing FA suppression fires on the objective during the assault just as maneuver elements are within a few hundred meters of it buys the commander precious minutes at a critical time. Mortar fires then can be shifted quickly beyond the objective, forcing a counterattacking enemy to deploy prematurely.

The key to success with mortars is a good terrain analysis and well planned triggers and rehearsals at all levels from sand table to mounted. This ensures accurate timing in ceasing the suppression mission, creating, in turn, a truly synchronized battlefield.

The desert, with its harsh environment and lack of many garrison range restrictions, creates unique training opportunities. By making productive use of equipment—the PLGR for reporting the FLOT and defining offensive triggers, the targeting head for emplacing defensive triggers and mortars for suppression and TRP marking—the company FIST can shape the battlefield to support the maneuver force. Units can prepare for future desert war by integrating some or all of these lessons into home station training.

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Why We Need FISTs— Never Send a Man When You Can Send a Bullet

by Colonel David H. Petraeus, IN; Major Damian P. Carr; and
Captain John C. Abercrombie

"Never send a man when you can send a bullet." Sam Colt said that, and he was right. The fire support team (FIST) is the key to making sure the big bullets sent are accurate, timely and the right type.

This article is the product of discussions about FISTs with the 1st Brigade's artillery battalion commander, fire support officers (FSOs) and several others in the maneuver and fire support communities of the 82d Airborne Division at Fort Bragg, North Carolina. We concluded that the expertise and capabilities FISTs provide maneuver companies are critical and that FISTs contribute enormously to success in the close fight. But before discussing FIST expertise and capabilities, we offer some background on how the FIST concept evolved.

Evolution of the FIST. The FIST concept had its beginning in the mid-1970s during the height of the Cold War. In 1975, the Commandant of the US Army Field Artillery School, Major General David E. Ott, wrote to General William E. Depuy, the Commanding General of the newly formed Training and Doctrine Command (TRADOC), expressing his concerns about the inadequacies of the Army's observed fire support system. At the time, for example, a mechanized infantry company had three separate forward observer (FO) elements: one 81-mm mortar FO for each platoon and a two-man 107-mm mortar FO party as well as a three-man Field Artillery FO party for each company headquarters.





C Company FIST, 3d Battalion, 504th Parachute Infantry Regiment, represents the ten-man infantry company FIST with its equipment: PLGRs, MELIOS, binoculars and single-channel ground and airborne radio system (SINGARS). The first row shows the three forward observer parties, alternating from left to right are the forward observers and radio telephone operators. The second row contains the FIST headquarters element, consisting of the company FSO, company FSNCO, fire support specialist and radio telephone operator.

General Ott observed that by the nature of the organization, the company commander often was unable to coordinate the activities of the artillery and mortar observers. General Depuy agreed and charged the first Close Support Study Group to "optimize observed fire support for maneuver forces on the modern battlefield."

The solution proposed by the study group was a fire support team (FIST) at the company level. The study group presented the case that these teams would improve the technical capabilities provided to maneuver elements, enhance combined arms training and provide a Field Artillery officer to coordinate company-level fire support for the company commander.

To further ensure the success of this concept, the study group proposed a new enlisted military occupational specialty (MOS) of 13F Fire Support Specialist. The new 13Fs would gain the requisite skills in formal training at the Field Artillery School at Fort Sill, Oklahoma, and sustain those skills by training in their units.

The organization, manning and training of the current 10-man FIST are the results of the study group's recommendations. That structure, 13F MOS and institutional and unit training remain the cornerstones of fire support expertise in today's FISTs.

What, then, do FISTs bring to the combined arms fight? We believe the answers can be grouped into two areas: expertise and capabilities.

FIST Expertise. As foreseen more than two decades ago, today's FISTs provide expertise that enables maneuver unit leaders to fully exploit the panoply of

fire support assets available to them. FISTs allow company commanders and platoon leaders to focus their attention and efforts on developing and executing the concept of maneuver while the FIST does similarly in the fire support arena.

This division of labor works well, for although most company commanders and platoon leaders understand the importance of fire support, few have the depth of knowledge needed to plan, coordinate and execute a fire support plan. Now, having said all that, we hasten to add that the integration of fires is a command responsibility, and maneuver leaders must at least understand the capabilities and limitations of the direct and indirect fire systems supporting them to be effective combined arms leaders.

But few maneuver commanders, for example, can explain how top-down fire planning works or the significance of "massing" fires. (For more information, see the article "Improving the Demand Side of Fire Support" by Brigadier General Huba Wass de Czege, Infantry, and Lieutenant Colonel Michael V. Cuff on Pages 51 to 52 of the November 1993 edition of *Military Review*.)

While the division of labor works well for planning and executing combat operations, the same is also true for training. Mastering the technical aspects of fire support requires a degree of specialized training that can't be provided to every maneuver officer attending a branch school. The Officer Basic Course at the Infantry School, Fort Benning, Georgia, for example, has a total of 888 hours of instruction; however, only 21 hours (two-and-a-half percent) are fire support-oriented. The amount is even less

in the Officer Basic Course at the Armor School, Fort Knox, Kentucky, during which only 14 hours are dedicated to fire support training. These observations are not meant as criticism; rather, they reflect a simple fact—our schoolhouses can't train everyone to be an expert in everything.

Even if the maneuver branch schools could provide in-depth fire support instruction to the degree provided Field Artillery officers and 13F MOS soldiers (as is done for the handful of maneuver officers who attend the Field Artillery Officer Advanced Course at Fort Sill), most maneuver leaders undoubtedly would find it difficult to sustain that fire support expertise. The need to focus on maneuver tasks and resource limitations (most notably time) make maintaining perishable fire support expertise difficult, at best.

Even Field Artillery units struggle to achieve and sustain proficiency in fire support skills. Maintaining digital fire support skills demands weekly training sessions. The same level of effort is needed to keep FO call-for-fire procedures sharp, and the need to work on other tasks is equally pressing. This is not to say that maneuver and fire support training are accomplished sequentially; rather, the two are inextricably linked and are worked in parallel.

The focus of FIST training is on ensuring expertise in "go-to-war" duties. The 82d Airborne Division's program is comprised of written tests, vehicle recognition training and FIST minimums. The latter encompass those critical tasks that fire support personnel at each level must perform to standard, including establishing and maintaining communications, conducting fire missions, performing land navigation, and planning and coordinating fire support. To be certified, each fire supporter must receive a grade of 90 percent or better on the written tests and vehicle identification exam and he also must complete the other fire support minimums for his duty position. This program—which has high visibility in the 82d—ensures that FISTs are well trained when they link up with their maneuver platoons and companies for training or contingency operations.

The company FIST and maneuver units come together in training to integrate fire support into platoon and company operations. The FIST concept that aligns an FO party with every platoon and an FSO with every company headquarters makes integrating artillery and mortar fires into training events relatively easy.

The FIST serves as a constant reminder of the importance of and need for fire support.

In addition, the close relationship between the FISTs and the units they habitually support helps with coordination of indirect fire support assets for training and ensures FSOs and fire support NCOs (FSNCOs) participate in company training meetings where they quickly can address questions about fire support.

FIST Capabilities. Closely related to fire support expertise, the FIST also brings special equipment and other capabilities that help accomplish battlefield tasks. These allow the FIST to plan fire support concurrently with the development of the maneuver plan and employ special fire support systems and munitions. Another significant FIST contribution is, of course, redundant communications when the maneuver unit has difficulty communicating on its command net.

Concurrent Planning. A common challenge at the combat training centers (CTCs) and in recent contingencies is the limited time available to plan, coordinate, integrate, synchronize and rehearse the activities of the various "combat multipliers" before the execution of a mission. Parallel planning—the concurrent development of the plans for each combat, combat support and combat service support asset available to support the maneuver concept—has repeatedly proven to be key to mission accomplishment.

FISTs provide company commanders the capability to conduct parallel planning in the fire support area. First, the FSO coordinates to determine the availability of fire support assets. Next, and based on his commander's fire support guidance, he integrates those assets into the overall plan in support of the maneuver concept. Then he ensures planned fires are synchronized with maneuver through fire support and combined arms rehearsals. Finally, his FOs refine the targets and he updates them on the fire support plan. FIST digital communications and automated fire support systems greatly expedite the target refining process.

Special Equipment. FISTs have special items of enormous value for planning and executing tactical operations. These include the ground/vehicular laser locator designator (G/VLLDs) usually mounted on tracked or wheeled vehicles (pending funding, the lightweight laser designator rangefinder, or LLDR, will replace the G/VLLD at the turn of the century); the

AN/PVS-6 mini eye-safe laser, infrared observation set (MELIOS), which is a hand-held laser rangefinder (and now has an azimuth indicator as well); and the hand-held precision lightweight global positioning system (GPS) receiver (PLGR). These items allow a FIST member to pinpoint his location, precisely determine the ranges to and location of his target and illuminate that target with lasers for attack by helicopters, close air support aircraft or precision artillery munitions, such as Copperhead.

The advent of digital communications equipment, such as the forward entry device (FED), also has helped the entire fire support process, streamlining fire planning and execution. In the planning phase, for example, targets developed to support an overall brigade defensive plan are distributed to FISTs digitally. The FISTs then accurately locate the targets on the ground (often registering defensive targets and adjusting such aspects as the sheaf), add additional targets and the data for them and help refine other aspects of the fire support plan. This information is sped back through digital channels for inclusion in the brigade plan. (The FED will be replaced by the lighter weight hand-held terminal unit, or HTU, which expands the FO's capabilities with other digital devices, starting in early FY 1998.)

Additionally, although units still typically plan digitally and execute using voice communications, Army XXI tests are demonstrating the dramatic value of digital communications for execution as well. In such cases, digital "comms" greatly reduce the time required to clear fire missions and send them to fire direction centers (FDCs). Digital communications also eliminate some of the errors associated with voice communications and reduce the possibility of fratricide. When coupled with position locating systems and precision range-finders, digital communications significantly increase the likelihood of swift first-round effects on targets.

Moreover, digitally equipped FISTs are the first link in an information chain that can extend to the corps level and above. Reports sent digitally by FISTs can be collected and analyzed by higher level fire support elements (FSEs) and used to help paint the overall picture of developments on the battlefield, thereby, providing commanders at all levels greater situational awareness.

Redundancy in Communications. Finally, the voice and digital communications capabilities of FISTs can be valuable to platoon leaders and company commanders when command

communications nets go down, are jammed or are overloaded by transmissions. In such cases, leaders have turned to their FOs or FIST radio operators for years and used fire support nets until command nets are restored. Beyond that, the traffic on fire support nets on element locations and activities often provides useful information to company commanders and platoon leaders.

Sam Colt's admonition to "send bullets" instead of men applies today. And FISTs provide the expertise and capabilities to get those big bullets where we need them most.



Colonel David H. Petraeus, Infantry, has commanded the 1st Brigade and 504th Parachute Infantry Regiment, 82d Airborne Division, Fort Bragg, North Carolina, since June 1995. Prior to his present assignment, he was the Chief Operations Officer of the UN Mission in Haiti and G3 of the 101st Airborne Division (Air Assault), Fort Campbell, Kentucky. Colonel Petraeus commanded the 3d Battalion, 187th Infantry, part of the 101st Airborne Division, and a rifle company in the 24th Infantry Division (Mechanized), Fort Stewart, Georgia. He also served as a Battalion and then Brigade S3 in the 3d Infantry Division (Mechanized), Germany. He earned a Doctorate in Public and International Affairs from Princeton University.

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The Ultimate FO: Lieutenant John Fox

Medal of Honor Winner



Fifty-two years after he gave his life calling in fires to cover his unit's withdrawal, First Lieutenant John R. Fox received the Medal of Honor. In a ceremony at the White House 13 January, the President awarded Medals of Honor to seven African-Americans, all but one posthumously, for heroic actions during World War II—the only blacks to receive the nation's highest honor during that war. Among them was First Lieutenant John R. Fox from Cincinnati, Ohio, who made the ultimate sacrifice for his fellow soldiers while serving as a forward observer (FO).

The Citation. "The President of the United States of America, authorized by Act of Congress on March 3, 1863, has awarded in the name of The Congress the Medal of Honor to First Lieutenant John R. Fox for conspicuous gallantry and intrepidity at the risk of his life above and beyond the call of duty:

"First Lieutenant John R. Fox distinguished himself by extraordinary heroism at the risk of his own life on 26 December 1944 in the Serchio River Valley in the vicinity of Sommocolonia,

Italy. Lieutenant Fox was a member of Cannon Company, 366th Infantry, 92d Infantry Division, acting as a forward observer while attached to the 598th Field Artillery Battalion.

"Christmas Day in the Serchio Valley was spent in positions occupied for some weeks. During Christmas night, there was a gradual influx of enemy soldiers in civilian clothes, and by early morning, the town was largely in enemy hands.

"An organized attack by uniformed German formations was launched around 0400 hours on 26 December 1944. Reports were received that the area was being heavily shelled by everything the Germans had, and although most of the US infantry forces withdrew from the town, Lieutenant Fox and members of his observer party remained behind on the second floor of a house, directing defensive fires.

"Lieutenant Fox reported at 0800 hours that the Germans were in the streets and attacking in strength. He called for artillery fire increasingly closer to his own position. He told his battalion commander, 'That was just where I wanted it. Bring it in 60 yards!' His commander protested the bombardment would be too close. Lieutenant Fox gave his adjustment, requesting the barrage be fired. The distance was cut in half.

"The Germans continued to press forward in large numbers, surrounding the position. Lieutenant Fox again called for artillery fire with the commander protesting again, stating, 'Fox, that will be on you!' The last communication from Lieutenant Fox was, 'Fire It! There's more of them than there are of us. Give them hell!'

"The bodies of Lieutenant Fox and his party were found when his position was taken. This action by Lieutenant Fox, at the cost of his own life, inflicted heavy casualties, causing the deaths of approximately 100 German soldiers, thereby delaying the advance of the



enemy until infantry and artillery units could be reorganized to meet the attack.

"Lieutenant Fox's extraordinarily valorous actions exemplify the highest traditions of the military service."

The Medal. The Medal of Honor was created during the Civil War as the first permanent individual medal for "gallantry in action." Early in the Civil War, General-in-Chief of the Army Winfield Scott killed the idea of such a medal because he thought it smacked of European affectations. However the Navy persevered, and through Public Resolution 82, the Navy Medal of Valor was signed into law by President Abraham Lincoln in December 1861. The medal was "to be bestowed upon such petty officers, seamen, landsmen and Marines as shall most distinguish themselves by their gallantry and other seamanlike qualities during the present insurrection."

In July of 1862, a similar resolution was signed into law for the Army, providing for a Medal of Honor "to such noncommissioned officers and privates as shall most distinguish themselves by their gallantry in action and other soldierlike qualities during the present insurrection."

The Congress made the Medal of Honor a permanent decoration for all serving in the military in 1863.

During World War I, General John J. Pershing became concerned that the Medal of Honor, the nation's highest military medal, was being awarded too frequently and losing its distinction. He established stricter criteria for the medal's award. The medal was to go to one "who distinguishes himself conspicuously by gallantry and intrepidity at the risk of his life above and beyond the call of duty" with an act "so conspicuous as to clearly distinguish the individual above his comrades." To recognize significant gallantry not qualifying for the stricter criteria, the Distinguished Service Cross (DSC) was created as the nation's second highest military award.

Of the 2,299 Medals of Honor awarded to Army personnel since the medal's inception, 52 were awarded to African-Americans, but only one in World War I (posthumously in 1991) and none for World War II. Of the 1.2 million black Americans who served in all branches of the military during World War II, none of the 433 Medals of Honor were awarded to blacks.

In 1993, the Secretary of the Army launched a full-scale probe, commissioning a study to determine if World War II African-American soldiers had been recommended for Medals of Honor and their awards had been rejected as an act of racial discrimination. The study found that in both the Civil War and Spanish-American War, blacks had

received Medals of Honor roughly in proportion to the number of blacks to whites in military service during those wars. However, during World War II, there seemed to be a general understanding that the DSC was the highest award for gallantry a black man could be worthy of.

The study examined the war records of all African-Americans recommended for the Medal of Honor or receiving the DSC. On 23 September, 1996, Congress approved Medals of Honor for seven black World War II servicemen, including Lieutenant Fox. Congress righted a half-century old wrong.

John Fox, The Man. John R. Fox was born 18 May 1915 in Cincinnati. He met his wife Arlene, a native of Abington, Massachusetts, at Wilberforce University, an all-black school in Ohio. When he graduated in 1941, he went into the Army immediately as a lieutenant; his daughter, Sandra, was born before he left for World War II. Killed in action on 26 December 1944 at the age of 26, John Fox was buried at Colebrook Cemetery in Whitman, Massachusetts.

Friends of the family worked for years to get Fox recognized for his heroic actions. Their efforts culminated in 1982 at Fort Devens, Massachusetts, where Arlene Fox and her daughter accepted the DSC on Lieutenant Fox's behalf.

Mrs. Fox, 77 years old, now of Houston, Texas, also accepted the Medal

of Honor on behalf of her husband at the White House in January. Her description of her soldier husband: "He wanted to make the Army his life, regardless of the hardships....He always said he would never ask his men to do anything that he would not do himself....He wanted to make a difference."

In addition to the Medal of Honor, First Lieutenant John R. Fox earned the Bronze Star (posthumously), Purple Heart (posthumously), American Defense Service Medal, European-African-Middle Eastern Campaign Medal, World War II Victory Medal (posthumously) and Combat Infantryman Badge.

On a cold day in December far across the ocean from family and friends, John Fox and his small observer party volunteered to stay behind and call in artillery to protect his withdrawing unit. In the face of a Nazi advance, he called in artillery closer and closer to his position, ensuring his significantly outnumbered unit had time to regroup. Finally, above and beyond the call of duty, he called in artillery on his own position.

Later, when US forces took the town of Sommocolonia, they found his riddled body among those of more than 100 enemy soldiers. He had put the lives of the men in the unit he was supporting ahead of his own life—the ultimate FO.

Editor

Salute Battery Names Howitzer After a Medal of Honor Winner

In a ceremony 28 February, the 2d Battalion, 2d Field Artillery of the 30th Field Artillery Regiment at Fort Sill, Oklahoma, named one of its Salute Battery howitzers after Staff Sergeant Ruben Rivers, a World War II Medal of Honor winner from Tecumseh, Oklahoma. Rivers was awarded the medal posthumously by the President of the United States 13 January along with six other African-American World War II heroes denied the medal due to their color. Rivers was a member of A Company, 761st Tank Battalion in France on 16 to 19 November when he distinguished himself. Wounded with his leg slashed to the bone and repeatedly refusing morphine or evacuation, Sergeant



Rivers took command of a second tank when his was destroyed and fought with his company into the town of Guebling. When the company was stopped by enemy fire, the commander ordered the company to withdraw to cover. Sergeant

Rivers radioed, "I see 'em. We'll fight 'em!" and opened fire on enemy tanks along with another tank from A Company, enabling his company to withdraw. Rivers died when his tank was hit during the battle.



Fire Support for the Nordic-Polish Brigade—

An Interoperability Lesson for the Future

Text and Photos by Captain Harold M. Knudsen

Five years ago, it would have been unimaginable for a US Army Europe (USAREUR) direct support (DS) FA battalion to foresee the task of providing an allied maneuver brigade its fire support—a firing battery and a brigade fire support element (FSE)—augmented by a US Army Pennsylvania National Guard detachment providing the fire support team (FIST) slice. Add the fact that the allied maneuver brigade, itself, was multinational, comprised of elements from ten allied countries. Combine all this to form one of Task Force Eagle's three maneuver brigades in the US sector of NATO's Implementation Force (IFOR) and deploy it to Bosnia-Herzegovina to enforce the peace. It sounds like something out of a Tom Clancy novel; however, this unprecedented organization came to life during Operation Joint Endeavor as the Nordic-Polish Brigade.

The Nordic-Polish Brigade, headquartered in Dobož, was comprised

of one Danish battalion (one mechanized company and one tank company), one Swedish pure mechanized battalion and one Polish parachute battalion with BMP (tracked infantry combat vehicles) and BRDM (armored reconnaissance vehicles). Additionally, the brigade included a Finnish construction battalion, a Norwegian logistics battalion and infantry platoons from Lithuania, Latvia and Estonia. It even included a few Icelanders. The brigade was responsible for controlling the largest and one of the most unstable areas in the Task Force Eagle sector, an area that also had the highest mine density in Bosnia-Herzegovina.

As US and NATO armies continue to shrink, coalition efforts, such as Joint Endeavor, will occur more often. Hence, small contributions from many nations will come together to form a large army like the IFOR. Interoperability will be a challenge.

American soldiers in the Nordic-Polish Brigade worked interoperability issues

daily and helped develop new tactics, techniques and procedures (TTP) to accomplish the mission—many of which deviated from US doctrine or TTP. This article outlines the unique organizations and multinational operations for the Nordic-Polish Brigade from its formation in January 1996 through November 1996 as 1st (US) Armored Division personnel rotated out of the theater. The article gives examples of how US fire supporters expanded doctrine and used equipment to adapt to multinational organizations.

Unique Organizations

Nordic-Polish Brigade FSE. The FSE the US sent was standard but, upon arrival, was added to the Nordic FSE, which made the brigade FSE unique and robust. The FSE was led by a Norwegian lieutenant colonel fire support coordinator (FSCoord) and had a Norwegian major, Swedish major, Polish major and, from the US, a major, captain, sergeant first class, staff sergeant and two specialists who operated the radios and initial fire support automation system (IFSAS).

Our personnel robustness allowed us flexible shift routines; we trained the allied officers on our equipment, and they used it in the absence of US members. In addition, our Scandinavian and Polish officers, who also spoke English, helped bridge the language barriers and

doctrinal misunderstandings that sometimes arose.

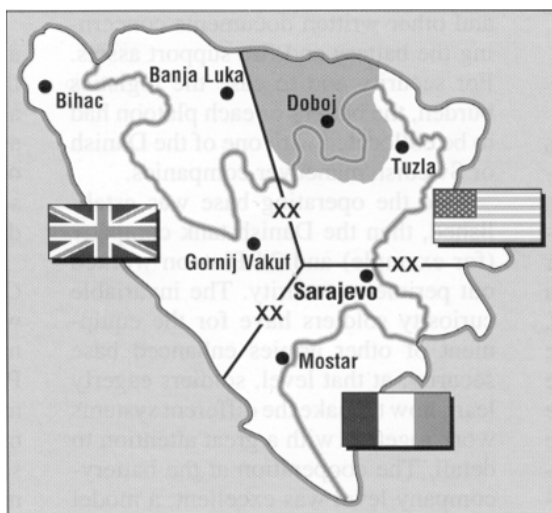
The air liaison office (ALO) cell came under the FSE. It consisted of three tactical air control parties (TACPs), two from Denmark and one from Norway. The TACPs road in M113 armored personnel carrier (APC) variations and worked closely with the FISTs and combat observation laser teams (COLTs) to direct artillery, helicopters and fixed-wing aircraft. The TACPs, FISTs and COLTs complemented each other's radio and laser capabilities.

Forward Command Post. In actuality, we had parts of three brigade FSEs: the Nordic FSE; the US FSE from the 2d Battalion, 3d Field Artillery (2-3 FA), part of the 1st Armored Division; and an FSE from the Pennsylvania Army National Guard. The 2-3 FA people and equipment basically were absorbed into the Nordic FSE while the National Guard FSE remained separate.

The National Guard FSE functioned in the brigade's forward command post (CP), the equivalent of a US brigade tactical command post (TAC). Two high-mobility multipurpose wheeled vehicles (HMMWVs)—one built up and carrying an IFSAS and one with a mobile subscriber radio terminal (MSRT)—departed with the brigade commander's forward CP. The soldiers in this FSE lived at the battery headquarters and, when not deployed, concentrated on logistics, maintenance and other administrative matters.

