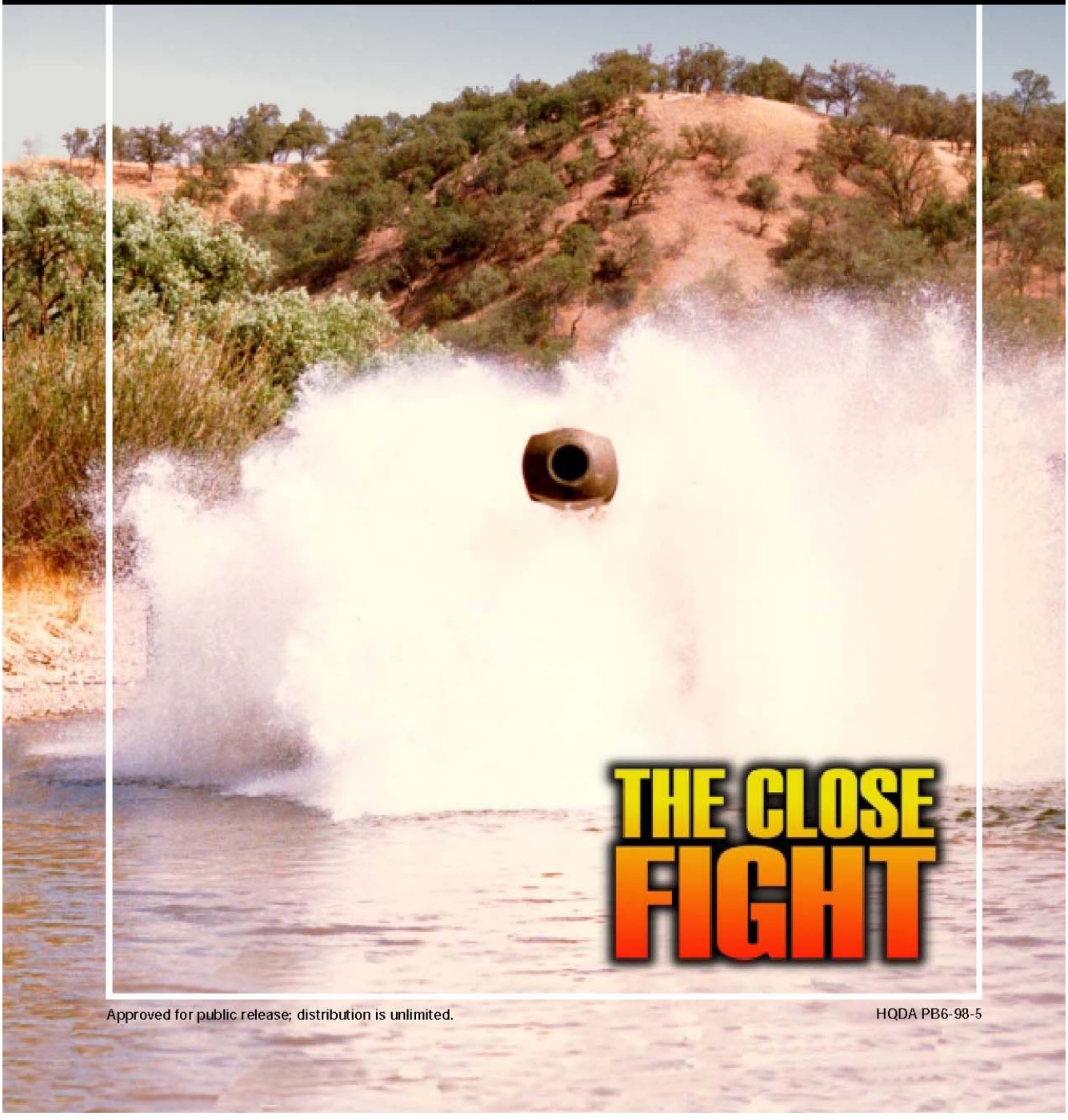
Field Artillery

A Professional Bulletin for Redlegs

September-October 1998



THE CLOSE FIGHT

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ARTICLES: TTP for the Close Fight

FEATURES

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ATLAS: Close Support for Future Light Forces?

Close support for Division XXI is on the cutting edge with Crusader, the world's most technologically advanced howitzer. The deep attack and battlefield-shaping capabilities of the multiple-launch rocket system (MLRS) and Army tactical missile system (ATACMS) along with Crusader were proven during the recent Division Advanced Warfighting Experiment (DAWE) at Fort Hood, Texas. But we must never forget our equally important mission of providing fire support to the lightfighter. The high-mobility artillery rocket system (HIMARS) will be a huge new asset, but our light divisions—our forced-entry forces—need a howitzer that will help them defeat the broad spectrum of threats they'll face in the future, a howitzer that's on the cutting edge.

The advanced technology light artillery system (ATLAS) may be just that howitzer. We are in the early stages of ensuring we understand the extremely technical and diverse requirements of the light community, especially our forced-entry forces. If we can design ATLAS to meet these unique requirements, it could become the future system for our airborne, air assault and light infantry divisions as well as light cavalry regiments, replacing our current direct and general support artillery. ATLAS will provide the lethality, strategic deployability, and operational and tactical mobility needed to defeat future threats across the spectrum of conflict. Using the latest innovations available, ATLAS will close the technology gap between our towed and self-propelled indirect fire weapons. It will be a revolutionary system for our light forces.

Strategically Deployable. An important advantage of light units is their ability to project combat power from anywhere in the world into any terrain and climate at any time. They do this by maximizing firepower while limiting size and weight, and that's what ATLAS is about.

ATLAS will incorporate innovations that result in minimal weight without sacrificing range, stability, accuracy, reliability or deployability. It has an objective weight of no more than 5,000 pounds, so the gun and its prime mover can easily roll on and roll off a C-130 cargo plane. Two howitzers and prime movers would easily fit into a C-141B with one ATLAS and prime mover airdroppable on standard platforms.

Once cleared of air-load material, technology and engineering will enable ATLAS to be emplaced and ready to fire in three minutes or less, using only five of its seven-man crew. ATLAS will displace in less than two minutes with five cannoneers, ensuring maximum survivability against counterbattery fires or chemical and biological contamination.

Operationally and Tactically Mobile. ATLAS' light weight means it can use a modified high-mobility multipurpose wheeled vehicle (HMMWV) as its prime mover. Additional modifications to turn a HMMWV into an ammunition carrier will allow safe storage of 19 to 40 complete rounds, easy selection and retrieval of any desired round, on-board projectile fusing and propellant preparation, and a conveying system to move the prepared round up to ATLAS' breech, helping the gunners achieve maximum rates of fire.

Right now, our brethren at the Army Aviation Center are developing the UH-60(X) helicopter to carry a 9,000 pound payload at least 75 kilometers under "high/hot" conditions. That means a rotary wing aircraft could carry an ATLAS howitzer with enough crew, equipment and ammunition to conduct an air assault artillery raid in one sortie. On the ground or in the air, ATLAS will rapidly traverse the length and breadth of the battlefield, ensuring constant and lethal direct support for the combined arms forces and increased survivability for the crews.

Latest Technologies. ATLAS will incorporate cutting-edge technology to create a light, rugged weapon that meets a wide variety of tough requirements. One such possible innovation is isogrid construction. To reduce the weight of structures, manufacturers for decades have drilled holes in aircraft and automobile frames but at the cost of reduced strength. If you've ever wondered why sports cars often have three holes in their steering wheel spokes, they're design holdovers from the days when practically every piece of a racing car was drilled for weight savings. Isogrid construction takes that concept further. Using computer modeling and precision milling, we can build howitzer carriages with unique diamond-shaped cutouts that are about 30 percent lighter than solid frames with no loss of strength.

Electro-rheological (ER) fluid is another dramatic invention that may find its first military application in ATLAS. By passing an electrical current through ER fluid, its viscosity can be adjusted in milliseconds. Imagine putting 30-weight oil in your engine and, simply by pressing a button or flipping a switch, instantly change it to 5-, 15-, or 90-weight oil—whatever the environment or mission requires. ATLAS may employ ER fluids along with mechanical advantages to create a hybrid recoil system that fine-tunes tube travel to specific charges and projectiles. This system would reduce recoil stress to a fraction

of what today's howitzers endure, and less recoil stress means greater accuracy, faster rates of fire and lighter construction.

If we can meet the rigid requirements for our light forces, a single-caliber towed howitzer may be favorable for both direct support and general support forces: one gun for both missions. Or technology even may allow ATLAS to be multi-caliber—with cannoneers able to change the size of its bore on the firing point. ATLAS will make its appearance during the transition between cloth-bagged propellants and the modular artillery charge system (MACS) propellants used in Crusader and will fire either. An advanced ignition system, possibly a laser, will practically eliminate misfires and increase the rate of fire.

Of course, ATLAS will incorporate state-of-the-art computerization to locate and lay the howitzer automatically and link it to tactical fire direction and situational awareness systems. The howitzer will have an on-board global positioning system (GPS) as well as a ballistic computer to receive, store and process meteorological data, muzzle velocity readings, targeting data, boresight corrections and ammunition inventories. It also will compute tactical and technical fire direction data on board.

ATLAS could give Redlegs what they need to provide the combined arms commanders in light units superb direct support. We are looking very closely at possibilities for ATLAS, are working with our XVIII Airborne Corps and other light units, and expect to have a prototype weapon that meets all our requirements, especially the 5,000-pound weight limit, soon after the turn of the century. Whether parachuted by the 82d Airborne Division, air-assaulted by the 101st Airborne Division or towed by the 10th Mountain Division, 25th Light Division or 2d Armored Cavalry Regiment, ATLAS will be another fine example of the Field Artillery's commitment to provide the best close support possible and remain on the cutting edge of fires.

INCOMING

LETTERS TO THE EDITOR

Digital Out-Brief-Leaving My OP

The following is a 22 June 1998 Email from Lieutenant Colonel John Kearney, Deputy Fire Support Coordinator (DFSCOORD) for 14 months for the 4th Infantry Division (Mechanized) at Fort Hood, Texas, that was sent to his division and division artillery commanders and others. The message is his digital out-briefing as he left Fort Hood and is printed with his permission. Ed.

Except for the corps FSE [fire support element], I have served as an FSO [fire support officer] within every element of our structure—battalion, regiment, division and echelons above corps. As experience is the best teacher, I leave you with a few of my fondest digital experiences. They may assist you all in fighting with fires.

Don't Forget the Lessons of TAC-FIRE. If you've ever seen TACFIRE [tactical fire direction system] "A and B shelters" and had to inventory them, you'd understand the true meaning of digital pain. But, if you've ever seen TACFIRE operated by competent, digitally trained soldiers, then you'd be in true awe. Think we've lost some of that.

I vividly remember having to fall-in at the ol' TACFIRE Park once a week for the dreaded digital sustainment training—everybody, no exceptions, no excuses. It was a hard way to train, but a lot of smart leaders were committed to making it work.

Digital skills are highly perishable, and it takes a TACFIRE-like commitment to maintain and sustain them. We don't need or want to see any TF AWE [Task Force Advanced Warfighting Experiment] eight-hour fire missions—*ever again*.

When Digital, Stay Digital. When providing recent O/C [observer/controller] support, it saddened and disturbed me when a DS [direct support] battalion commander made the independent decision to "Go Voice" because, in his mind, AFATDS [advanced FA tactical data system] didn't work. It saddened me because this system, like all our ATCCS [Army tactical command and control systems], was designed to support the commander—men like him—and those he serves. It disturbed me because within a short time of his decision to Go Voice, his unit went black to counterfire. Had he "stayed the digital course" and made it work, then maybe, just maybe, his unit would have been viable for close support. It wasn't, and another unit had to pick up the slack.

As a regimental FSO, I've seen this Go-Voice phenomenon before as both initiator and victim. It's my observation that the reason we Go Voice is because leaders don't trust or have confidence in the equipment, and the reason they don't is because they aren't trained to use it.

We see this over and over at the NTC [National Training Center, Fort Irwin, California] where fires are planned digitally and executed voice...and when executed voice, are usually late and unfocused. Therefore, those units don't accomplish their EFSTs [essential fire support tasks]. We must *plan* digitally, *execute* digitally and, in today's environment, *envision* digitally.

Speed Kills. I learned the importance of speed on the Korean DMZ [demilitarized zone] as the FSO for an infantry battalion in the Western Corridor. Our element [FSE] and FISTs [fire support teams] were issued our first digital equipment, the PSG-2A, dubbed the dumb DMD [digital message device]. We spent a lot of time in the TSFO [training set fire observation trainer] and quickly became digitally proficient.

One of the element NCOs figured out how to connect the device to a PRC 77 [radio], another figured out that we could recharge the DMD with the same battery charger as the TOW [tube-launched,

optically tracked wire-guided missile] night sight, and a third designed brevity codes for use in the DMD's simple plain-text message format. We were in business.

The only one not sold on digital was the battalion commander who was convinced that this digital stuff was, as he put it, "Crap." He had to hear the call-for-fire [CFF] over the radio—not the digital bleep.

A week before assuming the DMZ mission, I asked him if he knew what the MTP [mission training plan] time standard to mass an M198 battery at 4P3 was; when I told him the standard was (about) six minutes, he was shocked. Next I told him that the boys had been working on cutting the time in half. Then we showed him how.

A smart man, he trusted his FSO that day and rightly figured the force protection of his men outweighed his desire to hear the CFF voice over the net. By the end of the rotation, we had DMDs in both towers, on patrol, at the TOC [tactical operations center], with the mortars—everywhere—including in the commander's quarter-ton. We were digitally trained, proficient on our equipment, confident and extremely proud.

Fast forward some 12 years, and you all witnessed that *speed kills* in the complete destruction of four simulated CAAs [combined arms armies] during the DAWE [division AWE]. Again, we were digitally trained and proficient, confident and extremely proud.

Firstest with the Mostest. Nathan Bedford Forrest's maxim more than applies to the digital battlefield. Our fires can be "firstest" due to the speed of digital execution, but "mostest" poses a problem.

Colonel [David] Valcourt [4th Infantry Division Artillery commander] will tell you the fire supporter must do three things to set the conditions for decisive maneuver: (1) Have good clean digital communications and a flexible digital plan (for speed), (2) Have the correct turret loads and (3) Be in the correct position to support. Positioning to support no longer means "FA, move to and occupy PA 1 [Position Area 1] or OA 2 [Operational Area 2]"; it now means something like, "1BCT [1 Brigade Combat Team] is to position its force to protect the divisional MLRS [multiple-launch rocket system] battalion to range the 90 N/S [north/south grid line], NLT [not later than] 0600." Placing the position/protect onus on the maneuver commander ensures that the "mostest" will be there when we need it.

Be Digitally Inventive. Here's another example from another smart ex-Division Artillery commander, Colonel (P) [Lynn] Hartsell, of the 2d Infantry Division in Korea. He realized he had to be able to get to the NKPA [North Korean Peoples Army] before it could get to him; he had digital speed—IFSAS [initial fire support automation system], FED [forward-entry device] and BCS [battery computer system]—but lacked the requisite firing systems to mass. His guidance to me was simple: "S3, go over and talk with the I and V ROK [Republic of Korea] Corps Artilleries and see what you can do"—translated into "link them to our counterfire effort."

Damn, it was hard. The ROKs are masters at massing artillery centrally controlled and executed from the corps FDC [fire direction center]. We placed a couple of smart guys with digital equipment with the ROK corps FDCs to link back into our system, thus creating a "digital gateway." It worked, and the 2d Infantry Div Arty today remains the most lethal in our Army.

Connectivity versus Functionality. I learned this lesson with the cavalry in the desert. We had what we thought was a great digital link to the DS battalion's Q-36 radar, but the first time it lit-up and generated a real fire mission through the TACFIRE shelter to our VF/MED [variable-format/message entry device], the grid plotted was in our 1st Squadron's zone. Connectivity was great, but our functionality wasn't. Reminds me of the aviation-fires problems we have today—we can "ping" each other, but we can't get over the basic "What map mod are we on?" question to get the right functionality.

I relearned this connectivity-functionality lesson again working for Brigadier General [Thomas] Metz, Director of the Force XXI Coordination Cell, as his Fires IPT [integrated process team] lead (his FSO). He *understands* fire support and the "wickets" we go through to get the round from Point A to Point B. For the senior leadership's (and our own) benefit, he had us design a series of charts to depict the digital flow and force each IPT lead to rate its BOS' [battlefield operating system's] connectivity/functionality as Red, Amber or Green. As painful as this PowerPoint exercise was, it forced others to focus attention on fixing a Red or Amber rating.

Keep the DOCC in the TAC [Tactical Command Post]. I learned DOCC [deep operations coordination cell] operations from my time spent in the HTACC [hardened theater air control center] in Korea as an operations officer in the BCE [battlefield coordination element]—now, BCD [detachment]. Colonel [Gerald] Cummins, a light-fighter and one of the best fire supporters I've known, taught me the true meaning of D^3A [targeting process of decide-detect-deliver-assess].

In the HTACC (the Pit) we had in a macro sense exactly what we would replicate in the DAWE. In the Pit, we had all the digital stuff we could find—IFSAS and a FED link to an ATACMS [Army tactical missile system] shooter via commercial phone, MSE [mobile subscriber equipment] and TACSAT [tactical satellite]...situational awareness via the ABCCC [airborne battlefield command and control center] and AWACS [airborne warning and control system] downlinks to CTAPS [contingency theater automated planning system]...and access to an ASAS-RWS [all-source analysis system-remote work station], TACCIMS [theater automated command and control information management system] (theater C^2), an early version of AMDWS [air missile defense work station and an A^2C^2 [Army airspace command and control] "box" that linked with the ROKs. We monitored the USAF and ROKAF AI [air interdiction] and

Division TAC in the DAWE. Our fires can be "firstest," but unless leaders embrace digital operations, "mostest" poses a problem.

preplanned CAS [close air support] missions, executed the ACC's [air component commander's] ATACMS missions, kept him informed of the ground situation and cleared airspace and, when required, coordinated Army aviation's deep attacks beyond the FSCL [fire support coordination line] inside the ITO [integrated tasking order] cycle. We had the lookers, killers and deciders in one central location.

The lesson is that nothing replaces face-to-face interaction and receipt of mission-type orders. Think we'd want that same thing in our DOCC. Without it, we'll have majors and lieutenant colonels either making independent decisions away from the "decider" or, worse, doing nothing.

Intelligence, Aviation and Fires. The division fights these three. The Intel BOS has gotten away from "counting bumper numbers" for the commander and has moved toward the let's-kill-'em-now-and-count-later approach. There's healthy competition emerging between fires and aviation—that's good for business. There are plenty of kills to go around.

Digital MDMP versus D^{3}A. With the advent of true situational awareness, it's about time we relooked the MDMP [military decision-making process]. Decisions are made so much more quickly along the line of D^{3}A than orders can be cranked-out. In the DAWE, we saw time and time again that the BCTs had won the battles by the time their orders reached them.

If we've got faith and confidence in the system, then our reactions should be quicker; for our reactions to be quicker, our decision-making process must be quicker. I don't know how to change the MDMP, but there's got to be a better way.

Future Fires. Like it our not, our Army is digitally committed and fires will take the "digital point." Sooner rather than later, AFATDS is going to have technical fire control embedded—what, then, do we do with our FDCs and FCEs [fire control elements]? Does the 13F Fire Supporter become the "Super Forward Observer" and the "Super FDC Chief?" I think so. One-stop-shopping is the future. We need to look now at where we're going digitally.

My new OP [observation point] is at Fort Leavenworth. If you're on the third floor of Bell Hall, look me up—but watch out for the laser spot.

LTC John F. Kearney, Jr., FA
Center for Army Tactics
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Fort Leavenworth, KS

Response to "Protecting SF Teams in the Deep Fight"

Captain [Kevin M.] Donovan's article in the March-April *Field Artillery* correctly addresses the need to protect human intelligence (HUMINT) teams during joint and combined operations in depth. However, his solution is oversimplified for at least one theater of operations. I submit that fratricide can be prevented by staff coordination, battle drills and the timely updating of digital system databases, thereby negating the need for unrealistically large, restrictive fire support coordination measures (FSCMs).

I've been the III Corps Deputy Fire Support Coordinator (DFSCOORD) for over two years and have focused on the Korean Theater of Operations (KTO) for almost six. In the KTO, combined unconventional warfare task force (CUWTF) teams are regularly employed 50-plus kilometers from the FLOT [forward line of own troops]. Focused on the CINC's [commander-in-chief's] NAIs [named areas of interest], they provide collateral coverage of corps NAIs, the primary focus of corps LRS [long-range surveillance] teams. The corps FSE [fire support element] uses one-kilometer diameter no-fire areas (NFAs) to protect CUWTF and LRS teams, primarily from the effects of AI [air interdiction], ATACMS [Army tactical missile system] and MLRS [multiple-launch rocket system] fires. The FSE coordinates insertion, hide and extraction locations with the SOCCE [special operations command and control element] and collection manager in the ACE [analysis and control element], then promulgates NFA locations and updates via ADOCS [automated deep operations coordination system] and (or) AFATDS [advanced FA tactical data system] to the BCD [battlefield coordination detachment], Army DOCC [deep operations coordination cell] and subordinate headquarters. CUWTF and LRS hide locations are usually in rugged terrain, not places that mechanized forces or artillery (AI or MLRS targets) are likely to be.

Captain Donovan suggests that TMD [theater missile defense] special reconnaissance missions require a JSOA [joint special operations area] (or NFA) of 25 to 100 square kilometers. In fact, an NFA greater than one kilometer, unless supporting a direct action mission for a specific time, unrealistically handcuffs FSEs' clearing air-to-surface and surface-to-surface fires, especially with digital systems.

Again, the answer to fratricide prevention is not the creation of unrealistically large NFAs, rather the soldier and staff discipline to follow existing procedures and battle drills to ensure both the survival of HUMINT teams and the timely attack of high-payoff targets by deep fires and maneuver.

LTC Stuart G. McLennan III, FA
DFSCOORD, III Armored Corps
Fort Hood, TX

1999 Senior Fire Support Conference Set for April

Planning has begun for the next Senior Fire Support Conference at the Field Artillery School, Fort Sill, Oklahoma. The conference will be the week of 12 April. General information on the days and theme of the conference will follow in editions of *Field Artillery* with the details of registration and the speakers and sessions available in early 1999.

As in past years, Senior Fire Support Conference attendees include 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 Army corps artillery, FA brigade, division artillery and Marine regimental commanders and their command sergeants major; and US Field Artillery Association corporate members.

Integrating Fire Support into Devil Brigade Training

by Colonel Fred D. Robinson, Jr., AR, and Major Daniel R. Roper

Home station training in the 1st Brigade Combat Team (BCT), 1st Infantry Division (Mechanized) at Fort Riley, Kansas, is focused on one theme—preparing soldiers, crews and units for combat—warfighting. We train and operate as a combined arms team, which means fire support—Field Artillery—is integral.

The BCT's training mission is to conduct "tough, mission-essential task list (METL)-related, multi-echelon combined arms training, focusing on combat ready platoons, batteries and companies." This article explains how the Devil Brigade applies this training philosophy and integrates each of the fire support elements into home-station training.

