# Field Artillery

A Professional Bulletin for Redlegs

April 1995

# Fire Support for Power Projection

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**Front Cover:** The insert on the front was taken from "'Steel Rain': The Army National Guard in Desert Storm, Saudi Arabia, February 1991," a National Guard Heritage Painting by Frank M. Thomas. The 1st Battalion, 158th Field Artillery, Multiple-Launch Rocket System (MLRS), Oklahoma National Guard, is shown here firing salvos of rockets into Iraq. The unit's Redlegs were part of the more than 39,000 National Guard soldiers deployed to Southwest Asia.



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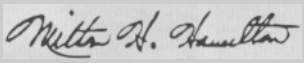

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# Future Fires for Force Projection

We're developing a concrete capability to demonstrate how future Field Artillery systems can enhance force projection operations. Working with the Rapid Force Projection Initiative (RFPI), we'll show that an information-dominant force armed with advanced fire support can provide overwhelming combat power from the opening moments of military operations.

The RFPI is sponsored jointly by the Missile Command (MICOM), Redstone Arsenal, Alabama, and the Dismounted Battle Space Battle Lab, Fort Benning, Georgia. It's a multi-year advanced concept technology demonstration (ACTD) to determine how to generate overwhelming combat power for force projection operations.

Today, limited air and sea assets keep the pieces of the deployment puzzle from falling easily into place. As we move toward the 21st century, we'll still be somewhat constrained by strategic mobility, but a versatile, lethal and deployable Field Artillery will help the warfighter project powerful combat forces rapidly.

## Lethal Firepower Early

RFPI is looking for the technologies that support deploying the maximum combat capability in the minimum number of air sorties, focusing on early entry operations. These operations require deploying initial combat elements to establish presence and prepare the way for follow-on forces.

The RFPI scenario calls for employing a brigade-sized light force from the XVIII Airborne Corps, Fort Bragg, North Carolina. This force will fight with an array of future stand-off attack systems to paralyze the enemy before he can close on the early entry force. The RFPI ACTD will culminate in 1998 with a demonstration of system capabilities. After the demonstration, the systems will remain with the XVIII Airborne Corps.

Field Artillery plays a central role in RFPI's warfighting concept. Initial computer simulations conducted by RFPI show that artillery systems offer significant advantages for obtaining maximum stand-off combat power with minimum lift. To explore the potential of artillery for early entry operations, RFPI is helping to develop two future Field Artillery systems.

First, RFPI will build a platoon of high-mobility artillery rocket systems (HIMARS). Deployable in C-130 aircraft, HIMARS provides both strategic and operational mobility for any theater of operations. In addition, this lightweight, versatile weapon will fire the full range of MLRS family of munitions (MFOM).

Second, RFPI will employ a platoon of the advanced towed cannon artillery system (ATCAS). ATCAS is a joint US Army and Marine Corps program to develop the future 155-mm lightweight howitzer. When teamed with HIMARS, ATCAS will allow the commander to change the tempo of operations dramatically and increase his volume of battlespace by rapidly shifting artillery anywhere in theater to deliver a spectrum of long-range, lethal munitions.

When we team our new light systems with future enhanced, precision munitions, such as the MLRS smart tactical rocket (MSTAR) and cannon projectiles tipped with global positioning system (GPS) fuzes, we'll expand the capabilities of early entry forces even further. These munitions will allow them to hit targets pinpoint with the first round, minimizing risks to friendly forces, civilians and property.

Precision weapons require fewer munitions to get the job done. This has important implications for force projection operations in terms of decreased demands for munitions on the logistical system supporting early entry forces.

## Information Dominance

While RFPI's focus is on exploiting the capabilities of new systems and technologies, emerging Army information operations doctrine further enhances the viability of force projection. The commander will be able to monopolize information—access tactical knowledge to make rapid, accurate decisions and deny the enemy the information the enemy needs to make decisions.

Through superior, near real-time information, commanders will rapidly and accurately identify high-pay off targets that can be engaged by RFPI's stand-off attack systems. In fact, this synergistic combination of information operations and lethal attack will contribute substantially to overwhelming the enemy force. For example, long-range, precise fires will eliminate essential command, control and sensor nodes, robbing the enemy of his ability to move information around the battlefield, paralyzing his decision making and leaving him even more vulnerable to lethal attack.

In addition to providing stand-off attack systems, Field Artillery will provide a key command and control asset for winning the information war—the advanced Field Artillery tactical data system (AFATDS). Sharing information in near real-time with other Army and joint command and control systems, AFATDS is a powerful means to distribute combat information. AFATDS will provide the commander automated decision and planning aids, weapons-target pairing and digital sensor-to-shooter links.

We're designing AFATDS to be a robust system, fully capable of supporting early entry forces. In November, AFATDS will be employed by the 10th Mountain Division (Light Infantry) Artillery, Fort Drum, New York, during the Warrior Focus Advanced Warfighting Experiment (AWE) at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana. This AWE allows us to employ AFATDS with light forces that often execute early entry operations to ensure it can provide the best possible command and control support for those forces.

Field Artillery developments are not a panacea for the challenges of force projection. Neither firepower nor any other element of combat power holds the solution to this complex warfighting task.

The Field Artillery, however, is prepared to act as a full partner in providing our nation the means to project decisive combat power anywhere in the world. Through RFPI and other efforts, we're committed to developing a more lethal, versatile and deployable artillery force—a force ready for force projection tomorrow and into the 21st century.

# NCO Development Program— A Career Commitment to Excellence

by Command Sergeant Major Richard A. Young, III Corps Artillery

**N-C-O-D-P** ...what do those five letters mean to you? We all get GOs on command inspections (CIs) of our NCO develop programs, but those classes seem to be the first to go when we get into a time-bind. Do we, as NCOs, believe in the program or are we just "checking the block"? I think it's both.

One problem is that we tend to think of NCODP as a class or series of classes. In fact, developing subordinate NCOs is a career commitment, not just a block of instruction presented in a classroom every so often. And when you take the time to develop your subordinate NCOs—model excellence, mentor them, facilitate their training of subordinates *and* present relevant classes—you continue your own professional development. These NCODP activities can be grouped into two parts: informal and formal.

**Informal NCODP.** This portion of NCO development would be impossible to quantify for CI. It happens everyday as modeling and mentoring from leader to subordinate, peer to peer and NCO to soldier. We acquire many of our leadership techniques by watching other leaders—we tend to emulate excellence in action.

If you asked me who I learned from, I could answer that question easily: the leaders I most admired. I'll never forget the lessons I learned from Staff Sergeant Pete Benavente; he taught me how to be a howitzer section chief. He opened up my head and poured knowledge in, packing my brain with as much as it could stand. (I sometimes thought more than it could stand.) In addition to being an expert in his job, he was a model for every other aspect of a good NCO.

First Sergeant Walter Higganbotham taught me about the importance of standards and how to see that my soldiers met them, and Command Sergeant Tim Eldridge showed me what I had to do/be to become a command sergeant major. As an NCO, you have others looking to you as a model or for mentoring. The question is, do they think of you a Benavente, Higganbotham or Eldridge?

Another way we develop NCOs informally is by facilitating their jobs as leaders and trainers of soldiers. The Field Artillery's most junior NCOs, our section chiefs, are where the rubber meets the road. They are the direct leadership link with soldiers and down where the real action takes place across the spectrum of military operations.

Every NCO up the chain is there only, in some way, to see that the section chief can do his job. Because of that, the *real* informal NCODP—critical NCODP—happens at the battery level where those junior NCOs must do their jobs.

That's a lot of responsibility on the first sergeant. He gets help from his battalion command sergeant major who gets help from his division artillery or brigade command sergeant major and so on. All ultimately contribute to developing the section chief and giving him the time and other resources he needs to train and lead his soldiers. And all the while, that section chief will be modeling the behavior you can expect to show up in the next crop of section chiefs. And so it goes.

**Formal NCODP.** From time to time, formal classes will be beneficial to your NCOs, and they do, after all, help you pass the CI—not an unworthy goal. But there are a couple of cautions.

First, don't get so engrossed in the signin sheet, the documentation of who came to how many classes, that you forget why you're having the classes: to develop NCOs. That calls for quality training and fighting off distractions so you can hold that training.

Second, don't assume quality instruction on one topic is what all NCOs of all military occupational specialties (MOS) need. Take the time and energy to develop classes useful for your diverse soldiers. For example, an NCODP class for a 13M Skill Level 30 multiple-launch rocket system crewman might not be a good class for your 92Y Skill Level 30 supply sergeant.

Some classes will be good for both of them. The way to develop a class that benefits both is to identify the critical leader tasks embedded in your unit's mission-essential task list (METL) and cross-walk the tasks—train the tasks in common.

There are several things you can do to ensure the quality and effectiveness of your NCODP. One is to synchronize the training with the unit training plan. Another is to ensure the training content is progressive and sequential, building skills and knowledge one upon another. Use rehearsals, rock drills, and small group processes to help the NCOs get involved and interested while they're learning. The training should be hands-on as much as possible.

Set conditions for leader (student) success by having event certification or some means of demonstrating what was learned; that might include developing mission orders or briefings. You can give an NCO training and then set milestones for him to update you (or someone who can mentor him) on his progress.

**NCO Career Excellence.** As NCOs, we must never forget our job is to teach and lead daily. We must model for, mentor, train and facilitate the jobs of our subordinate NCOs.

The bottom line is the best of the best NCODPs can't always be quantified for CI, but the Army can "quantify it" when the unit deploys and your soldiers and NCOs accomplish their mission. NCODP is quite an investment.

First Sergeant, the key and measuring stick is in your hands. The rest of you NCOs, line up behind him!

**Sergeant Major Richard A. Young has been the Command Sergeant Major (CSM) of III Corps Artillery, Fort Sill, Oklahoma, since July of 1993. He also served as CSM of the 214th and 75th Field Artillery Brigades, also in III Corps Artillery. As the CSM of the 2d Battalion, 82d Field Artillery, 3d Armored Division, he deployed the battalion to Operations Desert Shield and Storm and then brought it back to Germany and inactivated it. Also during his 24 years in the Army, CSM Young was first sergeant for three batteries.**

# Senior Fire Support Conference Dates Set

The dates for the next Senior Fire Support Conference at the Field Artillery School, Fort Sill, Oklahoma, have been set for 12 through 16 February 1996. Topics to be discussed will include fire support issues in doctrine, materiel development, training, force development and joint operations and also the role of Field Artillery in Force XXI.

Invitations to the conference will be sent to all Army corps and Marine expeditionary force (MEF) commanders; Reserve Component (RC) and Active Component (AC) Army and Marine division commanders; selected retired general officers; Training and Doctrine Command school commandants; AC and RC Field Artillery brigade, division artillery and Marine regimental artillery commanders and their command sergeants major; and US Field Artillery Association corporate members. Corporate members and other companies also may have displays at the conference.

If units or individuals have questions or need more information, they should contact the G3 of the Training Command at Fort Sill: DSN 639-5460/4203 or commercial (405) 442-5460/4203.

# Attack Helicopter Battalion FSO: Fire Support Planner or Executor?

Is the attack helicopter battalion FSO [fire support officer] a fire support planner or executor? The answer to this question is he's both—but more importantly, he's a coordinator. As a general rule, the attack helicopter battalion FSO is 20 to 25 percent planner and 75 to 80 percent executor or coordinator.

First, I must qualify what I mean by "executor." The assertion that the attack helicopter battalion FSO is a fire support executor does not imply that the FSO goes on every mission, executes fire support coordination measures [FSCM] and calls for fire missions. Instead, the FSO sees that the attack helicopter battalion executes the fire support plan for that particular mission, regardless of what agency generated the plan—i.e., aviation brigade FSE [fire support element], division FSE, force FA headquarters, etc. He ensures execution is integrated into the mission by coordinating with higher headquarters for specific (additional) fire support requirements, briefing the fire support plan, participating in the battalion rehearsal, conducting or participating in a fire support rehearsal, and conducting fire support execution in the TOC [tactical operations center] or the air or ground TAC [tactical command post] during the mission, if required.

The amount of fire support planning the FSO does depends on a number of factors. The two primary factors are the type of attack helicopter battalion (i.e., corps or division attack helicopter battalion) and the type of mission.

The first factor is the type of attack helicopter battalion for which he's an FSO. The fire support chain of command for the divisional and corps attack helicopter battalions are different. At the corps level, the FSO may have to operate more automously to meet his battalion commander's guidance for fire support.

According to *FM 6-20-2 Corps Artillery, Division Artillery and Field Artillery Brigade Headquarters* and a number of doctrinal publications for combat aviation operations, each attack helicopter battalion has a fire support section consisting of at least an FSO and fire support NCO (FSNCO). In a heavy Div Arty [division artillery], the aviation brigade FSE is authorized one fire support section for each divisional attack helicopter battalion. In a light Div Arty, the aviation brigade and the attack helicopter battalion are each authorized a fire support section. There's no FSE for a corps aviation brigade, but each corps attack helicopter battalion is supposed to have a fire support section attached from the headquarters element in headquarters and headquarters battery (HHB) of the corps artillery.

The divisional attack helicopter battalion FSO is similar to his ground maneuver counterpart in that he can coordinate with and receive guidance from a brigade FSO. On the other hand, the corps attack helicopter battalion FSO must interact directly with the corps main or tactical FSE with whom he may not have a habitual relationship established—he may even have to act autonomous to meet his commander's guidance. For that reason, more experienced FA officers (captains) should be FSOs for corps attack helicopter battalions.

The second primary factor determining whether or not the attack helicopter battalion FSO plans fires is the type of mission. There are few missions for which the FSO would have to develop a fire plan for execution by the supporting force FA headquarters, but the hasty attack is the most likely. The FSO performs hasty fire planning to support the attack helicopter battalion scheme of maneuver. (See the figure.)

- Plan fires for targets in, to the flanks of and beyond each engagement area.
- Plan fires along the route/air corridor.
- Request suppression of enemy air defense (SEAD) support (if required).
- Request support from Div Arty or corps target acquisition assets (i.e., Q-36 Firefinder radar) to ensure enemy indirect fire weapons that fire into the attack helicopter battle positions are targeted.
- Request on-order fire support coordination measures (FSCM), such as no-fire areas (NFAs) for battle positions and airspace coordination areas (ACAs) for routes or corridors.
- Plan for special conventional munitions, such as smoke, family of scatterable mines (FASCAM) and Copperhead.
- Establish priority targets and priority of fires.
- Develop a target list.
- Tie the planning and coordination together with a fire support execution matrix (FSEM) submitted through the next higher FSE to the force FA headquarters.

Listed are tasks the attack helicopter battalion FSO accomplishes to generate a fire plan for the force FA headquarters' execution.

For most attack helicopter missions, the fire support planning *and* execution is done by the supporting force FA headquarters. The attack helicopter FSO has input to the fire support plan through *coordination* with his higher FSE.

The best example of this scenario is a deliberate deep attack. For this type of mission, most fire support planning and execution for the mission is done by the aviation brigade FSE (if applicable), the division or corps FSE and the supporting force FA headquarters. The attack helicopter battalion FSO has only limited input to the fire support plan. He can nominate SEAD and other targets (bottom-up process); recommend or submit requests for FSCM; establish priority of fires within the battalion; request tactical air support, if required; submit requests from supporting target acquisition assets to establish critical friendly zones around assembly areas, forward assembly areas or forward area arming/refueling points; and conduct other fire support coordination.

The FSO's role in fire support execution is limited for the deep attack. He takes the fire support plan from the higher FSE, especially any SEAD programs to be executed by lethal and (or) non-lethal assets, and ensures the fire support plan supports the battalion commander's intent for fire support, the concept of the operation and the specific phases in the scheme of maneuver.

If there are conflicts or gaps in fire support, the attack helicopter battalion FSO coordinates with the next higher FSE to resolve those conflicts and ensure all phases of the scheme of maneuver have assets allocated to provide fire support. The FSO then briefs the fire support plan to the battalion.

Meanwhile, the higher headquarters FSE and supporting FA headquarters perform all three phases of the targeting process (decide-detect-deliver) to support the mission. First, high-value targets that can impact on the helicopter battalion mission and meet the target selection criteria are targeted by division and (or) corps assets. Second, the target list is revised and updated as intelligence and other data are received. Finally, SEADs and other fires are planned and transmitted to the firing units (artillery battalions) to be executed at a specified time.

The answer to the question posed at the beginning is the attack helicopter battalion FSO is a planner and an executor—but mostly a coordinator. As a planner, he ensures the fire support plan, whether developed by himself or another agency, supports the concept of the operation. As an executor, he ensures fire support assets are employed and synchronized with the type of mission and the scheme of maneuver. Even though fire support for most attack helicopter missions is planned and executed one to three levels above the attack battalion, the FSO still plays an important role because he's the attack helicopter battalion commander's coordinator and spokesman for fire support issues.

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# Operational Firepower and the Universal Joint Task List

The Office of the Chairman of the Joint Chiefs of Staff at the Pentagon has published a keystone document titled "The Universal Joint Tasking List" (UJTL) defining joint training requirements (Memorandum from Director of the Joint Staff to services and combatant commanders, 25 October 1993). The UJTL gives commanders specific guidance for refining their mission-essential task lists (METLs), provides a common language and war-fighting tasks for all levels of war (strategic, operational and tactical) and sharpens the focus on readiness training and resource decision making, particularly at the operational level. Of even greater interest, the UJTL is being used by BCTP [Battle Command Training Program] Operations Group Delta [Fort Leavenworth, Kansas] to assess units' performance of joint tasks.

The UJTL defines operational firepower as "the application of firepower and non-lethal means to achieve a decisive impact on the conduct of a campaign or war operations" (Page 2-49). This definition expands our view of firepower to include non-lethal as well as lethal combat capabilities and, therefore, expands the joint fire supporter's leadership and coordination responsibilities.

The UJTL subdivides operational firepower into three major subordinate tasks: target processing, target attack and firepower integration. These sub-tasks include several areas not normally part of the artilleryman's tool kit. In particular, non-lethal means—electronic warfare, psychological operations, etc.—are part of operational firepower. Lethal attack includes the use of Special Operations Forces as well as the more conventional means of land, sea and air attack. Integration of these widely varied combat capabilities is now the responsibility of the operational commander's fire support staff.

Expertise in these areas by Field Artillerymen is not the critical challenge; each area has dedicated and professional subject matter experts. However, the coordination of these combat capabilities is a critical responsibility, and it falls squarely on Army or Marine fire supporters as the most likely choice for the joint force fires coordinator (JFFC). This is a position listed in the author's draft of *Joint Pub 3-0.9 Fire Support of Joint Operations*. (The initial draft of Joint Pub 3-0.9 should be circulated this spring to all the services.)

The UJTL, Joint Pub 3-0.9 and other documents are a wake-up call for Field Artillerymen. As another example, a memorandum with the subject of "Joint Doctrine" from the Director of the Joint Staff to the services and combatant commanders dated 25 November 1994 is very clear. The Chairman of the Joint Chiefs of Staff's intent is to bring service doctrine in line with joint doctrine. Joint doctrine is no longer a basis of reference used as a convenience—it's authoritative in nature and varied from only by exception.

Professional joint references for fire support officers should include *Joint Pub 3-0 Doctrine for Joint Operations, Joint Pub 3-56 Command and Control Doctrine for Joint Operations, Joint Pub 5-00.2 Joint Task Force Planning Guidance and Procedures, Joint Pub 3-03 Doctrine for Joint Interdiction Operations, Joint Pub 3-01 Counter Air Operations, Joint Pub 3-56.1 Command and Control for Joint Air Operations, Joint Pub 3-53 Doctrine for Joint Psychological Operations, Joint Pub 3-51 Electronic Warfare in Joint Military Operations, Joint Pub 3-07 Military Operations Other Than War, Joint Pub 3-05.5 Special Operations Targeting and Mission Planning* and Joint Pub 3-0.9.

The fire support process is changing from the top down with doctrinal implications; roles, responsibilities and resources all will be affected. Complacency in joint firepower operations is about to get a rude shake; competency is the best replacement.

How operational level formations meet this opportunity will vary by theater and mission. Publication of Joint Pub 3-0.9 will further illuminate this issue, and field experience will determine tactics, techniques and procedures (TTP). However, for officers who intend to join the battlespace with an expertise in joint firepower coordination, the UJTL and its associated documents bear close study.

LTC Donald H. Zacherl, FA
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# The Challenge: Re-Training FISTers to Operate the M981 in Heavy Divisions

Until recently, I was a battalion fire support officer [FSO] in a Bradley-equipped infantry battalion in Korea. In the 10 months of my tenure, I worked with 10 fire support section chiefs and one platoon sergeant. Of these fine sergeants, staff sergeants and sergeants first class, only three had any experience operating and exploiting the capabilities of the M981 fire support team vehicle (FIST-V).

Due to the limited 12-month tour in Korea, the turnover rate is high. Therefore, in-depth knowledge of unit-specific equipment is more difficult to come by than in stateside units where soldiers serve 36 to 48 months. If you compound this with the fact that eight of the 11 sergeants mentioned came from light, airborne or air assault divisions, one can quickly see how training challenges arise.

Although the Army has fine NCOs, the FIST-V initially can be an intimidating vehicle. Inside you're immediately greeted by a myriad of electronic, hydraulic and motorized systems that can place NCOs in an unpleasant situation.

The FIST section chief is supposed to be the most experienced fire supporter in the company team. He's responsible for training a team of soldiers as well as a new second lieutenant to operate this vehicle. Additionally, he must maintain the vehicle to -10/-20 standards to be ready for combat at any time. Yet when this NCO walks in from the "light world," he immediately faces learning the vehicle and systems himself before he can train his people. It doesn't add credibility among the soldiers when the man they look to for experience and guidance doesn't know what the TSCD does (or even what it stands for—targeting station computer display). The chief of section must learn even the most simple tasks, such as installing the G/VLLD [ground/vehicular laser locator designator] in the targeting head.

Officers are managed in such a way as to afford the officer the opportunity to lead in both heavy and light units and round him out. But why do this to our 13F [Fire Support Specialist] NCOs? Why rotate light fighter 13Fs to heavy divisions?

NCOs should be the experts on their equipment and duty position. An expert is more likely to do the job right than a Jack-of-all-trades—it's best to enlist the expertise of somebody who specializes in the task required.

With all that in mind, I offer some recommendations to meet these challenges.

1. Give 13F an additional skill identifier (ASI) denoting him as a heavy FISTer. Then keep these soldiers on the heavy track for their careers. This could operate similar to the way the infantry tracks 11Ms (Bradley Fighting Vehicle Infantrymen) and 11Bs (Light Infantrymen). The training of a heavy 13F could start with AIT [advanced individual training] and continue on with assignments in heavy divisions. 13Fs would build knowledge that would be passed to other soldiers as they come up through the ranks. With these resident experts in our FIST teams, the FA would gain much in training and improved maintenance.

2. Institute FIST-V Crewman and Commanders Courses. The crewman course would focus on maintenance, operation of the targeting station and other equipment inside the vehicle. It would be a prerequisite for assignment to a heavy FIST team for specialists and below.

The commanders course could provide an overview of the maintenance and operation of the targeting station with more in-depth instruction on the capabilities of and how to employ the FIST-V. This course would be a prerequisite for company-grade officers and sergeants through sergeants first class going to their first assignments in heavy divisions.

3. On-the-Job Training (OJT). This is the current way section chiefs and lieutenants learn the FIST-V. Although hands-on experience is the way to gain expertise, OJT doesn't set up our junior NCOs and lieutenants for success if we don't provide quality training at the schoolhouse before they reach the field.

We paired NCOs with experience on the M981 with incoming NCOs who had no experience on the M981 in the same section. This enhanced the OJT process.

Also, we had a FIST certification program that focused on FIST-V maintenance, artillery safety and non-ICOM [integrated communications security] SINCGARS [single-channel ground and airborne radio system]—the artillery safety and SINCGARS portions are Korea-specific training. When the task force deployed for it's quarterly gunnery rotation, we blocked off five days for certification training. Then we trained and tested all newcomers at the section level, supervised by the senior leader in each section who was certified. My FSNCO [fire support NCO] and I spot-checked the training.

Although this type of program is effective, it doesn't make up for a lack of long-term experience. Our three NCOs who had extensive experience on the M981 were more adept at employing the vehicle. Also, they were attuned to little maintenance indicators that show there's a problem and could respond appropriately. In short, there's no substitute for experience.

A Bradley FIST-V is on the horizon; with the advent of this new, more capable FIST-V, tracking heavy and light FISTers will be crucial. A separate MOS or ASI will almost certainly have to be instituted. A light FISTer would not be qualified to operate such a vehicle if it were equipped with the 25-mm gun.

If we give our soldiers, NCOs and lieutenants the tools for success at the schoolhouse, they'll respond. We can better exploit all the capabilities of the M981 and increase maneuver confidence in what we do for them. After all, that is our business in fire support.

CPT Michael J. Forsyth, FA
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Lieutenant General H. Hugh Shelton, Commanding General of the XVIII Airborne Corps and Fort Bragg, North Carolina

# Projecting America's Military Might

by Patrecia Slayden Hollis, Acting Editor

On the evening of 18 September 1994, Operation Uphold Democracy was in progress. Two aircraft carriers with 10th Mountain Division (Light Infantry) soldiers, 160th Special Operations and Ranger forces and elements of the 82d Airborne Division aboard were within striking distance of Haiti. Expeditionary force Marines were poised to launch as well as other troops in various parts of the US as the complex branching and sequeling of the mission prepared to unfold. Meanwhile, 82d Airborne paratroopers were in aircraft winging their way toward Haiti. All was ready for the US Atlantic Command (USACOM) mission to rapidly project the power of the US military to reinstate the ousted Haitian President Jean-Bertrand Aristide.

At 2000 hours, President Clinton called off the invasion—diplomatic efforts had swayed the military triumvirate running Haiti to reinstate President Aristide. Without a doubt, America's ability to project decisive combat power influenced that decision. In the morning light of 19 September, US troops came ashore into Haiti.

**Q** *As the Commander of Joint Task Force (JTF) Haiti during Operation Uphold Democracy, what were your operational challenges?*

**A** We had a lot of operational challenges. First, using the adaptive joint force packaging concept, we had to position the right forces in the right places for the initial deployment. The concept is to plan for potential risks and package forces to counter the various levels of risks, giving the joint force commander the maximum power projection capability and flexibility. We had to be prepared to go in as either a warfighting force in forcible entry operations or, as was the case after a midair reversal, an operations-other-than-war force for permissive entry operations.

