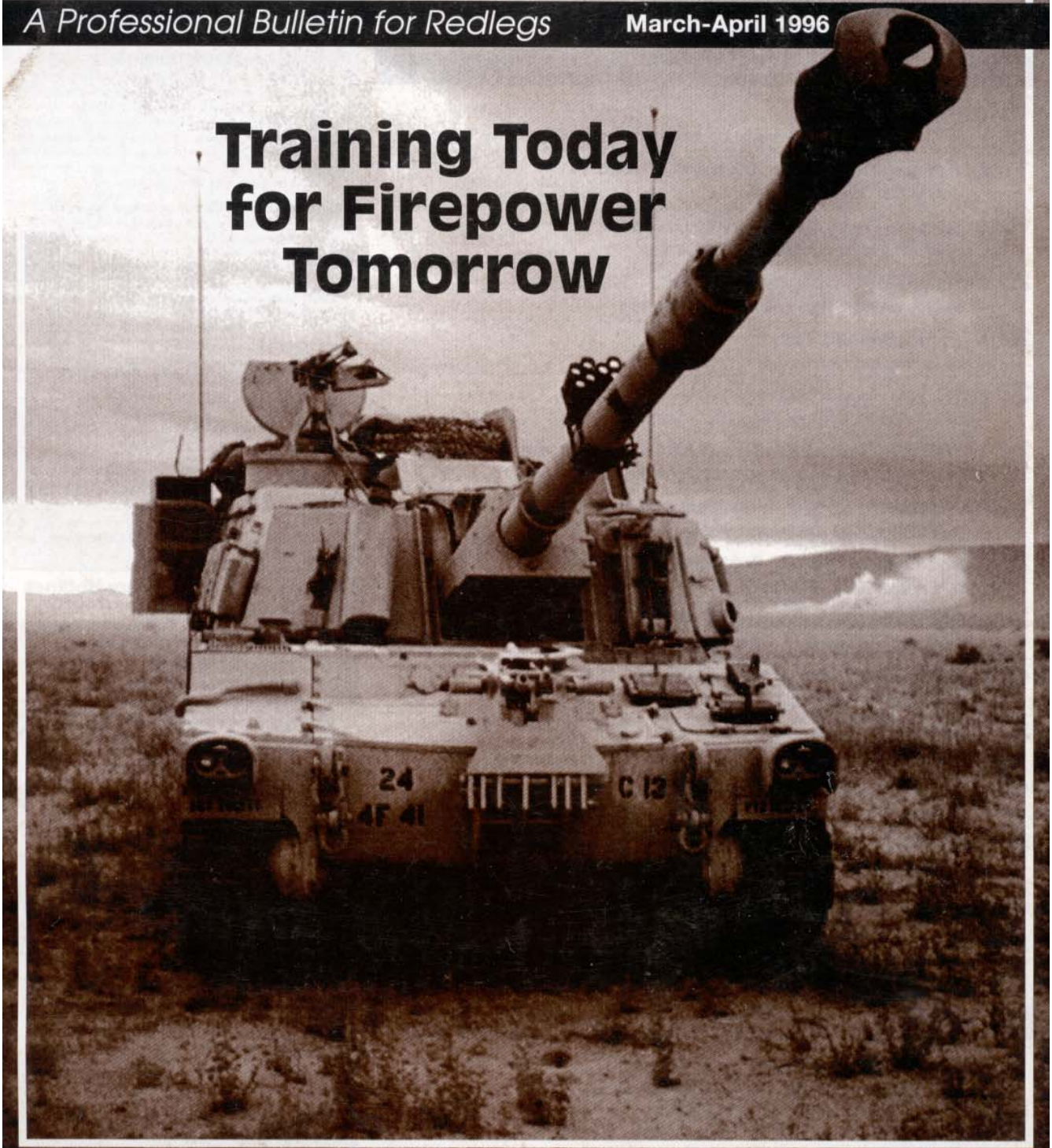
Field Artillery

A Professional Bulletin for Redlegs March-April 1996

Training Today for Firepower Tomorrow



HQDA PB6-96-2

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INTERVIEW

ARTICLES: Training Today for Firepower Tomorrow

DEPARTMENTS

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

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SUBSCRIPTIONS: May be obtained through the US Field Artillery Association, P.O. Box 33027, Fort Sill, OK 73503-0027. Telephone numbers are DSN 639-5121/6808 or commercial (405) 355-4677 or FAX (405) 355-8745 (no DSN). Dues are $18.00 per year ($35.00 for two years and $52.00 for three years) to US and APO addresses. All others add $12.00 per subscription year for postage. Subscriptions are also available through the Superintendent of Documents, US Government Printing Office, Washington, DC 20402. The telephone number is (202) 512-1800; FAX is (202) 512-2233.

SUBMISSIONS: Mail to Editor, ***Field Artillery,*** P.O. Box 33311. Fort Sill, OK 73503-0311. Telephone numbers are DSN 639-5121/6808 or commercial (405) 442-5121/6808 or FAX 5127 with DSN or commercial prefixes. Material submitted for publication is subject to edit by the ***Field Artillery*** staff; footnotes and bibliographies may be deleted due to space limitations.

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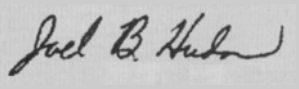

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Digitization—
A Training Revolution

Introducing new technology always creates training challenges in our Army. We must learn how to use the new equipment and integrate it into the force. Digitization will change not only the way individuals train and fight, but also the way units train to fight. Digitizing the force will create a major training challenge—and warfighting opportunity—for the Army.

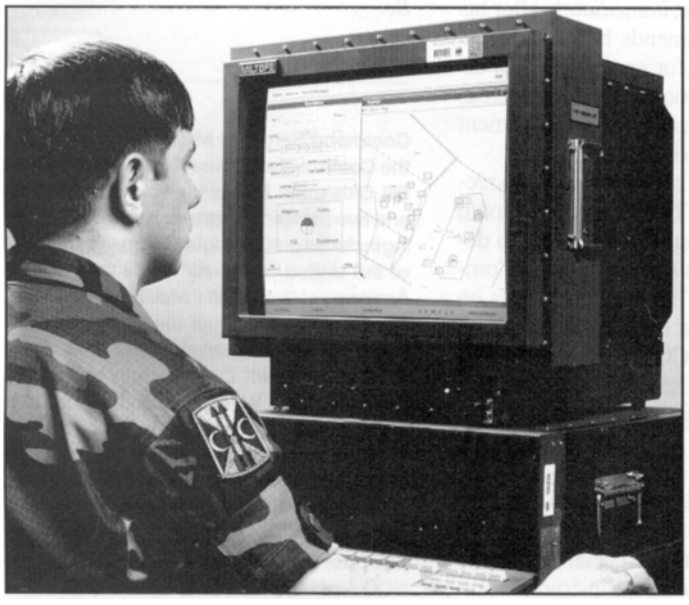
The Digitization Challenge. Recently, I had a conversation with a senior officer about the advent of the advanced Field Artillery tactical data system (AFATDS), which will truly digitize the FA. He said, "AFATDS will require about 20 hours of collective training a week—the field will *revolt*."

I argued to the contrary. Twenty hours of AFATDS training per week won't spark a revolution. The Field Artillery has been conducting sustainment training for 20 hours a week on the tactical fire direction system (TACFIRE) for the past 15 years. We built TACFIRE parks in the early 1980s to support that sustainment training.

But in one sense, that senior officer was right: digitization will cause a revolution, a training revolution. Digitizing the force will require us to rethink the way we train the FA soldier and his commanders and staffs—our frame of reference will have to shift.

Consider our current paradigm with TACFIRE. We plan digitally, but we execute by voice. Why? Largely, because it's too hard (read "slow") to execute digitally. With AFATDS, we'll have to plan *and* execute digitally. One reason is that AFATDS won't support voice execution as well as TACFIRE does. More importantly, unless we both plan and execute digitally, we will not realize AFATDS' potential.

To give you an analogy, consider the difference between a Paladin and another M109 howitzer. Paladin has more complicated electronic equipment: single-channel ground and airborne radio system (SINCGARS), an automatic fire control system, a global positioning system and more. Paladin adds many excellent capabilities, but its tactics are more complicated, putting more responsibility on the section chief. But if you want to take advantage of Paladin's increased lethality and survivability, you have to train to employ its capabilities. Likewise, if you want to take advantage of the increased functions and speed of AFATDS in fire mission processing, you have to train to plan and then execute digitally.



AFATDS—Courtesy of Magnavox Electronic Systems Company

It will not be an easy transition. To train to fight full-up digitally demands more time and involves more people—not only fire direction and fire support personnel, but also commanders and primary staff officers.

Road Map to the Future. To meet these challenges, the Center for Fire Support here at Fort Sill, Oklahoma, has undertaken a number of initiatives. We've charted a "road map" to guide us as we develop the doctrine, organizations, training, materiel, leaders and soldiers to take full advantage of digitization; I'll present the initial concepts of our road map to senior leaders at the Senior Fire Support Conference at the Field Artillery School in March.

Among the many training initiatives we're working on now are automating courseware; developing networked, multimedia classrooms; and improving distance learning. All take advantage of information technology to provide high-quality institutional training for Total Army soldiers, NCOs and officers.

Unit Training on the Edge. What can you do at the unit level to exploit the opportunities digitization will bring? The answer is simple, but not easy. You train to standard on core competencies—including planning and executing digitally. If you play football, you have to block and tackle. These are fundamental to football. The fundamentals of our future fire support system are to plan and execute digitally.

That's tough training. It demands a shift in thinking and detailed planning. It takes well-developed techniques and procedures painstakingly rehearsed to overcome the inevitable materiel difficulties you meet in field conditions. And it takes time and resources. You can use your most complex mission-essential tasks as vehicles to train the 21st century core competencies. But you must start training with the equipment you have now to both plan and execute digitally under realistic combat conditions.

Digitizing the Army will radically change the way we train and fight in the future. Because of TACFIRE, we're one step ahead of the rest of the Army—but we're only part way there. Our challenge is to take the next step in the process, to make the shift to a fully digitized force. With the fielding of AFATDS, the future is now—we must prepare to fight and win digitally on the modern battlefield.

The TABE— *Could It Make or Break a Soldier's Career?*

by Command Sergeant Major Jerry L. Wood,
Commandant of the Field Artillery NCO Academy

The NCO Academy, Fort Sill, Oklahoma, continues to seek innovative ways to decrease the attrition rate of our students. As the Commandant, I studied the problem and came up with some interesting facts.

The Facts. Approximately 35 percent of the students—primary leadership development course (PLDC), basic NCO course (BNCOC) and advanced NCO course (ANCOC)—arrive without a test of adult education (TABE) score or with a TABE score below 10, the minimum recommended to attend these NCO education system (NCOES) courses. The two sections of the TABE are reading and language; each requires a minimum score of 10. Although both sections of the TABE are important, performance on the language section is a consistent indicator of student success or failure at the Fort Sill courses. One hundred percent of the soldiers released academically failed to score above 9.9 on the TABE language section.

With these facts comes a caution: commanders should not use TABE scores to restrict soldiers from attending NCOES courses. TABE scores are intended to make the soldier aware of any weaknesses and give him/her a chance to improve in those areas before attending school. Once aware, the soldier can seek assistance through his local education center, the Basic Skills Education Program (BSEP), college classes—even tutoring. He should discuss the options with his unit chain of command before committing to one with the education center. He needs to know what his chain of command is willing to support before deciding on a course of action.

Probably the most important factor to consider is time. Unfortunately, many soldiers wait until 30 to 60 days before the class start-date to take the test. Obviously, their improvement options are severely limited.

Soldiers and commanders must understand that taking the test early identifies problems early so soldiers can improve. All too often, soldiers arrive at the NCO Academy thinking that simply taking the test was more important than responding to the results. They don't understand the importance of using the information to improve before coming to the course.

Although map reading continues to account for the majority of academic failures in PLDC, common leader training accounts for most BNCOC and ANCOC failures. BSEP typically helps prepare soldiers for PLDC. BNCOC and ANCOC students should strongly consider a college-level English composition class.

Students with low TABE language scores are more likely to experience problems in a Field Artillery BNCOC or ANCOC course. Soldiers in other military occupational specialties (MOS) should contact their proponent schools to determine recommended courses of action prior to attending their NCOES courses.

Recommendations. The soldier should take the TABE test *immediately* after his supervisor recommends he go before a promotion board for specialist. This allows him several months to identify areas of concern and establish an improvement strategy, as needed.

Ideally, soldiers scoring below the recommended 10 in TABE language would take English composition courses to develop their skills up to the English Composition II level. These classes focus on the problems most often experienced by BNCOC and ANCOC students. If funding is a problem, BSEP is an option that helps develop language skills at no cost to soldiers.

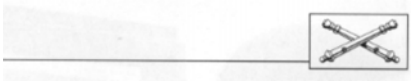
Soldiers who have limited time after the TABE should tell their small-group instructor of potential problems upon arriving at the academy. Special assistance will be provided when the instructor identifies

a weakness or when a student asks for help—if it's not too late.

Soldiers also should understand that while a minimum TABE language score of 10 is recommended for PLDC, BNCOC and ANCOC, the minimum score recommended for the US Army Sergeants Major Academy at Fort Bliss, Texas, is 11. Soldiers scoring between 10 and 11 on TABE language should develop a long-term improvement strategy that might include the suggestions mentioned. (Note: the Sergeants Major Academy is the only NCOES course that has different TABE scores for language and reading; the minimum score recommended for language is 11 while the minimum score recommended for reading is 12.)

Soldier Success. It is the business of the Field Artillery commander to set his soldiers up for success. As we, at the academy, seek new and innovative ways to improve the quality of training, the student must come prepared to receive it. That is the soldier's and unit's responsibility.

In the grand scheme of things, the NCO Academy has the soldier for a short time, but his performance in NCOES courses has a tremendous effect on his future in today's Army. Together, we must do all we can to make sure he can *Be All He Can Be.*



Command Sergeant Major Jerry L.Wood is the Commandant of the NCO Academy, Fort Sill, Oklahoma. He holds a bachelor's degree and two master's degrees. His military training includes graduating in the top eight percent of the United States Air Force Senior NCO Academy at Gunter Air Force Base, Alabama, and Honor Graduate of the Advanced NCO Course and Distinguished Honor Graduate of the Drill Sergeant Course, both at Fort Sill. Sergeant Major Wood has served as a Company, Battalion, Brigade and Division Fire Support Sergeant. He was a Platoon Sergeant, Drill Sergeant, Senior Drill Sergeant, Operations Sergeant, First Sergeant and Battalion Command Sergeant Major, the latter just prior to becoming Commandant of the NCO Academy.

MLRS Needs Robust Liaison Section

Major E.L. Hughes, in his article "Army MLRS Support for the Marines" (February 1995), mentioned the need for a robust liaison section in the MLRS [multiple-launch rocket system] table of organization and equipment. I agree.

From 8 to 31 March 1995, the 6th Battalion, 27th Field Artillery (6-27 FA), an MLRS battalion in III Corps Artillery, from Fort Sill, Oklahoma, participated in the 11th Marine Regiment's premiere Desert Firing Exercise (DESFIREX) 2-95. DESFIREX is the regiment's semiannual training exercise conducted at the Marine Corps Air Ground Combat Center at Twentynine Palms, California.

Training with the Marines provided 6-27 FA an excellent opportunity to work with joint service elements and maneuver the battalion over doctrinal distances, the latter an opportunity not afforded to us here at Fort Sill. DESFIREX was particularly rewarding for our liaison section as we were able to perform our doctrinal mission.

While supporting the 11th Marines, our mission was threefold. First, we had to maintain continual communications link (24 hours a day) between the reinforced unit and 6-27 FA's tactical operations center (TOC). We also had to provide unit capabilities information to the reinforced unit's S3, in this case, the Marines. And third, our mission was to validate 6-27 FA's liaison portion of the tactical standing operational procedures (TACSOP) operations annex.

6-27 FA conducts air reload operations at 29 Palms.

Maintain Continual Communications. We succeeded in maintaining continual communications between the reinforced unit and the 6-27 FA TOC throughout the exercise. We accomplished this using two methods of communication: secure voice and secure digital frequencies. We experienced few problems maintaining voice communications. When we did have problems, the system was quickly troubleshot and the problem fixed by the liaison section (liaison officer or the liaison sergeant) or the Marines. "Quick," of course, is relative as the distance between the remote and our vehicle was never less than 300 meters (and, it seemed, always uphill).

The Marines provided all digital communications. They assisted us by conducting command post exercises (CPXs) every evening. We found the CPXs gave the Marines and the 6-27 FA TOC the opportunity to conduct rehearsals and work out any fire planning issues.

Open communications weren't limited to ground operations. Prior to the final exercise, our mission was to take to the air with the commander and operations officer of the 39th Marine Air Group to help synchronize an MLRS platoon time-on-target (TOT) mission into the 1st Marine Division (1st MarDiv) battlefield shaping exercise. 1st MarDiv's mission was to prep the battlefield with MLRS fires followed immediately by fast movers and rotary-wing aircraft. Our part was to have a man in the air who knew the "artillery lingo" and could trigger the TOT with our Alpha "Steel Rain" Battery.

Provide Unit Capabilities Information to the Reinforced Unit's S3. We found that bringing a "Smartbook" on MLRS was extremely useful. It was based around the five requirements for accurate predicted fire as they apply to MLRS. We also included a section on controlled supply rates, required supply rates and rates of march. Using the Smartbook, we helped the Marines plan all phases of the exercise. Major issues were MAXORD [maximum ordinate] (when establishing air corridors) and land management, especially when MLRS had a reinforcing mission.

Additionally, we brought along the MLRS Platoon Leader's Handbook, a reference that was quite useful for future operations planning. Because safety was paramount, we helped the Marines with airspace coordination areas [ACAs] and fire support coordination lines [FSCL] by computing safety boxes and determining MAXORDs.

Validate the Liaison Annex of the 6-27 FA TACSOP. The Marines' logistical support was stellar. They provided all classes of supplies as we needed them. One exception was fuel; the Marines don't fuel their HMMWVs [high-mobility multipurpose wheeled vehicles] with JP-8.

We alleviated frequent trips to the battalion by carrying two five-gallon fuel cans along. We prevented a fuel shortage by timing our refuels (exchanging of fuel cans) with trips to the battalion or with the battalion commander or chaplain visits. We experienced no vehicle maintenance problems, even though we traveled 800 miles over rugged terrain. This can be attributed to excellent preventive maintenance performed by the liaison sergeant—Staff Sergeant Russell E. Coble, Chemical Corps, the battalion NBC [Nuclear, Biological and Chemical] NCO. (Although a liaison specialist is authorized, we didn't have one.)

We brought along all the equipment to perform our mission. Most of it we used. A lesson learned: it is essential that the liaison section bring along a minimum of 300 to 400 meters of WD-1 wire. The Marines exercise the "antenna hill" concept; they run all their remoted antennae into a junction box on a hill, then run a cable to the combat operations center (COC). Even though your vehicle is on the same hill, it may be a few hundred meters from the junction box. When we did have a maintenance problem with our AN/GRA-39, the Marines provided a spare. Again, the Marine logistical support was stellar.

DESFIREX 2-95 was indeed a premiere exercise. By continually moving, communicating and providing capabilities information, we succeeded by achieving all our objectives during this very demanding joint operations exercise.

CPT Daniel A. Richetts, FA
DESFIREX 2-95 Liaison Officer
6-27 FA, III Corps Artillery, Fort Sill, OK

Alternative MLRS Emplacement—1x3-Kilometer Formation

In his letter contained in the September-October 1995 edition ["The Problem with the OPAREA"], Lieutenant Colonel John M. House points out a problem with which every MLRS [multiple-launch rocket system] platoon leader can identify. The 3x3-kilometer platoon OPAREA [operational area] is a great concept—on paper. Quite simply, Lieutenant Colonel House is correct; the space is not there.

As an MLRS platoon leader for two years with A/21 FA [A Battery, 21st Field Artillery], 1st Cavalry Division [Fort Hood, Texas], I found space for MLRS operations at a premium in every scenario, ranging from the Persian Gulf War to corps Warfighters exercises at Fort Hood—*even* on the CBS [corps battle simulation] computer in the SimCenter. The battlefield, even in the wide open expanses of the desert, is crowded. I found this true in the barren desert of northern Saudi Arabia and southern Iraq.

The 1x3-Kilometer OPAREA. Sergeant First Class Johnny McCoy and Staff Sergeant Tony Zarrillo, my platoon sergeant and third section chief, respectively, helped me develop a concept that cuts the space required to position an MLRS platoon to three square kilometers—one-third of the area designated by doctrine—with no appreciable degradation in capability. The one-kilometer-by-three-kilometer strips shown in the figure each have nine firing points at least 500 meters apart (doctrinal). The major adjustment is that the ammunition resupply points (ARPs) and the platoon operations center (POC) are now on the OPAREA boundary.

This concept is based on a set pattern of firing points that ensures dispersion and prevents launchers from crossing over old firing points or their own routes to ammunition resupply—as shown in the figure's scheme of maneuver. It also prevents launchers from firing over each other.

Of course, one inherent weakness to this "set play" is its adaptability to uncooperative terrain. That's where the creativity and instincts of the platoon leader and section chiefs become paramount. No terrain totally fulfills a leader's expectations. Knowledgeable section chiefs, however, understand the capabilities and limitations of their weapon system and almost always can find a suitable firing point.

Each section chief must understand where his launcher fits into the big picture. The 1x3-kilometer platoon OPAREA requires cooperation and discipline. The OPAREA boundaries must be coordinated with higher headquarters and are inviolable without permission from the POC.

The ARPs and POC are on the edge of the OPAREA. Generally, one ARP is placed on each side. Launchers don't travel more than one kilometer to an ARP—not true in a 3x3-kilometer OPAREA. The POC positions are based on METT-T [mission, enemy, terrain, troops and time available] with the most important factor's being communicability with the launchers and the battery operations center [BOC].

In the proposed OPAREA, the three MLRS sections move in set patterns (adapted to the terrain) and have easily accessible ammunition resupply and clear command and control. This scheme opens possibilities and is realistic in terms of terrain availability.

Admittedly, this solution lends itself best to desert warfare—the terrain in which we designed the OPAREA. However, we found it adequate for the hilly terrain of central Texas as well. Using our 1x3-kilometer OPAREA, our ARTEP [Army training and evaluation program] occupation times averaged one-half of the standard for day and night operations. We often accomplished occupations with no radio transmissions.

The 1x3-kilometer OPAREA may not be the best possible solution in all scenarios, but it's one MLRS platoon's attempt to increase survivability, minimize response time and use the minimum amount of space on a crowded battlefield.

MLRS Platoon Defense. I also would like to address the other issues that Lieutenant Colonel House discussed. First, platoon defense is always a concern. A defensive perimeter may make everyone feel safer, but the fact is that the MLRS platoon is so lightly armed that it could not defend itself against a well-trained and equipped light infantry squad. Passive measures, such as communications security and downright hiding, are the best defense.

True, the signature of an MLRS is the most obvious and visible on the battlefield. That calls for the consistent and disciplined use of hide areas, dispersed firing points (at least 500 meters) and well-planned routes between firing points and ammunition resupply points.

As far as security from enemy maneuver is concerned, if an MLRS unit ever faces enemy ground forces, our situation can be defined as "untenable," at best.

CPT William T. Harmon, FA
Assistant Professor of Military Science
Oklahoma State University,
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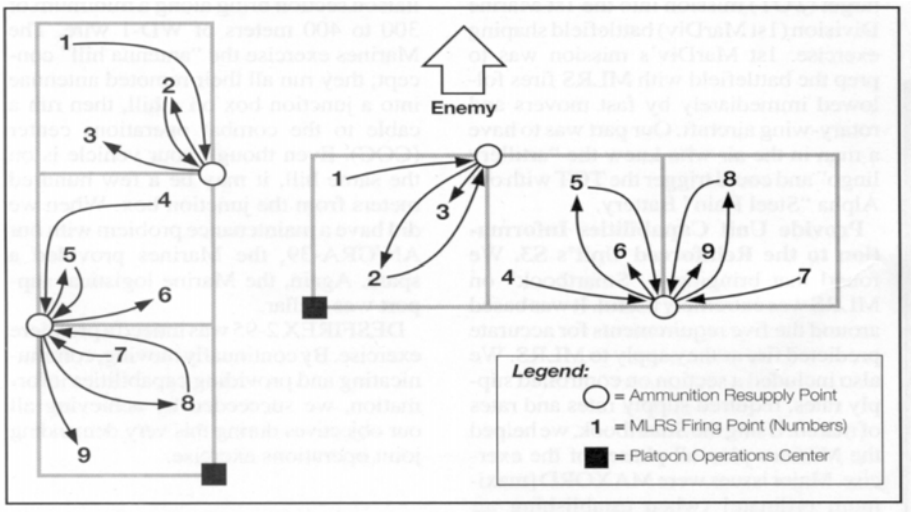


Two examples of MLRS platoon positioning in 1x3-kilometer operational areas (OPAREAs). Each OPAREA has nine firing points with three assigned to each launcher in 1x1 kilometer boxes. The launchers use each firing point once in numerical sequence.

General (Retired) Richard E. Cavazos, Senior Observer,
Battle Command Training Program

Cavazos On Training

Interview by Patrecia Slayden Hollis, Editor

Editor's Note: General Cavazos commanded at every level from rifle platoon through corps and Forces Command, retiring in 1984. Since that time, he has served as a Battle Command Training Program (BCTP) Senior Observer for division and corps commanders and their staffs.

Last Army Photo, 1984

Q *In today's Army, what training strategy should a battery commander have? A battalion or brigade commander?*

A Regardless of the level, the object is to train an individual (or unit) to be *technically competent, disciplined* and *motivated*. These are not platitudes; they're the foundation of training—of the Army.

What's *technical competence*? It has four parts. One is knowledge—unfortunately, a lot of trainers stop at that. If the soldier just has knowledge, he or she isn't trained.

The second is attitude. This part is true whether you're training a clerk or rifle platoon. You'd better have a rifle platoon that wants to close with the enemy. To establish that attitude with knowledge, you've got to spend part of your training time telling them how important what they do is to the unit. Everyone wants to know how he fits into the organization—how important his job is.

Third, to be technically competent, knowledge and attitude are translated into skill. The clerk typist needs the skill to hit the keys with alacrity and the machine gunner the skill to fire accurately. When your soldier has skill, you're still not there.

The last part is habit. Technical competence is a habit of doing things very well.