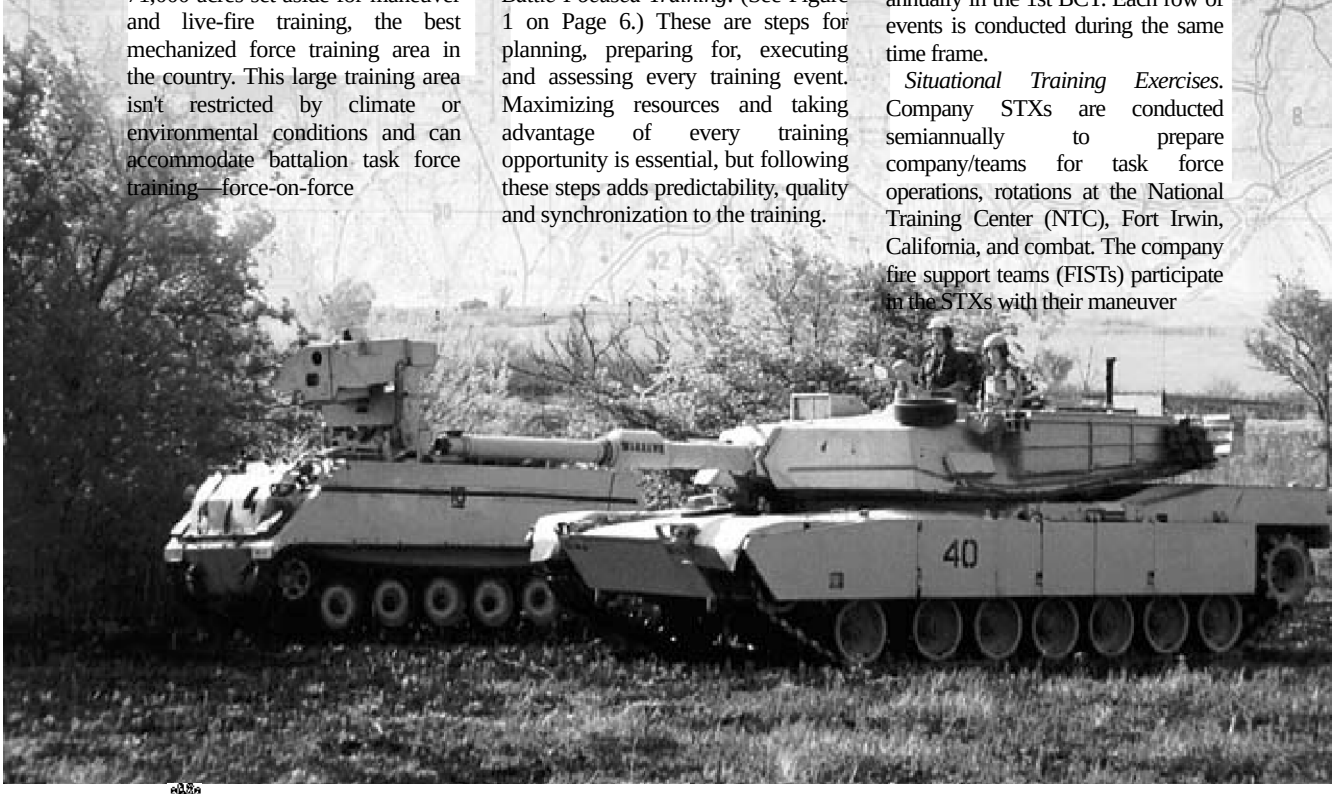
Background. Fort Riley has 71,000 acres set aside for maneuver and live-fire training, the best mechanized force training area in the country. This large training area isn't restricted by climate or environmental conditions and can accommodate battalion task force training—force-on-force and combined arms live-fires. It has 28 modern ranges that can train every weapons type in a heavy division, including multiple-launch rocket system (MLRS) rockets and Hellfire and Stinger missiles.

To conduct integrated combined arms training, we first ensure units are grounded in the basics. We start with the Eight-Step Training Model from *FM 25-100 Training the Force* and *FM 25-101 Training the Force: Battle Focused Training*. (See Figure 1 on Page 6.) These are steps for planning, preparing for, executing and assessing every training event. Maximizing resources and taking advantage of every training opportunity is essential, but following these steps adds predictability, quality and synchronization to the training.

If commanders go through these steps at their training meetings and develop training schedules in conjunction with other commanders—in our case, three maneuver battalions, engineer battalion, forward support battalion (FSB) and Field Artillery battalion—the synchronization foundation is laid for the road to war.

Integrated Training Events. The various battalions plan their training events to synchronize with the other units, culminating in collective, combined arms training. For example, the artillery battalion takes the gunners' test when the maneuver battalions are taking their gunnery skills test. Listed in Figure 2 on Page 6 are the individual and collective training events conducted at least annually in the 1st BCT. Each row of events is conducted during the same time frame.

Situational Training Exercises. Company STXs are conducted semiannually to prepare company/teams for task force operations, rotations at the National Training Center (NTC), Fort Irwin, California, and combat. The company fire support teams (FISTs) participate in the STXs with their maneuver

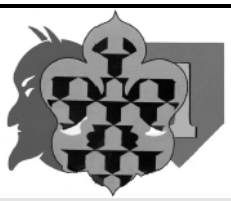


companies. STX missions include the deliberate defense and deliberate attack. Other tasks include deliberate decontamination, occupy an assembly area, casualty evacuation (CASEVAC), pre-combat inspections (PCI) and troop-leading procedures (TLP).

The fire support system is exercised from the company to the brigade level. The FA battalion tactical operations center (TOC) and the BCT fire support element (FSE) are fully operational during training events with BCT and fire support rehearsals required. So, while the FISTs are training at their level as part of a company/team and a task force, the entire fire support system is working.

We conduct BCT and task force orders drills during these exercises to maximize the training opportunity. Top-down fire planning and bottom-up refinement are stressed. We exercise voice and digital fire missions sent through the task force to the brigade where fire markers are dispatched to simulate effects. Company rehearsals and formal after-action reviews (AARs) are conducted with the brigade and task force commanders, fire support coordinator (FSCOORD) and engineer battalion commander.

Concurrently, battery lanes are taking place, testing each of the firing battery's skills in moving, shooting and communicating. Battery lanes are evaluated under defense and then offense scenarios to assess all firing battery METL tasks. Rearm, refuel, resupply point (R^3P) operations are exercised with an actual brigade support area (BSA) established to allow service battery to interact and train as part of the BSA.



1. Plan the training.
2. Train and certify leaders.
3. Reconnoiter the site.
4. Issue the plan.
5. Rehearse.
6. Execute.
7. Conduct an after-action review (AAR).
8. Retrain.

Figure 1: Eight-Step Training Model

Task Force Operations Training. This training encompasses the entire BCT in a movement-to-contact, forward passage-of-lines and the deliberate attack. Also during Task Force Operations, the company STX tasks previously trained are evaluated.

The direct support (DS) FA battalion provides fires for the task force, conducting a passage-of-lines, moving through breach lanes established by the company/teams and occupying a position area beyond the breach. The FA battalion must plan when to send batteries to specific locations on the battlefield to provide fire support for the critical points of the battle. Field Artillery movements, occupations and fire mission processing are the key tasks evaluated.

Close air support (CAS), mortars and combat observation lasing team (COLT) insertions also are trained in Task Force Operations. Again, task force and artillery battalions orders process, METL tasks and rehearsals are evaluated with formal AARs conducted for feedback and documentation for retraining.

Observer/Controller School. Quality O/Cs are required to maximize every training opportunity. We conduct an O/C School to assist in the integration and evaluation process. O/Cs learn about safety and common rules of engagement (ROE). With few exceptions, the ROE are based on those used at the NTC.

O/Cs evaluate every FIST, task force fire support officer (FSO), FSE, platoon, fire direction center (FDC) and battery (firing, service, and headquarters). The O/Cs come from the sister FA battalion on Fort Riley and an installation team out of the G3 shop.

Armor	Infantry	Artillery
Tank Gunnery Skills Test	Bradley Fighting Vehicle (BFV) Gunnery Skills Test	Gunners Test
Common Tasks Testing	Common Tasks Testing	Common Tasks Testing
Unit Conduct of Fire Trainer (UCOFT)	UCOFT	Guard Unit Armory Device, Full-Crew Interactive Simulation Trainer (GUARDFIST II)
Platoon Situational Training Exercise (STX)	Platoon STX	Platoon Evaluations
Company STX	Company STX	Battery Lanes
Task Force Operations		
Brigade Battle Simulation (BBS)		
National Training Center (NTC)		

Figure 2: 1st Brigade Combat Team (BCT) Annual Training Events. Each row of events is conducted in the same time frame with all building toward the BCT's force operations training: movement-to-contact, forward passage-of-lines and the deliberate attack.

Maneuver Shooter Program. The 1st BCT truly integrates fire support throughout the brigade—including teaching maneuver commanders to call for fires. This program starts with eight hours of call-for-fire training for all maneuver company and battalion commanders, using the ground unit armory device full-crew interactive simulation trainer (GUARDFIST). The commanders depend on their FSOs for training and guidance.

After completing GUARDFIST training, the leaders deploy to the Field Artillery battalion gun line for live firing. Here, the commanders rotate through each howitzer and FDC crewmember position. After "humping projos" as the Number-One Man and training in other crew positions, the leaders move to the observation post (OP) to call for fire. Coached by his FSO, each commander then calls for immediate suppression, immediate smoke, and adjust fire and fire-for-effect (FFE) fire missions.

The Maneuver Shooter Program gives maneuver commanders first-hand experience in the fire support call-for-fire procedures and demonstrates the capabilities and complexities of Field Artillery. Commanders have a new appreciation for what happens when a fire supporter doesn't adjust off a preplanned target and for the time it takes to lift and shift fires. They more clearly understand the time it takes to call for and clear fires and start thinking about how they, as maneuver commanders, can help minimize that time. The training even makes them start thinking about high-payoff targets (HPTs) and when the BCT commander is going to release the artillery (his guerilla) to destroy the enemy—firing on *his* HPTs.

COLT Training. The Devil Brigade is very proud of its COLTs and the way they are employed. The physical demands we put on the COLTs require increased physical training. In addition to our rigorous daily physical training (PT), COLTs participate in a weekly 15-kilometer road march with full packs and routinely go through the obstacle course.

During each task force exercise, the COLTs are air inserted at night deep in the brigade zone, walk two to four kilometers to an OP, establish communications with COLT platoon headquarters and begin killing enemy vehicles with Copperhead, dual-purpose improved conventional munitions (DPICM) and close air support (CAS). The 1st BCT COLTs are killers—not reconnaissance assets—with the long arm of the artillery as their primary weapon system.

We also incorporate COLTs into the 1st BCT Scout STX. This is an annual event that trains and evaluates each COLT during PCIs and in procedures for air and ground insertions, OP security, target location and calls-for-fire.

We are fortunate at Fort Riley to be only 30 miles away from the Air Force's Smoky Hill Training Area and have a very close relationship with the 10th Air Support Operations Squadron that owns our air liaison officers (ALOs). We pair our COLTs with Air Force enlisted terminal attack controllers (ETACs), and they train together in integrating CAS and Field Artillery—a tremendous training advantage.

Smokey Hill allows the COLTs a chance to communicate and direct aircraft onto a target. The aircraft drop dummy bombs that generate small puffs of smoke upon impact. The Smoky Hill COLT and CAS shoot takes place quarterly.

BCT-Air Operations Training. In addition to our COLT training, we take advantage of every opportunity to train with the Air Force in tactical exercises at Fort Riley. The ALO and his ETACs train with the BCT in all task force and brigade exercises.

The ETACs train with the task force fire supporters and COLTs during force-on-force operations, nominating CAS targets for immediate requests. The ALO and his tactical air control party (TACP) in the 1st BCT TOC work closely with the 1st BCT staff to process preplanned and immediate missions and participate in all orders processes and rehearsals. Although the actual aircraft are not always available, the communication channels and CAS employment techniques are exercised. Our ETACS and ALO wear the Devil Brigade patch, and we consider them part of the team.

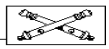
Mortar Training. Fire Support is not complete without mortars. The three mortar platoons are integrated into company STX and task force operations training. Before collective training, the mortars take the mortar gunner's exam (both mounted and dismounted) and the fire direction exam and conduct many mortar live-fire exercises, all culminating with the mortar platoon external evaluations. The 1st BCT FSOs are involved in mortar training, in fact the mortar platoons participate in the FA battalions weekly gunnery sustainment training.

Combat Service Support Training. CSS is a critical but often neglected component of the warfighting equation. During wartime, most of the FA battalion service battery is located in the BSA and falls under the FSB commander. During both our company STX and task force operations exercises, we place the BSA in the field and exercise the support system.

Service battery's key training events include delivering logistical packages daily to the FA battalion and playing a key role in the defense of the BSA against enemy attacks. Service battery even refines its skills with our FSB in Janus simulations, an interactive computer simulation model. Integrating FA battalion CSS and BSA assets allows the BCT to practice supporting artillerymen and their weapon systems.

Conclusion. Fire support is critical to the Devil Brigade's ability to conduct its warfighting mission. And to make sure fires are effective and in synch with maneuver during the battle, we integrate fire support into every possible training event, training not only Redlegs in FA and fire support tasks, but their maneuver commanders as well.

The vast training area and resources at Fort Riley allow us to integrate fire support into home station training along with the other battlefield operating systems (BOS), making us a "devil" of a brigade to face in war.



Colonel Fred D. Robinson, Jr., Armor, until recently commanded the 1st (Devil) Brigade, 1st Infantry Division (Mechanized) at Fort Riley, Kansas. He served in Germany as Commander of the 3d Battalion, 64th Armor, and Executive Officer of the 1st Brigade, both in the 3d Infantry Division (Mechanized) and in the Gulf during Operations Desert Shield and Storm as Executive Officer for the 2d Battalion, 69th Armor, 197th Infantry Brigade out of Fort Benning, Georgia. Currently, he is Chief of the Operations Division, J3, of the Joint Staff, at the Pentagon.

Major Daniel R. Roper until recently was the 1st (Devil) Brigade Fire Support Officer in the 1st Infantry Division (Mechanized), Fort Riley, Kansas. Currently, he is the S3 for the 1st Brigade's direct support battalion, 1st Battalion, 5th Field Artillery. His previous assignments include commanding B Battery and serving as Battalion Fire Direction Officer, both in the 4th Battalion, 5th Field Artillery, 1st Infantry Division, and Task Force Fire Support Officer in the same division, all at Fort Riley.

Integrating Fires into the Brigade Battle Plan

by Lieutenant Colonel Arthur M. Bartell, Major Glenn W. Harp and Sergeant First Class Philip P. Serrano

What is fire support planning? How does fire support planing relate to the military decision-making process (MDMP)? Where does the targeting process fit in reference to the fire planning process and the MDMP?

These are perplexing questions wrestled with by many who train at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana. Many fire supporters demonstrate expertise in all three processes, but few can successfully integrate fire support planning and the targeting process into the MDMP.

This article describes an integrated fire support planning process that incorporates targeting methodology and is embedded in the MDMP. The process follows three of the MDMP steps: mission analysis, course of action (COA) development and COA analysis or wargaming. The process culminates with the brigade's issuing its operations order (OPORD), which includes all the fire support products subordinate units need to plan fires to meet the brigade "Commander's Intent." (See Figure 1.)

Mission Analysis. Fire support mission analysis begins when the brigade receives the mission in the division OPORD, warning order (WARNO) or fragmentary order (FRAGO). The brigade fire support officer (FSO) and his staff analyze the orders to determine specified and implied fire support tasks derived from the fire support estimate process. These tasks are further scrutinized to determine the essential fire support tasks (EFSTs). Fire support planners—the FSO, the naval gunfire liaison officer (NGLO), the air liaison officer (ALO) and the electronic warfare support officer (EWSO)—deduce

Phase	Step
Mission Analysis	• Determine the specified, implied and essential fire support tasks. • Determine the FA, NGF, TA, EW specified, implied and essential tasks. • Develop the initial HVTL and overlay. • Commander issues his "Commander's Guidance for Fires," including EFSTs and HPTs.
Develop Course of Action (COA)	• Develop the "Concept of Fires" using the TPME methodology. • Determine the initial HPTL.
Wargame	• Finalize the "Scheme of Fires." • Develop the FSEM. • Develop the TSM and target list. • Determine the FSCM.
Issue Brigade Order	• Write the fires paragraph of the OPORD: "Concept of Fires." • Write the "Fire Support Paragraph," including FA, NGF, TA, EW concepts and supporting tasks. • Write the "Fire Support Annex," including the FSEM, Target List and Schedules. • Develop the TSM and incorporate it into the "Brigade Coordinating Instructions" or add it as a separate annex titled "Target Synchronization Matrix."

Legend:

EFSTs = Essential Fire Support Tasks
EW = Electronic Warfare
FA = Field Artillery
FSCM = Fire Support Coordinating Measures
FSEM = Fire Support Execution Matrix
HPTs = High-Payoff Targets
HPTL = HPT List
HVTL = High-Value Target List
NGF = Naval Gunfire
OPORD = Operations Order
TA = Target Acquisition
TPME = Task, Purpose, Method and Effects
TSM = Target Synchronization Matrix

Figure 1: Brigade Fire Support Planning Process. Information for this figure and article was taken from *FM 6-20-10 The Targeting Process* and the Fort Sill White Paper "Fire Support Planning for the Brigade and Below," Draft 4.

Essential Fire Support Tasks	Field Artillery Supporting Tasks	Naval Gunfire Supporting Tasks	Tactical Air Supporting Tasks	Electronic Warfare Supporting Tasks
Deny enemy use of mortars.	Conduct counterfire operations.	Provide interdiction fires.	Support close air support (CAS).	Jam mortar nets.
Disrupt enemy use of ADA (air defense artillery).	Provide suppression of enemy air defenses (SEAD).	Provide SEAD.	Support interdiction fires.	Jam ADA nets.

Figure 2: Fire Support Mission Analysis. This figure is a sample of essential fire support and supporting tasks determined from the specified and implied fire support tasks derived during the estimate process.

Field Artillery (FA), naval gunfire (NGF), tactical air and EW specified, implied and essential tasks. (See Figure 2.) EFSTs are used to develop both the "Fires" paragraph and "Fire Support" annex of the brigade OPORD. As a result, this portion of mission analysis concludes with the initial ingredients for the "Commander's Concept of Fires" and the supporting FA, NGF, tactical air and EW concepts.

Another vital function of fire support mission analysis is to develop high-value targets (HVTs). The targeting officer (TO) becomes an integral player in the intelligence preparation of the battlefield (IPB) process. In conjunction with the intelligence staff, the TO helps determine the HVTs, based on the doctrinal and situational templates. Then using either a target list worksheet or the target synchronization matrix (TSM), the TO lists the HVTs and associated templated or known grids, producing the high-value target list (HVTL). (See Figure 3.) The TO also graphically portrays the HVTs on an overlay or, even better, on the situational template. The result is the initial visualization of potential targets associated with the predicted enemy array.

During the mission analysis briefing to the brigade commander, the FSO articulates the possible fire support and associated FA, NGF, tactical air and EW supporting tasks, emphasizing the potential EFSTs. In conjunction with the S2, the FSO graphically displays the HVTs in relation to the situational template and explains the rationale for the targets' selection as HVTs. The brigade commander then has the initial information to develop his fire support and target planning guidance, which delineates the EFSTs and likely high-payoff targets (HPTs) that will facilitate accomplishing his intent. (See Figure 4.) Thus, fire support and target planners are properly focused and equipped to help the commander develop his Concept of Fires and synchronize

(1) Air Defense Artillery	SA-8	102435
	SA-14	112447
	SA-7	098404
(2) Fire Support	82-mm Mortar	126459
	82-mm Mortar	087438
(3) Command and Control	Battalion Command Post	111467

Figure 3: High-Value Target List (HVTL). During the IPB, the TO helps determine the HVTL from the doctrinal and situational templates.

Commander's Guidance for Fire Support. During Phase I, disrupt the enemy's ability to use his ADA [air defense artillery] assets to allow TF 1 [Task Force 1] unrestricted air movement to Obj [Objective] Hound. During Phase II, deny the enemy the use of indirect fires in and around Obj Beagle. Furthermore, disrupt and limit his capability to move forces on Obj Beagle. Phase III, delay the enemy's ability to reinforce Obj Hound from the north for 45 minutes or until Task Force 1 is in Obj Hound. The HPTs [high-payoff targets] are ADA, 82-mm mortars and maneuver (reinforcements).

Figure 4: Based on the FSO's fire support mission analysis briefing, the brigade commander articulates his guidance for fire support, including EFSTs and some likely HPTs that will accomplish his intent.

The MDMP process culminates with the brigade's issuing its operations order (OPORD), which is practiced in a brigade rehearsal as shown here.

Task: Disrupt enemy ADA fires against AAslt TF 1 [Air Assault Task Force 1] from PZ [Parachute Zone] Black to Obj Hound (support by fire position).

Purpose: To allow AAslt TF 1 unrestricted air movement into Obj Hound.

Method: POF [priority of fires] to brigade to execute the SEAD [suppression of enemy air defenses] program, then to TF 1 to conduct pre-assault fires on to Obj Beagle. TF Avn [Aviation] will provide 4 x AH-64 for route security then 2 x AH-64 to TF 1 to assist in observing pre-assault fires. One x FA battery will shoot the SEAD (Tgt # AF 2000, 2001 and 2002). CAS [close air support] will be used to look for reinforcements coming from the north (TA 2 [Target Acquisition 2]) NGF [naval gunfire] will BPT [be prepared to] assume responsibility for firing SEAD program. IEW [intelligence and electronic warfare] will acquire and o/o [on order] jam ADA nets. Restrictions: CAS minimum altitude is 6000 ft AGL [above ground level] and rotary wing aircraft is 300 ft AGL.

Effects: Neutralize enemy ADA along air corridor with no aviation lost to ADA and AAslt TF 1 in Obj Hound.

Figure 5: Concept of Fires. Based on the brigade Commander's Guidance for Fire Support, the FSO develops the Concept of Fires.

HPTs with detectors, delivery assets and assessors in subsequent steps of the MDMP.

COA Development. After receiving the "Commander's Guidance," fire support planners become integral players in COA development. The FSO uses the EFSTs as the basis for developing a Concept of Fires in conjunction with the "Scheme of Maneuver." The ALO, NGLO and EWSO assist the FSO and are responsible for developing the air, NGF and EW supporting concepts. The FSO or the direct support (DS) FA battalion S3, if present, develops the FA supporting concept. When developing the Concept of Fires, the FSO follows the *task*, *purpose*, *method* and *effects* (TPME) format as described in the Fort Sill White Paper titled "Fire Support Planning for the Brigade and Below," Draft 4. (See Figure 5.) The FSO bases the EFSTs required to support the Scheme of Maneuver on the tactical effects of disrupt, delay, divert, destroy, damage and limit rather than the technical effects of suppress, neutralize, destroy and harass. *FM 6-20-10 The Targeting Process* defines these tactical effects in a chart titled "Targeting Objectives" on Page 1-2.

The purpose for each EFST is nested in the maneuver purpose for which the EFST is designed to support. The *method* uses the FA, NGF, tactical air and EW supporting tasks determined during mission analysis along with priority of fires (POF), allocation of resources and restrictions to describe how the EFST is to be accomplished. Lastly, the *effects* provide a quantifiable measure of when the tactical effects of fires are achieved. The technical effects of suppress, neutralize, destroy or harass also may be used to provide initial attack guidance to delivery assets. For a more detailed explanation of how to craft the Concept of Fires using the TPME methodology, consult the previously mentioned White Paper available on the Fort Sill Home Page in the "Training Command" portion: http://sill-www.army.mil/index.htm.

While the FSO is developing the Concept of Fires, the TO develops the initial HPTL. (See Figure 6.) Using the commander's initial HPT guidance, the TO selects those HVTs (from the mission analysis HVTL) that support accomplishing the EFSTs and associated maneuver tasks. The TO records the HPTs and suspected grid locations on either a target list worksheet or TSM, thus producing the initial HPTL.

COA Analysis/Wargaming. Fire support planners are now prepared to enter the COA analysis or wargaming process. The purpose of the process is to synchronize the fire support and supporting FA, NGF, tactical air and EW concepts with the "Scheme of Maneuver" and the collection plan. The synchronizing documents are the TSM and the fire support execution matrix (FSEM). (See Figure 7.) In conjunction with the NGLO, ALO, EWSO and the FA battalion S3 (if present), the brigade FSO updates and synchronizes the Concept of Fires while the TO with the targeting staff produces the TSM.