The recall status for the National Guard FSE was six hours unless an increased level of readiness was required. The rest of the forward CP consisted of three APCs with tent extensions and the FSE radios remoted into the tents. This arrangement gave the commander greater flexibility to control operations at a distance from the brigade headquarters at Dobo.

COLTs and FISTs. Initially, there were no observers at the battalion level and below because our Scandinavian allies brought no artillery assets. Eventually, the National Guard detachment from the 28th Infantry Division (Mechanized) was identified to provide FIST personnel. But prior to its arrival, we employed a non-doctrinal stop-gap. A FIST vehicle (FISTV)-equipped COLT was attached from one of the US brigades to each of the three maneuver battalion headquarters in the Nordic-Polish Brigade. Each COLT had four men: a lieutenant, sergeant and



Bosnia-Herzegovina During Operation Joint Endeavor. The darker area around Dobo is the Nordic-Polish Brigade's area of responsibility in the US-led Task Force Eagle sector.

two fire support specialists. For most of the month of February, the COLTs were the artillery liaisons at their battalions.

We considered centralizing the COLTs at the brigade-level and farming them out to the battalions or companies as the missions required. Ultimately, we decided linking them to the battalions was more desirable to forge the all-important multinational relationships.

Once at the battalion, the COLT priorities were to integrate fire support into base camp defense plans and determine the best method to provide fire support to its maneuver companies. The

COLT also conducted initial target area survey around its base camp, at checkpoints and along routes. The COLTs filled the role of the artillery liaison team, but they also worked on the battalion staffs, advising the maneuver S3s and helping to coordinate US assets.

In late February, the 40-man National Guard contingent completed our organization for fire support. Fire support for the companies was provided by nine, two-man forward observer (FO) parties using HMMWVs, ground-mounted versions of the ground/vehicular laser locator designators (G/VLLDs), forward-entry devices (FEDs), precision lightweight global positioning system receivers (PLGRs) and the single-channel ground and airborne radio system (SINGARS). Each team

consisted of a lieutenant and a sergeant or fire support specialist from a task-organized unit of the Pennsylvania National Guard: the 1st Detachment, 28th Field Artillery (1-28 FAD).

The National Guard battalion FSEs were four-man sections, each with a captain, a fire support sergeant and two fire support specialists. Each had two HMMWVs, an IFSAS and SINGARS. All three battalion FSEs operated out of fixed sites in their respective battalion base camps with much of their equipment ground-mounted using portable power supplies.



Front gate of the Nordish-Polish Brigade Headquarters at Dobo.

Multinational Operations

Doctrine for adequate fire support is normally a DS battalion for each committed maneuver brigade. Assuming a linear battlefield, the battalion is normally deployed behind the maneuver brigade six to eight kilometers covering a parallel 15-to 20-kilometer battalion front.

Platoon Operations. Although the mission in the Nordic-Polish Brigade was nonlinear, the brigade only had one battery (from 2-3 FA) to provide fire support for three battalions. The Nordic-Polish Brigade area of responsibility (AOR) was the largest in the US sector and included 156 kilometers of the four-kilometer-wide zone of separation (ZOS). At no time could the battery's two platoons cover more than 50 percent of its AOR or 90 percent of its ZOS.

The battery had to conduct platoon operations to increase the area supported by artillery. Such operations were at the expense of the ability to mass fires. When the mission required fire support for a different part of the brigade AOR, a platoon moved out of its operating base and occupied a position within range of potential targets. The occupations lasted anywhere from a few hours to a week and became known as "support-the-force missions." They were similar in planning and methodology to an artillery raid but were less time-sensitive.

Integration of the Battery. In previous tours of duty in the former Yugoslavia, the Scandinavians had not had the luxury of field artillery support, so the positioning of their companies was not done with artillery in mind. Some of the camps were already occupied by a mechanized or tank company a month and a half prior to the US platoons' arrival.

Most camps were selected for the decent buildings for long-term housing rather than for their tactical locations within the brigade AOR. Others were chosen because of the space available after eliminating areas with mine fields or restrictive terrain. Thus, adding the howitzer platoon and employing it brought new considerations and required some flexibility.

Our immediate concerns were to integrate the battery into the brigade and then position it. The brigade G3 staff was very receptive to the battery and always planned for it in operations. The FSE actually handled the various orders and other written documents concerning the

battery and fire support assets. For security and to ease the logistics burden, the battery or each platoon had to be collocated with one of the Danish or Swedish maneuver companies.

Once the operating base was established, then the Danish tank company (for example) and 2d Platoon worked out perimeter security. The invariable curiosity soldiers have for the equipment of other armies enhanced base security; at that level, soldiers eagerly learn how to make the different systems work together with a great attention to detail. The cooperation at the battery-company level was excellent, a model of tactical interoperability for units of different nationalities and branches.

The logistics provided by the brigade were barracks space, food, water, medical and some engineer and maintenance support. The US channels had to provide the JP8 (different than Danish or Swedish fuel), the third level of shop maintenance and other US-specific needs, such as mail.

Radar Support. The brigade's only target acquisition radar support came from one section: 3/A/25 FA from USAREUR's 41st FA Brigade. Although located in different positions as necessary, the radar's primary base camp was at the Danish battalion headquarters. From there, the radar established continuous voice and digital communications with the brigade FSE. Because the brigade had no targeting cell in the radar section, the brigade FSE, assisted by the radar section warrant officer, analyzed radar acquisitions.

In Bosnia, radar sections were rotated among Mount Vis on the ZOS; Tuzla, the

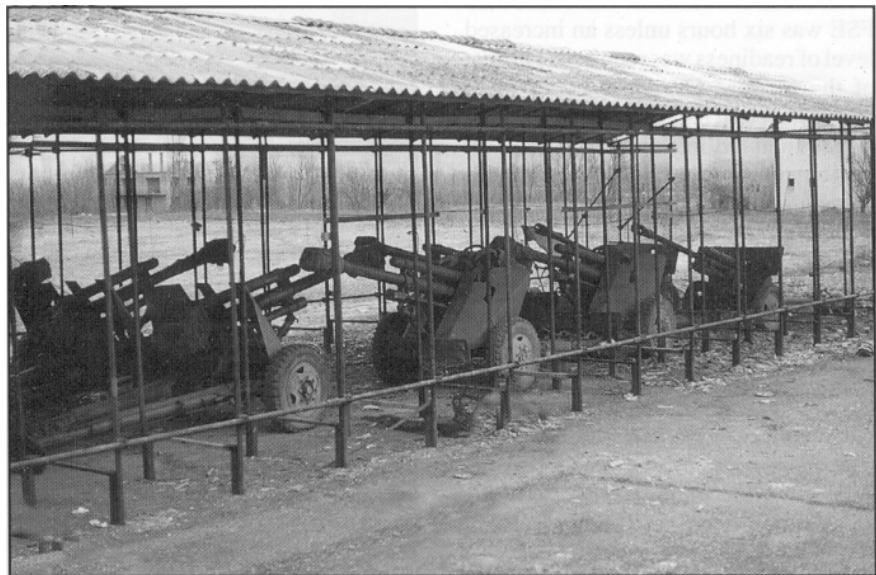
former Yugoslavian Air Force Base and headquarters for Task Force Eagle; and the Nordic-Polish Brigade every one to two months. This allowed the sections to take turns at the more austere duty positions.

Multinational Command, Control and Communications. Communications were very much degraded in the first month of operations. The vast Nordic-Polish Brigade sector had plenty of mountains and dead spots to hinder communications. Also, the limitations of several types of older, non-secure equipment caused additional degradation.

The primary link from IFOR's corps (Allied Central Europe Rapid Reaction Corps or ARRC) in Sarajevo to the 1st Armored Division was the United Kingdom's Tarmigan, and then from the division to the Nordic-Polish Brigade, the US mobile subscriber equipment (MSE) was the primary comms link.

The G6 of the brigade was Danish and was responsible for establishing and maintaining communications within the brigade. The Danish chose to bring the older VRC-46 radio variations without communications security (COMSEC) and encryption devices to Bosnia.

Because the brigade radio net was non-secure and the former warring factions (Serbians, Muslims and Croats) could listen to it, we didn't use it for much. For example, on one occasion, we conducted a "dry" mortar exercise on the brigade net. Within minutes, Serbians and Muslims contacted us about why the brigade was firing mortars.



Serbian M56 105-mm artillery pieces stockpiled for inspection per the Dayton Peace Accord.

The former Yugoslavian military had an advanced capability to conduct electronic warfare (EW) and jam its enemy's communications, which the former warring factions inherited. In one instance, US helicopter pilots believed their net was jammed whenever they came near the brigade headquarters around Dobo; at times, they experienced strange interference believed to be EW equipment.

Distance compounded the problem. The Danes had a retransmission device for the non-secure brigade command net. It took almost two and a half months to get a secure US retrans device to improve fire support communication across the brigade—at first limited to a 20-kilometer radius around the headquarters.

The only other secure means of communication throughout the brigade was the excellent Danish DEOS system (similar to our MSE). This system was secure and worked well to the other base camps, but it wasn't a mobile system. Units on patrol or at checkpoints had to use their internal battalion FM nets with no secure means of communicating with the brigade.

When the US soldiers from 2-3 FA and the Pennsylvania Army National Guard arrived with SINCGARS, the fire support net became the focus for brigade command and control. During several confrontations, the fire support net allowed the G3 to issue orders through a FIST to the commanding officer on the ground.

When forced to deal with a situation occurring near the perimeter of the brigade AOR, we often used FIST relays to solve the distance problem. The FIST and ground commander used the fire support net to control air assets sent to a hot spot. Although a nonstandard method of controlling assets, circumstances dictated the FIST relay solution, which became routine.

Brigade FSE as Aviation Liaison. The Nordic-Polish Brigade had no aviation liaison officer (LNO) or organic or attached helicopter assets. All aviation support for the brigade was provided by tasking from the 1st Armored Division G3 Air to its 4th Aviation Brigade. At the direction of our FSCoord, the brigade FSE assumed responsibility for requesting and coordinating all operational uses of helicopters.

For several months, the Nordic-Polish Brigade Aviation LNO (a Swedish captain) was placed with the 4th Aviation Brigade to coordinate helicopter activities in the AOR. Later, this captain moved to the brigade FSE and coordinated and tracked

helicopter support. Using their secure SINCGARS, company and battalion fire support officers (FSOs) communicated with the helicopters in the AOR, reporting and coordinating with the brigade G3 through the brigade FSE.

Also a unique employment, we used COLTS to guide and assist helicopters on their ZOS reconnaissance missions. Once the aircraft were in the sector, it was very difficult for the brigade to get feedback from or change and add something to the daily recon mission. The COLTs and FISTs were excellent contacts for the helicopter pilots and worked closely with them almost daily.

Multinational Training. In February, the brigade FSCoord issued the first training guidance and brigade plan to train the Danes, Swedes, Poles and Norwegians as FIST members. Luckily, the 1-28 FAD came with a guard unit armory device for full crew interactive simulation training (GUARD FIST II) that was superb for training the Scandinavian infantry and armor soldiers on calling for fires.

When US soldiers were away, allied soldiers, such as the Danes of the brigade's headquarters company, became FIST members who served as FOs and used the G/VLLD. More than once, Danish headquarters company soldiers emplaced and operated our equipment. We trained soldiers of the Finnish construction battalion to call for fires and on how to defend their camp with artillery. One time, we sent Swedish infantrymen with our FISTs to the live-fire range at Glamoc in western Bosnia to practice real calls-for-fire.

The training program was an effective team builder for the brigade, especially for the Finnish who didn't work with US FOs on a daily basis.

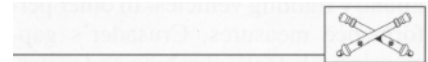
Language Challenges. Much has been learned from working with IFOR allies in this ongoing mission. The most profound lesson is the importance of being adaptable to pull separate national units together as a brigade—and to do it communicating via a second language.

We must credit our allies with their superb command of English, the second language that made most of our accomplishments possible. Proficiency in a foreign language should become a requirement for American military professional development. Not all multinational units will have command of the English language as many in the Nordic-Polish Brigade did. Even when working with allied soldiers fluent in English, displaying knowledge of their

language and culture is greatly appreciated and encourages team building.

In an operation such as Joint Endeavor, there will be some degradations of communications and cultural understanding by virtue of bringing so many different national units together, which is beyond the control of a single nation. However, the ability to expand systems—such as the US fire support system—with the least degradation in a multinational environment should be part of the goal for an Army package. Designers of the future Army should ensure US units have the equipment and doctrine to allow them to transition from a pure US, high-intensity focused organization to a multinational IFOR-type organization.

It took about a month to assemble our fire support organization from scratch: from the Scandinavians in theater transitioning from the UN mission to the IFOR mission to the last US soldiers joining the brigade and linking down to the company level. We had to overcome many challenges: from cross-leveling soldiers and equipment to accepting different philosophies and finding the best solutions to make fire support work. These exact circumstances may never occur again; however, to date, providing fire support for the Nordic-Polish Brigade was a good lesson in interoperability. There are more to come.



Captain Harold M. Knudsen was one of the Fire Support Officers in the Nordic-Polish Brigade Fire Support Element from January to July 1996 at Dobo, Bosnia-Herzegovina, during Operation Joint Endeavor. Currently, he's a Ground Forces Readiness Enhancement Observer/Controller with the 1st Brigade of the 91st Division (Exercise), US Army Reserve, at Camp Parks, California. Previous assignments include serving as Commander of A Battery, 2d Battalion, 3d Field Artillery and Assistant Division Artillery S3, both in the 1st Armored Division Artillery, Germany. During Operation Desert Storm, he served as battalion Fire Direction Officer (FDO) for the 2d Battalion, 29th Field Artillery, in the 8th Infantry Division (Mechanized) and, prior to the Gulf War, as part of the Fire Support Team (FIST) and as FDO for the same battalion while in Germany. He's a 1992 graduate of the German Army Artillery Advanced Course/Battery Commander's Course at Idar-Oberstein, Germany.

CRUSADER

UPDATE

Program Update. Crusader is in the demonstration and validation phase of development. This phase calls for the design, development, testing and delivery of two prototype Crusader systems in 2000. The prototypes will be used to demonstrate and validate Crusader's ability to meet the Army's requirements for a revolutionary cannon system.

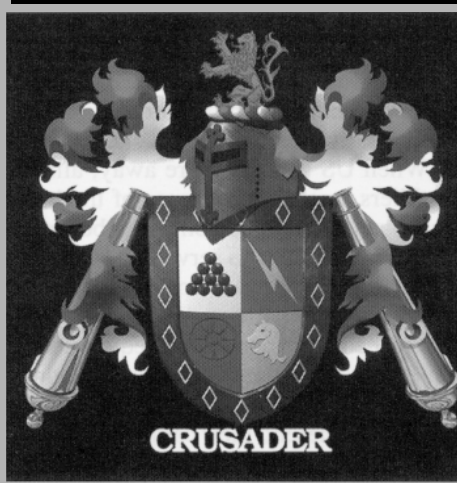
A Crusader key performance parameter is its ability to move. The difficulty the Paladin M109A6 howitzer has keeping up with maneuver forces highlights the importance of Crusader to the Army. This edition's update features the "Move" aspects of Crusader—a potent combination of speed, control and agility that define the most advanced ground combat vehicle in the world.

Move. Crusader's highway speed of at least 67 kilometers per hour, or kph, (78 kph preferred) and cross-country speed of at least 39 kph (48 kph preferred) will enable the self-propelled howitzer (SPH) and resupply vehicle (RSV) to keep up with armor and mechanized forces equipped with M1A2 Abrams tanks and the M2A2 Bradley infantry fighting vehicles. In other performance measures, Crusader's gap-crossing, obstacle-climbing and water-fording capabilities will equal or exceed those of the maneuver vehicles. The SPH and RSV are built on a common chassis that provides identical mobility characteristics and eases the burden on the maintenance and repair parts systems.

In addition to the capability of sustaining long moves, Crusader must have agility to survive on the high-threat, high-tempo battlefield of the future. The howitzer will use "shoot and scoot" tactics to evade sophisticated counterfire threats. Its ability to dash 750 meters in 90 seconds will enable it to rapidly move out of a counterfire footprint and resume a firing status as quickly as possible. The howitzer's high rate of fire gives it a voracious appetite for ammunition. For the RSV, the dash and sustained speeds will facilitate a continuous

flow of ammunition from the resupply point to the howitzers.

- **Powerpack.** The remarkably capable Perkins CV12 diesel engine includes self-cleaning air induction, electronic fuel injection and variable geometry turbocharging, and produces 1500 horsepower for vehicle movement and power generation (compared to Paladin's 440 horsepower). Crusader's engine is coupled to a hydromechanical, hydraulically actuated transmission.



The combined powerpack is positioned in the vehicle with strong consideration for maintainability.

The rear engine design allows the crew to easily roll out the powerpack for maintenance with on-board tools. The cooling system is integrated with the powerpack, and the entire package comes out as one unit, allowing the maintainer to troubleshoot without a ground hop kit. To reduce the need to idle the engine for prolonged periods, an alternate source of low power will be available to sustain the vehicles' critical functions while in a hide position or when the crew is placed in a "warm" status.

- **Track and Suspension.** Unlike Paladin, which employs torsion bar suspension, Crusader's ride will be smoothed by external hydropneumatic suspension

units. This technology was chosen for weight savings and increased reliability and to minimize intrusion into the vehicles' internal volume. For good trafficability in a wide range of soils, the track will be 25 inches wide. The primary contender is the T158LL track on the M1 tank, although lighter alternatives are being considered.

- **Crew Interface.** The driver will control the vehicle's movement using aircraft-like, drive-by-wire controls. This feature is not only space and weight efficient, but also will permit any of the three crew members to drive the vehicle, if necessary. On-board global positioning system (GPS) receivers coupled with a full set of navigation and movement planning decision aids will enable the crew to "shoot and scoot." These capabilities won't increase the movement coordination and planning burden on the chief of section.

- **Weight.** A technical challenge facing Crusader developers is keeping the vehicle within the 55-ton combat-loaded weight limitation. At 55 tons, Crusader is near the upper weight limit efficiently recoverable by the M88A1, the primary recovery vehicle projected for Crusader battalions. In addition, a 55-ton fielding weight allows growth potential without exceeding the rail, highway, plane and sea transportation assets that will move Crusader to combat theaters around the world. A wide range of material and design options, including the use of composite material armor, are being investigated to meet this requirement.

Conclusion. Fire support officers, take note of the mobility improvements Crusader brings to the artillery. These improvements will ensure Crusader is at the right place, at the right time, to provide overwhelming fires on the enemy. Crusader will ensure you never again have to face the angry glare of a maneuver commander who outran his supporting howitzers.

MAJ John R. Holland, FA
Field Artillery School Representative
Team Crusader, Minneapolis, MN



Universal Observers: Punching our FIST into the 21st Century

By Major Vance J. Nannini

With the fielding of the M109A6 Paladin and the Field Artillery tactical data system (AFATDS) and the trends leading to the development of Crusader and other systems and munitions, it's an exciting time to be a Field Artilleryman. At the same time, however, the light force fire support team (FIST) basically has remained unchanged in its mission and training since the 1970s. It still is

relegated to controlling mortar and Field Artillery (FA) fires without the training and equipment to most effectively control close air support (CAS) or naval surface fire support (NSFS).

It's time to revise doctrine and leverage technology to take the FIST into the 21st century. Although this article focuses on the FISTs supporting light forces, most of the recommendations also apply to FISTs supporting heavy forces.

First FISTs

FISTs evolved in the post-Vietnam War era when the infantry mortar forward observers (FOs) were combined with the FA FO structure. This was the result of the findings of the 1975 Close Support Study Group I (CSSG I), which had the mission statement "to optimize observed fire support for maneuver forces on the modern battlefield." CSSG I was initiated by the concern that separate mortar and FA observer structures were inappropriate on the modern battlefield as Army units operated over increasingly wider frontages.

Twenty years later, the FIST remains primarily the same—responsible for controlling mortar and FA fires—while Air Force forward air controllers (FACs) control CAS and firepower control teams (FCTs) provided by Marine air-naval gunfire liaison companies (ANGLICOs) control naval surface fire support (NSFS) as well as Navy or Marine CAS.

Jointness is a good thing, but not at the company level. As our company fire support structure is organized, a rifle company commander leading his company into battle can end up with his own FIST (nine to 10 soldiers), a USAF enlisted terminal attack controller (ETAC) and a FCT with six Navy and Marine personnel. Except for his habitually associated FIST, he probably will never have seen the other fire supporters.

The joint fire support "slice" should stay at the battalion level or higher to coordinate functions. The company commander at the "pointy end" of the battle does not need a lot of advisors—and he needs to have confidence in the personnel he's taking into combat. The commander needs to be able to turn to his company fire support officer (FSO) and say, "Engage that," and have the confidence the required actions will be taken.

The battlefield requirements that led to the formation of the 1970s FIST have continued and bypassed our late-90s FIST. To catch up, we must eliminate the "stovepipe" manner of providing fire support for our maneuver companies and ensure every FO is fully trained and equipped to control all available fire support. It's time to take the FIST into the realm of universal observers. This article identifies doctrinal, training and materiel requirements to make this concept possible.

Doctrine and Training

Close Air Support. The doctrine and tactics, techniques and procedures (TTP) for controlling CAS are well established (see *Joint Pub 3.09-3 Joint Tactics, Techniques and Procedures for Close Air Support*). The biggest obstacle that must be overcome in the universal observer concept is the parochialism within the Air Force (and Navy and Marine aviation communities, as well) that requires an ETAC, forward air controller (FAC) or air liaison officer (ALO) to control CAS strikes. Ostensibly, the argument is that a ground officer or NCO cannot "visualize the cockpit" or place himself in the pilot's perspective during a CAS run. However, the Air Force's adoption of the ETAC concept has demonstrated that one does not have to be a pilot to control a CAS strike.

Air Force doctrine permits Army personnel to control CAS only under emergency CAS (ECAS) situations. The Air Force defines ECAS as those CAS "missions conducted under emergency wartime conditions when a qualified terminal attack controller is unable to provide terminal attack control" [*Air Force Instruction (AFI) 13-103 Air Support Operations Center (ASOC) and Tactical Air Control Party (TACP) Training and Evaluation Procedures*, Page 3].

However, trends leading to an even greater dispersion of forces on the battlefield also lead to ECAS' becoming the norm. Widely dispersed forces operating in restrictive terrain coupled with the dual requirements to preclude fratricide and minimize collateral damage mandate that direct control—where the controller can see the target and friendly forces—will be the standard method of

controlling CAS. Yet the assumption is that a lone ETAC with each company will be able to be in the right place at the right time to control the mission.

As a result, we are not preparing our FOs to control CAS—the very soldiers who probably will be in position to see the strikes. Additionally, with the FOs' increased situational awareness, they should be the professionals to control CAS for the infantry companies. The Army should train FOs as terminal attack controllers, eliminating the need for ETACs at the company level.

FOs need practical experience in employing CAS, and one major challenge is getting CAS assets to train with. The Army and Air Force have a well developed program where the Air Force supports Army airlift requirements through the Joint Army/Air Force Air Transportability Training (JA/AAT) program. JA/AAT works, but the process currently used to schedule Air Force CAS training does not.

Where the Air Mobility Command is the final arbiter for JA/AAT, the Air Combat Command does not play a similar role for CAS training. CAS training requests are submitted to the appropriate Numbered Air Force (NAF), and these requests are then forwarded to subordinate fighter wings and squadrons. The wings and squadrons then select the missions they want to fly. Couple that process with the Air Combat Command's goal that squadrons only fly five percent of their sorties in CAS training missions—not including Air Warrior support for combat training center (CTC) rotations—and it's easy to see why there's not a lot of live CAS training.

We need an Army-Air Force JA/AAT-type conference to "contract"

CAS training on a predictable basis. Additionally, the Air Force must increase the number of sorties it dedicates for CAS training. Much like air support is apportioned, allocated and distributed in combat, it must be apportioned, allocated and distributed for peacetime training.