Let me give you an example of what I mean by habit. After the Battle of 73 Easting in Operation Desert Storm, ABC correspondent Sam Donaldson interviewed one young tank commander in the battle. The young tanker described the Battle: "I saw a tank about 500 yards to the left, told the gunner and then looked for another target. [In my day, *no way* would we have taken our eyes off a tank only 500 yards away.] I heard the gun go off, saw this tank in front of me and said 'Gunner, center.' The gunner traversed the gun and identified the target, I looked to the right because there had to be a third tank—it was a platoon of three—and told the gunner about the third tank as I heard the gun fire on the second tank. We hit all three."

Donaldson said "That's amazing. How long did it take?" The tanker said, "Oh, a long time—23 seconds."

Now that's technical competence ingrained as habit.

Discipline is required to train an individual or unit. You teach discipline. The first part of the definition of discipline is "the unhesitating obedience to orders." I give the Army an A+ on that. The second part is harder: "In the absence of orders, the mission is executed as if someone in authority had been there." In other words, if you take away all the leadership and only two junior soldiers are left, will they continue the mission? Discipline makes soldiers do that.

Now, how do you teach discipline? You teach the "obedience to orders" part of discipline by setting and enforcing standards. "Soldier, stand up when I talk to you." "Soldier, button your collar." "Soldier, get a haircut." Standards.

You teach "execution in the absence of orders" by giving young soldiers responsibility. I call it the "Fall-Out One Concept" where subordinates in the chain of command take over. Initially, those subordinates won't do well, but accepting a lesser performance during training for awhile allows young officers and soldiers suddenly given increased responsibilities to grow in confidence and know what to do when thrust into positions of higher authority.

That means you have to accept that today's training may not look so good—the second soldier on the third team may be in charge, and he has a lot to learn. But given the responsibility, he will learn. He will be more disciplined. That takes training time.

The last of the three parts of training is *motivation.* You motivate people in two ways. The first and most important is you always show respect for the soldier. You know, we never would have to have an EO [equal opportunity] class if we showed everyone respect and helped develop their self-esteem. If you diminish that, the soldier isn't as effective. If you take that away, you destroy the soldier.

You have to take time in training to motivate people, and you do that first by respecting them and second by appreciating them. That can be rather laborious. Sometimes soldiers you train come without high regard for themselves. But the time is worth it—motivation is extremely important.

You can have the most technically competent people in the world with some degree

of discipline, but if they aren't motivated, they aren't truly trained.

The Battle of 73 Easting lasted 23 minutes, and we destroyed two armored brigades. That's extraordinary—it's our training—competence, discipline and motivation. It takes all three to train an individual or unit. It's a rather complex business, this training.

Q *What's the role of BCTP in the Combat Training Center (CTC) training strategy?*

A Simplistically, BCTP is just a means to aid corps and division commanders in team building and help them focus on what training is required by measuring performance against doctrine in CBS [corps battle simulation]. The BCTP staff sort of "opens and closes the ranges and scores the targets." We let the commanders draw their own conclusions.

The program is challenging, encouraging innovation and agility in battle command. And, I'll admit, we raise the jump bar a little higher when we run across an extremely good unit. We challenge the unit to find areas in which it can improve. Thus, a unit only competes against itself.

Incidentally, other services and some of our allies are trying to implement a BCTP-like program. I believe they'll have great difficulty because their leadership did not undergo the self-analysis process of the "dirt" CTCs in their early years. I'm talking about the AARs [after-action reviews] where leaders at every level honestly assess the performance and capabilities of themselves and their units. Our Army is very comfortable with that process. Its part of our culture. It's unique.

The intent is for BCTP to be a cauldron where all battlefield operating systems are used intensely in a short time. In operations other than war, commanders and their staffs have more time to think. In a cauldron, they have little time to think. The concept is that if they're trained to operate in a cauldron, they ought do alright in operations other than war.

General John Tilelli as Vice Chief of Staff of the Army said, "I want the commander undergoing a BCTP Warfighter exercise to figure out what he'll do when 10,000 wolves are nipping at him and he has no assets left." That's how you train commanders and staffs for the accelerated tempo of modern combat.

Q *In terms of fire support, what are divisions doing well in BCTP? What can they improve?*

A Counterfire is superb—probably the best of any nation in the world. When I look back, I see that artillerymen used to get into counterbattery fights: artillery fighting artillery. Then it became a counterfire fight, a combined arms fight with air, artillery and gunships.

If the Army gets into a artillery-to-artillery battle with one of our adversaries, several of whom have considerably more artillery, the Army will lose. But if the Army uses all its resources, then it will beat that adversary.

So counterfire became a combined arms fight and that opened up a new challenge for the fire supporter: targeting. Five or so years ago, targeting was a significant problem. It is no longer a problem—the United States Army conducts the deep battle superbly. The DOCC [deep operations coordination cell] systematically finds, follows and strikes targets under the auspices of the corps or division commander.

Counterfire and deep battle are working very well—those are significant battles. But we need to refocus on the close fight. In the late 1980s we rightfully shifted our focus to the deep battle. We became so enamored with the deep fight that the close fight now needs attention.

First, the act of handing-off, say, an enemy tank regiment, from the deep to close fight needs attention. We start hammering that regiment way out, and when it comes down into the brigade zone, there might be a battalion and a half left. As it enters the brigade's zone, that battalion-plus is no longer part of the deep battle. But the brigade commander has no way of tracking it. He has no real intelligence assets at his level, yet he's in a hit zone. When that enemy battalion-plus hits the battalion-level, we *know* where it is but probably too late.

The transition from the deep to the close battle isn't as smooth as we'd like to be. In BCTP, some enemy units make it well into the brigade sector and no one has warned the brigade the enemy may be alive, well and on the way.

We need to do a better job of massing fires. When I had a rifle company in Korea, it was not unusual to have 15 artillery battalions support the company in a fight. *Fifteen* battalions for one rifle company. And one time, more than 20 battalions answered my call-for-fire. It was a bad day in Black Rock, but the enemy was stopped cold. That's massing.

I grant you, a division now doesn't have 15 battalions of FA to mass, much less 20. I'm a strong advocate of adding artillery to our force structure. But we still can do a better job of massing what we have.

FM 100-5 [Operations] says that fires should defeat the enemy's capability and will to fight. Now if you pinpoint a target and just smack it once, that may defeat the enemy's capability, but it won't defeat his will to fight. If you keep him under fire tirelessly day and night, over time you'll defeat his will to fight.

There are a lot of things artillery needs to be able to do that aren't encompassed in "killing." We've got to be able to blind or suppress the enemy and fire screens for friendly troops. We've got to be able to deceive the enemy with our fires—fire false preps.

Artillery doctrine has a tendency to talk in terms of killing, as opposed to screening, suppressing or deceiving the enemy. They're in our doctrine, but we don't train them well.

The Army also needs to work on countermortars. Bosnia has a lot of mortars. So does North Korea. There are a lot of mortars worldwide. The best countermortar weapon is another mortar. But the challenge is still to take mortars out.

When you fire a howitzer at high angle, you reduce the range because it's firing up; the round doesn't come straight down because it has an elliptical ordinate. To take out a mortar, let's say, the round has to clear a mountain and hit a dug-in mortar about 300 yards on the back side of the mountain. Now, that's a challenge.

Granted, systems such as Paladin can't be all things to all people—countermortars is probably mission Number 50 on the

"I believe in violence. If you're planning to take a hill, take it with all the violence you can generate."

> ***"The job of a tank or rifle company commander is to advance his forward observer..."***

list—but no one seems to be working on countermortars. Third world nations have a lot of mortars, and they kill just as dead as artillery does.

We need to get comfortable with battle damage assessment—BDA. I don't think we'll ever get the degree of BDA preciseness many people would like: the exact condition of the enemy. The assets to determine BDA to that preciseness are needed by intelligence for current operations and to project future operations. To go back and determine the precise degree of damage to the target—60, 40 or 20 percent—ties up too many limited intel assets, even with the advent of remotely piloted vehicles, drones, etc.

The best BDA we'll routinely be able to get is an order of magnitude—the enemy unit's in pretty bad shape, we've hurt it some or we didn't lay a glove on it. The Air Force won't fly BDA simply because it thinks its finite number of aircraft are more effective dropping bombs.

Ideally, we'd all like to know the exact condition of the enemy after a hit. We went to a lot of trouble to determine BDA during the air campaign of Operation Desert Storm, and if you'll remember, the Iraqis ended up having a lot more artillery left than the Air Force said. For BDA, an order of magnitude is more realistic and will do for battle planning.

Q *What are the greatest challenges maneuver commanders are having in integrating fires?*

A The battalion commander's integration of fires in his scheme of maneuver is haphazard at best. You see, maneuver commanders are very comfortable planning maneuver. I ask them, "Tell me how you plan to take this hill," and most start maneuvering with their hands. When one says, "First, I'm going to hammer the x&## out of it and then, I'll...." That's my kind of commander. I believe in violence. If you're planning to take a hill, take it with all the violence you can generate.

Our top-down fire planning is superb. But we need to pay more attention to bottom-up *planning*. Now, I know Redlegs call it bottom-up *refinement*, but I don't regard that as "refinement."

Somewhere out there in front, there's a young captain walking or crawling around with a pair of field glasses, telling his FIST [fire support team], "I want that hill smoked; I want that hill suppressed; and just as we get to the base of that hill, I want about 45 seconds to two minutes of intense fire right on the objective to cover us as we go in."

Take that bottom-up fire planning and mesh it with the top-down fire planning in TACFIRE [the tactical fire direction system] and it comes out as a effective schedule of fires. Right now the schedule of fires only addresses what the senior commander wants and not what the company FSO [fire support officer] out in front sees the commander needs. It's the responsibility of the maneuver commander to integrate his fires into his scheme of maneuver and the job of his FSCOORD [fire support coordinator] to see that all fires are meshed into the commander's schedule of fires.

Company commanders aren't getting their fair share of the fires. The job of a tank or rifle company commander is to advance his forward observer—it isn't to run down a ridge line with a bunch of infantrymen. If he moves his FO to the next hill, the enemy's in trouble. Just a radio call can bring in pretty impressive force. That should be the basis of our tactics—it works.

Q *The next generation 155-mm self-propelled howitzer, Crusader, will have significantly increased lethality and survivability. For example, it will be able to rapidly fire four rounds to simultaneously impact for a one-howitzer time-on-target (TOT); a pair of Crusaders will have the firepower of an M109 battery with a range of 40 to 50 kilometers. What are your thoughts on this developmental system?*

A Crusader's one-howitzer TOT is a superb concept. We've got to exploit its capabilities, but *not* reduce the number of our howitzers—which one can infer from your question. The question says that two Crusaders can do the work of a battery. Just because we're increasing the rate of fire and accuracy of our next-generation howitzer, it isn't a signal to reduce the artillery by two-thirds. We do not have enough artillery now, so Crusader's capabilities will begin to catch us up.

The Army Science Board was right when it said we need two artillery brigades per division instead of one. [See the article "Army Science Board: How Much Artillery is Enough?" by John J. Todd and Lieutenant Colonel James M. Holt, June 1995.] But most of the existing brigade per division is MLRS [multiple-launch rocket system], which has a large footprint and cannot fire close to friendly troops. Again, we need to pay attention to the close fight—we need more tubes.

Paladin is great and Crusader will even be better. But the naysayers will say, "With Crusader coming on board, this is a good place to cut." That's fallacious reasoning—we don't have enough artillery now.

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

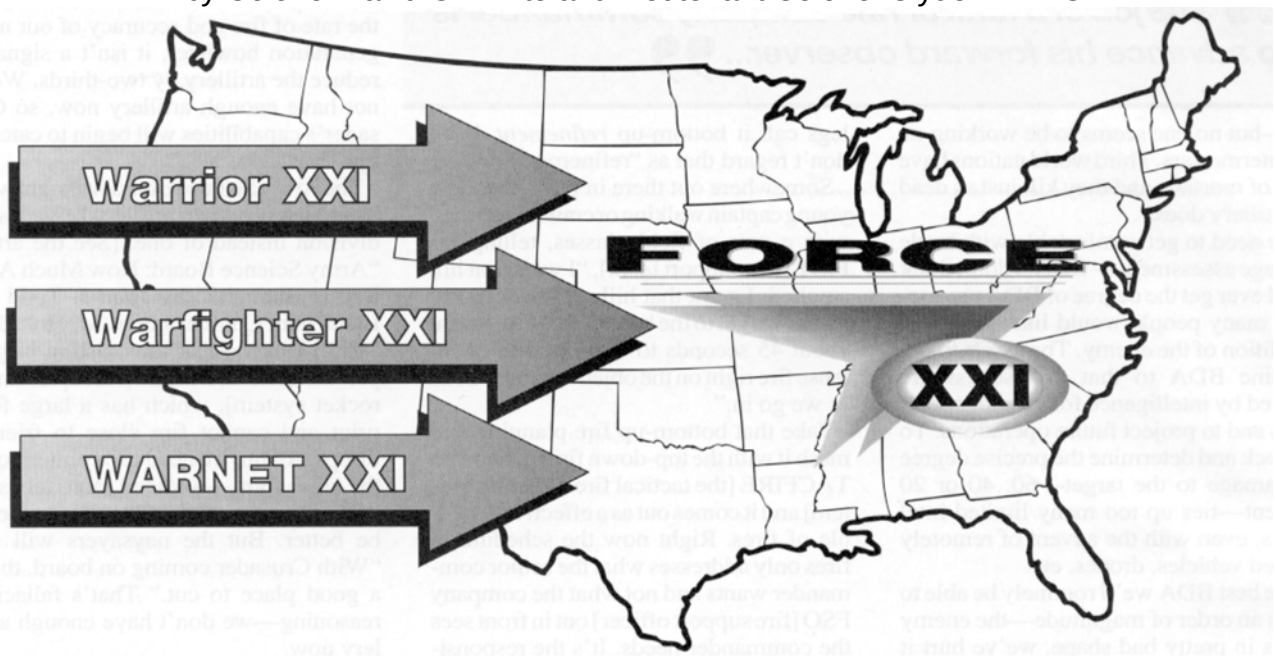
A I toast them: "God give the Field Artillerymen the mind, heart and professionalism to destroy our country's enemies—and a lot of free time and cold beer."

★★★★

General (Retired) Richard E. Cavazos has been a Senior Observer for the Battle Command Training Program, headquartered at Fort Leavenworth, Kansas, since his retirement in 1984. In his last active duty assignment, he was the Commander of Forces Command, Fort McPherson, Georgia. Other Army assignments included command at every level from the rifle platoon to the 9th Infantry Division at Fort Lewis, Washington, to III Corps at Fort Hood, Texas. General Cavazos' many honors include the Distinguished Service Cross with Oak Leaf Cluster, Silver Star with Oak Leaf Cluster and 29 other combat decorations. He was inducted into both the Ranger Hall of Fame at Fort Benning, Georgia, and the Fort Leavenworth Hall of Fame. He was the first hispanic Army officer to wear four stars.

Army Training XXI

by Colonel David C. White and Lieutenant Colonel Clyde W. Ellis



The combined arms training strategy (CATS)—the framework to synchronize artillery training efforts—is changing to support the future force. CATS, which has been a proponent-based, event-driven strategy, is moving to a task-based combined arms strategy, allowing us to rapidly tailor training for specific units or needs. We'll use the latest in technology in support of this strategy to rapidly solve unit training problems, merge unit and institutional training, help trainers in the field design and resource training and help the soldier develop himself.

This training strategy will encompass the Total-Army—Active and Reserve Components and Department of the Army civilians. For the Field Artillery, the schoolhouse will play a critical role in this process, recognizing that 67 percent of the FA will be in the National Guard.

The development of Force XXI will be achieved along three axes: the institutional/table of distribution and allowances (TDA) axis, joint venture axis and an Army Digitization Office axis. The Training and Doctrine Command (TRADOC) training corollary to the Force XXI axes are Warfighter XXI, Warrior XXI and WARNET XXI. Together, they form Army Training XXI, the structure for individual through the joint task force (JTF) levels of training. This strategy unites efforts into a synchronized, coherent plan to train the soldier and unit to be combat ready, capable of decisive victory.

Although the three training axes are intertwined, Warfighter XXI, the unit training axis, is the main effort. Warrior XXI is the institutional/self-development axis to support unit training, and WARNET XXI is the modernization piece to support unit training. Although Force XXI doesn't mature until 2010, the FA School at Fort Sill, Oklahoma, is already moving.

Warfighter XXI. To achieve the Warfighter XXI vision, the Army is investing in a unit training strategy that has five key components: the standard Army training system (SATS); training support packages (TSPs); training aids, devices, simulators and simulations (TADSS); standard Army after-action review system (STAARS); and the Army training digital library (ATDL). All components support collective training in FA units.

1. Standard Army Training System (SATS). This component is the "automation center of gravity" of Warfighter XXI and the trainer's software management tool for "unit-specific" situational training templates and training resources. SATS implements the training described in *FM 25-100 Training the Force* and *FM 25-101 Battle Focused Training* and is based on *TRADOC Regulation 350-35 The Combined Arms Training Strategy (CATS).*

SATS software Version 4.0 is greatly improved over the version fielded years ago, which tended to be cumbersome. SATS' new version is state-of-the-art software that's enhancing FA training in active and National Guard battalions. SATS 4.0 fielding began in February 1996 and will be fielded to all FA battalions by June 1996.

2. Training Support Packages (TSPs). The second component is comprised of doctrinal templates offering the unit trainer a complete package to execute training to standard. The TSP combines maneuver/collective, gunnery and soldier CATS matrices to produce a unit situational template. An events generator uses the template data to provide scenarios, conditions and standards to support training events in one environment or in a combination of the live, constructive or virtual training environments.

The TSP couples the training event template and the trainer's requirements with the training tools (TADSS) or the actual training exercises. Instead of the unit trainer's spending three days preparing for one day of training, the goal is for the trainer to use TSPs to prepare one day for three days of training.

3. Training Aids, Devices, Simulations/Simulators (TADSS). TADSS offers the trainer a selection of training tools to offset the financial, safety, environmental/ecological

and technological constraints associated with training. TADSS will be distributed interactive simulation (DIS)-compatible and fully embedded in equipment and systems. The Field Artillery School is proactively developing and integrating TADSS into the CATS strategy for institutional and unit training.

4. Standard Army After-Action Review System (STAARS). This component standardizes AARs and automates the feedback on systems, students and unit performance. STAARS capitalizes on the success the Army has achieved integrating the AAR into training during the past 15 years. Future STAARS will feed information into the digital library so soldiers worldwide will have immediate access to lessons learned.

5. The Army Training Digital Library (ATDL). This last component is the knowledge foundation of Warfighter XXI, a repository of all training-related information. When integrated across the three training axis, ATDL will be a self-sustaining, automated training information system for the Total Army. Unit trainers will use this system to help optimize resources as they budget, plan, prepare and assess the execution of unit-level training.

Warrior XXI. The Warrior XXI plan focuses on developing the institutional and self-development pillars and defines both current and future training requirements. The plan defines Warrior XXI initiatives and synchronizes them with Warfighter XXI and WARNET XXI efforts.

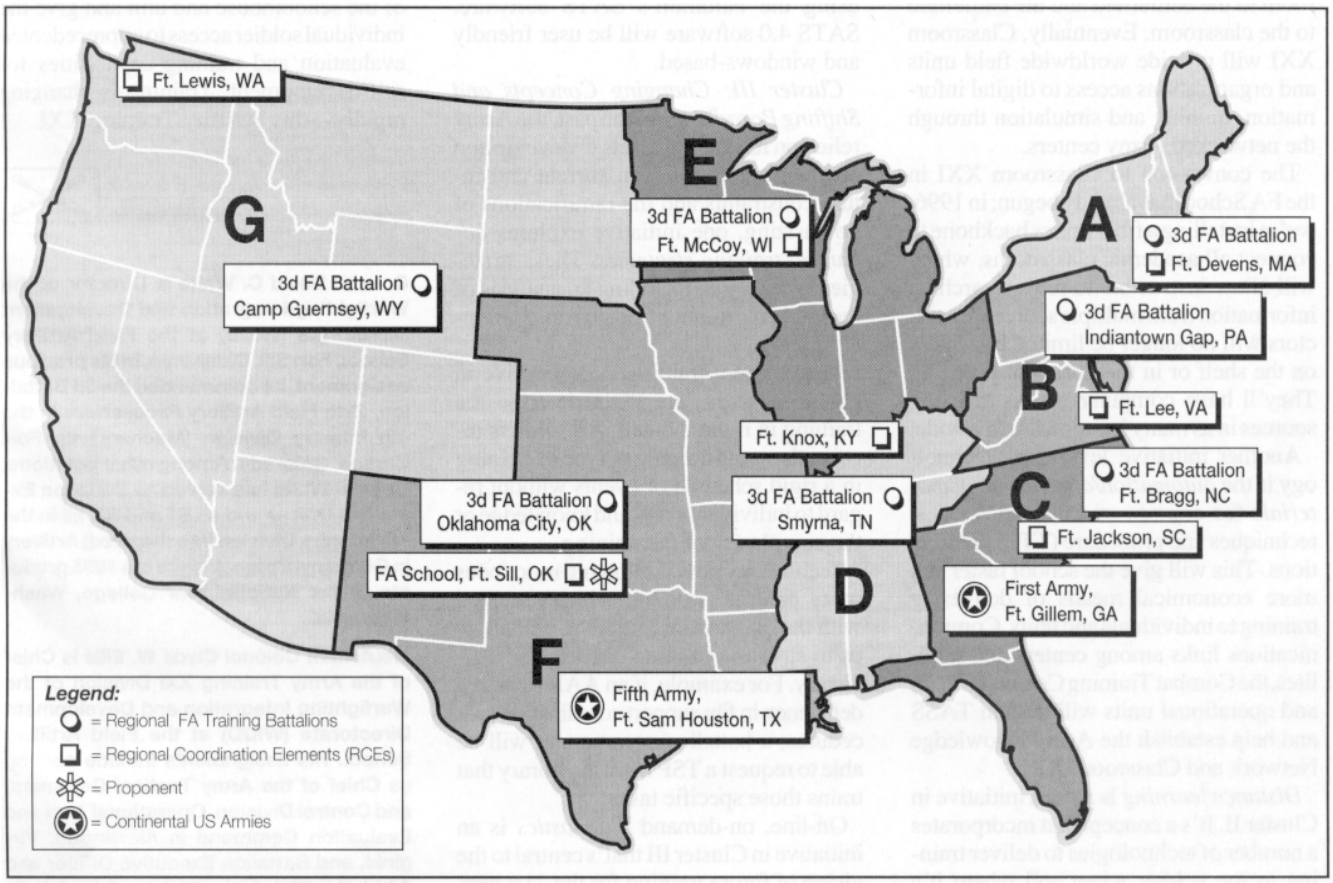
Warrior XXI provides a training strategy and training system for individual through joint task force levels of training exercises. For example, in the future, technology will allow us to link the Field Artillery Training Center and Field Artillery School to selected joint task force exercises, providing students early exposure to the fighting environment they're preparing to enter.

The end state of Warrior XXI is a networked organization of warfighting centers that meet institutional training needs and support Force XXI. Electronic highways will provide a comprehensive menu of distance learning opportunities ranging from individual task training to division and corps exercises in a DIS environment.

There are three clusters of initiatives supporting Warrior XXI: the first cluster restructures the schoolhouse, the second leverages technology to enhance individual and unit training and the third focuses on shifting training concepts and paradigms.

Cluster I: Restructuring the Schoolhouse. According to the 1995 TRADOC Strategic Plan, the service schools will be reconfigured into *centers and satellites*. Fort Sill most likely will be the Center for Fires with a focus on joint and combined fires, providing training and training products, doctrinal development, accreditation and other services to satellite posts. But Fort Sill also may be a satellite, delivering technical and tactical FA branch training.

The goal of the center-and-satellite concept is to better align enduring battlefield functions while creating a more effective and efficient training infrastructure. Each center will mirror a university with the satellites "colleges" within the university. Another initiative in the school restructuring cluster is the *Total Army school system (TASS).* It is composed of a fully accredited and integrated Active/National Guard/US Army Reserve school system organized by regions that provides standard institutional training and education (see the figure). TASS restructures Reserve Component (RC) schools and links



Total-Army School System (TASS) Seven Regions

them to the TRADOC school system, applying one program of instruction (POI) and one standard for all training.

Under the regional organization, the continental US (CONUS) is divided into seven regions, each with a regional coordination element. The FA School is functionally aligned with an FA training battalion in each of the seven regions and is responsible for accrediting those battalions, developing Total Army training system (TATS) courseware and certifying instructors. Last November, the school held the first TASS Conference to kick off FY 1996 as the implementation year of the TASS concept.

Cluster II: Leveraging Technology for Unit/Individual Training. One major initiative in the Cluster II is *Classroom XXI,* which uses high-tech to take the classroom to the battlefield and the battlefield to the classroom. Eventually, Classroom XXI will provide worldwide field units and organizations access to digital information, training and simulation through the networked Army centers.

The conversion to Classroom XXI in the FA School has already begun; in 1996, we're installing a fiber optics backbone to connect all academic classrooms, which will allow instructors to retrieve archive information from multiple sources. Instructors will no longer be limited by what's on the shelf or in the library at Fort Sill. They'll have computer access to many sources in as many locations Army-wide.

Another initiative leveraging technology is the *automation/digitization of materials* for courses and doctrine/tactics, techniques and procedure (TTP) publications. This will give the school faster and more economical means of delivering training to individuals and units. Communications links among centers and satellites, the Combat Training Centers (CTCs) and operational units will sustain TASS and help establish the Army Knowledge Network and Classroom XXI.

Distance learning is a third initiative in Cluster II. It's a concept that incorporates a number of technologies to deliver training to the soldier when and where it's needed. Two primary technologies being exploited to bring distance learning into the practical realm are computer-based instruction (CBI) on CD–ROMs and two-way interactive video training.

The FA School is integrating multimedia courseware into all FA courses. To support TATS, multimedia courseware contains a combination of delivery methods, to include video teletraining (VTT) and CD-ROM. Military Occupational Specialty (MOS) 13F Fire Support Specialist multimedia courseware is being distributed; MOS 13B Cannon Crewman and 13E Fire Direction Specialist courseware are in the early stages of development and scheduled for completion in the fourth quarter of FY 96. Additionally, the FA School has two teletraining network (TNET) facilities and a multimedia classroom, providing a full range of interactive training for students.

The last Cluster II initiative is *automated training development products* in the institution using the automated standard Army training software (ASATS). Units or individuals can access these products through the ATDL in several ways: using Internet, calling a 1-800 number or using the battalion's SATS software. SATS 4.0 software will be user friendly and windows-based.