During the wargame, the FSO develops the "Scheme of Fires," validates the

Unit: 21st ID (L) Phase: FRAGO No: As Of:

Decide				Detect			Deliver		Assess	
Pri	Cat	HPT	Location	NAI/TAI	Agency	Asset	When (I.A.P)	Asset	Effect (D,N,S,H)	Asset
1	ADA	SA-14	102435	301	TF 1/Avn	Man/AH-64	A	FA, NGF	N	TF1
2	FS	82-mm Mtr	126459	311	FA/Avn/TF1	236/AH-64/Man	I	FA, Avn, TF1	D	TF1
3	C^2	BnCP	111467	333	EW/TF2	TRQ-32/Man	P	EW, FA, TF2	N	TF2

Legend:

ADA = Air Defense Artillery
Avn = Aviation
BnCP = Battalion Command Post
C^2 = Command and Control
Cat = Category
D,N,S,H = Destroy, Neutralize, Suppress, Harass
EW = Electronic Warfare
FRAGO = Fragmentary Order
HPT = High-Payoff Target
I.A.P. = Immediate as Acquired or Planned
ID (L) = Infantry Division (Light)
Mtr = Mortar
NAI = Named Area of Interest
NFG = Naval Gunfire
Pri = Priority
TAI = Target Area of Interest
TF = Task Force

Figure 6: High-Payoff Target List (HPTL). While the FSO is developing the Concept of Fires, the targeting officer records the initial HPTs and their suspected grid locations on the target synchronization matrix (TSM).

Unit	Phase I	Phase II	Phase III
Brigade	POF-SEAD-AF 2000, 2001, 2002	POF CAS	POF
Task Force 1	2 x AH-64, o/o POF FA	POF FA Adjust Prep AF 2003, 2004, 2005	
Aviation	SEAD AF 2000, 2001, 2002 4 x AH-64 AAslt Security 2 x AH-64 TF 1	o/o Adjust Prep AF 2003, 2004, 2005 o/o Adjust Smoke	POF o/o NGF, CAS TA 2, AF 2006
Field Artillery	SEAD AF 2000, 2001, 2002 POF Bde, o/o TF1	POF TF 1, o/o TF 2 Counterfire Prep Fires 2003, 2004, 2005 Smoke Breach 30 Min.	POF Bde, o/o Avn AF 2006
Tactical Air	Bde o/o Avn Air Security	Bde o/o TF 2 TA 2, AF 2006	Bde o/o Avn TA 2, AF 2006
Electronic Warfare	Jam ADA Nets	Jam Mortar Nets	Monitor C^2 Nets

Legend:

AAslt = Air Assault
ADA = Air Defense Artillery
AF = Air Force
Avn = Aviation
Bde = Brigade
CAS = Close Air Support
C^2 = Command and Control
NGF = Naval Gunfire
o/o = On Order
POF = Priority of Fire
SEAD = Suppression of Enemy Air Defenses
TA = Target Acquisition

Figure 7: Fire Support Execution Matrix (FSEM). The FSO develops the FSEM and updates the initial Concept of Fires, especially the methods for accomplishing the EFSTs.

POF, allocates fire support resources and clarifies restrictions on fires. The Scheme of Fires sequences the HPTs and specifies triggers and execution responsibilities for sensors and shooters. Simultaneously, the FSO, in coordination with the battle staff, verifies the POF and determines the time, event or conditions requiring a change in priorities. Additionally, the FSO and his supporting staff select appropriate fire support assets (lethal and non-lethal) for HPT engagement at the right time and place to support the battle plan. Lastly, the FSO recommends the fire support coordinating measures (FSCM) and other restrictions needed to rapidly clear fires, adhere to the rules of engagement (ROE) and prevent fratricide.

The Scheme of Fires, POF, allocation of resources and restrictions analysis, development and verification occur as the battle staff executes the action, reaction and counteraction drill for each critical event or phase of the operation. The FSO records this vital fire support information on the FSEM and updates the initial Concept of Fires, especially the methods for accomplishing the EFSTs. The Concept of Fires—a synchronized Scheme of Fires and associated FSEM—are included in the brigade battle plan.

While the FSO and fire support planning staff develop the Scheme of Fires and FSEM, the TO and targeting team synchronize identified HPTs with detectors, deliverers and assessors. As targeting decisions are made during the wargaming process, the TO records them on the TSM. The TO also records attack guidance—suspected or known location and named area of interest (NAI) for each HPT—thus producing a complete targeting product for inclusion in the brigade OPORD.

Conclusion. The fire support planning process is a derivative of the MDMP and targeting process. By incorporating fire support planning into these three processes, fire support planners formulate all the products required for subordinate fire supporters to focus their planning efforts efficiently and effectively. As a result, subordinate planners don't have to wait for essential elements of the brigade fire support plan before executing their decision-making processes. Timely, focused fire planning can occur at subordinate levels in concert with the brigade's vision of fighting with fires.

Lieutenant Colonel (Promotable) Arthur M. Bartell is the Senior Fire Support Observer/Controller (O/C) at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana. In his previous assignment, he attended the Naval War College at Newport, Rhode Island. He also served as the Executive Officer for the 10th Mountain Division (Light Infantry) Artillery, Fort Drum, New York, and as Commander of the 3d Battalion, 6th Field Artillery in the same division. During Operations Desert Shield and Storm, he was the Deputy G3 and G3 of VII Corps Artillery.

Major Glenn W. Harp is the Senior Brigade Fire Support O/C at the JRTC. He also has served as a Brigade Fire Support Officer (FSO) in the 101st Airborne Division (Air Assault), Fort Campbell, Kentucky; S3 for the 1st Battalion, 320th Field Artillery, also in the 101st Division; and Commander of Headquarters and Headquarters Battery, 18th Field Artillery Brigade, and B Battery, 1st Battalion, 39th Field Artillery Regiment, both in the XVIII Airborne Corps, Fort Bragg, North Carolina.

Sergeant First Class Philip P. Serrano is the Brigade Fire Support O/C at the JRTC. In his previous assignment, he served as Senior Instructor/Writer at the Field Artillery School, Fort Sill, Oklahoma. Other assignments include serving as Battalion Fire Support NCO with 3d Battalion, 7th Field Artillery, 25th Infantry Division (Light), Schofield Barracks, Hawaii, and Battalion Fire Support NCO and Headquarters Platoon Sergeant with D Battery, 319th Field Artillery in Vicenza, Italy.

CTC Challenges

Enhancing Fires for the BCT

by Colonel John K. Anderson

Although unquestionably the US has the best Field Artillery in the world, the complex FA/fire support system requires constant training and attention to ensure fires are effective. Some Army leaders identified a fires challenge at the combat training centers (CTCs), specifically, the National Training Center (NTC) at Fort Irwin, California: fires are less responsive today than in the recent past.

Redlegs at the Field Artillery School at Fort Sill, Oklahoma, believe that, by the nature of the complex system, the fires challenge is not new and has been resident to some extent over the years. Further, the school is working on specific FA tactics, techniques and procedures (TTP) to ensure Redlegs are proficient in their stock and trade.

But the issue of making fires more responsive is not simply an FA challenge. It's a combined arms challenge to plan and execute fires that are integrated and synchronized in battle—provide fires at the right place and time with the right kind of killing power to meet the commander's intent. To bring about meaningful change, the FA School is teaming with Forces Command (FORSCOM) and Training and Doctrine Command (TRADOC).

During the February 1998 Senior Fire Support Conference at Fort Sill, the TRADOC school commandants analyzed the responsiveness of fires in a discussion led by the Commander of the Combined Arms Center (CAC) and came up with a list of specific challenges to tackle. The purpose of this article is to review these recurring trends and outline the school's strategy to reverse them.

Recurring Trends. Note that articles in this and other editions of the magazine address specific trends listed with the overall goal of making fires more responsive.

EFSTs and schemes of fires are too complex. In the area of employing fires, we often see essential fire support tasks (EFSTs) and schemes of fires too complex to execute. Frequently, this is caused by an overreliance on fires and the inability of commanders and fire support coordinators (FSCOORDs) to accurately define the role fires should play.

FISTs and COLTs aren't employed effectively. The fire support team (FIST) and combat observation lasing team (COLT) often don't clearly understand their roles in the execution of the brigade combat team's (BCT's) fire plan and, consequently, aren't in position to execute their part of the plan. Their ineffective employment is caused by outdated TTP and a lack of combined arms training.

Clearance of fire procedures are too slow. Fire supporters have to go through too many layers to clear missions. Often this is caused by overreliance on the tactical operations center (TOC) to clear fires and by using fire support coordinating measures (FSCM) inadequately.

Communications is an ongoing problem. Most units are not capitalizing on their digital capabilities and are not providing an early retransmission capability for long-range communications.

Units rely too much on FASCAM. There seems to be an overreliance on the family of scatterable mines (FASCAM) in all operations–both offensive and defensive. These minefields are seldom adequately covered with direct or indirect fires, and combined arms commanders and their fire support officers (FSOs) tend not to understand the tradeoffs they incur by firing this resource-intensive munition. Commanders and FSOs must better understand the tactical and technical considerations for FASCAM. See the article "Planning and Computing FASCAM" by Major David A. Vindich, USMC, January-February 1998.

The FA fails to provide first-round fires for effect (FFEs). FA units don't react rapidly enough to the loss of one requirement for accurate predicted fires and, therefore, are not able to provide timely and accurate first-round fires. See the article "How to Meet the Five Requirements for Accurate, Predicted Fires (And What to Do if You Can't)" by Captain Christopher A. Patton in this edition.

Additionally, although we are maturing in our use of the great Paladin howitzer, most units are not yet optimizing the system's capabilities. The weapon can fire within seconds of occupying a position, but the platoon operations center

(POC) often takes an excessive amount of time to become ready to fire.

Other Issues. There seems to be a consensus among trainers and training units that the current battle damage assessment (BDA) criteria used by the surface area weapons effects (SAWE) system at the CTCs don't assess realistic effects. Although the SAWE is an improvement over the manual means of the past, it still does not adequately simulate the effects of many of the munitions in the inventory today, both in terms of replicating BDA and pyrotechnics.

Strategy to Reverse the Trends. So how do we reverse these trends? The FA School is implementing a three-phased strategy.

Phase I. The Assistant Commandant appointed a colonel point of contact (POC) for the CTCs to provide one-stop-shopping for trainers and training units. The Director of the Fire Support and Combined Arms Operations Department (FSCAOD), Colonel John A. Yingling, is the POC for the NTC; Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana; Combat Maneuver Training Center (CMTC) at Hohenfels, Germany; and Battle Command Training Program (BCTP), at Fort Leavenworth, Kansas. This POC mechanism will provide the school feedback on FA and fire support performance at the CTCs as input for the development of TRADOC DTLOMS: doctrine, training, leader development, organization and materiel.

In this phase, the school also is ensuring all clearly understand the trends. The various TRADOC school commandants in the round table discussion led by the CAC commander at the Senior Fire Support Conference came to a general consensus on what the trends are and the need for a combined arms fix.

Also, the Chief of Field Artillery sent a letter to every division commander highlighting the trends and requesting the commanders emphasize correcting them during CTC train-ups. Without home-station practice, integrating fires in CTC rotations is, at best, very difficult. One article in this edition, "Integrating Fire Support into Devil Brigade Training" by Colonel Fred D. Robinson and Major Daniel R. Roper, outlines how one brigade systematically trains to integrate fires—which the brigade did most effectively at the NTC.

The Assistant Commandant sent a letter to all FA brigade and division artillery commanders outlining the problems and requesting their support in making them training priorities.

The FA School has completed an excellent white paper titled "Fire Support for Brigade and Below" to help meet some of the fires challenges; the white paper is available on the Fort Sill Home Page under the "Training Command" portion at http://sill-www.army.mil/index.htm. It provides the combined arms commander and his fire supporters TTP for planning and executing BCT fires and is the basis for the article in this edition called "Integrating Fires into the Brigade Battle Plan" written by three fires observer/controllers at the JRTC. The white paper also defines doctrinal terminology, the lack of which has caused confusion in the past. The FA School has published *ST 6-20-92 Striker TTPs* also available on the Fort Sill Home Page.

Phase II. The FA School is reviewing and revising programs of instruction (POIs) for the officer education system (OES) and (NCOES) to make sure we're teaching our future company/team fire support team (FIST) chiefs and their future FSNCOs the correct tasks. Additionally, we have greatly enhanced the mechanized and dismounted FSO lanes for the Field Artillery Officer Basic Course (FAOBC).

One of the goals of the POI revisions will be to ensure students know how to clear fires properly and quickly. Too often fire supporters clear fires off the situation map in the TOC, which is rarely completely up-to-date. Commanders on the ground are the best source for clearing fires. The TRADOC System Manager for the Advanced FA Tactical Data System (TSM-AFATDS) has the lead for the long-term resolution of clearing fires faster via digital means.

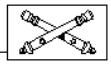
The school already has increased the amount of hands-on digital communications training significantly in FAOBC. Forward entry devices (FEDs) have been hard-wired into the guard unit armory device, full-crew interactive simulation trainer (GUARDFIST) facility, and the mechanized FSO lane and the Redleg War, the capstone field training exercise (FTX) at the end of FAOBC, are now entirely digital exercises. We also are looking at communications tasks in the other POIs as well as how we teach FASCAM and other subjects affecting the trends.

We have doubled our efforts to emphasize responsiveness as well as accuracy during the fire direction instruction in FAOBC. Instructors or students now time every fire mission during field training, and the more common missions are repeated until mission training plan (MTP) time standards are achieved. We now include a troubleshooting block of instruction designed to teach students what to do if they lose one or more of the requirements for accurate, predicted fire.

In terms of most effectively using the semiautonomous capabilities of Paladin, we have sent the draft of *FM 6-70 The Paladin Battalion* to the field for comment and will publish it in the near future.

Phase III. Improving the replication of the effects of fires at the CTC is a complicated, long-term project involving changing the BDA tables and software in the SAWE master control station and on every instrumented vehicle. We will continue to work with the CTCs and the Simulations, Training and Instrumentation Command (STRICOM) for windows of opportunity to correct the software along with sources of funds to pay for the changes.

Fires are difficult to plan and execute. Decreasing training dollars and higher unit operational tempos (OPTEMPO) have had an impact on collective training opportunities at home station. The combined arms community must work closely to devote scarce resources to meet the recurring fires challenges. The goal is to ensure the BCT *always* has the right kind of fires when and where it needs them.



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TTP for 3x6 Paladin Operations

by Captain Mark C. Strong, ARNG

The M109A6 Paladin howitzer is designed to maximize dispersion and use a variety of employment options, based on mission, enemy, terrain, time and troops available (METT-T). The Paladin battalion is organized and equipped to provide the maneuver commander rapid, devastating fires using agility, initiative and flexibility to mass the battalion.

Too many Paladin battalions are not optimizing the howitzer's capabilities. Many factors affect why units aren't making the most of the system: not considering multiple employment options, misunderstanding new technology and a lack of proficiency on the system. The latter is because of various reasons, including leaders' lack of training and experience on the system, home station training with terrain limitations, personnel shortages and system upgrades requiring ongoing re-training. These challenges consistently affect Paladin operations force-wide.

Employment Techniques. As stated in Chapter 3 of the coordinating draft *FM 6-70 Paladin Tactics, Techniques and Procedures (TTP)*, the key to maximizing employment of the Paladin system is understanding the added flexibility the howitzer provides in supporting the combined arms team. (The Field Artillery School is reviewing the FM with the draft scheduled to be moved to the Fort Sill Home Page for the field to review by the end of the second quarter of FY 99.) The responsiveness of the system must be continually balanced against the unit's operational tempo and its METT-T demands.

Firing batteries can be employed using battery, platoon, paired and single howitzer methods. Under battery operations, the battery can occupy a single firing area with six howitzers, two firing areas with three howitzers in each area or three firing areas with a pair in each.

The battery has two operations centers used as a battery operations center (BOC) and a platoon operations center (POC) or two POCs, depending on the employment tactic used. When the tactic is battery-level operations, the BOC controls the fight and the POC is positioned at some future point on the battlefield and monitors all operations, staying prepared to take over operations from the BOC, if necessary. A lack of trained POC personnel, continuous operations or maintenance problems may force a unit to use battery operations. A doctrinal battery position area (PA) is approximately 2000 by 2000 meters.

Platoon operations is the most flexible method of employing Paladin. This method is defined as two POCs controlling three howitzers each in PAs that are approximately 1000 by 2000 meters.

Platoon operations allow for various employment techniques, to include altering the number of howitzers in each platoon. Each POC is responsible for conducting tactical fire direction, battle tracking, administrative and logistical tracking, and back-up technical fire direction. The POC also tracks the same information for its sister platoon and remains capable of picking up the fight for both platoons at any time.

Platoon operations afford the commander the flexibility to employ his systems by sections. The section can operate with its Field Artillery ammunition support vehicle (FAASV) mated, separated or in an over-watch position. Platoons can operate with howitzers paired using one POC to control two

pairs in two firing areas and the second POC to control the third pair in a single firing area. This method maximizes dispersion up to the limits of the single-channel ground and airborne radio system (SINCGARS) range and provides economy of force.

Command and control of the platoon is flexible, allowing the platoon leader and the platoon sergeant to position themselves at the most critical point on the battlefield. The platoon leader can conduct reconnaissance forward, conduct C^2 in the platoon PA and monitor tactical fire direction and battle tracking in the POC. Likewise, the platoon sergeant can move to wherever on the battlefield he can most effectively perform his duties or, in the absence of his lieutenant, perform the platoon leader's duties.

Depending on METT-T, paired operations can be a very effective method of employing Paladin in both battery and platoon operations. Such operations are a key part of an artillery raid with one POC easily supporting the mission forward. The second POC fights with the remainder of the battery. Pairs also can disperse across a greater front to increase survivability. But communications requirements may limit the distance pairs can occupy from their controlling POCs. Effective use of retransmission can facilitate pair dispersion but may not be resourced.

New Technology. The M109A6 howitzer has many improvements in its survivability, reliability, availability and maintainability. A detailed discussion on these improvements is in Chapter 1, Section 1-4 of FM 6-70.

The system upgrade that has the most impact on training and unit proficiency is the M-93 chronograph. The integrated M-93 is not used in the same manner as the M-90 chronograph. Operators should refer to the TM-10 for instructions.

Calibration is still required with Paladin. However, the howitzer now can determine a muzzle velocity (MV) as long as the system has the extended lot designator for the propellant. To use this system, chiefs of section along with the POCs need to understand how the MV system determines readings and how they are sent to the POC as muzzle velocity variations (MVVs).

Upon receipt of "End-of-Mission," the howitzer sends a digital message to the POC with the average MV as an MVV. The POC is required to verify the MVV and acknowledge on the lightweight

Paladin Defensive Positioning in Open Terrain

With the fielding of the M109A6 (Paladin), many of the traditional cannon battery tactics, techniques and procedures (TTP) have undergone major changes. Traditional methods of constructing defensive diagrams required the plotting of all section positions. Because Paladin operations require frequent survivability moves, plotting the position of individual pieces is no longer practical. This article focuses on a new technique for planning platoon defensive positioning for Paladin operations in open terrain.

To begin constructing the defensive diagram (see the figure), plot the platoon goose egg (normally a center of mass grid with a 500-meter radius). A good way to do this is to use fire direction center (FDC) firing chart paper. Next you plot one azimuth of fire and one left and right limit for the goose egg. The reason for this is each howitzer's main gun and crew-served weapon cover this sector, regardless of its position in the goose egg.

Then you plot the position of the platoon operations center (POC), which should be positioned 300 meters outside the goose egg on the back azimuth of fire. Although this places the POC away from the howitzers, an M992A2 is positioned with it. This provides combat vehicle security for the POC as well as the rear of the goose egg. The auxiliary power unit (APU) on the Field Artillery ammunition support vehicle (FAASV) can be used to provide electrical power for the POC.

The remaining two FAASVs are located at the three and nine o-clock positions just outside the goose egg. Their sectors of fire interlock with the front and rear sectors to provide 6400 mil coverage of the position. This completes the construction of the diagram. The only time you would need to update the diagram is when one or more of the platoons in the battery moves to a new goose egg.

I developed and tested this defensive positioning at the National Training Center, Fort Irwin, California, and validated it in a deployment to Kuwait for Operations Intrinsic Action and Desert Thunder. This technique lends it self to the open dessert terrain and is only one of many for Paladin operations. The technique would have to be modified to suit other terrain and situations.

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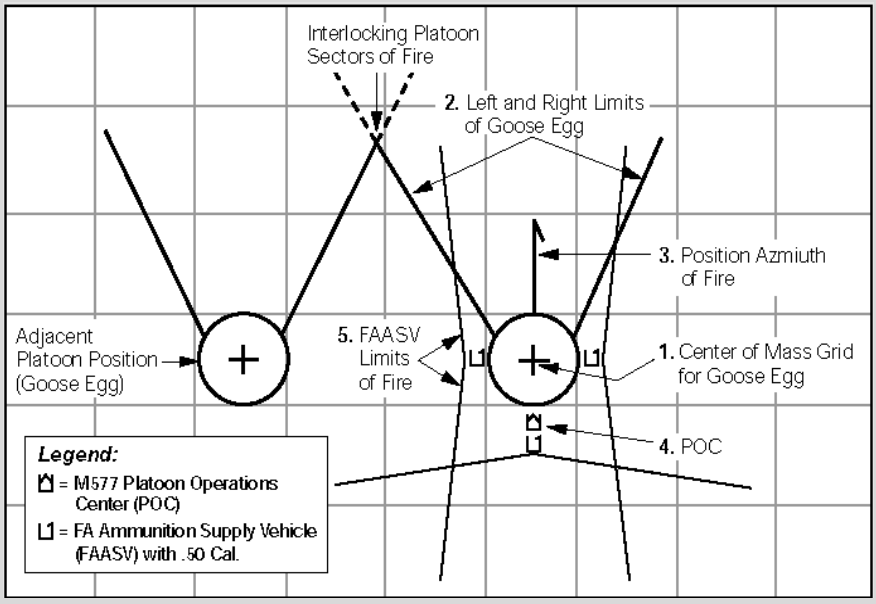


Paladin Defensive Diagram

computer unit (LCU) that the MVV is good and will be used. The LCU then sends a digital message to the howitzer to apply the new MV. If the digital message is not received by the howitzer, the MV will not be applied on the gun and the verification mission will not bump between the POC and the howitzer. This communication link has been a stumbling block for many units.

Paladin Proficiency. Gaining and maintaining proficiency on Paladin has been a challenge for a number of reasons.

Leader Training. Too often, leaders lack training on Paladin and are uncomfortable with the new technology. Captains don't receive formal Paladin training in the FA Officer Advanced Course (FAOAC) at the FA School, Fort Sill, Oklahoma. This has an impact on battery leadership proficiency, a proficiency level that doesn't improve dramatically at the lieutenant level. Currently, lieutenants receive only a limited amount of formal Paladin training at the Field Artillery Officer Basic Course (FAOBC).

At the field grade level, officers receive no formal training unless they attend Paladin new equipment training (NET). The field grade officer turnover rate for S3s and executive officers (XOs) is also a problem. Due to the short time majors are S3s and XOs (about a year), re-training new officers coming into these senior leadership positions in the battalion is ongoing. (With the implementation of the new Officer Professional Development System XXI, Operations Career Field officers will remain in these positions much longer, which will help alleviate this problem somewhat.)

Paladin battalions develop limited proficiency on the different methods of employment. The Paladin technology is foreign to many senior officers—the battalion leadership often has minimal or no experience in tactically employing or training Paladin. A commander tends to determine one way to fight the system without considering the other employment options available to him, one of which may be more effective with his METT-T. Paladin battalions deploying to our Combat Training Centers (CTC) focus training on employing Paladin one way for success. These battalions need to train at home station to employ Paladin using all the options.

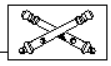
Training Area Limitations. Terrain restrictions have a significant impact when trying to optimize the howitzer. Paladin can occupy positions in areas unsuitable for other M109 series howitzers. The Paladin battalion can operate effectively in various terrain such as that found in Europe, the Middle East and Korea. But the battalion's home-station training may be restricted due to land management issues caused by environmental concerns, range control restrictions or topography. Additionally, land may not be available to conduct training on all howitzer employment methods.

The howitzer can operate in any terrain suitable for tracked vehicles. However, if the battalion is restricted to small firing points and has access to minimal maneuver area for the majority of its training, it's difficult to train howitzer crews and leaders on Paladin's variety of employment options.

Personnel Shortages. Such shortages also can affect the battalion's proficiency on Paladin. For example, 13B Cannoneer shortages impact on the battalion's proficiency with mated operations with the FAASV. This is one of the most difficult tasks to conduct. Shortages affect the section's ability to conduct 24-hour operations. 13E Fire Direction Specialist shortages lead units to focus one POC on the battery's fire direction capability. But if 13Es are short, it's difficult for the second POC to conduct battle tracking, tactical fire direction and function as the back-up POC for the other platoon.