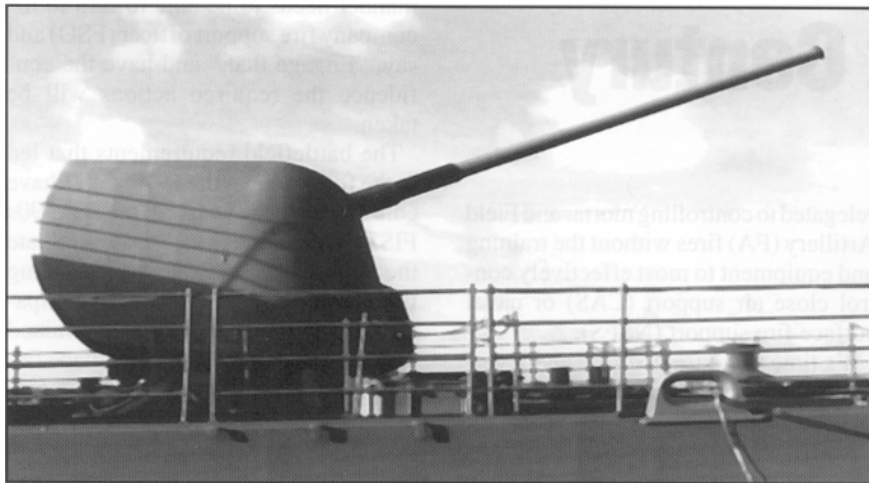
The use of simulators is the second source for CAS training that the Army should pursue with the Air Force. Recent training events organized by the Joint and Multi-Service Distributed Training Testbed (JMDT²) out of Langley AFB, Virginia, conducted a test at Fort Knox, Kentucky, last summer that successfully linked Army fire supporters with Air Force pilots executing CAS missions through simulation. Using this technology reduces the resources required for "live" CAS training and allows multiple iterations of CAS scenarios in a risk-free environment. Additionally, pilots and ground controllers can "refly" their missions in after-action reviews (AARs)—something not possible in live CAS missions.

The Army must couple these changes in doctrine and training with a comprehensive certification program in controlling CAS. The Air Force uses a very detailed program, as identified in AFI 13-102, to certify its ETACs and FACs to control CAS. This program involves a series of qualification gates, easily adaptable to Army use (most Army FOs are already proficient in most of the tasks). A standardized training, evaluation and certification program that parallels AFI 13-102 is essential for Army fire supporters to serve as credible terminal attack controllers.

Naval Surface Fire Support. Just as with CAS, the doctrine and TTP for controlling NSFS are well established. The biggest challenge in FIST control of NSFS is training proficiency and communications requirements.

The challenges in conducting live NSFS training are apparent. We only have two NSFS ranges in or near the continental United States: Vieques Island, Puerto Rico, and San Clemente Island, California. The expense of transporting significant numbers of fire supporters to these locations for periodic training is prohibitive. Additionally, the limited number of NSFS platforms and projectiles for training limits the number of live-fire training opportunities.

In terms of NSFS, however, training requirements can be met almost entirely by simulation. The conduct of a NSFS mission is very similar to the conduct of mortar and FA missions. Except for



The Navy's five-inch (modified Mark 45) gun will have a range of more than 60 miles.

some nuances, indirect fire is indirect fire. Army fire supporters already improvise NSFS training using NSFS call-for-fire and subsequent correction procedures when using the training set, fire observation (TSFO) simulator and when conducting mortar or Field Artillery live-fire training.

However, our FOs still need practical experience; each fire supporter should conduct at least one live NSFS mission just before or shortly after he assumes platoon FO responsibilities. (This training can be coordinated by the division artillery headquarters.) The skill transference from mortar and Field Artillery live fires coupled with improved simulation training will be enough to sustain NSFS proficiency.

NSFS communications, however, deserve more attention. Although ships are equipped to communicate with our single-channel ground and airborne radio system (SINCGARS), there are obvious range limitations.

The NSFS communications fix is relatively simple and involves revising communications net structures to have the NSFS call-for-fire relayed from the FO to the supporting ship through the battalion fire support element (FSE). At the battalion FSE, the call-for-fire can be relayed to the ship by either an ANGLICO-provided supporting arms liaison team (SALT) or equipping the battalion FSE with high-powered, high-frequency (HF) radios.

We should not equip our FOs with HF radios. Not only would the radio increase the FO's already significant combat load, but also the current man-portable HF radio (the AN/PRC-104) lacks the power to reliably communicate with ships operating at or near their maximum range. This will be especially true if the Navy fields its new five-inch gun mount (modified Mark 45) that has a range of more than 60 miles.

Finally, when the Navy enters the digital environment for NSFS, calls-for-fire will travel a fire support "Internet" to the supporting NSFS platform, virtually eliminating the need for voice communications.

Improved Simulator Requirements. FO training must grow beyond conducting fire missions into a very familiar impact area from static observation posts. While this technique is useful for assessing the gunnery team under standardized conditions, real-life contingency operations will include urban and heavily vegetated areas. We are not training

platoon FOs to control fires in those environments.

Most AARs from Joint Training Readiness Center (JRTC) rotations at Fort Polk, Louisiana, have identified the difficulty FOs have bringing fire support to bear in the decentralized, close-in fight in the Louisiana woods. FISTs need an indirect fire simulator that can replicate the close fight in urban and heavily vegetated areas so they can train for combat properly.

The FO's TSFO has been replaced by the guard unit armory device for full-crew interactive simulation training (GUARD FIST II). However, it takes an experienced operator to simulate CAS and NGF training, and the system has no urban or wooded environment option.

Simulators with more realism are available "off the shelf." Some fire supporters have worked fire support scenarios using M-1 and Bradley fighting vehicle simulators. Other simulators, such as the fire arms training system (FATS) and the Marine Corps' infantry squad trainer, with some modification, can be used to fill the fire support training gap. Virtual reality is another area that offers the potential for training our FOs in peacetime to execute close-in fire support operations in combat.

FIST Materiel

Communications Equipment. The foremost requirement to move FISTs into the realm of universal observers is a true multi-functional radio—very high-frequency, frequency-modulated and amplitude-modulated (VHF FM/AM) as well as ultrahigh-frequency (UHF)—in one system. This capability would allow any FO to control any asset he was qualified to control. Fire support responsibilities would no longer have to be stovepiped based on what radio the fire supporter was carrying.

With a multi-functional radio, an FO could, for example, quickly change bands and go from controlling an FA mission to



The AN/PRC-117D—a multi-functional radio.

controlling a CAS strike. Such capabilities already exist in the AN/PRC-117D and AN/PRC-139 radios.

The FO also needs a digital communications device that can interface with AFATDS, connecting the FO (as a first-line sensor) with the entire joint fire support system. The digital device must be realistic, however. The current AN/PSG-2 forward entry device (FED) is not appropriate for a light infantry FO. The light force FO must keep up with the platoon leader with his map in one hand and his rifle in the other with his radio handset crammed under his chin—he needs a "third" hand to punch in a digital call-for-fire in a FED.

Leveraging technology, the FO should have a voice-controlled digital device that works off his handset and is integral to his radio. With minimal keys on the handset to set up the basic formatting, the FO would "read" the required fire mission data into his handset. The device then would transform the information into a digital message format and transmit the message. Considering the limited formatting required to control fire support strikes (the computer would probably have to recognize less than 100 words), this capability should be easily achievable.

Laser Rangefinder/Target Locator. The Human Engineering Laboratory Battalion Artillery Tests (HELBAT) conducted in the 1970s identified that the major challenge for FOs was determining an accurate target location—a challenge that remains. The ability to accurately determine target location is a paramount requirement for the universal observer. Coupling a laser rangefinder with an integral compass and a precision lightweight ground receiver (PLGR) has been demonstrated successfully and would allow the FO to rapidly and accurately determine a target's location.

Such a device would virtually eliminate target location errors (TLEs), permitting first-round fire-for-effect for indirect fire missions, if the other four requirements for accurate predicted fires are met. For CAS missions, such accuracy would eliminate the need to "talk" a CAS pilot onto the target. The "pipper" in the pilot's heads-up display (HUD) could show the target location so the pilot could then fly his aircraft as required to engage the target. The Leica Vector IV and Litton Mark VII are two such systems available, and the FO/FAC system being developed by the Marine Corps soon will be.

Finally, the recently fielded miniature eye-safe laser infrared observation system (MELIOS) retains one of the major flaws of the AN/GVS-5 laser rangefinder that it replaced: it is virtually useless at night. If US forces are to truly "own the night" and fight as well at night as during the day, FOs must be able to provide the required support. FOs need a laser rangefinder

with an integral night-vision device.

Laser Target Designators. The ability to direct delivery of precision-guided weapons is another FIST capability that needs upgrading. The AN/PAQ-1 laser target designator has reached the end of its life, and the AN/TVQ-2 ground/vehicular laser locator designator (G/VLLD) with its tripod, power supply and thermal sight is too large and bulky for dismounted fire supporters to employ effectively. Although Army special operations forces (SOF) recently have fielded the very capable AN/PEQ-3 SOF laser and marking system (SOFLAM), this designator is not scheduled for delivery to the rest of the Army.

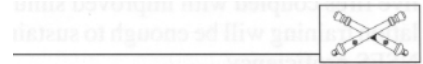
The light fire supporter sorely needs a new, lightweight, night-capable laser designator. The lightweight laser designator (LLDR), although currently unfunded, is a valid requirement. Analyzing the potential battlefields of the future, the LLDR should be modular (compact for dismounted operations) and allow laser designation up to approximately 2,000 meters in one configuration for urban and forested areas (shortrange module) and up to 5,000 meters in a second configuration for operations in deserts and other areas with long-range visibility (long-range module). The LLDR also must be fielded with an integral night-vision site for operations in darkness with "snap-on" boresighting.

Implementing the FIST concept in the 1970s required great vision. But, once again, it's time "to optimize observed fire support for maneuver forces on the

modern battlefield."

Technological advances in communications and laser rangefinders/target designators coupled with improved training will allow us to remove the communications-derived fire support stovepipe and move our FIST into the role of universal observers.

We can and must eliminate the need to deploy fire support specialists from sister services at the company level. We need the right observer in the right place at the right time with the right equipment to fully support the ground commander day and night, well into the 21st century.



Major Vance J. Nannini has more than six years of experience as an Fire Support Officer (FSO) at the company, battalion and brigade/regimental levels with the 82d Airborne Division at Fort Bragg, North Carolina; 101st Airborne Division (Air Assault), at Fort Campbell, Kentucky; 1st Ranger Battalion at Hunter Army Airfield, Georgia; and, currently, for the 75th Ranger Regiment, Fort Benning, Georgia. As an FSO, he participated in Operations Urgent Fury in Grenada in 1983 and Just Cause in Panama in 1989. He also has had firing battery and battalion staff assignments, to include commanding A Battery, 8th Battalion, 8th Field Artillery, 2d Infantry Division Artillery in Korea and serving as S3 for the 2d Battalion, 320th Field Artillery, 101st Airborne Division. Major Nannini earned a Master of Military Arts and Science in Strategy from the Command and General Staff College, Fort Leavenworth, Kansas.

Forward Observer's Lament

**You climb up the mountain in the drizzling rain,
You study the map and then the terrain.
All you see is the rain and the mud,
The radio's dead, and the first round's a dud.**

You shoot 16 rounds and what do you get?
No registration and soaking wet.
S3, don't you call me cause I can't wait—
Someone stole the wire to my double E8.

**You look for the RP, and it's easy to see,
1,000 yards from your OP.
You multiply one by the sensing in mils,
And the rounds come out on the distant hills.**

You shoot 16 rounds and what do you get?
No registration and soaking wet.
S3, don't you call me cause I can't go—
I sold my soul to the FDO.

**My buddy takes it easy most every day—
They bring him pills on a sterile tray,
His last command was "Roger, wait"—
Then the rounds fell in on OP 8.**

He shot 16 rounds and what did he get?
A padded cell and he lives there yet.
A Purple Heart hangs over his bed,
And the sun shines through a hole in his head.

**This is the end of the FO's song—
Some people say a man can't go wrong,
But they've never been on an old OP
And suffered the mistakes of the FDC.**

FOs of the 78th Artillery
4th Armored Division
Stars and Stripes, 1959

Company Fire Support Matrix— *Getting it Right at the First Line of the Fight*

by Sergeant First Class Sean E. Harris

Many company fire support officers (FSOs) don't know how to create the fire support products they need to convey the fire support plan to their units during rotations at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana. This results in forward observers (FOs), mortarmen and other company leaders not knowing what indirect fire support is available or how to employ what is available. Likewise, mortarmen don't know their part in the fire support plan. Finally, the lack of effective fire support products results in company leaders not knowing how indirect fires will support maneuver.

The fire support team (FIST) is responsible for fire support planning and coordination at the company level. In conjunction with his maneuver commander, the company FSO develops the fire support plan and briefs it to the platoon leaders and his FOs.

One technique that works well is for the FSO to communicate the fire support plan in three documents: the company fire support matrix (which includes a fire support execution matrix, or FSEM), company target list work sheet and company fire support overlay. From the fires paragraph and the fire support annex portions of the task force (battalion) operations order (OPORD), the FSO gathers much of the information he needs for his company products.

This article tells the company FSO how to develop a company fire support matrix and, briefly, what is included in the company target list work sheet and company target overlay.

Company Fire Support Matrix. *FM 6-20-20 Tactics, Techniques and Procedures for Fire Support at Battalion Task Force and Below*, which discusses the FSEM, implies the FSO must develop a matrix at the company level. The manual states, "the FSEM is a concise, easy planning tool that shows the many factors of a complicated fire support plan. Tactical SOPs [standing operating procedures] should standardize FSEM preparation to ensure synchronization



Photo by Raymond Bernard, JRTC

with maneuver matrixes." The FM implies that each fire support element (FSE) must develop its own matrix and SOP explaining how to use the FSEM. Standardization throughout the FISTs that support a particular brigade is highly recommended.

The portions of the company fire support matrix discussed in this article as shown in the figure on Page 18 are the "Scheme of Fires" paragraph at the top, "Unit/Phase" (FSEM), "HPTs" (high-payoff targets), "Mortar Ammo," "CAS Info" (close air support), "Assets Available," "FSCM" (fire support coordination measures), "NSFS Info" (naval surface fire support), "Guidance for Special Munitions" and "Additional Instructions."

• *Scheme of Fires Paragraph.* The maneuver commander's idea of the part fires will play in his operation is called scheme of fires (or concept of fires at the brigade level). The scheme or concept of

fires is a paragraph articulating how the fire support battlefield operating system (BOS) is going to be employed in support of maneuver.

On the company fire support matrix in the figure, the scheme of fires paragraph is the same as the fires paragraph of the company OPORD. To develop that paragraph, the FSO and his company commander first must clearly understand the task force scheme of fires. Then using his commander's guidance, the company FSO develops the fires paragraph (scheme of fires). *FM 6-71 Tactics, Techniques and Procedures for Fire Support for the Combined Arms Commander* (Appendix I) suggests maneuver commanders express their guidance for fire support in terms of scheme/purpose, priority, allocation and restrictions (PPAR).

Of the four areas, scheme/purpose is the most important. "Scheme and/or purpose should address exactly what

Company Fire Support Matrix

Scheme of Fires: From LD/LC (PL Green) to PL Black (Phase II) 60-mm mortar will move w/2 Plt to and occupy PA #1. Mortars will assist in fixing (suppress) enemy dismounts. Use 81-mm mortars first. Firing 60-mm mortars may compromise their position. 105-mm howitzers will suppress squads and larger and neutralize the COPs. NGF and 155-mm howitzers will fire counterbattery/mortar missions. During this phase, POF will go the Plt in contact. Actions on the Objective (Phase III) (over)*

Unit Phase	LD/LC	Movement to Obj	→ PL Black	Obj	Counterattack	
FSO				Relay smoke CFF to 81s	% 81-mm FPF	6
1 Plt		1 81-mm Pri Tgt	Cancel & lay on Pri Tgts during movement		81-mm Plt FPF	5
2 Plt				Responsible for smoking the breach w/mortars		4
3 Plt			60-mm Pri Tgt	Engage dismounts outside Obj from SBF position	60-mm FPF	3
Mortar		Move w/2 Plt to PA #1; % provide immediate fires from current position	Occupy PA #1 O61398T; lay on Pri Tgts from 3 Plt AOF 3300/m	5 min smoke to 2 Plt; engage dismount outside Obj; Reserve 2 HE for FPF	Lay on the FPF from 3 Plt; % move to check point # Z and link-up w/2 Plt	2
		<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	

HPTs	Action the FO should take upon identifying an HPT	
COPs	Initiate FFE mission on FDI net w/C Btry (ICM)	5
82 mortars	Assist in fixing w/Mortar report SALUTE	4
Squad	FFE w/105s on FDI net w/C Btry	3
Dismounted Counter Atk	Engage dismounts w/mortars and 105s	2
Mounted Counter Atk	Report location for CAS & 155s on Bn FS net	1
<i>e</i>	<i>f</i>	

Assets Available	Freq/Call-Sign	More Info:	
155 Plt	787 H98	Reinforcing	5
105-mm x 6 (A)	615 LØ7	FA POF to	4
105-mm x 6 (C)	712 NØ7	TF Thunder	3
81-mm x <u>4</u>	512 H12 H32	Operating split section	2
60-mm x <u>2</u>	45.20 Green 07		1
<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>

Mortar Ammo	HE	WP	Illum	CAS Info:
Section	18	6	0	2 A-10s on station H+45 — H+2
1 Plt	15	4		ETACs moving w/scouts
2 Plt	15	4		
3 Plt	15	4		
Cache	0	0		Submit CAS targets on the Bn FS net immediately
XO's truck	45	10	8	
Total	108	28	8	

FSCM	Location	Remarks	
NFA 1	Jeeter town	750-m radius	5
RFA	O64407	500-m radius No DPICM	4
RFL	N-S road on the Obj	Clear all fires across RFL w/B FSO, frequency 51.80	3
CFL	PL Purple		2
NFA 2	O69412	100-m radius	1
<i>k</i>	<i>l</i>	<i>m</i>	

Additional Instructions: Company Cdr will clear all fires

Plts must rehearse dropping off mortar ammo

Per Cdr's guidance, 2 Plt provides security squad to mortars

2 FO rehearse smoke CFF w/Plt Ldr & RTO

1 FO will operate on the Bn FS net

1 & 3 FO establish alternate for calling in FPFs

Confirm comms w/mortars & FA prior to leaving TAA

Report crossing all phase lines

Target Allocation: 1Plt 5 81-mm 2Plt 1 81-mm 3Plt 3 60-mm

Tgt Refinement Cutoff Time: 30 0700 Aug

FS Rehearsal Time & Loc: 29 1600 Aug Company CP

Action Upon Loss of FSO: 2 FO will move to CO CP ASAP

FSO Location During Battle: Moving w/Cdr

NSFS Info: 1 Spruance Class destroyer on station at H-6. Request NGF on freq 41.95 Call-sign R45

FCTs will move w/B & C Companies

Guidance for Spec. Munitions: No illum S of PL Black

Bn mortars 9 minutes of smoke for breach

ADAM mine field planned S of the Obj; more to follow.

* Scheme of Fires (the same as the fires paragraph of the company operations order) would continue on the back of the matrix.

Legend:		
ADAM = Air Denial Artillery Munition	FFE = Fire-for-Effect	Obj = Objective
Ammo = Ammunition	FO = Forward Observer	PA = Position Area
AOF = Azimuth of Fire	FPF = Final Protective Fire	PL = Phase Line
Atk = Attack	FS = Fire Support	Pit = Platoon
Bn = Battalion	FSCM = Fire Support Coordination Measures	POF = Priority of Fire
CAS = Close Air Support	FSO = Fire Support Officer	Pri = Priority
Cdr = Commander	HE = High Explosive	RFA = Restricted Fire Area
CFF = Call-for-Fire	HPTs = High-Payoff Targets	RFL = Restricted Fire Line
CFL = Coordinated Fire Line	ICM = Improved Conventional Munitions	RTO = Radio/Telephone Operator
CP = Command Post	Illum = Illumination	S = South
CO = Commanding Officer	LD = Line of Departure	SALUTE = Size, Activity, Location, Unit, Time and Equipment
COPs = Combat Observation Posts	Ldr = Leader	SBF = Support by Fire
DPICM = Dual-Purpose Improved Conventional Munition	LC = Line of Contact	TAA = Tactical Assembly Area
ETACs = Enlisted Terminal Attack Controllers (USAF)	N = North	TF = Task Force
FA = Field Artillery	NFA 1 = No Fire Area 1	Tgt = Target
FCTs = Firepower Control Teams (USMC)	NGF = Naval Gunfire	w/ = With
FD1 = Fire Direction Net 1	NSFS = Naval Surface Fire Support	WP = White Phosphorous
	% = On-Order	XO = Executive Officer

you [the commander] want fire support to accomplish during each phase of the battle. It should be specific in addressing attack guidance and engagement criteria" (Page I-1 of FM 6-71).

- *"Unit/Phase."* Basically, the company fire support matrix is built around the FSEM. The FSEM communicates priority of fires (POF); final protective fires (FPFs); priority targets; and specific targets, groups and series. If the task force FSO has assigned planned targets to the company or the FSO plans to fire mortar targets to support the company scheme of fires, it's important the company FSO include these on the FSEM portion of the matrix. (See FM 6-20-20, Section 2-8 on Page 2-6 for more detailed information on the FSEM).

This portion of the company matrix lays down specifically what each element does to execute the plan during the various phases of the operation. For example, the instructions for the mortars should contain locations during particular phases, azimuth of fire (AOF) and the priority targets they will lay on. If the mortar section is moving with a specific platoon, it should be noted on the matrix at the appropriate phase—for example: "Moving with 2d Platoon."

- *High-Payoff Targets.* The HPTs are listed on the company fire support matrix with the actions expected when elements of the company identify or make contact with each HPT. For example, an action may be "Immediately initiate a fire mission on the FD1 [fire direction 1] net," or "Immediately notify the company FSO with a SALUTE [size, activity, location, unit, time and equipment] report and be prepared to call-for-fire."

FM 6-20-10 Tactics, Techniques and Procedures for the Targeting Process states, "the focus of the decide function of

the targeting process at the TF [task force] level is to give observers critical information. They must detect targets and pass target acquisition reports to attack systems so they can deliver effective, timely fires" (Page 5-1).

It's the task force FSO's responsibility to give this "critical information" for his observers, including not only his Army FOs and combat observation lasing teams (COLTs), but also his Marine Corps firepower control teams (FCTs) and Air Force enlisted terminal attack controllers (ETACs). The company FSO must ensure he gets this information from the task force FSO.

- *Mortar Ammo.* The mortar ammunition (ammo) portion of the matrix helps the company FSO with the difficult task of tracking mortar ammunition. Initially, the section tells each FO the number and type of rounds his platoon has been tasked to carry.

Each FO can help the FSO by tracking the mortar ammo in his platoon. For example, a platoon leader may decide to cache his mortar rounds. At that point, the platoon FO would notify the FSO of the cache with a grid location and the number and type of rounds cached. The FSO then would adjust his matrix and continue to track ammunition.

- *CAS Info.* This box on the matrix gives information about CAS. The number and type of sorties expected per day or the time when CAS is expected to be on station could be listed. Additionally, information concerning employing ETACs could be listed in this portion of the matrix. An example is "A Company, plan on employing an ETAC in your sector."

- *Assets Available.* All indirect fire support assets (other than CAS and NSFS) available to the brigade are listed in this

portion: general support (GS) and direct support (DS) artillery, attack helicopters (in the fire support role) and mortars. The company FSO gets this information from the task force fire support annex.

FOs usually know what assets are available, but they often don't know the assets' radio frequencies or call-signs. This is important information if communication with the company or task force FSO is lost.

- *FSCM.* Information pertaining to FSCM, such as type, location, effective date-time-group (DTG), radius, establishing headquarters and specific restrictions are listed in this part of the company fire support matrix.