Of course, we had to have rules of engagement to go either way. We had peacetime rules of engagement to use after the warfighting portion of the operation or in other operations other than war. We planned for such a change, but we didn't think it would occur.

From a fire support standpoint, when the operation was designed for forcible entry, the importance of pre-assault fires and the control of fires—a greater reliance on precision—increased significantly. We were very concerned with minimizing casualties. And we didn't want to damage any more property than we had to.

Because of its precision, we planned to lean heavily on AC-130 gunships for fire support during that particular phase of the operation. Our primary means of control was to establish areas of operations for the major subordinate units.

Initially we planned to take howitzers with us for two reasons. First, if we had bad weather (low ceilings, etc.), we would not have been able to rely on the AC-130s for fire support and would need our howitzers for all weather conditions. Second, we knew the FRAPH [Front for Advancement and Progress in Haiti, an anti-Aristide paramilitary group] had howitzers and mortars. The FRAPH weapons could range the Port-au-Prince Airport. We wanted our commanders to be able to return fires—counterbattery or countermortar fires.

A JTF commander must have all the firepower he needs to deal with any circumstance—he doesn't want to take a chance on losing American lives. But at the same time, he has to factor in that for every local (in this case Haitian) killed in an environment that would be friendly to the US except for the ruling thugs, the commander could turn the average Haitian against his force or the US. So even when planning pre-assault fires for the warfighting mode, I kept the targets to a minimum. The JTF commander must make tough calls on whether or not to use his firepower.

**Q** *In Uphold Democracy, the mission changed literally in midair. The reverse can happen with a peaceful*

> ***"For every mission, we prepare branches and sequels to a particular plan because we realize that things might not go the way we anticipate."***

**"In Uphold Democrary, adaptive force packaging allowed us to change the plan in 'midair.'"**

*mission quickly becoming one involving combat and requiring joint fire support. How does the XVIII Airborne Corps prepare to accomplish rapidly shifting missions?*

**A** The key is anticipating change. As a JTF or the XVIII Airborne Corps, we have to be prepared to conduct the worst-case scenario—in the case of Uphold Democracy, a forcible entry. For every mission, we prepare branches and sequels to a particular plan because we realize that things might not go the way we anticipate. From the time we leave home station, there are decision points along the way that could activate a portion of the plan, which allows us great flexibility.

Our warfighting plan had two parts. One assumed we'd have 10 days' notice, and the second part assumed we had 96 hours' notice. The difference in the parts of the plan had to do with the forces that would be available. For example, forces afloat had to have enough time to get in position—the Marines afloat off the coast of Haiti. They were our force of choice for the plan because of the way Haiti is divided, and it really served us well to have Marines available.

In Uphold Democracy, adaptive force packaging allowed us to change the plan in "midair." We had the 82d Airborne Division in the air ready to jump into Haiti, elements of the 10th Mountain Division aboard an aircraft carrier for potential air assault operations and our Special Operations Forces in a variety of configurations. We had airborne, helicopter insertion and seaborne options.

But we also planned for operations other than war. For example, our AC-130s flying over the joint operations area [JOA] to provide pre-assault fires could become a source of fire support for force protection or foreign internal defense in operations other than war. As it turned out, the AC-130s flew over the JOA 24 hour per day for at least 45 days, and we never needed to call on their firepower.

We had a plan to go into effect if the military triumvirate running Haiti had decided to flee the country. President Aristide might have asked for help in getting the country functioning again—an operation other than war. But if that plan hadn't gone well, we might have needed combat forces, so we planned for a sequel. Going in, we were prepared to face multiple situations.

**Q** *What was the composition of and how did you use your joint force fires coordination center (JFFCC) during Uphold Democracy?*

**A** In Uphold Democracy, the JFFCC provided four members to the corps assault command post [CP], seven to the JTF headquarters afloat on the *Mount Whitney* and approximately 30 members to the main CP. The JFFCC consisted of members from the corps FSE [fire support element], Marine Corps, Navy and Air Force.

In the XVIII Airborne Corps, the JFFCC helps the joint planning group determine branches and sequels, as needed, for operations. It links the J2 and J3 for targeting, produces and maintains a JTF high-payoff target list and monitors and reacts to current operations. It supports the JTCB [joint targeting coordination board].

The joint force fires coordinator (JFFC) serves as my principal joint fires advisor and coordinator and is the focal point for fires on the JTF staff. He's my "joint FSCOORD" [fire support coordinator], if you will, and works under the deputy commander of the JTF and in coordination with the J3.

As it turned out in Uphold Democracy, the JFFCC "targeted" and coordinated the confiscation of arms caches.

**Q** *How do you handle the dilemma of trying to maintain warfighting skills for units involved in non-combat operations other than war?*

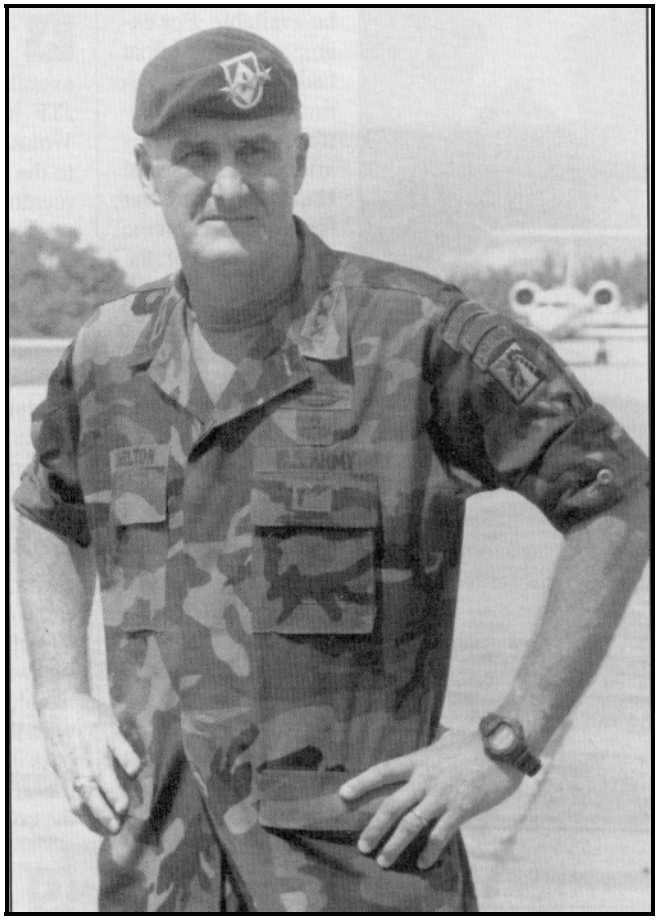
**A** That's a real challenge. For the most part, I don't have a magic formula for how to deal with that because the demands on our units in operations other than war are very diverse. For example, the challenges for one of my

Lieutenant General Shelton talks to soldiers while in Haiti during Uphold Democracy.

COSCOM [corps support command] units, one of the most frequently deployed units in the corps, is considerably different than, let's say, the 10th Mountain Division. For example, one of our COSCOM units deployed to Somalia and had to leave its equipment behind as a part of the JTF that remained there. It was several months before the unit started receiving replacement equipment.

That causes different training challenges than the 10th Mountain Division that went into Haiti and was able to conduct live-fire exercises up through the company level while there. When they came back from Haiti, the ramp back up to ready-to-go within 18 hours of notification was considerably quicker than for the COSCOM unit that still doesn't have all its equipment.

In the XVIII Airborne Corps, we operate on a different time line than other units. Every minute of those 18 hours after notification is consumed with out-loading, with deploying; it's too late to go out to the range and shoot a few last rounds. At that point, training is moot.



Lieutenant General Shelton, JTF Commander, at Port-au-Prince Airport. *Photo by LTC Timothy D. Vane, XVIII Abn Corps PAO*

Our highest priority is to sustain the training and combat readiness of our units. To maintain corps readiness after units have been involved in non-combat operations, we examine each unit individually. If we see a training or equipment shortfall, we focus on enabling that unit to ramp back up as quickly as it can.

There are some real challenges in keeping soldiers trained who are frequently deployed in operations other than war. For example, I talked to a Patriot missile soldier from our 108th Air Defense Brigade not long ago who has been in the Army for four years and has been deployed for six months of every year.

In comparison, the 101st Airborne Division deployed to Panama to secure Cuban refugees for movement to Guantanamo Bay [Cuba]. The 101st was well-trained when it left, and the deployment was relatively short—about six weeks. The 101st recovered very quickly and was ready to go again within a matter of days.

So the answer is, the corps focuses on the training and readiness shortfalls of each unit after operations other than war.

**Q** *What capabilities will the advanced towed cannon artillery system (ATCAS), the developmental lightweight 155-mm howitzer, bring to your corps?*

**A** Considerable. First of all, the ATCAS' capability to shoot a wider variety of munitions at longer ranges helps us in counterfire operations, decreasing the standoff range of current threat systems. That's a great improvement in fire support capabilities.

With the ATCAS being lightweight and more deployable, we'll have more lethality earlier in our operations. One of the biggest problems the XVIII Airborne Corps faces is deploying lethal systems that are effective immediately upon arrival and are light enough to be moved to the battlefield in enough numbers to make the difference early on. We've got a lot of very lethal systems—the challenge is to develop lethal systems our early entry forces can use. ATCAS will help our early entry forces immensely.

Another advantage of ATCAS is its mobility after deployment and, like the Paladin [M109A6 howitzer], its capacity for independent operations, making it very effective and highly survivable. It promises to be a terrific weapon system for the XVIII Airborne Corps.

**Q** *What other fire support capabilities might you need for power projection?*

**A** HIMARS [high-mobility artillery rocket system] is a *major* fire support system for power projection. We can employ it for forcible entry operations early on within the joint operational area or the corps operational area. It meets our requirements for a C130-transportable rocket and missile launcher, easily deployable to and within a theater. The mobile truck-mounted launcher can fire the entire MLRS [multiple-launch rocket system] family of munitions—just the capabilities we need.

HIMARS will give the XVIII Airborne Corps a counterfire and deep fire system early on in a battle using 30 percent fewer sorties. Combined with the Q-37 radar, it gives us tremendously increased capabilities for forcible entry operations and seizing an airfield or lodgement area. The XVIII Airborne Corps is a big fan of HIMARS.

***"HIMARS will give the XVIII Airborne Corps a counterfire and deep fire system early on in a battle using 30 percent fewer sorties."***

**Q** *In what area do you think the Army's digitization will have the greatest impact on light forces?*

Lieutenant General Shelton talks to 10th Mountain Division soldiers at their camp in Haiti.

**A** In fire mission processing time. The ability to see the target and pass that information instantly in a highly accurate manner to the shooter will cut fire mission processing down to microseconds. We're already seeing reduced mission processing times now in fire support exercises. There's tremendous potential here.

We're working on digitization with a helicopter pilot lasing a target and sending that information directly to the GDU [gun display unit] with the proper clearance of fire en route; we're firing almost instantaneously. Then add the increased ranges of weapons under development, such as the ATACMS' [Army tactical missile system's] Block IA's 300 kilometers, and we'll really be able to "reach out and touch someone"—way out.

**Q** *How are we improving our ability to rapidly project a heavy force, such as the 24th Infantry Division (Mechanized) at Fort Stewart, Georgia?*

**A** The 24th Division has always worked hard to maintain its capability to deploy and deploy very rapidly. For example, in October 1993, when asked how long it would take the corps to deploy an armored force to Somalia, I responded the 24th could be wheels-up in 18 hours. I said that with confidence because we had just conducted a corps-level EDRE [emergency deployment readiness exercise] with the 24th Division. And the 24th ID did just that—was in the air en route to Somalia in 18 hours.

The 24th packages an IRC [immediate ready company] that's ready to fly with 18 hours of notice. The division also can have a tank or mechanized battalion task force in the air within 48 hours—which it did in the rapid reinforcement of Somalia in November 1993.

The division practices sea EDREs frequently to be fully prepared to marry up with FSS—the fast surface ships that will come into Savannah port to pick them up. Fort Stewart can move equipment to the port immediately and run a first-rate deployment operation.

While the corps headquarters was afloat on *Mount Whitney* during Uphold Democracy, we were running a corps EDRE with the 24th Division. We loaded a battalion task force aboard a ship in Savannah, coincidently, at the same time that Saddam Hussein decided to roll south—again. We had planned to sail that ship to Haiti to have it standing by October 15th when President Aristide returned. But Saddam started toward Kuwait.

Showing its great flexibility, the 24th Division quickly came under the control of Third Army for Operation Vigilant Warrior, flew to the Gulf and off-loaded equipment prepositioned afloat. The division validated the plan and refined procedures and techniques to quickly draw equipment and move into assigned operational areas. As a result of Vigilant Warrior, the next such operation will go even smoother. Anytime America needs a heavy force to go anywhere in a hurry, the 24th is ready.

The keys to rapid deployment are to have the systems and procedures in place and exercise them frequently. Moving mechanized, airborne or air assault forces around the globe on short notice is complex business.

A critical improvement for the 24th would be the addition of the C-17 aircraft. Getting that aircraft fully operational will help the 24th Division and other Army units deploy faster, greatly enhancing America's ability to engage in major regional conflicts and win rapidly and decisively.

**Q** *What message would you like to send Redlegs stationed around the world?*

**A** As a "Blueleg" most of my life, I recognize the key part Field Artillery plays in America's warfighting capability. We live in a complex and unpredictable world, one that demands we all stay trained and combat ready.

As we move toward the turn of the century and Force XXI, we need to focus on developing systems that will give us greater lethality and deployability to win decisively early in any conflict. With systems such as ATCAS and HIMARS under development, I'm confident the Field Artillery is doing just that.

**Lieutenant General H. Hugh Shelton is the Commanding General of the XVIII Airborne Corps and Fort Bragg, North Carolina. In Operation Uphold Democracy, he was the Joint Task Force Commander in Haiti. Before his present command, he commanded the 82d Airborne Division, also at Fort Bragg. During Operations Desert Shield and Storm, he was the Assistant Division Commander for Operations in the 101st Airborne Division (Air Assault). Lieutenant General Shelton also commanded the 1st Brigade of the 82d Airborne Division; 3d Battalion, 60th Infantry of the 9th Infantry Division, at Fort Lewis, Washington; and a detachment of Special Forces and a company in an airborne infantry brigade, both in Vietnam. He was the Deputy Director for Operations, J3 of the Joint Chiefs of Staff in Washington, DC, and Chief of Staff of the 10th Mountain Division (Light Infantry) at Fort Drum, New York.**

# Fire Support for a Force Projection Army

by Brigadier General William L. Nash and Lieutenant Colonel James F. Byrne, Jr.

In July 1944, the US First Army was bogged down in the hedgerow country of Normandy. Restrictive compartmentalized terrain, breakdowns in tank-infantry cooperation, equipment and leadership failures, and a tough and resilient enemy combined to shatter hopes for a rapid breakout from the Normandy beachhead. Instead of conducting a rapier-like thrust into the interior of France, the Army found itself bludgeoning its way through the bocage—paying for every hard-fought kilometer with appallingly high casualties.

The bulk of these casualties was inflicted on hard-pressed American infantrymen, who probably did not have a particularly high opinion of the rest of the combined arms team. Given the mobility and communications problems encountered by the rest of the force, the infantryman soon found himself virtually isolated on the battlefield. Fortunately, under even the worst of conditions, he was still able to turn to "the sovereign American remedy for battle problems—the artillery."[1]

Fifty years have passed since the US Army slogged its way toward St. Lo and the eventual breakout. Our force reflects more than half a century's worth of technological, sociological and doctrinal changes. It's moving from the industrial age to the information age and has been strengthened, molded, tempered and reshaped as it passed into, through and out of the Cold War era. It's increasingly part of a joint team involved in interservice operations.

Yet there are still some striking similarities to the Army that fought at Normandy. As we were 50 years ago, we are once more focused on force projection. As we were 50 years ago, we are still the finest Army in the world. And as it was 50 years ago, artillery is still the King of Battle...but, that's not enough.

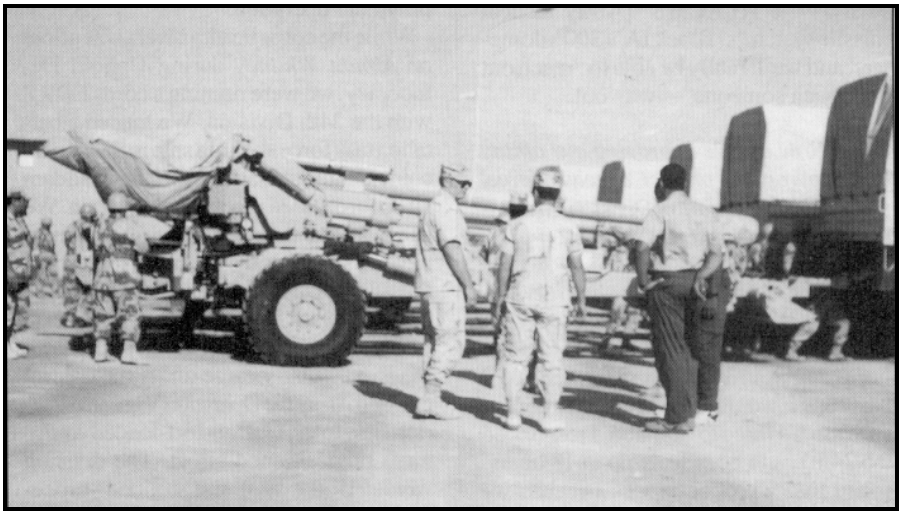
## Fire Support—More than FA

When considering fire support for today's force projection Army, artillery is necessary but not sufficient. Fire support is the collective and coordinated use of indirect fire systems, air delivered weapons and other lethal and non-lethal means in support of an operation. It's often the most significant source of firepower available to a commander and a major component of combat power.

Now more than ever, we must understand all the elements of fire support—not just artillery—and be proficient in planning, coordinating and using those fires in ambiguous, rapidly changing situations. To ensure success across the operational spectrum, all the elements of fire support must be trained and equipped to operate in support of national military objectives in the environments of peace, conflict and war.

Of equal importance, Army maneuver commanders from the battalion level and higher must be knowledgeable of the capabilities and limitations of all fire support elements. Commanders must view fire support as an integral part of their schemes of maneuver. They must know how to plan, coordinate and synchronize the use of fire support assets in war as well as in operations other than war (OOTW). These requirements are easy to identify but difficult to resource and execute.

We must continue to train in the application of fire support assets in conventional warfighting scenarios. But we also must develop the mental agility and technical expertise to apply these same assets to the OOTW environment. We must recognize



The US Army Security Assistance Advisor in Saudi Arabia, an on-the-ground fire support coordinator.

(and reflect in our training) the fact that fire support will often be augmented by assets from other services and nations.

## Projecting Power

The dramatic changes to the international landscape that have occurred during the past five years are reflected in equally dramatic changes in Army doctrine. Although we still have forces stationed around the world, they are primarily forward presence elements. As a result of the end of the Cold War, the majority of our forces have returned to continental United States (CONUS) bases.

Force projection—the military's ability to respond quickly and decisively to global requirements—"is fundamental to our operations doctrine."[2] However, force projection no longer implies the slow, ponderous buildup of combat capability we executed in World War II. Today's Army operates in a geopolitical environment characterized by instant crises that may require instant responses.

The ability of today's Army to project power around the globe is defined by the strategic mobility triad of strategic lift, prepositioned equipment and supplies (ashore and afloat), and overseas presence. Improvements programmed for this triad will allow the Army to deploy a light brigade within four days, a light division within 12 days, an armored brigade (employing afloat prepo stocks) and two additional armored divisions within 30 days. The bottom line: the Army will have the capability to project an entire corps of five divisions anywhere in the world within 75 days.

Are we prepared to take advantage of possible host nation fire support assets?

Strategic lift, prepositioned equipment and forward deployed forces all were used to project Army forces to Southwest Asia during Operation Desert Shield. It should be noted that many forward deployed soldiers already in the region were not assigned to combat units but were involved in security assistance missions to nations in the theater.

These soldiers performed an important role in coordinating the deployment and assisting in the onward movement of forces. They were, and continue to be, key players in the interoperability of combined forces during the conduct of combat operations. These soldiers become intimately familiar with the unique organizational structure, tactical processes and overall capabilities and limitations of the various coalition forces. They assist in coordinating the use of local forces to secure installations critical to the deployment of US forces. They are force multipliers for the force projection Army.

During the Gulf War, prepositioned equipment from Germany was moved into the region, as were supplies and equipment prepositioned afloat. However in 1990, there were only a limited amount of Army supplies prestaged on ships and no combat equipment.[3] Since then, the Army has prepositioned afloat the equipment for a heavy armored brigade, consisting of two tank battalions, two mechanized infantry battalions, a Field Artillery battalion and appropriate combat support and combat service support assets.

During the October 1994 Gulf crisis, this equipment, along with the reserve stocks in Kuwait, played a critical role in demonstrating national resolve and deterring potential Iraqi aggression. Although full deployment was not necessary, our force projection Army, with the assistance of our sister services, quickly moved CONUS-based personnel to link up with both ground-based and afloat equipment sets. If there were any lingering doubts about the Army's role as a national power projection asset or its ability to respond quickly and decisively to global requirements, the actions taken this past fall have dispelled them.


Here, an F/A-18 Hornet taxis along the flight deck of a nuclear-powered aircraft carrier. This highly lethal asset can be available on Day One.

## Fire Support Readiness

At the tactical and operational levels, there are fire support power projection questions that must be addressed. On Day One, did our unit commanders and their staffs understand what elements of fire support were available to them, if needed? On Day One, were they trained and prepared to coordinate the use of these elements? On Day One, were they equipped to take full advantage of naval air and surface fires, Air Force assets and host nation fires? On Day One, were our fire support teams (FISTs) planning and coordinating these significant additions to

organic fire support assets? No doubt the answer to all these questions was "Yes"—on Day Two. But in a force projection environment, that may be one day too late.

Our doctrine, demonstrated capability and ongoing operational realities define the Army as an instrument of power projection. And though our traditional role of fighting and winning our nation's wars remains our principal focus, today's force projection Army finds itself increasingly involved in OOTW; these operations other than war are not new missions for the Army. They are, however, for the first time formally reflected in our doctrine.

Peacekeeping, peace enforcement, disaster relief and nation assistance are not only the missions that seem to occupy the bulk of our planning and operational focus, but they also seem to constitute the lead stories on the nightly news. In most of these newscasts, there are numerous young men and women in the background with the words "US Army" printed over their left pockets. Where does fire support fit into these widely televised missions?

One thing we've learned is that an operation other than war in no way implies an absence of conflict. A peacekeeping mission can quickly escalate into one of peacemaking, peace enforcement or some other current phrase that means soldiers on the scene are involved in close combat.

In these situations, what is the role of fire support? Are Army assets available on the ground? Have we coordinated with our sister services, host nation and permanently stationed in-country US Army personnel? Have we considered (in advance) possible rules of engagement (ROE) and political sensitivities and realities that constrain our use of various means of fire support? Have we addressed the possible trade-offs between collateral damage and the absolute need to protect the force?

The Army's fifth tenet, versatility, reflects the necessity and requirement for Army forces to be postured to react to diverse mission requirements and to have the inherent ability to transition from one mission to another. The innate versatility of fire support assets is reflected in their ability to provide support over long ranges and quickly shift that support, based on changing priorities. This characteristic defines fire support as a key component of combat power in the force projection Army. And the effective use of this component of combat power-its versatility-depends on detailed planning and training prior to deployment and precise coordination during the initial phases of operations.

**Packaging.** Planners must tailor packages based on total fire support asset visibility and availability. They have several considerations when determining the composition of packages. Should planners automatically include Field Artillery elements with every force package, or are there situations where other fire support assets would be more appropriate? Should ROE be used to develop force packages, and if so, should they influence fire support packaging? What about host nation assets? Should they be entered into the fire support equation? The bottom line: given the assumptions of joint and combined operations conducted across diverse strategic environments, do we need to relook our long-practiced support relationships concerning fire support assets?

**Training Commanders.** Along with force package planning before deployment, we must look at the training opportunities available for our commanders. Do our commanders understand and have the opportunity to exercise the specific capabilities of all the fire support assets available (including the non-lethal variety)? Do we emphasize planning considerations for naval gunfire or carrier-based air support? Do we train with Air Force electronic warfare (EW) systems and observe their employment firsthand? Are commanders and their staffs currently trained in synchronizing diverse fire resources from other services and other nations in support of their concept of the operation?

In the force projection Army, fire support is the business of battalion, brigade and division commanders. Our training programs must provide these leaders the opportunity to practice their trade. The coordination of fire support must be one of the first tasks accomplished upon alert.

**Liaisons.** Immediate liaison must be reestablished (assuming it was initially established and exercised during training) during the alert and marshaling phases. Liaison is needed with forward presence and host nation friendly forces already in the area of operation (if possible) and with components tasked to provide fire support. Target acquisition procedures must be integrated with SOF, US advisors and (or) local military forces already on the ground. Communications compatibility must be analyzed, and workarounds (e.g., equipment and personnel exchanges and process modifications) established as necessary. Protected areas need to be identified and anti-fratricide measures coordinated in what will probably be a joint and combined environment.

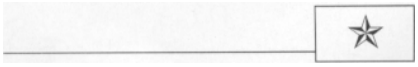
Once again, security assistance organizations in the area of operations can and should help with this vital coordination. Knowledgeable of the terrain, familiar with the local customs and an immediate in-place linkage with local military and civil officials, security assistance soldiers can serve as the "advance guard" of the force projection Army.

Today's Army needs the versatility and combat power inherent in fire support. Although we are half a century removed from the hedgerows of Normandy, we still rely on the sovereign remedy for battlefield problems—and rightfully so. The combination of mobility, accuracy, deployability, versatility and combat power associated with fire support ensures it will retain importance in future operations. But to make the most of fire support assets, we need to relook our traditional reliance on Field Artillery and enhance training and planning emphasis on coordinating and synchronizing other elements of fire support.

The world has changed, and the Army has changed with it. Artillery is still the King of Battle, but the force projection Army must be trained and prepared to take advantage of the King's fire support allies.