Constant Upgrades. Paladin is constantly undergoing improvements to upgrade the capabilities of the system. Upgrades require crews to retrain on the system, which calls for a training plan that include these capabilities for the battalion to succeed. For example, upgrades such as the muzzle velocity system (MVS) and global positioning system (GPS) require new training and employment techniques. Battalions need to review the TM-10, develop training plans to cover the new capabilities and revise their tactical standing operating procedures (TSOPs) to accommodate these changes.

The ability to use Paladin in high-tempo operations most effectively to support combined arms operations calls for leaders and soldiers to make the most of its flexibility and upgraded capabilities. To do otherwise is a waste of an indirect fire asset.



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1999 *Field Artillery* Themes

Although *Field Artillery* has a theme for every edition, we are not theme-bound. In most editions we include articles not related to the theme. The remaining 1998 theme is the November-December Red Book, our annual report.

If you have an idea for an article, call the editor at DSN 639-5121/6806 or commercial (580) 442-5121/6806. Our Fax number is 7773 and works with both prefixes. Our Email is famag@usafas.army.mil.

Edition	Theme	Deadline
Jan-Feb	Lightfighter Fires	1 Oct 98
Mar-Apr	Initial Entry Training	1 Dec 98
May-Jun	Leadership	1 Feb 99
Jul-Aug	History	1 Feb: History Contest 1 Apr: Other
Sep-Oct	RC Redlegs	1 Jun
Nov-Dec	Red Book	1 Aug

Battalion TOC Certification

In the III Armored Corps Artillery, we deem success at the National Training Center (NTC), Fort Irwin, California, as our ability to defeat the world-class opposing force (OPFOR), while obtaining the most training value possible out of a rotation.

After reviewing NTC lessons learned by battalions of the III Corps Arty, we found one important area that needed strengthening. We needed a certification program for key leaders in battalion tactical operations centers (TOCs) and special training for S2s.

TOC Certification. The program prepares a battalion TOC to perform its wartime mission, whether at the NTC, in an Army external evaluation (AEE) or combat. The program's five phases—leader, ride-along, off-site and home-station training plus verification of key leaders by the Commanding General of the Corps Artillery—is an excellent way to ensure a TOC is ready to excel as a team.

Phase I Leader Training includes an extensive battalion S2 certification program and a detailed study of the after-action reviews (AARs) from the unit's previous and most recent deployments to the NTC.

Newly assigned battalion S2s usually aren't experienced at applying the information they receive to an intelligence format that's useful in the planning process. To address this challenge, III Corps Arty has run a six-month training and certification program for battalion S2s for the last 18 months. Ten battalion NTC rotations have been completed with certified battalion S2s. At the NTC, these S2s wargame better, develop more focused priority intelligence requirements (PIRs) and make critical decisions sooner and at a more timely point in the battle.

The foundation of S2 certification is a 30-day reading program followed by a one-week course held quarterly covering the tactical and administrative missions of the S2, ranging from the intelligence preparation of the battlefield (IPB) to battle damage assessment (BDA). The training culminates with a challenging field exercise, such as an AEE, to test the S2, including an interview by the corps artillery G2 on security and tactical issues and sources of intelligence information. The S2 certification training plan, checklists, and classroom slides are available for download on the III Corps Artillery G2 Home Page at http://155.219.65.3/g2.htm

Phase II Ride-Along Training is at the NTC with arrangements made for the battalion commander, S3 and S2 to spend one or two days "in the box" with NTC fire support observer/controllers (O/Cs) to see the orders process and a force-on-force battle. This ride-along is great experience when combined with the *Phase III Off-Site Training*—the standard NTC Leader Training Program and ramp-up field training and command post training exercises. At the NTC, the TOC staff members meet their maneuver counterparts, reconnoiter the area and work through the orders process.

Phase IV Home-Station Training has the TOC preparing

and presenting a road-to-war briefing. With the FA brigade commander present, the battalion commander briefs the Corps Artillery Commander on how he intends to approach his next NTC rotation—manning, training assessment, training plan, timeline and significant issues.

The next step in Home-Station Training is an inter-battalion officer professional development (OPD) class. The S3 of a battalion that recently completed an NTC rotation presents this OPD to the TOC of the unit preparing for one. The OPD addresses TOC setup and layout and tactics, techniques and procedures (TTP) for the counterfire battle drill. Also covered are the orders process; reception, staging and onward movement integration (RSOI) draw/turn-in/reporting procedures; NTC-specific division artillery and FA brigade tactical standing operating procedure (SOP) requirements; and the link to the NTC Tactical Analysis Facility (TAF), the Star Wars Building, including communications, manning and equipment. Other key Home-Station-Training events are participation in a Janus command post exercise and in both communications and tactical Firefinder radar exercises.

In *Phase V Verification*, the TOC briefs the Corps Artillery and FA brigade commanders on its operations order and FA support plan (FASP) before deploying to the NTC. During this briefing, the two senior commanders question the battalion staff members extensively—sharing, mentoring and coaching them into a cohesive, organized team that's ready for the NTC experience.

Conclusion. The TOC Certification Program maximizes the battalions' training value for NTC rotations. Certified "TOC teams" make the most of their time while waiting for their commanders to make timely decisions—go beyond the basics to perform at a more sophisticated level for critique by NTC O/Cs. These TOC teams display unity and a greater confidence in their ability to succeed at any mission.

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Fire Support Battle Command

The Dual Role of the DS Battalion Commander

by Colonel Richard P. Formica

Fire Support is What We Do

That means we ensure the combined arms commander has massed or precision fires where he wants them and when he needs them—both FA and fires from other fire support assets. To achieve this, the direct support (DS) battalion commander must focus all elements of his FA battalion—gun sections, fire direction centers (FDCs), supporting sections and teams—and his fire supporters to provide timely, accurate and lethal fires. As the DS battalion commander, he plays a dual role: FA battalion commander and brigade fire support coordinator (FSCOORD). Each role brings unique responsibilities and distinct expectations.

As the FA battalion commander, he holds a special position in the battalion and division artillery. The soldiers expect a lot from him. He must lead from the front and by example. He must be visible. He must be present to personally look his soldiers in the eye and know they're being taken care of and are ready for the fight. The command sergeant major (CSM), the battalion executive officer (XO) and the operations officer (S3) assist him, but he alone exercises command. Leaders care for and serve soldiers and their families.

As the FSCOORD, he holds a special position in the brigade combat team (BCT). He maintains a personal relationship with the brigade commander, is normally afforded tremendous access to him and serves as one of his closest tactical advisors. He is assisted by the brigade's fire support officer (FSO), but he alone brings the professional maturity, the wherewithal and the authority to focus the effects of fires throughout the brigade area of operations. This brings a price: time and energy that otherwise would be devoted to commanding his battalion.

Is this a dilemma for the FSCOORD? Is he operating at a disadvantage because of these two seemingly mutually exclusive demands on his time and energy? I don't think so.

The DS battalion commander must master the art of fire support battle command. This article addresses how the commander-FSCOORD does that before, during and after the fight.

Before the Fight. Competing demands on the DS battalion commander's time begins before the fight—during the military decision-making process. (MDMP). There's a multitude of activities occurring simultaneously, each with a claim on the his time and energy: brigade planning; the corresponding DS battalion planning effort; fire support planning and preparations; battalion and battery preparations for combat and sustainment operations; combined arms, fire support and FA technical rehearsals; and pre-execution checks.

It all begins with brigade planning. This is a critical time for the FSCOORD to be able to understand the brigade commander's intent and see how the brigade plan is developing. This firsthand information helps him prepare the fire support plan and anticipate DS battalion activities that will represent what the battalion can (and cannot) do in the upcoming operation.

Three of the brigade activities in the MDMP are critical for the FSCOORD and demand his personal involvement: the mission analysis briefing to the brigade commander, receipt of the brigade commander's planning guidance and the brigade course of action (COA) wargame.

It is during the mission analysis phase of planning that the battle staff begins to shape the brigade's approach to the upcoming operation. While the brigade S2 and S3 are predominant during mission analysis, the brigade FSO also develops and presents his estimate of the situation and gives the commander an update on the current and projected fire support status. The FSCOORD can discuss that status with the brigade commander and issue guidance and priorities to the FA battalion as necessary. More importantly, the FSCOORD is present to hear the staff estimates and get his "head in the game." He starts the MDMP in synch with the brigade battle staff and BCT commander.

After receiving the mission analysis briefing, the brigade commander issues his initial planning guidance. For the FSCOORD to be in tune with the commander, it's imperative he be present to hear the guidance in person. The FSCOORD can discuss any issues with the commander, obtain clarification where necessary and provide immediate feedback and guidance to the brigade FSO and then to the DS battalion S3 at the tactical operations center (TOC).

Armed with the brigade commander's guidance and in synch with the battle staff, the FSCOORD can shift his attention to the DS battalion TOC. If time is available, this is a good opportunity to go to the TOC, receive the mission analysis briefing and issue his guidance in person. The artillery battalion S3 and S2 then complete mission analysis and begin developing COAs for the FA support plan. This visit to the TOC provides an opportunity for the commander to meet with the battalion leadership and battery commanders and check on the status of the battalion and its soldiers...to exercise command.

However, the FSCOORD must return to the brigade TOC for the COA wargame, the pivotal event for fires in the brigade planning process. The wargame is truly the brigade's first and most formal targeting team meeting. The entire battle staff comes together and identifies enemy high-value targets by battlefield operating system (BOS), determines which are high-pay-off to the brigade and selects the right attack system with which to kill them.

During the wargame, the FSCOORD and his FSO solidify the essential fire support tasks (EFSTs) for the fight. Engagement areas (EA) and targets are selected—and more. The brigade observation plan is developed. The delineation between the brigade deep and close fight is made. Moreover, the FSCOORD can begin planning the critical FA tasks (CFATs) required to execute the evolving fire support plan. The wargame is critical for the synchronization of the brigade plan and is essential for the development of the fire support plan.

As the brigade orders process continues, the FSCOORD splits his time between the (1) brigade TOC where the FSO completes the fire support plan, (2) maneuver battalion TOCs where he can personally give guidance and instruction to the task force FSOs and (3) DS battalion area where he can guide the development of the FA support plan or visit batteries to supervise preparations for the fight.

Once the plans are finished and briefed, the FSCOORD turns his attention to preparation for the fight. Again, there are competing demands for his time. He must check the brigade observation plan, review the task force fire support and observation plans for fidelity with the brigade plan and issue the FA support plan to the batteries.

Rehearsals are critical elements of the preparation phase. They allow the DS battalion commander to wear both hats: FSCOORD and FA battalion commander. Rehearsals are conducted at all levels. There are several that demand the FSCOORD's attention. He must attend the division rock drill and monitor the division fire support rehearsal on the radio. The FSCOORD uses the brigade's combined arms rehearsal to check the synchronization of the brigade plan with the fire support plan and the DS battalion's FA support plan. He employs the brigade FSO and the targeting officer (TO) to conduct the fires portion of the brigade rehearsal. The DS battalion S3, fire direction officer (FDO) and S2 also participate. They portray the DS battalion's role in the brigade fight. This approach allows the DS battalion commander to perform as the FSCOORD for the brigade and commander of the supporting FA battalion.

In addition, the FSCOORD participates in the brigade fire support rehearsal and monitors the FA technical rehearsal. Both usually are conducted over the radio net, giving the FSCOORD the opportunity to participate from any location.

The maneuver battalions and FA battalion also conduct rehearsals, usually in the form of rock drills. Ideally, the FSCOORD would attend them all. The reality is that he can't. Often they are scheduled unavoidably at the same time.

1. Is the force protected?

- 100% of soldiers are accounted for. CSM/S3
- 100% of sensitive items are accounted for. CSM/S3
- Battle buddies are assigned. .....CSM
- Adequate water is on hand- also, ice. ..... XO
- RFAs, NFAs and ACAs are planned and rehearsed. ..... Bde FSO/S3
- CFZs and CFFZs are planned and sent to the radar. ..... Bde FSO/S3
- CASEVAC is rehearsed. ..... XO
- Religious support plan is in place. ..... XO
- Sleep plan is in effect. XO/S3

2. Are the EFSTs identified?

- Brigade commander's intent is understood. .....FSCOORD/Bde FSO
- Brigade commander knows what fires can/cannot do. .....FSCOORD
- Tasks are communicated to DS and R battalion TOCs. .....FSCOORD/Bde FSO
- CAS is planned and available. .....Bde FSO

3. Is the fire support plan adequate?

- Brigade fire plan meets the commander's intent. .....Bde FSO
- Eight elements of a target are determined.* .....Bde FSO
- Fire plan is linked to R&S plan. .....Bde FSO
- Focus of fires is on HPTs. .....FSCOORD
- Transition targets are identified. .....Bde FSO
- FSCM are planned. .....Bde FSO

4. Are we ready to fight the plan?

- FA technical, FM fire support and combined arms rehearsals are completed. ... FSCOORD/Bde FSO/S3
- Observers are in position with G/VLLDs checked. .Bde FSO
- Communications is operational, both voice and digital. ..... Bde FSO/S3
- Retransmission is in place and operational. S3
- FISTVs are operational. .....Bde FSO/XO
- CAS availability is confirmed. .....Bde FSO

5. Is the FA battalion set?

- Battalion and platoon FDOs understand the brigade targets. S3
- EFSTs are understood down to the platoon level. S3
- CFATs are developed and understood down to the platoon level. CSM/XO/S3
- FA positioning plan is set and synchronized with brigade and the radar. S3
- Five requirements of accurate, predicted fires are met. CSM/S3
- Ammunition is on the guns with the right types in the right platoons. S3/XO
- Guns are safe and ready. CSM/S3

6. Are we prepared to survive the fight?

- Firing batteries' defenses are set as well as the battalion TOC's and combat trains.' CSM/S3
- POCs have ADA warnings. S3
- Platoons know where the minefields are. S3
- Appropriate MOPP level protection is in effect. S3/CSM
- Chemical alarms are out and working. S3/CSM
- Decontamination plan is in place. XO/S3
- Combat lifesavers are equipped and ready to go. XO/S3
- Each platoon has rehearsed CASEVAC. XO/S3

7. Can we sustain the battalion?

- Enough fuel is on hand and in the guns. .....XO
- Personnel replacements are on hand. .....XO
- Howitzers, FISTVs and M577s are in the fight. .....XO
- Replacement parts and system are in place and access is rehearsed. .....XO
- Emergency ammunition is in the combat trains. S3/XO

8. Can we communicate with each other?

- Digital communications is established. S3
- Bde CMD, Bde FS, Bn CMD and D/A CMD nets are operational. .....Bde FSO/S3
- Retransmission is functional and rehearsed. S3
- FIST communications is operational. ..... Bde FSO
- All have practiced jumping the net. .....Bde FSO/S3

9. Have we coordinated with the right folks?

- Div Arty knows our requests for additional fires. S3
- Adjacent brigade and division FSEs know our plan. .. Bde FSO
- We have the division FSCM. ..... Bde FSO
- Maneuver units understand our FA positioning. S3
- Have coordinated with the ALO, EWSO, brigade aviation officer and engineer. ..... Bde FSO

10. Are we postured for the next fight?

- Next mission is anticipated. .....FSCOORD/Bde FSO/S3
- DS and R battalion TOCs have our WARNO. ..... Bde FSO
- Brigade and Div Arty have our forecasted RSR. S3
- Brigade and the FSB have our casualty and battle loss projections. XO/S3
- Consolidation and reconstitution is planned. .....XO
- Troops are disciplined, fed, rested and motivated. .CSM/XO

*Purpose, Engagement Criteria, Trigger Point, Desired Effects, End State, Primary Executer, Alternate Executer and Delivery Asset

Legend:

ACAs = Airspace Coordination Areas
ADA = Air Defense Artillery
ALO = Air Liaison Officer
Bde = Brigade
Bn = Battalion
CAS = Close Air Support
CASEVAC = Casualty Evacuation
CFATs = Critical FA Tasks
CFZs = Critical Friendly Zones
CFFZs = Call-for-Fire Zones
CMD = Command
CSM = Command Sergeant Major
D/A = Division Artillery
Div Arty = Division Artillery
DS = Direct Support
EFSTs = Essential Fire Support Tasks
EWSO = Electronic Warfare Staff Officer
FA = Field Artillery
FDOs = Fire Direction Officers
FIST = Fire Support Team
FISTVs = FIST Vehicles
FS = Fire Support
FSB = Forward Support Battalion
FSCM = Fire Support Coordinating Measures
FSCOORD = Fire Support Coordinator
FSEs = Fire Support Elements
FSO = Fire Support Officer
G/VLLDs = Ground/Vehicular Laser Locator Designators
HPTs = High-Payoff Targets
MOPP = Mission-Oriented Protective Posture
NFAs = No-Fire Areas
POCs = Platoon Operations Centers
R = Reinforcing
RFAs = Restricted Fire Areas
R&S = Reconnaissance and Surveillance
RSR = Required Supply Rate
TOCs = Tactical Operations Centers
WARNO = Warning Order
XO = Executive Officer

FSCOORD's Top Ten

Before the fight, the DS battalion commander is very busy plannng fires for the BCT and ensuring the FA battalion can help deliver them.

The FSCOORD should attend those rehearsals that best enable him to influence the fight. He might attend the rehearsal of the main effort task force or that of a task force whose fire plan is essential to the brigade fight. Or he may opt to go to the artillery battalion TOC to supervise the FA battalion rock drill. Anytime he's back in the battalion area, he can check on the status of the battalion, meet with leaders and commanders and visit soldiers.

Before the fight, the FSCOORD is busy. To ensure the battalion is ready for the fight, the commander participates where necessary and delegates where appropriate. He must balance his time between his FSCOORD and commander roles and depend on his subordinates to do their part.

One of the tools the FSCOORD can use to help focus his dual-role efforts is the "FSCOORD's Top Ten" (see the figure). It's a checklist that identifies each of the EFSTs and CFATs and the battalion's field grade officers responsible for planning and executing them. The FSCOORD's Top Ten is generic and must be adapted to a specific mission. Certain tasks take on more or less importance in different missions and in the various phases of the fight.

During the Fight. The FSCOORD must position himself where he can best observe the effects of fires and direct them as needed during the fight. That means positioning on the battlefield near the brigade commander. In the future, as we exploit information technologies, this could mean in the brigade TOC or some other digitized command and control facility. But today—and for the next several years—that means he must be forward positioned to see and influence the fight.

This is a problem for the FSCOORD. The brigade commander directs the fight from his battle track, an M113-series vehicle equipped with the communications network necessary to command the brigade. The FSCOORD must be collocated. He must see and understand the battle as the brigade commander sees and understands it. Therefore, the FSCOORD needs to fight from a forward-positioned battle track. Current tables of organization and equipment (TOEs) don't recognize this requirement. Many units have taken M113s "out of hide," equipped them with radios and other equipment and resourced them with fire support specialists—also "out of hide." From this forward-positioned battle track beside the brigade commander's track, the FSCOORD can see and direct the fires.

This surfaces another TOE problem. As the FSCOORD goes forward in his out-of-hide battle track with the minimum number of radios and without a digital device, his advanced FA tactical data system (AFATDs) designed for his high-mobility, multipurpose wheeled vehicle (HMMWV) is in his HMMWV parked back at the brigade TOC. This means that while the FA battalion and its fire support structure strive to improve responsiveness of fires through digital systems, the FSCOORD operates in the voice mode only. The effect on the fire support system is that fires must be directed and focused on the voice net. Until the FSCOORD is doctrinally equipped with a battle track and adequate voice and digital systems, the brigade fire support system is destined to remain on the voice net—or until situational awareness matures to the point that he has the information he needs to focus fires from another location.

Collocated with the brigade commander, the FSCOORD is in the best position to direct and coordinate the massed, lethal effects of fires. As the FA battalion commander, he maintains contact with the battalion and battery leaders on the battalion's command net. He is attuned to the battalion scheme of maneuver, maintains visibility of its available combat power, and tracks its casualty, ammunition and maintenance status. During the fight, the FSCOORD ensures safe, accurate, timely and lethal fires as he exercises fire support battle command.

After the Fight. After the fight, the DS battalion commander maintains his dual focus. As the FSCOORD, he assesses the status of the brigade's fire support assets and issues orders and priorities to begin reconstitution and recovery operations. He also issues initial planning guidance to posture the brigade's fire support systems for the next operation. As the FA battalion commander, he returns to the battalion TOC and issues the orders to focus the battalion's recovery operations. He also provides the battalion leadership his initial planning guidance for the next operation in person.

Once he has met with the CSM and XO, the commander assesses his battalion's support status. He checks and reinvigorates the battalion's administrative and logistical systems.

He visits the batteries and soldiers. Face-to-face, he reassures them of their contribution to the previous fight, assesses and influences their welfare and begins their preparation for the next fight. Only by this face-to-face contact with soldiers can the battalion commander maintain a good fix on the pulse of the battalion.

After some rest, the battalion commander is ready to return to the brigade TOC and resume his role as the brigade FSCOORD for the next fight. He plays a challenging but critical role in providing timely, accurate and lethal fires in support of the brigade's combat operations.

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How to Meet the Five Requirements for Accurate, Predicted Fire

(And What to Do If You Can't)

by Captain Christopher A. Patton

The goal of the FA is to provide *accurate* first-round fires for effect (FFE), yet many units at our combat training centers (CTCs) experience difficulties in accomplishing this goal. For accurate FFE, you must meet the five requirements for accurate, predicted fire: accurate target location and size, firing unit location, weapon and ammunition information, meteorological data and computational procedures.

Sometimes meeting these requirements in the more traditional means described in the manuals is not possible. Then units must meet them in non-typical ways or even take steps to improve their firing data until they can meet the five requirements. (In some cases, units may meet the requirements but find it necessary to isolate position constants.) But unless you've trained at home station to meet the five requirements for accurate, predicted fire in non-typical ways, life at the CTCs can be difficult in rotations designed to force units to train in ways anything but typical.

No FA reference outlines specifically what to do if we can't meet the five requirements or how to improve firing data under varied circumstances. This is largely due to the many mission, enemy, terrain, troops and time available (METT-T) variables a unit can face—not to mention the unit's training level, equipment, organization and other considerations. This article fills that void by discussing common techniques to meet the five requirements and steps to take to improve firing data if you can't.

Five Requirements

Page 1-3 of *FM 6-40 (FMFRP 6-6-40) Tactics, Techniques and Procedures (TTP) for Field Artillery Manual Cannon Gunnery* and Chapter 1, Section II of *ST 6-40-2 Field Artillery Battery Computer System (BCS) Cannon Gunnery* outline the common means of achieving the five requirements. Although the non-typical means discussed in this article may not be accurate enough, you should compute firing data with the most accurate means available to you in a given situation (METT-T) and evaluate your effects— whether by adjusting fire the first time, firing to a flank or even to the rear to maintain the element of surprise. Obviously, if you achieve the desired effects, then continue to fire.

I Accurate Target Location and Size. This requirement is the forward observer's (FO's) responsibility, but the artillery unit ensures its FOs can locate targets accurately. Optimally, all observers will be on common survey with their firing units. (For information on common survey, see Appendix E of ST 6-40-2.)

Units typically accomplish this requirement with their organic survey elements. This provides the observer the three elements of common survey (in order of importance): direction, location and altitude. The observer then can orient a ground/vehicular laser locator designator (G/VLLD) or man-transportable laser target designator and rangefinder (MULE) on the survey-determined direction and report the grid and altitude to the fire direction center (FDC). With this information, the unit should have few problems meeting this requirement.

If a unit can't meet Requirement I in this way, there are alternate methods it can use to determine direction, location and altitude with varying degrees of accuracy. (See Figure 1.) The techniques work if the unit has the appropriate equipment (planning is critical here) and knows how to use it.

It is unlikely, in most cases, however, that a unit can determine direction but not location. Trilateration is a useful technique for most situations if an observer has a laser capability. This technique provides both location and direction.

II Accurate Firing Unit Location. This requirement is the responsibility

of the firing unit. Optimally, organic survey elements will provide survey data allowing firing units to meet this requirement and be on common survey with the rest of the unit and the observers. If not, units can employ one of the methods listed in Figure 2.