Cluster III: Changing Concepts and Shifting Paradigms. In the past, the Army relied on its internal assets to develop and conduct training. Given current and future constraints and the ramifications of downsizing, one initiative explores *advanced training strategies.* These strategies are holistic, including an analysis of the total environment, not just institutional training.

Most current training is descriptive in nature—that is, the POIs describe the training in minute detail. All soldiers receive the same training or type of training in a rigid schedule of events without regard to individual skills and knowledge or the complexity of the training.

Technology now is allowing us to focus more on task training, which, coupled with the diagnostics initiative, will allow us to structure training quickly and efficiently. For example, if an AAR reveals a deficiency in fire support coordination procedures, a battalion commander will be able to request a TSP from the library that trains those specific tasks.

On-line, on-demand *diagnostics* is an initiative in Cluster III that's central to the vision of future training for the 21st century. Diagnostics will provide the soldier a means to gauge his competency level and a self-development vehicle to sharpen skills that require additional training. Diagnostics will provide an unlimited menu by allowing soldiers, leaders and trainers to access evaluation tools and training programs in electronic data-based libraries through electronic gateways from any location.

WARNET XXI. The last training axis in Army Training XXI is WARNET XXI. This "warrior network" is the modernization axis describing and linking embedded training on system's acquisitions, new equipment training (NET) and digitized training to the information technology being integrated throughout the tactical Army as we develop Force XXI.

The Army is conducting a series of advanced warfighting experiments (AWEs) to explore new warfighting concepts and technological advances to support the development of a digitized, information-dominant force. WARNET XXI will connect the training to support the AWEs and, ultimately, Force XXI.

Information connectivity and improved technology will merge the training efforts of the schoolhouse and unit and give the individual soldier access to unprecedented evaluation and training capabilities for self-development. Training is changing rapidly—this is Army Training XXI.

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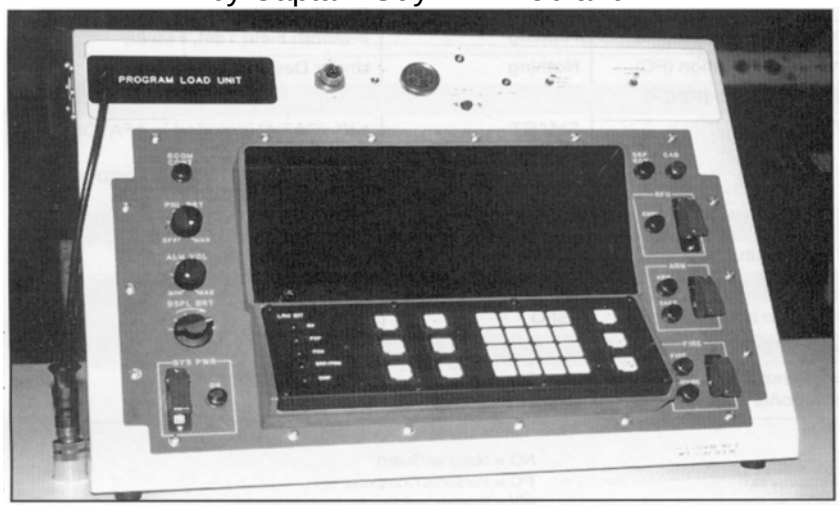
Lieutenant Colonel Clyde W. Ellis is Chief of the Army Training XXI Division of the Warfighting Integration and Development Directorate (WIDD) at the Field Artillery School. His assignments include serving as Chief of the Army Tactical Command and Control Division, Operational Test and Evaluation Command in Alexandria, Virginia, and Battalion Executive Officer and S3 for the 6th Infantry Division (Light) Artillery at Fort Wainwright, Alaska.

FA Training Devices for 1990s and Beyond

by Captain Guy E. Willebrand



FCP-TPT—Photo by CPT Guy Willebrand

By the year 2010, the Army will be able to train the Field Artillery system from the individual to the corps levels using distributed interactive simulation (DIS) protocols in its training devices. These digitized devices will link with other combined arms, joint and allied simulations, simulators and operational platforms located anywhere—air, land or sea—to integrate live and synthetic training and realistically simulate the Force XXI battlefield.

A recent innovation, DIS integrates live, constructive and virtual models and simulations employed as a synthetic environment for training. The acronym stands for three words. "Distributed," the first, means geographically separated simulations connected via computer networks to create a shared synthetic environment. The second word, "interactive," means different simulations electronically linked (as opposed to the same simulation remoted to a distant location) to act together and upon each other; the linkage may include humans as part of the simulation.

Finally, "simulation" is categorized into three types: live, virtual and constructive. Live simulation means real equipment and soldiers operating in the field. Virtual simulation means using manned simulators. And constructive simulations refers to war games and models (with or without human interaction). DIS play can consist of any combination of live, virtual and constructive simulations.

The DIS protocol standards define an infrastructure for linking simulations of various types at multiple locations to create realistic, complex "worlds" for highly interactive entities ("The DIS Vision, A Map to the Future of Distributed Simulation," May 1994). With DIS protocols, operational platforms, such as fixed-wing aircraft and (or) naval vessels, may be linked with computer-driven, interactive simulations into one training environment. The figure on Page 12 summarizes the FA training devices in use or under development, many of which will be DIS-compatible.

Delivery Systems. For cannon systems, the future training means are embedded training (ET) for Crusader and the Crusader institutional crew station trainer (CICST). Although the M109A6 Paladin (to be displaced by Crusader) has an ET system, it's part of the automatic fire control system (AFCS) and is limited to training AFCS functions.

Because Crusader's functions will be a totally automated, Crusader's ET will train individuals and crews on the full range of self-propelled howitzer and resupply vehicle operations. In addition, Crusader will have CICST to provide better training at reduced costs in the FA School at Fort Sill, Oklahoma, and institutions offering the 13B Cannon Crewmember Basic NCO Course (BNCOC). (For more information on Crusader training, see the article "Crusader—Training Force XXI's Firepower," by Major William L. Bell, Jr., Retired, in this edition.)

Under development for the Paladin is a computer program that replicates the AFCS. This program is compatible with a 486 processor personal computer (PC) and will allow units to train AFCS tasks without the howitzer. This device is ideal for National Guard (NG) units.

Unfortunately, our howitzers without an AFCS will be limited to the training devices available: practice and dummy rounds, M31 Field Artillery trainer and Field Artillery direct fire trainer. However, both towed and non-Paladin M109 howitzers will be able to train in a closed-loop scenario with the fire support combined arms tactical trainer (FSCATT) under development (listed last in the figure), as discussed later in this article.

The multiple-launch rocket system (MLRS) has the fire control panel trainer (FCPT) at the FA School, but no sustainment training devices at the unit level, other than ET in the fire control panel. The FCP ET requires the launcher to be powered up and is limited in its ability to sustain crew tasks.

The FCP tactical proficiency trainer (FCP-TPT) provides Active Component (AC) and NG units a means to maintain proficiency on the FCP. V Corps Artillery in Germany completed the FCP-TPT field test in October 1995, and fielding for the NG began in January. Fielding for the AC will begin in June.

Training Device	Type	Replaces	Fielding
Delivery System			
Crusader Embedded Trainer	ET	Paladin ET	FY 2005
Crusader Institutional Crew Station Trainer (CICST)	Institutional	Nothing	FY 2005
Fire Control Panel Trainer (FCPT)	Institutional	Original FCPT	In use at USAFAS
Fire Control Panel Tactical Proficiency Trainer (FCP-TPT)	Unit	Nothing	NG Jan 1996 AC Jun 1996
FCP-TPT Mounted in HMMWV	Unit and Simulation (PC)	Nothing	3-Month Field Test, Feb 96
FCP-TPT Loaded into a PC	Unit and Simulation (PC)	Nothing	Under Development
Fire Support Command, Control and Communications (FSC^3)			
AFATDS ET	ET	SMART	• V1 (CAT A) included in AFATDS • V2 (CAT A-B) 1998 AC • V3 (CAT A-D) 1999 AC complete • NG starts 2000
Target Acquisition			
Firefinder AN/TPQ-37 (Block II) P^3I	ET and Institutional	Nothing	Under Development
Forward Observer			
GUARDFIST II/A	Simulation and Institutional	TSFO	Begin Fielding in FY 1995
Fire Support Combined Arms Tactical Trainer (FSCATT)			
FSCATT	Unit, Simulation and Institutional	First Time Link of Entire FA System	Phase I, 2QFY97

Legend:

AC = Active Component
AFATDS = Advanced Field Artillery Tactical Data System
ET = Embedded Training
GUARDFIST II = Guard Unit Armory Device, Full-Crew Interactive Simulation Trainer
HMMWV = High-Mobility Multipurpose Wheeled Vehicle
NG = National Guard
PC = Personal Computer
P^3I = PrePlanned Product Improvement
TSFO = Training Set Fire Observation
SMART = Simulator Monitor Analyzer Recorder Tester/Trainer
USAFAS = US Army Field Artillery School

Training Devices for the Field Artillery

The FCP-TPT operates in an institutional mode, a stand-alone mode (individual) or a free-play mode (collective), giving units the flexibility to train in a classroom environment or autonomously in the field. AC units will use the FCP-TPT in the stand-alone and free-play modes only. The NG will use all three modes to support its training.

The FCP-TPT looks and feels like the FCP, providing training for the FCP. It's based on the 486 processor, is DIS-compatible and interfaces with the fire direction system (FDS) via land line, telephone or radio. The device has low production and maintenance costs and doesn't require the launcher to sustain FCP skills.

The FCP-TPT has two potential applications not fully developed. Mounting the FCP-TPT onto a high-mobility multipurpose wheeled vehicle (HMMWV) is the first. This application would expand the FCP-TPT's use now limited to the classroom and decrease damage to the launcher during field training. V Corps Artillery will test this application.

The second potential application is an FCP-TPT computer program compatible with a 486 PC. The MLRS FCP would be displayed on a monitor with 30 built-in scenarios, allowing 13M MLRS Crewmembers to train on a PC anywhere. Its only drawback is that it would not have the actual feel of the FCP.

Fire Support Command, Control and Communication Systems (FSC^3). Currently fielded to units with the initial fire support automated system (IFSAS) is the simulator/stimulator monitor analyzer recorder tester/trainer (SMART). SMART simulates training from battalion to corps-sized units and can replicate a division artillery. It drives and monitors training with tailored scenarios—using the commander's guidance, tables of organization and equipment (TOE), standing operating procedures (SOPs) and the unit basic load. SMART simulates forward observer (FO)/forward entry device (FED) operators, meteorological (Met) sections and Firefinder radars that are not physically a part of an exercise.

The AFATDS (advanced Field Artillery tactical data system) ET will replace SMART. Three versions of AFATDS ET will be developed and used on CD-ROM. Versions 2 and 3 build upon their respective previous versions and maximize the application of ET, which is partitioned to run training separate from tactical operations.

Version 1 ET refreshes and maintains individual tasks without bringing anyone on line. It is designed for sustainment training for the AFATDS operator in message preparations, transmission and reception by simulating non-players. In addition, computer-aided instruction (CAI), also known as computer-based instruction (CBI), is being fielded for operators unfamiliar with AFATDS—Version 1, ET Category A (Individual/Operator).

Version 2 incorporates Marines and allies and will train multiple nodes in a classroom or field environment. Version 2 is Category A and B (Collective/Crew/Team) and is DIS-compatible.

Version 3 simulates other fire support systems not present by turning subscribers on or off. Version 3 is Category A through D; Category C is Battlefield Functional Area, and D is Force Level ET that supports a corps force-on-force command post exercise (CPX).

Target Acquisition Systems At the unit level, the Fire finder radar does not have an effective training device. Firefinder AN/TPQ-37 (Block II) PrePlanned Product Improvement (P^3I) system will have ET to provide crews sustainment training. Each will train individual, crew and force levels from the section to brigade levels in the field or garrison. The ET will have programmable scenarios "invisible" to the crew and train maintenance and repair procedures as well as system operations. The ET will be DIS-compatible to enhance its collective training capabilities and interact with other devices. There is no ET under development for the AN/TPQ-36 radar.

Non-System Training Devices. The Guard unit armory device full-crew interactive simulation trainer (GUARDFIST II) is a transportable system that provides simulated battlefield scenarios for Field Artillery FOs. It is employed in two versions—II and IIA. GUARDFIST II consists of one instructor station and one FO station. It began fielding in April 1995 to the Field Artillery School and each NG Field Artillery brigade, NG FA and maneuver battalion, AC and NG armored cavalry regiment (ACR) and AC division artillery.

GUARDFIST IIA consists of one instructor and 30 FO stations and replaces the training set fire observation (TSFO). It has been fielded to the FA School and will begin fielding in April 1996 to selected Training and Doctrine Command (TRADOC) schools, all NG regional training centers and each AC division artillery and AC ACR.

GUARDFIST II/A operates in three training modes: a stand-alone for FO sustainment training, an interactive manual mode to train FOs and FDC personnel and an interactive automated mode similar to interactive manual mode but with a digital interface between the FO FED, GUARDFIST II/A and the battery computer system (BCS).

GUARDFIST II/A will simulate tactical scenes (from desert to Europe to Korea) with a variety of targets, munitions/fuzes and battlefield sound effects with the scenes displayed in the day or at night. The training device supports 18 skill level one and two tasks. It can review exercises to analyze individual performances and maintain the training files of individuals on hard drive or 3.5-inch disks.

The fire support combined arms tactical trainer—FSCATT—is a "system of systems" designed to train each element of the FA system in a stand-alone mode or integrated into a closed-loop mode. It is DIS-compatible and will support institutional training at the FA School and sustainment training in all active and NG Field Artillery units.

FSCATT will be fielded in two phases. Phase I FSCATT focuses on individual and crew training devices. The goal is to exercise the FA system by realistically executing fire missions while reducing ammunition and operational tempo (OPTEMPO) costs. Phase I will be fielded to each NG FA battalion, AC and NG ACR, AC division artillery and AC brigade in the second quarter of FY 97.

This first phase will train three elements of the FA system: target acquisition and forward observation, fire direction and collective training, and weapons delivery. The target acquisition element consists of the FO trainer—GUARDFIST, although it isn't part of the FSCATT procurement.

The second element of Phase I is fire direction functions in a collective training—a fire direction simulator and a collective training controller. The collective training control subsystem (CTCS) will monitor and evaluate the performance of the FDC and record the results for after-action reviews (AARs). The weapons delivery system consists of the howitzer crew trainer (HCT), a simulator that replicates an actual M109A5 turret, and (or) a howitzer strap-on trainer for self-propelled and towed howitzers (M102, M119, M198, etc.).

The HCT is a full-sized, functioning turret. It provides realism of principle howitzer functions, to include elevation, deflection, recoil, loading and firing of simulated rounds. The howitzer strap-on trainer monitors only the measuring of deflections and quadrants.

The HCT will have the same capabilities of the CTCS in that it will evaluate and record the crew's performance for AARs. It will interface electronically with the other FSCATT training subsystems and tactical equipment.

Phase II FSCATT includes the capabilities of Phase I and focuses on individual through the battalion levels of combined arms training on a simulated, fully interactive, real-time battlefield, allowing FA units to participate in the combined arms virtual battlefield. In addition to Phase I components, Phase II will have an M998 HMMWV module, a fire support team vehicle (FIST-V) module, an M577 armored personnel carrier (APC) command post (CP) module, a driver's station on the HCT and a separate PC with semi-automated forces (SAF) stations.

Using DIS, FSCATT will operate with other simulators in the CATT family. For example, the Field Artillery will be able to interact with the close combat tactical trainer (CCTT) on a common digital training battlefield. CCTT is a collection of human-in-the-loop simulators for Armor and Infantry. It replicates the crews of the M1A1/A2 tanks, M2A2/M3A2 Bradleys, M113A3 APCs, FIST-V and HMMWV vehicles.

DIS Enhancements. With DIS, separate training devices of different combat arms and services in different locations will work as one device in a closed-loop environment. DIS exercises will support a mixture of virtual entities (human-in-the-loop simulators), live entities (operational platforms and sets and evaluation systems) and constructive entities (war games and other automated simulations). The DIS infrastructure provides the interface standards and communication protocols to create a seamless battlefield for multiple users. The FA training devices and DIS capabilities will truly train the force we need for the future.

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MLRS Platoon Lanes: Battle-Focused Training

By Colonel L. Scott Lingamfelter

Finding the best venue to train the multiple-launch rocket system (MLRS) platoons can be a challenge in an environment where units must get the most training out of every dollar yet maintain battle focus for combat readiness. Units must ensure the training is resourced, has trained observer/controller/evaluators (OCEs) and is situated on terrain with the right tactical environment. The 6th Battalion, 37th Field Artillery and its attached A Battery, 38th Field Artillery of the 2d Infantry Division in Korea met the challenge with battalion-orchestrated platoon lane training.

We began by assuming the concept of training two levels down, as set forth in *FM 25-101 Battle Focused Training*, is valid. Having the battalion orchestrate the training ensured it was resourced with OCEs, land and training aids and, most importantly, used a consistent model to train and evaluate all 12 platoons, applying the same standard.

Designing the Platoon Lane Training. Clearly, the MLRS battalion staff is not manned to provide OCEs for platoon lanes—nor is that the level to provide the best expertise to evaluate platoons. We elected to use battery commander/first sergeant teams as the OCEs for each of the four platoon lanes. We then selected the type of lanes we felt would best meet our training objectives, based on an assessment of our previous training results.

We agreed that one lane would be devoted to occupation of a tactical assembly area (TAA) and related survival tasks; another focused on the reconnaissance, selection and occupation of positions (RSOP) in an operational area (OPAREA); a third on delivery of fires; and the fourth and last a rearm and refuel lane. We designed each lane for specific terrain in relative proximity to each other (a brief

Task	Evaluated Platoons									A/38 FA		
Fire Missions	1/A	2/A	3/A	1/B	2/B	3/B	1/C	2/C	3/C	1/A	2/A	3/A
• Verify the survey data.	S	S	S	NS	S	S	NS	NS	S	S	S	S
• Post the FSCM in the POC.	NS	S	S	S	S	S	S	S	S	S	NS	S
• Plot the targets.	NS	NS	S	NS	S	S	NS	NS	NS	S	NS	S
• Establish digital communications.	S	S	S	S	S	S	S	S	NS	S	S	S
• Lay the platoon on the target.	S	S	S	S	S	S	S	S	S	S	S	S
• Transmit FM;FOCMD (at-my-command) to higher headquarters.	NS	S	S	S	S	S	S	S	S	S	S	S
• Recompute the amended grid, as directed.	NS	S	S	NS	S	S	S	S	S	S	S	S
• Execute the ITO target (ATACMS).	NS	S	S	S	S	S	S	S	S	S	S	S
• Execute SEAD target (MLRS).	S	S	S	NS	S	NS	S	S	S	S	S	NS

Legend:

ATACMS = Army Tactical Missile System
FM;FOCMD = Fire Mission; Forward Observation Command
FSCM = Fire Support Coordinating Measures
ITO = Integrated Tasking Order
MLRS = Multiple-Launch Rocket System
POC = Platoon Operations Center
SEAD = Suppression of Enemy Air Defense

Figure 1: Lane 3—Delivery of Fires. On the left side of the figure, major tasks of Stay Hot, Shoot Fast TTP are listed. ("S" means the platoon met the standard, and "NS" means the training was not to standard.) A platoon's performance can be evaluated, as highlighted vertically. Similarly, the battalion's overall performance can be evaluated by task, as highlighted horizontally.

road march) and for platoons to rotate through two lanes per day, executing one in the day and one at night. Each platoon would receive an orientation briefing upon arriving at the training site and a "hot wash" after-action review (AAR) upon conclusion of the lane.

The OCE teams reconnoitered the area and selected the ground best suited for each lane. Then lane team developed the lane it would observe and control, to include the tasks, conditions, standards, training scenario and evaluator package. The lane teams back-briefed the battalion commander, command sergeant major and staff on the concept for each lane. The battalion's key leaders proofed the lane concepts for consistency and quality while ensuring each lane met its training objective. In the process, battery commanders and their first sergeants received first-rate leader development in planning and resourcing battle-focused training.

We then rehearsed the lanes. Each OCE team walked its lane with the battalion's leadership to ensure the terrain was satisfactory to evaluate the platoons. This included giving the leadership the lane orientation briefing, discussing the flow of the lane and outlining the AAR process. The latter ensured that, when the platoon completed the lane, it would understand what happened, why it happened and what needed fixing.

A key aspect of this AAR process was the platoon had to "own" the results it achieved during a lane. To ensure this occurred, the OCEs needed to know how to conduct an AAR so the evaluated platoon determined what it should sustain or improve—avoid having the OCEs tell the platoons what needed sustainment or improvement. Practice AARs by the OCEs helped the process work.

Our results-oriented lane training design allowed us to see all platoons in a set environment against a consistent backdrop. We also agreed that the lanes would use a similar data collection method to enable senior leaders to see training trends not only in specific platoons, but across the battalion as well. Platoons having difficulty in certain lanes could recycle through portions of the lane and identify training requirements for the future.

Figure 1 shows the way we displayed results with the platoons across the top. We used "S" to indicate the platoon met the standard for the task and "NS" to indicate the platoon's training was not to standard.

With these indicators, a picture emerged. Along the vertical axis, we could tell if a platoon was having problems with a task(s). This suggested whether or not the platoon should be recycled through portions of the lane. We also could see if specific tasks across the battalion were problem areas for many of the platoons. This helped us begin planning future individual, collective and professional development (officer and NCO) training.

Lane 1: Occupy a TAA—Survive and Defend. We selected this critical preparation phase of any combat operation as our first lane. We found that, in general, the platoons had difficulty applying the factors of observation, cover and concealment, obstacles, key terrain and avenues of approach (OCOKA) as they occupy a TAA. The platoons understood how to occupy at the section level (establish individual fighting positions, use camouflage, etc.). But they were less adept at using their limited assets to clear the area before occupation and plan an adequate position defense. Also, the platoons understood how to operate their crew-served weapons, but their skills in constructing an M60 machinegun fighting position were not to standard across the board.

Finally, all platoons were challenged to conduct patrols adjacent to their positions. In several cases, the opposing force (OPFOR) captured platoon members on patrol, a fact unknown to the platoon leader, sometimes, for as long as an hour. In sum, we identified several key tasks needing training in the future.

Lane 2: RSOP. We elected to design the RSOP lane to look closely at the platoon's ability to receive a mission; conduct reconnaissance; plan, brief and rehearse the mission; and move to and finally occupy the firing position. We learned platoons do these fairly well.

But we noted the platoon sergeant wasn't used effectively during the reconnaissance

phase, particularly in preparing the platoon for the mission while the platoon leader was reconnoitering. This lack of synergy was evident when one platoon leader returned from reconnoitering and found his platoon sergeant unprepared for the upcoming mission because he failed to brief him before the reconnaissance phase. The result was the platoon leader scrambled to make up for lost time and effort—but to no avail. He was "killed" during the lane scenario, leaving his unprepared platoon sergeant to pick up the pieces.

A clear strength, however, was the priority of work during reconnaissance, particularly the use of survey and the ammunition platoon sergeant's efforts to make the occupation go smoothly.

Lane 3: Delivery of Fires. This lane evaluated "Stay Hot, Shoot Fast" tactics, techniques and procedures (TTP) that are key to our ability to engage enemy targets quickly. (See the article "Stay Hot, Shoot Fast: An Evolving Concept in MLRS Tactics" by the author and Captain Robert D. Kirby, April 1995.)

In particular, the lane evaluated at-my-command (AMC) missions (laid on an aim point), when-ready (WR) amended missions, suppression of enemy air defenses (SEAD) missions and time-on-target (TOT) missions using the Army tactical missile system (ATACMS). Because we conduct these TTP often, our times, in most cases, met the standard (see the sample time chart in Figure 2). But crews not familiar with the TTP generally would find this lane a challenge.

One area that continues to need work is the careful management of the launcher data bases by crews and the platoon operations center (POC).

Lane 4: Rearm and Refuel. Platoons do not often practice these skills in the proper setting. Therefore, in this lane, we required them to establish and secure an ammunition cache site. We also coordinated with the division's air assault battalion for an air resupply of ammunition to the platoon cache, giving platoon members a chance to train arm signals and hook-up procedures with a UH-60 helicopter.

The platoon had to road march to a refuel-on-the-move (ROM) site and then quickly move through the site while also providing local security. Our platoons performed the refueling tasks well but clearly need work on how to establish and coordinate security with limited personnel.

Safety: Protecting the Force. While we didn't run a lane dedicated to force protection, we looked at safety comprehensively across all lanes. In each lane, we evaluated the platoon's use of the risk assessment process. We also implemented a system to capture safety violations by platoon. We used a risk assessment matrix for each lane (see Figure 3). The key is the linkage between the event, an associated hazard, the likelihood of its occurrence and the control that we established to prevent the hazard. With such emphasis on proactive prevention, we had no significant accidents or major heat-related injuries in very humid conditions during 10 days of training.

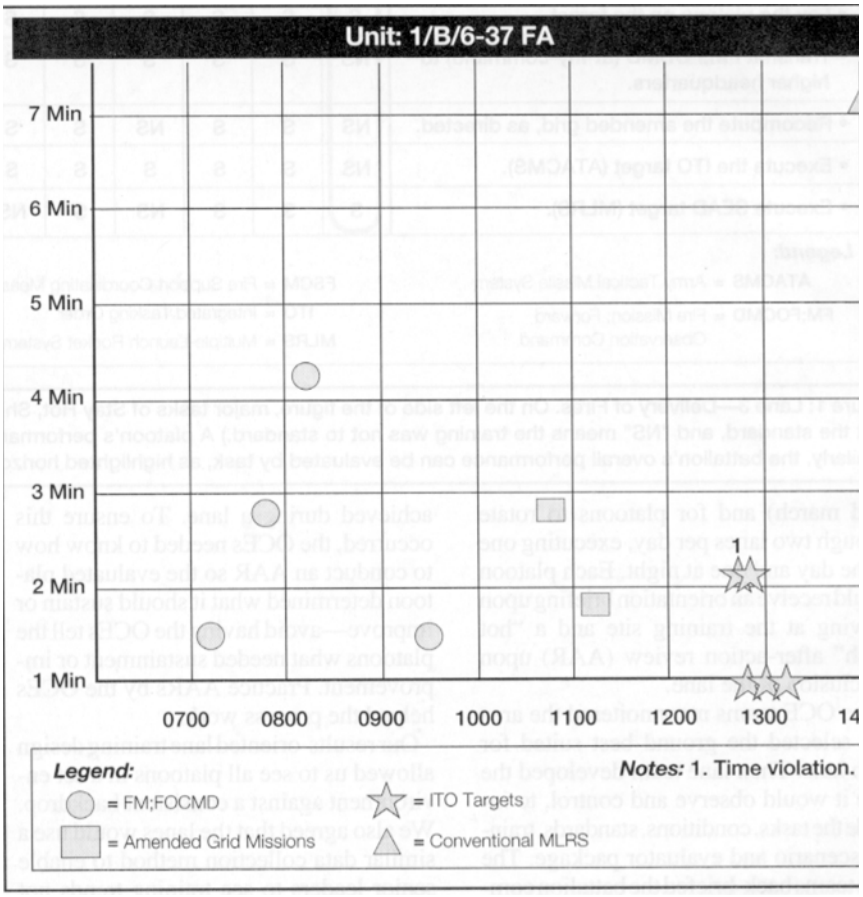


Figure 2: Lane 3—Delivery of Fires. In this figure, one platoon's firing mission times are charted for evaluation.