### *Endnotes:*


1. Russell Weigley, *Eisenhower's Lieutenants* (Bloomington, Indiana: Indiana University Press, 1981), 149.
2. *FM 100-5 Operations* (Washington, D.C.: Headquarters, Department of the Army, 14 June 93), iv.
3. Fred Elam and Mark Henderson, "The Army's Strategic Mobility Plan," *Army Logistician* (Fort Lee, VA: Army Logistics Management College, May-June 92), 4.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# Ammunition Resupply: PLS at the NTC

The Steel Dragons of the 2d Battalion, 82d Field Artillery (2-82 FA), 1st Cavalry Division, Fort Hood, Texas, launched the first palletized loading system (PLS)-equipped ammunition platoon into the maneuver box at the National Training Center (NTC), Fort Irwin, California, in October. The system proved it could support the ammunition operations of a direct support (DS) FA battalion under simulated combat conditions. Notably, PLS did not call for changes in ammunition supply procedures—but it did call for fewer trucks to haul ammunition faster using fewer soldiers.

This article explains how the battalion employed PLS during its rotation and how the newly fielded system performed.

## Ammunition Supply Point (ASP)

Arriving at the NTC with its 18 PLS trucks, the ammunition section drew all the battalion's unit basic load (UBL) from the ASP. This UBL consisted of approximately 3,800 complete rounds of artillery ammunition, typical for a DS battalion's 14-day rotation.

During this rotation, the maneuver-oriented ammunition distribution system (MOADS) was not yet established at Fort Irwin. Therefore, the battalion's UBL was not organized in combat-configured loads (CCLs) at the ASP.

The battalion's UBL was loaded by pallets on the PLS flatracks by the ASP forklift operators. Each PLS driver then drove up to his flatrack and, from within the cab, pulled his flatrack onto the bed of the PLS. The entire operation took less than a minute for each PLS.

When the battalion used heavy expanded-mobility tactical trucks (HEMTTs) for ammunition resupply, each pallet had to be lifted from the ground using the HEMTT's crane, The procedures usually required two soldiers—one to operate the crane and one to sling and guide the load.

## UBL to Ammunition Holding Area (AHA)

Moving the battalion's UBL from the ASP to the AHA required 22 PLS vehicles. A HEMTT-configured battalion would have taken 30 trucks to move the same amount of ammunition. A PLS can carry up to 320 projectiles or 400 propellant canisters as compared to a HEMTT, which can carry 217 projectiles or 350 propellant canisters.

At the AHA, each PLS driver dropped his flatrack on the ground. The ammunition platoon then unloaded the ammunition off the flatracks and segregated it by type and lot number. The down-load and reconfiguration of the ammunition is a one-man operation with PLS because the driver can drop the flatrack on the ground and use the material handling crane to move the ammunition by himself.

Once the ammunition was sorted, the ammunition platoon tailored the UBL into combat loads for the initial supply to the firing battery platoons. For the tailored loads, each platoon package required three PLS vehicles; it would have taken four HEMTTs per platoon to carry the same amount.

## Logaid Site

The platoon packages are delivered at a Logaid site somewhere along the route the firing platoons use to move to their initial firing positions. The basic execution of the Logaid does not change with the arrival of PLS, but PLS makes this portion of the supply process quicker and more efficient. All the PLS driver has to do is pull into his Logaid location, drop his flatrack with the push of a button and then move the truck cab out to the perimeter for security and dispersion. Last, the howitzers and FA ammunition support vehicles (FAASVs) move to their designated flatracks and load the ammunition from both sides of the flatrack simultaneously.

After the firing platoons leave the Logaid for their initial firing positions, the ammunition platoon quickly stacks and ties down the residue on the flatracks. Then as quickly as the ammunition was delivered, the PLS picks up the flatracks and moves them back to the battalion AHA. Using HEMTTs, each pallet of ammunition had to be separately down-loaded from the HEMTT onto the ground, requiring two soldiers. In addition to speeding up the process, PLS flat-racks keep the ammunition off the ground and out of dirt or mud.

At the AHA, the battalion ammunition platoon consolidated the residue onto six PLS trucks, which returned to the ASP. The ammunition remaining at the AHA was up-loaded on four PLS trucks and sent to the combat trains to be available for immediate resupply. The eight trucks left in the 18-PLS platoon went to the field trains to await missions.

## Maintenance Problems

Battalion maintenance encountered two problems with the PLS trucks. These problems were not unique to the NTC; they existed at home station as well. First, the manuals for the PLS (TM 9-2320-364 series) are not laid out clearly, making them difficult to use. Information the mechanic or operator requires is in the book, but he can't quickly access it because the manuals are poorly organized. The PLS program manager is working to correct this problem.

The second problem is the lack of PLS repair parts in the system. Parts for PLS are not readily available, and it takes weeks to requisition them. Units need to anticipate high-demand parts, order them early and bring them to the NTC.

PLS' unique capabilities give units some significant advantages. PLS is faster, calls for fewer soldiers to operate and makes it easier to up- and down-load ammunition. Overall, PLS was a tremendous asset for the Steel Dragon battalion at the NTC.

CPT Eric W. Stewart, FA
Commander, Service Battery
1LT Mark A. Simpson, FA
Battalion Ammunition Officer
2-82 FA, 1st Cav Div, Fort Hood, TX

Raymond A. Barnard, JRTC

# Preparation for Force Projection: The Intermediate Staging Base

by Lieutenant Colonel James T. Palmer and
Major David L. Anderson

A C-130 lands on a dusty flight landing strip at 0200 in the Republic of Cortina. The last howitzer section of a six-gun battery quickly deplanes and joins the other guns that have assembled near the flight apron. Minutes later, all six howitzers are called forward to a firing position hastily selected by the advance party.

Confusion ensues in the firing position. The gunnery sergeant arrives without a declinated aiming circle, and the survey party has had to land at a different location due to aircraft maintenance problems. No illumination projectiles arrive because the containerized delivery system drop was delayed, and all the variable time fuzes are in the Field Artillery (FA) battalion trains, not yet in country. The fire direction center (FDC) lacks maneuver graphics for the search and attack mission, and the Q-36 Firefinder radar is unable to communicate digitally with the FDC because the wrong variables are loaded in its single-channel ground and airborne radio system (SINCGARS) radios. Overwhelmed, the battery commander calls the battalion S3 and reports, "Alpha Battery is out of action."

Observer/controllers (O/Cs) at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, routinely see deployments similar to the one just described. Most would agree that serious execution flaws could be prevented on D-Day if the deploying unit had focused on actions in the intermediate staging base (ISB).

No training center in the Army focuses on contingency operations more than the JRTC. Each month, a brigade task force of four or five battalions of infantry, artillery, aviation and combat support deploys from home station to the imaginary island of Aragon (JRTC) at the request of the Republic of Cortina. The brigade arrives at an ISB approximately four days before D-Day (see Figure 1). Here, it must marshal its attachments, including special operations forces (SOF), a mechanized company team, an Air Force tactical airlift liaison officer (TALO), a combat support hospital, an air and naval gunfire liaison company (ANGLICO) platoon and, frequently, an allied maneuver company.

The division order is issued to the brigade in the ISB, and the planning process begins immediately. Under time constraints, the brigade commander and his staff must plan, prepare and execute a complex operation that culminates in combat operations in an extremely hostile operating environment.

Logically, brigades and battalions must develop standing operating procedures (SOPs) for actions in an ISB. Observations at the JRTC indicate that both heavy and light artillery units must be able to "lash up" a joint and combined fire support plan on short notice. The actions taken by the fire support coordinator (FSCOORD) and his staff in the ISB usually spell the difference between success and failure on the battlefield.

This article discusses the planning, preparation and execution phases that FA battalions deploying to an ISB must master. The key phrase Redlegs must remember for such contingency operations is, "Get Ready—Get Set—Go!"

## Get Ready— The Planning Stage

In a mature theater where a joint task force (JTF) has been established, it's common for a brigade commander to receive the division operations order immediately upon arrival in the ISB. At the JRTC, the brigade task force usually receives the order at D-4—just 96 hours before execution. Then the brigade must publish and brief its order about 24 hours later to maximize the time for subordinate battalions and companies to plan and rehearse appropriately. Several plans need to be developed concurrently in the ISB.

- **Fire Support Plan.** The FSCOORD and the brigade fire support officer (FSO) develop the fire support plan from the top down. Redlegs always work diligently on this plan, developing the target selection standards (TSS), attack guidance matrix (AGM) and the fire support execution matrix (FSEM) to the standards of *FM 6-20-50 Tactics, Techniques and Procedures for Fire Support for Brigade Operations (Light)*. However, the allocation of resources, the scheme of fires for the insertion and coordination with other firing units in country remain as challenges for FSOs at all levels.

In the ISB, coordination is difficult. JTF, division artillery, cavalry regiments, ANGLICO, Special Forces A Teams and host nation liaison officers must all provide input to the final fire support plan to be executed at H-Hour.

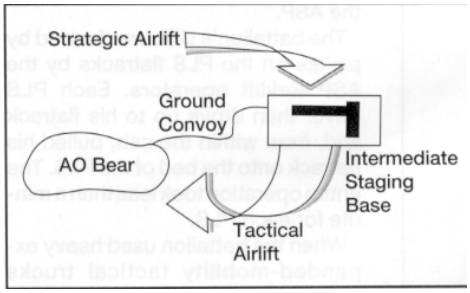


Figure 1: A Typical Deployment with an ISB. Most strategic airlift terminates in the ISB. Units then reconfigure their equipment from strategic to combat loads and convoy or go by helicopter into the area of operations—in this case, AO Bear.

| | D-1 | D-Day | D+1 | D+2 | D+3 | D+4 |
|---|---|---|---|---|---|---|
| Maneuver | JI/Deploy → | Deploy/Establish Lodgment → | | Combat Operations/Movement-to-Contact | | |
| FA Battalion | JI/Deploy → | Occupy Initial Firing Positions → | | Support Movement-to-Contact | | |
| | Supplies Received/Issued | Supplies Received/Issued | Supplies Received/Issued | Supplies Received/Issued | Supplies Received/Issued | Supplies Received/Issued |
| Class I | 1800/1800 | 0/0 | 3600/0 | 1800/2700 | 1800/0 | 0/0 |
| Class III | Deploy w/UBL | | | | | |
| Package | | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| DF2 | | 0/0 | 0/250 | 250/0 | 0/175 | 175/50 |
| MOGAS | | 0/0 | 0/75 | 75/0 | 0/55 | 55/90 |
| Class II/IV | | | | | | |
| Plywood | 768/768 | 0/0 | 0/0 | 0/0 | 75/0 | 0/75 |
| 4x4 | 120/120 | 0/0 | 0/0 | 0/0 | 60/0 | 0/60 |
| Pickets | 75/75 | 0/0 | 0/0 | 0/0 | 100/0 | 0/100 |
| Class V | (UBL) | | | | | |
| HE | 512/512 | 0/0 | 288/0 | 0/288 | 432/0 | 1284/720 |
| ICM | 602/602 | 0/0 | 0/0 | 0/0 | 144/0 | 0/0 |
| WP | 166/166 | 0/0 | 48/0 | 0/0 | 0/0 | 0/0 |
| ILL | 100/100 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| HC | 118/118 | 0/0 | 48/0 | 0/0 | 0/0 | 144/0 |
| HEPT | 68/68 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| APERS | 58/58 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| HE-CHG 8 | 240/240 | 0/0 | 0/0 | 0/0 | 144/0 | 0/44 |
| Small Arms | | | | | | |
| 5.56 | 12000/12000 | 0/0 | 2200/0 | 0/2200 | 3000/0 | 0/3000 |
| 7.62 | 3500/3500 | 0/0 | 1000/0 | 0/1000 | 1500/0 | 0/1500 |

***Legend:***
DF2 = Diesel Fuel
MOGAS = Motor Gasoline
HE = High Explosive
ICM = Improved Conventional Munition
WP = White Phosphorous
ILL = Illumination
HEPT = High-Explosive Plastic-Tracer
APERS = Antipersonnel
Chg 8 = Charge 8
UBL = Unit Basic Load

Figure 2: Sample FA Battalion CSS Execution Matrix for Resupply. The "Received" column is the quantity received by battalion trains via aerial delivery. The "Issued" column is the quantity issued by battalion trains to the firing batteries.

• **Movement Plan.** Most strategic airlift terminates in the ISB. There units reconfigure their equipment from strategic loads to tactical loads and board helicopters or Air Force aircraft for the final insertion into the area of operations (AO). Heavy equipment, such as tanks, Bradley fighting vehicles (BFVs) and engineer assets, will probably conduct a ground convoy from a C5-capable airstrip into the AO, necessitating a link-up plan. In support of the brigade commander's scheme of maneuver, the movement plan becomes a two-part exercise.

The first step in developing the movement plan is the prioritized vehicle list (PVL). Two PVLs must be developed: one for tactical air movement and one for tactical ground convoy.

The second step is the development of the brigade's air-ground movement schedule prepared by the brigade movement planner based on input from the FA battalion S3. Integration of all the artillery battalion assets into the movement plan in the proper sequence to support the commander's scheme of maneuver must occur. Convoys and tactical air movement chalks must be configured in accordance with the task organization. The FA battalion must plan the movement of command and control assets, combat service support (CSS) assets, firing batteries, the Q-36 radar and survey.

At the JRTC, the deployment of the Q-36 radar, a firing element and a jump tactical operations center (TOC) early in the brigade's insertion continues to be a successful technique. The radar and the firing element provide coverage for the brigade during the expansion of the lodgment area or airhead. Force protection, route reconnaissance and countermine operations must be integrated into the movement plan. Ammunition and CSS assets necessary to sustain the FA battalion for the first three to four days also must deploy early in the airflow.

• **Logistics Plan.** Integrating logistics and tactical planning at the battalion level continues to present a significant challenge to units during rotations at the JRTC. Too often, commanders and operations planners develop the scheme of maneuver and concept for fires separately and then ask the logisticians to devise a logistics scheme to support the overall plan. Obviously, logistics plans and operations plans must be developed concurrently.

If this doesn't occur, then CSS actions may cause lapses in support and combat power will be plagued with peaks and valleys rather than being sustained. The battalion logisticians must identify available resources (bearing in mind that Cortina is remote), haul capabilities, stocks of supplies that will deploy with the unit and consumption rates.

The artillery battalion's logistics support hinges on the brigade's aerial resupply plan. The aerial resupply plan will be the lifeline for its subordinate battalions for several days or weeks. In an austere theater, virtually 100 percent of logistics support

will arrive via air lines of communication.

The FA battalion S4 must project requirements for resupply based on the scheme of fires. (See the sample FA battalion CSS execution matrix in Figure 2 on Page 15.) Ammunition, construction material, food and water all compete with each other for priority of airlift.

Successful units prepare a "menu" of necessary supplies, rigging 463L pallets or A22 containers with them before leaving the ISB. Then as C130s or helicopters become available, the pre-rigged loads are delivered to drop zones or landing strips according to a pre-arranged schedule. Minor adjustments can be made by substituting different items on the menu.

Of course, a landing zone recovery plan with adequate security is mandatory. The Redleg support platoon, with help from the forward support battalion, must recover the loads off the drop zone before they are captured by the enemy.

• **Casualty Evacuation Plan.** Units often deploy with operations plans and orders that contain voluminous health service support annexes. However, rarely do all the players involved really understand how medical evacuation will occur on the battlefield and what Level III health care facilities are available in country. Clearly a coordinated effort is necessary to plan, develop, war-game and rehearse an evacuation plan for mass casualties.

All Redleg leaders must know how and when to evacuate their wounded once they arrive in country. Key leaders must know the locations of casualty collection points, ambulance exchange points and battalion aid stations.

Artillery batteries must evacuate casualties by ground transport whenever possible, saving aeromedical evacuation for litter-urgent patients. Five-ton trucks or heavy expanded-mobility tactical trucks (HEMTTs), when properly configured, are ideal platforms for back hauling wounded in action (WIA) and properly treated litter-urgent casualties from casualty collection points to the brigade support area (BSA).

## Get Set— The Preparation Stage

Once the brigade order is briefed, the FA battalion S3 immediately prepares a time line of events to accomplish before departing the ISB. By D-3, the FA battalion and its attachments are working non-stop reconfiguring vehicle loads and preparing all equipment for the tactical insertion. Time is of the essence as key leaders conduct backward planning from the objective to the flight strip. The one-third for planning and two-thirds for implementation rule clearly applies at all echelons.

First, the FSCOORD, S3, S2 and the targeting officer assist the brigade FSO by participating in the brigade targeting meeting. Under the leadership of the brigade executive officer, this meeting has a clear agenda and follows the decide-detect-de-liver methodology described in *FM 6-20-10 Tactics, Techniques, and Procedures for the Targeting Process*.

Targeting meetings focus the entire combat power of the brigade (lethal and non-lethal) on high-payoff targets that will defeat the enemy and support the brigade commander's scheme of maneuver. The targets approved must be specific, achievable and well known throughout the brigade. Further, each target must have a purpose within the scheme of maneuver.

At the conclusion of the targeting meeting, the brigade S3 publishes a fragmentary order (FRAGO) delineating the targeting responsibilities of staff sections and subordinate units for the next 24 to 36 hours.

Second, rehearsals take place at all echelons in the ISB. The brigade commander usually conducts a combined arms rehearsal, often beginning with a large walk-on terrain kit. Each FSO must walk on the terrain kit with his maneuver commander and describe exactly where the targets are and who will shoot them. Similarly, each mortar platoon leader and battery commander should illustrate the scheme of fire support and the movement of each weapon system. The ranking artilleryman for each phase of the insertion must be identified at the combined arms rehearsal so maneuver commanders will know who to call to resolve any conflicts with fire support.

If possible, fire supporters should conduct a separate systems rehearsal immediately following (or prior to) the combined rehearsal. The intricate details of naval gunfire, close air support (CAS), suppression of enemy air defenses (SEAD) and pre-assault fires are worked out at the fire support rehearsal.

Third, Redleg NCOs must conduct troop-leading procedures. These procedures must include a thorough pre-combat inspection. Weapons systems and vehicles must be combat loaded to rigorous standards before the initial insertion. Basic battle drills, such as the verification of weapons zero, counterambush techniques and layout of section equipment, will yield great benefits on the battlefield. Ammunition, both main gun and small arms, must be carefully loaded, and troops must be briefed in detail on the enemy situation and the rules of engagement (ROE). Successful units often develop simple vignettes to drill soldiers as they prepare to enforce the ROE. Load plans are carefully checked and the means of entry—heavy drop parachute, helicopter or C130 aircraft—is rehearsed at the small-unit level.

Fourth, the joint inspection (JI) takes place for those units that will land in the AO. Known as the "first battle of the JRTC," the JI is a meticulous, time-consuming process where rolling stock and personnel are inspected by a joint Army/Air Force team of experts who certify all aircraft loads for safe loading and air operations. Great emphasis is placed on proper load plans, tie-down procedures and loading and handling of hazardous materials, including all flammables and ammunition.

Heavy attachments to light Army units frequently experience difficulty with the JI process, resulting in long lines of frustrated chalks. Each improperly rigged vehicle must be reloaded, reweighed and reinspected before it can be rolled aboard aircraft. During the JI, loading teams will manifest and weigh all personnel and equipment before loading the aircraft. Key leaders must be present at all stations of the JI process so the unit can maintain its time line.

Last, a communications exercise of some sort is of great importance before wheels up. Each FM and digital radio operator in the FA battalion should enter his appropriate radio net at some time over a two-or three-day period in the ISB, validating the unit's communications capability. If possible, the battalion also should conduct a communications rehearsal with the brigade and the maneuver battalion FSOs before the aircraft are loaded.

In a matter of hours after the aircraft take off, the brigade will be split between the ISB and the objective area, totally dependent on radio communications to orchestrate the insertion, pre-assault fires, SEAD programs and close supporting fires in the vicinity of the flight landing strip. A simple communications rehearsal in the ISB often spells the difference between success and failure.

Redleg staff officers plan for deployment into the area of operations at the JRTC.

## Go—The Execution Stage

A successful deployment from the ISB into the AO requires decentralized execution. Battery commanders and their NCOs are the keys to success.

Command and control during the insertion is a real challenge. At the JRTC, the ISB and the AO are 50 miles apart. FA battalions must deploy a command post (CP) of some sort into the AO early. A jump TOC that can secure and sustain itself for up to 48 hours is probably the best way to control the deployment.

The FA battalion S3 is the logical choice to go forward and execute the movement plan. The artillery battalion executive officer is the right person to "push" the battalion out of the ISB. A retransmission capability between the ISB and the AO completes the communications link if satellite communications (SATCOM) or high-frequency (HF) assets are unavailable.

The first element into the AO is usually the brigade's assault force. The assault force deploys with enough security and communications assets to seize the initial lodgment and communicate the conditions of the routes in. The assault force must be prepared to sustain itself in a hostile environment for up to 48 hours—at least until the brigade TOC arrives. Engineers and Redlegs attached to the assault force can often begin the reconnaissance for and preparation of firing positions, depending on the enemy situation.

The next step is the expansion of the lodgment by maneuver forces and the air follow-on of combat support assets, including FA and mortars. Clearing and protecting the flight landing strip—from which all support will flow—becomes a priority mission. Firing batteries and Firefinder radars arrive in the lodgment early in the airflow.

Firing positions are established with force protection as the most important consideration. FA battery and Q-36 radar positions require extensive engineer support for survivability. Additionally, a 6400-mil capability is important to provide coverage for the entire brigade zone.

Frequently, two days pass before all elements of the fire support system arrive on the battlefield ready to provide support to the brigade commander through the coordinated efforts of the FSCOORD and his staff. The complex process of deploying an FA battalion from home station to the ISB pales in comparison to the planning and preparation that takes place in the ISB before the tactical insertion. One lesson is clear: the 96 hours a unit spends in the ISB is crucial for success in Cortina.

## Observations on Power Projection

Rotations during the past 18 months at the JRTC have clearly established that the actions in the ISB set the tone for the entire training exercise. Units that can plan, prepare and execute violently usually achieve early success.

The following training observations are presented to assist units as they plan for operations in an ISB. We are confident that the observations apply in combat operations as well.

• Centralized planning in the ISB and decentralized execution in the AO will yield the best chances for success.

• An 80 percent plan is good enough. Conduct a detailed war game in the ISB and publish the FA support plan (FASP). The soldiers need more time than the planners to prepare for the insertion.

• Rehearse the movement plan as well as the operations plan—you can't win if you can't get into the AO.

• Conduct a valid communications exercise (COMMEX) in the ISB, even if it competes with the JI process.

• Recognize early on that fire support will be austere on D-Day. Naval gunfire, mortars and 105-mm howitzer platoons offer fast, all-weather fire support up front.

• The JI is the "first battle"—do it right the first time and you'll free up lots of time leaders can use for rehearsals and troopleading procedures.

• The aerial resupply plan is your lifeline for contingency operations. Construct a menu of commodity items, such as ammunition, barrier materials and food and water. Then select from the menu and recover the supplies as they arrive by parachute or C130 aircraft.

• Force protection will probably be your greatest concern for the first few days of combat in an area saturated with insurgent forces—you must survive to shoot.

• Expect at least one of the following to occur in the first 24 hours of combat: some key leader will become a casualty; a critical piece of equipment will fail; weather will affect the operation in some unforeseen way; or you'll lose FM communications at a critical time in the fight. Don't forget that the one thing you can count on is Murphy.

• Remember, the enemy has a vote. Expect him to work diligently to unravel your plan.

If units faithfully and systematically "Get Ready—Get Set—Go!" they'll minimize problems and increase their chances for victory. With proper planning, coordinating and rehearsing, the battery commander who calls his battalion S3 will report, "Alpha Battery, ready for action!"

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# Stay Hot, Shoot Fast:

# An Evolving Concept in MLRS Tactics

by Lieutenant Colonel L. Scott Lingamfelter
and Captain Robert D. Kirby

Desert Storm clearly demonstrated the destructive combat power that the multiple-launch rocket system (MLRS) brings to the modern battlefield. Moreover, it pointed out that fire support systems capable of ranging the depth of the battlefield can effectively destroy a potential enemy before he can bring the full weight of his combat power to bear on our forces. The Iraqis learned this lesson firsthand. Other potential enemies US and allied forces may face also have noted the power of MLRS.

While these potential adversaries find it difficult to match the technology of MLRS, they can and have improved their fire support systems designed to challenge our fire support system and the tactics we employ. In particular, they've sought to increase the range of cannon and rocket systems not only to reach deep into our side of the battlefield, but also to ensure they can remain out of MLRS' deadly range.

More importantly, they have sought to develop tactics to decrease their dwell time—their exposure time—at a particular firing point. Consequently, we're pressed to develop tactics, techniques and procedures (TTP) to ensure we can bring destructive fire on targets before the enemy systems can displace to new firing points. The challenge is to design TTP to take down enemy fire support systems shortly after they're detected.

## Five-Minute Response

Setting a rigorous response standard, we assume an enemy system can emplace, fire and displace in five minutes. Our superior target acquisition means can acquire the enemy's fire in less than a minute. With hustle, it takes two minutes to process the fire mission within our own system. Once the mission has been transmitted to the launcher, another one to two minutes may be consumed by the launcher's moving from a hide position to a firing point. At the firing point, the launcher requires at least one minute and 15 seconds to elevate and traverse to the target. Assuming a range-to-target of 20 kilometers, the time of rocket flight will be at least another minute. Total response time for this hypothetical mission is seven minutes and 15 seconds—well within the mission training plan (MTP) standard of 16 minutes without travel time from the hide area.

But that excellent time is two minutes too slow to engage a five-minute target. While some will argue that we can save time by shooting rockets over the cab (a capability for targets beyond 19.5 kilometers with Version 6.06 launcher software) and employing sensor-to-shooter shortcuts, we still will be pressed to attack the target in less than five minutes.

Fortunately, there are some capabilities in the Versions 6.05 and 6.06 software that permit us to lay our launchers on predetermined targets and fire them as soon as targets are acquired. To do so, however, the launcher must *remain* in a "hot" status on a firing point—more exposed to enemy attack than when the launcher is concealed in a hide area waiting for a fire mission.