Similar to meeting the first requirement, these methods need certain equipment and training and only can be exercised under certain conditions (for example, when a celestial object is visible for a simultaneous observation).

None of the alternatives listed in Figure 2 are accurate enough to be considered

Direction	Page Reference
• Conduct a simultaneous observation with a firing unit/mortars.	*FM 6-50 (MCWP 3-1.6.23) Tactics, Techniques and Procedures (TTP) for the Field Artillery Cannon Battery* (97), Page 5-2
• Conduct a trilateration mission with the fire direction center (FDC) or a forward-entry device (FED).	*ST 6-40-2 Field Artillery Battery Computer System (BCS) Cannon Gunnery* (Version 0.022), Page 5-35
• Conduct any of the methods outlined in this article for determining accurate firing location (see Figure 2), assuming the availability of the backup computer system (BUCS) and/or an aiming circle.	
• Scale a direction from a terrain feature visible on a map.	
Location	
• Use the AN/PSN-11 precision lightweight global positioning system receiver (PLGR).	FM 6-50, Page 4-6 *TM 11-5825-291-13 PLGR Technical Manual*
• Conduct a resection (Page 5-34), triangulation (Page 5-37) or trilateration (Page 5-35) mission with the FDC or a FED.	ST 6-40-2
• Conduct a graphic resection.	FM 6-50, Page 5-13
• Conduct any of the methods outlined in this article for determining accurate firing location (see Figure 2), assuming the availability of BUCS and/or an aiming circle.	
• Determine location by mapspot.	
Altitude	
• Determine the altitude from the trilateration or resection mission used to determine location.	ST 6-40-2
• Use the PLGR.	TM 11-5825-291-13
• Determine the altitude by mapspot.	

Figure 1: Forward Observer Methods to Determine Direction, Location and Altitude without Survey Data

Direction	Page Reference
• Conduct a simultaneous observation (Page 5-2), Polaris 2 (Page 5-10), Polaris - Kochab (Page 5-3), or directional traverse (Page 5-11).	*FM 6-50*
• Conduct a BUCS hasty astro.	*ST 6-40-31 FA Backup Computer System (BUCS)*(Dec 90), *Page 2-52*
Location	
• Conduct a graphic resection.	*FM 6-50, Page 5-13*
• Use a PLGR.	*FM 6-50, Page 4-6/TM 11-5825-291-13*
• Determine the location from a mapspot.	
Direction and Location	
• Conduct a graphic traverse.	*FM 6-50, Page 5-14*
• Conduct a BUCS graphic traverse.	*FM 6-50, Page 5-23*
Altitude	
• Use the PLGR.	
• Determine altitude by mapspot.	*FM 6-50, Page 4-6/TM 11-5825-291-13*

Figure 2: Firing Unit Methods to Determine Direction, Location and Altitude without Survey Data

common survey; however, they might be enough to allow you to meet the goal of the FA and achieve an accurate first-round FFE.

III Accurate Weapon and Ammunition Information. The tangible elements of this requirement are propellant temperature, projectile square weight and muzzle velocity variation (MVV). Units should have little trouble measuring the propellant temperature with enough temperature gauges on hand for all contingencies. Reading the square weight on a projectile and reporting it to the FDC is also a simple task.

Muzzle velocity management, on the other hand, is far more difficult. Optimally, we calibrate every round fired with the M90 or M93/94 chronograph. I discuss all four of our MV management options briefly in this article with the techniques found in FM 6-40, Chapter 4.

Calibrate with the M90 or M93/94 Chronograph. This is the most reliable method to determine MVV. Optimally, calibration should be continuous. If you calibrate with the M90, you must correct for nonstandard propellant temperature and projectile square weight with the Muzzle Velocity Correction Table-1 dated June 1996 or by entering the appropriate data into the BCS;MVD message format of the BCS.

The M93/94 determines a calibrated MVV, and you enter this directly into the BCS;MVV file as historical data.

Perform a Subsequent Lot Inference. Once you have a baseline MVV for all howitzers, you can infer second-lot MVVs if you receive a different lot of propellant. Calibrate the second lot with a single howitzer and infer to other howitzers using the DA Form 4982-R (MV Record).

Use the equation MVV=SS+PE. You can predict the MVV of a particular weapon with a particular lot of propellant by determining shooting strength (SS) by using the weapon's 2408-4 Weapons Record Data/Gun Book and the tabular firing table (TFT). Determine the appropriate propellant efficiency (PE) for the lot of propellant and add it to the SS to determine a predicted MVV. PEs are available on the Fort Sill Home Page under the "Training Command" menu in the Gunnery Department's Fire Direction Branch section with a discussion of how to use them.

Use SS alone to estimate MVV. If no PE is available for the lot of propellant you have, you may consider using SS alone. Often this will provide more accurate firing data than using standard firing table MV. If you can't use one of the other three methods for whatever reason, this is a technique to determine more accurate firing data than you currently have. But the only way to verify the accuracy of the data is to fire it and evaluate your effects.

If you can't calibrate every gun, or at least one and infer MVVs for the others, then the last two techniques may help you in meeting Requirement III. If you do not have PE information, however, your fires most likely will be inaccurate. Once you verify your fires and find them inaccurate, you should consider the five steps to improve your firing data also outlined in this article.

IV Accurate Meteorological Information. Unfortunately, if a meteorological section doesn't have a meteorological message available when you need it, there's no alternate means to determine the effects of the weather. A confident fire direction officer (FDO) might consider estimating his own meteorological data at line 00 by estimating wind speed and direction (and temperature for that matter). See *FM 6-15 TTP for Field Artillery Meteorology* for more information.

Additionally, an FDO who keeps a log of the previous day's meteorological messages may consider using a day-old message flown at the same time as he currently is firing as a possible improvement to his current firing data. Of course, this means is not ideal and anyone considering it must use common sense and evaluate the similarity of the previous day's weather to the current day's. This solution may, however, improve data determined with a six-hour-old or a standard meteorological message and can be evaluated by firing.

You also simply can fire with a standard meteorological message and evaluate the effects of your rounds based on the best data available (excluding the meteorological message, in this case). This will determine whether or not you met your goal. If so, then continue to FFE. If not, then begin the five steps to improve firing data.

V Accurate Computational Procedures. If you fail to perform any required computations correctly, you probably won't fire accurately. Then you have to identify the incorrect data by reviewing your BCS database. Proper procedures in the FDC should identify any errors before you fire—via conducting check missions and verifying all data fired by an independent means (BCS to manual computations).

Proper troubleshooting techniques after your observer identifies inaccuracies will enable you to quickly identify and correct any errors in your computation of firing data and allow you to continue the mission.

If you have done your best to meet all five of the requirements for accurate, predicted fire by the best means available, your next step is to assess your accuracy. If you achieve the goal of first-round FFE, then go forth and kill the enemy. (It's probably a good idea to begin with an adjust fire mission or a mission fired well into enemy territory to verify your accuracy and avoid fratricide. Again, this depends on your situation). If you did not fire accurately, it's time to improve your firing data.

The Five Steps to Improving Firing Data

We address the process of registering and subsequent techniques as the five steps to improve firing data and not just "registering" for more than just semantic reasons. It is a conscious decision on the part of the FDO (with the approval of the commander) to perform these steps for the benefit of the entire unit and not just for the immediate benefit of one platoon, which would be the result of just "registering." (See Figure 3.)

The five-step process allows the unit—probably a platoon for its battalion but could be multiple battalions)—to isolate position constants and transfer this information to the other platoons and, thereby, mass the fires of the battalion. Additionally, this process requires the

1. Cause the rounds to burst at a point of known location.
2. Determine did-hit and should-hit data.
3. Determine the total corrections.
4. Isolate position constants.
5. Update the total corrections.

Figure 3: Five Steps to Improving Firing Data. These are the steps to take to improve your firing data when you are unable to meet the five requirements for accurate, predicted fire by the best means available. (Steps four and five keep you from having to register again.)

unit to register just one time (optimally) and merely update total corrections over time as measurable nonstandard conditions change and are updated in the BCS database.

This process assumes you eventually will obtain the necessary information and isolate position constants by stripping the measurable nonstandard conditions (Big Met) out of the AFU;REG file. (Big Met is all the measurable, nonstandard conditions for which you can account.) Removing these conditions enables you to transfer this information to other units as long as both units are on common survey. For example, if you don't meet Requirement II, you can expect survey to get to your unit eventually. If you don't meet Requirement III, you *will* meet it after you calibrate the registering howitzer during the registration. And if you don't meet Requirement IV, you can arrange to have a message determined by the meteorological station when you register or as close to that time as is possible. (The Requirement I is the FO's responsibility and Requirement V is to ensure computations are performed correctly.)

The FDO's Decision Flow Chart in Figure 4 helps FDOs determine whether or not they should conduct the five steps to improve firing data and, if so, what registration techniques they should use. Conducting a registration requires significant ammunition and time and puts the registering unit at risk to enemy counterfire. Therefore, a registration should not be an automatic answer to

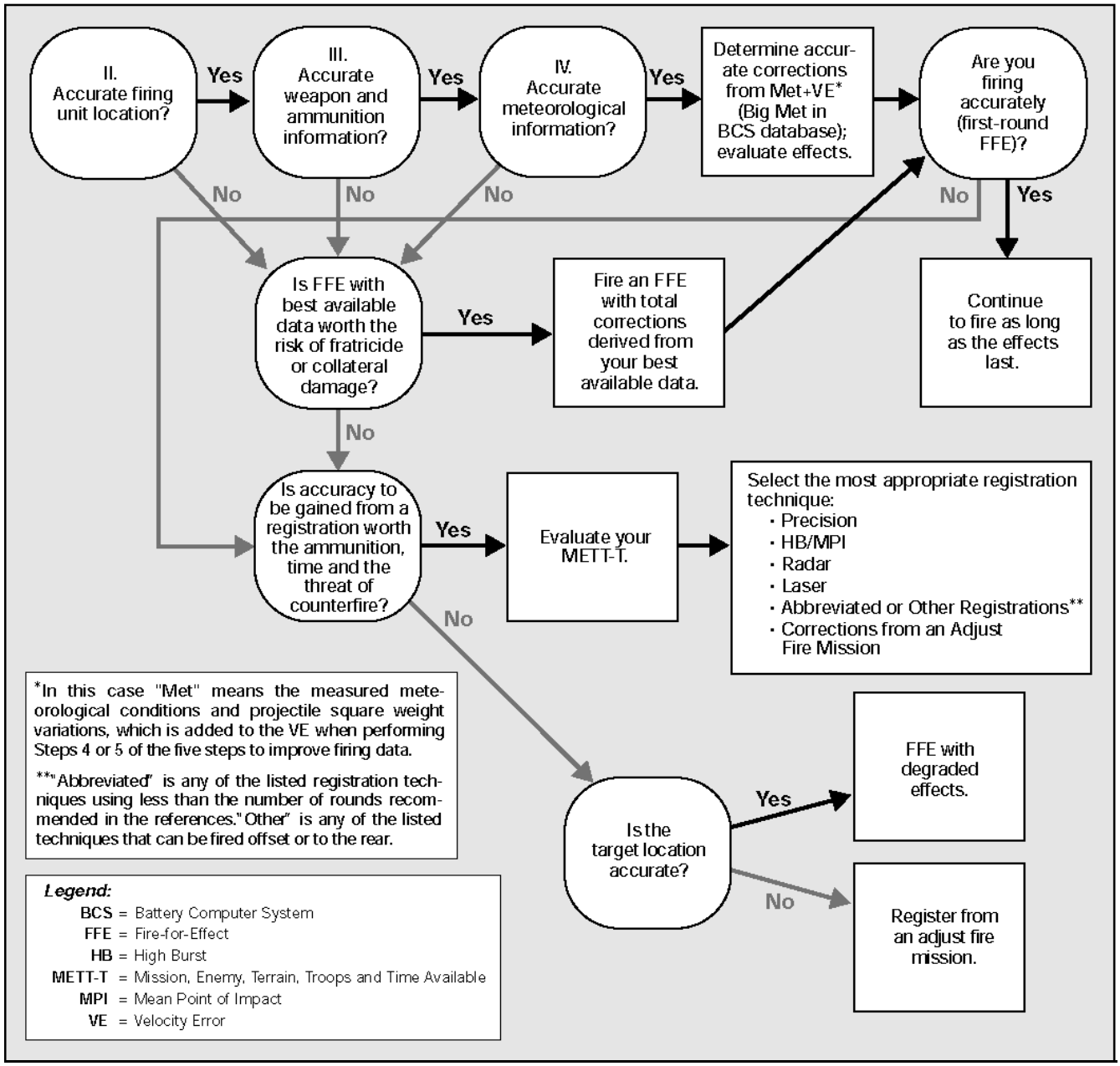

Figure 4: FDO's Decision Chart. This flow chart helps the fire direction officer (FDO) determine whether or not to register and, if so, what registration technique to use. The FDO enters the chart at the top left with Requirements II, III and IV. For Requirement I, Accurate Target Location, the FDO has to depend on the forward observer's (FO's) having done his job correctly. (Requirement V, Accurate Computational Procedures, applies to the FDO's computation, identification or verification of all data.)

not meeting the five requirements. (See Figure 5.)

Which registration technique you choose depends on a myriad of factors conveniently grouped under METT-T. Here are two scenarios with varying METT-T.

First Scenario. Your unit is meeting the five requirements for accurate, predicted fire and is firing accurately. As night falls, the meteorological station rolls over in a ditch while moving from one location to another. Your unit continues to fire accurately until the weather changes significantly after sundown.

You don't have a method to meet this requirement, so you decide to conduct the five steps. If the meteorological station will be back up soon and you can wait, you might conduct a registration with one unit and have that unit transfer position constants after conducting a concurrent meteorological technique. (You might also consider transferring position constants if all your units are fairly close together and firing generally on the same azimuth of fire, but this is not the best choice.) If the meteorological station will be down for a while, you might consider conducting a registration with all your units, but this only will improve firing data until the weather conditions change again.

In this scenario, you have only one observer in position. You have 30 minutes until you need to fire, so you have time available. Your observer has a G/VLLD, so you decide to conduct a laser registration. (If you had a radar and could use it, conducting a radar registration would be preferable.) The laser registration is faster and uses fewer rounds than a precision registration and can yield a higher assurance of validity using the typical number of rounds (six).

Registration Technique	Page Reference
Precision Registration	ST 6-40-2, Page 5-40/*FM 6-40 (FMFRP 6-6-40) TTP for Field Artillery Manual Cannon Gunnery* (96), Page 10-6
• HB/MPI Registration	ST 6-40-2, Page 5-46/FM 6-40, Page 10-16
• Radar Registration	ST 6-40-2, Page 5-51/FM 6-40, Page 10-34
• Laser Registration	ST 6-40-2, Page 5-57
• Registration from an Adjust Fire Mission	ST 6-40-2, Page 5-56
• Any Abbreviated Form (Less Usable Rounds) of These Registration Techniques	

Figure 5: Registration Techniques and References

Second Scenario. In this scenario, you also lose meteorological support, but you are in the middle of providing continuous support to your maneuver units. In this situation, you notice your fires become inaccurate with the changing weather and you can't afford to adjust fires due to the highly mobile enemy forces attacking friendly units.

This time you wisely decide to take corrections from your last adjust fire mission and use them as registration corrections. Even though you have to repeat this process as weather conditions change, this technique will keep you and your fellow units in the fight until the meteorological station can resume operations.

FDOs and commanders at all levels must be familiar with and train on alternate means to allow a unit to fire accurately if it can't meet the five requirements for accurate, predicted fire by typical means. If the unit can't meet the requirements, understanding the different registration options will allow it to quickly improve firing data in a manner that yields the most accurate firing data with the artillery out of the fight the least amount of time.

Captain Christopher A. Patton until recently was a Gunnery Instructor in the Fire Direction Branch of the Gunnery Department at the Field Artillery School, Fort Sill, Oklahoma. Currently, he commands C Battery, 6th Battalion, 27th Field Artillery, 75th Field Artillery Brigade, part of III Armored Corps Artillery at Fort Sill. He also served as an Assistant S3 and Ammunition Platoon Leader in Service Battery, both for 1st Battalion, 37th Field Artillery at Fort Lewis, Washington; and Company Fire Support Officer in 5th Battalion, 77th Armor and Fire Direction Officer for C Battery, 2d Battalion, 29th Field Artillery, both in the 1st Armored Division in Germany.

DAC-Futures Formed at the FA School

In July, the Field Artillery School at Fort Sill, Oklahoma, created the office of the Deputy Assistant Commandant for Futures (DAC-Futures). This office pulls together the research, development and resourcing efforts of the Depth and Simultaneous Attack Battle Laboratory (D&SA Battle Lab), Task Force 2000 (TF 2000) and the Directorate of Combat Developments (DCD). DAC-Futures integrates all futures work in the near term and out to Army After Next and beyond at the Center for Fires, Fort Sill. The center's efforts now more closely align with the futures development and procurement efforts of Headquarters, Training and Doctrine Command (TRADOC).

The DAC-Futures is Colonel Sammy L. Coffman at 4640 or 5013 (coffmans@doimex1.sill.army.mil); the Director of the D&SA Battle Lab is Colonel Peter S. Corpac at 3706 or 3636 (corpacp@doimex1.sill.army.mil); the Director of TF 2000 is Colonel Jerry C. Hill at 4511 or 5206 (hillj@doimex1.sill.army.mil); and the Director of DCD is Lieutenant Colonel Russell J. Hall at 2604 or 6980 (hallr@doimex1.sill.army.mil). The prefixes are DSN 639 and commercial (580) 442-xxxx.

AFATDS Update

Plan for AFATDS NET

For a unit, the advanced Field Artillery tactical data system (AFATDS) training is a journey. The unit's success is directly related to command emphasis and the amount of effort leaders and soldiers invest in the three phases of the journey.

Phase I: Pre-NET. This phase begins with the new material information briefing (NMIB) and ends when the new equipment training team (NETT) arrives to begin training. The NMIB is a cooperative briefing involving the TRADOC System Manager (TSM) for AFATDS out of Fort Sill, Oklahoma; the AFATDS Program Manager (PM) and Communications and Electronics Command (CECOM) NETT out of Fort Monmouth, New Jersey; and most importantly, the unit. It finalizes the details for equipment issue and determines the locations and schedule for the NET. Once the NMIB is complete, the process of preparing for NET begins and involves not only the entire FA battalion, but also the division staff. (See the figure.)

Phase II: NET. NET is four weeks of instructor-led training for leaders, maintenance personnel and operators with a one-week communications exercise (COMEX). In September 2000, AFATDS NET will grow to seven weeks to allow time to cover technical fire support functions added to the software.

Leader and maintenance training runs through the first week of NET. The leader course is designed for key leaders who make tactical decisions using AFATDS but don't supervise day-to-day AFATDS operations—such as, S2s, S3s, fire support officers (FSOs) and fire support coordinators (FSCOORDS). The maintenance course is for soldiers maintaining the AFATDS computers and power generation and distribution equipment—31U, 35J and 52Ds.

The operator's course starts the second week and lasts three weeks. It's designed for AFATDS supervisors, senior AFATDS operators and AFATDS operators. The course is to train-the-trainers, not just serve as an operator's course. If possible, units should pair supervisors and senior operators at workstations during training. This facilitates teamwork and helps soldiers tap the experience of the NET trainers to work through issues that pertain to their respective levels.

The final week of NET is the COMEX. All those who will supervise, operate and maintain AFATDS *must* participate in the COMEX. Non-AFATDS devices—battery computer system (BCS), Kiowa Warrior, initial fire support automated system (IFSAS), all-source analysis system (ASAS), maneuver control system (MCS—participate in the COMEX. The NETT and Field Integration Team (FIT) out of Fort Hood, Texas, teach the unit how to interoperate with these systems and what the limitations are. During the COMEX, the unit takes charge of the equipment and its operation—the NETT departs in five days.

Phase III: Post-NET. This phase begins immediately after NET with the implementation of the unit sustainment training plan developed during Phase I. Units build on their NET experience to achieve the training levels necessary for sustained digital fire support operations.

Units can conduct sustainment training using their trainers qualified in NET and by tapping several resources: distance learning alternatives; requesting an FA School mobile training team (MTT); using the Fort Sill Website and Email to exchange information with other AFATDS units to remain current on software changes and tactics, techniques and procedures (TTPs); and using the AFATDS liaison network developed in the previous phases. Fielded units also get "one free" NET support team for a major exercise.

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S1

- Identify inbound leaders/soldiers with the AFATDS skill qualification identifier (SQI).
- Stabilize key NCOs and officers and ensure the unit doesn't lose them at the same time after they are trained.

S3/Fire Control Element/Fire Direction Center

- Develop an AFATDS standing operating procedure (SOP) to include data distribution, master unit list (MUL) and command and supported unit relationships. (Get a copy from an AFATDS-equipped unit or use the 66-3 on the Fort Sill Website.)
- Schedule key leaders for the AFATDS operator's course at Fort Sill.
- Develop a schedule that ruthlessly fences-off the weeks/personnel for NET.
- Establish liaisons with the Communications and Electronic Command (CECOM) NETT at Fort Monmouth; the Command, Control and Communications Division (CCCD) of the Fire Support and Combined Arms Operations Department (FSCAOD) at the FA School, Fort Sill; and the Field Integration Team (FIT) at Fort Hood.
- Prepare an AFATDS sustainment training plan to implement after fielding.

S4/Property Book Officer/Battalion Maintenance Officer and Team

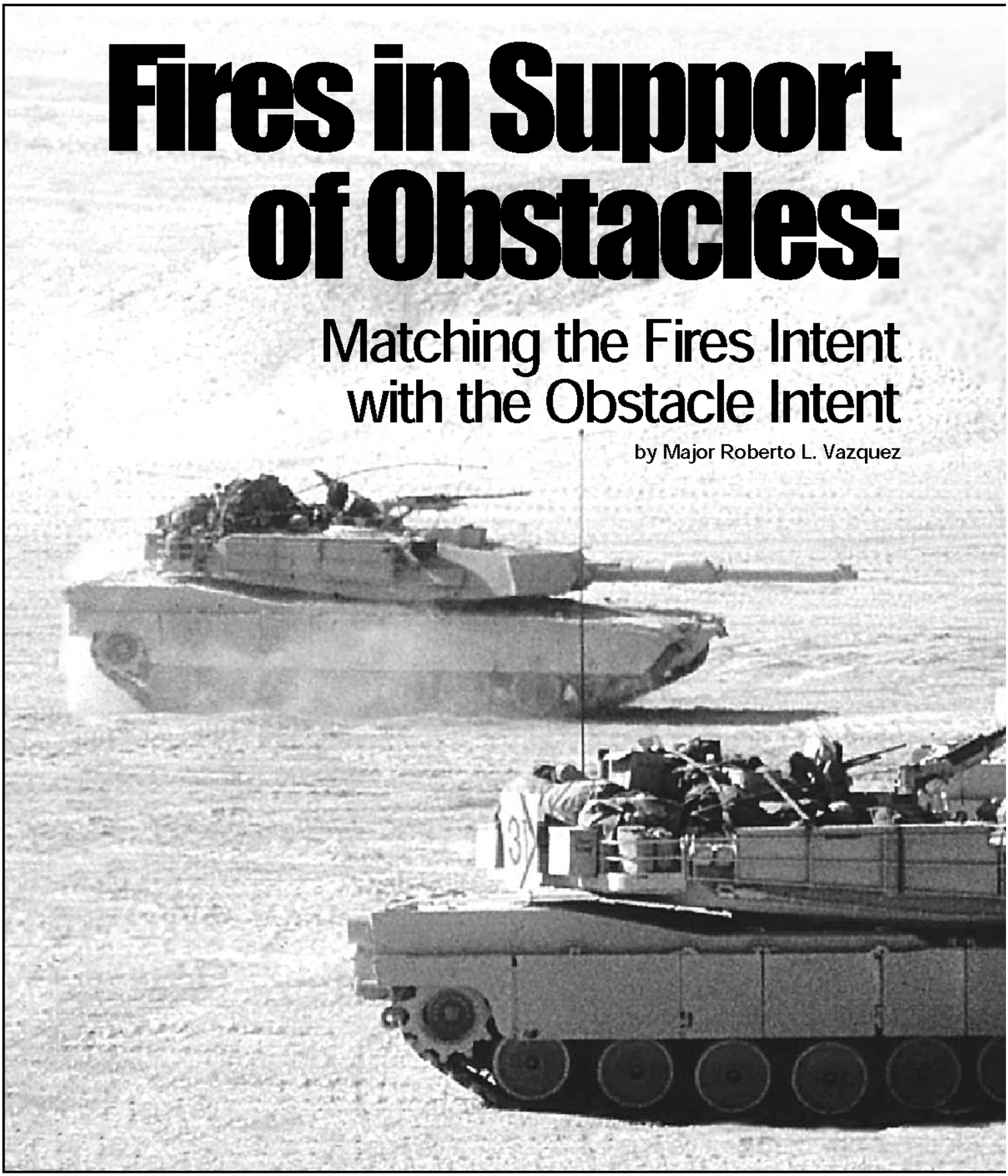
- Develop a plan to pick-up issued equipment on the unit property books.
- Determine unit status reporting (USR) procedures.
- Determine whether AFATDS computers should be floats or spares, where they should be maintained and the procedures for exchange.
- Integrate AFATDS computers into the Army maintenance management system (TAMMS) and prescribed load list (PLL) database.
- Determine the necessity of command-directed PLL items (SCSI terminators, cables, etc.). FIT and TSM-AFATDS can help with this.