Event	Hazard	Risk	Control Measure
Conduct PCIs.	Leaders' Failure to Supervise	Low	• Key leaders ensure PCIs are conducted.
Deploy.	Accidents, Road Conditions	High	• Conduct convoy briefings on TCPs, road conditions for HETs, speed, etc.
Down-load HET.	Personnel Injury	Med	• Establish ground guides.
Move to TAA.	Fatigue	High	• Ensure soldiers rest ahead; conduct convoy and route reconnoissance briefings.
Endure hot weather.	Hot Weather Injuries	High	• Ensure soldiers are hydrated initially and continuously.

Legend: **HET** = Heavy Equipment Transporter **TAA** = Tactical Assembly Area
PCIs = Precombat Checks and Inspections **TCPs** = Tactical Checkpoints

Figure 3: Risk Assessment Matrix. Before executing a lane, 6-37 FA developed a risk assessment matrix for the lane to ensure the battalion recognized the potential dangers and implemented control measures for safe training.

We listed the most common safety errors and catalogued them by unit (Figure 4). What emerged was a picture (Figure 5) of the force protection areas in which individual platoons or the entire battalion needed attention.

The force protection process resulted in safe training and an informed AAR process. Using this methodology, units can improve their safety performance and avoid the fallacious assumption that no accidents mean all procedures are being executed safely and to standard.

Future Training. As each platoon finished a lane, senior leaders began planning future training, based on well-defined results. After the platoon lane training, we developed the focus for future Sergeant's Time and platoon-level collective training plus subjects for NCO professional sessions. In other words, we took the guesswork out of what tasks the platoons needed to spend their valuable training time on.

At first glance, some NCOs may contend that this is just another attempt to force-feed training to them. It is key, therefore, that the AAR process is effective—that the results are credibly to the NCOs who train the platoons. The areas of strengths and weaknesses must be self-evident to the platoon members as demonstrated by their performance in the lanes.

From the 48 platoon-level AARs conducted in this fashion, the lane teams and battalion commander conducted a battalion-level AAR for the platoons' key leaders—down to the section chief level—to review performance as well as trends across the battalion. The AAR highlighted footage captured on video—often enlightening. The process concluded with the trends in each of the four batteries and suggested future training. Platoon lane training is ideal for MLRS and other units as platoons must train to one standard and fight using common procedures. The process provides the battery OCE teams leader development, the platoons a superb training opportunity, and unambiguous results that point the way to future training. Now that's *battle-focused* training.

Reason	Incidents
Individual *(Self Discipline to Standard)*	• Soldier not following hand and arm signals while operating boom control.
	• Section chief kept SPLL door open while traveling; chief not wearing CVC helmet.
Leader *(Enforce Standards)*	• HEMTT traveling on highway with outrigger extended (A-40-A/6-37 FA).
	• OE-254 emplaced without goggles (1/A/6-37 FA).
	• A-21 not chock blocked (1/A/6-37 FA).
	• OE-254 emplaced without goggles (3/B/6-37 FA).
	• Chock blocks not used (3/A/6-37 FA).
Training *(Skills to Standard)*	• Soldier not following hand and arm signals while operating boom control.
	• Section chief kept SPLL door open while traveling; chief not wearing CVC helmet.
Standards (*Standards/Procedures Clear and Concise)*	• A-21 not chock blocked (1/A/6-37 FA).
Support *(Equipment, Personnel, Facilities, Maintenance to Standard)*	• Battalion logistics not proactive in correcting maintenance problem with A-40 FA.

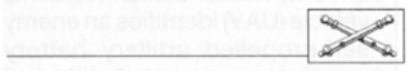
Legend:

CVC Helmet = Combat Vehicle Communications Helmet

HEMTT = Heavy Expanded-Mobility Tactical Truck

SPLL = Self-Propelled Launcher-Loader

Figure 4: Force Protection—Safety. The figure is a sample catalogue of 6-37 FA's most common safety violations that had been captured on individual incident forms.



Colonel L. Scott Lingamfelter, until December 1995, commanded the 6th Battalion, 37th Field Artillery (+) (Multiple-Launch Rocket System) in the 2d Infantry Division Artillery, Republic of Korea. Currently, he's serving as the Deputy Chief of Staff of the 2d Infantry Division until he attends a Senior Service College in June. His previous assignments included serving as the 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 the 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.

Focus	Evaluated Platoons									A/38 FA			Battalion
	1/A	2/A	3/A	1/B	2/B	3/B	1/C	2/C	3/C	1/A	2/A	3/A	Total
Individual	5	1	1	5	1	1		1		1	1	1	**18**
Leader	4	1	1	4	3	1		1		1	1	1	**18**
Training	3	1	1	2	3		1	1		1	1		**14**
Standards	1	1					1	1		1	1		**1**
Support	1		1							1			**3**
Total	**14**	**4**	**4**	**11**	**7**	**2**	**2**	**4**		**5**	**4**	**2**	**59**

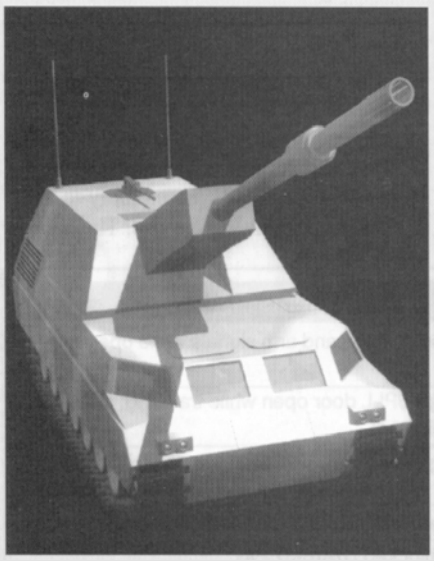
Figure 5: Safety Violations. This matrix shows a clear picture of the battalion's safety violations. Listed vertically, 1/A had a total of 14 safety violations in all categories and needs work across the board; listed horizontally, the battalion needs to concentrate on safety in individual, leader and training tasks.

Crusader—

Training Force XXI's Firepower

by Major (Retired) William L. Bell, Jr.

Although the temperature inside the Crusader self-propelled howitzer was a controlled 72 degrees, sweat was rolling off the three-man crew as the howitzer dashed across the bleak desert terrain at nearly 45 kilometers per hour. Offset about 400 meters behind and to the left was another Crusader howitzer, the other half of the pair.



Courtesy of United Defense Armament Systems Division

Miles above, the crew of an Air Force joint surveillance and target attack radar system (JSTARS) long-range reconnaissance aircraft operating in conjunction with an Army Hunter unmanned aerial vehicle (UAV) identifies an enemy self-propelled artillery battery emplacing as part of a build-up of enemy forces. Later, an AN/TPQ-37 Firefinder radar confirms this battery as a counterfire target within range of the Crusaders.

Based on the commander's guidance, the advanced Field Artillery tactical data system (AFATDS) in the battalion fire direction center (FDC) selects the M898 155-mm sense and destroy armor munition (SADARM), generates a digital call-for-fire and transmits it to the platoon operations center (POC). The POC then transmits a digital fire order to the Crusaders.

The Crusader commander, a staff sergeant, in the lead howitzer, acknowledges the fire order on the computer at the crew station. He quickly selects a suitable position for his howitzer, rolls to a stop and prepares to execute the mission. The other howitzer occupies a position 400 meters behind and to the left of its partner. Once emplaced, each howitzer computes its own firing data, verifies pertinent fire support coordinating measures (FSCM) and fires eight SADARM rounds in less than 60 seconds.

High over the target, there's a distinct "pop" as the two submunitions in each SADARM are expelled from their carrier. Their parachutes deploy, and the submunitions descend toward the ground in a controlled spin, each scanning for a target with infrared and millimeter wave seekers.

The submunitions locate two howitzers of the enemy battery, confirm them as targets and fire explosively formed penetrators at the howitzers. The first penetrator hits one howitzer's turret, killing the crew and setting the howitzer on fire. The second hits the other howitzer on the rear deck, destroying the engine. Smoke and flames billow from the two howitzers as the submunitions of the remaining SADARMs "pop" and descend toward the enemy battery, scanning for targets.

In less than a minute, one third of the enemy battery is destroyed. Before the last rounds impact, the Crusaders displace almost a kilometer at dash speed, ensuring they're out of the enemy's counterfire footprint.

"Okay—that's it for this exercise," bellows the senior instructor over the intercom. I want all students to meet me in Room 24 in five minutes for the after-action review." The crew climbs out of the Crusader institutional crew station trainer inside the Field Artillery School Gunnery Department's Crusader Simulation Room and walks toward Room 24.

Crusader is the Army's next generation cannon artillery system and will provide the maneuver commander an unprecedented level of responsive, accurate and lethal firepower. As a revolutionary "system of systems," Crusader consists of a 155-mm self-propelled howitzer and a companion resupply vehicle (RSV). Specifically designed to take advantage of the digitized battlefield, Crusader will be the Army's most advanced land combat system and set the standard for future combat systems.

It will have significant advantages over current Field Artillery systems, including the Army's most modern self-propelled howitzer, the M109A6 Paladin, which Crusader will displace on a one-for-one basis when fielded in 2005. Crusader's maximum range will be at least 40 kilometers as compared to only 30 for Paladin. It also will have a rate-of-fire of 10 to 12 rounds per minute with a sustained rate-of-fire of three to six rounds per minute. In comparison, Paladin has a maximum rate-of-fire of four rounds per minute with a sustained rate-of-fire of one round per minute. Crusader's delivery accuracy will be nearly twice that of Paladin's, using accuracy enhancements such as global positioning system (GPS) technology and projectile tracking systems. Crusader's increased survivability will result from better armor, crew protection and greater mobility.

From the soldier's point of view, one great advantage of Crusader will be its automated functions—a radical change from the manual work load of howitzer crews today. Crusader's computer will perform or manage everything from loading ammunition and propellant to resupply and refueling. Crusader's capabilities will decrease the howitzer crew from four to three and the resupply vehicle crew from five to three as well as dramatically alter their roles.

Fire support training currently focuses on live-fire, performance-based and combined arms training. While effective, this training is costly in manpower, ammunition and other scarce resources. Advanced weapons systems, such as Crusader, must use training aids, devices, simulators and simulations (TADSS), such as the Crusader institutional crew station trainer (CICST), to provide better training at reduced costs.

Crew Training Device. CICST is a significant part of the overall training strategy for the Army's newest cannon system and will be in the Field Artillery School at Fort Sill, Oklahoma, and schools

supporting 13B Cannon Crewmember Basic NCO Courses (BNCOCs). The device will train those skills and tasks peculiar to Crusader. Each will use state-of-the-art simulation technology to interact with Crusader tactical software to create visual, audio and sensory perceptions of operating or performing operator maintenance on Crusader.

The device will be reconfigurable, consisting of six individual crew stations (student stations) and one instructor console/simulator. Trainers will be able to configure this device into sets of three howitzer crew stations and three RSV crew stations to train the various crew positions. CICST will provide automatic scoring and reports of student actions and the student-instructor interface.

The instructor console will simulate the full range of Crusader howitzer and RSV individual tasks, including initialization of the howitzer and RSV, tactical/technical fire control and fire mission processing, navigation of the vehicles in varied terrain and weather conditions, use of decision aids, ammunition and propellant upload/download and other functions requiring crew action and inputs through normal displays and indicators.

As a critical capability, CICST will use distributed interactive simulation (DIS) protocols, common terrain databases and both visual and voice technologies to interface with the family of combined arms tactical trainers (CATTs). These include the close combat tactical trainer (CCTT), fire support combined arms tactical trainer (FSCATT) and other systems or simulations, such as the family of simulations (FAMSIM) and the Warfighter's Simulation 2000 (WARSIM 2000). Interaction between the CICST and CATT simulators via DIS will train collective capabilities at the various levels above the Crusader crew level.

Current plans provide the FA School and BNCOC institutions multiple sets of CICST reconfigurable stations that will be fielded simultaneously with the Crusader system in 2005.

Embedded Training. In addition to the institutional crew trainer, Crusader will have embedded training (ET) to provide realistic sustainment training for individuals and crews in a garrison or field environment. Crusader will incorporate three categories of ET: individual, crew and force-level. (Embedded trainers sometimes have a fourth category, functional, which is not necessary on Crusader.)

Crusader will have fully embedded individual and crew training, as opposed to using appended or umbilical ET methodologies. It also will have section-to-battalion force-level ET.

1995 Demonstrators of Crusader Crew Stations. The actual Year 2005 crew stations will incorporate state-of-the-art technology replicating Crusader functions—all of which will be fully automated.

Force-level ET must be able to accept scenario data from FAMSIM and WARSIM 2000 and interoperate via DIS with CATTs—to include CCTT and FSCATT. Using ET, Crusader crews will be able to participate in sophisticated force-on-force exercises using the system's full range of communications, mission planning and operational capabilities. The unit will be able to train realistically in its motor pool or close-in training area without expending ammunition and fuel or wear and tear on equipment. In addition, force-level ET will allow Crusader crews to conduct real-time battle rehearsals before combat operations.

Tactical Engagement Simulation. To allow more realistic training during force-on-force exercises at the Combat Training Centers (CTCs), Crusader will have an embedded tactical engagement simulation (TES) system. TES will interface with the CTC range instrumentation systems, such as the simulated area weapons effects/multiple integrated laser engagement system II (SAWE/MILES II) system.

Maintenance Devices. A series of institutional maintenance training devices also is planned for Crusader. These devices will provide hands-on training for unit maintenance personnel and direct support/general support maintenance students in Career Management Field 63 Mechanical Maintenance.

Maintenance training devices are planned for the turret and fire control system, auto-loader, hull and for components of the RSV resupply functions. The devices will train students how to inspect, troubleshoot, repair and test the repairs of Crusader components.

Crusader will provide future commanders firepower for Force XXI—unprecedented levels of lethality, accuracy and responsiveness. Crusader also will give these commanders state-of-the-art means of training the way the Army fights. It will change the way Force XXI trains.

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COMBAT TRAINING CENTERS CMTC:

Stability Operations Training

by Lieutenant Colonel Michael A. Hiemstra

For many soldiers, the term "stability operations" means little, but for soldiers training recently at the Combat Maneuver Training Center (CMTC) in Hohenfels, Germany, and now deployed to Bosnia, it means a great deal.

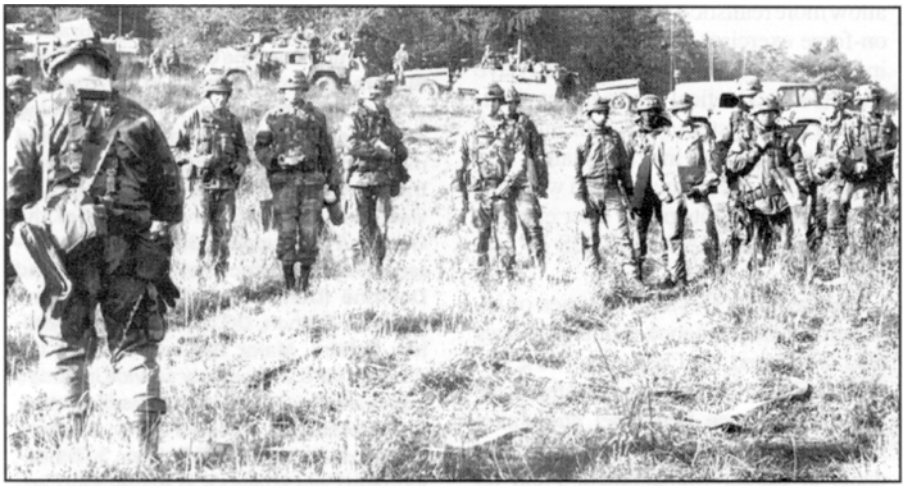
Historically, rotations at the CMTC have been based on high-intensity conflict or a mix of high-intensity conflict and peacekeeping operations. Recent stability operations training at the CMTC exposed soldiers to complex situations to prepare them for deployment to the Balkans and the challenges of conducting peace enforcement operations in Bosnia. Instead of motorized rifle battalions and regimental artillery groups, leaders and soldiers encountered factional organizations, limited mobility, snipers and detailed rules of engagement (ROE).

Units learned new lessons about limited freedom of movement, battery security and force protection and reaffirmed the continued importance of fire support and FA rehearsals. Here are some of the stability operations lessons units learned.

There is no well-defined front line and no guarantee of secure lines of communication in stability operations—even simple movements can be difficult. Extended distances between position areas (PAs), poor road networks, low weight-class bridges, land mines and factional checkpoints severely restrict movements and present challenges for convoys, survey, position occupation, communications, maintenance and supply operations. Often it is difficult for the battalion commander to move between the brigade tactical operation center (TOC) and his TOC. It is a challenge for battery commanders to occupy areas contaminated with mines and for battery first sergeants and supply sergeants to move logistics packages (LOGPACs). While operating over extended distances, it is even more important that the commander's intent be clear, guidance be easy to understand and plans be well-coordinated.

*Detailed planning, **coordination** and strict convoy discipline are critical to movement and survival in stability ops.* There are several things units can do to improve survivability.

• Don't allow a vehicle to travel alone; it makes an easy target. Teach convoy leaders to coordinate for cleared, approved routes before the convoy departs.



Leaders prepare to conduct a combined arms rehearsal at the CMTC.

An advance party soldier uses a mine detector to clear a new position area.

• Implement a system similar to the aviation community's flight-following procedures to track vehicles and personnel as they move around the area of operations (AO). Require each convoy leader to check out as he departs, report his route and estimated time of arrival and check in at his destination.

• Teach soldiers and leaders not to deviate from approved routes unless authorized and carefully coordinated.

• If stopped on a road during a convoy, stay in the center of the road. Do not "herringbone" off the road as land mines are often on roadsides.

• Train all soldiers to identify mines, likely locations for mines and what to do if they discover mines. A technique taught at the CMTC uses the mnemonic device HARMM: if you see a mine, Halt immediately, Avoid the area, Report the mine's location, Mark the mine and Move out of the area.

• Check your mine detectors and ensure soldiers can use them. Have the advance party clear a battery PA when the threat of mines exists. This procedure takes a lot of time. A technique to reduce the time required is to first clear a central location and then clear lanes to howitzer positions like spokes on a wheel. Mark the lanes and cleared areas with engineer tape and require all personnel to remain inside the cleared areas. As time permits, clear the areas between the lanes.

• Develop and practice a battle drill for responding to mounted/dismounted mine strikes.

Stability operations may present different threats than those encountered during high-intensity conflict. Firing batteries that move and shoot hundreds of rounds nearly every day sometimes remain relatively static without firing a mission for days. Therefore, force protection and security become high priorities.

The probability of ground attack or mortar and sniper attacks increases while the probability of air attacks or heavy artillery concentrations decreases. Artillery PAs often become part of maneuver lodgment areas. Firing battery commanders and first sergeants often find additional assets located inside their perimeter for security—the battalion TOC, radar or portions of the battalion trains.

Leaders and soldiers quickly learn how difficult it is to establish a truly secure perimeter and defend themselves against a mounted or dismounted ground attack or even against displaced civilians and thieves. They learn that improperly constructed or poorly located fighting positions and inadequately briefed sentries who do not understand their responsibilities contribute little to position security and defense.

Threats to safety and security often arise inside the perimeter. Field sanitation, hygiene and field feeding operations become significant challenges requiring immediate solutions when the threat of mines and snipers prevent soldiers from routinely leaving the battery perimeter.

To survive in a stability operations environment, security must be immediate, continuous and universal. Unit leaders must conduct a detailed threat analysis and from it develop position security. Regardless of the type of PA or battery formation, a sound defense requires detailed planning, time and large amounts of Class IV building materials.

Units should develop a time line, establish a priority for building defensive fortifications and make the process part of standing operating procedures (SOPs). Leaders should determine the locations of fighting positions and check fields of fire from ground level. They should issue orders detailing responsibilities and actions to soldiers on listening posts/observation posts (LP/OPs) and ensure soldiers thoroughly understand them.

Both leaders and soldiers should have copies of *GTA 7-6-1 Fighting Position Construction Infantry Leader's Reference Card.* It is an excellent, pocket-sized source that contains diagrams of two-man fighting positions, crew-served weapons positions, material requirements, time lines for construction and leaders' checklists.

Battery commanders should estimate the amount of Class IV needed for each PA (so the S4 can order it ahead) and include Class IV requirements in battery load plans. Battery leaders should develop and practice drills to counter the effects of mortar and sniper attacks.

First sergeants should inspect field sanitation kits for completeness, train field sanitation personnel and empower them to enforce standards. The battalion physician's assistant should inspect facilities and conditions inside the perimeter. Because each position may have its own field kitchen, all leaders should know the fundamentals of feeding operations (*FM 10-23 Basic Doctrine for Army Field Feeding*).

Fire support and Field Artillery rehearsals are a necessity. Fire support rehearsals are a normal part of preparations during high-intensity operations but often are forgotten during stability operations. Yet, in stability ops, a tactical decision may have strategic implications. Complicated ROE combined with the requirement for absolute accountability and accuracy of all indirect fires demand detailed planning, targeting and rehearsals.

The reduced demand for indirect fires during stability operations (as compared to high-intensity operations) can lull fire support personnel into a false sense of security. This unwarranted feeling of security combined with a tendency to not rehearse could mean fire supporters risk being surprised or unprepared to respond when called.

Fire supporters must conduct brigade and task force fire support rehearsals daily to maintain focus and ensure their system is continually prepared to respond with accurate nonlethal and lethal fires. The maneuver commander and fire support coordinator (FSCOORD) should determine what to rehearse, based on the most likely and most dangerous belligerent courses of action (COAs). The FSCOORD should prioritize the rehearsals, based on the most critical fire support tasks (CFSTs) facing the unit. The FA battalion S3 and brigade fire support officer (FSO) should develop battle drills to test the readiness of the unit's decision, detection and delivery sub-systems.

During stability operations, getting approval to fire indirect fires, clearing them and delivering them can be lengthy and complicated processes. Maneuver and fire support personnel should continually rehearse and test these processes at different times of the day to ensure they are responsive.

A soldier prepares to enter his fighting position on the edge of his battery's perimeter.

Units should develop and rehearse plans to support observation points, checkpoints and convoys with obscuration, screening and killing fires; rehearse plans to support joint military and civil-military working group meetings; rehearse the counterfire system; and rehearse the use of precision munitions.

By the time this article is printed, units in Bosnia will have several months of experience in the theater. They will build on their training at the CMTC, continue to learn about stability operations and develop techniques to benefit us all.

In the meantime, units must prepare for future stability operations. The key to success is in the details—detailed SOPs, battle drills, security and operational planning and coordination with thorough rehearsals followed by precise and flexible execution—Train to Win!

Lieutenant Colonel Michael A. Hiemstra is the Senior Fire Support Observer/Controller at the Combat Maneuver Training Center (CMTC), Hohenfels, Germany. Before coming to the CMTC, he commanded the 5th Battalion, 41st Field Artillery, 3d Infantry Division (Mechanized), also in Germany. Other assignments include serving as Deputy G3 and Battalion Executive Officer for the 4th Battalion, 1st Field Artillery, both in the 5th Infantry Division (Mechanized), Fort Polk, Louisiana; S3 in the 2d Battalion, 11th Field Artillery and Brigade Fire Support Officer, both in the 25th Infantry Division (Light), Schofield Barracks, Hawaii; and Battery Commander in the 1st Battalion, 82d Field Artillery, 1st Cavalry Division, Fort Hood, Texas.

COMBAT TRAINING CENTERS NTC:

Fire Support Trends

by Lieutenant Colonel Marcus G. Dudley

After six months as the senior fire support trainer at the National Training Center (NTC), Fort Irwin, California, I have been impressed with units' ability to improve their synchronization of fires with maneuver during the 14-day campaign. As units progress through a rotation, they improve with every battle, a testament to the high quality of officers, NCOs and soldiers in today's Army.

Many of the trends and issues affecting rotational units are based on the level of training the unit has achieved before coming to the NTC. Two key areas continue to affect unit performance at the NTC: observer planning and firing incidents during live firing. Both areas can be trained to standard before units deploy for an NTC rotation.

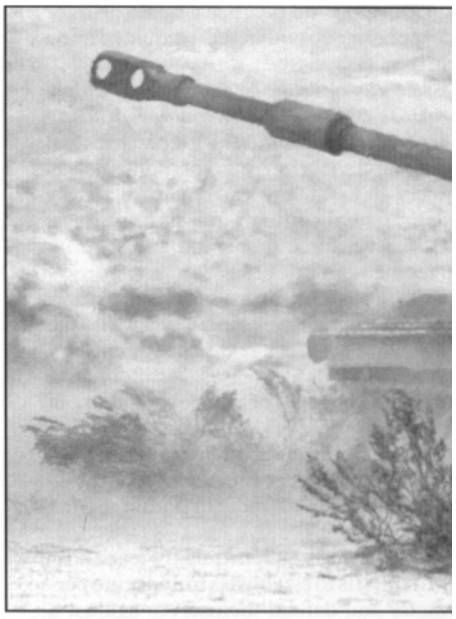
Observer Planning. The Field Artillery's ability to bring timely, accurate fires on the enemy depends on our ability to get eyes on the enemy and provide accurate target locations for the formation and function we're trying to affect. Without an effective observation plan that includes combat observation/lasing teams (COLTs), scouts, company fire support teams (FISTs) and air observers, units end up executing the fire plan rather than adjusting fires onto the enemy. In other words, the artillery pounds dirt instead of pounding "home" the commander's intent for fires.