- *NSFS Info.* This box contains information about naval gunfire (NGF) and its employment on the battlefield. It also may contain information about FCTs or ways to request NSFS in the absence of FCTs.

Examples include: "2 Spruance Class destroyers are GS to the brigade," or "Requests for NGF will be handled on the TF FS [fire support] net" or "A Company will have an FCT attached."

- *Guidance for Special Munitions.* Maneuver commanders are expected to give guidance on the use of special munitions (FM 6-71). The company FSO receives guidance on employing smoke, illumination, improved conventional munitions (ICM) or family of scatterable mines (FASCAM) from the task force fire support annex and his commander. An example of guidance from a higher headquarters could be: "Use of illumination must be approved by the brigade commander."

An example of a company commander's guidance for special munitions might be smoke to obscure a breach site.

The company FSO determines the number of minutes of obscuration needed and the asset to provide the coverage and writes on the matrix, for example, "Eight minutes of smoke will be provided by TF mortars at target AF2001."

- *Additional Instructions.* Instructions from higher headquarters and any instructions the company FSO has for his FOs are listed in this part of the matrix. For example, "Use a PLGR [precision lightweight global positioning system receiver] for all obstacles in your sector," or "1st Platoon, plan for one FA target."

- *Miscellaneous Information on the Matrix.* Unrelated but positioned below the FSCM portion is a series of fill-in the blanks comments built into the matrix. "Target Allocation": the FSO must inform his FOs if they are allocated targets for planning. Even if the task force hasn't allocated the company any planned targets, the company FSO still can allow the FOs to plan company mortar targets.

- "Refinement Cutoff Time": if the task force FSO has established a deadline for target refinement, the company FSO must ensure his FOs send refinements to him in enough time to meet the task force's deadline.

- "FS Rehearsal": This time must take into account platoon troop leading procedures to ensure maximum participation by the company's fire supporters. The FSO may prefer to execute the fire support rehearsal prior to the combined arms rehearsal to ensure the FOs are prepared to brief and execute at the task force/company rehearsal.

- "Actions Upon Loss of FSO" and "FSO Location During Battle": If actions upon loss of the FSO (or fire support NCO) or the FSO's location during battle is standard, it can be written "as per SOP."

The numbers along the far right side of the matrix and the lower case, italicized letters identifying sections of the matrix

help the FSO update the plan with his FOs over the radio. The system allows the FSO to easily change, for example, the AOF in 1b from "3300" to "3200" or the grid in 4l from "064407" to "567345."

Company Target List Work Sheet. In addition to the company fire support matrix, the FSO produces a target list work sheet. It contains the planned targets from brigade and the task force and the targets the FSO has planned to support the company. The target list work sheet may be modified to include columns titled "Refined by," "Primary Shooter" and "Alternate Shooter." These columns help the FSO develop and refine his fire support plan.

If the FSO has specific targets he plans to fire during the execution portion of the mission, he includes these in his fire support briefing. He should identify where each target is, when it is to be fired, who initiates and fires (in the case of company mortars) the target and what the purpose for firing the target is.

Company Fire Support Overlay. The final product the company FSO produces is a fire support overlay. The overlay contains planned targets, FSCMs, unit positions and other related information. The amount of information on the overlay and its depiction should be standardized.

It's critical for FOs to have a fire support overlay because it's impossible to remember all the information an overlay can provide. Clear transparencies cut in half work well as overlays.

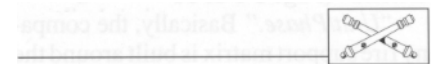
The fire support matrix described in this article is the primary tool for the FSO to communicate the company fire support plan. Each brigade must have a detailed SOP on how to fill out and use its company fire support matrix. Company FSOs must practice producing clear, complete matrices and briefing them at home station.

One way to train company FSOs is to

have the task force FSO produce a fire support annex and then act as the company commander, allowing his FSOs to practice developing and writing fire support plans. Also, during combined arms home station training, the task force FSO can review what the company FSOs produce and conduct after-action reviews (AARs).

FISTs must train continually to use the matrix. The FSO must ensure his company commander, platoon leaders and mortar section sergeants understand the matrix. In addition, every member of the platoon should be able to read it.

Units must be thoroughly trained on a standard company fire support matrix throughout the brigade before they come to the JRTC—or, more importantly, go into combat.



Sergeant First Class Sean E. Harris has been a Company Fire Support NCO (FSNCO) Observer/Controller (O/C) and now a Battalion FSNCO O/C at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, for 14 brigade rotations. He also served in a number of positions with the 1st Battalion, 319th Airborne Field Artillery Regiment of the 82d Airborne Division, Fort Bragg, North Carolina, including as a Forward Observer and Company FSNCO and, in the latter position, participated in Operation Just Cause in Panama, Operations Desert Shield and Storm in the Persian Gulf and two rotations at the JRTC. As a Battalion Fire Support Sergeant with the same battalion, he participated in a division Battle Command Training Program (BCTP) Warfighter Exercise and an additional rotation to the JRTC. Among other schools, Sergeant First Class Harris completed the Naval Gunfire Spotter Course at Little Creek, Virginia; and the Joint Firepower Controllers Course at Hurlburt Field, Florida.

Senior Fire Support Conference Dates

The dates for the next Senior Fire Support Conference at the Field Artillery School, Fort Sill, Oklahoma, have been set for 16 through 19 September 1997. The 97 Senior Fire Support Conference will focus on the theme "Training" as we proceed with Force XXI and the Army of the 21st century, to include fire support issues in doctrine, materiel development and joint operations.

Invitations to the conference will be sent to all Army corps and Marine Expeditionary Force (MEF) commanders, Reserve Component (RC) and Active Component (AC) Army and Marine division commanders; selected retired general officers; Training and Doctrine Command school commandants; AC and RC corps artillery and Field Artillery brigade, division artillery and Marine regimental

artillery commanders and their command sergeants major; and US Field Artillery Association corporate members. Corporate members and other companies also may have displays at the conference.

For more information, contact the G3, Training Command at Fort Sill: DSN 639-5460/4203 or commercial (405) 442-5460/4203. The Fax number is 7494 and works with both prefixes.

Photo by Linda A. Young, Fort Sill TSC



When a 13F—Fire Support Specialist—arrives at his field unit shortly after graduation from advanced individual training (AIT), what can that unit expect of him? Is he fully proficient in both his military occupational specialty (MOS) 13F10 and other soldiering skills? How much training does a 13F receive to prepare him for his gaining unit? And what can that unit do to further develop him and other 13Fs?

A glance at 13F AIT training helps answer these questions and shows some of the recent changes in the program—changes brought about by feedback from field units, cadre at the 13F's FA Training Center (FATC) at Fort Sill, Oklahoma, and from 13F soldiers themselves.

The FATC has seven weeks and two days to take a basic training (BT) graduate and develop him into a 13F Fire Support Specialist who is self-confident, technically proficient in his MOS and common task skills and imbued with the spirit, discipline and teamwork to make him an asset to any fire support team (FIST). Much goes into the 13F AIT program to maximize training resources and produce the best fire support specialist

possible. After all, as our soldiers are the Army's credentials, our fire supporters are the artillery's credentials. Instructors in the Fire Support and Combined Arms Operations Department (FSCAOD) of the Field Artillery School at Fort Sill and the AIT cadre train our FISTers. The AIT battery is dedicated exclusively to training 13 Foxtrots (other FATC AIT batteries are responsible for more than one MOS). FSCAOD instructors teach the formal program of instruction (POI) whereas battery drill sergeants are responsible for physical conditioning, common task training (CTT) reinforcement, evening study periods and the soldierization process.

FISTer Training. Usually, a new 13 Foxtrot class begins each week and fills at the maximum capacity of 30 soldiers. Two FSCAOD instructors per class allow for a 1:15 instructor-student ratio and for the instructors to know their students and mentor them in their development. The seven-week POI as depicted in Figure 1

Building a Better FISTer: MOS 13F AIT

by Lieutenant Colonel Russell E. Quirici

on Page 22 commences with communications training. Besides learning basic radio telephone operator (RTO) procedures, OE-254 antenna setup and communications security, 13Fs train extensively on the single-channel ground and airborne radio system (SINCGARS), using the VIC-1, AN/GRA-39 remote and net control devices.

With fundamental communications skills under their belt, 13Fs move onto map reading and land navigation—critical skills for our fire supporters. Soldiers receive two days of map reading training to expand their basic skills learned in BT. The skills are then put to the test on two days of land navigation training, recently added back into the curriculum. Recognizing the criticality of land navigation skills to a 13F and responding to requests from field units, cadre and, particularly, graduating soldiers, FSCAOD pooled its instructors to reinstate a challenging land navigation course.

Soldiers strike out in two-man teams over Fort Sill's rugged West Range terrain. Simple map spotting will not suffice—an accurate pace count and correct azimuth are essential for successful completion of the five-point course in

Contents	Days
Communications <ul style="list-style-type: none"> • RTO Procedures • OE 254 Antenna • SINCGARS with VIC-1 • SINCGARS with AN/GRA-39 Remote • SINCGARS with Net Control Devices • SOI Authentication and Codes 	9
Map Reading/Land Navigation	3
Duties of Fire Support Specialist	2
Gunnery: Request and Adjust Area Fire	5
Graded Live-Fire Shoots	3
FED	3
Dismounted G/VLLD with Night-Sight	2
Special Missions (GUARDFIST II)	2
FIST-V Training	2
Course Review and Test	1
Legend: FED = Forward Entry Device FIST-V = Fire Support Team Vehicle Guard Unit Amory Device Full GUARDFIST II = Crew Interactive Simulation Trainer G/VLLD = Ground/Vehicular Laser Locator Designator RTO = Radio Telephone Operator SINCGARS = Single-Channel Ground and Airborne Radio System SOI = Signal Operations Instructions	

Figure 1: FSCAOD Program of Instruction for 13F Advanced Individual Training

which the soldier teams will cover five to seven miles.

After finishing the course, FISTers are confident in their land navigation skills. The AIT battery augments this training with a shorter night land navigation course on its battery field training exercise (FTX).

FISTers next move into the crux of their MOS—fire support. With *FM 6-30 Observed Fire Procedures* firmly in hand, soldiers learn the duties of fire support specialists, methods of target location and call-for-fire procedures. The guard unit armory device full-crew interactive simulation trainer, called the GUARDFIST IIA, provides an excellent training vehicle for 13Fs as they learn the heart of their MOS: requesting and adjusting area fire.

After three days of following missions and learning from their own and others' mistakes, the soldiers prepare for the true rite of passage for all fire supporters—the graded shoots. The weekend and evenings prior to each graded shoot find soldiers fastidiously reviewing and practicing for these artillery moments of truth. On both

West and East Ranges that offer challenging and varied terrain, all 13Fs shoot polar, grid and shift-from-a-known-point missions for grade. FISTers must pass all three shoots to move forward with their class. A lot of trepidation exists during this week; however, FISTers emerge from the experience more confident in themselves and, equally important, confident in their MOS.

Due to ammunition limitations, special missions (illumination, smoke, etc.) are conducted in GUARDFIST IIA training with all 13Fs conducting each special mission. FISTers return to the field for a live laser shoot with the ground/vehicular laser locator designator (G/VLLD), following training on it and on the AN/PSG-7 forward entry device (FED).

Whether bound for heavy or light units, all FISTers receive familiarization training on the M981 fire support team vehicle (FISTV). Tasks include installing, removing and stowing the laser designator rangefinder and thermal night-sight.

Additionally, soldiers learn how to turn the FISTV on, run the system test, power down the targeting station, boresight the night-sight and perform vehicle preventive maintenance checks and services. Due to personnel, time and equipment limitations, soldiers do not operate the FISTV in the field; training is conducted in static locations. The formal POI concludes with a three-hour end-of-course comprehensive test (EOCCT)—a final exam of sorts—that covers all previous blocks of instruction. Next to the graded shoots and final Army physical fitness test (APFT), the EOCCT causes the 13Fs significant consternation and serves as the last hurdle to the graduation stage.

The "Whole Soldier." Battery training and development of soldiers run concurrently with the formal POI. In addition to the drill sergeants' involvement in key POI training, such as live shoots, GUARDFIST IIA and the land navigation course, drill sergeants—most of whom are 13Fs themselves—play a critical role in the

making of a FISTer. Their focus is on the whole soldier: physical conditioning, discipline, common skills and the soldierization process.

Physical conditioning of soldiers, especially with the unique demands on our fire supporters, is a daily part of battery training. The FISTer battery conducts physical training (PT) daily, alternating between muscle failure workouts and aerobic conditioning. Responding to field units' concerns over 13F road march requirements for increased aerobic conditioning, runs have been lengthened to distances of four to six miles. Additionally, soldiers heading for Airborne School at Fort Benning, Georgia, receive extra upper body conditioning with pull-ups as a supplement to their PT program.

All 13Fs take their final APFT at least two weeks prior to graduation and continue with the battery PT regimen through graduation day. Many soldiers have come a long way through BT and AIT to meet Army APFT requirements. Every graduated 13F has met the Army standard of 60 points in each APFT event, graded by drill sergeants strictly in compliance with Army standards and overwatched by brigade test and evaluation personnel. No pressure is put on the cadre for high PT scores.

Soldiers who fail the final APFT spend the final two weeks of class and up to two weeks following graduation on remedial PT. Should they fail again, they are sent to the Brigade Fitness Training Battery for intensive physical conditioning training. All soldiers are encouraged to continue with their PT after graduation while on leave, hometown recruiting assignment or in transit between AIT and their gaining units.

Battery road marches make up a second portion of physical conditioning of soldiers. 13F road marches have undergone significant change in the past year as a result of field feedback telling us that soldiers in light units needed to arrive better conditioned for road marches with maneuver elements.

AIT battery road marches have doubled in frequency and length from one 10-kilometer road march to a minimum of two 20-kilometer road marches per class, better preparing the 13F for road marches in his gaining unit. As with any new soldier arriving at a unit, whether from AIT or another unit, soldiers need to be acclimatized and conditioned for the particular requirements of that unit.

The AIT FISTer battery is also responsible for conducting a three-day FTX

Orientation to 13F10 Course	Antennas	Adjustment of Fire/Observed Fire Procedures
Map Reading	SINGARS Net Control Station	Special Situations/Observed Fire Procedures
Terrain Association Exercise	Field Wire Laying Techniques	Dismounted G/VLLD with Night-Sight
RTO Procedures	DMD	AN/GVS-5 Laser Rangefinder
ECM and ECCM	FIST DMD	FED
SOI Codes and Authentication	Fire Support Specialist Duties	SINGARS with VIC-1
AN/GRA-39	Observer/Target Locator Duties	

Legend:
DMD = Digital Message Device **ECM** = Electronic Countermeasures **ECCM** = Electronic Counter-Countermeasures **FIST** = Fire Support Team

Figure 2: 13F Fire Support Specialist Training Modules Available on CD-ROM

for the 13Fs prior to graduation. Soldiers road march to and from the FTX site (five kilometers each way) and learn field survivability techniques as well as reinforce common task skills.

As part of the FTX, all 13Fs move through lanes built upon a tactical scenario that incorporates common skills tasks into each lane. Portions of the lanes include fire support tactical situations the new 13Fs must be prepared for. As soldiers move in a squad and encounter enemy fire, for example, calling for fire support is as much a part of the lane requirement as returning fire and fighting through to the objective.

After a 13F completes all POI requirements, battery training and testing, and after the battery cadre certifies his growth and development as a soldier, he's ready to graduate and report to his first warfighting unit. Most newly graduated FISTers arrive at their units after 10 days of leave or permissive TDY as part of the Hometown Recruiter Assistance Program (HRAP).

Continued FISTer Development. A FISTer's gaining unit can do a number of things to integrate him into his section and help him meet the many challenges

of his demanding MOS. First, PT must continue as a regular part of the soldier's life. Soldiers depart AIT anticipating a diagnostic APFT shortly after arriving at their gaining units. Whether deployed, in the field or in garrison, the newly graduated 13F's physical conditioning development and success depends on timely and aggressive sustainment of a challenging PT program.

Second, as 13Fs receive the same training whether bound for a light or heavy organization, the new FISTer needs training on the unit's unique equipment, terrain and procedures. Examples include mounted land navigation training for FISTers in heavy units and drivers' training/vehicle safety on unit-specific equipment for FISTers in all types of units.

Next, new FISTers need continued development and supervision in soldier responsibility. Most 13Fs have enjoyed about two weekends with off-post privileges during training, but typically for newly graduated soldiers, unsupervised evening and weekends are relatively new experiences. Their reception and integration into their first units will help them develop self-discipline and personal responsibility both on and off duty.

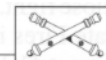
As FISTers engage in self-study programs, units should encourage them to consider using some of the new CD-ROM 13F training resources. MOS 13F is the charter MOS for distance learning technology in the Field Artillery, and great interactive training CDs are available for many of the 13F tasks, including map reading, communications and gunnery. Figure 2 lists the CD-ROM 13F MOS training modules available from the Army Training Support Center (ATSC), Fort Eustis, Virginia.

The training base needs field feedback. The FATC has developed a 13F survey that will be sent to units early this summer. Meanwhile, units can write,

phone or E-mail comments, suggestions and critiques. The FATC wants to know if there's something the brigade can do to build an even better FISTer. (See Figure 3.)

Finally, the field needs to identify outstanding 13F NCOs and encourage them to consider becoming "time-on-target" drill sergeants. The Field Artillery needs the best of the 13F NCO corps to develop, mentor and train our fire supporters for the next century.

13F training remains the most physically and mentally challenging POI of all Field Artillery MOS trained at Fort Sill. Instructors, drill sergeants and cadre stretch resources to broaden and strengthen the training and development of our FISTers, including additional weekend and evening training. Nothing less will suffice. After all, FISTers are our artillery's credentials.



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Figure 3: How to Get Feedback to the 13F Training Base

The FO and His PLGR in the Close Fight

by Lieutenant Colonel Joseph F. Napoli and Sergeant First Class Sean E. Harris

One of the most difficult tasks for a forward observer (FO) is to accurately and rapidly initiate indirect fires during the close fight to fix and finish the enemy. This is particularly difficult in rough terrain in which boundaries are not identifiable, visibility is limited and the rules of engagement (ROE) are restrictive—a common scenario at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana.

The most common problem FOs have in initiating fires is rapidly determining an accurate target location. Consequently, indirect fires are seldom used in the close fight because of fear of fratricide or excessive collateral damage or, if used, seldom are effective.

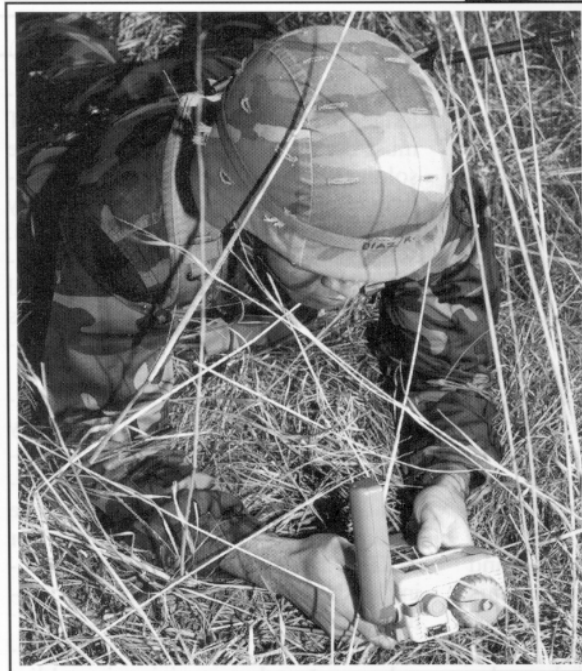
This hesitation to make the most of fires in the close fight is a major factor in the disproportionate casualty rate between blue force (BLUEFOR) and opposing force (OPFOR) units observed at the JRTC—clearly, the BLUEFOR misses indirect fire opportunities in the close fight. (See the article "Fast, Accurate Fires in the Close Fight" by Lieutenant Colonel David L. Anderson in March-April 1996.)

A key piece of equipment owned by FOs throughout the Army is the precision lightweight global positioning system receiver (PLGR). This device enables observers to rapidly, accurately determine a target location, even under challenging conditions, such as those at the JRTC.

Many fire supporters are technically proficient with the PLGR; however, few are tactically proficient. This article focuses on tactical proficiency with the PLGR. It also suggests some home station training techniques to build the FO's PLGR experience and confidence in the close fight.

Employing the PLGR

The PLGR can give FOs, platoon leaders and company commanders the confidence to rapidly call for indirect fires, any time, regardless of the terrain. Fire



Using his PLGR, the FO rapidly determines his location before initiating a call for fire. (Photo by Linda A. Young, Fort Sill TSC)

support officers (FSOs) and observers, including those in the fire support teams (FISTs), firepower control teams (FCTs), enlisted terminal attack controllers (ETACs) and combat observation lasing teams (COLTs), must maximize the PLGR's capabilities.

During a movement-to-contact (approach march technique or search-and-attack technique), FOs walking with their platoons must be prepared to request and adjust indirect fires quickly and accurately when the platoon makes contact. The following is a simple call-for-fire (CFF) technique that only slightly modifies the technique in *FM 6-30 Observed Fire Procedures*. For this technique to be effective, certain actions must occur during troop leading procedures (see the figure on Page 26).

Before leaving the assembly area or patrol base, the FO confirms his PLGR



works and positions it on his load bearing equipment (LBE) so he can read the screen at a glance. The "automatic off" function should be off so PLGR data will be readily available. He removes his compass from its pouch and has it available. He also calls his fire support asset personnel to lay on the first target planned along the route.

The FO switches the PLGR to the navigation (NAV) function and double checks the direction and distance to the planned target with his map. Although, he relies on the PLGR, it's critical for him to spot-check the accuracy of the PLGR data with his map frequently.

Once the FO begins moving with the platoon, he must be prepared to initiate a CFF immediately. FOs miss many opportunities because they aren't mentally prepared to initiate a CFF when the platoon makes contact with the enemy. From the moment the FO begins moving with his platoon, he must constantly think



Photo by Raymond Bernard, JRTC

what his actions will be if the platoon makes contact. Although this article suggests what his actions should be, there's no substitute for the quick thinking and initiative of a highly trained observer.

Actions Upon Contact. As soon as the lead element of the platoon makes contact, the FO immediately takes cover and reports, "L41 [his asset], this is X01—CONTACT; my location is 43614734. Over." (His PLGR has allowed him to immediately self-locate within plus or minus 30 meters.) Because the procedures have been practiced and rehearsed at home station, all parties take certain actions based on this simple report.

Although the FO calls his asset directly, the FSO monitors and plots the FO's location. The FSO immediately begins clearing the mission and is concerned with units or elements the FO may not be aware of. Because most contacts occur within close proximity to the FO's light infantry platoon, the FSO begins clearing

a 400-meter area around the target grid. Once the FSO hears the FO's CFF, he requests permission from the commander to fire.

The fire direction center (FDC) for mortars or Field Artillery reads back the FO's initial report and prepares for a fire mission using polar plot data. As soon as the FO determines what type of mission he intends to use—adjust fire, fire-for-effect (FFE) or immediate suppression—he transmits his CFF.

For example, his CFF may be, "Immediate suppression, polar, direction 3,570 [mils/grid], distance 300 [meters]. Over."

The FO then sends a good target description (in accordance with *FM 6-30 Observed Fire Procedures*, Page 4-3). The FSO should not bother the FO with SALUTE-type questions until the fire mission is finished. (SALUTE is a mnemonic that stands for size, activity, location, unit, time and equipment.) At

this point, the FO's priority must be getting rounds downrange.

This polar plot technique is superior to other methods of locating targets because the FO relies on the FDC to determine the grid to the target. Although polar plot is the quickest method, it's not often used in mobile situations in restrictive terrain because of the difficulties of self location. Instead, FOs attempt to determine a target location using terrain association with a map or adjusting from a planned target—extremely difficult tasks in restrictive terrain, particularly during darkness and adverse weather conditions.