## Stay Hot, Shoot Fast TTP

The 6th Battalion, 37th Field Artillery assigned to the 2d Infantry Division Artillery in the Republic of Korea has recently tested a technique now known as "Stay

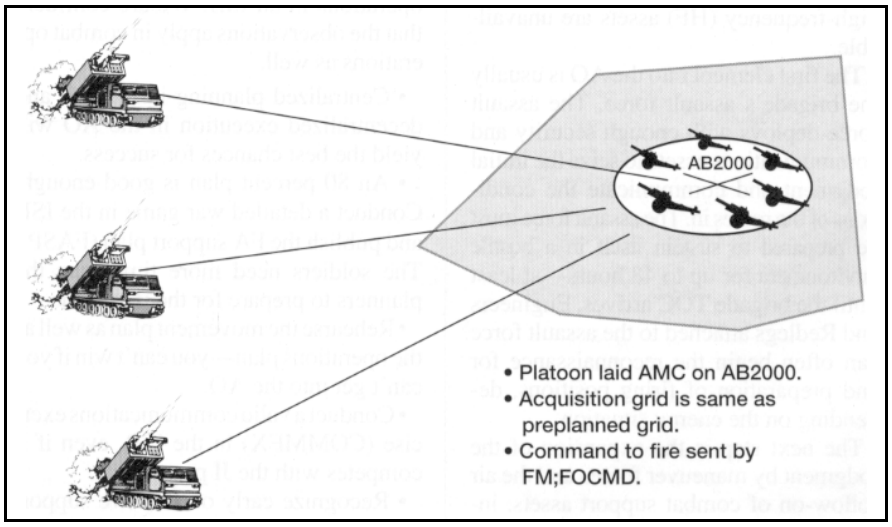



Figure 1: Fire mission Using FM;FOCMD.

Hot, Shoot Fast." This technique places a launcher on a firing point and laid—launcher-loader module (LLM) elevated—on a target grid of an expected enemy system. The method of control is at-my-command (AMC).

**Fire Mission Using FM;FOCMD.** When an enemy target is acquired firing from the expected grid, the battery operations center (BOC) uses its fire direction system (FDS) to send a fire order to the launcher(s) to engage the preplanned target(s). This is accomplished by executing an FM;FOCMD (fire mission; forward observer command) sent from higher or by calling up an FM;FOCMD from the message index, entering the original target number and FIRE in the CONT (control) field, then pressing execute. MLRS;CFFs (MLRS; calls-for-fire) are displayed and then transmitted using the XMIT key for each launcher assigned the mission. The launcher receives the command to fire and fires the number of rockets specified in the original fire order.

In tests conducted in the field, the total time required to execute this technique was about 21 seconds. If you add this time to the time to acquire the target and select the right unit to fire and the flight of the round, MLRS can engage a target in less than three minutes. (See Figures 1 and 2.)

However, our enemies won't always be cooperative enough to use the firing points we've templated. Suppose they elect to vary their firing points? Again, our current software permits us to meet this challenge using Stay Hot, Shoot Fast TTP.

**Fire Mission Using Amendment Fan (Shift Zone).** Instead of firing the preplanned target grid, the fire mission is shifted, or amended, to the new target grid acquired by our systems. The launcher will accept amended missions up to 200 mils on either side of the direction of fire to the preplanned target for a total shift fan of 400 mils (Figure 3).

The BOC can plot the amendment fan, or shift zone, on its operations map for all launchers laid on a potential target. This is done by plotting the launcher location and target location, drawing the azimuth to the target and then plotting azimuths 200 mils left and right of the azimuth to the target. When you add the minimum and maximum ranges to this fan, the result is a shift zone where the launcher can engage targets using amended mission procedures.

When an acquisition source sends the target location to the BOC, fire direction personnel determine which launcher or launchers can engage the target and then send an amended CFF to the unit(s) to fire. This procedure requires the FDS operator to use the FM;CFF of the preplanned mission (recalled from the database or sent by higher) and modify it for the new (or actual) target location. (The operator verifies that the target number remains the

1. FDC receives FM;CFF with "AMC" in the CONT field from higher.
2. FDC verifies the grid and the following information—
   a. TGT field enter target block number.
   b. CONT field enter AMC. c. SH field enter JED.
   d. SIZE field enter (dictated by higher).
   e. UFFE field enter PLT to fire.
   f. OVRIDE field enter X.
3. FDC executes FM;CFF.
4. FDC transmits MLRS;CFF for each launcher (fields are protected).
5. Launcher crew acknowledges alarm.
6. Initial firing data appears on FCP.
7. Gunner transmits WILCO to FDC.
8. Launcher moves to correct heading.
9. Gunner pushes launcher lay.
10. Ready-to-fire message is transmitted automatically to FDC.
11. FDC receives MLRS;STATUS of READY from launchers and executes.
12. FM;FOCMD with READY is generated after third launcher is ready.
13. FDC transmits FM;FOCMD to higher.
14. FDC receives FM;FOCMD from higher with FIRE in the CONT field.
15. FDC executes FM;FOCMD.
16. MLRS;CFF is generated with FIRE in the CONT field.
17. FDC transmits MLRS;CFF to launchers (do this for each launcher).
18. Launcher receives MLRS;CFF.
19. Launcher crew acknowledges alarm.
20. Gunner transmits WILCO to FDC.
21. Gunner arms and fires according to prompts.
22. MLRS;MFR is automatically sent to FDC.
23. FDC executes the MLRS;MFR.
24. OPSTAT is automatically sent to higher.

Figure 2: Fire Mission Processing Using FM;FOCMD.

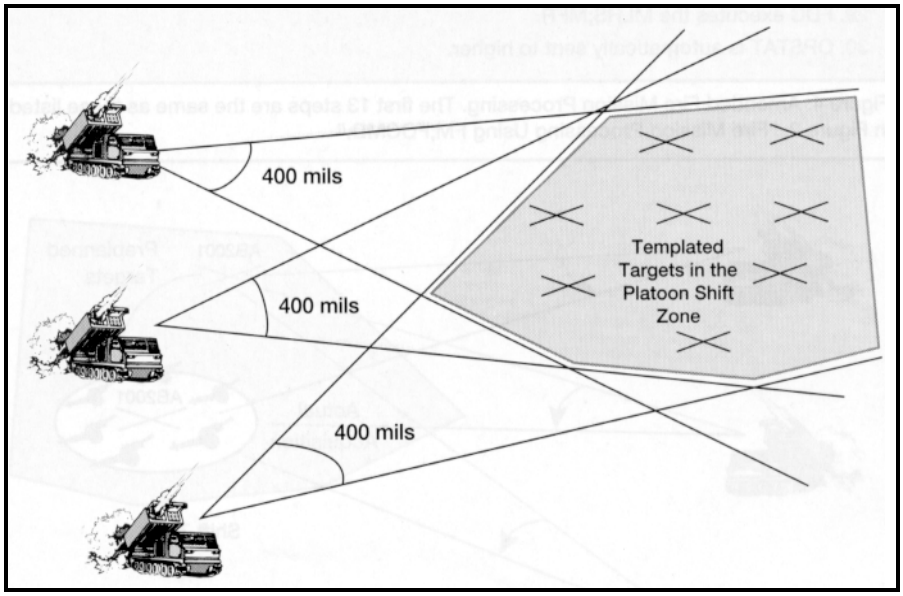



Figure 3: Amendment Fan (Shift Zone).

same as the preplanned target and enters the new target location and an X in the OVRIDE field.) The operator executes this FM;CFF and then transmits the MLRS;CFF(s) to the launcher(s). These MLRS;CFFs will have an A in the ACT field. The launcher receives the new CFF with a prompt indicating that it has received an amended CFF from the BOC.

During this sequence, the launcher transmits to the BOC an MLRS;STATUS message with CANCOM (can't comply) in the MSTAT (mission status) field because it already has a mission assigned with the same target number. The FDS operator should ignore this message, delete it and continue with the mission.

The gunner presses the alarm acknowledge key then launcher lay key on the fire control panel (FCP) and the LLM traverses to the new target location without first having to stow the LLM. When the prompts appear, the gunner then arms and fires rockets.

Depending on the amount of shift, the launcher can respond to the new grid and fire in about 45 seconds. The total mission time for an amended mission is about four minutes, including acquisition time, actions in the BOC and a time of flight of about one minute. This is more than enough time to engage a target exposed for five minutes. (See Figures 4 and 5.)

**Processing and Firing Challenges.** There are distinct challenges to an MLRS unit using Stay Hot, Shoot Fast TTP. First, the BOC must closely monitor the status of launchers and the data base associated with them. The Stay Hot, Shoot Fast procedures require the precise location and status of each launcher to work properly. Any error that goes undetected until the fire mission is processed simply adds more time to correct the error and execute the mission when we can least afford the time to do so.

Secondly, Stay Hot, Shoot Fast requires clean digital communications from the BOC to launcher. First time acknowledgement of messages is crucial. Any non-acknowledgements or no acknowledgements adds more time to the processing. Thirdly, the launcher and fire direction crews must be well rehearsed in the battle drills associated with the Stay Hot, Shoot Fast TTP. (See Figures 6 and 7.) Quick trigger fingers ensure we can beat the rigorous time challenge imposed by the enemy.

Last, the launcher must park on or as close to the park heading as possible. Any mils sacrificed by not parking on the parking heading may take mils away from the shift fan and cause the launcher to reject the mission.

14. FDC receives FM;CFF from higher with WR in the CONT field.
15. FDC verifies the grid and the following information—
    a. TGT field verify the same target number as AMC mission (change as necessary).
    b. CONT field has WR.
    c. SH field enter JED.
    d. SIZE field enter (dictated by higher).
    e. UFFE field enter PLT to fire.
    f. OVRIDE field enter X.
16. FDC executes FM;CFF.
17. MLRS;CFF is generated with A in the ACT field.
18. FDC transmits MLRS;CFF to launchers (do this for each launcher).
19. Launcher receives MLRS;CFF.
20. Launcher crew acknowledges alarm.
21. FDC receives MLRS;STATUS with CANCOM in the MSTAT field. ***Delete*** this message.
22. Amended target data prompt appears on FCP.
23. New firing data appears on FCP.
24. Gunner verifies launcher heading.
25. Gunner transmits WILCO to FDC.
26. Gunner pushes launcher lay.
27. Gunner arms and fires according to prompts.
28. MLRS;MFR is automatically sent to FDC.
29. FDC executes the MLRS;MFR.
30. OPSTAT is automatically sent to higher.

Figure 4: Amended Fire Mission Processing. The first 13 steps are the same as those listed in Figure 2, "Fire Mission Processing Using FM;FOCMD."

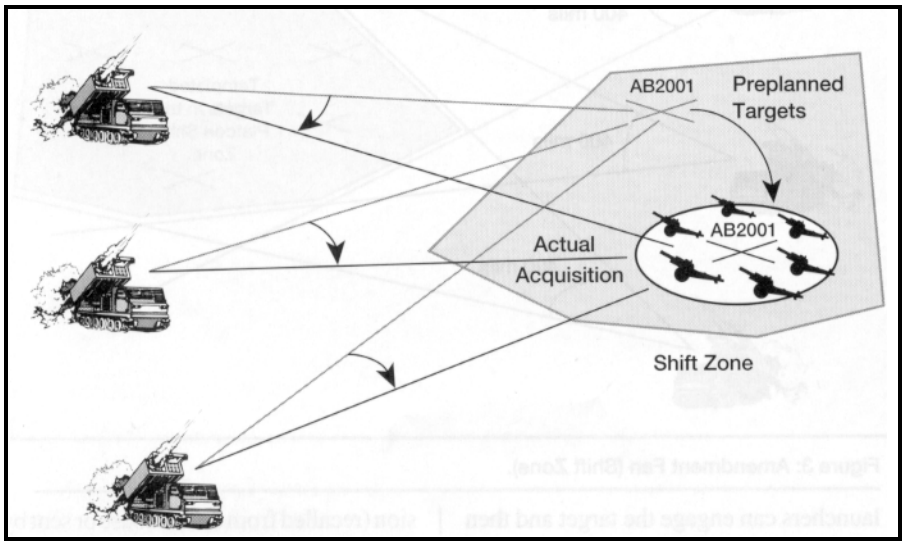



Figure 5: Amended Mission.

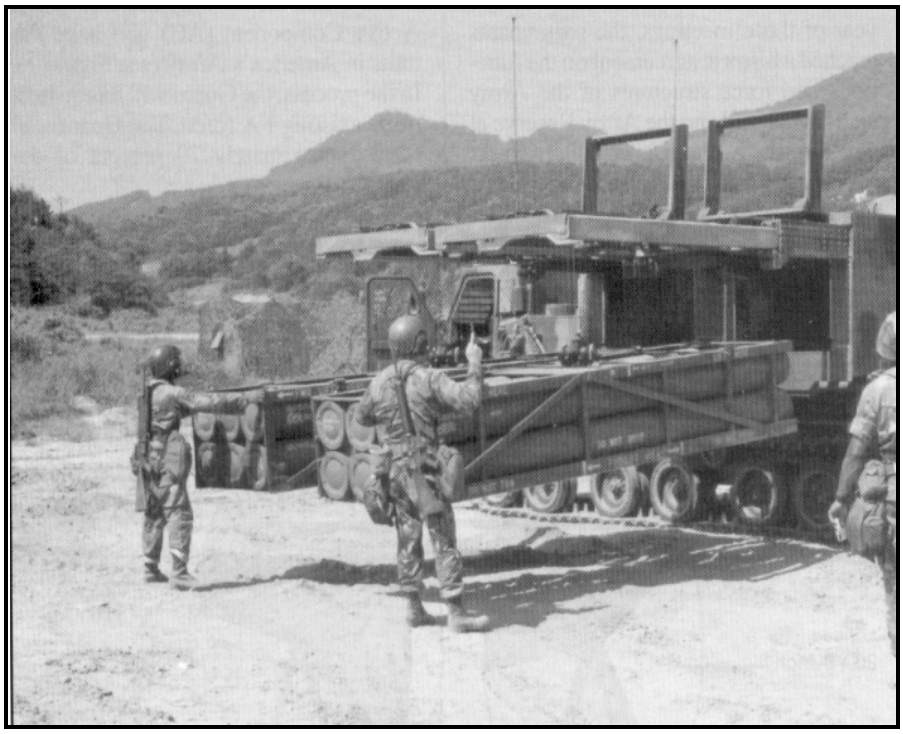
## Assuming the Risk

The final challenge is breaking the paradigm that launchers must operate from hide areas as our current doctrine states. We recognize the launcher's vulnerability on a firing point as opposed to the relatively better security of a hide area.

Given that our enemies will try to acquire our launchers as rapidly as possible to end our devastating fires, we must be willing to "up the ante" by assuming greater risk on firing points. This may be very unsavory to those who feel our system was designed to work from hide

1. Receive AMC mission from higher.
2. Make corrections, if needed.
3. Put unit to fire in UFFE field of FM;CFF.
4. Put X in OVRIDE field of FM;CFF.
5. Execute the mission.
6. Transmit MLRS;CFF to the launchers.
7. Wait for MLRS;STATUS message of READY from all launchers and transmit to higher.
8. While the launcher is laid on the target, receive FM;CFF with current or new target number and new grids with WR in CONT field.
9. Call off new grids to the operations officer and plot the new grids.
10. Verify all information in FM;CFF and make any changes needed for amended missions (number of rounds, target number, platoon for fire, size, etc.); the target number is changed to the target number the launchers are currently laid on.
11. Put X in OVRIDE field and execute.
12. MLRS;CFF is generated for transmission to all launchers assigned the mission.
13. Verify that an A is in the ACT field of the MLRS;CFF message for the amended mission and transmit to the launchers.
14. Receive MLRS;STATUS message with CANCOM in the MSTAT field. ***Delete*** this message. If executed, an EOM will be transmitted to the launcher, cancelling the mission.
15. Wait for the MFR from each launcher and execute all of them.

Figure 6: Amended Fire Mission Processing—BOC Battle Drill.



Quick reloads with ammunition prepositioned at the firing point are an essential part of the Stay Hot, Shoot Fast TTP.

positions under all circumstances. However, the alternative of permitting the enemy to escape our grasp by his scooting before we can shoot is unacceptable.

Nevertheless, by selecting well concealed firing points, nestled in hillside cuts, valleys or stream beds, units can minimize launcher vulnerability to observation by enemy ground forces, particularly special operations forces (SOF). Additionally, after each fire mission, the launcher should scoot to another firing point, reload with ammunition prepositioned there and lay on the next preplanned target.

Clearly it would be better if we had faster processing software for both the FDS and launcher. Without a doubt, the most important change we can make to our system is the improved launcher mechanical system (ILMS) that will reduce launcher lay time to about 15 seconds. But even with the ILMS, Stay Hot, Shoot Fast TTP are needed to ensure we can "outdraw the bad guys"—when the time comes.

1. Receive AMC CFF from FDC.
2. Push alarm acknowledge.
3. Initial data will be displayed.
4. Transmit WILCO.
5. Park on heading.
6. Push LCH LAY.
7. Ready-to-fire message is transmitted automatically.
8. Await amended mission.
9. Receive WR CFF.
10. Push alarm acknowledge.
11. Amended Target Data message appears.
12. Transmit WILCO.
13. The amended data will be displayed.
14. Press LCH LAY.
15. Arm and Fire.
16. STOW the LLM.

Figure 7: Amended Mission Processing—Launcher Battle Drill.

**Lieutenant Colonel (Promotable) L. Scott Lingamfelter commands the 6th Battalion, 37th Field Artillery (MLRS), 2d Infantry Division Artillery, in Korea. His previous assignments include serving as S3 and Executive Officer of the 1st Infantry Division (Mechanized) Artillery at Fort Riley, Kansas, and in the Persian Gulf during Operations Desert Shield and Storm; Battalion Executive Officer of 1st Battalion, 76th Field Artillery in the 3d Infantry Division (Mechanized) Artillery, Germany; and Battery Commander in the 2d Battalion, 92d Field Artillery, in the 42d Field Artillery Brigade, also in Germany.**

**Captain Robert D. Kirby commands B Battery, 6th Battalion, 37th Field Artillery (MLRS), 2d Infantry Division Artillery. His previous assignments include serving as a Battalion Liaison Officer and then Platoon Fire Direction Officer in the 4th Battalion, 7th Field Artillery, 42d Field Artillery Brigade, V Corps, Germany, and a firing Platoon Leader for two batteries: E Battery, 7th Field Artillery, 10th Mountain Division (Light Infantry) Artillery, Fort Drum, New York, and C Battery, 4th Battalion, 77th Field Artillery, 41st Field Artillery Brigade, also in V Corps, Germany.**

## National Guard FA:

# A Decisive Force for Strategic Victory

by Brigadier General William C. Bilo

*...a fighting force of citizen-soldiers, the provider of units to augment the active force, an integral part of America's Army, trained and ready for both warfighting and domestic missions.*

America's Army's Vision of the National Guard
Major General John R. D'Araujo, Jr.
Director, Army National Guard

The spirit of the Army National Guard soldiers of the present and the future is rooted in more than 358 years of experience, service and commitment to the United States. The Army National Guard is affordable, accessible, capable and, ultimately, expandable to meet the needs of an ever-changing national security environment.

Moving toward the future, we'll continue to build on our tradition of service to our nation, states and local communities. Our soldiers will continue to focus on achieving seamless integration with the other components of America's Army by concentrating on resource multipliers and demonstrating competence in the key areas of affordability, accessibility and deployability.

The active and Guard components of the Army's Field Artillery (FA) community will be more related, integrated and responsive to each other than ever before. This is because the leaders of America's Army have come to a common ground on force structure. With nearly all combat arms missions in the Army National Guard and the active Army, the Guard will share the FA community's vision: a force equipped with the most modern systems for accurate, timely fire support.

**Reserve Component Leaders' Meetings and the "Off-Site" Agreement.** Directed by the Chief of Staff of the Army, the Vice Chief of Staff hosts frequent, periodic meetings among the senior leaders of the National Guard, the Army Reserve and their respective support organizations. The goal of these meetings is to resolve differences at the highest levels, enabling America's Army to speak with a single voice and present a shared vision of what America's Army is and does.

In December 1993, after more than a year of these meetings, the participants reached a historic agreement on the functions and force structures of the Army National Guard and the Army Reserve at the "end state"—the point at which America's Army will have converted from a Cold War Army to the Army of the 21st century.

Among other things, this agreement realigns the missions of the Army National Guard and the Army Reserve. Nearly all combat arms missions are moving to the Army National Guard. For the FA community, this means only the Guard and Active Component (AC) will have FA units in America's Army (see Figure 1). In the process, the Guard will retain most of its existing FA force. The Guard will have approximately 70 percent of the total FA force.

Our weapon/tube count will increase from 1,776 to 2,248 with 3x6 to 3x8 conversions the major contributor to the increase (see Figure 2). All Guard 8-inch

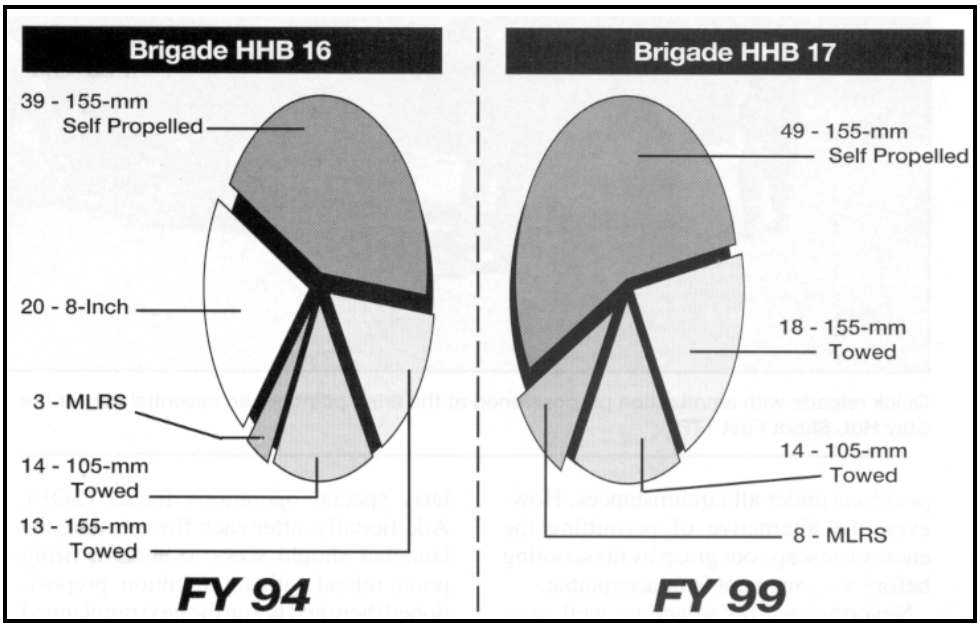



Figure 1: Army Guard Field Artillery Battalions Today and Tomorrow. The number of FA battalions, 89, will remain the same from FY 94 to FY 99; however, some of the battalions' weapons systems will change.

*"'Steel Rain': National Guard in Desert Storm," a painting by Frank M. Thomas*

battalions will convert to 155-mm howitzers or multiple-launch rocket systems (MLRS).

In the scheme of things, this won't have a large impact. The Army Reserve will inactivate units affecting about 3,100 soldiers while the Guard will retain a similar number of spaces it otherwise would have lost. The Army Reserve will remain a reservoir of trained, experienced individual artillerymen for America's Army that the Guard will actively seek out. We need and want that talent.

**Guard FA Readiness.** In demonstrating the *capability* of the Guard artillery, we need to look at readiness in this period of declining resources. Our highest priority units are our corps artillery battalions and the FA battalions in our former round-out and round-up brigades. Now that all AC divisions have three full maneuver brigades, the mission of the seven National Guard round-out and round-up brigades has changed—they're now the highest priority of our 15 "enhanced readiness" brigades.

In those brigade artillery battalions and our corps FA battalions, our equipment-on-hand readiness has steadily improved for all equipment during the last three years. The equipment-on-hand readiness for pacing items—those items most critical to the mission—has improved as well, with an increase of more than 10 percent in the last three years. The Guard continues to improve in all readiness areas—personnel and training as well as equipment—as we look at total systems fielding and resourcing.

By the end of FY 95, we plan to have all corps artillery units at an overall readiness level of C-2 ("can undertake most of its wartime mission") or better on all dimensions, according to the Joint Status of Resources and Training System (SORTS—for the Army, AR 220-1). An exception is units in Contingency Force Pool Support Packages 1 through 4 and any Force Activity Designator (FAD) II units we plan to keep at the C-1 level ("can undertake full wartime mission"). The artillery battalions in the enhanced readiness brigades will train to C-3 ("can undertake many but not all portions of the wartime mission") and maintain equipment-on-hand, equipment serviceability and personnel readiness levels at C-1.

We know we won't be able to maintain these high readiness rates in our lower priority units, particularly in our division artilleries, due to resource limitations. We'll focus our resources on those units programmed for use early in mobilization. However, we'll provide our "strategic hedge" units (our eight combat divisions and the three brigade-equivalents not identified as enhanced readiness brigades) the resources to maintain C-3 readiness levels across the board. This is the minimum needed to keep units cohesive and usable.

Every unit will have at least 15 days of annual training, 48 unit training assemblies (two training days each month) and 50 percent of validated full-time manning requirements. In addition, they'll have 75 percent Equipment Readiness Code (ERC) P1 and ERC A equipment fill (the equipment necessary to perform warfighting missions) and training seats for 67 percent of duty military occupational specialty (MOS) qualifications.

The hedge brigades will train as needed for their most demanding employment missions. We must never forget that Guard divisions have found themselves in action in less than 24 hours in response to riots in Los Angeles, floodwaters in the Midwest and Southeast, earthquakes and fires. It's our military command and control capabilities that allow our Guard units to synchronize both people and resources to meet such demands.

**The Army National Guard FA Coordination Council.** To identify improvements or enhancements for Guard FA units, this Council was formed at the direction of the Acting Chief of the National Guard Bureau in October 1993. I chair the Council, and it includes representatives from the National Guard Bureau staff and Guard officers at Fort Sill, Oklahoma, and Fort Leavenworth, Kansas. In forming the Council, we assumed that the National Guard FA force structure would increase and modernize and that the Guard could accept additional structure. Our task is to determine how to enhance the readiness of Guard FA units.

The Council has identified several key concerns. First is system fielding techniques. When a unit gets an equipment "upgrade," it needs everything that comes with it: support equipment, item-peculiar supplies and parts and, perhaps most important, training for both operators and mechanics. Effective conversion requires total package fielding.