Fire support coordinators (FSCOORDs) and fire support officers (FSOs) must improve their ability to clearly articulate the task, purpose, method and desired end state for each target they plan to engage. A target should refer to the specific enemy formation and function the commander wants to attack, rather than merely a grid coordinate on a map. This process starts with the maneuver commander's describing to his staff how he expects fires to contribute to the brigade or task force fight. The staff then develops a concept of fires that supports each maneuver course of action (COA). A key element of determining the feasibility of a maneuver COA is whether or not the concept of fires supports that maneuver option and meets the commander's intent for fires.

During war-gaming, the maneuver staff develops the detailed scheme of fires that identifies when and where in time and space on the battlefield the enemy formation or function will be found. This also tells when and where observers must be able to bring accurate observed fires on the enemy. The brigade and battalion staffs determine the observers' locations during COA development and war game. Units can use the following eight steps to focus their efforts.

Step 1. Identify the requirement for an observation post (OP). The requirement for an OP is identified during the war game. Units may need OPs to execute the reconnaissance and surveillance (R&S) plan or trigger artillery or close air support (CAS) targets.

Step 2. Conduct terrain analysis. Terrabase is an effective tool. Units can best use terrabase by running the terrabase shot from the named area of interest/targeted area of interest (NAI/TAI) or artillery target. This saves time by identifying all OPs available.



Advanced systems, such as this M109A6 Paladin, won't solve firing incidents at the NTC–only soldiers and crews trained ruthlessly to standard. *(Photo by SFC Sebastian, Fort Irwin TSC)*

Step 3. Allocate the OP asset. The asset is chosen based on the OP's mission. For example, if the Copperhead munition is to be executed, then a ground/vehicular laser locator designator- (G/VLLD)-equipped observer is required. Primary and alternate observers are identified for each target.

At this point, units determine OP requirements—for example, an observer night-vision capability or accurate grid locations.

For an observer plan to be most effective, it must include all available assets-FISTs (shown here from 3-82 FA), scouts, COLTs and air observers.

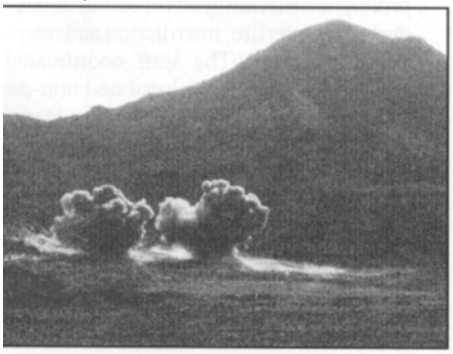
Step 4. Select the OP. The OP should be selected from the possible OPs developed during the terrain analysis. Units should consider the mission and capabilities of the asset on the OP, including angle-T, limited visibility, communications, etc. The enemy situation also is considered.

Step 5. Plan the occupation or insertion. First determine the approach: air, mounted, dismounted, etc. Next, plan routes, checkpoints, dismount points, time to get to the OP, etc.

Step 6. Make necessary coordination. Coordinate the passage of the OP through friendly forces, as necessary. Deconflict terrain for the OP.

Step 7. Support the occupation or insertion. Plan for indirect fires, electronic warfare (EW) support, ground tactical support, medical support, extraction, security and resupply.

Step 8. Execute. At the conclusion of the war game, the maneuver staff should have the scheme of fires work sheet completed, all observer positions selected, observers identified and a clear task, purpose, method and end state for every target planned. The plan then can be disseminated and rehearsed with changes made only through bottom-up refinement and further development of the enemy situation.



Live-fire incidents at the NTC are directly related to the quality of the unit's home station training.

Live-Fire Incidents. The last rotation we had without a firing incident was Rotation 94-01 (October 1993). Rotation 96-02 (November 1995) was the first rotation since 95-06 (March 1995) without a firing incident during calibration. During FY 95, units had 45 firing incidents, 17 fire direction center (FDC) errors and 28 gun crew errors. During the first two rotations of FY 96, there have been four firing incidents.

The lack of dual independent checks conducted to standard caused each firing incident. Sloppy crew drill execution and (or) not following crew drills on both the guns and in the FDC cannot be tolerated at any time.

Live-fire battles at NTC are often the only time maneuver commanders experience the devastating effects artillery brings to the battlefield. When a firing incident occurs, all indirect fire systems are placed in "Check Fire Freeze" until the source of the error is isolated.

Inevitably, a firing incident occurs at a critical time in the battle. All too often, Check Fire Freeze is called as the task force is closing on an objective and desperately needs obscuration, suppressive and killing fires. The task force "dies" at the breach site due to a lack of FA fires—so does the unit's credibility with the maneuver commander to support him with effective and timely fires.

Firing incidents at the NTC are directly related to the quality of the unit's home station training program, regardless of the weapons system—fielding Paladin won't solve this firing-incident problem. Units must come to the NTC with soldiers trained on detailed crew drills (guns and FDCs) to standards ruthlessly enforced by the chain of command. Here are some tips to help eliminate firing incidents.

- Use digital communications and gun display units (GDUs) to enhance safety.
- Drill crews (FDC and guns) in accordance with appropriate technical manuals and field manuals to standards ruthlessly enforced by the unit chain of command.
- Make dual independent checks a way of life.
- Fire the weapon system at the sustained rate of fire. Take this into consideration during planning. Slow down to be safe. You will fire multiple volley missions during your rotation and in combat. Trying to fire too fast results in sloppy crew drills and cutting corners, causing errors.
- Train the battery and battalion leadership to enforce standards and supervise execution as integral parts of their duties.
- Develop gross error checks as part of the crew drill to catch common errors on survey, meteorological messages, piece locations, etc.

Positive Trends. Not everything at the NTC concerning fire support is negative. Units are achieving great success in planning and executing the counterfire battle. Maneuver commanders are stating their force protection priorities as part of their intent. Radar zone planning, triggers and location are an integral part of most combined arms and fire support rehearsals. Artillery battalion counterfire drills and acquire-to-fire times continue to improve, which significantly contributes to reducing the effectiveness of the opposing force's (OPFOR's) artillery.

Units are arriving with a better understanding of how to synchronize fires and continue to grow throughout each rotation. They are better prepared to execute a wide variety of tough, realistic missions. The orders process, troop-leading procedures and synchronization of fires with maneuver have improved with every rotation.

Fire support is tough business. But with continued hard work, the Field Artillery's effects on the battlefield will sustain us as the King of Battle.

Lieutenant Colonel Marcus G. Dudley is the Senior Fire Support Observer/Controller at the National Training Center (NTC), Fort Irwin, California. In his previous assignment, he commanded the 3d Battalion, 82d Field Artillery, 1st Cavalry Division, Fort Hood, Texas, participating in two rotations at the NTC. Other assignments include serving as Chief of the Cannon Division, Gunnery Department, Field Artillery School at Fort Sill, Oklahoma; S3 of the 212th Field Artillery Brigade, Fort Sill; S3 of the 2d Battalion, 18th Field Artillery, also in the 212th Field Artillery Brigade, during Operation Desert Storm; Chief of the Doctrine Division, including the Combat Training Center Liaison Branch, in the Fire Support and Combined Arms Operations Department, Field Artillery School; and Brigade Fire Support Officer in the 3d Battalion, 8th Field Artillery, 25th Infantry Division (Light), Schofield Barracks, Hawaii.

Training the Force FA METL:

The Interdiction—Counterfire Exercise

by Colonel J. Robert Wood and Major Ronald G. Costella

The direct support (DS) assets of the typical division artillery (Div Arty) are routinely exercised as the brigade combat teams prepare for and execute National Training Center (NTC) rotations at Fort Irwin, California. On the other hand, the general support (GS) assets rarely are exercised as a complete team.

Arguably, staff exercises such as map exercises (MAPEXs), command post exercises (CPXs) or Battle Command Training Program (BCTP) Warfighters stress the command and control ability of the force FA headquarters. But these drills don't truly evaluate the Div Arty's ability to target and deliver rounds accurately. In these exercises, a "hand wave" or response from a computer terminal assumes away the friction of war.

The 24th Infantry Division (Mechanized) Artillery, Fort Stewart, Georgia, set out to exercise the force FA headquarters through the full range of the *decide-detect-deliver-assess* (D^3A) targeting methodology. The vehicle to accomplish this was the Div Arty Interdiction and Counterfire Exercise, or ICE for short. Although we learned many lessons about our D^3A tactics, techniques and procedures (TTPs), this article focuses on the training value of the ICE and its ease of replication anywhere.

Exercise Design

The goal of the Div Arty ICE 95 was to sustain the proficiency level of the Div Arty mission-essential task list (METL) tasks, exercise the force FA headquarters, strengthen sensor-to-shooter links and the targeting process and refine TTPs, standing operating procedures (SOPs) and planning factors. The staff developed a master events list (MEL)-driven scenario that generated tactical information for target production that allowed for actual attacks during counterfire, interdiction and deep-attack missions. The staff coordinated and synchronized divisional and non-divisional assets during the exercise, learning how to employ all systems to conduct the division's deep battle.

The 24th Div Arty assembled players from the battalion to corps levels to replicate the assets expected in the division's battlespace. Solidification of sensor-to-shooter links and the communications required to support these links became the cornerstone of the planning process. The command and control and logistical nodes for the targeting process drove requests for

personnel and equipment. In addition, resources were allocated for exercise control and evaluation cells to run the exercise and gather data for internal evaluation. The Div Arty assembled a complete fire support and maneuver team (see Figure 1).

The ICE provided a unique opportunity to practice multi-echelon training with nested training objectives—many units accomplished their training objectives in concert with ICE. From corps to division to battalion, each units' objectives complemented the 24th Div Arty's goals. For example, the 24th Division Air Attack Artillery Battalion (1-5 AAA) conducted platoon Army training and evaluation programs (ARTEPs) in conjunction with the ICE. The 1-5 AAA platoon leaders coordinated and executed protection of moving targets and stationary batteries throughout the exercise.

We used the Div Arty's DS battalions with the divisional MLRS battery (A/13 FA) in the GS role with the 18th FA Brigade's target production cell (TPC), target acquisition detachment (1st FAD) and fire control element (FCE), replicating a GS reinforcing brigade. GS target acquisition assets included the Guardrail common sensor and Mohawk side-looking airborne radar (SLAR) aircraft (224th Military Intelligence), Q-36 and Q-37 counterbattery radars (G/333 FA) and combat observation/lasing teams (COLTs) replicating long-range surveillance (LRSD) teams. The Guardrail and SLAR acquisitions were down-linked to both the Div Arty tactical operations center (TOC) and the division all-source collection agency (ACE) via the commander's tactical terminal (CTT) and interim ground station module (GSM), respectively.

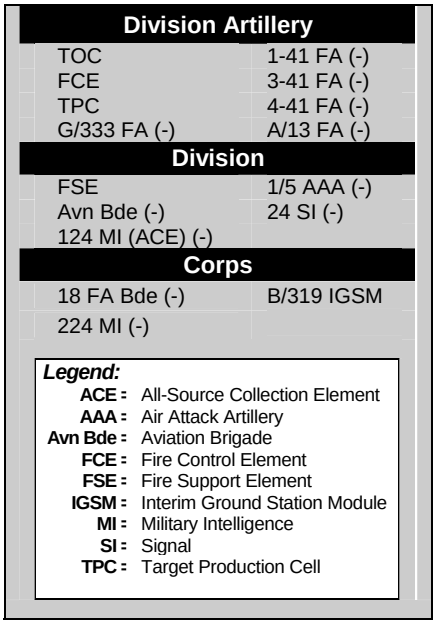


Figure 1: Participants in the 24th Division Artillery (Div Arty) Interdiction-Counterfire Exercise (ICE) 95.

The 24th Aviation Brigade was a key player in the division deep fight. Accordingly, the brigade began parallel planning with the Div Arty staff. During execution, the aviation brigade TOC and the attack battalion TOC collocated with the Div Arty TOC. This nonstandard, but convenient, positioning proved to be invaluable and led to the refinement of many 24th Division TTPs for the deep fight.

Exercise control

One goal of Div Arty planners was to create an exercise control cell that was so robust that the exercise design was transparent to executors. To accomplish this goal, the control cell was established to administer the ICE, coordinate VIP visits and facilitate after-action reviews (AARs).

For ICE 95, we consciously minimized administrative and logistical play. Accordingly, the Div Arty S1 and S4 were available to help control the ICE, and the S1/S4 expando van became a command and control platform. Under the exercise control cell, two cells were established. The first was called the white cell. Under the direction of the Div Arty S4, it drove the MEL. The white cell replicated all division main command post (DMAIN), division tactical command post (DTAC), corps fire support element (FSE) and brigade FSE functions. In addition, it positioned and supervised the "enemy" artillery, AAA assets and the deep attack target.

The second cell, called the evaluation cell, was under the direction of the Div Arty S1. It evaluated the cause and effect relationship between an intelligence action and a fire support reaction. In addition, the evaluation cell evaluated the exercise design with the aim of improving future ICEs.

Master Events List

Six weeks before the ICE, the Div Arty plans and exercises officer facilitated a workshop to develop the exercise MEL. A matrix related a critical fire support task (CFST) to the requisite intelligence information to stimulate action. Background intelligence information also was included to force the realistic analysis, dissemination and synthesis of information leading to an action. We planned for the background information to be transmitted in 30-minute windows.

Once we knew the critical information requirements (CIRs), the ACE (part of the white cell) crafted an intelligence scenario that logically supported the CFSTs. This process was tedious and time-consuming, but in the end, it proved to be essential to exercise flexibility and realism. During execution, we could instantaneously increase or decrease the tempo by inputting more or less intelligence information into the system.

This intelligence information was sent both digitally and by voice from two locations. Complementary, repetitive and conflicting information originating from the ACE was sent verbally to the FA intelligence officer (FAIO) and digitally from the white cell to the TPC via the initial fire support automation system (IFSAS). Two IFSAS operators supervised by an NCO-in-charge (NCOIC) had advance knowledge of the MEL and scripted appropriate combat intelligence (CBTI), commander, shelling (SHELREPs) and surveillance reports. The information originating from the ACE replicated LRSD reports, imagery, unmanned aerial vehicle (UAV) reports, joint surveillance and target attack radar system (J-STARS) output and human intelligence (HUMINT). Concurrently, real-time intelligence was reported by Guardrail, Mohawk SLAR and COLTs.

Tactical Scenario

Once we developed the MEL and established the threat, the Div Arty staff, in concert with the division FSE, produced a tactical scenario to support the ICE MEL. The scenario had to support the Div Arty in a GS role. As such, the 24th Division "was deployed in response to aggression overseas." One of the 24th's brigades had to defend in a covering force role to buy the division commander 72 hours to build forces in country. All Div Arty units and the 18th FA Brigade were in country with the covering-force brigade. The organization for combat placed the 24th Div Arty GS and the 18th FA Brigade GSR.

The Division FSE and the Div Arty battle staff went through an abbreviated orders process and produced a division operations order (OPORD), fire support annex, Div Arty FA support plan (FASP),

road-to-war and intelligence scenario. The appropriate targeting products—high-payoff targets (HPTs), attack guidance matrix (AGM), target selection standards (TSS), decision support matrix (DSM) etc.—to stimulate the D^3A process were included in the division OPORD.

ICE Execution

The four-day Div Arty ICE 95 was conducted in September at Fort Stewart. Once in position, all participants conducted a communications exercise (COMEX) under the direction of the Div Arty signal officer to test all systems and verify information flow channels. The communications architecture took advantage of all available systems, to include the FM, UHF, tactical local area network (TACLAN), mobile subscriber equipment (MSE), enhanced position location reporting system (EPLRS), wire and telephone.

The exercise focused on counterfire missions in the morning (Figure 2), interdiction missions in the afternoon (Figure 3) and a nightly deep attack by Army aviation (Apache) assets (Figure 4). FA fires were both live and dry with redundant safety checks to prevent firing mishaps. Intelligence information (both scripted and real-time) flowed throughout the exercise.

During the counterfire missions, live artillery rounds were acquired by Firefinder radars. In addition, a field exercise mode (FEM) tape and scripted SHELREPs were used to augment the number of acquisitions in an effort to replicate the number expected during a typical division counterfire fight. Live Paladins, dry multiple-launch rocket systems (MLRS) and notional FA brigade assets were fired in response to the acquisitions. Q-36 acquisitions went directly to the FA battalion TOC, and as necessary, the division artillery received requests for additional fires to process and distribute.

During the interdiction missions, live Paladins, dry MLRS, and notional FA brigade assets fired in response to scripted intelligence acquisitions.

In the nightly deep attacks, live and dry suppression of enemy air defenses (SEADs) were synchronized with a multiple integrated laser engagement system (MILES)-equipped Apache battalion attacking a moving convoy protected by Avenger weapon systems. Additionally, the convoy had a battlefield deception vehicle (BAT-D) transmitting in plain text as a target for the communications intelligence (COMINT)-gathering capability of Guardrail. Two air defense radars covered the air route and also were targets for the Guardrail's electronic intelligence (ELINT)-gathering capability. Finally, Guardrail and Mohawk SLAR aircraft acquired the moving targets and augmented scripted intelligence with real-time information.

The Div Arty ICE 95 staff planners reduced some friction by collocating command and control elements in the same "grid square." The result was eased communication and an ability to quickly assemble key leaders for "hot wash" AARs. Each mission was rehearsed and followed by an informal AAR.

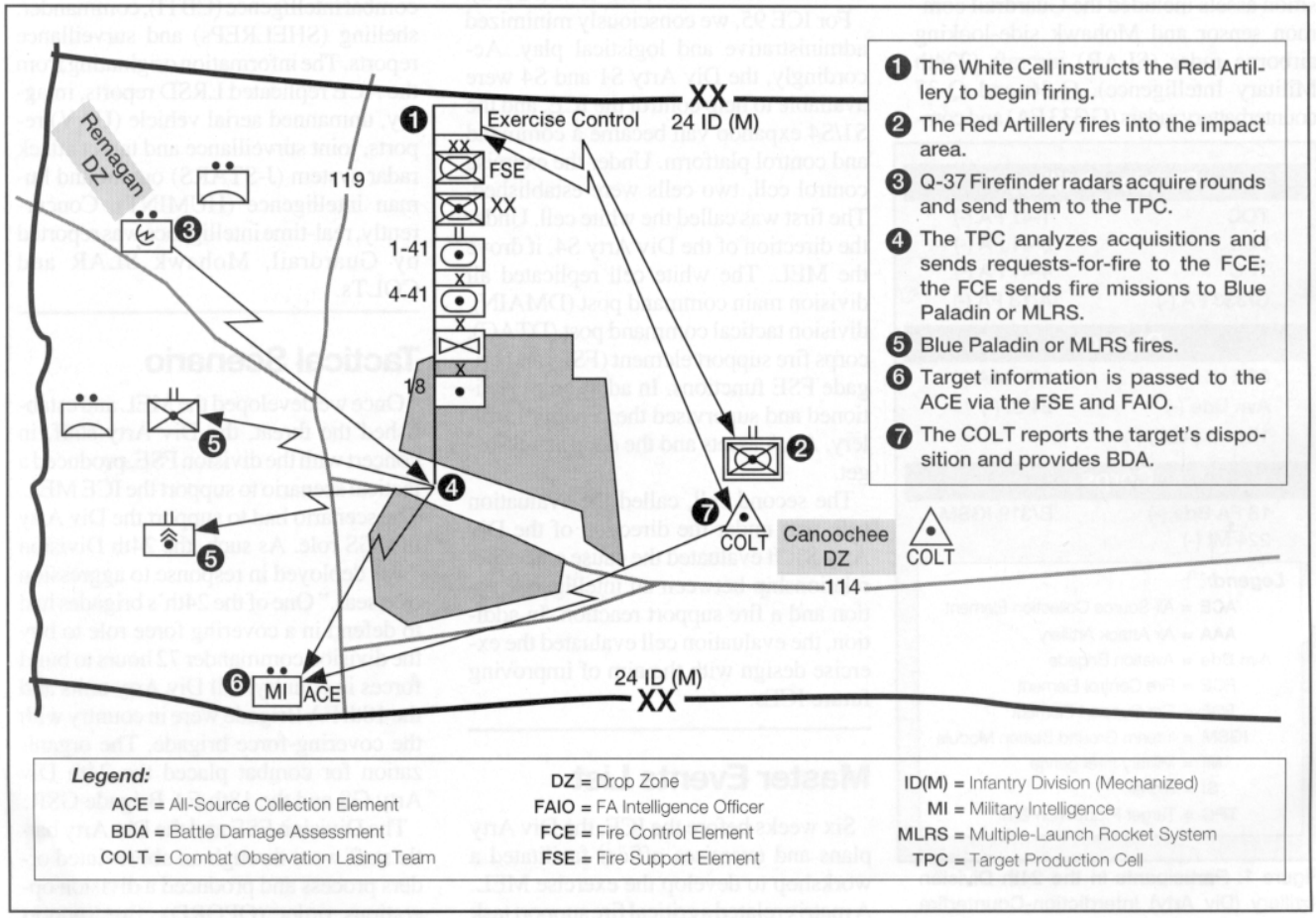


Figure 2: The counterfire portion of the Div Arty ICE 95.

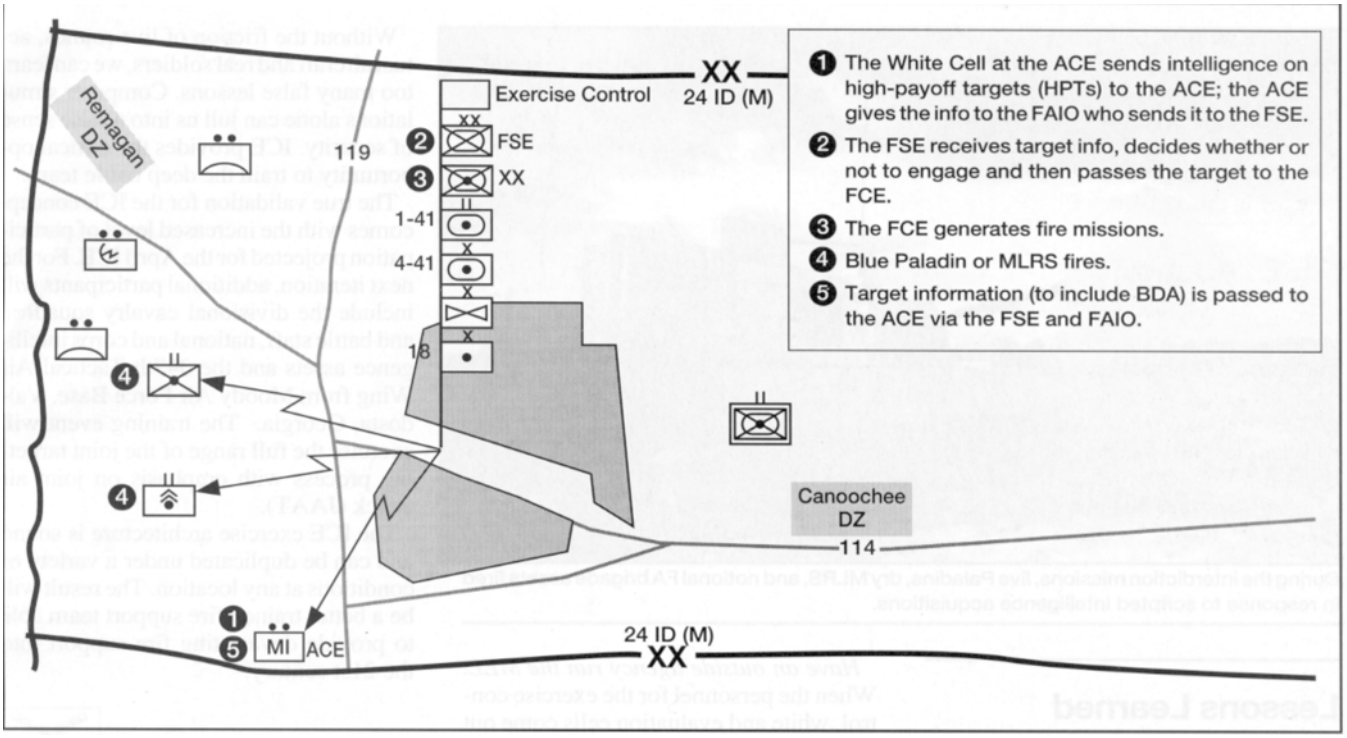


Figure 3: The interdiction portion of the Div Arty ICE 95.

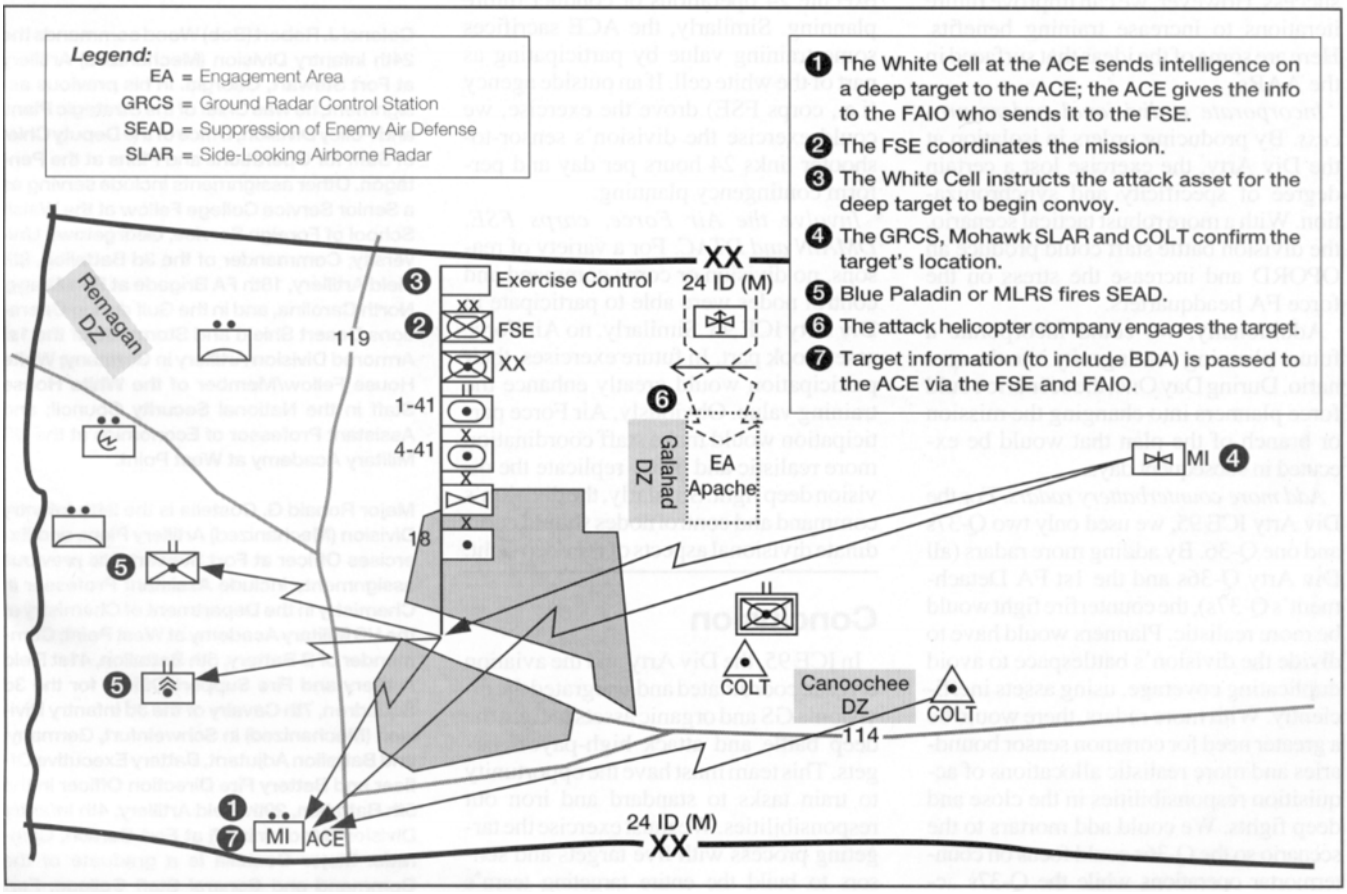


Figure 4: The deep attack portion of the Div Arty ICE 95.