FOs tend not to have confidence in the results of those difficult tasks and miss opportunities to use indirect fires in the close fight. The fear of fratricide prevails. Equally important, because of the poor results of missions using the more difficult target-location methods, many maneuver commanders also have lost confidence in the ability of indirect fires to support close contacts.

The technique suggested in this article takes advantage of two types of equipment designed to increase the accuracy of fires: a fire direction computation computer—such as a lightweight computer unit (LCU), battery computer system (BCS) or mortar ballistic computer (MBC)—and a PLGR. When the FO determines a direction of 4,150 mils and a distance of 300 meters, the FDC inputs this information into the computer, which produces a 10-digit grid. The alternative is the FO's determining a grid with a map and an observed fire (OF) fan on the move—a difficult task, especially during hours of limited visibility.

If necessary and time permitting, the FO may use the PLGR to determine the target grid based upon direction and distance from his current location. This is a useful method when the FO has time to input data into the PLGR. A laser rangefinder can make this process even more accurate by providing an exact distance to input into the PLGR.

Determining a target grid with the PLGR is easy. Prior to using his PLGR, the observer must ensure it's reporting an accurate grid location. Then, for example, in the way point mode, the observer selects RNG-CALC and determines which way point he wants the direction and distance to be from. (The PLGR's current position is always way point 00.)

The FO inputs three things into the PLGR: the distance to the target (RNG),

Fire Planning

- Plan targets along the intended route.
- Establish a net to talk directly to an indirect fires asset.
- Identify a dedicated asset to lay on priority targets.
- Identify what actions are expected upon contact with each high-payoff target.
- Confirm the standing operating procedures (SOP) for immediate suppression missions with each asset supporting the company.

Troop Leading Procedures

- Rehearse the modified call-for-fire with the asset.
- Rehearse the planned targets along the route with the fire direction center (FDC).
- Conduct radio checks with the FDC and the company and battalion fire support officers (FSOs).
- Conduct pre-combat checks with the precision lightweight global positioning system receiver (PLGR).
- Rehearse the platoon battle drill "React to Contact," including the forward observer's (FO's) actions.
- Load planned targets as way points into the PLGR.

During movement-to-contact, the FO walking with his platoon must be prepared to request and adjust indirect fires quickly and accurately when the platoon makes contact. To make the most of his fires, he must follow the fire planning and troop leading procedures outlined here.

the direction to the target (AZ) and the estimated target altitude/elevation (EL). Then the observer presses the down arrow (#5 key) and the PLGR calculates the grid.

When the FO is in contact and the platoon is attempting to fix the enemy, the FO doesn't have time to lose a target or input data into the PLGR. The better choice at that point is to let the FDC use its fire direction computer (LCU, BCS or MBC) to determine the target's location. Using polar plot data in conjunction with the PLGR will get the rounds downrange quicker and won't sacrifice accuracy.

Planned Targets. The primary use of planned targets in this technique is to allow the firing asset to follow the element as it moves to its march order objective or through its sector. The reality is that determining exactly where the planned target is on the ground, even with the PLGR, is difficult, and the enemy seldom appears during chance contact where a planned target is. That fact helps to make the FO's job of trying to determine the shift from a known point (planned target) during contact in 25 seconds or less formidable.

But planned targets are still useful. By using planned targets along the route, the FO ensures the asset supporting the platoon is ready and able to provide fires when needed. The asset lays on the planned targets, ensuring it can range them. Then the asset only will have to make minor deviation and quadrant/elevation changes when the FO sends in his CFF, increasing the responsiveness of fires.

The FO may fire planned targets when the situation is right. The PLGR can help him determine where the planned target is in relationship to "ground truth." It's important to keep in mind that the six-digit grid the asset has for the planned target may be quite different than the target's actual grid. The FO must take this difference into account when firing planned targets and send refinements, as necessary. This is especially important during the close fight. The difference between the previously planned and actual target grids reinforces the use of the FDC polar plot method when the platoon is in contact.

PLGR Home Station Training

Success with the PLGR requires home station training. Calling for fire from an observation post (OP) or training with a training set fire observation (TSFO) is helpful but limited in its application to actual combat situations. In combat, the FO will have to quickly locate a moving target, one that's likely to be maneuvering on the platoon. He won't have a terrain sketch or be standing protected in a hole or a bunker.

All FO training should be based on this question: "How will this training prepare my FOs for the tasks they must accomplish with their platoons?" If the answer is "It won't," then the response is, "How can I modify the training to make it applicable?"

One method to train on PLGR

techniques is simple and requires few resources yet fully integrates fire support into the platoon's training, particularly the company and battalion mortar FDCs. The unit establishes lanes for the platoon to maneuver in restrictive terrain. A small OPFOR with a PLGR-equipped firemarker team initiates contacts. When the platoon makes contact, the FO calls for fire, employing the polar plot procedures for target location. A controller with the mortars asks what grid is being shot (based on the FO's polar plot data) and relays the grid to the firemarker with the OPFOR, who then marks the fires with an artillery simulator. Both the platoon and FO can continue until the OPFOR is neutralized.

Units can conduct this training with or without an infantry platoon. This training is cost-effective and easily can be conducted in varied locations to challenge FOs in new terrain.

The FO is the critical player in providing responsive indirect fires during the close fight. Our FOs must overcome their hesitancy to initiate calls-for-fire in restrictive terrain upon contact. They must regain the confidence of their platoon leaders and company commanders by providing fast, accurate fires—regardless of the conditions. The PLGR can help significantly.



Lieutenant Colonel Joseph F. Napoli is the Senior Brigade Fire Support Observer/Controller (O/C) and, previously, the Senior Field Artillery Operations O/C at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana. He also has served as the Executive Officer to the Secretary General's Military Advisor at the UN, New York; Brigade Fire Support Officer (FSO), 82d Airborne Division, Fort Bragg, North Carolina; and Company FSO, 101st Airborne (Air Assault) Division, Fort Campbell, Kentucky. He commanded a battery in the 6th Battalion, 37th Field Artillery, 2d Infantry Division, Korea.

Sergeant First Class Sean E. Harris has been a Company Fire Support NCO (FSNCO) O/C and now a Battalion FSNCO O/C at the JRTC for 14 brigade rotations. He also served in a number of positions with the 1st Battalion, 319th Airborne Field Artillery Regiment of the 82d Airborne Division, including as a Forward Observer and Company FSNCO and, in the latter position, participated in Operation Just Cause in Panama, Operations Desert Shield and Storm in the Persian Gulf and two rotations at the JRTC.

The Eyes of the Light Force—Equipping Observation Teams

The mission of light infantry fire supporters—both fire support teams (FISTs) and combat observation lasing teams (COLTs)—makes it essential they have the right equipment to get the job done. The light fire supporter must move as fast as his infantry counterpart while packing his mission-essential equipment, weapon and basic load of food, clothing and ammunition. He must locate his own position, communicate digitally with higher headquarters and accurately locate targets in addition to serving as a basic infantryman—all while patrolling long distances over tough terrain, even at night. He must call for fire *immediately* when his company makes contact with the enemy 500 meters away (if he's lucky enough to have that much notice). Being a light infantry observer is not an easy job.

Light Infantry Brigade Task Force Observer

Being an observer may not be an easy job, but it's a critical one. The COLT's mission is to strike high-payoff targets (HPTs) in the deep and main fights, and the FIST's mission is to provide infantrymen fires close-in.

COLTs. Each light brigade task force has two COLTs. Each COLT has a chief (13F20) and fire support specialist (13F10). Each has equipment that creates soldier loads in excess of 100 pounds: a ground/vehicular laser locator designator (G/VLLD), night-sight, tripod, single-channel ground and airborne radio system (SINGARS), M16A2, night-vision goggles (PVS-7), precision lightweight global positioning system receiver (PLGR), mini-eye-safe laser infrared observation set (MELIOS), forward entry device (FED) and rifle, rations, ammunition, extra water and personal gear.

The greatest challenge for the COLT members is removing the equipment they need from their high-mobility multipurpose wheeled vehicle (HMMWV), emplacing and employing it and then displacing rapidly enough to be effective for their supported forces. And they must be prepared to do all that repeatedly on a high-tempo battlefield.

Company FIST. Each light brigade task force has nine company FISTs, one for each maneuver company in the infantry battalion. Each FIST includes a headquarters and three FO teams. The headquarters has a fire support officer (13A), fire support NCO (FSNCO) (13F30), fire support specialist (13F10) and radiotelephone operator (RTO) (13F10); the FO teams each have a fire support sergeant (13F20) and an RTO (13F10) for a total of 10 FISTers per company.

The FO is distinctive among the soldiers in the maneuver company. He

is probably the one with a hand mike stuffed between his Kevlar helmet and his ear (a night-sight on at dark), his M16 slung over one shoulder, a map in one hand and a PLGR in the other and a MELIOS in his rucksack—every few minutes, he awkwardly tries to change the frequency on the radio in the RTO's rucksack. The RTO carries his weapon, basic load and personal gear plus the SINGARS connected to the FED. FISTs operate with equipment that creates a soldier load in excess of 75 pounds.

The challenge for the FO party is not just being able to carry the weight, but also being able to distribute the equipment so a two-man team can transport it, usually by rucksack. There simply isn't enough room in the rucksacks.

New Lightfighter Equipment

The Field Artillery community recently has made great strides to ensure that light fire supporters have the right equipment to support the light infantry. This includes equipment that's lighter and performs multiple functions, including at night—capabilities that will decrease the observer's load while enhancing his fire support operations. Two pieces of equipment highlighted in this article are the lightweight laser designator rangefinder (LLDR) and the hand-held terminal unit (HTU).

LLDR. Light fire supporters need a system that combines the ease of use and man-portability of the MELIOS with the night and laser designation capabilities of the G/VLLD. (See the figure on Page 28.) The Directorate of Combat Developments at the Field Artillery School, Fort Sill, Oklahoma, established the requirements for such a system in 1994. Although it has remained an unfunded requirement, recent efforts have developed a system that meets these requirements—the LLDR.

The LLDR is a lightweight, compact, man-portable system designed for dismounted or mounted operations that require 24-hour precision target location and designation. The LLDR's built-in modularity allows for different configurations to meet specific mission requirements.

LLDR's target location configuration consists of a tripod and a target locator module (TLM) containing the following: 10x day optics, thermal imager, eye-safe laser rangefinder, digital electronic compass and vertical angle measurement, internal global positioning system (GPS) and interface to a PLGR, battery, microprocessor, operator interface and display and data/image export capabilities. This suite of integrated equipment will operate in day or night under almost all weather and battlefield obscurant conditions and provide the observer accurate target location data in digital display and a digital data stream.



FED (Photo by Linda A. Young, Fort Sill TSC)

The TLM will locate targets to within 80 meters circular error probable (CEP) to 10,000 meters. The thermal night sight will provide target recognition at a minimum of two kilometers. The TLM will weigh about 20 pounds, including five for the tripod.

For the target designation mission, a laser designation module (LDM) will be attached to the TLM. A separate battery will be required to meet the increased power demands of the designation mission profile. The LLDR will be able to designate a standard sized target (2.3 by 2.3 meters) to a range of at least five kilometers stationary (three kilometers moving) during the day and two kilometers at night. The designator will mark targets for precision-guided munitions, such as Hellfire missiles, Copperhead artillery rounds and precision-guided mortar munitions. The weight of this mission package (TLM with LDM plus battery) and tripod will be approximately 35 pounds.

In addition, the LLDR's thermal imager will allow the operator to "see the spot" from the designation laser. Two advantages of this feature are the operator will *know* he's illuminating the target and the equipment will be able to be simply and rapidly boresighted without the use (and added weight) of an external collimator.

The LLDR also will have an eye-safe mode for training, thus eliminating a deficiency of earlier systems, and maintenance will be facilitated through a built-in-test capability and modular design.

LLDR will have a wide variety of applications. In addition to the projected fielding to Army light FISTs, a requirement exists for the LLDR to go to all COLTs. The Marine Corps and Army are pursuing opportunities for a joint program. Additional LLDR production could be needed to provide systems for the Air Force and foreign military sales opportunities.

LLDR is in the engineering and manufacturing development phase with contract award scheduled for June. The first unit equipped (FUE) date is planned for the middle of FY 01. LLDR has been advanced as a Force XXI initiative and is competing for additional funding through the Warfighters Rapid Acquisition Program (WRAP) in FY 97 and FY 98. WRAP would accelerate LLDR's initial operational capability



HTU (Photo courtesy of Litton Data Systems)

(IOC) to the first quarter of FY 00 and add units for integration into the COLTs' HMMWVs.

HTU. This is a small, lightweight system with various tactical software applications that will allow users to compose, edit, store and display images and messages that are received or transmitted via several types of tactical communication devices.

The HTU, sometimes also called the lightweight FED, will replace the current FED. It will allow the FO to communicate with more systems, including the advanced Field Artillery tactical data system (AFATDS).

The HTU is small (9.7 by 7 by 3 inches), lightweight (less than four pounds), hand-portable and vehicle-mountable. It has a super reflective and sunlight-readable, high-resolution display with controllable backlighting for night operations.

In addition, the HTU has an internal hard disk with 260 megabytes of memory that can run several commercial operating systems (OS), including MS-DOS and Windows. It has a dual-channel modem port and field communication's wire binding posts. The HTU is user friendly with pointing device (thumb control ball), audio/visual alarms and detachable keyboard. It also has rain, dirt, humidity, altitude and fungus protection.

Most importantly, the HTU has several expansion options, to include voice activation, memory and data processing increases, head-mounted display and head-mounted camera. The voice activation feature would allow the observer to call for fires without "punching in" data.

HTU fielding will begin in the first quarter of FY 98 in conjunction with the continued AFATDS fielding.

Conclusion. The light fire supporter's ability to accomplish his mission is severely hampered by the limitations of the currently fielded equipment. The LLDR and HTU will decrease the observer's load and increase his capabilities. The HTU, when fielded in late 1997, will significantly improve our lightfighters' fire support operations, but we need the LLDR and we need it *now*.

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Capabilities	LLDR	G/VLLD	MELIOS
Designation	Yes	Yes	No
Rangefinding	Yes	Yes	Yes
Target Location	Yes	Partial (Provides Polar Data)	Partial (Provides Polar Data)
Self-Location	Yes	Partial	Partial
Night Operations	Yes	Partial	Partial
Boresight Check	Yes	Partial	No
Data Export	Yes	Yes	Yes
Eye-Safe Training	Yes	No	Yes
Total Weight (Includes Add-Ons)	35 lbs	107 lbs	19.5 lbs

Capabilities Summary. The LLDR gives the observer all the capabilities of the G/VLLD and MELIOS—and more—for 35 pounds.

Lightfighter FCE Coming to FAOBC

Light artillery commanders and Joint Readiness Training Center (JRTC) observer/controllers (O/Cs), the latter from Fort Polk, Louisiana, have stated that new lieutenants assigned to light units aren't well trained in light fire support considerations. The Basic Fire Support Branch and the Combined Arms Division instructors of the Fire Support and Combined Arms Operations Department (FSCAOD) in the Field Artillery School, Fort Sill, Oklahoma, are developing a Lightfighter Fire Coordination Exercise (LFCE) to expose future company fire support officers (FSOs) to the intricacies of fire support in the light community.

FAOBC Light Infantry Observer Curriculum. In the current Field Artillery Officer Basic Course (FAOBC) curriculum, our light training consists of three four-hour blocks of classroom instruction followed by a four-hour light practical exercise conducted in the classroom. Six live shoots are conducted in addition to 12 hours of observer simulation training for special situations via the guard unit armory device full-crew interactive simulation trainer (GUARDFIST). One of the live-fire shoots, the graded Bunker Shoot, evaluates students on danger close call-for-fire (CFF) procedures.

New Light Fire Supporter Exercise. The LFCE being developed will have FAOBC students apply their course knowledge in four major deficiency areas noted by the commanders and JRTC O/Cs: (1.) Fires are not accurate and (or) responsive immediately upon contact; (2.) Company FSOs don't understand the difference between minimum safe distances (MSDs) and danger close; (3.) Company FSOs don't understand the use of priority targets and quick-fire planning; and (4.) Forward observers (FOs) and FSOs can't accurately locate themselves and targets while moving.

The students will execute the LFCE after classes in the deficiency areas as well as after completing the defensive and offensive fire support blocks of instruction. The LFCE will reinforce classroom instruction with a practical exercise conducted in a light force field environment.

Three days prior to the LFCE, students will receive an operations order (OPORD) briefing from their instructors. The OPORD will be based on an air assault task force conducting a deliberate attack of an isolated enemy company position. (The air assault will be notional; students will plan fires from the landing zone through actions on the objective, consolidation and extraction.) The lieutenants will have three hours of classroom time to develop their initial plans.

The day prior to execution, the students will conduct a leader's reconnaissance of the area of operations, finalize their plans and conduct task force rehearsals. During the reconnaissance, the instructors will reemphasize classroom instruction on the use of the global positioning system (GPS), terrain association, actions upon contact, the echelonment of fires and determining the MSD lines for various light fire support weapons systems. Each student will develop his own fire support plan, which will be collected and graded.

On the day of execution, the students will assume the roles of the three company fire support headquarters and their respective observer parties. Instructors will serve as range safety officers and as the battalion FSO; tactics instructors will serve as the company commanders.



Photo by Linda A. Young, Fort Sill TSC

Upon arrival at the "landing zone," the students will conduct pre-combat checks and a radio rehearsal of their plans. Due to range restrictions and ammunition constraints, fire markers will replicate indirect fires, using artillery simulators for both mortar and artillery fires. Instructors will ensure the fire markers move approximately 100 meters in front of the students to accurately mark fires. Each company will encounter at least one target of opportunity en route to the objective. Once the objective is "secured," the students consolidate and develop a quick-fire plan based on an enemy counterattack and then participate in a detailed after-action review (AAR).

The LFCE is easily modified to accommodate the Marine lieutenants in FAOBC. Marine students will be assigned to their own company for the operation, providing these students the opportunity to replicate USMC FO team operations. This team will report to the same battalion FSO, but the differences in Army and USMC organization and communication nets will be transparent to the other companies.

Conclusion. Scheduled to begin in June, the FAOBC Lightfighter Fire Coordination Exercise, will greatly improve all lieutenants' understanding of fire support, regardless of their first unit of assignment. Additionally, it will give students another chance to apply their classroom instruction in developing and executing fire support plans, capabilities verified during the execution phase of the practical exercise.

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Six Days in August: Observed Fires from Hill 314 at The Battle of Mortain

US Field Artillery Observation Post, European Theater, WWII



by Robert Weiss

In August 1944, my four-man forward observer (FO) party from the 230th Field Artillery Battalion occupied Hill 314 with the 2d Battalion, 120th Infantry near Mortain, France. Our force, part of the 30th Infantry Division, was small due to intelligence reports that the Germans were retreating.

The reports were in error; for six memorable days, we fired an average of one mission every 45 minutes against the elite 2d SS Panzer Division surrounding our hill.

About 1600 on 6 August, a lazy Sunday afternoon, I initiated the first fire mission in what would become our struggle to survive.¹

“Want to shoot some Jerries, Lieutenant?” From the casual, even tone of his voice, Sergeant John L. Corn might have been asking if I wanted an apple. He well could be calm. We had been told we faced an enemy in retreat, an easy assignment.

I edged up to the BC scope, a periscope-like device, and peered through it. There were Germans, all right, in gray-green uniforms with rifles. A company of infantry in close formation marched along the Bel Air Road 2,000 yards to the east. I turned and alerted Sergeant Armon A. Sasser at the radio close by: “Fire mission. Enemy infantry.”

Sasser switched on our “portable” 610 radio and, in muted tones, called the

battalion fire direction center (FDC): “Crow, this is Crow Baker 3....”

High-explosive shells from 105-mm howitzers were soon in the air. I watched explosions near the Jerries and then gave additional commands. When the smoke and dust cleared, the gray-green uniforms had disappeared into the grasses and trees.

It was an easy thing, shooting Jerries. We waited and watched.

Mortain's Part of the Normandy Breakout. After the American breakthrough at St. Lo on July 25, General Omar N. Bradley sensed that the breakthrough could be converted into a breakout, a wide-ranging, swift-moving maneuver that might trap the Germans and shorten the war significantly.

On July 27, Bradley opened the gate and sent General George S. Patton, Jr., with three armored and four infantry divisions rushing south out of Normandy and then west to take Brittany.

While Patton was making his dash to Brittany, Bradley's infantry pushed hard to clean the enemy out of Normandy and drove resolutely south on Patton's eastern flank. On 3 August, the 1st Infantry Division secured the town of Mortain near the southern tip of Normandy and the high ground immediately to the east, including Hill 314, some 1,000 yards east of Mortain.² (See the map.)

The designation “314” meant this terrain feature was 314 meters above sea level, approximately 1,000 feet, one of the highest points in Normandy. This high ground dominated the routes the Germans would have to use if they tried to halt the breakout.

FA FOs on Hill 314. On 6 August, the 30th Infantry Division replaced the 1st Division at Mortain. Our FO party met a 1st Division Field Artillery FO at the top of Hill 314. He told us that shooting the retreating Germans as our troops flushed them out of the hedgerows had been a “picnic.”

Lieutenant Ralph Kerley, a tall, tough and mature Texan, commanded E Company, 2d Battalion, 120th Infantry, the first company on Hill 314. Kerley immediately deployed troops to set up a roadblock on Bel Air Road east of the hill. The bulk of his men spread out to the end of the east ridge on the hill.

I set up an observation post (OP) with E Company. In the bright sunlight, I could see for miles. Fields and trees stretched away to the east, uninterrupted except for an occasional hedgerow and a few farm buildings. It was a French impressionist painting come to life

E Company was joined on the hill by two other rifle companies: G Company positioned on the western ridge and K Company on the northern high ground. H Company, a heavy weapons unit, protected E Company's right flank on the south slope of the hill. Our infantry covered the top of the hill, but not shoulder-to-shoulder; significant distances separated each company from the others. The 2d Battalion had the same “hold-the-high-ground” mission as the 1st Infantry Division.

The positions the departing infantry left were sufficient only for a hasty defense. Kerley's infantry immediately began improving the positions, but digging

was difficult in the rocky ground. Within a half-hour, six enemy FW 190 aircraft swept the area, the first daylight air offensive the division had encountered since coming into battle almost seven weeks before.³

Around 1745, enemy mortar shells burst in our vicinity. Everyone took cover. We measured the direction of the mortars as carefully as we could, based on the sounds of firing, and reported to battalion. A light mortar, such as our 60-mm mortar, had a range of slightly in excess of one mile. A plot combining the direction from which we had heard the mortar firing with the normal range of a mortar placed the enemy along Bel Air Road, barely beyond our own infantry roadblock. Nonetheless, a sense of security filled the air. The last few days had been quiet for the 1st Infantry Division.

In the early evening, I spotted more gray-green uniforms around a building about 2,500 yards to the east. Again, we called in a fire mission, and our artillery brought a hail of exploding shells and jagged steel onto the target.

In the dying light that Sunday, a messenger from an infantry outpost rushed up, breathless, cheeks glistening with sweat. Enemy infantry had been observed. He gave us an approximate location and, still panting, laid down in the grass to cool off before going back into the unknown.

We fired our last fire mission of the day as darkness closed in. Enemy soldiers were only a few hundred yards from our previous target.

It had been a reasonable afternoon's work, and we were ready for a reward. The infantry was serving hot rations brought in by jeep. This was the last real meal anyone on the hill would have for nearly a week. Fortunately, the kitchen crew also passed out boxed K-rations, two per man.