Staff Tasks to Prepare for AFATDS NET

Fires in Support of Obstacles:

Matching the Fires Intent with the Obstacle Intent

by Major Roberto L. Vazquez



When properly employed, obstacles can be significant combat multipliers in defensive operations. But an obstacle not covered by direct or indirect fires is merely an inconvenience to the lead elements of the enemy formation. On the other hand, fires that aren't integrated with the obstacle plan may, in fact, be detrimental to the task and purpose of the obstacle.

When the commander conveys to the staff what he wants obstacles and fire support to accomplish and why in his intent and guidance, the staff develops a course of action (COA) to accomplish these tasks. The fire support officer (FSO) must be prepared to recommend essential tasks and purposes for fire support for the operation. The fire support tasks and purposes, whether approved by the commander or modified, become the basis for the essential fire support tasks (EFSTs) for the operation.

The commander's intent—in this case, his intent and guidance for obstacles to support his scheme of maneuver and his concept of fires—provides the FSO the *target of* the obstacle, the desired *obstacle effect* (or purpose) and the *relative location* of the obstacle in the scheme of maneuver. Meeting the commander's intent will be the result of fires covering obstacles in concert with the scheme of maneuver and the obstacle plan.

The targeting objective or desired effect of an attack on an enemy capability is "to disrupt, limit, delay or destroy" him (*FM 6-20-10 The Targeting Process*, Page 2-8). These targeting objectives can be "habitually associated" with certain types of obstacles—respectively, to disrupt, turn, fix or block the enemy (*FM 90-7 Combined Arms Obstacle Integration*). (See Figure 1.)

Commander's Desired Obstacle Effects	Commander's Obstacle Intent/Targeting Objective
Disrupt	Disrupt
Turn	Limit
Fix	Delay
Block	Destroy

Figure 1: Matching the Targeting Objective to the Commander's Intent for Obstacles

When planning fires for an obstacle, the FSO defines the EFST's task, purpose, method and effects (TPME)—he matches the intent of his fires with the commander's intent for the obstacle. (See Figure 2.)

1. Task: Tells what the EFST will do to the enemy; it has three parts: targeting objective, enemy formation and function.

2. Purpose: Describes how the task will contribute to the friendly force's mission and commander's intent.

3. Method: Provides the details of how to accomplish the task, including priorities, allocations and restrictions.

4. Effects: Is assessment-oriented and quantifies success.

Figure 2: Four Elements of the Essential Fire Support Task (EFST). Defining these TPME elements for each EFST helps ensure fires complement and are integrated into combined arms operations.

Disrupt Obstacle. If the purpose of an obstacle is to disrupt an enemy force or formation, one can expect fires to have the same targeting objective: disrupt the enemy formation by breaking it up, causing it to deploy early or slowing part of the force while allowing another part to advance unimpeded.

Figure 3 illustrates how fires might be integrated with a disrupt obstacle. As the enemy motorized infantry battalion (MIB) approaches the obstacle group, the Team A FSO fires target group A2D with dual-purpose improved conventional munitions (DPICM). The Bradley infantry fighting vehicles (IFVs) engage the enemy with tube-launched optically tracked, wire-guided missiles (TOWs) between target reference points (TRPs) 08 and 09, forcing him to deploy into attack formation.

The combination of the obstacles and indirect fires slows the southern half of the enemy formation, allowing the northern half to proceed into Engagement Area (EA) Hot. Then Team A masses direct fires on the northern half of the enemy formation in EA Hot to destroy it before shifting fires to the remaining enemy force as it enters EA Hot. After disrupting the lead enemy MIB forward of the TF EA, Team A repositions to a subsequent BP to assist in the fight in the TF EA. An example of an EFST for this disrupting obstacle might read as follows:

Phase II: EA Hot

Task: Disrupt the ability of the lead MIB to mass its 3 MICs [motorized infantry companies] in EA Hot.

Purpose: To enable Team A to engage no more than 2 MICs at a time in EA Hot.

Method: Priority of FA fires to Team A, mortar priority to Team B. Team A: FA suppresses southern MIC at obstacle MD01 with target group A2D (DPICM, targets AD1005, AD1010). IEW [intelligence and electronic warfare] locates and jams MIB CMD [command] net.

Effect: FA destroys 3 BMPs and suppresses southern MIC direct fires until northern 2 MICs are destroyed in EA Hot. MIB CMD net jumps one or more times.

Turning Obstacle. A turning obstacle is typically supported with fires having an objective of limiting the enemy's ability to maneuver freely. Figure 4 is an example of how fires might be integrated with a turning obstacle.

As the advanced guard main body (AGMB) approaches the turning obstacle between TRPs 06 and 09, the Team B FSO initiates target group A1C to be fired with high-explosive (HE) rounds and DPICM. The infantry in the northern part of BP 21 orients its fires on TRP 09 to prevent the enemy from by-passing the anchor point of the obstacle group, and Team B tanks engage the enemy oriented on TRPs 01 and 02. The terrain, the obstacles and the direct and indirect fires seal the enemy's by-passing to the east and force him to redirect to the southwest to continue the attack. As the enemy passes TRP 03, the Team B commander re-orients his fires between TRPs 02 and 04 with all platoons maintaining a high volume of fire to ensure the AGMB continues southwest into the TF's main EA Pom. This turning obstacle EFST might read like this:

Phase II: EA Spice

Task: Limit the AGMB's ability to maneuver and force it through EA Spice into EA Pom.

Purpose: To enable Team B to destroy 2 MICs in EA Spice while forcing the remainder of the AGMB into the EA Pom where the TF will destroy what remains of the AGMB.

Method: Priority of FA and mortar fires to Team B. Team B: FA neutralizes southern MIC at obstacle MT02 with target group A1C (DPICM and HE, targets AC2100, AC2105). Team B allocated one FA battery FPF [final protective fire]. Restrictions: No smoke in EAs without TF commander approval. IEW locates and jams AGMB CMD net, then ADA [air defense artillery] net when remnants of AGMB enter EA Pom.

Effect: FA destroys 3 BMPs and neutralizes AGMB while direct fires destroy 2 MICs in EA Spice. AGMB CMD net jumps 2 or more times.

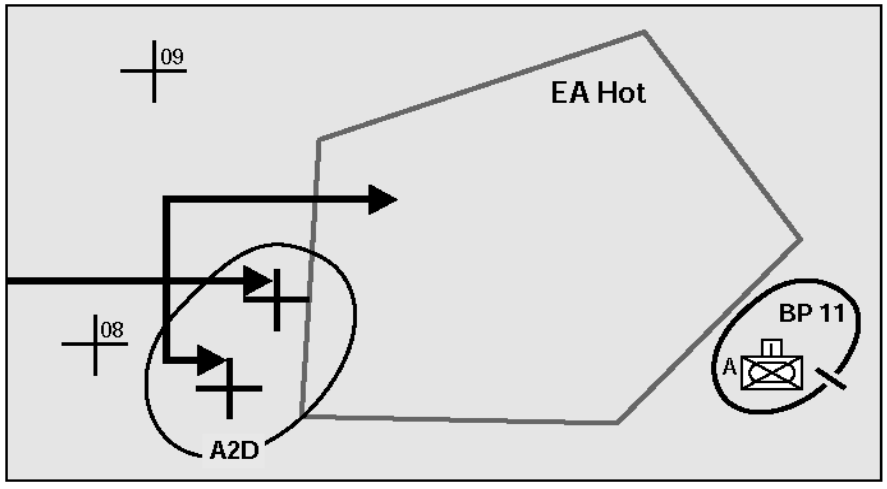


Figure 3: Disrupt Obstacle. Team A (balanced armor and mechanized infantry) must defend Battle Position (BP) 11 oriented on Engagement Area (EA) Hot between target reference points (TRPs) 08 and 09 to disrupt the lead enemy battalion, a motorized infantry battalion (MIB), forward of the task force (TF) EA. The TF fire support officer (FSO) has planned target group A2D to ensure Team A will engage no more than two enemy companies at a time with direct fire.

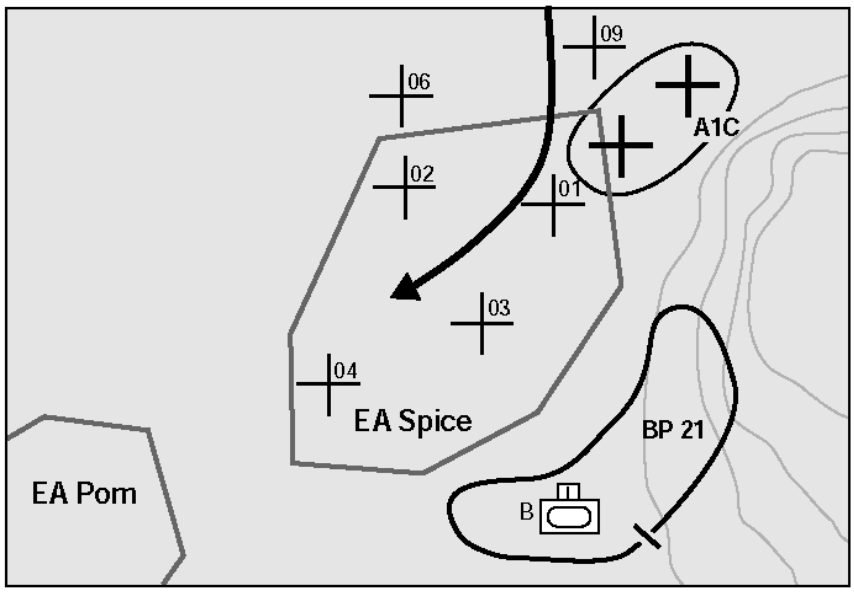


Figure 4: Turning Obstacle. Team B (armor heavy) in BP 21 oriented on EA Spice must destroy two of the enemy's motorized infantry companies (MICs) and turn the force into the TF's main EA Pom. The anchor of the turning obstacle is the restrictive terrain and the FSO's planned fires at A1C.

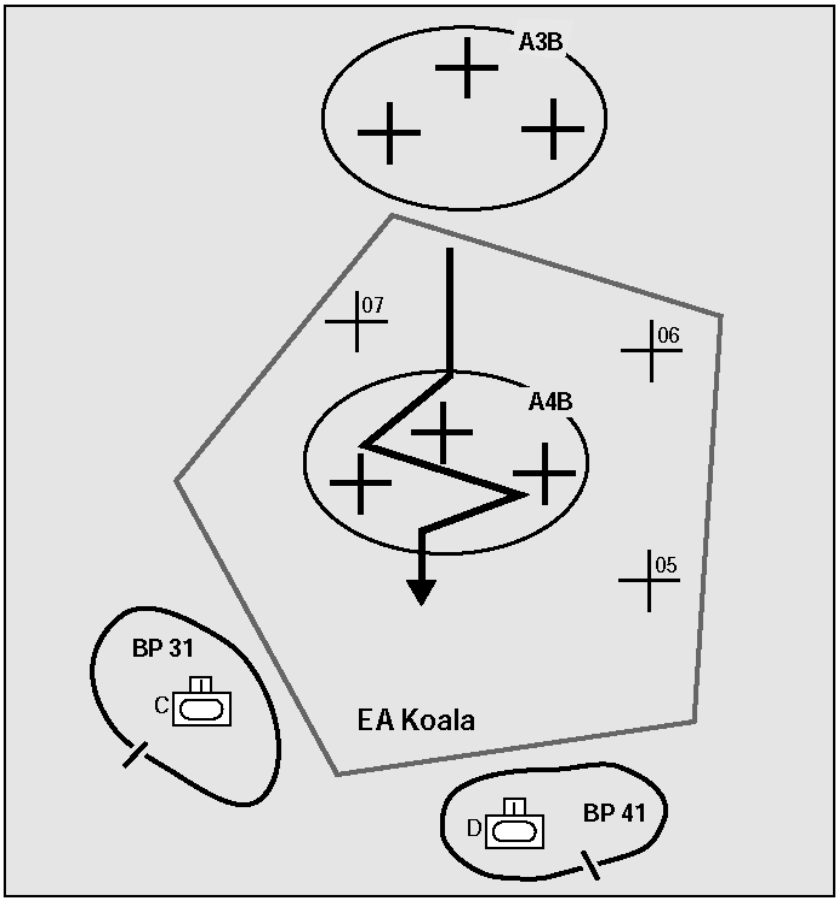


Figure 5: Fixing Obstacle. Teams C and D (both tank-heavy) in their respective BPs are to mass direct fires on and destroy two battalions of the enemy motorized infantry brigade (MIBR) in EA Koala. The TF FSO planned Phase I suppressive fires for A3B to disrupt the enemy formation and Phase II fires for A4B to delay the enemy's first echelon and allow the tanks and wire-guided missiles to destroy it in EA Koala.

A turning obstacle is typically supported with fires having an objective of limiting the enemy's ability to maneuver freely.

Fixing Obstacle. Fixing obstacles may be complemented with fires intended to delay an enemy formation. Figure 5 is an illustration of fires integrated with a fixing obstacle.

Team C in Figure 5 is oriented between TRPs 05 and 06; Team D is oriented between TRPs 06 and 07. The TF FSO planned FA fires in target group A3B (Phase I) to disrupt the enemy formation with suppressive fires and force the commander to deploy early. FA target group A4B in EA Koala is intended to delay the first-echelon MICs by neutralizing them in the EA with DPICM, enabling the tanks and TOWs to destroy them in the EA. Thus, the EFST for this fixing obstacle is:

Phase II: EA Koala

Task: Delay the first-echelon MIB forces movement through EA Koala.

Purpose: To allow Team C and Team D to mass direct fires on and destroy the first-echelon MICs in EA Koala.

Method: Priority of FA and mortar fires to Team C. Team C: FA neutralizes first-echelon MICs at obstacle MF03 with target group A4B (DPICM and HE, targets AB1620, AB1625, AB1630). Team C allocated one FA battery FPF. Team D: Alternate executor for A4B. Restrictions: No smoke or illumination in EA without TF commander approval. IEW locates and jams first-echelon MIB CMD nets, then MIBR [motorized infantry brigade] CMD net after first-echelon MIBs are destroyed.

Effect: FA destroys 3 tanks and 6 BMPs and neutralizes AGMB while direct fires destroy 4 MICs in EA Koala. MIB CMD net jumps one or more times. MIBR CMD net jumps one or more times.

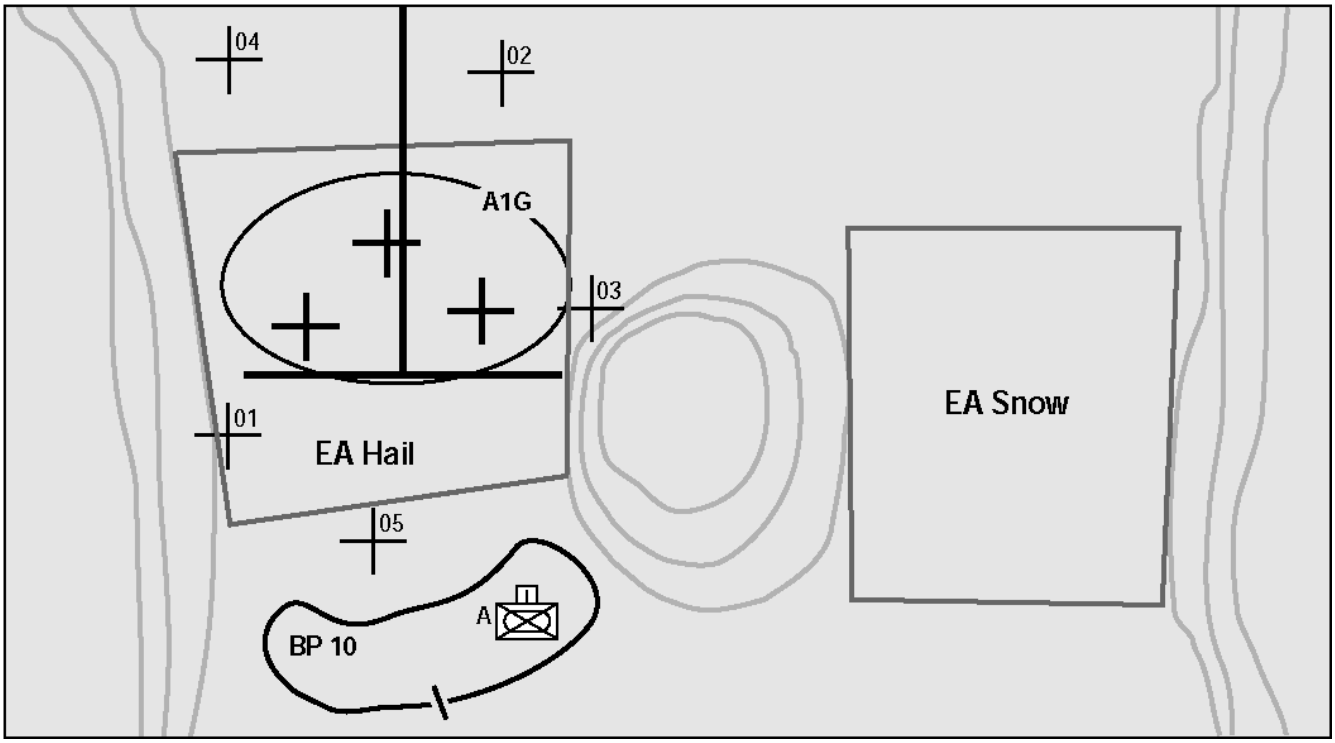


Figure 6: Blocking Obstacle. Team A (tank heavy) in BP 10 must prevent the enemy MIB from using the western pass as an avenue of approach, forcing the enemy brigade follow-on forces through the eastern pass so the TF can mass fires and destroy them. When the lead elements of the MIB pass TRP 04, the Team A FSO will fire target group A1G. To prevent the enemy from penetrating BP 10, the FSO has allocated one FA battery final protective fire (FPF) and one mortar platoon FPF.

Blocking Obstacle. Because blocking obstacles are used to either deny the enemy an avenue of approach (AA) or prevent him from passing through an EA, fires for a blocking obstacle often have a targeting objective of destroying an enemy element. Figure 6 is an example of the application of fires to a blocking obstacle. The object is to block an enemy MIB from using the western pass. The TF commander wants the follow-on forces of the enemy MIBR to advance through the eastern pass so he can mass his combat power to destroy the enemy in EA Snow.

Team A has its eastern platoon oriented between TRPs 01 and 02 and the western platoon oriented between TRPs 02 and 03. The mechanized platoon in the center is oriented between TRPs 02 and 04. When the lead elements of the MIB pass TRP 04, the Team A FSO will initiate group A1G to destroy elements beyond the blocking obstacle MB04.

Copperhead priority target AG1005 will be used to destroy engineer breaching vehicles. If the enemy succeeds in establishing a breaching lane, the TF commander will re-seed the obstacle with family of scatterable mines (FASCAM) (target AG9000). An example of a blocking obstacle EFST is:

Phase II: EA Hail

Task: Destroy elements of an MIB attempting to breach the blocking obstacle in EA Hail.

Purpose: To enable Team A to deny the enemy access to the western pass at EA Hail and force the MIBR into the pass at EA Snow for the TF to mass combat power against the MIBR.

Method: Priority of FA and mortar fires to Team A. Team A: FA destroys elements of an MIB in the western pass with target group A1G (DPICM and HE, targets AG1100, AG1105, AG1110) at obstacle MB04. Destroy enemy engineer breaching vehicles with Copperhead priority target AG1005. If the obstacle group is breached, re-seed with one FA-emplaced medium-density FASCAM minefield (AG9000). Team A allocated one FA battery FPF and a mortar platoon FPF. Once the follow-on elements of the enemy MIBR turn to the eastern pass, priority of FA fires is to Team D. IEW locates and jams MIBR CMD net, then ADA net when CAS reports IP [initial point].

Effect: FA destroys 2 tanks and 7 BMPs at the blocking obstacle. Copperhead destroys 3 engineer vehicles. Obstacle group is re-seeded with FASCAM if breach lane is established.

Clearly understanding the commander's intent for obstacles and fires enables the FSO to develop and recommend the most appropriate EFSTs to integrate fires and support the maneuver commander's plan.

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So...Where On the Battlefield Should the Company FSO Be?

Instructors at the Field Artillery School's Officer Basic Course (OBC) are often asked this question. The answer: "The FSO [fire support officer] should be where he can best execute fires to meet the commander's guidance." The next question is inevitably, "Which manual is that in, Sir?"

FM 7-10 The Infantry Rifle Company states that "during the battle, the FSO normally locates with the commanding officer....At times, the FSO may locate away from the commanding officer to more effectively control supporting fires." Similarly, *FM 71-1 Tank and Mechanized Infantry Company Team* states that "the mechanized infantry company/team FSO normally locates with the company/team commander, either in the commander's vehicle or in the fire support vehicle [FSV]..." The instructor's answer is most like the instructions in FM 7-10.

But this begs yet another question: "What do 6-series [FA] manuals say about the company FSO's location?" Surprisingly, no 6-series manual provides a clear answer.

FM 6-20-20 Fire Support at Battalion Task Force and Below and *FM 6-30 Observed Fire Procedures* describe the company FSO's location based on three FSV options. In Options 1 and 2, the company FSO is collocated with the company commander. The difference between the two options is the placement of the FSV. In Option 1, the FSV is near the company commander and the company FSO remains with it. In Option 2, the FSV is "on terrain to maximize the use of the laser designator/rangefinder (LD/R)." In this option, the company FSO rides with the maneuver commander. Option 3 takes the FSV out of the company zone/sector.

The instructor's answer doesn't necessarily match that of the 6-series manuals. FM 6-20-20's answer is rooted in the location of the mechanized and armor company FSV. Yet, Marine Corps forward observers (the equivalent to Army company FSOs), light, airborne and air assault companies don't have FSVs.

So...why doesn't the instructor just say the FSO stays with the company commander? There are three significant reasons.

1. Communications. The best integrated fire plan is worthless if the FSO is not in a position to communicate with fire support assets. The company FSO has the entire weight of the fire support battlefield operating system (BOS) at the end of his radio transmission. If he loses communications with those systems, they are wasted assets for the company. The company commander positions the FSO where his communications (both to the commander himself and to the fire support systems) are unhampered by range or terrain. The company commander's location may not be the best place for the FSO to communicate with fire support assets.

2. The Battalion/Task Force Fire Support Plan. FM 71-1 states, "The task force fire support plan may designate tasks for the company that require the FSO to occupy a vantage point separate from the company." Although the primary duty of the company FSO is to serve as the fire support coordinator (FSCOORD) for the company, he has a significant secondary duty of executing task force fires. The company commander is responsible for ensuring the fire support team (FIST) or FSO executes those fires. The company commander's position on the battlefield may not be the best place for the FSO to coordinate fires for the task force fire support plan.