During the interdiction missions, live Paladins, dry MLRS, and notional FA brigade assets fired in response to scripted intelligence acquisitions.

Lessons Learned

The Div Arty ICE 95 was a resounding success. However, we can improve future iterations to increase training benefits. Here are some of the ideas that surfaced in the AARs.

Incorporate a divisional orders process. By producing orders in isolation at the Div Arty, the exercise lost a certain degree of specificity and synchronization. With a more robust tactical scenario, the division battle staff could produce an OPORD and increase the stress on the force FA headquarters.

Additionally, we could incorporate a future planning contingency into the scenario. During Day One, the scenario could force planners into changing the mission or branch of the plan that would be executed in subsequent days.

Add more counterbattery radars. For the Div Arty ICE 95, we used only two Q-37s and one Q-36. By adding more radars (all Div Arty Q-36s and the 1st FA Detachment'sQ-37s), the counterfire fight would be more realistic. Planners would have to divide the division's battlespace to avoid duplicating coverage, using assets inefficiently. With more radars, there would be a greater need for common sensor boundaries and more realistic allocations of acquisition responsibilities in the close and deep fights. We could add mortars to the scenario so the Q-36s could focus on countermortar operations while the Q-37s acquire artillery targets.

Have an outside agency run the MEL. When the personnel for the exercise control, white and evaluation cells come out of the Div Arty leadership, it's difficult to execute 24 operations or conduct future planning. Similarly, the ACE sacrifices some training value by participating as part of the white cell. If an outside agency (i.e., corps FSE) drove the exercise, we could exercise the division's sensor-to-shooter links 24 hours per day and perform contingency planning.

Involve the Air Force, corps FSE, DMAIN and DTAC. For a variety of reasons, no division or corps command and control nodes were able to participate in Div Arty ICE 95. Similarly, no Air Force assets took part. In future exercises, their participation would greatly enhance the training value. Obviously, Air Force participation would make staff coordination more realistic and better replicate the division deep fight. Similarly, the division's command and control nodes should coordinate divisional aspects of the deep fight.

Conclusion

In ICE 95, the Div Arty and the aviation brigade coordinated and integrated the division's GS and organic assets to fight the deep battle and attack high-payoff targets. This team must have the opportunity to train tasks to standard and iron out responsibilities. We must exercise the targeting process with live targets and sensors to build the entire targeting team's expertise.

Without the friction of live rounds, actual aircraft and real soldiers, we can learn too many false lessons. Computer simulations alone can lull us into a false sense of security. ICE provides the critical opportunity to train the deep battle team.

The true validation for the ICE concept comes with the increased level of participation projected for the April ICE. For the next iteration, additional participants will include the divisional cavalry squadron and battle staff, national and corps intelligence assets and the 347th Tactical Air Wing from Moody Air Force Base, Valdosta, Georgia. The training event will exercise the full range of the joint targeting process with emphasis on joint air attack (JAAT).

The ICE exercise architecture is sound and can be duplicated under a variety of conditions at any location. The result will be a better trained fire support team able to provide devastating fire support into the 21st century.

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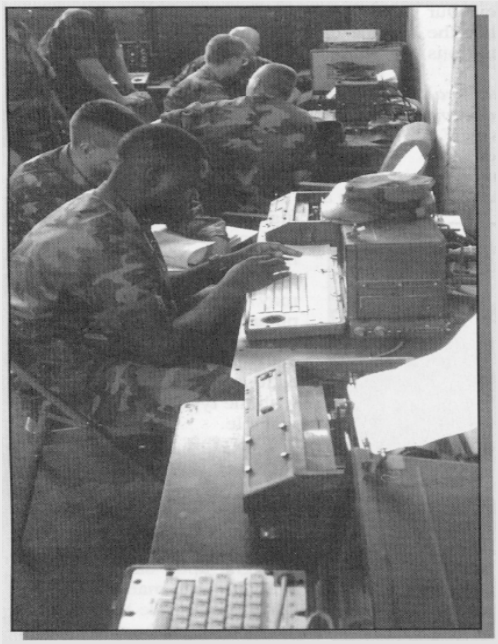
Marne Thunder's IFSAS Sustainment Training

While consolidated fire direction training is not new, the 3d Infantry Division (Mechanized) Artillery (Div Arty) in Germany took the idea a step further. Marne Thunder built a semi-permanent initial fire support automation system (IFSAS) sustainment training facility. Easy and inexpensive to construct, the facility makes sustainment training easier to schedule and saves valuable training time and resources. This article describes how the facility works.

The Site. The 3d Infantry Div Arty brings subordinate fire direction centers (FDCs) to a single location for fire direction sustainment training. Complex communications, database management and software differences between battalion FDCs and the multiple-launch rocket system (MLRS) battery operations center, for example, make face-to-face interaction the preferred method of sustaining our IFSAS skills.

IFSAS, fielded to the Div Arty in fall of 1994, consists of a lightweight computer unit (LCU) loaded with IFSAS application software capable of processing battlefield graphics, ammunition and firing unit information, meteorological data, artillery target intelligence, non-nuclear fire planning and tactical fire control. IFSAS can operate as a single station (one LCU) or a dual station (two LCUs linked) to divide the work load between current operations and planning/future operations.



3d Infantry Div Arty IFSAS Sustainment Training Facility.

Constructing our IFSAS sustainment training facility was simple. The site is an FDC section room with a wire hot-loop with several splices in the loop. We secured WD-1 to the wall and spliced six-foot pieces of wire into the loop at six-foot intervals. Each splice supported an LCU station, and we set up tables and desks around the edge of the room at each station. Our site accommodates up to 10 units, each configured as either a single or dual station.

The LCUs and their printers are powered from standard 110 or European 220-volt outlets using the optional AC/DC power converter. We safely power several complete LCU stations using a single wall outlet and a power surge protector strip.

With the hot-loop and desks in place, trainees arrive at the site with their LCUs and printers in hand and are ready for communications checks in less than 30 minutes. The number of participants depends on the unit. At the 3d Infantry Div Arty, we link the Div Arty FDC; fire support elements (FSEs) of the division main, tactical and rear command posts; MLRS battery operations center; Div Arty counterfire cell; Div Arty survey; and a direct support battalion FDC.

The training site can be constructed anywhere that has two or three wall outlets. Once the site is established, units spend very little time setting up and more on training. The site makes it easier to mesh diverse cycles for sustainment training and it increases quality training free of distractions.

In addition to consolidated training, we use the site for IFSAS opportunity training, affording the section chief additional freedom to train his section.

Long Distance Training. Although consolidated training at a central location is ideal for a Div Arty unit, sometimes it is not practical when one or more units are stationed at different locations, for example, Army National Guard Div Artys. Such is the case in the 3d Infantry Div Arty, where the headquarters, a cannon battalion and an MLRS battery are in Bamberg; a cannon battalion and its supported maneuver brigade are 50 kilometers away in Schweinfurt; and a second maneuver brigade and its fire support slice are stationed 70 kilometers away in Vilseck. To bring these players together for sustainment training is expensive and time-consuming. The LCU's ability to communicate digitally over a secure phone line overcomes these distances easily. (The IFSAS software is classified and requires a secure telephone.) We can train units at three different locations without dispatching a vehicle or erecting an OE-254 antenna.

Although the ability to work through problems in a digital environment is enhanced when all team members are at a single location, this does not eliminate the need to train with FM communications over doctrinal distances. Certain skills are more effectively trained in a field environment. For this reason, the 3d Infantry Div Arty makes the most of digital training at the Combat Maneuver Training Center, located in Hohenfels; Grafenwoehr Training Area; and division and higher command post exercises. But a central training site allows us to exploit the LCU's versatility and concentrate on fire direction.

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3d Infantry Division (Mechanized)
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NETT

Paladin Lessons Learned

by Major Jeffrey A. Taylor

The Paladin M109A6 howitzer has achieved tremendous success since it began fielding in 1993. The Paladin New Equipment Training Team (NETT), part of the Gunnery Department at the Field Artillery School, Fort Sill, Oklahoma, is the proponent for Paladin tactics, techniques and procedures (TTP). Paladin NETT has developed a data base of lessons learned from fielded units and many trips to the National Training Center (NTC) at Fort Irwin, California. This article highlights some key lessons learned by the NETT and discusses some challenges for Paladin units.

• *Paladin enhances the brigade's deep fight.* Paladin's increased responsiveness and survivability coupled with the 30-kilometer range of its rocket-assisted projectile (RAP) made possible by the M284 cannon assembly enhances the brigade's opportunity to fight deep with fires and quickly move to avoid counterfire.

Although the M109A6 moves no faster than its M109-series predecessors, its automatic fire control system (AFCS) allows the fire support coordinator (FSCOORD) to fire quicker. The AFCS' position location and directional reference, on-board technical fire control and gun-drive servos that automatically points the tube to hit the target make the system more responsive. Quicker response time allows the Paladin to keep moving longer, not faster.

The mission training plan (MTP) time standard to receive a fire mission on the move, stop and shoot is 75 seconds while the standard to occupy a position area and get ready to fire is two minutes. Units must master platoon operations center (POC) drills to achieve these ready-to-fire standards. Battalions at the NTC demonstrated they can stop and mass on a target in three minutes. With Paladin, the FA can respond quicker with more volumes of fire and increased accuracy. Our primary limitation for the deep fight is the quantity of 30-kilometer range munitions available.

• *Paladin allows the battalion tactical operations center (TOC) to spend more time on fire support tasks and less on FA tasks.* Paladin and non-Paladin cannon units alike must pay close attention to emplacement and displacement times, the counterfire threat and moving units while providing fires. But Paladin's greatly reduced response times makes the battalion S3's job much easier; he can rapidly plan moves, more easily keep the guns in range, consistently providing more fires on the target, and make survivability moves. Survivability from counterfire is an NTC success story.

• *The position area technique continues to be the preferred method of planning and controlling Paladin moves and for coordinating land.* Land management has become a greater problem. Compared to the number of position areas coordinated for its predecessors, the M109A6 is land hungry. Paladins employed as pairs, the most commonly used tactic at the NTC, require a grid square for each pair. Further, land must be coordinated for other battery resources as they should not be in the howitzer position areas, which each have a 500-meter radius. Add to this Paladin's shoot-and-scoot capability, and we can have a land coordination nightmare. The concern is to coordinate the land we need while protecting other units from being in the counterfire footprint.

Some battalions are experimenting with movement control methods. At the NTC, one battalion used a Paladin zone with limits of advance, giving exclusive land use to the artillery for movement. Another used axis of advance, follow and support, and attack and support by fire positions to articulate its scheme of maneuver.

The NETT advocates selecting position areas that support the critical fire support tasks and, if practical, selecting intermediate positions to orient units during moves. The FSCOORD must develop an understanding with maneuver that firing units may fire along their routes to the planned position areas. No matter what control measure is used, the battalion S3 must select locations that can range the target with the type of ammunition available.

"Everything about Paladin is METT-T [mission, enemy, terrain, troops and time available]"—as one platoon sergeant in the 24th Infantry Division (Mechanized) Artillery, Fort Stewart, Georgia, aptly said. Based on METT-T, commanders position Paladin by single howitzers, in pairs or by platoons. Although paired operations have been the most common employed, some senior commanders are using

more platoon positioning for command, control and logistical reasons.

• *Training new personnel on Paladin after NETT will be a challenge until all units are fielded.* New personnel initial training after the NETT departs will be a problem until all units have Paladin. Commanders must closely monitor personnel turnovers and the time and resources required to train replacements.

The toughest aspect of that challenge is the time and expertise it takes to train a new sergeant or higher rank in a firing battery. Lack of such training can be particularly difficult during a major exercise, such as an NTC rotation. With the M109A3/A5 howitzers, soldiers easily could move from cannon unit to cannon unit. Skill level tasks basically were the same. This is not the case with Paladin.

The Field Artillery School offers the Paladin Commander's Course for ranks staff sergeant and above, which culminates with a live-fire exercise. Beginning in March, the course's instruction will be reduced from 18 to 11 days. The 24th Division conducts a two-week initial training course for its new Paladin personnel.

Training and qualifying new personnel on Paladin will remain a problem until the FA has a pool of Paladin-trained personnel. The Department of the Army's Enlisted Branch is strongly considering a Paladin additional skill identifier (ASI) to assist in the reassignment process.

• *Friendly units' killing Paladins is a problem at the NTC.* Paladin fratricide has occurred on several NTC rotations. Maneuver crews weren't familiar with Paladin, its movement techniques or its infrared image or used to having the artillery so close. To prevent this type of fratricide, units need to conduct both fire support and tactical rehearsals at the brigade level and the battery commander and platoon leaders must coordinate closely with adjacent units.

• *Leaders must be familiar with safety requirements in TM 9-2350-314-10 Operator's Manual for Howitzer, Medium, Self-Propelled: 155-mm, M109A6.* Lead poisoning, carbon monoxide poisoning, closing certain hatches when firing and using seat belts are some of the safety items Paladin leaders must be familiar with. One Paladin crew was hospitalized with carbon monoxide poisoning for a couple of days after firing the weapon with improper ventilation. A change to the -10 safety requirements resulted from this incident. Also, lead poisoning can result from firing M119 and M203 propellants, if precautions are not followed.

• *Shooting at load elevation continues to be the most common firing incident.* Many of these incidents occur during multiple-round missions. Recently, the Chief of Field Artillery sent a memorandum to all Paladin units outlining key steps to eliminate these problems; he directed units incorporate the steps into the Paladin manuals TM 9-2350-314-10 and *FM 6-50-60 Tactics, Techniques and Procedures for M109A6 Howitzer (Paladin) Operations (Coordinating Draft).*

The key change is the gunner must verify the three safety checks by the chief of section before he gives the command "Prime." These secondary checks plus proper crew drill will help prevent firing at load elevation.

Another common error is inputing the minimum quadrant elevation (Min QE) into the AFCS as loading elevation. According to TM 9-2350-314-10, the proper loading elevation is 299 *or* lower; therefore, if a chief of section inputs a Min QE higher than 299, he must manually depress the tube after he presses the "load" key.

• *The section chief's responsibilities increased two-fold with Paladin fielding.* Not only does he require the same basic skills as before, but he also must master all the new technology on-board, specifically the AFCS. Some of the section chief's biggest challenges fall in the area of situational awareness and understanding maneuver tactics and graphics. Unit improvements in the orders process, troop-leading procedures, precombat checks and inspections, mission checklists, and technical and tactical rehearsals with rock drills have enhanced the section chief's performance. His ability to conduct frequent and effective crew drills and maintain strong discipline on the howitzer is directly proportional to his success as the Paladin section chief.

• *We need to increase some of the personnel and equipment in the Paladin battalion table of organization and equipment (TOE).* These requirements are outlined in the FM 6-50-60 and will be in the manual due out this year. Members of a June 1995 Paladin Field Working Group and February 1996 video teleconference hosted by the Gunnery Department agreed on several changes that would correct shortcomings in Paladin TOEs. (See the figure.)

• *Additional areas of focus are POC functions and battery and platoon defense development.* POC functions remain an item of special interest because of the concern that the fire direction officer (FDO) has too much to do to track information for the platoon. POCs should be able to handle both the fire direction and operation center duties for the platoon. Platoon leaders and platoon sergeants can help the POC with operations center duties from their HMMWVs by tracking the status of some items.

- Give the battalion commander a tracked vehicle with driver and track commander and four long-range radios—in addition to the commander's high-mobility multipurpose wheeled vehicle (HMMWV).
- Give the platoon sergeant a HMMWV with long-range radio.
- Add an ambulance and medic per battery.
- Give firing battery commanders, platoon leaders and gunnery sergeants tracked vehicles with long-range radios.
- Give the first sergeant two long-range radios for his HMMWV.
- Add a fifth radio to the POC to monitor the battalion command net and meet other communications requirements.
- Make the jump-TOC digitally capable.

Recommended TOE Changes for the Paladin Battalion

Battery and platoon defense is different because of Paladin's frequent moves between and within position areas. The NETT recommends a defense diagram based on a position area rather than individual Paladin locations. Sectors of fire for the position area can be identified by target reference points, whether identifiable terrain features or emplaced panels or markers.

• *To make the most of Paladin, we must have confidence in the system—because it works.* Paladin's increased responsiveness and survivability drastically improve the artillery's capabilities. Paladin will "bridge the gap" until we field the system of the 21st century—Crusader.

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COMBAT TRAINING CENTERS JRTC:

Fire Support Observations

by Lieutenant Colonel Theodore J. Janosko

Raymond Bernard, JRTC

The Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana, provides advanced-level joint training under tough realistic conditions of low- to mid-intensity combat. JRTC exercises the light infantry brigade task force with emphasis on the company and platoon. In addition, JRTC conducts specialized rotations, including the NATO Partnership for Peace Exercise, called Cooperative Nugget 95, and the advanced warfighting exercise (AWE) Warrior Focus.

In terms of fire support, units routinely come to the JRTC with several strengths. The habitual relationship between commanders and their fire supporters is working; company through brigade commanders understand the concepts of integrating and synchronizing fires. Most commanders use the PPAR format in *FM 6-71 Tactics, Techniques and Procedures (TTP) for Fire Support for the Combined Arms Commander* to write fire support guidance: purpose, priority, allocation and restrictions.

FA units routinely show other strengths. They execute voice and digital counterfire drills quickly, and the S2s are becoming more skilled in proactive counterfire. Most M119 and M198 sections demonstrate good crew drills as do the majority of the are direction centers (FDCs). Units are carefully managing their engineer and Class IV resources to greatly improve survivability. Battlefield awareness of the threat, ambushes and mines is increasing.

However, several areas need immediate attention to improve combat readiness and prevent combat casualties. This article addresses five such areas: targeting, rehearsals, effects of indirect fires, combat observation/lasing team (COLT) employment and ammunition management.

The Targeting Process. The brigade targeting process often lacks focus and fails to orient collection efforts and supporting fires. Intelligence, operations and fire support personnel do not focus on all elements of the targeting process (*decide-detect-deliver-assess*). *Decide* is usually adequately done; however, too often, the S2's enemy analysis is inadequate, which de-synchronizes the targeting meeting.

Detect suffers from inadequate collection follow-up—no one tracks the confirmation or denial of targets. Often the *delivery* of fires are not planned or poorly synchronized and the delivery and *assess* assets are not informed of requirements.

Targeting meetings routinely fail to focus combat power to find, fix and finish critical high pay-off targets (HPTs). Most units don't use meeting results to refocus collection plans or task units to confirm or deny named areas of interest (NAIs). In addition, the results of the meetings are not reliably disseminated to subordinate elements. There's often little follow-up on taskings given to subordinates as part of the targeting process. Individuals are not coming to meetings prepared, and no one is sure what the outcome should be.

Units can improve their execution of the targeting in several ways. Personnel need to read *FM 6-20-10 TTP for the Targeting Process,* paying special attention to Chapters 2 and 5, to better understand the process. The S2 should present a analysis of the enemy situation, the high-value targets (HVTs) for the enemy and a recommended list of HPTs. The S3 should present the friendly situation, describe future operations and be prepared to "cut" a fragmentary order (FRAGO) at the conclusion of the meeting. The brigade fire support officer (FSO) or targeting officer should facilitate the meeting and have a list of required attendees; the agenda; a list of resources available for detection, delivery and assessment; and a target synchronization matrix. The FSO must ensure products and taskings (a FRAGO) that come out of the targeting meeting are disseminated to subordinate units.

The FSO or targeting officer should work closely with the S2 to develop the HPTs. They continually coordinate with brigade to get the latest data and locations for proposed targets. The targeting process should be incorporated in the battle staff training at home station.

Rehearsals. Once units depart the intermediate staging base, rehearsals are infrequently conducted and seldom benefit the operation when conducted. Fire supporters aren't integrated into the maneuver rehearsal as recommended in *FM 7-20 The Infantry Battalion,* and most fire support rehearsals only confirm the planned target list. Units do not habitually ensure the six requirements of a target are met: purpose, location, observer, communications net, trigger and rehearsal.

Units have poorly written rehearsal standing operating procedures (SOPs) and don't use the rehearsal techniques listed in *FM 6-20-1 TTP for the Field Artillery Cannon Battalion.* Key players, such as fire direction officers (FDOs), COLT leaders, firing battery commanders, air liaison officers, air and naval gunfire liaison company (ANGLICO) representatives, etc., are often absent from rehearsals.

Units need to develop a sound SOP and integrate fire support into the maneuver rehearsal. The commander and FSO must describe succinctly the actions taken as each unit fights with maneuver and fires. The FSO must describe the maneuver or enemy action that will trigger a fire support task or event. The fires must be tied to (synchronized with) maneuver.

The key to success is that all leaders understand how their actions fit into the overall plan. A walk-on terrain model is usually worth the time required to construct it.

Before any target is included in a rehearsal, it should meet the six requirements of a target. The target must have a *purpose*: to disrupt, delay, divert, destroy, damage or limit. It's *location* should be stated as an eight- or 10-place grid. The primary and alternate *observers* must be designated. The means of *communications* and net must be designated and available to the primary and alternate observers. A *trigger* is established for each target—either a time or event (number of vehicles at a given position, etc.). And finally, the targets key to success must be *rehearsed.* An excellent overview of key rehearsal elements is in FM 6-20-1, Pages 3-12 through 3-15.

Effects of Observed Indirect Fires. Infantry platoon leaders and forward observers (FOs) are reluctant to use indirect fires during small unit contacts in the heavily wooded terrain of Cortina. They are overly cautious for fear of fratricide—the opposing force (OPFOR) is normally only 200 to 300 meters away—and the rules of engagement are restrictive. Too often, units don't take advantage of the limited opportunities to kill the enemy.

Most fire support teams (FISTs) at the JRTC don't have a battle drill for this situation and aren't well-trained to adjust fires onto rapidly moving mounted and dismounted enemy forces. Decentralized "fast" fire missions rarely are employed, particularly during the search and attack phase of operations. Also, most units don't fire enough ammunition to achieve the desired effects on the target.

Units can improve their indirect fire effects with proper planning, battle drills and training for close-in engagements. They can plan and quickly use mortar fires and artillery to isolate, block or defeat attacking enemy forces. Units should consider using priority targets for both artillery and mortars and the selected use of quick-fire channels for fast, accurate fires.

Units need battle drills to immediately fire a round in reaction to contact. Once the first round is on the ground, observers should be trained to make one hold, accurate shift and fire-for-effect.

FIST training should include engaging close-in targets with fire support while the observer is moving; a situational training exercise (STX) lane is ideal for this type of training. One-round adjustments, bold shifts and the use of priority targets can be established or reinforced by aggressive training set fire observation (TSFO) and force-on-force training at home station. Units must ensure target descriptions are accurate and that the attack guidance is understood.

COLT Employment. Most units don't plan to employ COLTs. They rarely consider the COLT as an observer or target designation asset for Copperhead (although it's difficult to create Copperhead geometry at the JRTC), attack helicopters, close air support (CAS) or naval gunfire. Too often, a COLT is handed off to a subordinate unit at the last minute with little planning or coordination time for either the unit or the COLT.

To solve these problems, units must start by considering COLTs early in the planning process. The COLT mission has expanded from the original concept of just maximizing the use of laser-guided munitions (LGMs). The COLT now is a target acquisition (detect) asset to be considered during the brigade targeting meeting—*FM 6-20-50 TTP for Fire Support for Brigade Operations (Light),* Page 2-11. The COLT can weight the main effort of the brigade by overwatching an obstacle or adjusting fires on a critical target, such as an aerial denial artillery munition/remote antiarmor (ADAM/RAAM) minefield.

Units should rehearse COLTs' communications, fire and extraction (as necessary) plans. COLTs must use stealth and other survival techniques; FM 6-20-50, Appendix J, discusses the doctrinal use of COLTs.

Ammunition Management. Several brigade task forces haven't had enough ammunition to meet the commander's guidance for fire support because they didn't manage their ammunition. In several instances, infantry companies initiated attacks with minimal or no mortar ammunition or when there was insufficient artillery "killer" ammunition for the desired level of destruction.

Units aren't planning ammunition in volleys, calculating the number of volleys required to accomplish the mission and allocating ammunition by volleys. In addition, ammunition counts at the batteries, battalion tactical operations center (TOC) and battalion administrative and logistics operations center (ALOC) often differ widely.

Ammunition resupply is often pre-packaged before D-Day with little thought given to follow-on missions. Planning for ammunition resupply usually is done for only one means, and if weather or the threat eliminates that means, units are slow to come up with alternate means.

The figure lists a technique to help manage ammunition. Ammunition is such a critical resource that field grade officers should be closely involved in its management.

Mortar ammunition is just as critical to the maneuver commander and also must be planned. The battalion FSO works closely with his commander and S3 in assigning priorities for mortar fires. He also coordinates with the executive officer and S4 to ensure the battalion has enough mortars to accomplish the commander's intent.