Meanwhile, a French civilian informed our superior headquarters that artillery, paratroopers and German infantry regiments from the Russian front were assembling on the high ground approximately two to three miles north of our position.⁴ Another civilian reported enemy artillery several miles south and east of Hill 314.⁵ By the time I fired the last mission on 6 August, our division artillery headquarters knew enemy tanks were in the vicinity of Barenton just six miles southeast of Mortain.⁶

Before sunset, signal personnel connected us to a telephone network that

reached the battalion FDC. The liaison officer, rang soon after and gave me a nighttime plan of defensive artillery fire. My FO party and I moved down behind the east ridge, close to Kerley's command post. We anticipated that any action we would see in this position would be slight indeed.

The Battle for Hill 314. The night offered little time for rest. Overhead the exhaust trails of German aircraft soiled the sky while enemy tanks were active to our front. As we listened tensely to the ever-increasing grinding and meshing of gears, the tale of a retreating enemy grew less convincing.

As darkness fell, the war was heating up to white-hot intensity in our front yard. Shortly after midnight on 7 August, Field Marshal Gunther von Kluge struck with four divisions, including the elite 2d SS Panzer, "Das Reich." No advance artillery barrage gave the counterattack away. Two divisions plus elements of other units struck north of Mortain.

The 2d SS Panzers swarmed around Mortain and Hill 314. The tank division's objectives were to fan out to the north in support of the other German divisions and charge 20 miles west to Avranches on the Atlantic coast and cut off General Patton, splitting the American forces in two.

Earlier that night, code breakers at Bletchley Park, England, had intercepted a message that told the timing and objectives of the German counterattack. The code breakers passed the decoded dispatch to its higher headquarters. But by then, the counterattack was rolling.

After midnight, messengers from E Company's listening posts and patrols brought reports of enemy activity below us. Our field phone lines were still intact. Again and again Sergeant Sasser cranked our field phone in the dark and relayed to the FDC the artillery fire missions I fed to him, relying on the defensive fire plan I had been given.

Artillery dropped a curtain of hot, exploding steel in the face of the enemy. I had no choice except to bring down artillery fire close to E Company and hold off the attempt by the Germans to overrun our position on the brow of the hill. The shelling stopped them little more than a bayonet's length away from the farthest outpost, but none of E Company's men were injured by artillery.

Down below, the German panzers

had rolled over H Company. Its lone 57-mm antitank gun had cracked a military joke against the powerful German tanks. The enemy had captured 19 of H Company's 20 jeeps and, of course, the antitank gun. H Company troops who had escaped worked their way up the hill and blended into E Company.

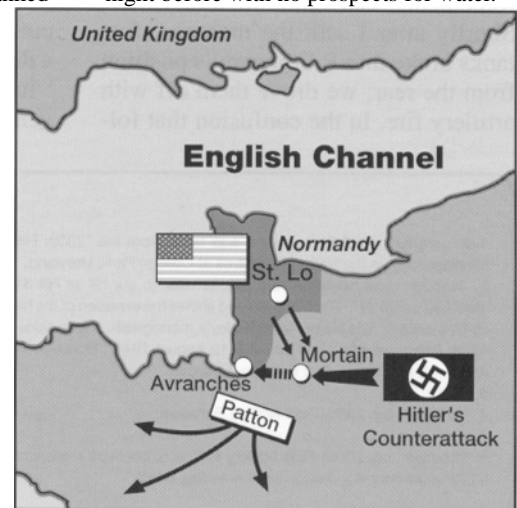
Where the Germans cut through H Company and exposed the right flank to attack, I adjusted artillery fire by sound, a last resort method. Even then, we didn't fully comprehend the spreading menace on our flank as we momentarily diverted the enemy from E Company with an "iron gate" of artillery shelling.

The strength of the German attack was not immediately apparent.⁷ Sniper fire harassed us through the night. On the western ridge of the Hill, small enemy groups screaming "Heil Hitler" infiltrated G Company's position. Our infantrymen stood fast and shot back as best they could against the unseen enemy in the dark.

Artillery fire became the only significant shield against the onslaught. On all sides of the hill, the muffled growl of tanks rose and echoed in the night. In the early daylight and mist, we discovered we were surrounded.

Through assault after assault the second day, we held the Germans off by artillery fire. The attack had broken telephone communications, but my radio continued to function, despite having the end of its antenna shot off by a German 88-mm gun—the dreaded 88.

By midnight, E Company, which had borne the brunt of these attacks and shelling, was running low on rifle ammunition, faced snipers to the rear and only had the K-rations passed out the night before with no prospects for water.



Ammunition for its machineguns was in the valley to the rear where enemy snipers lurked. The company had one 81-mm mortar with no ammunition and two 60-mm mortars with only a few shells left. E Company had no mines, no antitank guns and only one bazooka with nine rounds of ammunition. Medical supplies were dwindling fast.

The third day started at 0200 with an enemy tank reconnaissance. E Company continued to receive the brunt of the attacks while the other two companies consolidated their positions. My radio was the only means of communication, and the defense of the hill fell entirely to the artillery.

The Germans tried to blast us off the hill with artillery and, failing, resorted to white phosphorus shells, a weapon from hell. There was no escaping the tiny burning white phosphorus fragments. Then the shelling stopped.

It was our turn. I scrambled to the top of the rocky observation post where the enemy could clearly see me. The German tubes responded quickly, and their muzzle blasts revealed their locations. A "high-noon" shoot-out ensued that knocked out three enemy batteries and a tank before prudence took over and I slid off the rocky top to cover.

Throughout the third day and into the night, my FA battalion alone was shooting about 2,000 105-mm shells every 24 hours. The Germans tried to overrun our FO position, but the deadly artillery fire and determination of our infantrymen held them at bay.

The tank attacks and enemy artillery fire went on and on. The night of the sixth day, I decided our division headquarters could not possibly know how tenuous our hold was on Hill 314. I sent an encoded message: "Without reinforcements, can hold 'til tomorrow." Shortly after I sent the message, five tanks broke into E Company's position from the rear; we drove them off with artillery fire. In the confusion that followed, I never received

the division commander's message that reinforcements were on the way.

Just before dawn the next morning, Sergeant Corn's leg was blown to bits by enemy artillery. Reinforcements arrived at 0900 12 August, but by that time, Sergeant Corn was dead.

Looking Back. At the Battle of Mortain, our infantry battalion held out against intensive shelling and repeated tank attacks for six days. Although journalists dubbed the 2d Battalion, 120th Infantry, the "Lost Battalion," Kerley always contended the battalion was isolated but never lost.

In the end, although the Germans lost the larger Battle of Mortain, they escaped Bradley's trap at Falaise.

At the Battle of Mortain, our artillery had no radar, no lasers and no acoustic or infrared seekers for targeting the enemy. We used the tools of the times: sight, sound, a contour map and judgment with deadly effect.⁸ The only means of communication from the hill was my artillery radio with one spare set of batteries; by some miracle, my radio functioned almost to the end.

All came off that hill with a searing sense of personal loss. Of the approximately 647 infantrymen who had marched onto the hill, only 370 walked away. My FO party called in 193 missions in the six-day period—one fire mission every 45 minutes. But Sergeant Corn's unruffled voice would never again give calm assurance under fire or tell the story of Hill 314 at the Battle of Mortain.

General Bradley, in his memoir, *A Soldier's Story*, called the defense of the hill "...one of the epochal struggles of the war."

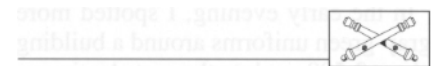
As I look back on this event of so many years ago, there are naturally many echoes and many questions. One to puzzle out is what, if anything, would have made a difference in the defense of the hill.

It seems probable that if the intelligence web had absorbed the fire

missions and the civilian reports of enemy activity, the possibility that the enemy was not retreating and might be counterattacking would have stood out. In that case, a stronger, better equipped force might have been positioned on the hill. The ability to correlate such information on today's computer-generated graphic display and receive a lightning-fast response via digital communications would have taken away the element of surprise that favored the German attack.

Another question is whether there can be too much artillery. The final outcome of the defense of Hill 314 speaks for itself on that issue.

Sometime after the Battle of Mortain, Kerley wrote, "Had it not been for the artillery there can be little doubt the battalion would have been destroyed or captured...."



Robert Weiss served as a Forward Observer with the 30th Infantry Division in World War II from July 1944 to May 1945 in the European Theater of Operations. He received his commission in the Field Artillery through the Officer Candidate School at Fort Sill, Oklahoma, in 1943 and remained on active duty until December 1945 when he attended the University of Chicago Law School. Robert Weiss worked for many years in tax and business law in Portland, Oregon, establishing his own law firm in 1978, now with offices in Portland and Seattle, Washington. At age 74, he devotes his time to writing and has had poems and several articles published, including the article "Normandy: Recollection of the 'Lost Battalion' at the Battle of Mortain, August 1944" in the Spring 1996 edition of *Prologue: Quarterly of the National Archives*. Both the *Prologue* article and the one that appears in this edition are drawn from a copyrighted, full-length book manuscript by Robert Weiss, "Enemy North, South, East, West" about the Lost Battalion at the Battle of Mortain.

Notes:

1. Information on all fire missions was taken from the "230th Field Artillery Battalion Message Log" in the National Archives at College Park, Maryland.
2. Although most contemporary reports refer to our hill as Hill 314, it also has been identified as Hill 317. The map we used shows the elevation of the highest point of the hill as 314 meters. See Major Ralph Kerley's monograph, "Operations of the 2d Battalion, 120th Infantry at Mortain, France, 6-12 August 1944," Donovan Technical Library, US Army Infantry School, Fort Benning, Georgia.
3. Kerley, 9-10.
4. Message Log, 230th Field Artillery Battalion.
5. Ibid.
6. Message Log, 230th Field Artillery Battalion, contains a telephone message sent at 2130 hours from our division artillery to that effect.

7. In an after-combat interview (retained in the National Archives at College Park, Maryland), the 30th Division Artillery Operations Officer, Lieutenant Colonel F.C. Shepard, commented on August 25, 1944 that he "...did not realize until about the end of the third day that the Germans were making an all-out effort to break through to Avranches....VII Corps Headquarters apparently did not realize at the time how serious it was...."
8. The contour map we used as a firing chart had a 10-meter contour interval. A note at the bottom advised, "Road classification is based on Michelin...and its reliability is uncertain....Contours...are interpolated from...French [maps]They should be accepted with caution...."

Scheme of Fires Matrix and PLOT-CR: Tools for Integrating Brigade Fires

by Sergeants First Class Kenneth A. Bower and Jeffery G. Hodges



Many task force (TF) commanders and their fire support officers (FSOs) don't understand the brigade commander's concept of fires or don't know how to integrate that concept into TF plans. The result is the TF indirect fires are out of synch with the brigade fires. Further, the TF doesn't realize its fires are out of synch until the rehearsal, normally just before "line of departure." That's too late.

In addition, even if the TF fire plan *does* support the brigade commander's concept of fires, FSOs often don't use a standardized means to clearly and systematically convey resourcing or other relevant target information to their "shooters." The shooters, the fire support team (FIST) members, are where the "rubber meets the road." Without the right information and resourcing, the final sequential link to implementing the brigade commander's concept of fires is broken.

These disconnects can be reduced by the addition of two tools: the brigade/TF scheme of fires matrix and the application of the company FIST mnemonic PLOT-CR: purpose, location, observer, trigger, communications net and rehearsal. This article discusses these tools for integrating and synchronizing fires from the brigade to the company levels.

Scheme of Fires Matrix

The ability of TF commanders and FSOs to understand the brigade commander's concept of fires prior to the task force's beginning course of action (COA) development is critical to creating an executable TF fire support plan. To facilitate that understanding, fire supporters have developed matrices that incorporate an observation plan, radar coverage plan and a scheme of fires—many of which are quite good. However, these matrices are sometimes

confusing to the TF commander and often poorly understood by the FSO because they do not address the *task* and *purpose* for the target, the *method* for accomplishing the task and the desired *end state*.

TF FSOs often begin mission analysis and COA development without understanding the brigade plan. The TF FSO receives no guidance from the brigade FSO on the purpose of each target, when each task force will receive priority of fires or when responsibility for those fires will transition between the two task forces. The result is the TF commander's guidance to his FSO conflicts with the brigade commander's guidance and plan.

The brigade and the TF FSOs don't realize their plans lack synchronization

until the brigade fire support rehearsal. This late discovery does not leave enough time for TF FSOs to consult with their maneuver commanders to ensure indirect fires are synchronized with the direct fire plan. The result: a scheme of fires that, in reality, is not executable at the TF level.

The scheme of fires matrix (see the figure on Page 34) discussed in this article outlines the target task, purpose, method and end state; is easily understood; and provides guidance to the task force to develop a plan. All levels of maneuver (sergeant through colonel) should understand it because it uses maneuver doctrinal terminology.

The "Task" portion of the matrix is what action is taken to accomplish the commander's intent for the target. The "Task" focuses on the enemy and specifies the formation the commander wants to attack, the function of that formation he wants to influence and the targeting effect he wants to achieve.

In "Purpose," the FSO clearly states why the commander wants the task accomplished in terms of how it helps the maneuver plan. "Method" is how the task will be accomplished and by what asset in terms that allow the FSO to determine the volume and duration of fires and the type of munitions. "End State" is the outcome of accomplishing the task and allows the executor to know when to move to the next fire support event.

As he develops this matrix, an FSO quickly can tell whether or not his unit's fire support can achieve the end state and advise the commander accordingly. Just by reviewing the top half of the matrix (as shown in the figure), the maneuver commander can quickly determine if the plan is synchronized with his scheme of maneuver.

For example, in the figure, the brigade commander can easily determine the southern motorized rifle platoon (MRP) will be destroyed prior to crossing the line of departure (LD) using close air support (CAS) and artillery. He also can see that the FSO is allowing 30 minutes to adjust the smoke to cover TF 3-81 Infantry before LD. Upon LD, the FSO has planned 30 minutes of suppressive fires on the objective and a 60-minute smoke screen to cover the task force while it occupies its position.

Based on the brigade scheme of fires matrix, the TF commander can refine his targets, but most importantly, he clearly can see what the brigade is trying to accomplish with fires. Using the matrix, the TF FSO will be able to see when the brigade will transition indirect fires from the brigade to task force or from task force to task force responsibility and what the brigade commander's critical fire support tasks are. For example, after TF 3-8 Infantry establishes two breach lanes (as indicated in the "End State" line for the last trigger in the figure), priority of direct support (DS) fires then shifts to TF 3-92 Armor.

During the mission analysis briefing, the TF FSO describes to the TF battle staff what the brigade is trying to accomplish with fires *before* the task force begins COA development. The matrix allows the TF commander and his FSO to easily understand the intent for every fire support event.

The bottom portion of the matrix is reserved for other relevant information. Often it includes the observation plan, fire support coordination measures (FSCM), airspace coordination areas (ACAs), CAS timing information, radar zones and miscellaneous remarks.

This matrix is easily adapted to existing tactical standard operating

procedures (TACSOPs) and operations orders (OPORDs). Such a matrix ensures the task force can execute the brigade commander's concept of fires.

But another important link, the company FISTs and combat observation lasing teams (COLTs), must understand the information on the scheme of fires matrix—what their missions are and why—and have the resources in place to accomplish their missions. They need a standardized information format for refining and executing targets, one such as PLOT-CR.

PLOT-CR

Without reinforcing fires, artillery support to a brigade is one DS battalion. With the realignment of our M109A6 battalions into a 3x6 configuration, the brigade commander loses six rounds per battalion volley. Using battlefield calculus, one can only expect seven or eight missions per hour. We can't afford to waste a mission.

The PLOT-CR standardized format ensures the FSO systematically synchronizes every target assigned and his FISTs and COLTs have the details and resources they need to execute every target. But the fact is, few TF FSOs or fire support NCOs (FSNCOs) use

FS Event	WP0001	WP0002	W12D	WP0002
Trigger	LD -90 Min	LD -30 Min	LD	LD
Task	Destroy S MRP	Adjust Smoke to Obscure S/C MRPs from SBF 1	Suppress C/N MRPs for 30 Min	Obscure S/C MRPs from Breach 60 Min
Purpose	To facilitate TF 3-81 breach without receiving direct fire from S MRP.	To ensure smoke is adjusted prior to LD.	To allow SBF forces to occupy SBF positions.	To allow breach force to establish breach lanes.
Method	4 Sorties A-10s and DS/R Arty Provide SEAD (Bn 3-Rds per MRP Vehicle)	1 Btry M825, 1 Rd Adjust	1 Btry per Target, 1 Rd per Min	1,000 M Smoke Screen (2 Btry Built, 1 Btry Sustain)
End State	4 Vehicles Destroyed from the S MRP; POF to TF 3-81	Smoke Adjusted to Obscure N/C MRPs from SBF 1	2 Companies Occupied in SBF	TF 3-81 Established 2 Breach Lanes; POF to TF 3-92

Legend:			
Arty = Artillery	DS = Direct Support	N = Northern	R = Reinforcing
Bn = Battalion	IN = Infantry	POF = Priority of Fires	Rds = Rounds
Btry = Battery	LD = Line of Departure	S = Southern	TF = Task Force
C = Center	M = Meter	SBF = Support by Fire	
	MRP = Motorized Rifle Platoon	SEAD = Suppression of Enemy Air Defenses	

Task Force Scheme of Fires Matrix. This is a tear-away of the top portion of the scheme of fires matrix that ensures task force fire support is synchronized with the brigade commander's concept of fires. The bottom portion of the matrix covers primary and backup observers and their locations for each target and radar coverage, fire support coordination measures (FSCM) and airspace coordination areas (ACAs) for targets (as necessary) with "Remarks" for miscellaneous information the final listing in that first column.

PLOT-CR (purpose, location, observer, trigger, communications net and rehearsal) for their shooters. In an informal survey recently conducted among 34 Field Artillery Officer Advanced Course and Advanced NCO Course students at Fort Sill, Oklahoma, only three had ever systematically applied the mnemonic PLOT-CR (or some other format providing the same information).

The Fire Support Team Observer/Controllers at the Combat Maneuver Training Center (CMTC) in Hohenfels, Germany, have been teaching PLOT-CR to both maneuver and artillery leaders for well over two years.

- *Purpose.* The target planner must clearly define the purpose of the target for the observer. In deliberate fire planning, the majority of targets are developed at the brigade targeting meeting.

According to *FM 6-20-10 The Targeting Process*, "The S3 is responsible for giving a detailed description of the commander's concept of the operation to all personnel engaged in brigade-level targeting. The guidance that results from this interpretation must specify the targets that the commander feels are most important and the targets that pose the greatest threat to the mission."

A good example of a target purpose is "destroy five BMPs at obstacle." If the maneuver S3 can't provide that level of detail, the target should be deleted. An observer won't be able to execute the target if the target planners are vague.

- *Location.* The target location usually comes from a map spot. Although an eight-digit location is preferred, a six-digit location will suffice.

A key feature of the deliberate fire planning process is bottom-up refinement. *FM 6-71 Fire Support for the Combined Arms Commander* states very correctly that "if you begin the battle with no refinements, you are in for a long day." The company FISTs refine their targets to support the company scheme of maneuver or defense.

The FSO ensures the FISTs' refinements don't change the purpose of the target as stated in the brigade commander's concept of fires. For example, if during refinement, the company commander wants to move a target whose purpose is to destroy vehicles at an obstacle, then that refinement should not be processed.

The FISTer takes additional steps to locate the target when the unit is in the defense. After he refines the target, he surveys the location using any of the precision location devices available. He

then fires one check round on the target to ensure the round lands exactly where the commander needs it.

- *Observer.* FM 6-20-10 directs the TF FSO to "assign observers and backup observers for all TF targets and brigade targets assigned to the task force." If a unit only can fire seven or eight missions an hour, the FSO must ensure redundant eyes for each mission.

The company FSO normally designates who the backup observer will be. He also ensures the backup observer will be in a position to see the target. The TF FSO or FSNCO must know who the backup observer is and his location. The name of an individual or the bumper number of the vehicle is standard—a backup observer identified as "2d Platoon" is too vague.

- *Trigger.* *FM 6-20-40 Fire Support for Brigade Operations (Heavy)* defines a trigger as "a target area of interest (TAI) in the brigade S2's intelligence preparation of the battlefield (IPB). The TAI should be under surveillance at all times (use night observation devices and planned illumination targets at night). The element observing the TAI should have the authority to fire or have a direct communications link to whoever has the authority to fire."

Although an observer will be positioned to see the target, he may not be able to see the target's trigger. In this situation, additional eyes must be provided to overwatch the trigger. The TF FSO or FSNCO are the link between the trigger observer and the target observer, if they are on different frequencies. The TF FSO or FSNCO accomplish this by coordinating closely with the S2.

Synchronizing the trigger-to-target should occur early in the war-gaming process. If the TF fire support triggers don't match the TAIs on the overlay, the fires probably will hit the target late.

- *Communications Net.* As a general rule, both the TF and brigade FSOs have dedicated frequencies; however, the number of nets is not the problem. Terrain, distance and poor preventive maintenance checks and services (PMCS) are a few of the reasons that FISTs aren't able to communicate. Maintaining constant communications is a challenge for all levels of fire support.

FM 6-20-20 Fire Support at Battalion Task Force and Below directs the use of "primary and alternate communication nets." The TF FSO and FSNCO must continually check their communications to ensure they can talk to each other as

well as to the brigade FSO and company FISTs. In addition, the company FISTs must be able to talk to backup observers or anyone in the fire support system.

- *Rehearsal.* The rehearsal is a crucial portion of the fire support preparation for combat. Ideally, the TF FSO rehearses fire support before the integrated fire support-maneuver rehearsal. Regardless, he must rehearse all his primary and backup observers.

The most common type of fire support rehearsal is over the radio. The TF FSNCO ensures the primary and backup observers are on the net before the rehearsal begins. A radio rehearsal checks communications among the FSOs, FISTs and backup observers and ensures all are in synch to accomplish the limited number of fire missions.

The scheme of fires matrix and PLOT-CR are two tools to help commanders and fire supporters accomplish the brigade commander's concept of fires and that those fires are synchronized and integrated with the scheme of maneuver. These tools help ensure the task, purpose, method and end state for fires is clear from the brigade to the first-line observer and that each target is executable.



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Artillery and Counterinsurgency: The Soviet Experience in Afghanistan

by Lieutenant Colonel (Retired) Lester W. Grau, IN



The leverage that technology offers depends on combat circumstances, such as the theater, opponent and objective. Guerrilla war, a test of national will and the ability to endure, negates many of the advantages of technology.

The Russian Army and its predecessor, the Soviet Army, fought the most recent, large-scale counterinsurgencies pitting technologically advanced mechanized forces against dedicated guerrillas. The Russians are publishing many of their lessons learned now. Although some of these have no direct application to the United States Army, others do; military professionals need to be aware of how other militaries attempt to solve contemporary problems.

The Soviet Army invaded Afghanistan on Christmas Eve 1979 with tables of organization and equipment (TOE) divisions equipped and trained to fight conventional, maneuver warfare on rolling plains. It came to replace an ineffective communist leader, not to fight

an insurgency. It planned to stabilize the situation, occupy garrisons and assist the Afghanistan government while the Afghan government forces fought the guerrilla resistance.¹

Soon, however, "mission creep" set in, and Soviet forces were locked in a counterinsurgency fight in rugged mountains and desert—a fight for which they were neither equipped nor trained. The technologically superior Soviet Ground Forces were trained to rely heavily on massed artillery, firing normative fires to shatter the defenses of a stationary enemy prior to the attack.² The Mujahideen guerrillas did not accommodate the Soviet gunners by occupying linear defenses or staying in place.

Throughout the war, the Soviet Army continued to rely on artillery and close air support (CAS) as a substitute for ground maneuver and close combat. The Soviet 40th Army needed a lot of light infantry but chose instead to expend massive firepower to save soldiers' lives and

compensate for its lack of infantry. It was an expensive, indiscriminate and ineffective policy.³

As the war progressed, the Soviets adapted their tactics, training and force structure to fight the Mujahideen more effectively, and artillery played a significant role in their evolving counterinsurgency tactics, techniques and procedures (TTP).