3. "Tunnel Vision." Often, the company commander locates with his main effort. From that vantage point, he can best control the company maneuver fight. It's also common for him to find himself in contact, embroiled in a personal fight—lose his focus on events outside the sight on his personal weapon. Company FSOs often "follow suit." The result is blazing M-16s or main guns and cold artillery and mortar tubes. It is only in the after-action review (AAR) process that they realize how the proper application of indirect fires would have reduced friendly casualties.

So...is the instructor saying that the company FSO's staying with the company commander is wrong? *Not at all*. In fact, inherent in the instructor's answer is that it's one of the *best* places for the company FSO...that is, if communications are unobstructed, the company FSO can execute the task force fire support plan and the commander can stay out of direct contact. And it's up to the FSO to advise the commander on just where he needs to be positioned.

If he fails to advise the commander on his best position to execute fires or advises him poorly, the FSO runs the risk of becoming nothing more than an over-burdened, not-so-well trained rifleman.

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FA School, Fort Sill, OK

The FSNCO
Fire Support for an EA

by Sergeant First Class Jack A. McCann, Jr.

At the National Training Center (NTC), fire support NCOs (FSNCOs) at both the battalion task force (TF) and company/team levels tend to be reactive in developing an engagement area (EA). As a result, fire support teams (FISTs) have difficulty getting into position at the right time and place to acquire the enemy and trigger and execute timely and accurate indirect fires at the decisive point.

EAs are built from the inside out. The commander chooses the decisive point, the point on the ground where he wants to kill the enemy, and the EA is constructed from there. The goal is to integrate, synchronize and mass the combined arms effects of fire support, maneuver and countermobility against the enemy to meet the commander's intent.

Once the essential fire support task (EFST) to develop an EA has been determined, the company/team and TF fire support officers (FSOs) and their FSNCOs coordinate to develop the EA. They must develop the observation plan, emplace targets (based on planned obstacles), refine the targets (based on the actual siting of the obstacle), emplace the tactical and execution triggers, proof the EA and rehearse with the FISTs. They also establish timelines and priorities of work.

The TF FSNCO is the expert and coordinates and supervises the overall effort. However, the company/team FSNCO, the senior NCO working directly with the FISTs, should be proactive—take the reins and make EA development happen.

Company/Team FSNCO. The FIST is the maneuver commander's precision target acquisition asset. The FSNCO is (or should be) the most experienced fire supporter at the company/team level and on-board the M981 fire support team vehicle (FISTV). He plays an important role in EA development. *FM6-20-40 Tactics, Techniques and Procedures (TTP) for Fire Support for Brigade Operations (Heavy)*, Page 1-4, states, "...the FSNCO assists the FSO...and

supervises and trains the members of his team....He must be able to perform all the duties of his FSO."

After being notified of a defensive mission, the company/team FSO and commander begin the planning process. This gives the FSNCO time to complete some implied tasks inherent to the defense. EA development is the one mission the FSNCO can accomplish without the FSO present. The FSNCO's coordination with the TF FSNCO is vital to accomplishing the implied tasks.

The company/team FSNCO achieves success with initiative—top-down planning, bottom-up refinement and decentralized execution. His proactive involvement in the process can greatly improve the effectiveness of the operation. Figure 1 on Page 36 lists tasks the company/team FSNCO can accomplish in preparation for a defensive mission.

• *Refine the targets.* This is the first step in bottom-up refinement. Target refinement starts as soon as the FIST receives the initial target list worksheet from the TF fire support element (FSE). Refinement is based on the actual site of the obstacles, the direct fire plan and the refined situational template of the supported company/team's sector. Target refinement is a continuous process through execution.

• *Select observation posts.* The selection of OPs is critical. They must allow the observers to acquire and engage the enemy in the EA. The company/team FSNCO nominates and recommends OPs to his FSO and commander. Although the commander and FSO are responsible for positioning the FISTs, with a little initiative, the FSNCO can make this happen.

There are two approaches to selecting OPs. In the first, the TF directs OP areas, like position areas, during the TF planning process. These OPs are planned to support the targets and EFSTs. They are analyzed using a terra-based computer program to maximize the ranging capabilities of the FISTV and observation of the battlefield. The FISTs then refine the location of the OPs once a detailed reconnaissance of the area is completed. This approach is more centralized and uses more in-depth planning and assets not found at the company/team level.

In the second approach, each FIST is allowed to select its own primary and alternate OPs based on the company/team sector, the enemy's avenues of approach into the sector and the targets. This approach is decentralized and relies heavily on the initiative of the FSNCO/FIST.

The first step in the FSNCO's selecting OPs is a thorough map and terrain analysis. Primary and alternate OPs should be in the company/team sector and allow the FIST to accomplish its EFST's task and purpose—observe the supported sector, adjust and evaluate the effects of fires and support the obstacles in the EA. These OPs need to take advantage of the range of the ground/vehicular laser locator designator (G/VLLD), helping to provide for FISTV survivability. The FSNCO coordinates the OPs with other FIST and maneuver OPs to prevent gaps in observation coverage.

A reconnaissance of the routes to and from these OPs is conducted and rehearsed in daylight, limited visibility and in mission-oriented protective posture level four (MOPP-4). The FSNCO should consider using dismounted OPs with platoon forward observers (FOs), if available, in order to hide the FISTV and (or) cover dead space. A dismounted OP can make maximum use of concealment, given its smaller signature.

The FSNCO also considers terrain when selecting OPs. He never uses a prominent terrain feature for an OP; it's

- Refine each target.
- Select the observation posts (OPs).
- Establish communications with the, task force (TF) fire support element (FSE) and other fire support teams (FISTs).
- Conduct pre-combat checks (PCCs) and (with the company/team FSO) precombat inspections (PCIs).
- Draw a terrain sketch for each OP and conduct target area survey.
- Report the exact location of engagement area (EA) obstacles to the TF FSE.
- Report the exact location of all the vehicles in the company/team to the TF FSE.

Figure 1: Company/Team Fire Support NCO (FSNCO) Tasks for a Defensive Mission

too identifiable by the enemy and easily targeted.

Table 2-2 on Page 2-4 of *FM 6-30 TTP for Observed Fire* outlines the advantages and disadvantages of positioning the FISTV on both forward and reverse slopes. In a reverse slope defense, OP selection is more critical. The observer may be able to identify his target, but he probably won't have enough terrain to properly trigger indirect fires. Therefore a second observer, possibly a scout or dismounted FO, must be in an OP positioned forward. This will provide the eyes required to acquire and trigger timely and accurate indirect fires. As necessary, the FSNCO coordinates with the company/team commander for engineer support.

The bottom line is the observer must be in position to see the commander's decisive point and execute his EFST. Therefore, the company/team commander must commit the assets necessary to get the observer into position.

• *Establish communications*. Initiative, cross-talk and coordination among FISTs are imperative during the preparation and execution of an EA. Without proper coordination, gaps in observation coverage could allow the enemy free passage through the EA.

Cross-talk is most critical between the primary and alternate shooters of a target. These two teams must understand each other's responsibilities, their OPs and their tasks and purposes.

Communications and coordination with the TF FSE also are essential. Communications is the FIST's link to the weapons systems; without it, effective fire support won't happen.

• *Conduct pre-combat checks and inspections*. The company/team FSNCO conducts in-depth pre-combat checks (PCCs) and, with the FSO, pre-combat inspections (PCIs) of all personnel and FISTV equipment. Pre-combat checklists vary from unit to unit; but at a minimum, the FSNCO goes through the appropriate-10 technical manual list of required checks.

• *Draw a terrain sketch for each OP*. The terrain sketch helps the FIST analyze its area of responsibility. The sketch provides a quick reference for accurate target location. In addition to terrain features, the sketch includes the location of all obstacles, company/team target reference points (TRPs), friendly forces within the observed sector, primary and alternate targets, and tactical, execution and limited visibility triggers.

Terrain sketches are refined on a regular basis. They are drawn in as much detail as possible and refined at midday and again before sunset. The difference in lighting shows the subtle differences in the terrain. A properly drawn terrain sketch that's completed early is a valuable tool.

• *Determine the exact location of emplaced obstacles.* With the AN/PSN-11 precision lightweight global positioning system receiver (PLGR), the FIST precisely locates the obstacles in the EA. From a map, the TF plans obstacles that don't necessarily get emplaced exactly where planned. The company/team FSNCO reports the obstacle's location to the TF FSE when the engineer platoon leader begins to layout or site-in the obstacle.

Determining the exact location of obstacles is an essential part of the target refinement process and may identify holes in coverage. All obstacles must be under observation and covered by direct and (or) indirect fires.

• *Determine the exact location of friendly units*. With the PLGR, the FISTs precisely locate all vehicles in their supported company/team. This gives the FSE a basis upon which to plan accurate critical friendly zones (CFZs) to protect friendly units. The FISTs update these locations regularly to ensure effective radar zone coverage.

Task Force FSNCO. FM 6-20-40, Page 1-7, states, "...the Bn/TF FSNCO assists the FSO...and supervises and trains the maneuver FISTs...He must be able to perform all the duties of his FSO."

The TF FSNCO orchestrates fire support during EA development. He establishes the priorities of work and develops a timeline not only for the FSE, but also for the FISTs. His involvement in the process is essential to the effectiveness of the operation. Figure 2 lists the tasks the TF FSNCO accomplishes.

• *Establishes priorities of work and the timeline*. The TF FSNCO establishes and maintains priorities of work on the tracking chart shown in Figure 3. He and the FSE are responsible for coordinating all the tasks listed on the chart and ensuring they are executed. On the chart, he lists the tasks in the priority in which they need to be accomplished and by when.

• *Disseminate the target list*. Early dissemination of the target list is a vital component of EA development. The target list is transmitted to each FIST at the earliest possible time—most likely during the TF planning process. This

- Establish priorities of work and a timeline.
- Disseminate the target list (early).
- Consolidate and update target refinements.
- Coordinate for engineer support.
- Provide each FIST a line-of-sight diagram for its OP (terra-based software).
- Coordinate for mortar registration.
- Update the FISTs on the friendly and enemy situations.
- Establish and coordinate radar zones.
- Emplace triggers.
- Proof the EA.
- Rehearse.

Figure 2: Task Force FSNCO Tasks for a Defensive Mission

Responsibility	Task	Time Task Complete
FSE	Disseminate target list.	
FSO/TF FSNCO/FIST	Complete target refinement. Select OPs.	
TF FSNCO/FIST	Dig-in FISTVs.	
TF FSNCO/FIST	Establish FSCM.	
FSE	Determine line-of-sight for each OP.	
FIST	Complete PCC and PCI.	
FSE/FIST	Conduct voice and digital radio checks.	
FSE	Provide meterological data to mortars.	
Survey Chief	Survey mortar positions.	
TF FSNCO/FIST	Register mortars.	
FIST	Verify obstacles.	
TF FSNCO/TO	Plan CFZs. Emplace triggers. Illuminate triggers.	
FSE	Send SITREPs.	
FSO/TF FSNCO	Conduct rehearsal.	

Legend:

CFZs = Critical Friendly Zones
FIST = Fire Support Team
FISTVs = FIST Vehicles
FSCM = Fire Support Coordinating Measures
FSE = Fire Support Element
TF FSNCO = Task Force Fire Support NCO
FSO = Fire Support Officer
OP = Observation Post
PCC = Pre-Combat Checks
PCI = Pre-Combat Inspections
SITREPs = Situation Reports
TO = Targeting Officer

Figure 3: Example Priorities of Work Tracking Chart

helps the FIST begin EA development and OP selection.

• *Complete target refinement*. As EA development proceeds, the TF FSNCO consolidates all the FIST changes to refine the targets and transmits the updated list to the brigade FSE.

• *Coordinate for engineer support*. The TF FSNCO coordinates the use of engineer assets for digging in FISTVs. Because of the proximity of the FSE to the engineer in the TF tactical operations center (TOC), the TF FSNCO can establish a good working relationship with the engineer and easily coordinate for his FISTs' digging assets.

FM 5-103 Survivability outlines the time it takes to dig-in a FISTV—one hour for a turret defilade in soft soil and one hour and 45 minutes in hard or rocky soil (see Figure 4). For survivability purposes, it's advisable FISTVs be dug in at least to turret depth.

• *Provide each FIST a line-of-sight diagram*. An observer plan is constructed in concert with the S2 and S3's using a terra-based computer program to assist in OP position selection. The TF FSNCO provides line-of-sight diagrams for each OP based on the terra-based program, which shows the actual terrain upon which the FISTs will operate. The FSE in the TOC has access to these types of tools.

• *Coordinate for mortar registration*. Registering TF mortars in the defense is essential to the success of fire support for an EA. To facilitate mortar registration, the TF FSNCO coordinates with the direct support (DS) Field Artillery battalion survey team for survey for the mortar platoon positions. The TF FSNCO ensures a computer meteorological report is sent to the mortar platoon every four hours.

Type of Position	Soft Soil (Hours)	Hard/Rocky Soil (Hours)
Hull	**0.6**	**0.81**
Turret	**1.0**	**1.45**
3 Tier	**1.6**	**2.5**

Figure 4: FISTV Survivability. This charts give the times required to dig-in a FISTV based on an armored combat earthmover (ACE)-bulldozer mix (see *FM 5-103 Survivability,* Page C-63). The FISTV should be dug-in at least to the turret.

Because mortars are the TF's most responsive indirect fire asset, the FSNCO places their registration high on the priorities of work list. Also, battlespace in the EA is deconflicted with the mortars with the event listed on the TF defensive preparation timeline.

• *Update FISTs on friendly and enemy situations*. A set time interval for the TF FSNCO to provide the FISTs updates is invaluable for EA development.

• *Establish and coordinate radar zone planning*. The TF FSNCO insists the FISTs frequently send accurate location reports for their supported company/teams. Battle positions (BPs) are updated on the situation map—the same map upon which the CFZs graphics are drawn.

• *Emplace triggers and proof the EA*. All triggers must be deconflicted with maneuver TRPs. There are two types of triggers: tactical and execution. The FSNCO calculates the distances these triggers are from the target based on limited and non-limited visibility. Fire support personnel mark triggers using physical trigger kits when time permits and with laser triggers for hasty purposes. The emphasis is on precision time-distance factors in accordance with the procedures for engaging moving targets published in Section IV, Page 5-23 of FM 6-30.

The tactical trigger allows the guns time to shift on to the intended planned target. The formula used to calculate the distance of the tactical trigger from the target is (shift time of the guns in minutes) x (enemy rate-of-march in meters per minute) = distance from the target to call for at-my-command and do-not-load. For example, if it took the guns 8 minutes to shift and the enemy was moving at a rate of 20 kilometers per hour (333 meters per minute), the formula would read: 8 min x 333 meters per min = 2664 meters from the target.

The execution trigger tells the observer to fire the target. The formula used to calculate the distance this trigger is from the target is (time-of-flight of the round expressed in minutes + transmission time expressed in minutes) x (enemy rate-of-march in meters per minute) = distance from the target to call for execution. For example, if the time-of-flight of the round is 32 seconds and the transmission time is 10 seconds (32 + 10 = 42 seconds, which is .7 minutes) and the enemy is moving at 20 kilometers per hour (333 meters per

minute) then the formula would read: .7 min x 333 meters per min = 233 meters from the target.

There are three means to emplace triggers. In the first, the TF FSNCO uses either the FSO's M998 or air liaison officer's (ALO's) M113 to emplace triggers. While driving around the EA, he maintains communications with the FISTs in their OPs with their targeting heads up and operational to perform target area survey. This ensures the FISTs see him and can identify any dead space not previously noticed. The TF FSNCO then goes to each target and announces it to the responsible FIST. Then he establishes the tactical, execution and limited visibility triggers for that target. This process must be completed for each target, time permitting.

In the second option, the TF FSNCO instructs the FIST with the least important task and purpose to emplace the triggers. The emplacing team leaves a dismounted element on its OP with the G/VLLD and a radio to perform target area survey for that OP. The emplacement procedure is the same as in the first option.

Finally, each FIST emplaces its own triggers. The company/team FSNCO uses another vehicle (such as the commander's M998) and establishes the triggers while the remainder of the team performs the target area survey. This is the least preferred option because it doesn't facilitate redundant eyes on each target by other FISTs.

In a reverse slope defense, trigger emplacement becomes more difficult. The observer may not be able to identify the tactical triggers associated with his target. Therefore a second observer, possibly a scout or dismounted FO, must be positioned in an OP forward to provide the eyes to trigger timely, accurate indirect fires.

There are three techniques for marking triggers: day, limited visibility and laser. These are based on the different rates-of-march the enemy uses during these periods. If time permits, all three trigger types should be emplaced for each target.

Day triggers are physical triggers that are placed on the ground that can be observed during daylight—such as VS-17 panels or 4x4 painted plywood panels. These triggers may be difficult to see during the fight because of battlefield obscurants.

A limited visibility trigger is a trigger that emits a thermal signature and can be observed through a thermal or infrared sight—a five-gallon can with a mixture of fuel and dirt, a bag of charcoal or reverse polarity paper or tape. It is a thermal or reverse polarity trigger used during limited visibility and at night and is only good for as long as it produces a thermal signature. A thermal trigger is best to use even in daylight because it can be seen through battlefield obscurants. The distances for emplacing limited visibility triggers differs slightly from day triggers because the enemy moves slower in periods of limited visibility in the day and at night.

The laser trigger is a lased point on the ground where a physically emplaced trigger would be. These also are known as "hasty triggers." They consist of an azimuth, distance, vertical angle and grid. This information is recorded in the targeting station when day and limited visibility triggers are used. If a laser triggers is used as the primary means of triggering fires, it must be sited at tactical and execution distances for both day and limited visibility rates-of-march.

Lighting thermal triggers before sunset is critical and should occur before the obstacles are closed. This event is placed on the TF timeline and disseminated to all company/teams. The TF FSNCO coordinates for security, such as a combat vehicle escort or the use of a combat vehicle to perform this task, as necessary.

There are three basic means of lighting triggers. In the first, the TF FSNCO goes forward in an M998 or ALOM113 and lights the triggers while maintaining communications with the FISTs to verify they can observe the thermal trigger. This is the preferred option because the teams are in position and it precludes any FISTV maintenance problems. The next option is the FIST performing the screen mission (if a screen mission was planned) lights the triggers on the way back to the OP. The third is to coordinate with maneuver elements lighting TRPs to light the fire support triggers at the same time. Regardless of the means employed, the trigger must be lit. An unlit trigger isn't a trigger.

While the TF FSNCO emplaces triggers, he proofs the EA. He confirms that the primary and alternate shooters can observe their targets and triggers. If not, he changes responsibility for that target and triggers to an observer who can accomplish the task and purpose. Target responsibilities are established in initial planning and refined during EA proofing.

Proofing the EA is essential in the target refinement process. During proofing, the locations of all obstacles are verified with a PLGR and target refinement is completed based on the obstacles' locations.

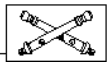
- *Rehearse*. If time permits, the best rehearsal is a mounted rehearsal with all FISTs in their OPs. The next best choice is an FM voice rehearsal.

The key fire supporter in a company/team defensive rehearsal is the FSO. He must understand his task and purpose and exactly how the fire support system will integrate with the scheme of maneuver in the EA. The fire support rehearsal includes the scheme of fires, priorities-of-fire (POF), fire support coordinating measures (FSCM), clearance of fires procedures, the task and purpose for each primary and alternate observer and his target, the role of mortars plus jump plans.

The scheme of fires provides a logical sequence to follow. It orients observers on each trigger and target. The rehearsal validates the targets and ensures they are integrated with the obstacles. The rehearsal also confirms FIST "ownership" of each target.

Conclusion. Fire support EA development tasks aren't taught in our NCO education system. These skills mirror our maneuver brethren's and must be acquired.

Initiative, communications and early coordination are the keys to success in fire support for an EA. As FSNCOs, we must be proficient in EA development tasks—be proactive in improving the lethality of indirect fires in the defense.



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On the Gun Line

Firing First-Round FFE

by Major David G. Johnson and Captain Christopher J. Bonheim

1-129 FA, AT 98, Fort McCoy, WI

"Bandit 6, this is Alamo 6. Your battery's FFE [fire for effect] for that last mission did not achieve effects. The rounds impacted 300 meters from the target. Why was your battery unable to mass on target? *Over."*

Battery commanders never want to hear a radio transmission such as this one. And they don't have to.

FM 6-40 Tactics, Techniques and Procedures (TTP) for Manual Cannon Gunnery discusses the five requirements for accurate, predicted fire—for achieving first-round FFE: 1. accurate target location and size, 2. accurate gun location, 3. accurate weapon and ammunition information, 4. accurate meteorological information and 5. accurate computational procedures. When fires don't result in a first-round FFE, we tend to point a finger at the fire direction center (FDC) for failing to meet the five requirements (all but the first, which is the forward observer's responsibility). In fact, the firing platoon's calculation accuracy and procedural attention to detail also can make the difference between a first-round FFE and a waste of ammunition.

This article provides information for the howitzer section chief, gunnery sergeant and platoon sergeant to help them achieve accurate, predicted and massed fires. The guns must provide the FDC accurate information for a first-round FFE; they then must fire the correct projectile, powder and fuze using correct procedures.

Units are more prone to make mistakes in some parts of the firing procedures. This article lists those and organizes them by the five requirements for accurate, predicted fire—likely problems from the 13B perspective.

1. Accurate Target Location and Size. This requirement is the responsibility of the forward observer. Common survey at the firing point links the gun position with the target location. But the gun line can't influence the accuracy of the target location and size.

2. Accurate Gun Location. Errors in location are generally caused by incorrect or sloppy advance party and occupation procedures. The following errors will affect the gun position reported to the FDC.

• *Implementing incorrect procedures before, during and after advance party operations*.

– Not establishing common survey—orienting station (OS) grid and altitude, azimuth (AZ) of orienting line (OL), distance to the end of orienting line (EOL) and description of the EOL.

– Determining the incorrect OS grid and altitude via the position and azimuth determining system (PADS), precision lightweight global positioning system receiver (PLGR), map spot or hasty traverse.

– Not declinating the aiming circles and M2 compasses before reconnaissance, selection and occupation of position (RSOP).

– Failing to clear the aiming circle away from all magnetic attractions.

– Failing to tighten the instrument-fixing screw securely on the aiming circle, which causes errors in the readings given to the howitzer.

– Failing to use a plumb bob while leveling the aiming circle.

– Failing to first roughly orient the 0-3200 line when measuring an AZ or an orienting angle (OA).

– Failing to verify survey—the AZ to the EOL within plus or minus 10 mils.

– Reporting the incorrect cant compensation for each howitzer location (no more than 90 mils).

– Giving an incorrect initial deflection to the gun guide at the pantel stake.

– Measuring the distance from the aiming circle to the gun position incorrectly.

– Using an improper base length to perform subtense for distance measuring (for example, using the M16 when the distance is greater than the values in the appropriate table).

– Measuring and computing the vertical angle (VA) incorrectly.

– Reporting the incorrect piece-to-crest to the FDC.

– Reporting the incorrect deflections to the FDC.

– Reporting the incorrect executive officer's minimum quadrant elevation (QE) to the FDC.

• *Failing to lay the battery or platoon completely or correctly*. The laying memory aid TLABSPAP stands for trails, lay, aiming point identified, boresight (verified), safe (verification of lay), prefire checks performed, ammunition prepared and position improvement.

– Reading the red numbers on the aiming circle rather than the black numbers on the azimuth scale.

– Moving the lower motion on the aiming circle when the procedure requires moving the upper motion.

– Boresighting incorrectly.

– Determining the incorrect sight picture between the panoramic telescope crosshairs and the aiming circle.

– Failing to level the bubbles on the panoramic telescope mount and elevation quadrant.

– Moving the panoramic telescope inconsistently.

– Setting incorrect data on the panoramic telescope.

– Failing to zero-out the gunner's aid counter when corrections are not needed.

– Failing to set 3200 on the reset counter after sighting in the primary aiming reference point (i.e., the collimator).

– Failing to obtain a proper sight picture on an aiming reference point (i.e., the collimator).

– Failing to center the pitch level and the cross-level on the panoramic telescope mount after the howitzer is traversed or the cannon tube is elevated or depressed.

– Using incorrect settings on the elevation quadrant.

– Moving the traversing hand wheel inconsistently and failing to compensate for backlash.