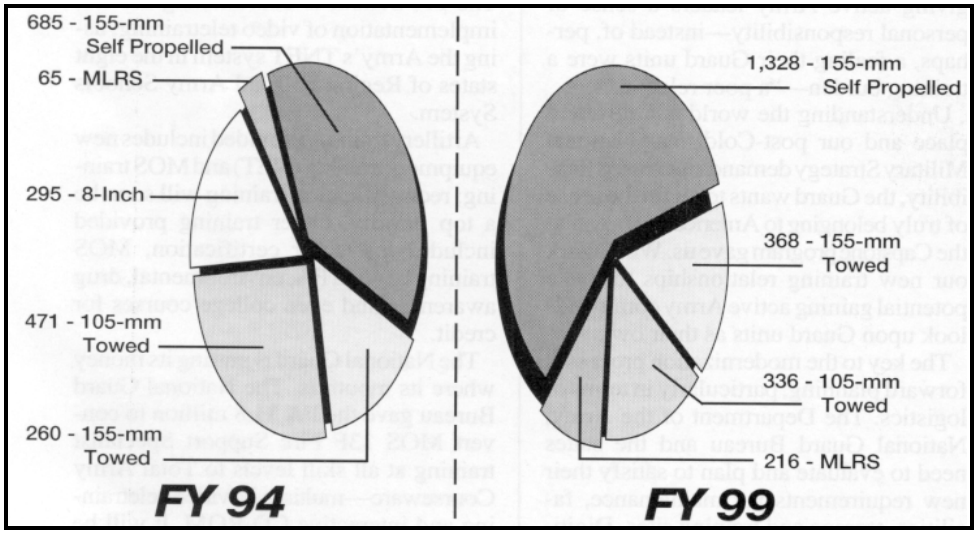



Figure 2: Army National Guard Artillery Tubes Today and Tomorrow. The number of artillery tubes rises from 1,776 in FY 94 to 2,248 in FY 99—an increase of 472 tubes. The tube increase is due primarily to 3x8 conversions.

Another concern is system compatibility. In modern, information-based warfare, fires must be closely integrated and coordinated. If 70 percent of our artillery—the Guard FA—can't talk with supported commanders and is not integrated into fire support command, control, communications and intelligence systems, our effectiveness is compromised.

The next concern is system availability. When will new systems become available so we can retire old systems? We don't want to go through the drill of transitioning to interim systems and then to the end state, doubling costs plus significantly increasing turbulence.

The last major area of concern the council identified was maintaining our edge—which amounts to training, recruiting and retaining soldiers; coordinating with the AC and aligning with AC commands. One related issue is the increase in MOS 13-series soldiers due to ongoing conversions to 3x8. This has implications for recruiting, retention and allocation of training seats.

Another related issue is the importance of forward planning. Before the force is modernized, expanded and up-gunned, both the National Guard Bureau and states need to consider the impact on stationing, recruiting, training seats, scheduling training facilities and scheduling collective training.

**Corps FA.** The largest and, perhaps, most important part of the Guard FA force is found at echelons above division (EAD). One of the six Guard FA battalions that supported the allied attack into Iraq was the 1st Battalion, 158th Field Artillery, Oklahoma Army National Guard. It supported the ground assault with responsive, accurate and devastating MLRS fires throughout the campaign. During the next several years, the Guard expects to assume a growing part of the MLRS mission for America's Army.

Launchers will come from both the active Army, "cascading" as active units are drawn down, and from Congressionally mandated procurement. Seven battalions have been converted to MLRS to date. However, our eighth MLRS battalion still needs $46 million to get its complement of pacing items and associated items of equipment (ASIOE). Each new battalion requires about $130 million for a complete battalion set.

We'll increase our tube artillery batteries from six to eight guns from FY 97 to FY 99, but the soldiers for these units will be authorized sooner so we can train and have them prepare for the guns when they arrive.

**Modernization.** The Guard FA has several modernization issues yet to be resolved.

- Allocation of structure and systems—Paladins, FA ammunition resupply vehicles (FAASV), palletized loading system (PLS)—which units will get which systems? We need to minimize turbulence to maintain readiness.
- The priorities on the Department of the Army master priority list (DAMPL)—what are the priorities going to be? Priorities drive resources, and resources determine readiness.
- Training and operational alignment with active Army commands—what exactly are those alignments? The Army has discontinued the Capstone program of the component chains of command based on wartime operations plans and substituted "training alignments" between active and Guard units.

Capstone was one of the most successful Army-wide operational programs, at least from the perspective of the Guard. Capstone alignments provided each unit a clear wartime mission; allowed Guard soldiers to maintain a clear sense of urgency, morale and mission focus; and permitted mission-essential task list (METL) development that emphasized critical training events. It established systems and equipment compatibility via the DAMPL. It also provided communications channels between Guard and active commands, giving active Army leaders a sense of personal responsibility—instead of, perhaps, a feeling their Guard units were a training burden—"a poor relative."

Understanding the world is a different place and our post-Cold War National Military Strategy demands increased flexibility, the Guard wants to retain the sense of truly belonging to America's Army that the Capstone program gave us. We'll work our new training relationships to make potential gaining active Army commands look upon Guard units as their own.

The key to the modernization process is forward planning, particularly in terms of logistics. The Department of the Army, National Guard Bureau and the states need to evaluate and plan to satisfy their new requirements for maintenance, facilities, storage and training sites. Digitization of the battlefield will impose new requirements as equipment is upgraded. And all this must be done with constrained resources.

**ODCSOPS Working Group.** Reviewing lessons learned from the Persian Gulf War, the senior Army leadership concluded there was not enough artillery available, especially corps artillery. The Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) at the Pentagon established an action officer working group in the fourth quarter of FY 93 to define requirements and evaluate the ability and feasibility of the Guard's absorbing additional structure. It recommended that the Army resource a second corps FA brigade in the National Guard for each active Army division and that corps FA brigades be configured as either 155-mm towed, 155-mm self-propelled or MLRS—no eight-inch units.

These recommendations are being implemented. Current actions include gaining approval of proposed units and their systems, aligning Guard corps FA units with active Army corps and divisions and "tweaking" the plan in the total Army analysis cycle (TAA03).

**The Guard—Fort Sill Partnership.** The National Guard is working closely with the FA School at Fort Sill to maintain Guard training readiness in a time of declining resources. Colonel Johnny McWhirter, our Guard advisor in the FA School, is heavily involved in making sure National Guard needs are met.

One area of close cooperation is distance education—clearly important to an Army National Guard located in 3,393 armories and other facilities nationwide. The FA School is coordinating the test implementation of video teletraining, using the Army's TNET system in the eight states of Region F, Total Army Schools System.

Artillery training provided includes new equipment training (NET) and MOS training; reclassification training will soon be a top priority. Other training provided includes instructor certification, MOS training beyond FA, environmental, drug awareness and even college courses for credit.

The National Guard is putting its money where its mouth is. The National Guard Bureau gave the FA $1.8 million to convert MOS 13F Fire Support Specialist training at all skill levels to Total Army Courseware—multimedia video-teletraining and interactive CD-ROM. It will be available in FY 96.

The partnership works both ways. The Wyoming National Guard is working with the FA School to convert MOS 13E Fire

Direction Specialist reclassification training to TNET to be taught from Wyoming.

The FA Center and School is not just talking Total Army—it's doing it.

**Challenges**. So what are we facing as we drive toward the 21st century? We face training, systems compatibility, fielding and resource priority challenges.

Within our resource constraints, we have to execute both individual and collective training. Basic combat training (BCT) and advanced individual training (AIT) seats are at a premium. With our reconfigured and realigned units, we're determining what to train before mobilization and what after. As units convert and upgrade, new equipment training becomes critical—and it may not be provided fully by the Training and Doctrine Command (TRADOC) after FY 95. As resources shrink, integrating simulators and distributed training into our programs becomes more and more important.

Systems compatibility—both weapons and command, control, communications and intelligence ($C^3I$) systems—is another important challenge. Without weapons compatibility, we are like the gunners in the redoubt on Breed's Hill with 16-pounder cannonballs for 10-pounder cannons. And if we aren't integrated into the digitized fire control system of the future, we won't be able to put steel on target.

We must have total package fielding. It does no good to have millions of dollars' worth of weapons if we don't have the training, radios, maintenance and mission support equipment, spare parts and ammunition to serve them.

In terms of resource priorities, we'll have to continue to struggle for the force structure and end strength, full-time manning and operational dollars we need to maintain baseline readiness while keeping high-priority units ready for new and demanding missions.

**Conclusions.** The bottom line for the Guard FA in the post-Cold War world is intellectual as much as material. We need to have active-Guard relationships in place that give Guard units a "registration point" for planning peacetime training—something upon which to base planning and preparation. Understanding that no plan survives contact with reality, we can "adjust fire" and "fire-for-effect" on mobilization to make whatever changes we need.

Both active and Guard artillerymen need to recognize that we can both be the "first string" team. There must be one FA community, one FA team.

The Guard and the Army need the schoolhouse's help. Without a strong institutional Army (TRADOC, Army Materiel Command, etc.), we won't have the trained soldiers and state-of-the-art equipment we need to fight and win in the 21st century as a team. The active Army sets the tasks, conditions and standards—the Guard will meet or exceed them.

**Brigadier General William C. Bilo has been the Deputy Director of the Army National Guard Bureau in Washington, DC, since September 1993. His previous assignment was as Commander of the Division Support Command (DISCOM) of the 29th Infantry Division (Light), Virginia Army National Guard, the same division in which he had served as Chief of Staff, helping to reactivate it in 1984. General Bilo also served as Director of Personnel for the Headquarters State Area Command and, later, Chief of Staff, for the Maryland Army National Guard. While serving on active duty from 1964 to 1972, he commanded three batteries, including two in combat: a Pershing missile battery in Germany and a service battery and 155-mm howitzer battery, both in the 1st Cavalry Division in Vietnam.**

# Army Selects Enhanced Readiness ARNG Brigades

The Department of the Army announced in late August 1994 the designation of the Army National Guard's (ARNG's) 15 "enhanced readiness" combat brigades. The Department of Defense in its October 1993 "Bottom-Up Review" identified the need for highly trained and equipped, combat-ready Reserve Component (RC) forces to ensure our nation can win two nearly simultaneous major regional conflicts.

These enhanced readiness brigades—seven heavy, seven light and one armored cavalry regiment—are that combat force: 27th Infantry Brigade, New York; 29th Infantry Brigade, Hawaii; 30th Infantry Brigade, North Carolina; 39th Infantry Brigade, Arkansas; 41st Infantry Brigade, Oregon; 45th Infantry Brigade, Oklahoma; 48th Infantry Brigade, Georgia; 53d Infantry Brigade, Florida; 76th Infantry Brigade, Indiana; 81st Infantry Brigade, Washington; 116th Armored Brigade, Idaho and Montana; 155th Armored Brigade, Mississippi; 218th Infantry Brigade, South Carolina; 256th Infantry Brigade, Louisiana; and 278th Armored Cavalry Regiment, Tennessee.

The 15 enhanced readiness brigades will be organized and resourced to mobilize, train and be available for deployment 90 days after call-up. They'll be employable in the fast-evolving regional conflicts expected in the future or reinforce Active Component combat units in a crisis.

ARNG strategic Reserve combat forces—eight divisions, two brigades and one infantry scout group—will be fully structured, but manned and resourced at less than 100 percent. These units will maintain readiness levels allowing them to mobilize in extended crises or protracted operations and as the first echelon for crisis response during domestic emergencies. As with the enhanced readiness brigades, the units' assets also could be activated and employed as a rotation force for peacekeeping or peace enforcement operations and operations other than war.

The ARNG's eight divisions are the 28th Infantry Division (Mechanized) in Pennsylvania and West Virginia; 29th Infantry Division (Light) in Virginia, Maryland, Massachusetts and Connecticut; 34th Infantry Division in Minnesota, Iowa and Wisconsin; 35th Infantry Division in Kansas, Nebraska, Illinois, Kentucky, Colorado and Missouri; 38th Infantry Division in Indiana, Ohio and Michigan; 40th Infantry Division (Mechanized) in California, Arizona and Montana; 42d Infantry Division (Mechanized) in New York, New Jersey, Vermont and Massachusetts; and 49th Armored Division in Texas.

The ARNG also is reorganizing its two Special Forces Groups and the aviation force structure as part of a five-year plan to reduce and reshape the RC. From 1989 to 1999, ARNG combat maneuver battalions will have been reduced from 184 to 126. The end strength of the ARNG will be 367,000 by 1999—down from 410,000 in late 1994.

Office of the Assistant Secretary of Defense
Washington, DC

*75th Ranger Regiment*

# Fire Support for Power Projection: A Special Operations Perspective

by Lieutenant General J.T. Scott

*Special Operations Forces' [SOF's] flexibility, versatility, and unique military and cross-cultural skills enable them to function effectively either alone or as part of a larger force. Their singular capabilities maximize strategic advantage while minimizing risk. Because they offer more than just a military solution, America's need for SOF is greater than ever. They are volatile forces for volatile times.*

United States Special Operations Command
1994 Posture Statement

In its efforts to redesign itself to field Force XXI, the Army is guided by the need to be able to execute its Title 10 requirement of conducting prompt, sustained combat on land, as well as meet all the demands of the National Military Strategy (NMS). The strategic challenge associated with these requirements is clear: the Army must be able to rapidly project overwhelming combat power from bases within the continental US (CONUS) to achieve decisive victory in a wide range of worldwide deployment scenarios.

This is precisely the challenge that special operations forces (SOF) have organized to meet during the past two decades. For this reason, there is a great deal of similarity between mission requirements for SOF and the challenges now facing the larger conventional Army. This article, which examines fire support for SOF, illustrates this parallel and provides a unique perspective on the requirements, planning considerations and individual challenges associated with providing fire support for a power projection Army.

SOF are trained and equipped to operate across a continuum that ranges from training host nation military forces during peace-time to conducting multi-service strike operations during regional or global conflict. To achieve the objectives of the NMS in an international environment that continues

**Unconventional Warfare (UW):** Military and paramilitary operations of long-duration, mostly by indigenous forces organized, trained and supported by SOF.

**Direct Action (DA):** Small-scale offensive operations to seize, destroy, capture, recover or inflict damage to personnel and equipment in support of strategic or operational objectives. In DA, SOF units may execute raids, ambushes or assaults; emplace munitions; conduct standoff attacks by air, ground or maritime platforms; or provide terminal guidance for precision-guided munitions.

**Special Reconnaissance (SR):** Reconnaissance and surveillance operations conducted at the strategic or operational levels to verify or collect information on enemy actions, capabilities or intentions.

**Foreign Internal Defense (FID):** Military operations to assist another government protect itself from subversive groups.

**Counterterrorism (CT):** Military operations to preempt or resolve terrorist activities.

**Psychological Operations (PSYOP):** Activities to induce or reinforce attitudes of foreign governments, organizations or individuals.

**Civil Affairs (CA):** Activities to furnish advice on the civil dimension of military operations or to develop or restore civilian institutions and infrastructures.

Traditional Missions of Special Operations Forces

to be dangerous and unpredictable, SOF are being called upon to play an increasingly larger role in the defense of US interests.

The tempo of operations for Army Special Operations Forces (ARSOF)—Special Forces, Rangers, Special Operation Aviators, Civil Affairs specialists, psychological operations (PSYOP) soldiers and specially designed support units—reflects this trend. During FY 1994, more than 30,000 ARSOF soldiers from both the Active and Reserve Components were sent to more than 100 countries in 1,200 different deployment scenarios. These soldiers performed missions ranging from training foreign soldiers, to providing humanitarian and disaster relief, to conducting combat operations.

*Joint Chiefs of Staff Publication (JCS Pub) 1-02 Definition of Military Terms*, defines SO as "operations conducted by specially organized, trained and equipped forces to achieve military, political, economic or psychological objectives by unconventional military means in hostile, denied or politically sensitive areas." See the figure for a list of traditional SOF missions.

## SOF Requirements for Fire Support

Fire support plays an integral role in SO, particularly direct action (DA) missions. SOF fire support platforms must detect, discriminate and surgically destroy high-value targets at will. Much like the conventional fire support system, SOF fire support must achieve five basic requirements: support the commander's battle plan, support forces in contact, be internally synchronized to deliver fires at the right time and place, be externally synchronized to complement the effects of other battlefield operating systems (BOS) and be logistically sustained to ensure continuous support.

The nature of SO missions, however, requires fire support systems with distinctly unique attributes. JCS Pub 1-02 defines fire support as "the collective and coordinated use of indirect fire weapons, armed aircraft and other lethal and non-lethal means against ground targets in support of maneuver force operations." This definition provides a useful starting point for describing SOF fire support requirements.

**Target Acquisition.** In the area of target acquisition, SOF depend almost exclusively on high-level imagery, signals, electronic and human intelligence sources. This differs from conventional operations in which ground-based sensors, such as Q-36 or Q-37 Firefinder radars, are a principal source of target acquisition data.

To achieve desired target effects, SOF depend predominantly upon armed aircraft, both fixed and rotary wing, because ground-based systems are not always available or well suited for attacking point targets with precision fires. In the area of non-lethal fires, electronic warfare (EW) and PSYOP play a major role in preparing the battlefield in lieu of lethal fires that normally sacrifice the element of surprise. In SO, non-lethal fires are used to create infiltration corridors to enable SOF to penetrate hostile territory. They also perform traditional functions, such as attacking enemy command and control systems and destroying the enemy's will to fight.

**Fire Support Considerations.** During operations, SOF will employ theater air and naval assets if they're available and their employment won't disclose or encumber the operation. The immediacy of the mission and the desire to protect its clandestine or low-visibility nature may result in SOF fire support being provided exclusively from organic SOF fire support assets. For this reason, SOF fire support assets are designed and employed based upon three key considerations: deployability, responsiveness and discriminate response.

First, SOF fire support assets must be as deployable as the units they'll be employed with. To facilitate emergency deployment as well as interoperability. SOF are organized

AH-6 Cayuse helicopters fire 2.75-inch fin-folding rockets. The Cayuse is a key fire support platform for multiple special operations.

with joint fire support systems troop-listed under one command. SOF units train in peacetime with the Army, Air Force and Navy platforms that will support them in wartime. This makes it possible to rapidly deploy tailored packages of ground forces, fire support, command and control and support units based upon mission requirements. Using the principles of adaptive joint force packaging (AJFP), fire support assets are carefully selected to achieve mission requirements.

Second, SOF fire support systems are designed to be highly responsive to operators. They must be able to penetrate enemy airspace, communicate over extended distances and remain on station for the duration of operations. For this reason, SOF fire support platforms are outfitted with terrain-following/terrain-avoidance radars, precision navigation systems, defense avionics and extended-range and in-flight refueling packages.

Third, SOF fire support systems must achieve decisive effects on target—the first time they're employed. They must operate within the restrictive ROE characteristic of clandestine or low-visibility operations. Simply put, they must achieve the required effects on target while minimizing collateral damage and avoiding fratricide. Improvements in munitions reinforced by detailed synchronization of maneuver and fires enable both fixed-and rotary-wing platforms to furnish precision fire support to ground units. Automated mission planning and rehearsal techniques help SOF deliver violently executed yet highly precise fire support. In sum, SOF fire support assets must be able to penetrate to get where they are needed and deliver their ordnance in a surgical manner, night or day, in all types of terrain—a demanding set of operational requirements.

**Fire Support Assets.** To meet these requirements, the Army has two key rotary-wing platforms, the AH-6 Cayuse helicopter and the modified MH-60L helicopter, known as the defensive armed penetrator (DAP). These helicopters support SOF and conventional force requirements for air interdiction (AI), close air support (CAS), armed escort, reconnaissance and airbase or point defense.

Both aircraft are modified to enhance deployability and mobility. They can be deployed to a theater on fixed-wing aircraft and off loaded and armed within one hour. This capability furnishes the ground force commander an unusual degree of flexibility as both aircraft carry all current conventional munitions and can acquire targets at considerable distances. Unlike conventional operations in which attack helicopters are considered a maneuver asset, the primary role of the armed helicopter in SO is for fire support.

The Air Force's AC-130U now being fielded is the primary fire support platform for SOF.

The Air Force provides a range of fixed-wing platforms to meet SO requirements. They can move quickly to objective areas to provide precision fire support as well as CAS, AI and air escort during the infiltration and exfiltration of ground or maritime forces.

The primary Air Force SOF (AFSOF) platform is the AC-130 Spectre gunship. The AC-130U now being fielded greatly enhances the capability to support both SOF and conventional force needs for CAS, AI and air escort. In terms of navigation, adverse weather capability and lethality of fires, the AC-130U is the most sophisticated gunship in the world. The air refuelable AC-130U is armed with side-firing 105-mm and 40-mm cannons, a 25-mm gun and electronic countermeasure systems. Low-light level television and infrared sensors facilitate pinpoint accuracy during extended loiter periods at night or in adverse weather. Two additional benefits of the AC-130U are its increased standoff capability and ability to minimize collateral damage with its accuracy.

## SOF-Peculiar Requirements

Two primary SOF missions described earlier, DA and PSYOP, create special fire support requirements. SOF units must be able to conduct terminal guidance operations (TGO)—a form of DA. In addition, SOF units must employ a range of systems within the broad realm of PSYOP.

**Terminal Guidance Operations.** TGO is often the key to success in denied areas. It's more than just employing laser target designators (LTDs); it encompasses a family of operations that includes all forms of electronic, mechanical and navigational assistance for aircraft, missiles, ships or artillery units to facilitate target acquisition.

The objective of TGO is to link two capabilities: the ability of attack aircraft to deliver ordnance and the ability of SOF ground teams to locate and illuminate key targets. The operational concept is to infiltrate SOF ground teams into the enemy communications zone, based on named areas of interest (NAIs) identified during intelligence preparation of the battlefield (IPB). When the SOF teams illuminate targets, strike aircraft attack them.

TGO normally is conducted on the threat side of the fire support coordination line

A Special Forces captain communicates with Air Force aircraft.

(FSCL) but may also be conducted in a nonconventional environment in which coordination lines have not, or cannot, be defined. In either case, TGO requires detailed planning to ensure that communications can be established, ordnance is compatible with designators and air support for SOF engaged in TGO is integrated into the theater air campaign.

The planning agent for the ground SOF teams normally will be a forward operational base (FOB) or a Special Forces operational base (SFOB). The next higher headquarters at the joint level, normally the joint special operations task force (JSOTF) commander, will task ground SOF units, coordinate infiltration and exfiltration, and establish liaison with the unified command's air operations center (AOC). Because of the sensitivity of TGO, the ultimate decision maker on all TGO missions is the supported commander-in-chief (CINC).

**Information Warfare.** The second SOF-peculiar requirement closely associated with fire support is information warfare and PSYOP. PSYOP serves as a force multiplier to complement traditional fire support activities in all forms of SO. It's as relevant to humanitarian operations as it is to strike operations.

In simple terms, PSYOP enables the supported commander to achieve an information advantage in the application of force. PSYOP degrades enemy combat power by persuading air defense units not to engage, air forces not to fly and ground forces not to use their weapons systems—or to desert, defect, or surrender.

As defined in *JCS Pub 3-13 Joint Doctrine for Command and Control Warfare ($C^2W$)*, PSYOP is a key pillar of $C^2W$, which involves "the integrated use of operations security, military deception, PSYOP, electronic warfare and physical destruction to deny information to, influence, degrade or destroy enemy command and control capabilities and to protect friendly command and control against such actions." The desired effect is clear: cause the enemy to react in a manner deemed advantageous to the attainment of US objectives. Integration of PSYOP into $C^2W$ planning enhances its effectiveness and contributes significantly to achieving the SO objectives.

## The Operational Environment

The range of SO missions and the threats that SOF may face create a unique operational environment. SOF missions can range from 12-man Army Special Forces A-teams conducting special reconnaissance (SR) well forward of an Army corps, to Navy Sea-Air-Land (SEAL) teams boarding vessels while underway to conduct strike or recovery operations. Each SO mission presents unique mission requirements.

As in all military operations, mission, enemy, terrain, troops and time available (METT-T) drive the plan, including $C^2$ arrangements. Command structures are determined by the nature of the mission and the geographical region in which it will be executed. These structures may be based on multinational joint special operations task forces (JSOTFs) built around the core of the regional SO commanders (SOCs), or they may feature unilateral SOTFs. Political constraints may add to the complexity of the operational environment.

## Planning Considerations

Clearly, the missions, fire support assets and the environment in which SOF operate are different from those associated with conventional operations. The fire support planning principles, however, are very similar. A discussion of these principles in *FM 6-20 Fire Support for the AirLand Battle* illustrates this similarity and provides the basis for describing the fire support officer's (FSO's) duties in ARSOF units authorized FSOs: the Ranger Regiment, the 160th Special Operations Aviation Regiment and certain special mission units (SMUs).

**Plan Early and Continuously.** SO depend on a thorough IPB, detailed targeting, speed and precise execution. The effectiveness of fire support planning is, therefore, a vital determinant of success. During planning, assets are matched against targets and integrated into the development of the overall fire support plan. Plans must be updated when intelligence on targets is verified or, conversely, as new intelligence is provided.

**Exploit All Available Targeting Assets.** The SOF FSO often will have access to sophisticated imagery, signal, electronic and human intelligence sources. This intelligence provides targeting data for AI missions and surgical fires. Because ground elements, such as Rangers, often will have only organic lightweight mortars to support them, targeting must be accurate to protect the force and ensure mission accomplishment.

**Consider the Use of All Lethal and Non-Lethal Attack Means.** As stated earlier, PSYOP and other $C^2W$ systems can have a dramatic effect on the success or failure of SO. This non-lethal dimension of fire support can set the terms of battle by influencing attitudes, deceiving or blinding the enemy and reducing the ability to counter friendly actions. Non-lethal fires must complement and reinforce lethal fires. The SOF FSO must ensure this occurs.

**Use the Most Effective Means.** Fire support delivery means must be closely matched to targets. Detailed weaponeering is the norm during planning for SO. The SOF FSO uses automated weaponeering programs (in fire direction software for artillery systems) and the joint munitions effectiveness manuals (JMEMs) to assist in this process.

**Furnish the Type of Support Requested.** In recommending support, the SOF FSO includes special consideration of desired effects on target, limitations on the use of force, required loiter time, proximity of friendly troops and weather. With proper target intelligence and weaponeering, it is possible to achieve the intent of this principle.

**Avoid Duplication.** As in any operation, the SOF FSO must achieve economy of effort. With detailed target intelligence, the appropriate level of fire support can be determined, and the right balance between overmatch and redundancy can be achieved.

**Consider Airspace Coordination.** As described earlier, SOF rely extensively on aerial fire support. This presents complex,

yet manageable, challenges. The SOF FSO must ensure time and distance separation is provided for and assets are on station when required.

**Provide Rapid and Effective Coordination.** In addition to traditional fire support coordination measures (FSCM), the SOF FSO relies on detailed planning with joint forces, supporting units and adjacent headquarters to engage targets rapidly and prevent fratricide. Detailed rehearsals reinforce synchronization and make this possible.