The "God of War" in Afghanistan

Artillery, the Russian God of War, was a dominant part of Soviet ground combat power. Many analysts described Soviet Ground Forces as an artillery army with a lot of tanks.

The Soviet divisions brought their tanks and artillery to Afghanistan. The tanks proved of limited value. Although the artillery proved of greater value, the target set presented by the Mujahideen was often difficult to engage and of limited tactical value. Soviet firing tables and norms were developed for high-intensity war fought on relatively flat terrain by mechanized forces against mechanized forces.⁴ Faced with a different war on different terrain and a different enemy, Soviet gunners initially had difficulty in quickly engaging targets—the "hip shoot" was not a normal mission.

Soviet artillery planning was designed to physically obliterate defending forces within square hectares by normative fires involving hundreds of rounds massed in a small area. When the Soviet gunners used these normative fires in Afghanistan, they had little impact on the guerrillas.⁵

During the course of the war, the Soviet artillerymen developed new firing techniques, nomographs and firing tables to cope with the enemy, mountains and desert.⁶ They found that new technology, such as precision-guided munitions (PGM) and scatterable mines, offered some tactical advantages but no decisive advantage in counterinsurgency.

They also found that mortars were frequently better than howitzers in hitting

caves and terrain folds. Howitzers were usually of more value than gun/howitzers and guns in the mountains. Multiple rocket launchers (MRLs) were particularly effective against dismounted Mujahideen.

A constant problem was detecting and engaging targets rapidly enough to be effective. Throughout the war, Soviet gunners were hampered by a lack of tactical intelligence that could rapidly identify a viable target set and pass the data to the guns before the target disappeared.

Large-Scale Operations. Artillery planning for large-scale operations in Afghanistan was the most similar to regular Soviet artillery planning. Artillery planners would form regimental artillery groups (RAGs), brigade artillery groups (BrAGs), division artillery groups (DAGs) and army artillery groups (AAGs) as needed.⁷ The Soviet Army used massed artillery to suppress or destroy enemy positions and seal the area to prevent escape by firing remotely delivered mines onto escape routes.

Soviet commanders started each sweep with an artillery preparation and advanced in contested areas behind a wall of artillery fire. Despite proclamations to the contrary, they apparently showed little concern for the civilian population and used artillery indiscriminately in and around villages.⁸

Support of Tactical Units. Soviet artillery missions in Afghanistan included counterbattery, artillery preparation and support, blocking fire, sweeping fire in blocked areas, harassing and interdiction fire, illumination support and direct fire.⁹ Counterbattery was often ineffective.

Approximately 85 percent of the Soviet force usually was engaged in some form of security. Forces guarded base camps, airfields, logistical centers, cities, district headquarters, garrisons, depots and government facilities the Mujahideen frequently attacked with mortars and rockets. The Mujahideen fired and moved before Soviet counterbattery could respond.

Artillery positioned in firebases supported defensive security missions in a general support (GS) role. These firebases were mutually supporting and located 10 to 15 kilometers apart.¹⁰

Soviet offensive artillery support included GS, reinforcing (R) and attached. The artillery fired to protect march columns, protect advances, prepare for attacks in cities and villages, support block and sweep (search and destroy)

missions, and provide indirect and direct fires during combat.

When regiments and brigades went on the offensive, they employed their organic artillery and any artillery positioned within supporting range. Artillery attached to a regiment or brigade was usually reattached in direct support (DS) of a battalion.

When artillery was attached DS, the most common attachment was an entire artillery battalion to a maneuver battalion.¹¹ Sometimes a howitzer battery and MRL battery supported a maneuver battalion. Often Soviet commanders attached a battery to a separate maneuver company.

Mortars (part of Soviet artillery) often were attached to maneuver companies. The 82-mm Vasilek automatic mortar batteries that provide both an indirect and direct fire were particularly welcome by maneuver units.¹²

Soviet artillery protected maneuver units during movement. Prior to a movement-to-contact, Soviet artillery planners learned to plan fires on likely ambush spots. Further, if the Soviet force had to move through a narrow valley or defile, artillerymen planned parallel barrage fires along the axis of advance some 300 to 400 meters away from the road. If several artillery groups supported an advance, the planners created a continuous fire corridor to protect the advancing force.¹³

The Soviet Army used large quantities of artillery fire to protect advancing forces. One Soviet airborne battalion decided to advance behind tanks and

personnel carriers through a narrow, 14-kilometer-long forested zone to clear it of Mujahideen. The tanks and personnel carriers were to protect dismounted paratroopers. However, the Mujahideen had rocket propelled grenade (RPG) antitank launchers, called RPG-7s, that endangered the vehicles. The paratroop battalion had an artillery battalion attached, so an artillery officer from a battery moved with each paratroop company to adjust fires.

The artillery kept a protective wall of fire in front of the ground force as it slowly advanced through the area. The indirect artillery fire and the direct fire of the armored vehicles protected the Soviet men and vehicles and prevented the Mujahideen from taking carefully aimed shots. During the course of the three-day advance, the defending Mujahideen fired more than 40 RPGs at the vehicles but did not seriously damage any of them.¹⁴

The Soviet combatants used artillery preparations before attacking cities and villages. Their indirect artillery fire hit suspected guerrilla strongholds and assembly areas while direct fire artillery hit snipers and firing points. Artillery also fired blocking fires or scatterable mine fields to seal the populated areas and prevent the guerrillas from escaping or bringing in reinforcements. Consequently, civilian casualties were high. Russian assessments recommended using PGM, antitank guided missiles with fragmentation warheads and artillery rounds with a reduced bursting radius to decrease civilian casualties in future city fighting.



Mortars (part of Soviet artillery) often were attached to maneuver companies. The 82-mm Vasilek automatic mortar batteries (shown here) provide both indirect and direct fire and were particularly welcome by maneuver units.

Unlike conventional Soviet attacks that conducted artillery fires by phases and a time schedule, the Soviet planners learned that, in city fighting, they could not plan fires to a time schedule; they only could plan on-call fire support for the attacking force. They also learned to use blocking fires to help secure areas just cleared or prevent counterattacks.¹⁵

The Soviet combatants used artillery to support block and sweep missions designed to find guerrillas in the countryside. Again, artillery sealed the flanks through which the guerrillas might escape. Sweeping fire preceded the searching Soviet ground forces even when there was no indication that the Mujahideen were present.¹⁶ Further, Soviet artillery concentrated on mountain passes, gorge exits and road or trail intersections when supporting a ground maneuver unit.¹⁷

In theory, all Soviet combat arms officers could adjust indirect artillery fire, but practice constantly demonstrated that non-artillery officers were not up to the challenge or not trusted to do so. Commanders refused to authorize indirect fire support adjusted by a maneuver officer unless he knew his *exact* position (cases exist where maneuver commanders knew their positions to within 50 meters but were denied needed indirect artillery fire support).¹⁸

Further, the number of forward observers (FOs) and fire direction officers (FDOs) assigned by TOE were not enough to support forces deployed in a counterinsurgency. FOs had to be in battalions and separate companies.¹⁹ FDOs had to be available to accompany

separate firing batteries and separate firing platoons because the terrain could not always accommodate an entire artillery battalion.

Because the artillery battalion was the base or planning unit of the Soviet Army, Soviet artillerymen were not used to deploying split-fire direction centers (FDCs), a requirement in the rugged terrain of Afghanistan. The Soviet Army never could train its maneuver officers sufficiently to solve its indirect-fire-adjustment problem, so it assigned additional FOs and FDOs from the Soviet Union to its 40th Army in Afghanistan throughout the war.

Maneuver officers could, however, readily adjust direct, observed fire; direct fire was a common offensive mission for artillery attached to maneuver units. Armored, self-propelled artillery was preferred for direct fire missions, but towed or unarmored artillery also was used in this role.

The unarmored BM-21 MRL often was used when other direct fire failed to dislodge the enemy. The truck-mounted BM-21s usually were moved into direct firing positions under the protection of an air strike, and each fired its 40 122-mm rockets immediately after the air strike ended. The guerrillas in the impact area who survived were normally unable or unwilling to return fire on the BM-21s as the MRLs pulled out of their firing positions to reload.²⁰

Battalion and Company Raids. The 2S1 122-mm self-propelled howitzer and 2S9 120-mm self-propelled howitzer/mortar were best suited to support raiding motorized rifle or air

assault forces. They usually deployed by battery or battalion.

Before a raid, the Soviet planners determined initial targets from aerial, visual and artillery reconnaissance. They usually fired a three- to five-minute artillery preparation on those targets.

If the Mujahideen opened fire on Soviet forces in the course of the raid, the Soviet gunners quickly tried to engage the target before it could escape by registering with one or two ranging rounds and then firing massed artillery fires on the target using normative firing tables for suppression or assured destruction.

While pitched battles occurred, the most common activity for raiding Soviet forces was pursuing a withdrawing enemy. Mujahideen usually left a rear guard to slow down the attacker while the main body escaped. The rear guard tried to stay within 200 to 300 meters of the Soviet force to escape Soviet air and artillery. In that case, the Soviet FO spotted his first round some 200 meters beyond the enemy and then walked the rounds back onto the enemy.²¹

Once the Soviet leadership introduced the laser-guided *Smel' chak* [Daredevil] mortar round into Afghanistan, the massive 2S4 self-propelled 240-mm mortar proved effective in destroying Mujahideen strongpoints and fortifications located in caves and terrain folds that howitzers could not hit.

In June 1985, Senior Lieutenant A. Beletskiy employed his 2S4 battery against a Mujahideen stronghold that artillery could not engage. The stronghold was located near the Pandshir Valley and garrisoned by Mujahideen of Ahmed Shah Masood. Lieutenant Beletskiy used a laser rangefinder to determine that the distance from the target was 2,350 meters. He then fired a conventional high-explosive (HE) spotting round, evidently to establish the PGM footprint. He adjusted his firing data and then fired a ground laser-guided *Smel' chak* round. It hit the target exactly. The 2S4 battery destroyed the Mujahideen stronghold with just 12 rounds.²²

Breaking Contact and Withdrawing. Soviet forces, particularly airborne and air assault forces, were at risk when their advance ended and they started to withdraw from the mountains. The Mujahideen followed closely on their heels to avoid artillery and direct fire, occupying abandoned positions and shooting at the retreating force.

Artillery fires became a standard way to allow a Soviet force to break contact and withdraw. Before the Soviet force



The Soviets often used the unarmored BM-21 MRL when other direct fire failed to dislodge the enemy. The truck-mounted BM-21s usually were moved into direct firing positions under the protection of an air strike, and each fired its 40 122-mm rockets immediately after the air strike ended.

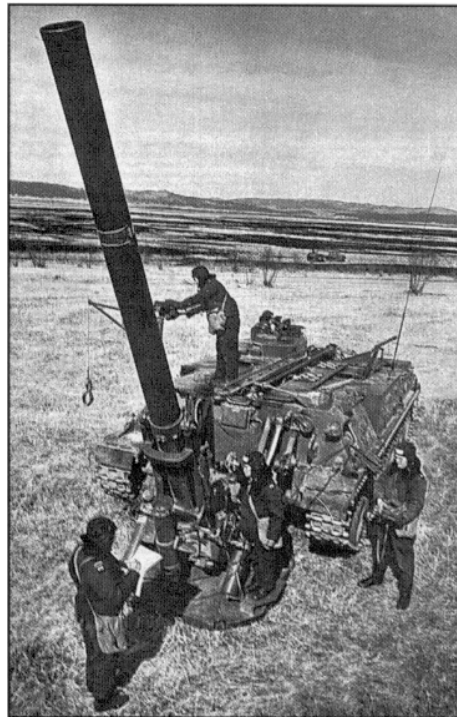
began to withdraw downhill, Soviet artillery would hit the reverse slope of the mountain crest that the Soviet force was on as well as the flanking slopes of mountains possibly occupied by the enemy and surrounding peaks and trails. As the Soviet force began to withdraw, Soviet artillery fire shifted to the crest of the mountain that the Soviet force was on. As the Soviet force withdrew, Soviet artillery fire gradually shifted downhill in a series of lines some 150 to 200 meters apart. The Soviet artillery continued to hit the mountain and its surroundings until the Soviet maneuver force completed its descent and was some three kilometers from possible Mujahideen small-arms fire.²³

Artillery Ambush. The Soviet gunners used towed artillery—the D-30 122-mm howitzer, MT-12 100-mm antitank guns and vehicle-mounted antitank-guided missiles—to provide base camp security and protect outposts and government installations. Artillery observers, usually located on high ground, found targets and adjusted fire during the day.

At night, target acquisitions and engagements were difficult, but Soviet reconnaissance troops employed their *Realii-U* sensor to detect unobserved targets. The *Realii-U* is a seismic motion detector that allows the operator to determine the number and type of objects moving near it. Soviet planners used the *Realii-U* to aid in the defense, monitor the security zone and support the artillery ambush.²⁴

A D-30 122-mm howitzer platoon leader conducted a successful artillery ambush in February 1986 near the town of Talukan in the northeast province of Takhar. Lieutenant V. Kozhbergenov installed the *Realii-U* sensor near a Mujahideen supply trail he couldn't see from his platoon observation post (OP)—see the map on Page 40. He then plotted three artillery concentrations (110, 111 and 112) spaced 100 to 150 meters apart along the trail and computed the firing data for each. The platoon leader plotted concentration 111 at the narrowest part of a valley. He then periodically used the DMK assault meteorological set to calculate the meteorological report to adjust his data (the report is good for an hour).²⁵

At night, the *Realii-U* operator reported that some 10 to 15 people, two trucks and five pack animals were passing through concentration 112. The platoon leader ordered "Fire Mission." His gunners stood by their pieces. As the Mujahideen



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approached concentration 111, the gunners fired a volley into 111. Then, the first piece switched to fire concentration 110 and the third to fire concentration 112. Number two gun continued to fire on concentration 111. The platoon expended 12 rounds and destroyed two Toyota trucks and killed four pack animals and six men as well as destroying small arms and ammunition.²⁶

Soviet commanders also planned artillery fire in support of ground ambushes. Ground ambush planning often included artillery illumination fire, fire on the kill zones, fire on probable enemy assembly areas after their withdrawal from the kill zone and fires to break contact with the enemy.²⁷

Convoy Security. The Soviet lines of communications (LOC) stretched more than 1,600 kilometers across inhospitable terrain. Almost all Soviet supplies traveled over a tenuous road network that tied down 15 of the 93 battalions of the Soviet 40th Army in perpetual LOC security. Other battalions provided convoy and march security to the vehicles that slowly drove from the Soviet border

to the forward garrisons and back.²⁸ Artillery contributed to LOC security by providing convoy escorts and fire support and accompaniment.

In the escort role, self-propelled artillery was dispersed throughout the march column among tanks and armored personnel carriers. These weapons systems remained within direct fire support distance of each other. If the Mujahideen ambushed the column, the artillery pieces, tanks or armored personnel carriers within the kill zone stopped and returned fire while the trucks drove out of the kill zone.²⁹ Artillery pieces had advantages over tanks in mountainous terrain because their main gun tubes have far greater elevation.

Artillery assigned in fire support and accompaniment moved with the column in three groups (normally batteries, but sometimes battalions). The first group moved at the head of the column, the second in the middle of the column and the third at the end. Artillery FOs were spaced every 10 to 15 vehicles throughout the column. This spacing ensured continuous fire support, even when distance gaps developed.

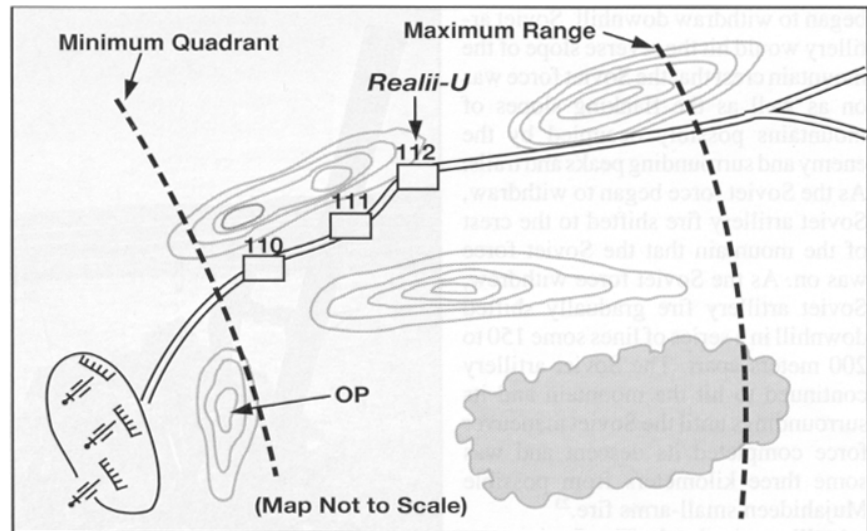
As the column started to march, the artillery stationed at the start point provided initial support. As the column reached the maximum effective range of the supporting artillery, the second artillery group deployed into firing positions, usually within the artillery fan of the supporting artillery. The second group then provided fire support as the third artillery group leapfrogged forward to the middle of the column. As the end of the column passed the second artillery group, the head of the column came near the maximum effective range of the second artillery group. The third artillery group then occupied firing positions, and the second firing group rejoined the column. The Soviet artillery would continue this procedure until the march column closed into an assembly area.³⁰

The Mujahideen usually tried to ambush a convoy near the front to stop it and destroy forward control elements. When possible, the Mujahideen cut a convoy into pieces and tried to destroy the pieces systematically. The forward positioning of the first artillery group often allowed its convoy to engage the ambushing force by direct fire. FOs also called in indirect fire on the ambush in an effort to defeat or annihilate the attacker.³¹

Conclusion

The Soviet generals attempted to substitute firepower for ground maneuver. They did not deploy enough infantry to Afghanistan and most were motorized rifle forces hard-pressed to fight far from their carriers. The Soviet leadership needed to use infantry aggressively to engage the Mujahideen and prevent the enemy withdrawal, but Soviet political decisions, security duties and force structure prevented assigning sufficiently, trained light infantry to conduct offensive mountain combat. Soviet gunners tried to "pick up the slack" and lost 433 artillery pieces and mortars fighting the Mujahideen.³² But fire without maneuver cannot be decisive.

There are some lessons that US artilleryman should take from the Soviet experience in Afghanistan. First, counterinsurgency requires innovative thinking



Artillery Ambush. The Russians used the *Realii-U* seismic motion sensor to detect unobserved targets. Shown here is an actual plan for such an ambush. Fire concentrations were plotted (110, 111 and 112) along a Mujahideen supply trail out of view from the observation post (OP). When the *Realii-U* detected enemy movement, the Russians fired the concentrations.

Notes:

1. Aleksandr A. Lyakhovskiy, *Tragediya I Doblest' Afghana [The Tragedy and Valor of the Veterans of Afghanistan]*, (Moscow: Iskona, 1995), 116. General Lyakhovskiy served with the General Staff Operations Group supporting the Soviet 40th Army during 1987-1989.

2. Normative fires are the number of expended rounds required to guarantee mission accomplishment. These are mathematically and field-test proven and are expressed as the numbers of rounds fired by type of artillery system within a specified time to produce a guaranteed percentage of kill. Soviet artillery missions are assigned in terms of annihilation, destruction, neutralization and harassment fires. The first three missions are given in normative fire terms.

Annihilation [*unichtozheniye*] consists of inflicting such losses or damage on a target that it completely loses its combat effectiveness. In the annihilation of unobserved targets, fire is conducted until a designated number of shells is expended, assuring a 70 to 90 percent kill probability of individual targets or the mathematical expectation of 50 to 60 percent of targets destroyed in a group target. The implication is that the target is so damaged it cannot be reconstituted and is incapable of even token resistance.

Destruction/demolition [*razrusheniye*] consists of putting a target in an "unfit" condition. The implication is that the target is so damaged it cannot be reconstituted without a significant expenditure of time and resources and is capable only of sporadic and uncoordinated resistance.

Neutralization/suppression [*podavleniye*] involves inflicting such losses on a target and creating such conditions by fire that the target is temporarily deprived of its combat effectiveness, its maneuver is restricted or prohibited or control is disrupted. In neutralizing an unobserved group target, the expenditure of a norm of rounds assures the mathematical expectation of 30 percent of the targets destroyed. The implication is that the target is severely damaged but would be capable of eventual coordinated resistance after the suppression fire is lifted.

Information taken from G. E. Peredel'skiy & M. P. Kankov, *Artilleriyskiy Divizion v Boyu [Artillery Battalion in Combat]*, Moscow: Voenizdat, 1989, 20-21.

For example, annihilation normative fire against a single artillery piece is 300 rounds of 122-mm howitzer ammunition, 200 rounds of 152-mm howitzer ammunition or 360 rounds of 122-mm MRL ammunition. Neutralization normative fire against an enemy stronghold occupying one hectare of ground is 200 rounds of 122-mm howitzer ammunition, 150 rounds of 152-mm howitzer ammunition or 240 rounds of 122-mm MRL ammunition. Information extracted from tables in V. Ya. Lebedev, *Spravochnik Ofitsera Nazemnoy Artillerii [Field Artillery Officer's Handbook]*, Moscow: Voenizdat, 1984, 373-375.

3. Lester W. Grau, *The Bear Went Over the Mountain: Soviet Combat Tactics in Afghanistan* (Washington: National Defense University Press, 1996), 52.

4. Lester W. Grau, "Soviet Artillery Planning in the Tactical Defense" (Fort Leavenworth: Soviet Army Studies Office, 1990).

5. Soviet-style normative fires proved very effective when the Mujahideen reverted to conventional tactics. After the Soviet withdrawal, the communist Afghan government forces unexpectedly held on for several years. The Mujahideen guerrillas adopted conventional linear tactics to attempt to take the cities of Kabul and Jalalabad. The communist forces, using normative artillery fires, decimated the Mujahideen and delayed a Mujahideen victory by at least a year. See Makhmut

Akhmetovich Gareev, *Moya Poslednyaya Voyna [My Final War]* (Moscow: Insan, 1996), 232-233, 248.

6. Nomographs are planning charts showing numerical relationships. The Soviets had literally hundreds of tactical nomographs that allowed commanders or staffs quickly to determine march times, the most effective systems for rapid artillery annihilation of an area target, the length of time a firing position can be safely occupied during a fire mission, etc. Most of the nomographs changed due to the terrain of Afghanistan.

7. Grau, *The Bear...*, 20, 37, 50, 61, 68, 79, 82 and 90. Occasionally, due to terrain or range considerations, artillery groups split, an uncommon occurrence for regular Soviet forces in Europe but a common one for US artillery.

8. *Ibid.*, 44-46 and 75-76.

9. M. I. Karatuev, V. A. Dreshchinskiy, "Primenenie Artillerii v Lokal'nykh Voynakh I Vooruzhennykh Konfliktakh" ["Employment of Artillery in Local Wars and Military Conflicts"], *Voennaya Mysl [Military Thought]*, May-June 1996, 26-27.

10. *Ibid.*, 28.

11. Grau, *The Bear...*, 3, 25, 45 and 71.

12. In the Soviet Ground Forces, mortars, antitank guns and antitank guided missiles were artillery weapons. Artillerymen were integrated into motorized rifle battalions to operate the organic mortars and antitank systems.

13. Karatuev, 26.

14. Grau, *The Bear...*, 24-26.

15. Karatuev, 27.

16. Sweeping fire is an offensive rolling barrage with lessened densities of frontage. In a regular offensive rolling barrage, the Soviets used one artillery piece of 100-mm or larger for every 25 meters of frontage for the rolling barrage. Sweeping fire could double or triple that frontage.

17. Karatuev, 27-28.

18. Grau, *The Bear...*, 15-18.

19. Boris V. Gromov, *Ogranichenny Kontingent [Limited Contingent]*, (Moscow: Progress, 1994), 186-187. General Gromov served three two-year tours in Afghanistan, the last as Commander of the 40th Army during its withdrawal.