Although the quality of training for low-to mid-intensity conflicts at home station has improved significantly in the past several years, there's still much to do—the impact of FA and other fires on the outcome of battle and protection of the force are just too important.

Brigade Fire Support Officer

- Identifies the requirements for the battalion/brigade fights.
- Allocates resources based on the commander's guidance for fire support and the S2's analysis of requirements.
- Identifies future operations requirements.

FA Battalion S3

- Identifies the requirements for gunnery (registration and calibration) and counterfire ammunition (based on the S2's analysis).
- Forecasts ammunition consumption.
- Tracks/controls ammunition expenditures.

FA Battalion Executive Officer

- Identifies resources.
- Plans (for more than one means) and coordinates resupply operations.
- Monitors ammunition consumption.
- Anticipates future requirements.

Field grade officers in the FA battalion must manage ammunition closely to ensure there's enough to meet the commander's guidance for fire support. The FA battalion commander, also the fire support coordinator (FSCOORD), monitors ammunition supplies closely and identifies any shortfalls to the brigade commander.

An Ammunition Management Technique

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USMC

Desert Firing Exercise 2-95

by Captains Russell H. Smith, USMC, and Jamie E. Clark, USMC

The semiannual, division Desert Firing Exercise (DESFIREX) at the Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California, is the largest, most complex live-fire fire support coordination exercise regularly conducted by any branch of our armed forces. The missions cover the spectrum of those for the Field Artillery—in the case of DESFIREX 2-95 in March 1995, not only direct support (DS) and general support (GS) missions, but also a number of counterfire missions and programs in which an entire artillery regiment massed fires. DESFIREX 2-95 players included the 1st Marine Division and the 11th Marine Regiment, both from Camp Pendleton, California.

But DESFIREX 2-95 was not simply a Marine FA exercise. In addition to Air Force, Navy and Marine fixed- and rotary-wing aircraft, support was provided by the multiple-launch rocket systems (MLRS) of the Army's 6th Battalion, 27th Field Artillery (6-27 FA), 75th Field Artillery Brigade, III Corps Artillery, Fort Sill, Oklahoma. DESFIREX 2-95 was the first time an entire Army MLRS battalion deployed and conducted live-fire training in support of a Marine division.

The 11th Marine Regiment, reinforced by the Reserve 14th Marine Regiment, headquartered in Dallas, Texas, fired more than 8,500 rounds during DESFIREX 2-95. 6-27 FA fired 162 practice rockets in the support of the exercise—the entire year's allocation for a typical MLRS battalion.

DESFIREX 2-95 was not only excellent planning, coordination and attack training for the joint fire support assets involved, but it also tested doctrine heretofore only discussed and refined tactics, techniques and procedures (TTP) for standing operating procedures (SOPs).

Background

DESFIREX 2-95 was conducted by the 1st Marine Division for 16 days in March 1995. Its theme was "Fighting with Fires" with the goal of training maneuver commanders to employ the gamut of supporting arms across a divisional front.

The objectives of the joint exercise were simple: to execute real-time fire support planning and coordination and attack targets using organic mortars, cannon and rocket artillery fires and fixed- and rotary-wing air support. DESFIREX 2-95 used a building-block approach and was divided into four phases.

Battery Phase. In the four-day Battery Phase, firing batteries of the 11th Marine Regiment and 6-27 FA conducted independent operations that focused on building unit cohesion and refining SOPs. Also during this phase, batteries conducted heliborne artillery raid training with assault support provided by the Marine Medium Helicopter Squadron HMM-166 and Marine Heavy Helicopter Squadron HMH-466.

Battalion Phase. The second phase was the four-day Battalion Phase. During this phase, the 11th Marines' cannon battalions and 6-27 FA massed fires and refined battalion SOPs. The complexity of the exercise increased significantly in this phase.

The 11th Marines combat operations center (COC) began nightly command post exercises (CPXs) with the artillery battalions. The goal was to exercise the digital communications and automated systems of the Marine Corps fire support system (MCFSS) to increase operator proficiency and "shake out the bugs" before the regiment assumed tactical control later in the exercise.

In addition, 6-27 FA reinforced the cannon battalions and practiced platoon-sized raids with security provided by elements of the 1st Tank Battalion and the 1st and 3d Light Armored Reconnaissance (LAR) Battalions. Marine and Air Force air assets were integrated into the Battalion Phase. The Marine Light Attack Helicopter Squadron HMLA-369 escorted the artillery on raid, artillery adjust fire and forward air controller (airborne)—called FAC(A)—missions, in support of regimental-level training objectives.

The fixed-wing community also was well-represented throughout the remainder of the exercise. During the Battalion Phase, AV-8B and F/A-18 aircraft from the Marine Attack Squadrons (VMA)-214

Sot Troy T, Heinzroth, 1st MarDiv

An 11th Marine observer calls in a request for fire during DESFIREX 2-95.

and VMA-311 and the Marine Fighter/Attack Squadrons (VMFA)-314 and VMFA All Weather (AW)-242 conducted close air support (CAS) and FAC(A) missions; KC-130 aircraft from the Marine Aerial Refueler Squadron (VMGR)-352 air-dropped ammunition and other supplies. In addition, the Air Force's EC-130 Compass Call aircraft from the 41st Electronic Warfare (EW) Squadron conducted training designed to acquaint ground units with operations in a hostile EW environment.

Battalion with Maneuver Phase. The third phase of DESFIREX was the three-day Battalion with Maneuver Phase. For this phase, the Marine cannon battalions remained DS to their infantry regiments. Each of the infantry regiments had the exclusive use of one of the corridors of MCAGCC.

Maneuver units fielded regiment and battalion tactical exercise without troops (TEWT) cells consisting of COCs and fire support coordination centers (FSCCs), company-level fire support teams (FISTs) and organic mortars while the artillery units participated with their full complement of personnel and equipment.

Battalion with Maneuver "put it all together," exercising fire support TTP at all levels to refine unit SOPs. The result was a smoothly functioning combined arms team that was confident and capable.

During this phase, 6-27 FA reinforced the 2d Battalion, 11th Marines (2/11 Marines) with rocket artillery fires and continued its raid training with the 1st Tank and the two LAR battalions. In addition, the MLRS battalion provided a capabilities briefing and raid demonstration to visiting students of the Amphibious Warfare School.

Marine and Navy Air assets supported the division's maneuver units during the Battalion with Maneuver Phase. An extensive range of offensive air support missions—CAS, laser CAS, FAC(A) and laser designation of artillery-delivered precision guided munitions—was flown in support of ground forces.

The Battalion with Maneuver Phase was a rare opportunity for the division's infantry regiments to employ extensive real-time fire support in concert with their schemes of maneuver.

Quick-Fire Channels. Throughout the first two phases of DESFIREX 2-95, the 11th Marines exercised counterfire procedures by establishing an air quick-fire channel. Employing "sensor-to-shooter" techniques, counterbattery radar teams tracked outgoing artillery and mortar rounds and determined the grid of the impacting rounds. This simulated the radar team's ability to track incoming hostile indirect fire and rapidly locate the enemy unit that fired the rounds.

The grids were passed directly through the regiment's target production cell (TPC) to on-station attack aircraft via an air support liaison team (ASLT) assigned to the regimental COC. Aircraft then rapidly engaged simulated enemy indirect fire units.

In the final phase of DESFIREX, the 11th Marines employed a variation of the quick-fire channel using LAR units as the "sensor" and a cannon artillery battalion as the "shooter." In this variation, the battalion established a VHF radio link directly with the LAR units screening the division's flank. This ensured responsive fire support for the LAR units if they had difficulty communicating on the division-level fire support nets.

After weeks of preparation and training, the fourth phase, a 72-hour fire support coordination exercise (FSCEX), culminated DESFIREX 2-95.

Division FSCEX

The FSCEX was the "Graduation Exercise" for not only the 11th Marines, but the 1st Marine Division as well. It provided a unique opportunity for the 1st Marine Division to coordinate the full range of supporting arms available on the modern battlefield.

DESFIREX 2-95 FSCEX was the first to involve six maneuver units under division control. These were selected units and headquarters sections from the 1st Marine Regiment; 7th Marine Regiment; 2d Battalion, 5th Marines; 1st and 3d LAR Battalions; and 1st Tank Battalion. In addition to the 11th Marines' organic elements, Reserve units from the 5th Battalion, 14th Marines; Battery G, 3d Battalion, 14th Marines; and the Air Naval Gunfire Liaison (ANGLICO) Platoon of the 4th Marine Division augmented the regiment and, once again, validated the integration of the Marine Corps' regular and Reserve forces. The joint assets of 6-27 FA and Air Force strike aircraft continued support of the division in FSCEX.

FSCEX tested the skills of the 11th Marines in support of a division scheme of maneuver. It had three parts: the Deep Battle to shape the battlefield, Defensive Operations and the Counterattack, including reestablishing the main defensive line. The 1st Marine Division tactical field headquarters controlled FSCEX.

Deep Battle. The division conducted final, detailed planning the week before FSCEX. A deep battle cell (DBC) comprised of key members of the division staff was formed to coordinate the deep fight.

The 24-hour deep battle began in the morning and consisted of a combined arms engagement of the forward reconnaissance elements of the enemy at a critical road junction in the northwest corner of MCAGCC. Using a technique known as "time bridging," this area was well forward of the division's forward line of own troops (FLOT) with the engagement occurring 24 to 48 hours in the future. The enemy's forward reconnaissance elements were first engaged by a strike package of Air Force F-111s and B-1Bs dropping laser-guided ordnance.

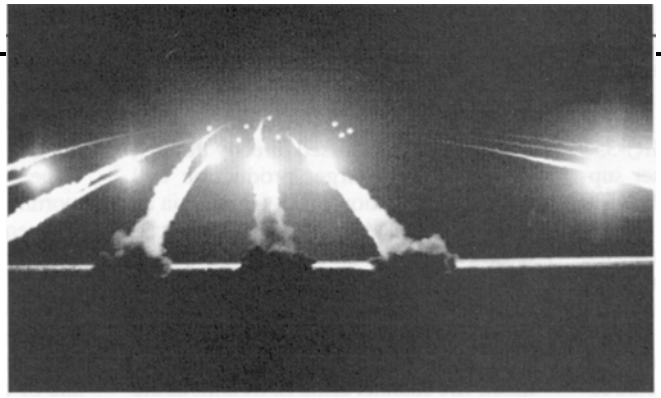
A platoon of launchers from 6-27 FA followed with an MLRS surface raid/deep interdiction strike. The deep strike aspect of the raid was moving the launchers to a point just south of the fire support

Sgt Troy T. Heinzroth, 1st MarDiv

B/6-27 FA fires an MLRS rocket down range in support of 1/11 Marines.

Sgt Troy T. Heinzroth, 1st MarDiv

A battery fire direction center (FDC) during DESFIREX 2-95.



Night firing of MLRS by C Battery, 6th Battalion, 27th Field Artillery.
Photo by CPT Anthony Daskevich, 6-27 FA

coordination line (FSCL) about midway across MCAGCC. The 1st LAR provided security for the platoon. This was another FSCEX "first" in that MLRS had a dedicated, supporting maneuver unit.

After the MLRS raid, 34 UH-1 and AH-1 helicopters from Marine Aircraft Group (MAG)-39 engaged targets in the area. Using such a large number of attack helicopters as a separate maneuver unit in support of a Marine air ground task force (MAGTF) was a non-doctrinal employment of Marine rotary-wing assets.

The deep strike accomplished three important objectives. It effectively blinded the enemy by destroying his forward reconnaissance elements; it influenced the enemy to follow an avenue of approach of our choosing and, thus, channeled his main force toward our strongest point of defense; and it forced the enemy to prematurely deploy his main echelon, giving us additional time to work on our defenses.

Defensive Operations. The 12-hour Defensive Operations began in the morning. By using time bridging, the enemy's rate of advance was accelerated, which quickly put his main body to the division's immediate front. The division assumed a defensive posture with a company of light armored vehicles (LAVs) from the 3d LAR forward of the division's main defensive line.

The 3d LAR had a guard mission to be followed by a rearward passage-of-lines and subsequent battle hand-over to the 7th Marines, the unit fighting the main effort. As a part of the fire support package available to the 3d LAR, a battery from 2/11 Marines was DS to the company until it commenced the rearward passage-of-lines. Additionally, HMLA-169 supported with rotary-wing CAS, called CAS (RW), consisting of a section of UH-1N helicopters. The FSCCs from division, 3d LAR and 7th Marines closely coordinated and rehearsed their communications. As a result, the rearward passage-of-line and battle hand-over took place in little more than two hours and without incident.

The 1st Marine Division then focused on defensive operations in which the enemy's main body was lured into engagement areas designed for the combined arms to blunt and halt his advance. The defensive operations part of FSCEX culminated with the decisive defeat of lead elements of the enemy's main body.

Counterattack. Next, units advanced up their respective corridors toward the enemy in the counterattack. As this advance continued, the division moved toward its objective of reestablishing a defensive line in the northern portion of MCAGCC. This phase proved highly successful as the deconfliction and coordination of real-time fires in support of simulated maneuver was perfected and refined.

The final phase of the exercise took place with a forward passage-of-lines through the 7th Marines and the 1st Tank Battalion's assumption of the main effort from Reserve units. A final rehearsal for the division FSCCs, 7th Marines and 1st Tank was canceled due to time and, consequently, units faced challenges in executing the forward passage-of-lines that routinely would have been cleared up in a rehearsal. The challenges were gradually resolved, and units learned a valuable lesson: rehearsals are critical.

The culmination of FSCEX consisted of a schedule of fires massing all fire support assets on selected targets in the division objective area. The fires were triggered sequentially according to an established time line. The results were impressive—artillery cannon and rocket fires and air-delivered ordnance impacted at the predicted time and place.

The joint appreciation for each service's capabilities and doctrine, both operationally and logistically, grew as diverse concepts were integrated into MAGTF war-fighting philosophy. The units participating in the division's FSCEX built upon doctrine that, for the most part, only had been discussed—never exercised by the division staff.

For example, deep interdiction for defensive operations was chosen as the best option to slow the enemy's advance. Planners from the 1st Marine Division DBC quickly determined that concentrated MLRS fires were essential to slow the enemy's advance. Target groups were established along a major avenue of approach. These groups were triggered by MAG-39.

There was considerable risk involved in dispatching MLRS far enough forward to engage the target areas. Assessing the acceptability of the risk and protecting the raid force are major planning considerations in any operation employing the MLRS deep-strike option. In this case, the 1st LAR Battalion protected the MLRS.

Although DESFIREX was beneficial to all the joint assets that played, perhaps the most important are the bonds forged by the 11th Marines with its Reserve counterparts and the Army's III Corps Artillery. With a decided lack of organic GS assets, the Marine Corps cannot afford to overlook joint operations with MLRS—a most economical and sensible solution.

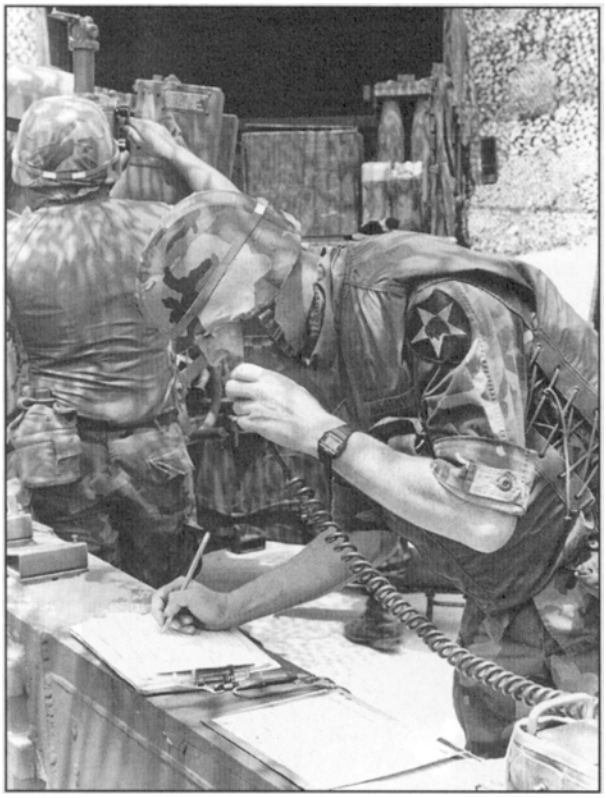
Joint training events, such as the March 1995 DESFIREX, are most assuredly a step in the right direction.

Captain Russell H. Smith, USMC, was the 11th Marine Regiment's Assistant Operations Officer (S3A) during Desert Firing Exercise (DESFIREX) 2-95 at the Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California. Currently, he's the Logistics Officer (S4) for the 5th Battalion, 11th Marines at Camp Pendleton, California. Among other assignments, he served as a Fire Support Officer (FSO) for the 15th Marine Expeditionary Unit (Special Operations Capable), MEU (SOC), participating in Operation Support Hope in Rwanda; relocation of the US Liaison Office in Mogadishu, Somalia; and Operation Vigilant Warrior in Kuwait.

Captain Jamie E. Clark, USMC, was the 1st Marine Division Assistant Fire Support Coordinator (AAFSC) during DESFIREX 2-95 at the MCAGCC. He now commands Headquarters Battery of the 11th Marine Regiment. Captain Clark also has served as the FSO for the 13th MEU (SOC) deploying twice to the Western Pacific and participating in Operation Continue Hope.

2d Infantry Div Arty
Master Gunner Program

Modeled after Armor's Master Gunner program, the 2d Infantry Division Artillery (Div Arty), Korea, has a Master Gunner program that improves gunnery skills at all levels and increases combat readiness. Like Armor Branch's program, the 2d Div Arty's Master Gunner program is very successful. But unlike the fully resourced Tanker's program, our resources come out of our hide—and are well worth the cost.



Master Gunner Selection and Training. An experienced, top-notch senior NCO in the Div Arty headquarters (at least a master sergeant) and in each cannon and rocket battalion (at least a sergeant first class) is assigned as a full-time Master Gunner. He works for the commander and command sergeant major (CSM) as an expert on Div Arty howitzer and rocket systems and crew-served weapons.

His mission is to increase the combat effectiveness of weapons systems and knowledge and safety awareness of crews and improve weapons maintenance readiness.

After selection, the Master Gunner attends one week of Eighth Army Theater Army Area Command (TAACOM) training on maintenance and becomes certified on the M16A1, M60, MK19, M2 guns and our howitzer and rocket systems. He learns the maintenance requirements for every level and, more importantly, develops a working relationship with higher level maintenance points of contact. His CSM tests his Master Gunner knowledge and skills in written and hands-on exams. The CSM then retests him semiannually on the operation and maintenance of unit weapons systems in both written and hands-on examinations.

Master Gunner's SOP. His standing operating procedures (SOP) are critical to the Master Gunner's success. At a glance, all weekly, monthly, quarterly, semiannual and annual gunnery-related requirements are consolidated into one document. In addition to listing his responsibilities, it lists all gunnery training for the year; the tasks required by the Field Artillery mission training plan (MTP), division training regulation, tactical and safety SOPs and the Div Arty and battalion commander's training guidance; artillery tables; section/platoon certification and evaluation standards; preliminary marksmanship instruction (PMI) for small-arms training in garrison; and standard set ups for rocket or howitzer firing points.

Master Gunner Duties. He serves as the observer/controller/evaluator (OCE) of all gunnery and small-arms training and unit external evaluations and holds competitions to improve crew competence and esprit. The Master Gunner also sets up and runs the annual direct-fire ranges that simultaneously employ cannon and crew-served weapons. He ensures standards are consistently met across the Div Arty.

The Master Gunner is the liaison for his unit maintenance—he tracks the maintenance status of weapons and fire control equipment without bypassing the normal maintenance chain or interfering with section maintenance responsibilities. Working closely with TAACOM, he facilitates the process of getting the right part for equipment repairs in a timely manner.

The Master Gunner helps produce the unit status report (USR) by gathering and consolidating data in monthly reports used for the USR. His SOP includes a checklist of his reports.

He meets with the Div Arty commander, CSMs and other master gunners monthly to discuss and standardize gunnery procedures and resolve related issues affecting combat readiness and the effectiveness of the Div Arty systems.

Conclusion. Although the 2d Div Arty must resource the Master Gunner Program internally, the payback is high. The work of the Div Arty Master Gunners combined with other safety initiatives has resulted in no firing incidents since the program began in 1993. Training standards are clearly established and evenly applied across the Div Arty. Maintenance and combat readiness rates have improved.

The Master Gunner is another eye for the chain of command, helping to keep the Div Arty well trained and maintained, competent and battle ready.

MAJ Kirk M. Nielsen FA
Former Assistant S3
MSG Donald J. Johnson, FA
Former Master Gunner
2d Infantry Div Arty, Korea

Fires in AWE Focused Dispatch—

A Step Toward Task Force XXI

by Major Vince C. Weaver, Jr.

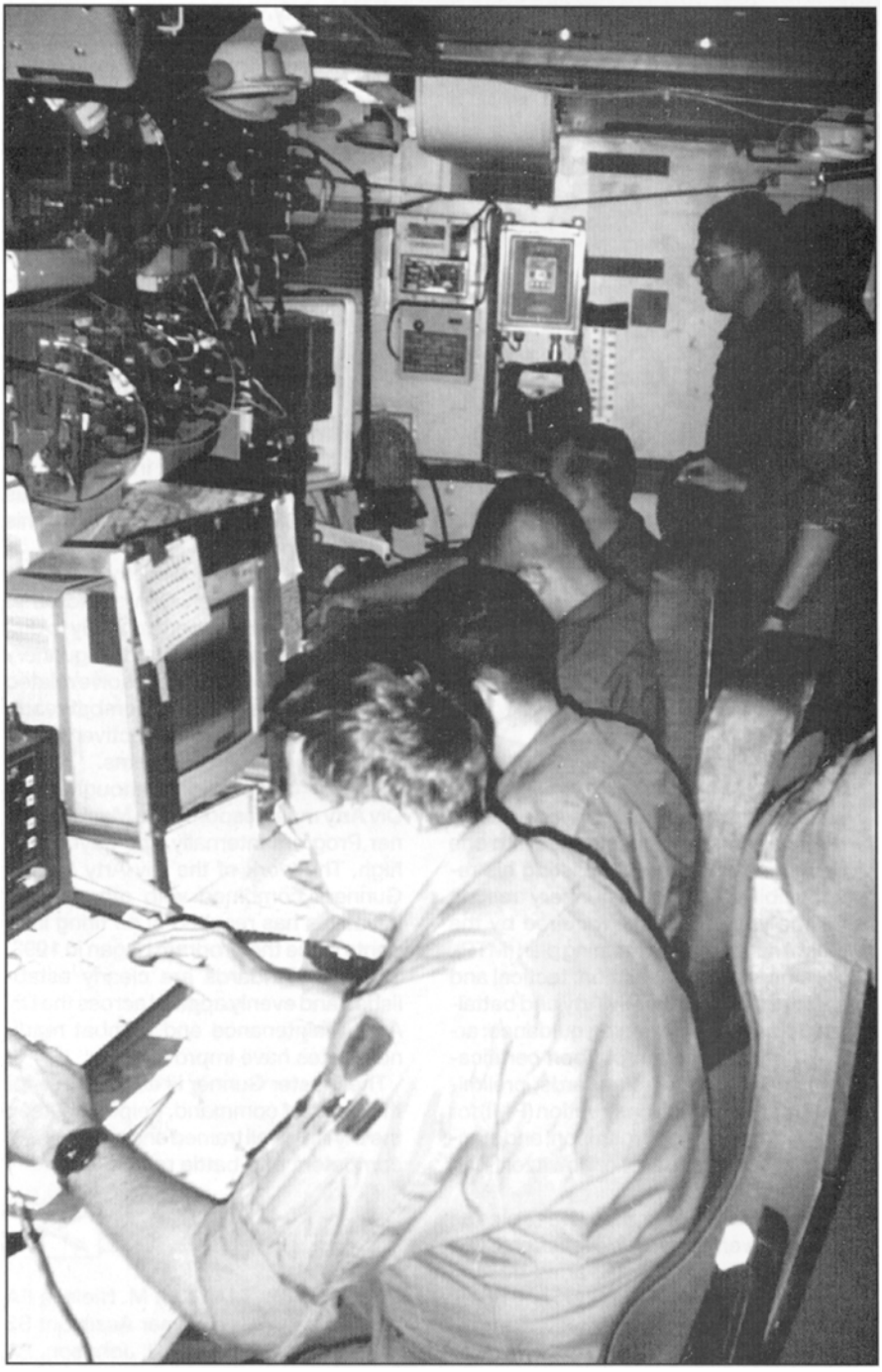


Photo by 1LT Scott Noble

Inside a Focused Dispatch command and control vehicle (C^2V), from left to right, the stations are the initial fire support automated system (IFSAS), all-source analysis system (ASAS), brigade and below command and control (B^2C^2) and intervehicular information system (IVIS).

This past August, soldiers from across the Training and Doctrine Command (TRADOC) and the 2d Battalion, 33d Armor out of Fort Knox, Kentucky, helped the Army take another step toward our force of the future—Force XXI. This step was the final exercise of the advanced warfighting experiment (AWE) Focused Dispatch.

The Army AWEs explore the potential of new technologies by putting those technologies into the hands of soldiers—sometimes directly off the commercial shelf. The first AWE for mounted forces was Operation Desert Hammer conducted at the National Training Center (NTC) at Fort Irwin, California, in the summer of 1994. Focused Dispatch was a follow-on experiment for digitized forces and moved us closer to the Task Force XXI AWE where a brigade-sized element of the 4th Infantry Division out of Fort Hood, Texas, will experiment with digital systems at the NTC in February 1997.

At the conclusion of Desert Hammer, many leaders saw that digitizing the battlefield held great potential for our future. Among other advantages, digitization can provide a common, relevant picture of the battlefield across all the battlefield operating systems (BOS). Using this advantage for fires experimentation in Focused Dispatch, we could digitally link any sensor on the battlefield with indirect fire assets to execute critical fire support tasks (CFSTs).

We eliminated selected layers of traditional fire support coordination for selected targets by creating digital links to gain responsiveness in fires. The result was the company fire support officer's (FSO's) primary task of executing critical fires shifted more toward managing sensors and coordinating fires. We saw the company fire support team (FIST) become less of an observer and more of a fire support element (FSE) at the company level—managing sensors, helping to establish the fire mission threads (the digital route a call-for-fire will take from sensor to shooter) and ensuring clearance of fires.