**Provide Flexibility.** SOF FSOs must react to enemy initiatives and changes in target intelligence. In other words, fire support plans must incorporate the means to influence the battle when the enemy does the unexpected.

**Provide Adequate Support.** This principle depends on adherence to the other principles already listed. It includes delivering support during infiltration, suppression of enemy air defenses (SEAD), attacking the enemy in the target area and covering the force during exfiltration. In short, providing adequate support is the ultimate challenge for the SOF FSO.

## Lessons Learned

Although SO missions, operational environments, constraints and restrictions will be different in every situation in which SOF deploys, a general set of lessons applies. These lessons reinforce the relevance of the FM 6-20 planning principles described.

**Use Doctrine as the Starting Point.** SOF must be prepared to deploy as joint teams capable of conducting unified, seamless operations. Joint doctrine provides the common starting point. A few years ago, joint SOF doctrine was virtually non-existent. Today, joint doctrine, as codified in *JCS Pubs 3-0 Doctrine for Joint and Unified Operations, 3-09 Joint Fire Support* and *3-05.5 Joint Special Operations Targeting*, provides a basis for joint operational planning and developing tactics, techniques and procedures (TTP) for interoperability. It provides a common, flexible framework to ensure that unity of effort is achieved in the pursuit of operational objectives.

**Emphasize Integration and Synchronization.** Integration means putting disparate units together to achieve the full benefit of their combined capabilities; synchronization means exploiting the effects of combined capabilities at the right time and place on the battlefield. These are demanding tasks. Perhaps the key lesson in this regard is that integrating and synchronizing fire support requires cooperation and teamwork—the principal task of the SOF FSO.

**Provide for Redundancy of Capabilities.** Due to the distances frequently associated with SO and the complexities involved in penetrating hostile territory, the SOFFSO must plan for multiple means to deliver fire support. War-gaming to determine possible gaps in coverage, which could expose friendly vulnerabilities, is a familiar technique to reduce risk. Stationing assets to operate from land or sea bases to eliminate the need for inflight refueling is but one example of a measure that can be taken to reduce the risks to friendly forces.

**Define Battlespace to Permit Freedom of Action.** Coordinating with joint force commanders should result in boundaries and other FSCM that provide freedom of action for the SOF commander. When SOF and conventional forces operate close to one another, the locations of all elements must be established. SOF FSOs also must coordinate to establish restrictive FSCM that protect SOF units without hampering the supported commander. Although this is a well-established doctrinal requirement, it continues to present challenges for units during joint exercises and training at the Combat Training Centers (CTCs).

**Continue to Update the Estimate of the Situation.** Success or failure is often predicated upon the continued updating of the factors of METT-T. When the factors change, commanders must react in a decisive manner to avoid being overtaken by events. The SOF FSO, like all battle staff officers, must continue to update his estimate from his functional perspective. This requires SOF FSOs to have exceptional judgment and experience and the ability to perform under conditions of extreme stress.

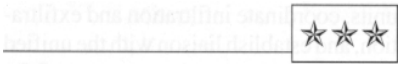
## The Human Dimension

Clearly, the fire support planning principles outlined in Army doctrine and a set of general lessons apply to fire support for SOF. However, no complete "laundry list" of considerations can be determined. Instead, quite the opposite is true.

While doctrine is a starting point for unified action in support of the commander's intent, SOF commanders and FSOs must consistently "push the doctrinal envelope" to ensure a true fire support *capacity* for each mission.

*Capacity* is achieved when *capabilities* (the platforms described earlier) are employed by commanders and fire supporters armed with the correct intellectual approach. It results from understanding the physical and political constraints of the operational environment, knowing when to use—and when not to use—doctrine and avoiding narrow-minded, single-service approaches to problem solving. This intellectual approach is the key to achieving true synergy.

The significance of this term—*capacity*—reflects a fundamental truth of SO: people are more important than hardware. While the fire support systems that support SOF are the most advanced in the world, the challenges, distances, austere environments and other constraints associated with SO missions will almost always exceed the technological capabilities available. For this reason, the ultimate determinant of success or failure in the SOF fire support arena is the ability of the SOF FSO to apply the principles described in imaginative, innovative ways to achieve the commander's intent.



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# *A Modest Proposal:*
# A CSS Unit for Corps FA Brigades

by Major Mark L. Morrison, OD

Combat service support (CSS) for deployed Field Artillery (FA) brigades is unsatisfactory. This problem has received considerable study to date—most intensely following Operation Desert Storm—but no solution has been implemented.

Recently, the III Corps Artillery Commander, Fort Sill, Oklahoma, directed his 214th FA Brigade Commander to propose a CSS structure to support deployed corps FA brigades. This article is a result of that effort.

**The CSB and the High-Tech FA Brigade.** Currently, support for FA brigades comes from parts of a forward corps support battalion (CSB) supporting corps troops on an area basis. This concept has proved unsuccessful for a several reasons. First, the corps CSB may not support artillery units in peacetime and, therefore, may not have the experience required to repair the different equipment found in the various brigades. Second, in many cases, the corps CSB may not stock the appropriate authorized stockage list (ASL) in peacetime and, therefore, won't be able to provide it in a timely fashion in war. Third, the CSB usually is positioned too far to the rear to provide adequate, timely support for the majority of artillery missions.

The advent of new artillery weapon and support systems—M270 multiple-launch rocket system (MLRS), M109A6 Paladin howitzer and M992 FA ammunition support vehicle (FAASV)—have changed the way the FA fights. These systems allow for greater dispersion on the battlefield (distance), increased firepower (ammunition tonnage required) and increased mobility (fuel and distance to resupply). These new capabilities coupled with forward battlefield positioning place greater demands on the CSS system.

**An FA Brigade FSB—Ideal.** Each divisional armored or mechanized infantry brigade has a habitually associated forward support battalion (FSB) to support three mechanized battalions, an FA battalion and a few separate companies. That support is backed up by a main support battalion. Because a typical FA brigade has at least three battalions plus attachments, it would follow that each FA brigade also needs an FSB.

But realistically, given the active CSS force structure likely to be available, the design may have to be a specially tailored, company-sized CSS unit (CSSU). Because at least 50 percent of the Army's CSS units are National Guard and Reserve, they'll have to augment active forces in forming CSSUs. These units must be identified and linked to a specific FA brigade/CSSU. Once affiliated, these units can begin the complex training process.

The 13th Corps Support Command (COSCOM), which supports III Corps, recognizes the requirement to change the method of support for FA brigades. In several Battle Command Training Program (BCTP) exercises during the past year, the 13th COSCOM has experimented with various CSSU structures to determine the best. During this process, we've outlined CSSU requirements but not a standard CSSU. Our next step is to move beyond computer simulations and field a prototype unit to support one of our tactically deployed FA brigades.

**CSSU Requirements.** *FM 54-30 Corps Support Groups*, Chapter 1, Page 1-7 discusses the forward logistics element (FLE) concept. FLEs have many uses, and their composition varies based on mission, enemy, terrain, troops and time available (METT-T) and the supported unit's requirements. Although FLEs are both non-permanent and nonstandard, they provide a point of departure for examining support for corps FA forces.

A CSSU would differ from the FLE in that it would be larger, more capable and would have a habitual association with an FA brigade, much like a FSB has with an armor or infantry brigade (see Figure 1). To structure and test such a unit, we must outline its requirements—which drive its composition.

• The CSSU must be able to support an FA brigade in support of a US corps or division.

• It must be relatively mobile. The CSSU's major equipment should remain uploaded, allowing it to move within three hours.

• It must be able to plug into a COSCOM or division support command (DISCOM) for resupply and backup support. If not, it must be augmented with enough fuel and transportation assets to provide support for extended periods.

• It must be self-sustaining.

• It must be prepared to be supported primarily by the COSCOM by throughput distribution. The CSSU then must provide the FA brigade's battalions supply point distribution.

• Its maintenance element must be task organized to support any artillery brigade configuration: pure MLRS or a M109 series howitzer battalions or a combination of the two (augmentation support teams required).

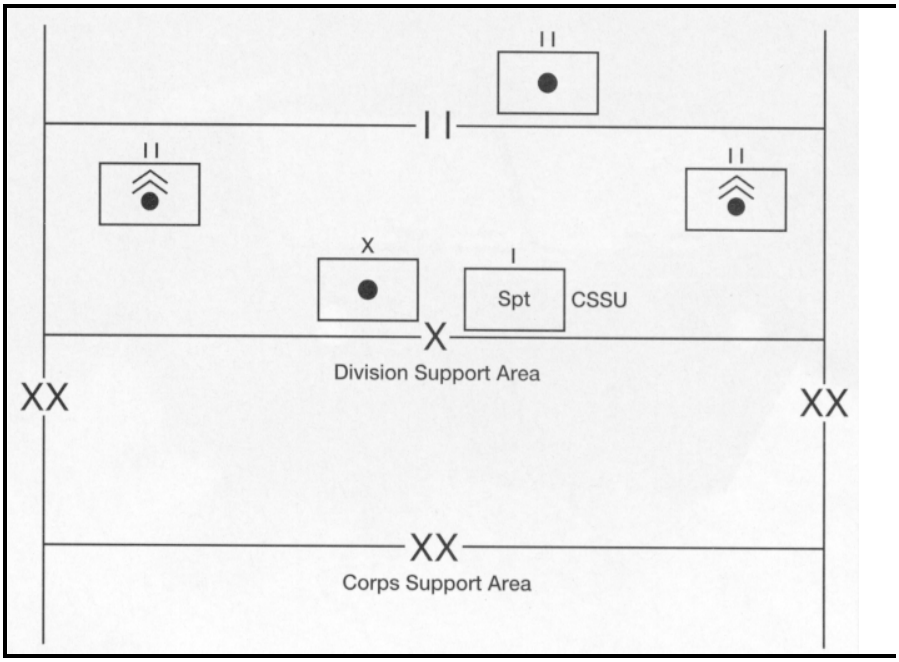
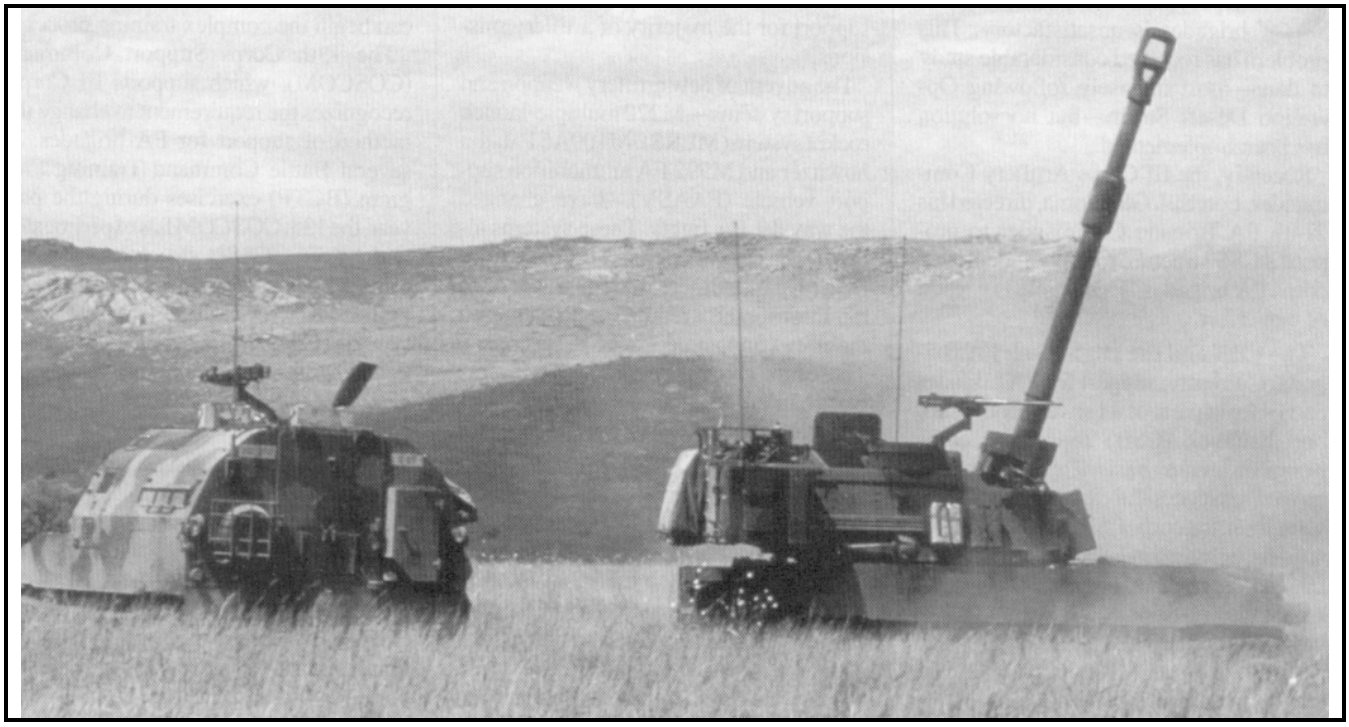



Figure 1: CSSU Spacial Relationships

• The CSSU must be prepared to receive aerial support for emergency resupply and medical evacuations (MEDEVACs), as required.

**CSSU General Composition.** Based on our support analysis and the requirements itemized, the CSSU should have four primary components: a headquarters element, a maintenance element, a supply/services element and a medical element. In this configuration, the CSSU will require approximately two square kilometers for adequate setup and support. It should be located in the vicinity of the



The M109A6 Paladin and its FAASV have greater mobility and shoot faster, placing greater demands on the CSS system.

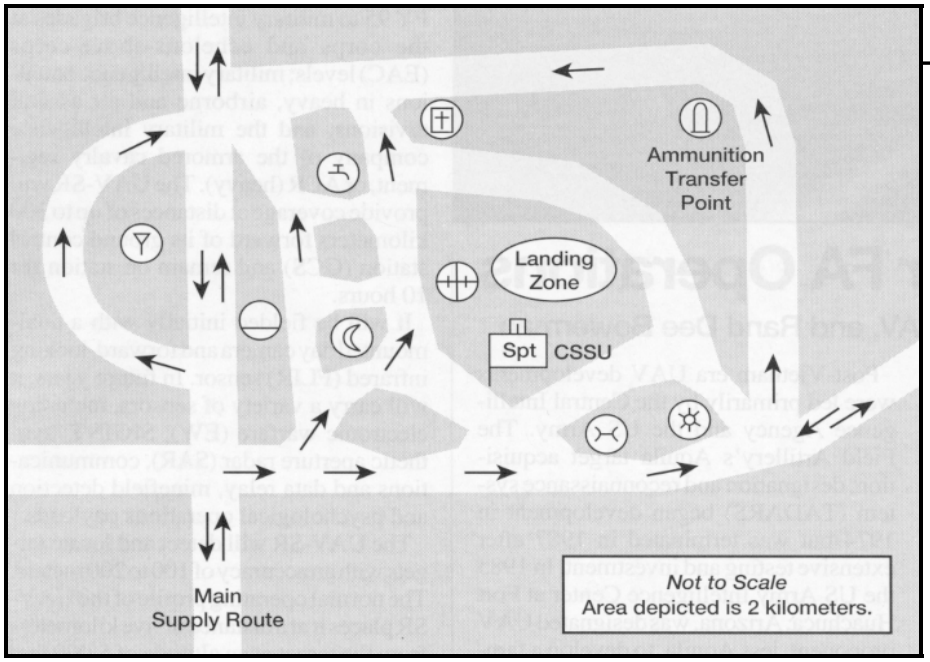



Figure 2: CSSU Layout

supported brigade headquarters to enhance security, shorten resupply distances and facilitate information flow between the CSSU and the brigade administrative and logistics operations center (ALOC).

The *headquarters element* is comprised of three main sections: command, support operations and a detachment headquarters. The command section contains the CSSU commander, a major with a functional area designator of 90A Multifunctional Logistician. He's the primary interface with the brigade ALOC. The support operations section coordinates operations and relays logistical requirements to the CSB. The detachment headquarters establishes local security and provides the unit's internal support, specifically organizational supply, maintenance, food service and communications support.

The *maintenance element is* comprised of three main sections: the base maintenance section, the maintenance support teams (MSTs) and the supply section. One of the MSTs constitutes the CSSU maintenance base. It has teams for specific FA repair requirements, such as radar, the tactical fire directions system (TACFIRE) or other digital systems, etc. The base provides internal CSSU support (direct support) and backup support to the forward deployed MSTs.

Each battalion also has an MST organized with applicable support teams, such as track vehicle repair teams, MLRS maintenance support teams and artillery turret/fire control repair teams. These teams support forward with each battalion but stage out of the CSSU. The supply section maintains tailored combat ASLs for both the CSSU and the FA battalions.

The *supply/services element is* comprised of five main sections: the general supply section, Class V Ammunition transfer point (ATP) and petroleum, water and mortuary affairs sections (see Figure 2). The general supply section maintains one day of supply (DOS) of Class I Subsistence for the brigade, receiving and issuing daily rations. It also receives and issues Class II Clothing and Organizational Equipment; Class III (Package) Petroleum, Oil and Lubricants; Class IV Construction Materials; and Class VI Personal Demand Items (sundry packs), as required. With the support of the maintenance base, the supply/services element receives and issues non-weapon system replacement operations (WSRO) Class VII Major End Items.

The Class V ATP supplies ammunition. Because the ATP section from a corps ammunition company can only supply 970 short tons a day using the new palletized loading system (PLS), it will need augmentation to meet the daily brigade ammunition requirements.

The Class III (Bulk) petroleum section stocks 35,000 gallons of either diesel or JP8 fuel to support the brigade. The water section maintains one DOS of water for the brigade. The mortuary affairs section is prepared to retrograde all remains to the corps rear for further processing by using truck back-haul capability.

The *medical element is* tailored to provide Treatment Level II via a treatment squad with some patient holding capability and an ambulance squad to evacuate patients and ensure continuity of care en route. The treatment squad will have advanced trauma management training and equipment to treat and return the patient to duty or resuscitate and stabilize the patient for evacuation. The medical element's primary mission is to reinforce artillery battalion medical elements and support the brigade headquarters and CSSU.

The organization that can best support an FA brigade is a dedicated FSB. Short of that, a CSSU as described in this article can greatly enhance the current support capabilities of today's mechanized FA brigades.

As we work toward Force XXI, Forces Command (FORSCOM) and the Training and Doctrine Command (TRADOC), including the FA School at Fort Sill and the Combat Arms Support Command at Fort Lee, Virginia, must ensure our combat forces are properly supported—and that means solving the supply problems of the highly mobile, high-tech corps FA brigade.

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# UAV Support for FA Operations

## by Colonel Bernard H. Street, AV, and Rand Dee Bowerman

As the Army evolves toward the 21st century, the need for timely and synchronized fire support to battlefield commanders becomes more important than ever. Commanders must improve their ability to detect, locate, identify and engage targets at maximum range and receive immediate target damage assessment (TDA). Unmanned aerial vehicles (UAVs) provide commanders at all echelons these capabilities.

This article discusses the evolution of Army UAVs and their coming role in support of the Field Artillery community.

**Background**. Although UAVs were envisioned as far back as 1916, modern UAV experience began with a pilotless B-17 controlled from a second aircraft. The controlling aircraft guided the unmanned B-17 to a target area where it was flown into the actual target. These unmanned B-17 aircraft, stationed at Roswell, New Mexico, also were used extensively during the atomic bomb tests in the South Pacific to monitor radiation.

Following the Soviet interception of Francis Gary Powers' U-2 in 1960, the Air Force and other national agencies directed their resources into UAV programs. The AQM-34, adapted from the BQM-34 target drone, was one such system. Variations of the AQM-34 flew more than 17,500 missions around the world from 1958 until 1975.

A highly successful system, known as Buffalo Hunter, flew more than 1,600 missions in Southeast Asia. It employed a variation of the AQM-34 and operated originally at altitudes of more than 60,000 feet. The operational concept later evolved to include very low-level photo-reconnaissance missions over North Vietnam. Other missions included signals intelligence (SIGINT) and psychological operations flown by the 100th Strategic Reconnaissance Wing. The last mission of Buffalo Hunter took place over Saigon on 30 April 1975 during the final stages of the United States evacuation.

Post-Vietnam era UAV developments were led primarily by the Central Intelligence Agency and the US Army. The Field Artillery's Aquila target acquisition, designation and reconnaissance system (TADARS) began development in 1974 but was terminated in 1987 after extensive testing and investment. In 1985 the US Army Intelligence Center at Fort Huachuca, Arizona, was designated UAV proponent, less Aquila, to develop a family of UAVs to provide organic, near realtime support to battlefield commanders. The requirements for deep and close UAVs were approved by the Training and Doctrine Command (TRADOC) in December 1988.

**Current UAV Program**. Congressional interest focused on developing unique UAVs that had common architecture and could interoperate on the battlefield. To ensure this coordinated effort, Congress halted all service UAV funding and directed the Joint Program Office for UAVs (JPO-UAV) be established. It was chartered to develop a Department of Defense (DoD) master plan for UAVs and establish a family of common and interoperable UAVs that would support commanders.

Since 1989, this family of UAVs has evolved into the UAV-Short Range (UAV-SR), UAV-Close Range (UAV-CR) and UAV-Endurance (UAV-E). Figure 1 shows the operational characteristics and fielding information of each type of UAV.

The conceptual foundation for UAV support to commanders has evolved as tactical doctrine changes. The family of UAVs was designed to support combined arms commanders from the division to the theater levels in the intelligence preparation of the battlefield (IPB), indications and warnings, situation development, battle management, targeting and target development, TDA and force protection. The cornerstone of the concept has always been to provide organic, timely and responsive support in the rear, close and deep battles.

The ***UAV-SR*** will be fielded starting in FY 95 to military intelligence brigades at the corps and echelons-above-corps (EAC) levels; military intelligence battalions in heavy, airborne and air assault divisions; and the military intelligence company of the armored cavalry regiment, or ACR (heavy). The UAV-SR will provide coverage at distances of up to 300 kilometers forward of its ground control station (GCS) and remain on station for 10 hours.

It will be fielded initially with a dual-mounted day camera and forward-looking infrared (FLIR) sensor. In future years, it will carry a variety of sensors, including electronic warfare (EW), SIGINT, synthetic aperture radar (SAR), communications and data relay, minefield detection and psychological operations payloads.

The UAV-SR will detect and locate targets with an accuracy of 100 to 200 meters. The normal operating profile of the UAV-SR places it at a distance of five kilometers from the target at an altitude of 5,000 feet above ground level (AGL). The launch, recovery and maintenance sites will be in the corps or the division rear areas while the controlling GCS can be forward with main and forward tactical operations centers (TOC). This collocation with the supported TOC facilitates tasking and reporting.

The ***UAV-CR*** is designed to provide direct support to maneuver brigades and will start fielding in FY 98. It will be assigned to the military intelligence direct support companies in all divisions and the military intelligence companies of all ACRs and separate brigades. Additionally, the unique deployability and support requirements of light divisions drove a decision to place two UAV-CR systems in each of their military intelligence battalion general support companies in lieu of the UAV-SR. The UAV-CR will provide coverage of up to 50 kilometers from the GCS for three hours.

As with the UAV-SR, the UAV-CR will eventually carry several different payloads; however, initially it will come with a dual-mounted day camera/FLIR and a basic data meteorological sensor. The meteorological sensor will provide temperature, humidity and barometric pressure. The sensor was included to address Field Artillery requirements and will increase the resolution of weather knowledge in the battle area.

The UAV-CR will be launched and recovered in the brigade area, and maintenance normally will be provided by the parent intelligence unit. It will be fielded

| | Close Range (UAV-CR) | Short Range (UAV-SR) | Endurance (UAV-E) |
|---|---|---|---|
| Range (Objective) | 50 km | 200 km (300 km) | 500 nm (1200 nm) |
| Flight Endurance | 3 Hours (4 Hours) | 10 Hours (12 Hours) | 24 Hours (72 Hours) |
| Service Ceiling | 13,000 Feet AGL<br>(15,000 Feet AGL) | 15,000 Feet AGL<br>(25,000 Feet AGL) | 25,000 Feet AGL<br>(70,000 Feet AGL) |
| Sensors | Current: EO/FLIR, MET<br>Planned: MTI/SAR, EW, NBC Recon, Minefield Detection | Current: EO/FLIR<br>Planned: MET, MTI/SAR, SIGINT, EW, PSYOP, Laser Designator Range Finder, NBC Recon, Minefield Detection, Communications/Data Relay | Current: EO/FLIR, SAR<br>Planned: MET, MTI/SAR, SIGINT, PSYOP, NBC Recon, Communications/ Data Relay |
| Equipment Baseline (BL) | 2 DGCS, 4 AV | 2 GCS, 8 AV | 2 GCS, 4 AV |
| Fielded Echelon | Maneuver Brigade[1] = 1 BL | EAC, Corps = 2 BL<br>Division[2] = 1 BL<br>ACR = 1 BL | EAC, Corps = 1 BL |
| Fielded Capability | FY 98 | FY 95 | FY 98 |

1 *Light divisions receive two additional UAV-CR BLs for general support.*
2 *Heavy, Airborne and Air Assault divisions only. Light divisions do not receive UAV-SR.*

***Legend:***

**km** = kilometer
**AGL** = Above Ground Level
**EO/FLIR** = Electro-Optic/Forward-Looking Infrared
**MET** = Meteorological
**MTI/SAR** = Moving-Target Indicator/Synthetic Aperture Radar
**EW** = Electronic Warfare
**NBC Recon** = Nuclear, Biological and Chemical Reconnaissance
**DGCS** = Downsized Ground Control Station
**AV** = Aerial Vehicle
**SIGINT** = Signal Intelligence
**PSYOP** = Psychological Operations
**GCS** = Ground Control Station
**EAC** = Echelons Above Corps
**ACR** = Armored Cavalry Regiment
**nm** = nautical mile

Figure 1: Army Family of Unmanned Aerial Vehicles (UAVs)

with two downsized ground control stations (DGCS) and up to four air vehicles (AVs). Operationally, the UAV-CR DGCS will be found at the brigade main TOC. However, depending on the tactical situation, a DGCS could support a forward battalion, battalion task force or the direct support artillery battalion.

The ***UAV-E*** is designed for deep reconnaissance and surveillance missions as well as to serve as a "surrogate satellite" stationed well behind friendly lines performing wide-area surveillance and communications relay operations. The UAV-E will be assigned to the UAV company of the military intelligence battalion (aerial exploitation) in the corps and theater military intelligence brigades and will be fielded starting in FY 98. Occasionally, the UAV-E will be involved in deep targeting missions with the Army tactical missile system (ATACMS) and attack aircraft.