20. Grau, *The Bear...*, 48-52.

21. Viktor Litvinenko, "Novo to, Chto Khorosho Zabyto" ["What is Completely Forgotten is Brand New"], *Armeiskiy Sbornik [Army Digest]*, September 1996), 46. Colonel Litvinenko commanded an artillery regiment and was the chief of the 201st Motorized Rifle Division Artillery during 1984-1986 in Afghanistan.

22. *Ibid.*

23. *Ibid.*, 45-46.

24. Litvinenko, 44.

25. *Ibid.*

26. *Ibid.*

27. Grau, *The Bear...*, 180-184, 189 and 192.

28. Lyakhovskiy, conversations with the author.

29. Litvinenko, 44.

30. *Ibid.*, 44-45.

31. *Ibid.*, 45.

32. Lyakhovskiy, Appendix.

and constant examination of tactics to get steel on the target accurately and rapidly. Second, maneuver and artillery must cooperate more closely than in conventional warfare and be tightly integrated at all times. Third, direct fire is a viable offensive firing technique—not just a defensive measure taken when enemy soldiers are "in the wire." Fourth, artillery assets can play a major, active role in convoy escort and accompaniment in rugged terrain. Fifth, cities and villages always will have civilians in them; gunners must develop techniques to fight around them. Sixth, PGM and other specialty rounds are playing an increasing role in counterinsurgency. Seventh, the biggest problem artillery has in counter-insurgency is finding a viable target.

During the war, the Soviet gunners developed firing techniques, nomographs and firing tables to cope with the enemy, mountains and desert, but they were not enough to defeat the Mujahideen. In the

end, the Mujahideen national will and ability to endure was decisive, and the Soviets withdrew after fighting for more than nine years.

After the war in Afghanistan, the Soviet Army was beset by the effects of a collapsing empire, faced overwhelming economic catastrophe and, apparently, decided to prepare only for high-tech conventional maneuver war—not for future counterinsurgencies. This decision to avoid guerrillas was in vain, however, as Soviet, and later Russian, forces again had to fight guerrillas in Tadjikistan, Azerbaidjan, Georgia and Chechnya. The Russians had to relearn the bitter lessons of Afghanistan because they had not incorporated them into their operations in the turbulent interim between counterinsurgencies.

Russian military science is now wrestling with conflicting visions of future war and, perhaps, the lessons of Afghanistan and the other guerrilla wars finally are being incorporated.

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GUARDFIST II—*Training the FO*

The guard unit armory device full-crew interactive simulation trainer—GUARDFIST II—is leading the way in virtual training for our forward observers (FOs). Developed by the Army National Guard (ARNG) and being fielded to ARNG and Active Army units, the portable, low-cost GUARDFIST II trains individual FOs. As shown in the picture, the GUARDFIST II has dual stations: one for training the FO and one for the instructor/operator (I/O).

The computer generates, monitors and controls the various simulated training scenarios, records FO performance, maintains a library of training exercises, generates the video and sound effects, processes input for the keyboard and trackball and performs test and diagnostic functions. The computer has a magnetic tape drive for updating the system with any new software that may be developed. It also includes expansion boards for video, graphics, digital

message device (DMD) and communications interfaces.

Through manipulation of the trackball, the student can select the compass view and orient it on a target or point and with his binoculars, scan the terrain viewable from his observation post (OP) and select his binocular magnification of the scene. During conduct of the training, the monitor allows the FO to observe terrain, targets, projectile impact, height of burst, smoke, obscuration and illumination so he can make the necessary adjustments. The system includes a headset and microphone for the FO to transmit voice calls-for-fire and terminal posts to connect the GUARDFIST II to the lightweight computer unit (LCU) for the FO to communicate digitally with the fire direction center (FDC).

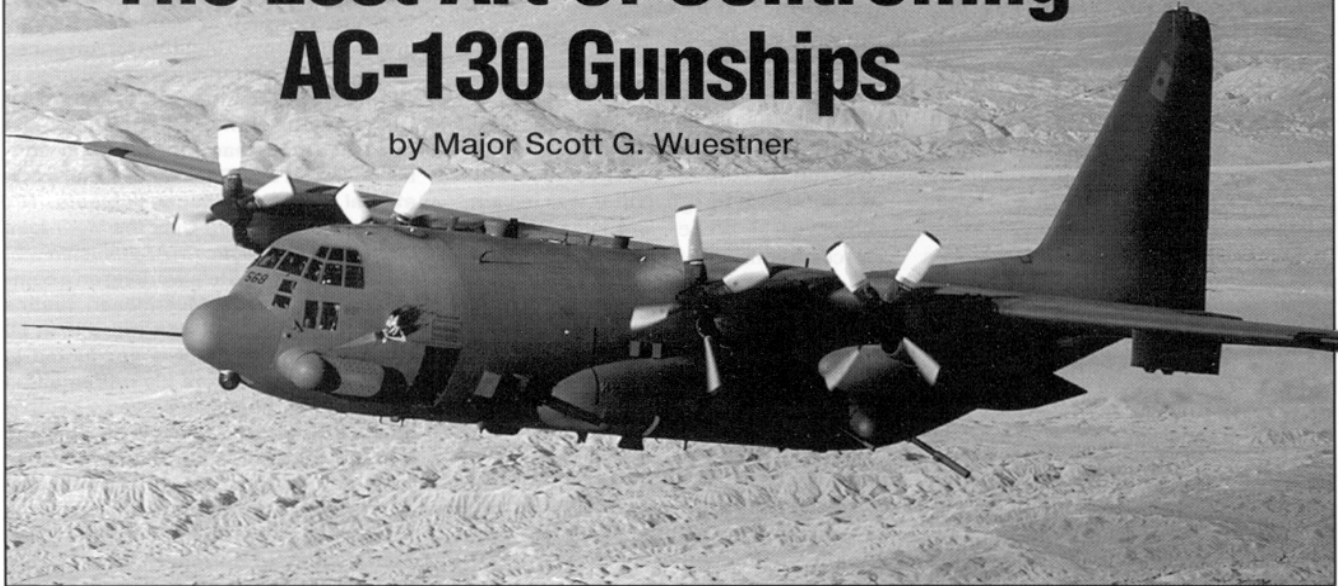
In the near future, the GUARDFIST II will become an integral part of the fire support combined arms tactical trainer (FSCATT) that will be the indirect fire portion of the Army's combined arms tactical trainer (CATT). The FSCATT will be a "system of systems" that fully integrates the training of the entire gunnery team—FO, FDC and weapons crew members. GUARDFIST II will provide the FO station in the training loop.

SFC Harold E. Homan
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The Lost Art of Controlling AC-130 Gunships

by Major Scott G. Wuestner



The Air Force AC-130 gunship is one of today's premier close air support (CAS) aircraft. The gunships have demonstrated their ability to provide extended periods of CAS at night with great lethality from the war in Vietnam to Operation Just Cause in Panama to Operation Desert Storm in the Gulf.

However, conventional light forces haven't been able to fully develop tactics, techniques and procedures (TTP) for calling in the AC 130 in the close fight. The problem is attributed mainly to the lack of access and training time with the platform. The purpose of this article is to provide AC-130 call-for-fire (CFF) TTP and positioning and target marking procedures.

The AC-130 gunship procedures can be found in *Joint Pub 3-09.3 Joint Tactics, Techniques and Procedures for Close Air Support (J-CAS)*. The information in this article outlines TTP not addressed in doctrinal publications.

AC-130 Gunship Call-for-Fire

The AC-130 CFF is sent in two transmissions and contains five lines of information. (See Figure 1.)

Line 1—Observer/Warning Order. This line closely resembles the artillery CFF format. "Fire Mission" may be replaced by "Recce" when requesting enemy reconnaissance or use of the gated

light illuminator night television, called GLINT. The warning order may also include "Mission #1" and "Mission #2" if multiple missions are requested.

Line 2—Friendly Location/Position Marking. The observer must first identify his position by describing his location. He may use graphics on a map, visual "talk-on" CAS techniques, direction and distance from a target reference point (TRP), a grid location sent over a secure net, any other method or none.

To further identify his location the observer may use common day or night marking techniques. These are outlined below and are designed to work with each of the gunship's three sensors.

- *Position Marking—Infrared (IR).* The Q-17 infrared camera on the AC-130H and updated IR detection set on the AC-130U is a passive system that detects radiated heat and energy. It presents the image on a black and white television picture format in white or black hot polarity. Both sensors have a wide and narrow field of view. Their excellent position marking devices include space or thermal blankets. Also, position marks, such as smoke and heat tabs, easily identify the observer's location.

- *Position Marking—TV.* The low-light level television (LLTV) sensor in the H-model and all-light level television (ALLTV) sensor in the U-model amplify available light, such as starlight, and present it in a black and white television format. This means it's compatible with

most ground laser pointers. The H-model TV has two fields of view: wide and narrow; the U-model also has a medium view. The GLINT is used only in permissive environments.

Excellent position marking devices for the TV sensor include the basic survival strobe, firefly and Phoenix strobes and red lens flashlight. The observer also can "rope" the aircraft by aiming the pointer at the gunship. ("Rope" is a J-CAS term used by the observer to identify his position for an aircraft.)

- *Position Marking—Radar.* The AC-130H has a limited adverse weather sensor: APQ-150 beacon tracking radar. This radar is an active India-band transponder and receiver that detects the PPN-19 and other beacons.

The AC-130U has the APQ-180 Strike Eagle radar. This radar gives the U-model an adverse weather capability. It can create high-resolution maps and detect and track moving vehicles during reduced visibility operations.

When employing any beacon to mark his position for a CFF, the observer turns the beacon on only to execute the mission and then turns the beacon off. This reduces the signature for the enemy's direction finding radar. If the observer uses radar reflectors, he must space them not less than 10 meters apart.

- *Position Marking—All Sensor Systems.* During tactical operations, the gunship will attempt to identify all friendlies prior to engaging targets. If

this is not practical and the gunship has a clearly defined target, the gunship can engage targets when the friendlies are known to be clear. This concept is known as reasonable assurance.

Gunship crews normally operate under direct positive control before engaging; however, battlefield conditions may preclude this and attacks can be cleared under the joint force commander's (JFC's) established guidelines.

Line 3—Target Location. The preferred method is to reference a target in terms of direction (degrees magnetic) and range (meters) from the observer's position. The observer also may refer to the direction in terms of the eight cardinal directions. (The gunships have a fixed north indicator that provides rapid orientation). Direction should never be referred to using the clock method: "...at nine o'clock."

Targets also may be described using visual talk-on CAS techniques, such as giving a direction and distance from the TRP to the target or building to the target. Additionally, grid coordinates may be used.

Line 4—Target Description and Target Marking. The target description aids in both identification and crew weapon selection. At a minimum, the description should cover what the target is, what it's doing, its size and degree of protection. The observer should not try to describe the target by color.

The observer has many options in marking a target for the gunship. Tracers from direct fire, flares or 40-mm rounds all provide a reference point for visual talk-on techniques. (Note that it isn't a requirement to mark the target to conduct a fire mission successfully.)

- *Target Marking—IR and TV.* The most

common marking technique is to use IR pointers or "Sparkle" with the TV sensor. "Sparkle" is the doctrinal term for marking a target with an IR laser pointer. IR pointers are limited to favorable environmental conditions. Temperature, humidity, fires and smoke all degrade pointer operations. Additionally, ambient light is a key planning factor in deciding whether or not to use an IR pointer mark.

- *Target Marking—IR Pointers.* Historically, IR pointers perform directly proportional to their power output. Weapon-mounted pointers, such as the AIM-1 and PAC-4 Charlie, are 30-milliwatt pointers and generally have a range out to two kilometers. The 50-milliwatt pointers (air commander's pointer) or 100-milliwatt pointers (GCP-1 B) perform out to three kilometers with greater clarity for the gunships. Using the pulse setting on an IR pointer or focusing the beams of two pointers on one target to produce an inverted "V" enable the gunship to quickly identify a target.

When sparkling a target, the FO normally won't mark the target until the gunship requests it. (Note: this is the same procedure used in marking targets for faster-mover CAS.) This reduces the observer's exposure with the IR device. When commanded to "Mark Target," the observer walks the IR pointer from his position to the target. It's important to mark the base of the target to reduce IR pointer spillover. This technique reduces the gunship's target identification time and the observer's vulnerability.

Also, to deconflict multiple pointers (i.e., maneuver control versus fire support CFF), it's critical the gunship pilot can clearly identify the observer's position (building two, battle position one, etc.).

If required, "At My Command" (AMC)

will be included at the end of the second transmission as part of Line 4. The navigator will tell the FO that the gunship is prepared to fire by stating, "Ready to Fire."

The FO will command the gunship to fire by saying, "Fire."

Line 5—Remarks. Flight hazards, changes in anti-aircraft threats or requests for special munitions and engagements is provided to the gunship. If required, the observer requests a time-on-target or danger-close mission on this line.

Execution and BDA. A properly authenticated transmission of the AC-130 CFF gives the crew clearance to fire. The observer does not have to clear the gunship "Hot." However, the gunship retains the right to request specific clearance to fire at any time, particularly when the mission is danger close (125 meters for 20-mm, 25-mm and 40-mm; 200 meters for 105-mm).

The goal of the gunship is first round fire-for-effect (FFE). The observer should only adjust marking rounds or for an incorrect target. Corrections are given using one of the eight cardinal directions and distance (meters) from the impact of the last rounds to the desired target. "Rights" or "lefts" are not used. If the rounds are on target, the observer immediately states FFE to the gunship.

The gunship will end the mission when the desired results are achieved. Battle damage assessment (BDA) always will be sent to the observer from the gunship. The observer can request continued effects or end the mission at any time.

AC-130 Crew Procedures

Once the observer has completed his transmission of the CFF, the gunship crew begins its target engagement procedures. A typical mission begins when the navigator establishes communications with the ground party and the CFF or reconnaissance mission is sent. Simultaneously, the sensor operators begin to locate the observer's position with the TV, IR or beacon tracking radar.

The fire control officer (FCO) inputs the direction and distance from the friendlies to the target into the computer or he enters the grid if sent. The FCO then directs the TV, radar or IR sensor to act as primary fire control for the engagement.

1st Transmission
Line 1. Observer/Warning Order: "[AC-130], this is [FO]. Fire mission, over."
2d Transmission
Line 2. Friendly Location/Mark: "From my position, [target reference point, building, grid, other or none] marked by [IR strobe, beacon, etc. or none]."
Line 3. Target Location: "[Degrees magnetic/range in meters, target reference point, grid or other]"
Line 4. Target Description/Mark: "[Target description] marked by [IR pointer, tracer, other or none), over."
Line 5. Remarks (If Required): "[Threats, effects required, danger close, time-on-targets, etc.], over."

Figure 1: The Ground Observer's AC-130 Call-for-Fire. This CFF has two transmissions and includes five lines of information.

The remaining sensor moves ("slaves") to the other sensor's position and follows the mission or maintains its observation of the ground party.

If an IR pointer is used, the TV follows the walk of the pointer from the observer to the target. This occurs upon the command of "Mark target" from the gunship. Once the target is positively identified, the FCO announces the distance from friendlies and any "No fire" headings in place. Once again, he confirms the primary fire control sensor and identifies which weapon system will engage the target.

The gunner, as directed, prepares the

appropriate weapon system and announces, "Ready." The navigator then confirms all firing data and clears the crew to fire. The pilot/aircraft commander gives his consent while the sensor operator provides final consent and fires the weapon. The crew then assesses the effects and relays the target's status or BDA to the ground controllers.

The most common types of fire missions are the CFF with no mark (see Figure 2), the CFF with IR "Sparkle Mark" (see Figure 3) and the CFF using GLINT.

Use of GLINT. The gunship's GLINT can be used in a variety of roles, either

preplanned or on-call. GLINT is referred to as "burn." When moving the burn, the observer directs the gunship to "roll burn" in a specific direction (cardinal or degrees) and distance (meters). He doesn't tell the gunship to roll burn in units or by the size of the burn on the ground.

The observer can have the gunship stop moving the burn by stating "Freeze burn." If the observer wants the gunship to turn the burn off, he states, "Stop burn." (See Figure 4 for procedures for a reconnaissance mission using GLINT.)

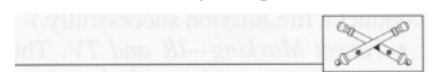
No-Comms Missions. No-communications CFF procedures require extensive preplanning with a gunship planner. Missions in all cases are still sent to the gunship "in the blind." Common techniques include two methods:

- *Method 1.* The observer turns on a beacon, such as the PPN-19, and provides a visual target mark, such as direct fire or sparkle.
- *Method 2.* The observer ropes the AC-130 to identify his position and then walks the sparkle from his location to the target.

In all cases, the gunship engages targets until the required effects are achieved.

The future holds many diverse missions for our light and heavy forces. Our observer teams must know how to employ all assets in order to be successful.

Unfortunately, not all fire supporters have the opportunity to work with AC-130 gunships. The AC-130 TTP in this article provide a foundation for FOs to control AC-130 gunships.



Major Scott G. Wuestner develops and tests fire support tactics, techniques and procedures (TTP) and equipment for the Special Operations Command at Fort Bragg, North Carolina. He has six years of experience working with gunships. His other fire support officer (FSO) and related experience include serving as a FSO Instructor for the Field Artillery Officer Basic Course at the Field Artillery School, Fort Sill, Oklahoma; Battalion FSO for the 2d Battalion, 75th Ranger Regiment at Fort Lewis, Washington; and Battalion FSO for the 3d Battalion, 17th Infantry, 7th Infantry Division (Light), Fort Ord, California. He participated in three rotations as a task force FSO at the Joint Readiness Training Center, Fort Polk, Louisiana. Major Wuestner commanded A Battery, 5th Battalion, 15th Field Artillery, 7th Infantry Division (Light).

Observer: "Spooky 22 [AC-130U] de B14 [FO]. Fire mission, over."
Gunship: "B14 de Spooky 22, fire mission, out."
Observer: "From my position at BP 2, marked by IR strobe, 245 degrees, 1500 meters, V-150 moving south on Highway 17. No mark, over."
Gunship: "Read back [pilot repeats observer CFF details], out....Round away, over."
Observer: "Round away, out....Southwest 200 meters, V-150 is now behind building. FFE, over."
Gunship: "FFE, out. End of mission, V-150 destroyed. Estimate three casualties, over."
Observer: "End of mission, out."

Figure 2: CFF—Direction and Distance, But No Mark

Observer: "Spectre 45 de B14. Fire mission, over."
Gunship: "B14 de Spectre 45. Fire mission, out."
Observer: "From my position at building four, marked by beacon, 125 degrees, 600 meters. BTR [tracked reconnaissance vehicle] on east side of building marked with sparkle, over."
Gunship: "Read back [pilot repeats observer CFF details], out....Mark target, over."
Observer: "Mark target, out." [Observer sparkles target.]
Gunship: "Rounds away, over."
Observer: "Rounds away, out....FFE, over."
Gunship: "FFE, out. End of mission, BTR destroyed. Estimate four casualties, over."
Observer: "End of mission, out."

Figure 3: CFF—Direction, Distance and IR Pointer Mark

Observer: "Spooky 22 de B14, recce, over."
Gunship: "B14 de Spooky 22, recce, out."
Observer: "From my position marked by space blanket, burn west 800 meters, suspected enemy vehicles, over."
Gunship: "Roger, out." [Gunship turns on GLINT.]
Observer: "Roll burn 400 meters south, over." [Gunship begins to roll burn.]
Observer: "Freeze burn, over." [Gunship stops moving burn.]
Observer: "Trucks are in northwest corner of burn. FFE, over."
Gunship: "Roger, I have the target. FFE, out....End of mission, trucks destroyed, over."
Observer: "End of mission, out."

Figure 4: Reconnaissance Mission Using GLINT

BFIST is on the Way

The Bradley fire support team vehicle (BFIST), called Thunderstrike, is on the way. And if selected for accelerated funding, the high-mobility multipurpose wheeled vehicle (HMMWV)-based combat observation lasing team (COLT) vehicles will be on the way with the BFIST. The 3d Infantry Division (Mechanized), Fort Stewart, Georgia, will begin fielding BFIST in FY 1999. The HMMWV-based COLT program would integrate BFIST mission equipment into a HMMWV platform, and pending funding, brigade sets of the HMMWV-based COLT systems would be fielded in conjunction with BFIST.

BFIST Development. The vehicle will replace the company FIST's inadequate M981 FIST vehicle (FISTV). Based on an M113 chassis and modeled after the old improved tube-launched optically tracked, wire-guided missile (TOW) M901 vehicle, the M981 has continuously had problems since its fielding in the 1980s.

In the 1980s, the infantry and armor communities moved on to the M1/M2 series of combat vehicles. Deficiencies in the M981's mobility, reliability and targeting capabilities were clearly noted in the Gulf during Operation Desert Storm in 1991. Additionally, the M981 presents a unique signature and provides less protection than the vehicles of supported maneuver units.

The BFIST will give the company FIST headquarters the equivalent mobility, survivability, maneuverability, speed and signature as the supported infantry, armor or cavalry unit. With the integrated mission equipment package (MEP), the BFIST automates and enhances surveillance capabilities along with enhancing target acquisition, identification and tracking plus position location and communications. The BFIST will communicate via digital nets with the battalion fire support element (FSE) and with maneuver battalion mortar, direct support (DS) battalion and battery fire direction centers (FDCs) and via voice with the maneuver company command.

The initial BFIST (M7) will use the Bradley M2A2 Desert Storm chassis. The FIST MEP hardware consists of the lightweight computer unit (LCU) and hand-held terminal unit (HTU) configured with forward observer software (FOS). The FOS software falls under the advanced Field Artillery tactical data system's (AFATDS') umbrella and will be fielded in FY 98.

The heart of the targeting station includes the targeting station electronic unit (TSEU) and the targeting station control panel (TSCP). Other key MEP components include the precision lightweight global positioning system receiver (PLGR) and the inertial navigation system (INS). The INS provides target heading reference data for all targeting missions as well as an inertial land navigation capability aided by PLGR and the distance transmitter unit (DTU). The LCU and HTU are the primary terminals for conducting fire support planning and execution functions with both devices using data from the BFIST sensors and external sources, such as subordinate FOS.

There are key capabilities the Bradley chassis gives fire supporters—including the Bradley integrated sight unit (ISU)



with embedded eye-safe laser rangefinder (BELRF), driver's viewer enhanced (DVE) and the vehicular intercom system (VIS). Additionally, the BFIST will be able to incorporate the battlefield combat identification system (BCIS).

In short, BFIST will integrate PLGR data with the information from the inertial navigation system to give automated accurate targeting data and will allow the company FIST to keep up with its maneuver units.

The first of four engineering and manufacturing development (EMD) prototypes of the BFIST was delivered to the government on 1 October 1996. Since then, the prototypes have undergone extensive government and industry technical testing, including a users' test with 10 soldiers from the 3d Infantry Division beginning in May. There is a low-rate initial production decision scheduled for September.

The next Bradley, the M2A3, is the chassis the next BFIST version will be integrated onto. The "A3BFIST" will replace the M7 variant in the 3d Infantry Division in FY 2004. The A3BFIST will include forward-looking infrared (FLIR) technology and technological advances in maintenance and support and in other areas.

HMMWV-Based COLTs. The FA School, Fort Sill, Oklahoma, also is working on enhancing the capabilities of our COLTs in the HMMWV-based COLT system to be fielded to all heavy and light brigades. The system is a strong candidate in the Warfighting Rapid Acquisition Program (WRAP) competition for accelerated funding, which would allow it to be fielded simultaneously with the BFIST's fielding to brigades.

This program will enhance COLT survivability. The COLTs will have hard-top HMMWVs with the ground/vehicular laser locator designator (G/VLLD), AN/TAS-4 thermal night sight, a crew-served weapon designed onto the turret and other BFIST equipment incorporated into the vehicle.

There's no doubt these two FIST improvement programs will significantly improve the capabilities of our fire supporters. The BFIST and HMMWV-based COLTs will help the FA achieve the precision, lethality and survivability needed on the Army XXI battlefield.

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