• *Placing the MlAl Collimator Incorrectly.* (Placing the collimator between 2400 and 2800 mils will minimize displacement with the panoramic telescope. The required distance is between four and 15 meters. Optimum distance from the gun must be within five to 12 meters. The collimator should not be placed higher or lower than four meters above or below the panoramic telescope.)

• *Failing to center the cross-level vial on the M1A1 collimator*.

• *Placing the M1A2 aiming posts incorrectly*.

• *Selecting a distant aiming point (DAP) incorrectly*. (It must be a minimum of 1500 meters, stationary.)

• *Selecting an unstable firing platform (spades and brakes)*.

3. Accurate Weapon and Ammunition Information. The following examples of poor ammunition management and weapon and equipment maintenance affect the unit's ability to mass fires.

• *Setting incorrect charges*.

• *Firing with inconsistent powder temperature*. (Errors in powder temperature usually cause range errors.)

– Failing to calibrate the thermometer.

– Failing to ensure the powder canister selected gives the most accurate temperature for the entire powder lot.

• *Handling ammunition improperly and storing it incorrectly.*

– Failing to establish a standing operating procedure (SOP) for ammunition storage and handling.

– Storing projectiles and propellant on the ground instead of on the required six-inch (minimum) dunnage.

– Storing projectiles and propellants in direct sunlight or rain.

– Removing the grommet protecting the rotating band before the round is placed in the bustle rack.

– Failing to clean dirty projectiles before loading.

– Dropping projectiles or pallets of projectiles.

– Failing to inspect powder for dampness before loading.

• *Reporting an inconsistent projectile weight to the FDC.* (This will cause range errors.)

• *Reporting the incorrect shell model and lot and powder model and lot.* (This also will cause errors in range.)

• *Placing the propellantinconsistently or improperly in the chamber*.

• *Ramming the round inconsistently*.

• *Using the wrong fuze or setting it incorrectly*.

Disciplined crew drill is a necessity. The section chief must know the standard, train to the standard and adhere to the standard.

• Failing *to use a fuze wrench when tightening fuzes*.

• *Firing a dirty or oily tube or one with cracks*.

• *Firing with a loose muzzle brake*.

• *Firing with an inconsistent recoil*.

• *Failing to inspect for stripped land and grooves between rounds.*

• *Firing with worn trunions or unleveled trunions*. (This causes the fire control equipment not to be parallel with the gun tube.)

• *Firing with inconsistent chamber conditions (moisture and heat) or breech conditions (spindle, obturator pad and split rings).*

• *Conducting incomplete or improper fire control alignment tests (FCAT)*. (These must be conducted in accordance with the technical manual.)

– Conducting the micrometer and end-for-end tests on the M1A1 gunner's quadrant incorrectly.

– Failing to perform comparison tests with the alignment devices to verify their accuracy (i.e., M139 or M140).

• *Firing with loose sight mounts and tube droop.*

• *Calibration—failing to measure the muzzle velocity with the M90 velocimeter each time the powder lot changes*. (Poor calibration procedures cause a battery or platoon to mass fires inconsistently.)

4. Accurate Meteorological Information. The section chief and above on the gun line have nothing to do with ensuring the meteorological information the FDC receives and computes accurately reflects the actual weather conditions. But the weather (air *temperature*, air density, wind direction and wind speed) significantly affects the projectile in flight. The FDC requests the met; but too often, the gun line experiences significant changes in weather and fails to ensure the FDC has requested a new met.

5. Accurate Computational Procedures. The computation of firing data in the FDC must be accurate, and FDC accuracy starts at the gunnery sergeant and howitzer section chief level. The following examples depict the types of computational errors that can occur on the gun line.

• *Determining incorrect data during advance party operations:*

– Computing the declination constant incorrectly for the M2A2 aiming circle.

– Calculating mathematical errors in the subtense.

– Adding negative and positive numbers incorrectly to determine the VA.

– Calculating the executive officer's minimum QE incorrectly.

• *Computing errors during laying operations*.

– Computing mathematical errors while laying by the OA, grid azimuth, aiming point-deflection or reciprocal lay methods.

– Calculating mathematical errors while laying with the M2 compass.

• *Computing errors in measuring the accuracy of the lay for a specific piece or the platoon or battery*.

– Calculating errors in the backward azimuth rule.

– Measuring the azimuth of the line of fire without survey control.

– Measuring the OA with survey control.

Although the crew drill doesn't fall cleanly within one of the requirements for accurate, predicted fires, without a doubt it is key to the firing unit's ability to provide accurate, predicted fires. In this case, "crew drill" goes beyond the scope of firing to include actions during the preparation to fire. Disciplined crew drill is a necessity. The section chief must know the standard, train to the standard and adhere to the standard.

"Alamo 6, this is Bandit 6. We have reviewed our data and procedures, both in the FDC and on the gun line, and as a result, we developed a massing checklist for our howitzer section chiefs, gunnery sergeants and platoon sergeants to follow. Over.

"Bandit 6, this is Alamo 6. Good to hear the problem is solved; get your guns *hot*. Over.

"Alamo 6, this is Bandit 6. Roger, *getting hot*. Out."

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Platoon Autonomy in Multinational Operations

by Captain Jonathan E. Howerton

Howitzer Battery, 3d Squadron, 2d Armored Cavalry Regiment was the primary American contingent with the Nordic-Polish Brigade of Task Force Eagle, the Multinational Division (North) in Bosnia-Herzegovina. How Battery was in direct support (DS) of this multinational brigade for Operation Joint Guard from October 1997 until July 1998.

The Nordic-Polish Brigade occupies the largest area of responsibility within the task force: 4,400 square kilometers. In addition to the small contingent of American troops, the brigade consists of elements from Denmark, Sweden, Finland, Norway, Poland, Lithuania, Slovenia and Latvia.

DS fires for a brigade normally are provided by an FA battalion. For our How Battery to provide the same coverage, we had to task organize into four firing elements, bringing autonomous operations to a new level—the platoon. Although this is nothing new to our Paladin brethren, for an M198 battery with eight howitzers, this is a new concept.

Organization and Command, Control and Communications. To prepare for our unique mission, we took our table of organization and equipment (TOE) tailored to conduct battery autonomous operations and modified it further to conduct platoon autonomous operations. (See Figure 1.) With a strength of 159 soldiers, the battery executed four manned and operational fire direction centers (FDCs) and four separate firing elements of two howitzers each. Basically, the platoon leaders fought mini-batteries and the battery commander fought a mini-battalion.

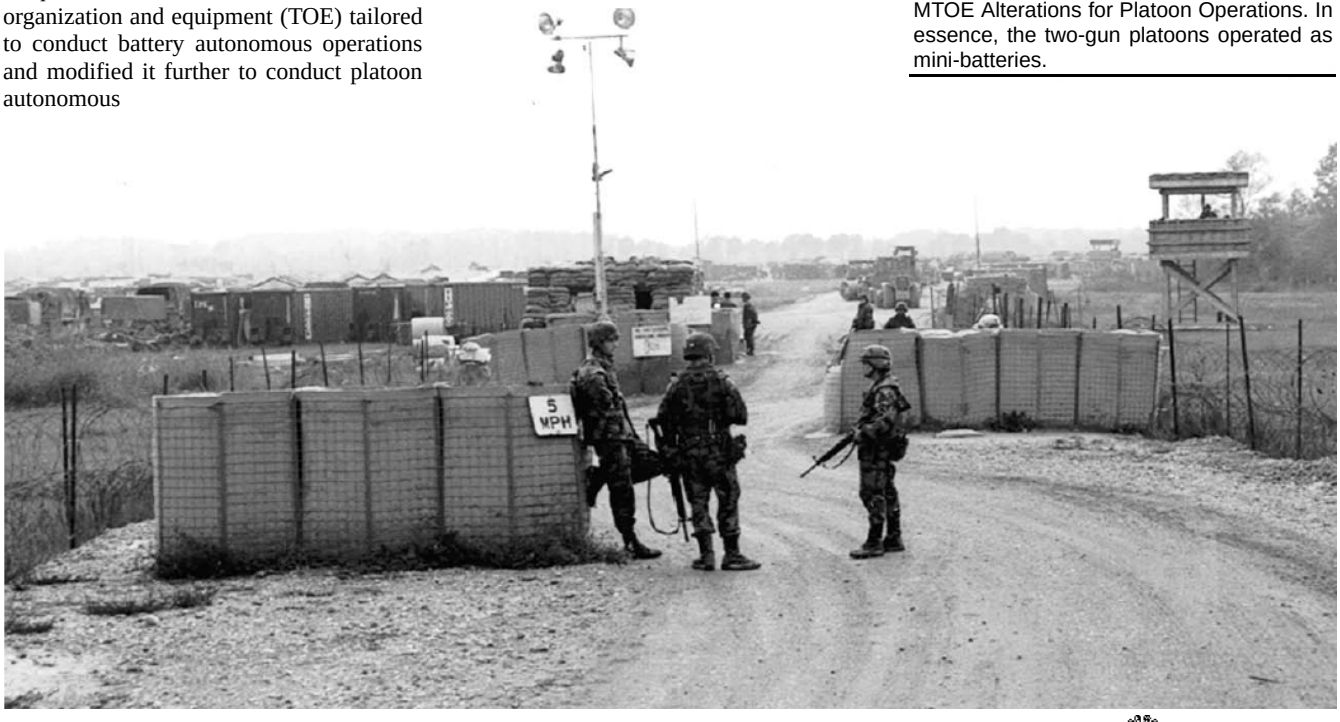
From a battery operations standpoint, working with the Nordic-Polish Brigade was really no different than working with an American maneuver brigade. This is because the Nordic-Polish Brigade used an American fire support element (FSE) at the battalion and brigade levels and American fire support teams (FISTs) for the maneuver companies as the liaison between the battery and the maneuver unit. It was transparent to the battery that it was to provide DS support to units from eight countries.

One of the battery's most unique challenges was our command relationship. The typical maneuver squadron task organization has the battery in a DS role to the squadron. The squadron provides the battery operational, logistical and administrative support.

But in the Nordic-Polish Brigade, the battery was supported predominantly by the Force FA Headquarters, which was the 1st Armored Division Artillery. However, the battery was still tied to the squadron for basic administrative and logistic purposes. Operationally, it was tied to the Nordic-Polish Brigade in a DS role and the Force FA Headquarters in a general support (GS) role and, logistically, to all three headquarters.

- Four Fire Direction Centers (FDCs) with Personnel and Equipment
- Four Firing Elements of Two Guns Each
- Organic Assets:
  - Survey Section
  - Four Ammunition Sections
  - Fueler
  - Wrecker
- Attached Assets:
  - Meteorological Section
  - Q-36 Firefinder Radar
  - Battalion Aid Station

Figure 1: Recommended 3x8 M198 Battery MTOE Alterations for Platoon Operations. In essence, the two-gun platoons operated as mini-batteries.



The battery occupied two base camps separated by 40 kilometers. In addition, the battery headquarters was 30 kilometers from the Nordic-Polish Brigade Headquarters, 125 kilometers from the squadron headquarters at Camp McGovern, 60 kilometers from the division artillery headquarters at Eagle Base and 40 kilometers from the regimental support squadron (RSS) at Guardian Base.

Our communications architecture supported the mission, but not without difficulties. We had retransmission sites for voice and digital communications, but because of terrain, we had to relay both through the Nordic-Polish Brigade FSE. Although the relays were effective, they were cumbersome and often slow. The battery also had mobile subscriber radio-telephones (MSRTs) and tactical satellite (TACSAT) as other forms of secure communications. AT&T phones were available.

The battery was organized into a light/heavy platoon configuration. The light platoon (1st Platoon) was collocated with the Danish Army at Camp Valhalla, and the heavy platoon (2d Platoon and Headquarters Platoon) was with the Swedish Army at Camp Caisson. Camp Caisson was selected as the battery headquarters because it's along the main supply route (MSR) between Camp Valhalla and Guardian Base. It also is closer to Eagle Base and Camp McGovern.

Although the "official" language of the brigade was English, it was important to understand that not everyone spoke English at the same level of proficiency. Daily intelligence briefings, fragmentary orders (FRAGOs) and operation orders (OPORDs) from the brigade headquarters were not always clear and precise. The familiar five-paragraph OPORD format was used, which helped, but there were times when clarification was necessary. It was crucial to remember that communications frustrations went both ways and that everyone labored under the burden of the communications barrier.

We learned to ask about anything questionable. Although written orders and reports were, at times, worded a little unusually, the actual call-for-fire format was the same. Although we never had to fire a mission, there would have been very little misunderstanding of when/how to do it if we had.

Tactics and Operations. The battery's primary mission in the Nordic-Polish Brigade area of responsibility (AOR) was to provide artillery support during weapons storage site inspections. This was accomplished either by laying on a priority target from the base camp or conducting an artillery raid. In addition, the battery also conducted presence missions in the AOR. Any movement in the brigade's AOR required a minimum of four-vehicle convoys.

The PA selection phase was difficult in the Balkan region because of the mine/unexploded ordnance danger.

The Raid. The purpose of the two-gun raid was to provide fires in support of a unit conducting a weapons storage site inspection. The platoon conducting the raid would, if needed, fire on the weapons storage site, based on our graduated response/clearance procedures.

The initial raid process began with a map reconnaissance for the prospective position areas (PAs). The PA selection phase was difficult in the Balkan region because of the mine/unexploded ordnance danger. Indicators of a mine-cleared area include freshly mown grass, frequently traveled areas and graveled/paved areas. Two additional safety resources were the Balkan mine map and the Nordic-Polish Brigade engineer computer database, both of which indicated known minefields and areas with unexploded ordnance.

The next step was a more detailed reconnaissance of the proposed PA by a reconnaissance team composed of the battery commander, the two platoon leaders, the two gunnery sergeants and the battery survey section. Once the site was determined to be cleared, the reconnaissance party arrived at the PA and decided whether or not it was tenable. Factors considered when selecting the PA were site-to-crest, distance from MSRs (force protection) and solidity of the ground.

The vast majority of the ground in the Nordic-Polish Brigade area is farmland. With the M198 howitzer weighing 16,000 pounds, most of that land can't support a howitzer during the winter season. Therefore, harder, more durable PAs had to be located when we arrived in Bosnia. The best alternatives were parking lots adjacent to the grassy fields or areas near coal processing plants that collect dust on the ground.

Once the PA was selected, survey control was conducted by the battery survey section and verified by the gunnery sergeants. All survey data and a sketch of the PA was sent to the Force FA Artillery Headquarters.

The battery received the next week's raid and priority target worksheet from the Nordic-Polish Brigade FSE on Fridays and was briefed Saturdays at the battery training meeting. Twenty-four hours before departing for the raid, the platoon leader determined the azimuth of fire from data provided by the Nordic-Polish Brigade FSE and the Force FA Headquarters. This was data on the location of the target, the target number, observer, weapons storage site number and the in-place ready-to-fire time.

Twelve hours before the raid, the section chiefs were briefed and a rehearsal using the PA sketch was conducted to identify any problems. Two hours before the raid, pre-combat checks and inspections were conducted. Thirty minutes prior to start time, the Force FA Headquarters issued a convoy number to the platoon.

Once the platoon had its convoy number, the convoy commander gave the convoy/safety briefing (see Figure 2). Because we didn't have a squadron-level

- Intelligence Update
- Convoy Number
- Convoy Frequency (Single Channel, Secure)
- Route of March (Route Names and Checkpoints)
- Order of March
- Actions at the Halt
- Breakdown Procedures
- Region-Specific Safety Concerns (Road Conditions, Civilian Traffic Concerns, etc.)
- Force Protection Level
- Risk Assessment and Control Measures

Figure 2: Raid Convoy and Safety Briefing

Day One: Hot Gun and Sergeant's Time. The Hot Gun section lays on the targets assigned by the Nordic-Polish Brigade fire support element (FSE) to support patrols and weapon storage site inspections within the range of the section's Copperhead. When the fire direction center (FDC) receives a mission, it passes the laying data on to the section via radio, which passes the data on to the gun. The laying standard is three minutes under normal conditions and four minutes for adverse conditions with an additional four minutes added for out-of-traverse missions. The secondary mission of the Hot Gun section is to conduct Sergeant's Time training.

Day Two: Training and Maintenance. In the first half of the day, soldiers pull maintenance on their personal and section equipment. The second half is section-level training. The secondary mission is to support the battery's raid or presence mission.

Day Three: Force Protection. All the battery base camp guards for 24 hours come from the same section with the chief of section acting as commander of relief and the gunner as the sergeant of the guard.

Day Four: Reconstitution. This is a "day off" with the secondary mission of supporting a raid or presence mission.

Figure 3: Battery's Four-Day-Mission Cycle. Each section rotated through the four-day cycle during weekdays. On the weekend, only the Hot Gun and Force Protection tasks were performed by two sections on Saturday and two on Sunday.

headquarters for immediate command and control, the Force FA Headquarters controlled and tracked our convoys.

The raid party consisted of the platoon leader, gunnery sergeant, two howitzer sections, half of the fire direction center (FDC) personnel with the lightweight computer unit (LCU), the platoon ammunition section, survey and the attached meteorological section. The ammunition section provided additional ammunition for all contingencies as well as Class IV materials for force protection.

Each howitzer section's advanced party man rode with the gunnery sergeant. Once the convoy was within three kilometers of the PA, the convoy split. The gunnery sergeant's vehicle with the FDC and Class IV/V vehicle moved ahead of the convoy to establish the position while the platoon leader and the two howitzer sections slowed down to give the advance party additional time.

When the howitzers arrived in the PA, the guides positioned the two guns and the gunnery sergeant laid them. The platoon leader then safed the firing elements.

The raid party arrived at the PA 30 to 45 minutes before the in-place ready-to-fire time established by the Nordic-Polish Brigade or Force FA Headquarters. This allowed the raid party to complete several tasks—verify survey control, fly a met, emplace observation posts, surround the PA with concertina wire and compute the initial firing data. Once it was ready to fire, the raid party remained in position and laid on the target until the weapons storage site inspection was complete (time varied with each inspection). This gave the platoon leader the opportunity to assess the training of his gun sections and FDC in a field environment.

Presence Mission. This mission was similar to the two-gun raid in composition with the platoon sent into the AOR as a show-of-force. The planning procedures for the presence mission were essentially the same as those for the raid with the exception of not having an actual target to lay on and, therefore, no requirement for an in-place ready-to-fire time.

The presence mission doubled as a training mission, allowing the platoon leader to meet his training objectives to prepare for the battery's training objectives. It was an opportunity to provide sections not involved with base camp force protection or Hot Gun tasks to train outside of the restrictive confines of the base camp. (See Figure 3.)

FDC Operations. A single howitzer battery supporting a brigade presented some unique situations for a platoon FDC. Because our platoons operated in a split configuration (two-gun raids), the FDC also split. The luxury of sending an entire FDC forward was not possible when a firing capability had to be maintained at the base camp.

We had two support missions, primarily for weapons storage site inspections: priority targets and two-gun raids. When raids were sent out, we sent the fire direction NCO (FDNCO) or the chief computer, a horizontal control operator and a vertical control operator in the fire direction shelter (M1037) with the LCU as the primary capability and the chart as the back up. The small number of personnel forward still had to meet mission processing time standards.

The rear element remaining at the base camp had to rely on other means of computing data. Because the platoon FDC had only one computer, the rear element relied on the backup computer system (BUCS) or chart-to-chart checks.

We had to study technical considerations a bit more carefully than usual. (See Figure 4.) The only live firing range in Bosnia is Glamoc, which was more than 200 kilometers from our two camps. Calibration had to be done, and done correctly, when the opportunity presented itself.

Logistics and Maintenance. The arrival of the battery headquarters at Camp

1. **Accurate Target Location.** The fire support team (FIST) and firing element must have common survey and common call-for-fire procedures.

2. **Accurate Battery Location.** All firing points must have proper fourth order survey data. The battery must have enough aiming circles to conduct split-platoon operations, if necessary.

3. **Accurate Ammunition Information.** Calibration must be done at a suitable time and to standard.

4. **Accurate Meteorological.** The battery's attached meteorological section can support two, two-gun raids only if the raids (platoons) are within 25 kilometers of each other. The battery must be alert to unusual effects changes when transitioning from the valley to the mountains or vice versa.

5. **Accurate Computations.** For split-platoon operations, the battery sends the lightweight computer unit (LCU) forward with the raid and uses octant graphic firing table (GFT) settings and terrain-gun position corrections (TGPC) at the base camp. Position constants don't transition well for nonstandard missions unless fourth order survey is completed. If the firing element is unable to conduct registration, it must compensate with accurate survey.

Figure 4: Five Requirements for Accurate, Predicted Fire- Lessons Learned

Caisson set into action a series of tasks it had to accomplish. When the 1st Infantry Division's FA battalion left as the Force FA Headquarters, its critical logistical infrastructure left with it: service battery. Our biggest challenge in the logistical arena was to operate without a service battery. Because of the distance to our parent headquarters, we were given authority to receive all logistical support through the RSS at Guardian Base.

We had to be aware of battery limitations. The MTOE for a 155-mm howitzer battery is not designed for the continuous split-platoon operations we had to accomplish. We had to consider platoon operations demands on Class VII items, such as aiming circles, LCUs, power supplies and other property book items over and above what the battery had.

The battery's commodity areas began establishing supply accounts with the RSS and coordinating the delivery of all classes of supplies, mail, direct support maintenance and the delivery of equipment shipped by container. Without the transportation assets of service battery, our first order of business was to find the transportation unit assigned to provide logistics packages (LOGPACs) to Camps Caisson and Valhalla. Once scheduled, the LOGPAC ran three days a week to both our camps and provided our Class I, II, III, VII, IX and mail.

The LOGPAC brought the classes of supplies easily, but mail was a challenge. We had to submit a series of memorandums through commands to get our mail delivered to the RSS mailroom and then get soldiers certified as mail-handlers. The mail came via LOGPAC three days a week—the other days we had to pick it up at Camp Eagle.

Because of our size, RSS didn't provide a forward area support team (FAST) for services or DS repairs. The first thought was to send the equipment through the FAST at Camp McGovern, but distance made that impractical. After coordinating with the RSS, a DS support contact team was sent from Guardian Base on an as-needed basis.

We had to be aware of battery limitations. The MTOE for a 155-mm howitzer battery is not designed for the continuous split-platoon operations we had to accomplish.

One of the limitations of an M198 battery is its hauling capabilities. Even with a battery ammunition section, the battery only can haul one-third of its unit basic load (UBL); each prime mover only carries 25 complete rounds. To increase the ammunition count forward on raids, we used one of the ammunition section's trucks to carry an additional 34 complete rounds. The truck's ammunition trailer carried the Class IV items required to secure the raid PA. This Class IV/V truck accompanied all raid and presence missions. The remainder of the UBL was stored in tactical download sites at each howitzer. These sites alleviated the necessity of base camp ammunition supply points.

Units preparing for deployment to an isolated area should consider several issues—not the least of which are logistical issues (see Figure 5).

- Who will provide the logistical support for the unit?
- How often will this support be needed?
- What items will be required in the unit's logistics package (LOGPAC)?
- How will rations be delivered?
- What are the requirements for cooks? (Some base camps might not have contract cooks; recommend three to four cooks per battery base camp to allow for leave and contingencies.)
- Who will provide direct support (DS) maintenance?
- Will the unit work directly with the DS maintenance elements or will a forward area support team (FAST) be provided?
- What is the maintenance work order process?
- Is the unit's support element qualified to pick-up and deliver mail?
- What are the qualification procedures for mail handlers?
- Are there authorized ammunition storage areas available to store the remaining part of the unit's basic load (UBL)?
- How will routine communications operate? Who will establish voice and digital retransmissions?

Figure 5: Logistical Considerations for Units Deploying to Isolated Areas

Operating in the Nordic-Polish Brigade was not only operationally challenging, but also environmentally challenging. Sharing base camps with two very proud Scandinavian armies, the battery existed in an environment unlike any other company level unit in the task force. Although Camps Caisson and Valhalla did not have all the amenities of a large American base camp (Sprint morale phones, email services, an on-base chaplain, contract food services) it did offer unique benefits. Our soldiers shared cultural, sports and professional experiences with our allied partners.

Serving DS to a multinational brigade and executing platoon operations for nonstandard missions was a challenge for our How Battery. But one can only see more of such unique challenges for America's artillery in the future.

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