**Field Artillery Support.** At all echelons, tasking the UAVs is the responsibility of the G2 or S2 in coordination with the G3. Because the number of UAVs are limited, careful mission planning must occur to maximize their contribution. During a UAV mission, the tasking may change dynamically as the tactical situation evolves.

Support to Field Artillery is among the most important missions for the UAV-SR and UAV-CR systems. They'll perform target acquisition, targeting, fire adjustment and TDA missions. Examples of scenarios in which UAVs are performing close and deep fire missions are depicted in Figures 2 and 3, respectively, on Page 36.

**Close Fire Mission.** As shown in Figure 2 on Page 36, the UAV-CR flying a mission is diverted by the brigade S2 to locate and confirm a convoy of tracked vehicles detected by the joint surveillance and target attack radar system (JSTARS) moving into the brigade area of responsibility. The UAV finds the convoy and identifies it as an enemy tank unit of suspected battalion size.

Its GCS passes the target information to the direct support artillery battalion by advanced Field Artillery tactical data system (AFATDS) and spots the first round. Software within the GCS calculates the firing adjustment and relays that information. After the fire-for-effect, a second UAV surveys the target area to assess the damage. It then moves on to another mission.

**Deep Fire Mission.** The UAV-SR in Figure 3 on Page 36, is performing a route reconnaissance deep in the enemy rear area. The corps G2 diverts the UAV to confirm and locate a suspected missile launch site detected by a combination of sensors, including Field Artillery radar and the GUARDRAIL common sensor SIGINT system. The UAV-SR confirms the target location, identification and disposition.

This information is sent to the corps deep operations coordination cell (DOCC) and validated as a high-priority target. When the appropriate artillery unit is tasked for the firing mission, the UAV GCS passes the unit the targeting data via AFATDS. After engagement, the UAV performs TDA and passes the data to the DOCC to determine if additional strikes are required.

**Conclusion.** As UAVs are fielded to intelligence units, we must integrate them

into Army operations—for example, add them to fire support execution matrices (FSEMs). Units must practice this integration in command post exercises (CPXs), field training exercises (FTXs), live-fire exercises and the Battle Command Training Program (BCTP). Current plans include UAV participation in Exercise Roving Sands, an advanced warfighting experiment (AWE) theater missile defense (TMD) exercise at Fort Bliss, Texas, scheduled for later this month. These and other exercises will help evolve the doctrine and tactics linking the UAV to the artillery system of systems.

In mid-1995, III Corps at Fort Hood, Texas, will receive two UAV-SR systems. In addition to the usual tests associated with fielding, the UAVs will participate in III Corps Artillery and division artillery exercises. They also will play an important role in the 1995 and 1996 Joint Precision Strike Demonstrations.

The Intelligence Center and TRADOC Systems Manager for UAVs is committed to helping the Field Artillery community develop doctrine and tactics, techniques and procedures (TTP) for employing UAVs on the battlefield. If Redlegs have ideas, suggestions or comments, please call, fax, E-mail or write us: Voice DSN 821-1805/2532/2971; STU III is DSN 821-3685; PROFS account is STREETB-HUA1 or letter to Commander, US Army Intelligence Center and Fort Huachuca, ATTN: ATZS-CDU, Fort Huachuca, Arizona 85613-6000.

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**Rand Dee Bowerman has been an Assistant TRADOC Systems Manager for Unmanned Aerial Vehicles since 1985. He has served in several Military Intelligence positions on active duty and active Reserves and as a Department of the Army civilian. His active duty assignments include the 335th Radio Research Company, Vietnam; US Army Security Agency Field Station, Udorn, Thailand; and the US Army Security Agency Field Station, Camp Humphreys, Korea. His military education includes the Command and General Staff College at Fort Leavenworth, Kansas.**

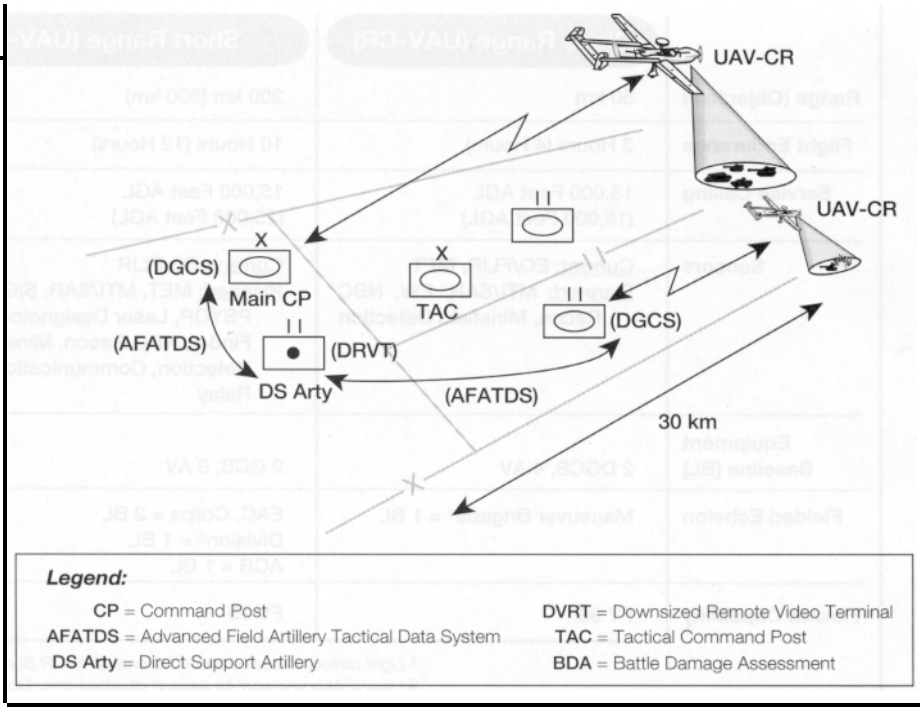



Figure 2: UAV-CR for Targeting to Support the Close Battle. The DGCS positioned with the brigade's main CP (or the TAC) receives data from the UAV and then can transmit it to AFATDS, all-source analysis system (ASAS), joint surveillance and target attack radar system (JSTARS) ground station module (GSM), common ground station, mobile subscriber equipment (MSE) and combat net radios. The DVRT allows the node, in this case the DS artillery, to see a video of what the UAV is scanning. These capabilities get the right imagery to the right commander at the right time.

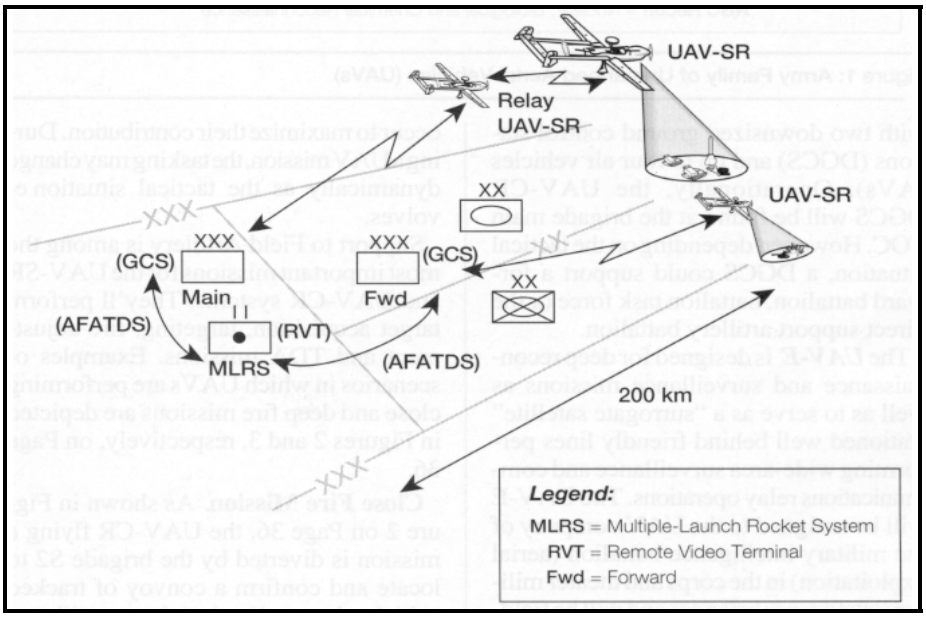



Figure 3: UAV-SR for Targeting to Support the Deep Battle. The GCS at the corps main CP and the corp forward CP can communicate the UAV-SR's information to the same systems as the CPs for the UAV-CR. The Relay UAV-SR is needed to maintain line-of-sight for transmission. (When a mission exceeds 120 kilometers, the curvature of the earth interferes with transmissions and requires a relay AV to maintain line-of-sight.)

# Terrain-Trajectory Diagrams for Firefinder in Korea

Deterrence and the potential threat of conflict on the Korean peninsula have propelled the 2d Infantry Division to elevate Firefinder target acquisition to the "graduate level." The Firefinder is a force multiplier, and the Korean mission, enemy, terrain, troops and time available (METT-T) have proven the value of a terrain-trajectory (TT) diagram.

**Why is the TT diagram helpful?** The terrain in Korea is obviously very different from the rolling hills in much of Europe and the deserts of Southwest Asia. The steep mountains and constricted valleys in Korea provide unique challenges for selecting a radar position. High mask angles in Korea often won't allow the Firefinder to locate threat artillery unless a positioning aid is available—such as the TT diagram.

The TT diagram integrates a terrain visibility diagram (a valuable intelligence tool) with a diagram of the anticipated trajectory of threat rockets and cannon artillery (a valuable artillery tool). Hence, TT diagrams combine both these assets to facilitate positioning Firefinder.

**What does the TT diagram look like?** TT diagrams are from the perspective of the radar position as shown in Figure 1. For best results, draw the diagram to scale—for example, one inch equals 100 mils in both the horizontal and vertical axes.

With the high mask angles common in Korea, depending on the origination point of the threat rocket or projectile (from the perspective of the radar position), the upward trajectory may not be visible to the radar. The TT diagram aids the selection of a position to ensure the upward trajectory is visible to the radar for critical hostile acquisitions.

*FM 6-121 Field Artillery Target Acquisition* (25 September 90) explains in Appendix F that when 50 mils of track volume are not available, you should adjust the lowest mask angle and then reevaluate whether the radar position is appropriate for the mission. No matter how much track volume is available, if the trajectory is not visible to the radar because of terrain masking, the hostile firing location won't be acquired. This is the flaw in using only track volume calculations to position Firefinder. With the TT diagram, you'll *know* whether or not the upward trajectory is visible to the radar.

**How do you make a TT diagram?** You draw TT diagrams manually. The terrain contour is measured at 100-mil intervals with an aiming circle from the proposed radar position. The terrain contour is then drawn on graph paper.

The remaining steps are listed in Figure 2 (all azimuths are grid azimuths). The mil-relation formula (W = r x m) is used several times in Figure 2. Critical points for drawing the trajectory are the azimuth (from the radar) and vertical angle (number of mils above or below the radar) to the firing point, impact point and apogee. The Army has approved but not funded the development of software to perform this important function.

The TT diagram is one of several initiatives in the 2d Infantry Division to increase the sustained readiness of the allied combined forces on the Korean peninsula. Deterrence is our duty, but when called to fight, we'll demonstrate that the 2d Infantry Division is, in fact, *Second to None!*

MAJ Victor P. Wu, Div Arty Asst S3
CPT D. J. Weatherford, Cdr, F/26 (TA)
CW2 Robert L. Spann III, F/26 FA
2d Infantry Division, Korea

1. Measure and plot the terrain contour (mask angles) at 100-mil intervals from the radar position.
2. From a map, measure the azimuths from the radar to the anticipated firing, impact and maximum ordinate locations.
3. From a map, measure the distances from the radar to the anticipated firing, impact and maximum ordinate locations.
4. Determine the altitude of the radar.
5. Determine the altitude of the firing location.
6. Determine the altitude of the impact location.
7. Determine the maximum ordinate of the cannon or rocket trajectory (based on range, projectile, charge, etc.).
8. Calculate the "radar max ord": Step 5 minus Step 4 plus Step 7.
9. Use the mil-relation formula (m = W/r) and the data from Steps 3, 4, 5, 6, and 8 to calculate the vertical angle (m) from the radar position to the firing, impact and maximum ordinate locations.
10. Use Steps 2 and 9 to plot (from the radar's perspective) the firing, impact and maximum ordinate points.
11. Plot the trajectory (from the radar's perspective) in relation to the terrain by connecting the three points.

Figure 2: Steps in Drawing a TT Diagram. This TT diagram is critical for radar operations in the mountainous terrain on the Korean peninsula.

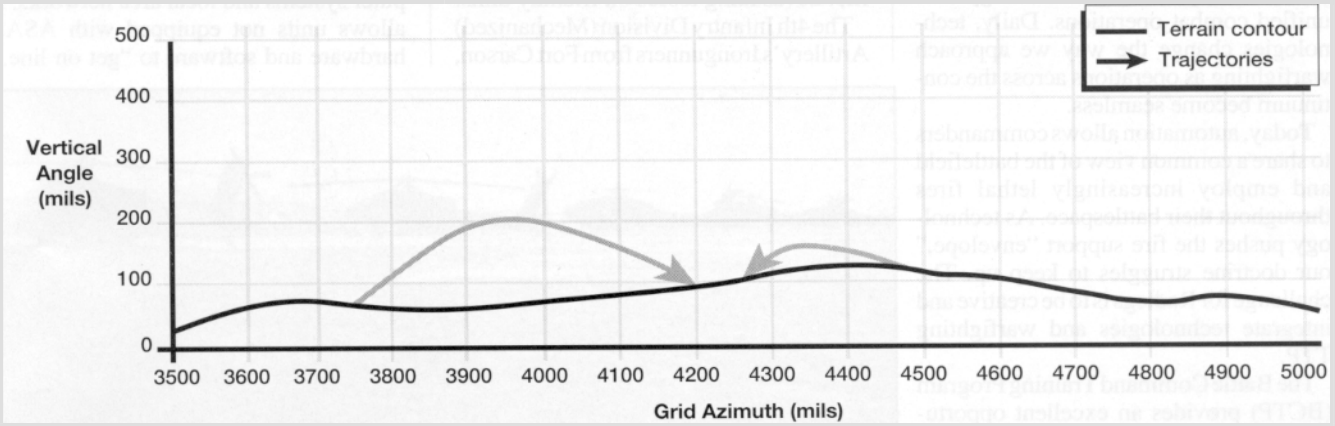



Figure 1: Example of a TT Diagram

C/3-29 FA, Leroy Scott, *Mountaineer*

# Proactive Fires:

## Leveraging Technology to Defeat Artillery High-Payoff Targets

by Colonel Alan D. Johnson and Lieutenant Colonels Charles J. Berlin III, MI, and Stuart G. McLennan III

The azimuth of "Field Artillery Vision 2020" by Brigadier General Leo J. Baxter (December 1994) is clear—leverage technology to achieve overwhelming Force XXI combat power on future battlefields. The Field Artillery already leads the way in developing joint doctrine; codifying information age warfare tactics, techniques and procedures (TTP); and projecting technology into unified combat operations. Daily, technologies change the way we approach warfighting as operations across the continuum become seamless.

Today, automation allows commanders to share a common view of the battlefield and employ increasingly lethal fires throughout their battlespace. As technology pushes the fire support "envelope," our doctrine struggles to keep up. The challenge for Redlegs is to be creative and integrate technologies and warfighting TTP.

The Battle Command Training Program (BCTP) provides an excellent opportunity to do both. Ideas can be tested against a robust World Class Opposing Force (OPFOR) capable of outranging friendly systems. A prime example is the North Korean Peoples Army (NKPA), an artillery army whose 240-mm multiple-launch rockets (MRL) and 170-mm (Koksan) self-propelled guns are particularly lethal. Traditional counterfires are effective, but they are reactive by definition. The conundrum is how to defeat these artillery high-payoff targets (HPT) before they inflict devastating losses on friendly units.

The 4th Infantry Division (Mechanized) Artillery's Irongunners from Fort Carson, Colorado, generated proactive fires TTP to solve this puzzle. This article focuses on how the Irongunners employed technology and proactive fires TTP to defeat the OPFOR during three Korean BCTP exercises. It should be noted that proactive fires are neither BCTP gamesmanship nor a panacea for success only in Korea. As we move out of the simulation center and into the real world, these TTP will evolve against other threats in other geographical areas of responsibility.

## Proactive Fires Primer

Proactive fires de-synchronize enemy phases of fires by defeating artillery HPTs before they can be massed. Regardless of the mission, the 4th Infantry Division conducts high-tempo, offensive mindset operations that synchronize air interdiction (AI) and close air support (CAS) sorties; attack helicopter deep operations; intelligence and electronic warfare (IEW) systems; long-range surveillance detachments (LRSDs); joint suppression of enemy air defense (JSEAD) packages; psychological operations (PSYOP); deception; and multiple-launch rocket system (MLRS) fires, to include SEAD and Army tactical missile systems (ATACMS). The automation centerpiece of proactive fires is Warrior.

Warrior is an interim automation tool, analogous to the initial fire support automation system (IFSAS) that will be replaced by the advanced Field Artillery tactical data system (AFATDS). Warrior isn't a new system, having been in existence since the late 1980s. However, it isn't widely understood or used outside the military intelligence community.

Warrior is actually computer software, a subset of the all-source analysis system (ASAS) software for stand-alone computer systems and local area networks. It allows units not equipped with ASAS hardware and software to "get on line."

The 4th Division conducts high-tempo, offensive mindset operations that synchronize AI, CAS and attack helicopter deep operations—among other operations.

Sergeant James Yahraes, C/10 FA, crew chief and Audie Murphy Club member, watches MLRS loading. C/10 FA is the "designated shooter" to fire reactive SEAD on targets that appear after the SEAD plan is formulated.

Warrior allows automated reception and plotting of intelligence information and facilitates rapid analysis and synthesis into intelligence and targeting products. This dramatically shortens sensor-to-shooter times.

Warrior hardware consists of Sunsparc computer terminals, which we put in the division main (DMAIN), division tactical (DTAC), division artillery (Div Arty) and brigade command posts. The divisional signal battalion establishes the local area networks using mobile subscriber equipment (MSE) to connect the Warrior terminals.

Warrior software is a criterion-based structured query language. Operators enter the commander's protocol into Warrior to execute automatic target analysis, trigger event alarms and determine output and reports. The key to success with Warrior is collocation of the intelligence and fire support analysis functions.

## Evolution of Proactive Fires

In the Fall of 1993, the division G2 borrowed two Warriors from the 2d Armored Division at Fort Hood, Texas, to prepare for an April 94 BCTP. Our training objectives were to focus the collection plan on and provide automation support for the targeting process.

The G2 initially placed the Warriors in the DMAIN collection, management and dissemination (CM&D) section and the all-source production section (ASPS). The CM&D terminal functioned as the file server and host for intelligence feeds. The ASPS terminal facilitated the G2's targeting effort. ASPS personnel passed printouts listing artillery and air defense acquisitions to the DMAIN fire support element (FSE) every 30 to 45 minutes or on-order.

The FSE used this printout to plot artillery and air defense systems on a target overlay.

The Div Arty commander placed an FA intelligence officer (FAIO) in the ASPS to speed this process. The FAIO used a radio headset to pass time-sensitive HPT intelligence to the variable-format message entry device (VFMED) operator in the FSE, thereby facilitating the timely engagement of these targets.

To assist the FSE, the G2 placed three soldiers per shift from the ASPS in the FSE to form an intelligence/fire support analysis team. The team was led by a captain and augmented by two personnel from the military intelligence battalion's tactical collection and analysis element (TCAE). The assistant fire support coordinator (AFSCOORD) supervised this team and the FSE's current operations element. The G2 Warriors also provided critical intelligence to the deputy FSCOORD supervising the division deep operations cell (DDOC), especially with regard to SEAD plans.

These procedures facilitated our training objectives and enabled us to do well during the BCTP. However, experience showed that while the analysis team concept worked, the FAIO need full-time access to the Warrior located in the ASPS. This was a critical shortcoming that degraded our ability to rapidly engage artillery HPTs.

The G2 borrowed additional Warriors to prepare for the I Corps BCTP in October 1994. Our solution was to move a dedicated Warrior and the FAIO into the FSE. This allowed the FSE to focus on artillery and air defense systems. The FAIO generated Warrior search criteria based on the commander's protocol, gleaned targets from the targeting map and Warrior screen and then passed fire missions to the VFMED or lightweight computer unit (LCU) operator. These procedures improved our performance during the I Corps BCTP, but they still didn't facilitate the dissemination of real-world classified intelligence to the units that needed it.

The 4th Infantry Division staff changed how battlefield operating systems are synchronized during tactical operations after using Warrior and proactive fires TTP. The staff subsequently revised the division's tactical standing operating procedures (TACSOP) to include a decide-detect/track-deliver-assess targeting methodology that results in the production and attack of a refined, all-source enemy target *before* it fires.

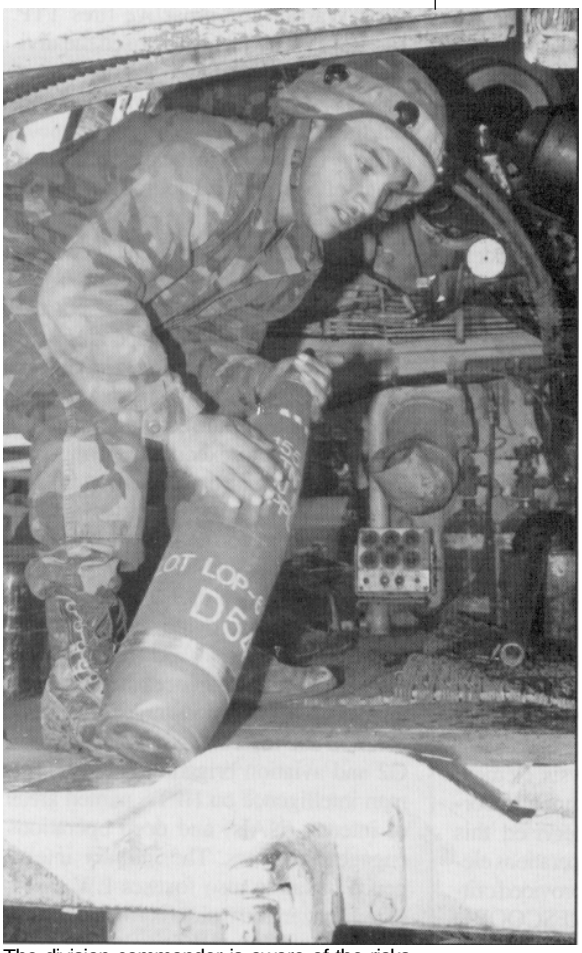
**Decide Phase.** Priority intelligence requirements (PIR) drive the collection plan. The G2 focuses collection assets and analysis on artillery HPTs, updating them after each targeting meeting. The G2 also submits information requests to corps, focuses divisional and echelon-above-division sensors to execute the collection plan and submits unmanned aerial vehicle (UAV) requests to corps for imagery intelligence 48 to 72 hours before the divisional attack helicopter deep operations. The G2 also uses a UAV remote video terminal to provide real-time imagery intelligence.

The military intelligence battalion coordinates LRSD isolation, target folder preparation and insertion schedules with the G2 and aviation brigade to provide human intelligence on HPTs, named areas of interest (NAIs) and deep operations engagement areas. The military intelligence battalion also focuses EW assets (Trail Blazer and Quickfix) to collect and (or) jam artillery HPTs. The battalion commander coordinates Quickfix restricted operating zones to support deep operations, the scheme of maneuver and the collection plan.

The DMAIN FSE still generates the high-payoff target list (HPTL), attack guidance matrix (AGM) and target selection standards (TSS), but the format of the TSS is changed. The commander's protocol in Warrior now includes this information.

The division and Div Arty commanders deliberately relax the TSS so the intelligence/fire support analysis team can use Warrior to rapidly generate targets based on normally "soft" information, such as signals intelligence and raw imagery intelligence. The division commander is aware of the risk, especially with regard to ammunition expenditures, but we have proved to him time and again that the risk is worth it.

The DMAIN FSE coordinates deception, PSYOP, AI and CAS support for proactive fires. The battlefield deception element facilitates deception story execution, including artillery fires, unit movements and positioning. The PSYOP support element coordinates leaflet drops, artillery leaflet fires and airborne radio broadcasts for the FSE. Divisional AI sortie nominations are massed against second-echelon maneuver and artillery HPTs and submitted to corps for inclusion in the integrated tasking order. The FSE tracks AI and CAS sorties by the integrated tasking order and updates target grids every two hours in coordination with the G3 operations officer, air liaison officer (ALO) and G3 air officer.



The division commander is aware of the risks involved in relaxing TSS, especially in terms of ammunition expenditures, but the payoff is worth the risks.

**Detect/Track Phase.** During BCTP exercises using the corps battle simulation (CBS), the CM&D intelligence file server receives battlefield intelligence collection module reports from the simulation center. The divisional signal battalion links the DMAIN Warriors to the corps' wide area network, using the MSE's packet switch capability. This capability enables the division to access corps computer files for reports and data.

During the I Corps BCTP, the G2 copied several UAV imagery intelligence and satellite imagery files simulating national imagery feeds into the analysis and collection element's (ACE's) forward area support terminal. This intelligence facilitated successful attack helicopter deep operations and proactive MLRS fires.

Warrior graphically portrays a myriad of intelligence data. In fact, Warrior eliminates the need for a targeting map because real-time information is displayed on the screen. During BCTP, signals intelligence consists primarily of communications intelligence (e.g., radio intercept) and electronics intelligence (e.g., air defense radars). Additionally, UAV, LRSD and moving-target indicator reports for selected areas are also displayed.

Intelligence produced by Warrior, coupled with the Q-37 Firefinder radar detections, enables the intelligence/fire support analysis team to quickly detect and track corps reactive artillery groups (CRAG), corps artillery groups (CAG) and division artillery groups (DAG). Warrior can be programmed to produce printed reports listing the unit, location, and date and time of activity.

Warrior also facilitates the production of overlays depicting the time-phased movement of air defense radars. For example, radars located from 0800 to 1000 hours can be depicted in green, those located from 1001 to 1200 hours in red, etc. This allows the intelligence/fire support analysis team to track air defense radars and predict movement plans. This procedure identifies air defense belts and validates SEAD plans, which in turn facilitates attack helicopter survivability during deep operations.

**Deliver Phase.** The collection plan results in a view of the battlefield that's a snapshot in time and space of a thinking, mobile enemy. The goal of the intelligence/fire support analysis team is to synthesize the plethora of incoming data into a coherent *prediction* of enemy dispositions in order to attack HPT's with the entire suite of proactive fires systems, thus de-synchronizing his plans.

Warrior event alarms facilitate the engagement of targets by CAS and (or) MLRS within six to 10 minutes of detection. The AFSCOORD and FAIO designate an alert box in Warrior to notify the intelligence/fire support analysis team when a report matches preset criteria (e.g., a unit or equipment type located within the designated area). The G2 coordinates imagery intelligence and (or) LRSD coverage of the alert box. The FSE coordinates CAS with the DTAC FSE and at-my-command missions with Div Arty.

Once an event alarm is triggered, the DMAIN FSE executes the fire missions via a quick-fire channel to the firing units, and the DTAC FSE commits available CAS in coordination with the ALO. The division also uses this technique to locate KS-19 air defense batteries and 240-mm MRLs before attack helicopter deep operations.

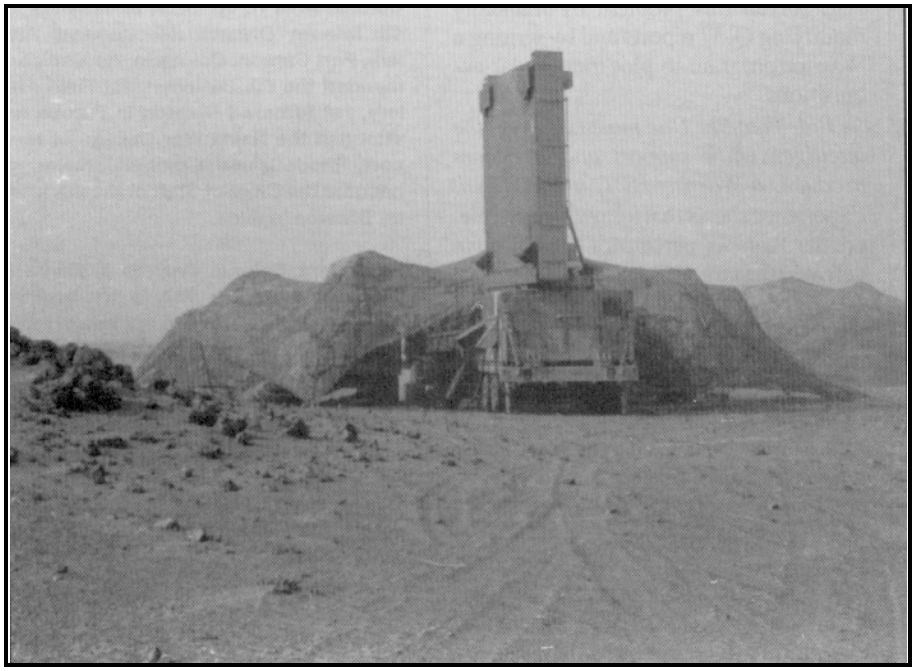
Our division deep operations normally consist of AI and attack helicopter deep operations. Massed AI are very effective when planned and executed correctly, even during BCTP. We also mass all available attack helicopter battalions at night against one HPT at a time, the norm being two to three turns per night.

The DDOC coordinates deep operations using an MSE hot-loop connecting the DMAIN, aviation brigade, reinforcing

4th Infantry Division deep operations normally consist of AI and attack helicopter deep operations. The division masses all available attack helicopter battalions at night against one HPT for two to three turns per night.

FA brigade, Div Arty and divisional military intelligence and air defense battalions. The DMAIN FSE generates the SEAD plan and coordinates execution with the aviation brigade, Div Arty and the reinforcing FA brigade.

JSEAD windows are critical because attack helicopter deep operations are conducted under this "umbrella." Two MLRS rockets are fired per ingress and egress SEAD target, per turn. The divisional MLRS battery—in this case C Battery, 10th FA—is the "designated shooter," firing reactive SEAD on targets that appear after the SEAD plan is formulated.



Intelligence produced by Warrior, coupled with Q-37 radar detections, enables the intelligence/fire support analysis team to quickly detect and track high-payoff artillery targets.

During the offense, the Div Arty echelons MLRS units forward, normally within three to five kilometers of the forward line of own troops (FLOT), to maintain the tempo of the attack and to deliver proactive fires. Maneuver brigades integrate an MLRS battery into each lead battalion task force, causing force protection to assume greater urgency as we "maneuver fires before we maneuver maneuver."

During the defense, the Div Arty also positions MLRS well forward. Whether executing proactive or counterbattery fires, the Div Arty expends 72 MLRS rockets per target. Some consider this excessive; however, these quantities are required to achieve joint munitions effectiveness manual (JMEM) effects in CBS.

**Assess Phase.** The 4th Infantry Division developed an automated battlefield damage assessment (BDA) algorithm to determine the effectiveness of proactive fires. Most proactive fires are unobserved, and with the exception of LRSD, UAV and pilot reports, target effects are determined by the number of rounds fired and target location error. The latter is minimal because Warrior generates targets to a 10-digit grid precision. The DMAIN FSE then consolidates mission-fired reports and passes them to the G2.

The BDA algorithm is a proven solution—plus or minus five percent—and is

used to refine the HPTL, collection plan, AI nominations and future attack helicopter deep operations and to generate MLRS and Q37 movement plans before the next targeting meeting. For details about the BDA algorithm, see "BDA Analysis: Using Automation to Speed the Process" by Captain John P. Hightower and Staff Sergeant John J. McClain of the 4th Infantry Division in the July-September 1994 issue of *Military Intelligence*.

## The Next Level

The 4th Infantry Division BCTP exercises provided a wealth of observations. Insights were captured in an after-action report and forwarded to the Field Artillery School and III Corps Artillery at Fort Sill, Oklahoma, and to I Corps Artillery at Salt Lake City, Utah. Here are some key observations from that report.

• *The organization of the DMAIN will evolve as automation systems are increasingly integrated into its operations*. Instead of separate vans, the DMAIN will consist of functional nodes with battlefield operating system representatives in each node. The advantages of collocating these nodes could be debated, but personnel may not be able to "reach out and touch each other" except over the ethernet.

Regardless, personnel in these nodes will use automation tools to coordinate targeting, future operations, logistics and current battle operations with adjacent, supporting and supported headquarters. Of note, ACE personnel will use the ASPS's Warrior as the file server and host to synchronize targeting operations because dissemination requirements differ for collateral and special compartmented intelligence. Collocating targeting functions in the ACE also facilitates dissemination of order of battle data to the G2's DMAIN collateral enclave and then to Warriors in subordinate units.

• *Divisions require dedicated UAV support*. Our FAIO logs show UAV imagery intelligence to be the most timely, useful intelligence for proactive fires. The G2 must be able to execute the division's collection plan without depending on corps UAV support.

• *Software to link IFSAS/AFATDS and Warrior/ASAS is required*. This software would allow the automatic transmission of fire missions and target lists that meet preset criteria. Currently, we manually enter targets into the LCU. Automating this process reduces the chance for human error and speeds engagement times.

• *CBS revisions need to reinforce the value of attacking "soft" HPTs*. Command, control, communications, computers and intelligence ($C^4I$) and logistics facilities are HPTs. Unfortunately, like the Vietnam "body count," CBS limitations cause units to focus mostly on a "tube count." $C^4I$ and logistics facilities are HPTs worthy of proactive fires, especially those associated with fire support, because defeating them effectively desynchronizes enemy maneuver and fire support plans.

• *Units need to train soldiers to operate automation systems*. Information age warfare requires that our soldiers operate a myriad of automation tools, often without formal training.

The 4th Division identified a handful of bright young officers and enlisted soldiers and conducted our own IFSAS and Warrior training. These operators developed the Warrior search criteria and wrote the commanders protocol that proved successful during our division BCTPs. These criteria were validated and refined during subsequent exercises by other operators.

• *Warrior needs the means to plot Q-37 acquisitions electronically*. Detection reports in Warrior lack the required field identifiers to automatically parse or graphically portray the detections. The G2 and FSE solved this problem by manually modifying Q-37 reports and by writing a Warrior program to plot these radar acquisitions.

• *Rule Number One must be: when the intelligence/fire support analysis team produces a Warrior HPT, it's engaged*. Experience shows that following that rule, greater than 75 percent of the time we defeated the target; the rest of the time we "pounded dirt." This may seem like a waste of ammunition, but the payoff is worth it; in CBS, an artificially high number of MLRS rockets must be expended to achieve JMEM effects.

Our historical BCTP required supply rate is 26 launch/pod containers (LP/C) per day. In reality, the number of LP/Cs would probably be lower. In BCTP, the key is to have a detailed resupply plan for moving the LP/Cs that are more than what a unit can carry. Experience shows that once the plan is approved by the observer/controllers, MLRS ammunition flows in accordance with the plan to forward ammunition supply points.

## Summary

The Irongunners moved "out of the box" to take advantage of Warrior capabilities and create proactive fires TTP. The keys were a focused, synchronized collection plan; integrated intelligence/fire support analysis team operations using Warrior; and massed, proactive fires by the entire suite of fire support platforms.

We assumed risk to achieve overwhelming battlefield lethality and glean exciting insights on integrating technology and warfighting TTP. In the end, the risk was worth it. The World Class OPFOR never knew what hit it.

We don't have all the answers, but proactive fires work. The Irongunners have only scratched the surface with respect to Warrior's potential as a Force XXI combat multiplier. As the 4th Infantry Division's moves its flag to the 2d Armored Division at Fort Hood, Texas, we challenge Redlegs to experiment with proactive fires and share insights with other Field Artillerymen and combined arms commanders. Meet you on the high ground!

**Colonel Alan D. Johnson commands the 4th Infantry Division (Mechanized) Artillery, Fort Carson, Colorado. He also commanded the 6th Battalion, 1st Field Artillery, 1st Armored Division in Europe and attended the Naval War College at Newport, Rhode Island. Colonel Johnson will become the Chief of Staff of the 4th Infantry Division in June.**

**Lieutenant Colonel Charles J. Berlin III, Military Intelligence (MI), is the Assistant Chief of Staff, G2 for the 4th Infantry Division. He commanded the 532d MI Battalion in Korea and the 747th MI Battalion in Panama; and served at the National Security Agency in Washington, DC.** **The authors wish to acknowledge the contributions of Colonel Charles Green, Military Intelligence, who, as the G2, borrowed the first Warriors for the 4th Infantry Division in 1993.**

**Lieutenant Colonel Stuart G. McLennan III is the S3 of the 4th Infantry Division (Mechanized) Artillery. Previous assignments include serving as Executive Officer of the 3d Battalion, 29th Field Artillery and Assistant Fire Support Coordinator, also at Fort Carson.**

**Kingfish Battle Notes:**

# Fundamental Errors in Fire Coordination Graphics

by Major Thomas A. Kolditz and Colonel Neil E. Nelson

***Editor's Note:*** *This article is the second in a series of "Kingfish Battle Notes," discussing fire support tactics, techniques and procedures in the 101st Airborne Division (Air Assault). The first article, "RAIDS—Fire Coordination for Aviation in the Deep Battle," appeared in the February 1995 edition. "Kingfish" was the code name of the 101st Airborne Division Artillery during World War II. The white bomb painted on the side of a helmet also signified a soldier was from the division artillery.*

The fire support officer (FSO) was fuming. He had just "lost five pounds" during a one-minute, one-way conversation with the fire support coordinator (FSCOORD) over clearance for counterfire. The FSO's frustration was that the issue was not with his fire support overlay, but with the way the boundaries were established on the higher headquarters graphics.

The rather nontechnical terminology used at high volume by the FSCOORD did not seem to capture the problem. The FSO had just discovered that you can't fix bad graphics with permissive fire support coordination measures (FSCM). He also had discovered an important doctrinal fact—boundaries are the most basic fire coordination measure and, therefore, require his personal attention while formulating the plan.

The FSO needed both the ability to recognize the overlay problem and the terminology to communicate the problem to the FSCOORD. This article attempts to establish common terminology for errors in fire coordination graphics and suggests there are six fundamental errors that contribute to most fire coordination problems. The goal of this article is to make common mistakes easier to recognize and, once found, easier to discuss.

We've got to get beyond assuming that graphics will be flawless before they're issued or fought. Ideally, graphics stand alone as representative of the plan and, in the hands of an experienced operator, amplify the order. Sometimes, however, confusion arises as to exactly what action the graphics were to portray. Planners intimately familiar with the plan and enthusiastic about its execution miss a detail of key importance to someone less familiar with their ideas. During crisis action or contingency planning, simple haste may cause mistakes that go undetected. It's up to fire supporters to detect these mistakes—*before* a call-for-fire.

The coordination of direct and indirect fires is a complex art, and there are many ways to assist execution with boundaries and other FSCM. Fundamentally, however, there are only six types of mistakes or errors in fire coordination graphics. The term "fundamental" was chosen because each error has to do with the basics of portraying space with lines. As a test, each error must apply to both boundaries and those lines more commonly thought of as FSCM—coordinated fire lines (CFLs), fire support coordinating lines (FSCLs) and restricted fire lines (RFLs).

All the figures in this article are based on actual graphics published by a division, brigade or battalion headquarters. If fire supporters check maneuver graphics looking for the following six fundamental errors, the vast majority of problems in clearing and otherwise coordinating fires will diminish.

**1. Insufficient Coordination Space.** Insufficient coordination space is when FSCM create corridors or other limited areas within which fires must be cleared (see Figure 1). The size varies with terrain. When you add the range probable error (PE) of the weapons system, likely target location error (TLE) and self-location error of friendly forces, it becomes clear why graphics that define one- or even two-kilometer corridors can cause problems in the safe, rapid coordination of fires. Figure 1 illustrates the point of vulnerability that can exist between measures and shows a way to correct it.

**2. Mal-Assigned Coordination Space.** Mal-assigned coordination space is when a graphic is labeled in such a way that it's unclear who is controlling (and, therefore, clearing) terrain (see Figure 2 on Page 44).

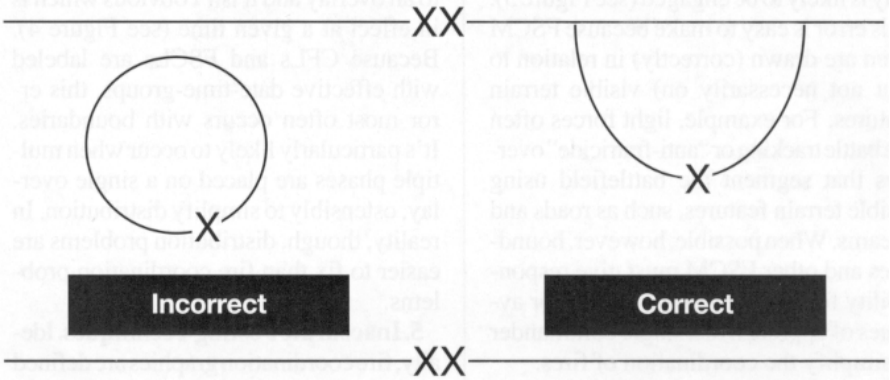



Figure 1: Insufficient Coordination Space. This error occurs when FSCM create corridors or other limited areas within which fire must be cleared.

This sounds like an obvious mistake, but it can occur easily when a fragmentary order (FRAGO) changes unit responsibility for a portion of a zone. Labeling errors also can cause problems in assigning responsibility for terrain.

Careful rehearsals help uncover this error and many other fire coordination problems. Caution: without care, rehearsal participants may focus only on a terrain model and not the graphical overlay from which they'll fight the order.

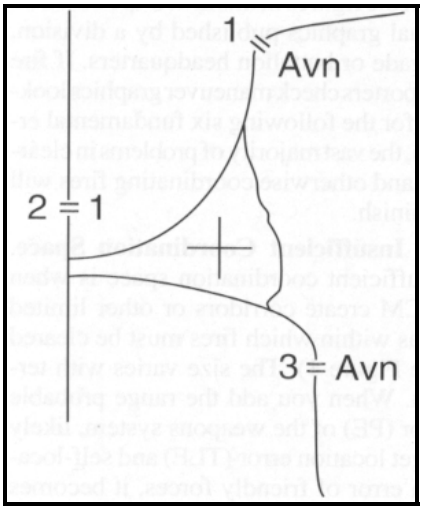



Figure 2: Mal-Assigned Coordination Space. This occurs when a graphic is labeled in such a way that it's unclear who is controlling (and, therefore, clearing) terrain. This error can occur easily when a FRAGO changes unit responsibility for a portion of a zone.

**3. Key Feature Disadvantage.** A key feature disadvantage is created when an FSCM overlays terrain on which the enemy is likely to be engaged (see Figure 3). This error is easy to make because FSCM often are drawn (correctly) in relation to (but not necessarily on) visible terrain features. For example, light forces often use battle tracking or "anti-fratricide" overlays that segment the battlefield using visible terrain features, such as roads and streams. When possible, however, boundaries and other FSCM must give responsibility for likely enemy positions or avenues of approach to a single commander to simplify the coordination of fires.

The graphical measures in Figure 3 (in this case, both a boundary and a CFL) parallel a high-speed avenue. The fix is to displace them to provide unambiguous responsibility for the key terrain feature, in this instance a road.

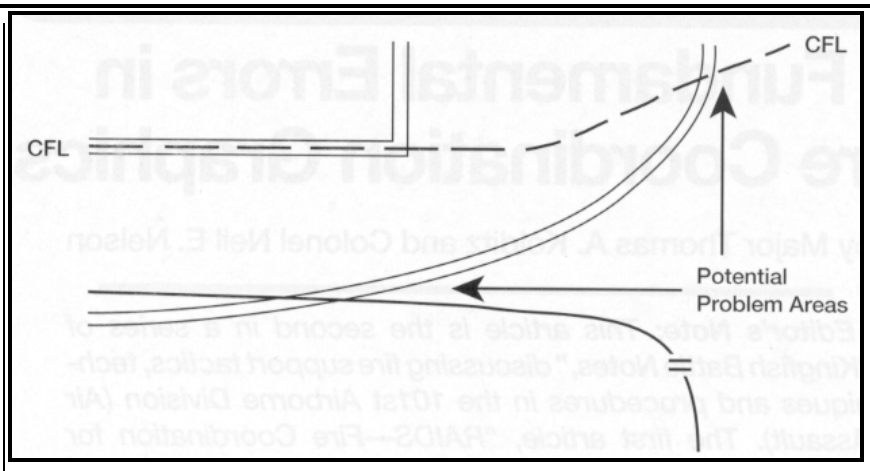



Figure 3: Key Feature Disadvantage. Because FSCM often are drawn (correctly) in relation to (but not necessarily on) visible terrain features, this error is easy to make. In this case, both a boundary and CFL parallel a high-speed avenue. The fix is to displace them to provide unambiguous responsibility for key terrain.

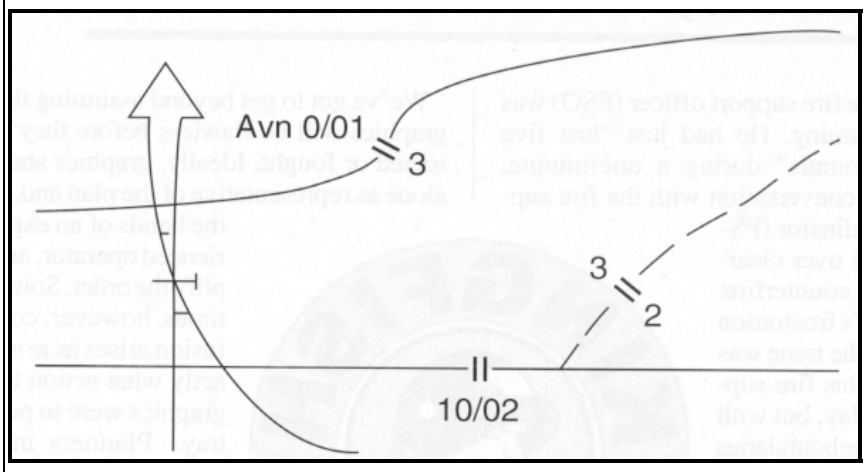



Figure 4: Unclear On-Order Sequence. This error is created when more than one on-order FSCM are posted to an overlay and it isn't obvious which is in effect at a given time. The graphics in this figure should be phased in on at least two overlays.

**4. Unclear On-Order Sequence.** Unclear on-order sequence is created when more than one on-order FSCM is posted to an overlay and it isn't obvious which is in effect at a given time (see Figure 4). Because CFLs and FSCLs are labeled with effective date-time-groups, this error most often occurs with boundaries. It's particularly likely to occur when multiple phases are placed on a single overlay, ostensibly to simplify distribution. In reality, though, distribution problems are easier to fix than fire coordination problems.

**5. Inaccurate Posting Techniques.** Ideally, fire coordination graphics are defined in eight-digit grids, point-to-point in a detailed operations order (OPORD). This enables accurate posting and rapid input to the tactical fire direction system (TACFIRE). Because maneuver boundaries are the most basic FSCM, when time permits they should be held to the same standard.

In practice, fires are cleared from a map through an overlay—particularly true in the case of branches, sequels or FRAGOs to a base plan. This encourages the use of the finest, most accurate pens possible on overlays used to clear fires (see Figure 5).

While most fire support NCOs index FSCM from the center of a line, points underneath a swath of black paint pen are ill-defined and almost impossible to efficiently clear. A 36-inch length of broad paint pen on a 1:50,000 map overlay creates approximately 28 square kilometers of ambiguous battlespace. Imagine how worthless such graphics are at 1:100,000 or 1:250,000.

If forced to use a wide pen, the fire supporter should draw the graphics first with

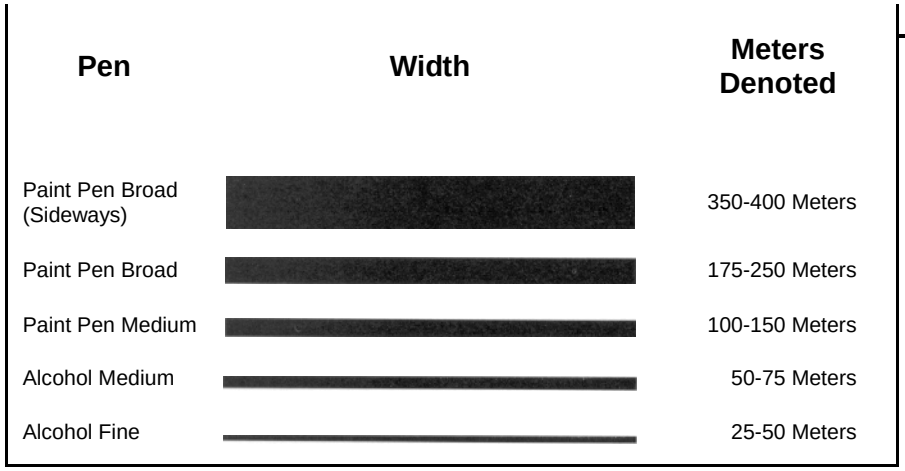



Figure 5: Pen Widths to Scale for 1:50,000 Map. Points underneath a swath of black paint on overlays are ill-defined and almost impossible to efficiently clear. If you must use a wide pen, draw the graphic first with superfine and then trace over the top of the original line, keeping the wider pen centered at all times.

superfine and then trace over the top of the original line, keeping the wider pen centered at all times. Graphics held to these standards are recognizable at a glance for their detail.

**6. Excessive Complexity.** This is like pornography—hard to define, but you know it when you see it. A series of on-order CFLs and boundaries is more complex than a series of phase lines that can serve multiple purposes. Feedback on planning at the Combat Training Centers (CTCs) is consistent: simple plans executed well are better than complex plans fraught with coordination or synchronization problems. The more complex the plan, the more likely it is that any of the fundamental errors will develop. Simple graphics are easy to coordinate and fight.

**Conclusion**. No checklist or system of review can ensure flawless graphics or a quality plan. A clear understanding of these six fundamental errors, however, can focus the commander and his fire support counterpart on potential problems in the graphical portrayal of the plan. If the plan is simple and the graphics are clear, it follows that the coordination of fires will be just as straightforward.

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# Running ARSS on DOS Higher than 5.1

The automated range safety system (ARSS) fielded in 1992 is great for computing artillery safety data and will print out the safety overlay and safety T. It's draw backs are that it won't work with a DOS higher than 5.1 and it won't print properly on any printer other than a dot matrix.

ARSS will run on the lightweight computer unit (LCU) or a personal computer (PC) with a higher DOS, but you must install the system as outlined in this article.

**Warning:** Never introduce floppy disks into the LCU that have not been checked for viruses.

**Warning:** Ensure that applications remain on the floppy disk and are not saved to the hard disk drive.

## Using ARSS on the LCU

This process requires two, 3-1/2-inch disks; one must be high density.

1. Make Disk #1 bootable from DOS 5.1.
2. For the high density Disk #2—
   a. Install ARSS on a computer that has DOS 5.1 or lower.
   b. Install impact areas as outlined in the ARSS user's manual. (You also may define impact areas once you have the ARSS running on the LCU.)
   c. Copy Sort.EXE (from DOS 5.1) into the ARSS400\ARSS subdirectory.
   d. Copy ARSS from the hard drive onto Disk #2.
3. The LCU requires a one-time preparation to ensure you can boot from the A drive. You—
   a. Turn off the LCU and remove the hard drive.
   b. Turn on the LCU.
   c. Key in [CTRL]—[ALT]—[S]
   d. At Extended Bios Features, hit Return.
   e. Quick Boot should = No.
   f. Escape, save and exit.
   g. Turn off the LCU.
   h. Put the hard drive back in.
4. To run ARSS on the LCU—
   a. Boot the computer with Disk #1 (bootable).
   b. At the A:> prompt, insert Disk #2 (ARSS) and type "CD ARSS400"
   c. At A:\ARSS400>, type "ARSS"

## Running ARSS on a PC

1. Once you have your two program disks (bootable and ARSS), the procedure are the same on a regular PC.
   a. Boot the computer with Disk #1.
   b. At the A:> prompt, type "CD ARSS400"
   c. At A:\ARSS400> type "ARSS"
2. Backup your impact areas onto a separate disk.

If you have questions about or problems with these two methods to run ARSS, call the Concepts and Procedures Branch of the Gunnery Department at DSN 639-5523 or commercial (405) 442-5523.

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