The Mounted Battlespace Battle Lab at the Armor Center, Fort Knox, conducted Focused Dispatch. As its primary focus for fire support experimentation, Mounted Battle Lab with support from the Field Artillery School, Fort Sill, Oklahoma, developed tactics, techniques and procedures (TTP) for digitally linking any sensor to indirect fire assets to exploit the increased situational awareness that digital systems offer.

his article discusses our initial observations from the AWE and the means of conducting a complicated AWE involving entities and capabilities at multiple locations in the US.

Initial Observations

We approached the TTP from three aspects: digital observer capabilities on maneuver platforms, digital quick-fire channels and digitally linking the task force mortars to the fire support system. On the surface, experimenting with these aspects may not look like anything new. Maneuver platforms have always been able to call-for-fire, and quick-fire channels are already a part of our TTP today. The difference is that digitization offers some unique capabilities in making the sensor-to-shooter link more responsive and lethal.

Maneuver Platforms as Observers. Equipped with position navigation, far target designation and the intervehicular information system (IVIS), an MIA2 tank can lase a target for an accurate target location and request fires on that target with the IVIS transmitting a tactical fire direction system (TACFIRE)-formatted fire-for-effect message. These capabilities give the commander more flexibility in assigning assets responsibility for executing CFSTs.

We developed some TTP for leveraging these capabilities while ensuring fires were accurate, met the commander's guidance and were positively cleared. For example, the TTP outlined how the commander should establish standards for accurate target location using a maneuver platform as the observer. Once an M1A2 initializes the position navigation system, it must have a standard for how far it can move before the target location error (caused by the inherent inaccuracies of the position navigation system) is too great for that platform to be an effective sensor.

Another example of TTP was managing sensors on the battlefield. TTP must state who assigns digital addresses for sensors. In the past when only fire supporters were digital, the FSE managed the digital addressing of the FIST. In the future, every platform will be digital and the system management will cut across all BOS.

Digital Quick-Fire Channels. The primary digital systems used in Focused Dispatch were IVIS as the command and control system at the task force and company levels and the initial fire support automated system (IFSAS) as the fire support digital system. IVIS provided a very basic, digital call-for-fire capability via maneuver platforms. We demonstrated that a maneuver platform equipped with IVIS can be digitally linked with any fire support command and control (C^2) node. This allowed the commander to tactically tailor fire mission threads for specific targets with a specific purpose.

The TTP that outlined these links point out that any increase in responsiveness by eliminating fire support C^2 nodes must be weighed against the information management functions lost by bypassing those nodes. For example, we could bypass the company FIST and send a request for fire from the company commander's tank directly to the task force FSO, but the fire mission processing responsibilities of the company FIST must still be accounted for.

In other words, the question then becomes who will help clear those fires or manage that fire mission from start to finish—receiving the message to observer, providing adjustments, ending the mission and providing battle damage assessment (BDA).

In addition, we must consider the primary mission of the maneuver platform. During the experiment, the company commander who initiated the IVIS calls-for-fire said that while it was possible to execute the fires, it distracted him from his primary mission of commanding his company and fighting his tank.

Tailoring sensor-to-shooter links is a method for decentralizing the execution of fires while ensuring they're positively cleared, remain fully within the commander's intent and support his scheme of maneuver. It also gives the maneuver commander an avenue for digitally executing CFSTs when the FSE at his level has become a casualty or when responsiveness is essential. However, these mission threads require detailed planning and coordination and diligent rehearsals for the digital systems and their operators.

Digitally Linking the Task Force Mortars and Fire Support Systems. The Program Manager for Mortars (PM-Mortars) provided a prototype mortar called the enhanced mortar fire control system (EMFCS) for Focused Dispatch. The system gives the mortar a "Paladin-like" capability in that the system can lay itself, compute it own firing data and compute the firing data of other mortars, if needed.

The system is compatible with some IFSAS messages and allowed the task force FSE IFSAS to automatically consider the mortar platoon for each fire mission processed. It also provided the commander the flexibility to establish digital quick-fire channels between IVIS platforms and the EMFCS.

These initial observations served as the basis for a briefing by the Mounted Battle Lab to the TRADOC commander immediately following the experiment. We found that even with digitization, our current targeting methodology of *decide, detect, deliver and assess* and the top-down fire planning process is sound. What we are learning is that there are new TTP evolving because of digitization enhancements. The final after-action review (AAR) for the AWE released last February goes into greater detail not only on fire support experimentation, but for all the BOS initiatives.

Conducting the AWE

To gain these insights and develop the TTP for experimentation required a series of three-week exercises at Fort Knox. The exercises used the constructive simulation model Janus, a virtual simulation network known as SIMNET as well as live-training exercises.

These exercises covered a 10-month period and focused on different aspects of digitization. Several Janus exercises focused on different aspects of digitization, such as the digital routing of calls-for-fire or information for intelligence staff planning and the C^2 processes of a digitized task force. The SIMNET exercise primarily trained the experimental unit and determined digital training issues for the task force.

The final part of the AWE was unique in that the task force participating and the opposing forces were split with live elements in the Western Kentucky Training Area and the remaining elements in the Mounted Warfare Test Bed at Fort Knox in a combination of virtual simulations using SIMNET and modular semi-automated forces (MODSAF). The brigade cell, direct support (DS) battalion cell and selected combat support and service support task force slices were in the Western Kentucky Training Area. The portions of the task force in the training area were the task force headquarters and one company team.

The remaining task forces of the brigade, company teams of the task force and the firing elements of the DS artillery battalion were represented in the simulation. Also tied into the simulation were air defense assets from Fort Bliss, Texas, and aviation assets from Fort Rucker, Alabama.

To further complicate matters, Fort Knox and the Western Kentucky Training Area were separated by more than 100 miles. As you can guess, linking IFSAS into a simulation, linking live and simulated elements and then synchronizing not only their movements, but also their digital systems, was no easy task.

The Live-to-Virtual Link. The live-to-virtual link posed some unique problems for the fire support system. Using an unclassified version of IFSAS, we had to figure out how to pass IFSAS data over 100 miles from the virtual environment into the live piece of the experiment and make it appear "transparent" to the task force participating in the experiment.

Due to several factors, we had to use standard commercial phone lines to support the unclassified IFSAS traffic. Using a low-cost telephone adapter box locally produced by TELOS Corporation, we interfaced the IFSAS systems over the commercial lines.

The adapter box isolated the telephone handset from the data link, eliminating extraneous noise from the circuit that would hamper digital traffic. The only problem noted with using the commercial lines came from using the unshielded wire to link the forward entry devices (FEDs) of the company FISTs in the SIMNET in a high radio frequency environment. The close proximity of the unshielded wire to the radios caused interference on the IFSAS net.

Also for the live-virtual link, we had the challenge of linking the live DS artillery battalion elements in the Western Kentucky Training Area and the Mounted Warfare Test Bed to the firing elements in simulation. The Depth and Simultaneous Attack (D&SA) Battle Lab at Fort Sill proved extremely helpful in this effort. The Simulations Branch of the D&SA Battle Lab provided a constructive simulation: the target acquisition and fire support model (TAFSM), which portrayed firing batteries of the DS artillery battalion on the simulated battlefield.

TAFSM can send, receive and process tactical information from tactical devices, such as an IFSAS computer. It also can generate and receive distributed interactive simulation (DIS) data packets to link with virtual simulation.

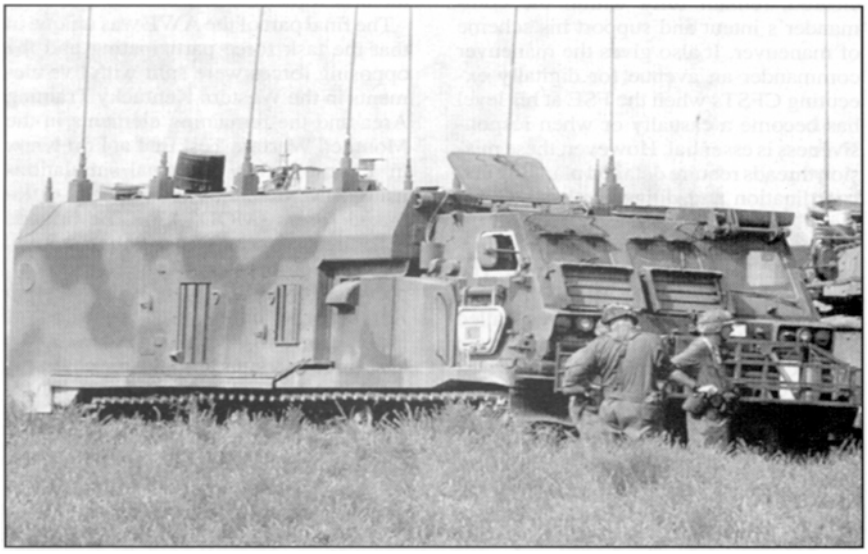
In other words, the DS battalion fire direction center (FDC) in the training area sent digital fire orders to TAFSM, which passed them to the simulated firing elements for execution. The transfer of the firing order and subsequent responses from the firing elements back to the battalion FDC were transparent to the DS battalion cell; the FDC sent orders to the firing batteries just as if they were live, and their resulting fires were replicated in the simulation.

Passing unclassified IFSAS data over a standard phone line and linking a tactical system into a constructive simulation have significant potential for training. First, digitally linking several different sites for an exercise using standard phone lines and a low-cost adapter box may prove an effective way to reduce travel costs. Secondly, TAFSM provided a way for the exercise unit to "plug and play" its go-to-war tactical equipment into the simulation. This reinforces the "train as you fight" principle of training.

Conclusion. In Focused Dispatch, the fires concentrated on the TTP associated with using the capabilities of maneuver platforms to execute fires, sensor-to-shooter links and digital systems to help selectively eliminate layers of fire support coordination. Currently, we're taking the insights and TTP developed during Focused Dispatch and using them as a starting point for developing TTP for the Experimental Force (EXFOR) of Task Force XXI.

While Focused Dispatch provided some valuable insights, it is only one of many efforts to prepare for the Task Force XXI AWE. The Field Artillery School has taken lessons from other AWEs—to include the recent Warrior Focus, the light forces AWE at the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana—to develop TTP for digitized forces. FA School subject matter experts (SMEs) have been involved in focused NTC and JRTC rotations to refine new TTP.

The EXFOR in the Task Force XXI AWE will have the advanced Field Artillery tactical data system (AFATDS) and Paladin and will further help to develop and refine digital TTP. Learning about digitizing the battlefield is an Army-wide effort. That effort will drive how we build our force for the future—Force XXI.



Courtesy of Soldiers; Photo by SFC Douglas Ide, Soldiers

One of the Army's three (C^2Vs) used as rolling tactical operations centers (TOCs) during Focused Dispatch.

Major Vince C. Weaver, Jr., is an Action Officer in Task Force 2000 in the Field Artillery School, Fort Sill, Oklahoma. Before joining Task Force 2000, he was a Small Group Leader for the Field Artillery Officer Advanced Course at the Field Artillery School. He commanded the Howitzer Battery of 1st Squadron, 2d Armored Cavalry Regiment in Germany, and during Operations Desert Shield and Storm in the Persian Gulf. He also commanded Service Battery of the 3d Battalion, 5th Field Artillery, 210th Field Artillery Brigade in Germany. Major Weaver is a graduate of the Command and General Staff College at Fort Leavenworth, Kansas.

FATC 13B OSUT—
Training Cannoneer XXI

Cannoneer XXI will face enormous challenges. He could operate autonomously on complex, highly lethal and technologically sophisticated battlefields, demanding substantial independent thinking. He must be prepared to shift from warfighter in combat operations to humanitarian or peacekeeper in operations other than war anywhere in the world. In short, Cannoneer XXI must be a highly skilled, confident, self-disciplined and physically fit soldier.

The Field Artillery Training Center (FATC), Fort Sill, Oklahoma, has mapped a path to train just such a soldier—Military Occupational Specialty (MOS) 13B Cannon Crewman—Cannoneer XXI. FATC is reshaping 13B10 one-station unit training (OSUT) to give the soldier not only the technical and tactical skills he needs for the future, but also more self-responsibility and discipline, such as performing tasks with little supervision. In addition, the training redesign facilitates soldiers' developing positive attitudes and Army values, retaining the model of the drill sergeant and his developmental interaction with the trainee.

The Overall Concept. With representatives from the FA School, NCO Academy at Fort Sill and other agencies, a process action team (PAT) met to identify the core competencies and essential skills required of 13B10 soldiers in the next century. Several suggestions emerged from the PAT that form the basis for redesigning the training.

First, the strategy for 13B OSUT training is to build skills sequentially. The five weeks of training now have more realism and gradually increase the level of training difficulty—the crawl-walk-run approach. One goal is to make the final field training exercise more challenging by increasing the tactical play and more closely replicating combat conditions. With the new strategy, our 13Bs should train to a higher level of proficiency faster.

The FATC also is modifying the individual tactics and techniques training to orient it more toward the FA perspective and tactics. For example, instead of conducting a night patrol, our 13Bs learn how to conduct a day patrol with the intent of defending a platoon-sized element.

In the future, as the howitzer crew is smaller and the crew jobs are less demanding physically but more mentally, the training will take advantage of the multimedia technology and training aids, devices, simulators and simulations (TADSS), such as the howitzer crew trainer under development. These will help the trainee learn more subtle mental skills in multiple applications in a realistic environment using minimum resources.

13B Pilot Training. Based on PAT findings, the following changes are being tested through an FATC pilot battery: B Battery, 1st Battalion, 33d Field Artillery.

- 13B OSUT now includes combat lifesaver training to prepare soldiers for decentralized, highly lethal operations in locations far away from medics.
- It has day land navigation training in a tactical scenario to prepare ammunition vehicle drivers and Cannoneers for independent operations.
- The FATC added a computer literacy class. The center gives new troops a diagnostic exam on computer literacy. Those who fail the exam take six hours of basic computer training.

As resources become available, the FATC plans to upgrade the pilot 13B OSUT with several additional initiatives. First, the center will increase radio operator training and add communications training to teach soldiers how to express themselves on the radio. The instruction also will increase the driver's training portion and include Paladin as part of the "Introduction to FA Systems" class. Our crew-served weapons training will increase to prepare soldiers to defend their position with fewer soldiers in the crew. And last, trainees will conduct daily crew drills to continuously reinforce their training.

As the pilot program progresses, the FATC will analyze the results and either implement the changes, if supported by the current program of instruction (POI), or submit the changes to the Field Artillery School as revisions for the next 13B OSUT POI.

FATC's path to changing 13B training parallels change in the Army. We will continue to enhance 13B training as the FATC is committed to providing the Army the finest possible Cannoneers for century XXI. *Mission First—People Always.*

MAJ Jose M. Marrero, PAT Chairman
S3, 1-78 FA, FATC, Fort Sill, OK

Fast, Accurate Fires in the Close Fight

by Lieutenant Colonel David L. Anderson

The lead platoon of the infantry company conducting a search and attack mission moves through the restricted terrain of Cortina. It makes contact with an opposing force (OPFOR) element of two to five soldiers.

The OPFOR immediately lays down a base of fire, beginning its battle drill for actions-on-contact. The element falls back and begins to maneuver to the flank of the infantry company. It then inflicts as many casualties from the flank as possible. The results: seven infantrymen casualties for every OPFOR casualty.

The infantry company begins to evacuate its casualties and reorganizes to continue the mission of finding and defeating the OPFOR operating in the company's zone. At no time does the platoon forward observer (FO) or company fire support officer (FSO) employ indirect fire support to fix or finish the enemy.

This scenario occurs again and again during the search and attack missions conducted at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana. The reason? Fire supporters and their maneuver counterparts don't know how to use danger-close fires in the chaos of initial contact. This observation implies that light infantry units are not well-trained in fighting with fires in restricted terrain.

No training center in the Army focuses more on light infantry operations in restricted terrain fighting a well-trained, disciplined OPFOR. The JRTC's "graduate-level" training requires tremendous actions and well-trained small units to execute the missions successfully. Although our light infantry units are among the finest in the world, they still need to drill their actions-on-contact to make the most of their combat power in the heat of contact.

This article describes fighting with fires techniques and battle drills proven effective in the close fight at the JRTC. The techniques require detailed planning, rehearsed battle drills and violent and rapid execution—all practiced at home station in combined arms training.

Detailed Planning. To fight with fires, our infantry company commanders, platoon leaders, company FSOs and platoon FOs must first plan to use indirect fires during search and attack missions. As fire supporters, you plan priority targets along the direction of attack on likely enemy ambush sites and templated enemy positions and then pre-clear those priority targets, if possible.

The purpose of each priority target is to isolate or fix the OPFOR during contact. Then you allocate a weapon system, such as an artillery battery or mortar platoon, to provide immediate, responsive fire support to the maneuver unit as it moves to contact. Based on the factors of mission, enemy, terrain, troops and time available (METT-T), you consider placing a Field Artillery platoon or battery in direct support (DS) to a maneuver unit conducting search and attack operations.

As the company moves along the route without making contact with the enemy, you cancel a priority target and establish the next target as priority; the designated fire unit lays on the new target. The trigger for canceling one priority target and establishing the next target is based on the minimum safe distance for the weapon system designated to fire the priority target (see the figure).

You coordinate the route of march with any friendly units operating in the company zone. If the company comes into contact with the OPFOR, the company commander can execute his actions-on-contact battle drill, including using indirect fires. Detailed planning and coordination ensures responsive fire support is available.

Fire Support Movement Techniques. You navigate by using a map or precision lightweight global positioning system (GPS) receiver (PLGR) and knowing the exact location of the maneuver element. You enter priority targets as "way points" in the PLGR. This helps the FSO establish the relationship between the observer's location and the location of the next priority target at all times.

Whenever possible, you fire marking rounds (smoke or high-explosive munitions) on the priority target beyond the minimum safe distance for the weapon system to show the platoon leader exactly where the next pre-planned target is on the ground.

Weapon	Range (Meters) Observer-Adjusted Delivery Technique										
	1,000	2,000	4,000	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000
60-mm Mortar	330	330									
81-mm Mortar	330	330	322								
4.2-Inch Mortar		350	360								
105-mm Howitzer			340	340	350	360					
155-mm Howitzer			430	440	450	460	470	530	600	680	
8-Inch Howitzer			450	450	470	500	510	520	520	600	610

Minimum Safe Distances by Weapon System [From *FM 6-141-1 Field Artillery Target Analysis and Weapons Employment: Nonnuclear (U)*].

You cancel the old priority target and establish the new one as the maneuver element moves. This occurs as the lead element of the unit moves within the minimum safe distance of the weapon system being used. You update the battalion fire support element (FSE) and firing unit fire direction center (FDC) every 500 meters of movement or every 30 minutes. This constant position update allows the FSE and FDC to accurately battle track and anticipate executing the priority target with speed and accuracy.

Actions-on-Contact. Company commanders/platoon leaders at the JRTC routinely demonstrate that they don't know how to fight with fires during the actions-on-contact battle drill. When maneuver elements make contact with the OPFOR, the commander/platoon leader usually take one of two actions. The element either immediately returns fire and chases the enemy or it takes no action and stays in its position. By chasing the enemy, the element gives him the advantage. The enemy can allow part of the element to pass and then conduct a hasty ambush. If the element takes no action, the enemy, again, has the advantage and can maneuver against the stalled element and bring direct and (if time permits) indirect fires onto it. In both scenarios, the enemy gains the initiative and can inflict casualties.

Too often, friendly indirect fires are never considered, much less employed, in the fight. If the commander/platoon leader controls his element, develops the situation and employs the assets available to him, then he can destroy the enemy while protecting his force.

To successfully defeat the enemy when in contact, the FSO/FO takes cover, immediately fires the priority target and gets a sheaf on the ground. You show the sheaf to the company commander/platoon leader and ask whether he wants to kill the enemy with indirect fire *or* with maneuver and direct fire *or* with a combination of both.

At this point, the commander/leader must exercise "combat patience." Combat patience is his controlling the element to allow the tactical situation to develop and then use the combat power available to him.

Once the commander/leader has decided how he'll defeat the enemy, you adjust the sheaf with bold corrections to kill the moving enemy or you adjust the sheaf to creep the fires onto a position immediately behind the enemy to isolate, fix or suppress him, facilitating the commander's attack by direct fire and maneuver.

The platoon FO must physically accompany the platoon leader as he fights the battle. He must be prepared to shift the fires as directed (usually farther away from the platoon, based on the direction of attack). The FO keeps the steel falling by using the command, "Repeat, [for example] right 60, add 100, repeat." The platoon FO commands, "End of mission" when the platoon leader directs. He immediately establishes another priority target and fires it.

You repeat this battle drill any time your unit makes contact with the enemy.

Home-Station Training. The key to winning the close fight is home-station combined arms training. The training can be as simple as the platoon leader and FO's walking a situational training exercise (STX) lane or as complex as resources and imagination allow. Critical for training is the relationship between the company commander/platoon leader and his FSO/FO.

Units can train this battle drill at home station by using two or three OPFOR soldiers hidden in heavily vegetated terrain to attack a platoon conducting a movement-to-contact. Fire coordination exercises (FCXs) must involve the FDCs, live FM radio transmissions and organic equipment. One fire marker moving down the lane with a PLGR and an artillery simulator while monitoring the fire net greatly enhances the battle drill training.

The key is to get fast, accurate fires on the ground immediately upon contact while coaching maneuver leaders to control their units, develop the situation and employ fire support assets to fix and finish the enemy force. After the FCX, units should train the battle drill using live artillery or mortars in a "walking shoot" or combined arms live-fire exercise (CALFEX).

Conclusion. During the past 18 months, units at the JRTC have clearly established that this action-on-contact battle drill is the key to success in the close fight. While the commander is responsible for fighting with fires, it's a combined arms training issue. Fire supporters must train not only their fire support teams (FISTs), but also advise the supported maneuver leaders on the use of indirect fires upon contact with the enemy. Units that can plan for the search and attack mission, execute good movement techniques, have developed and rehearsed a good actions-on-contact battle drill and have trained these tasks at home station can provide fast, accurate fires in the close fight.

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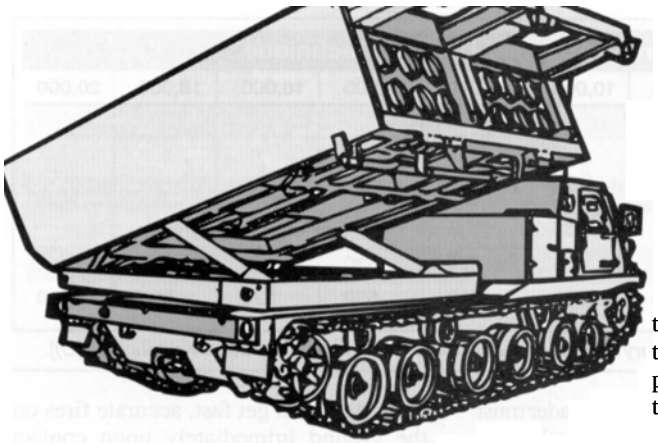
MLRS NET for the ARNG

by Captains Lawrence T. Hall, Jr., and Michael A. Sharp



By the end of 1996, approximately two-thirds of the Total FA will be in the Army National Guard (ARNG). As the nation depends on her Guard units for more and more indirect firepower, ARNG units are converting many of their venerable 8-inch battalions to the multiple-launch rocket system (MLRS).

Since 1991, the Gunnery Department of the Field Artillery School, Fort Sill, Oklahoma, has conducted MLRS new equipment training (NET) for Guard units transitioning to MLRS by deploying NET detachments. Currently, there are two NET detachments deployed: one at Fort Knox, Kentucky, assisting 1-623 FA, Kentucky ARNG, part of the 138th FA Brigade, and one in Chattanooga, Tennessee, assisting the 1-181 FA, Tennessee ARNG, part of the 196th FA Brigade. Both battalions will complete their transition this summer. As of March, nine ARNG battalions remained to transition to MLRS through the year 2002, with three in progress now.

The NET Detachments. The NET detachments provide technical and tactical training for individual through battery collective tasks, help prepare training plans and scenarios for inactive duty (IDT) and annual training (AT) periods and periodically assess the unit's training status. As in every unit, training is the commander's responsibility. But the NET detachments help by "training the trainers."

The detachment has a commander (captain), NCO-in-charge and four Instructor/Writers in Military Occupational Specialties (MOS) 13P Fire Direction Specialist and 13M MLRS Crewmen. (Future detachments will be led by master sergeants.) For the most part, the NET detachments rely on the ARNG unit for administrative and logistical support.

Training Strategy. The Gunnery Department provides a four-phased training program from individual qualification through battery certification. The phases are flexible enough to allow unit leaders to tailor the training to their unit. The four phases take nearly three years to complete, encompassing all IDTs and ATs. Phase I, the Common Core training, is conducted at home station during three to four IDTs. Soldiers learn radio and digital communications equipment and map reading and navigational skills, MLRS sections operate semiautonomously, communicating with the battery and navigating on their own.

To help in Phase I, the FA School provides training tools and resources. These include training support packages (TSPs) that cover every aspect of Phase I training. The TSPs are sent to the transitioning battalion as early as necessary for the unit to complete its training. For TSP information, call Sergeant First Class Robert Allen, Gunnery Department, at DSN 639-5151/4711 or (405) 442-5151/4711.

Also, the school provides 13 hours of training via the Teletraining Net (T-Net). This training is during an IDT weekend at the discretion of the battalion. Subjects include Introduction to MLRS, Material Readiness and Doctrine and Tactics. For more information, call Bill Lodes, Warfighting Integration and Development Directorate, at DSN 639-4325 or commercial (405) 442-4325.

Phase I must be completed before coming to Fort Sill for Phase II—MOS Training. In this phase, soldiers attend either the 13M, 13P or the MLRS Cadre Course conducted within the scheduled two-week AT period, with the exception of the three-week 13P course. Upon completion of Phase II, soldiers are awarded their new MOS. It's imperative that units maximize attendance at the course during this phase. Opportunities to make up this MOS-producing training are almost nonexistent in Phase III—Collective Training.

Phase III consists of section-, platoon-and battery-level training in two years of weekend drills and AT periods. (See the figure for a training calendar.) The unit uses its own equipment at a local training area or nearby Army post.

This phase is extremely intensive with little time for other training. Units should seek permission to be excused from state and civil disturbance missions and any other training requirements outside of the NET for the two years of Phase III.

Section training culminates with certification (Artillery Table II). The low-density MOS sections (maintenance, mess, supply, survey) generally are not included in the certification process but should not be neglected in this phase of training.

The bulk of platoon-level training is conducted in five or six consecutive days during the first week of AT; this is, essentially, the equivalent of four or five months of normal drills. There simply is no substitute for having soldiers in the field for this many consecutive days.

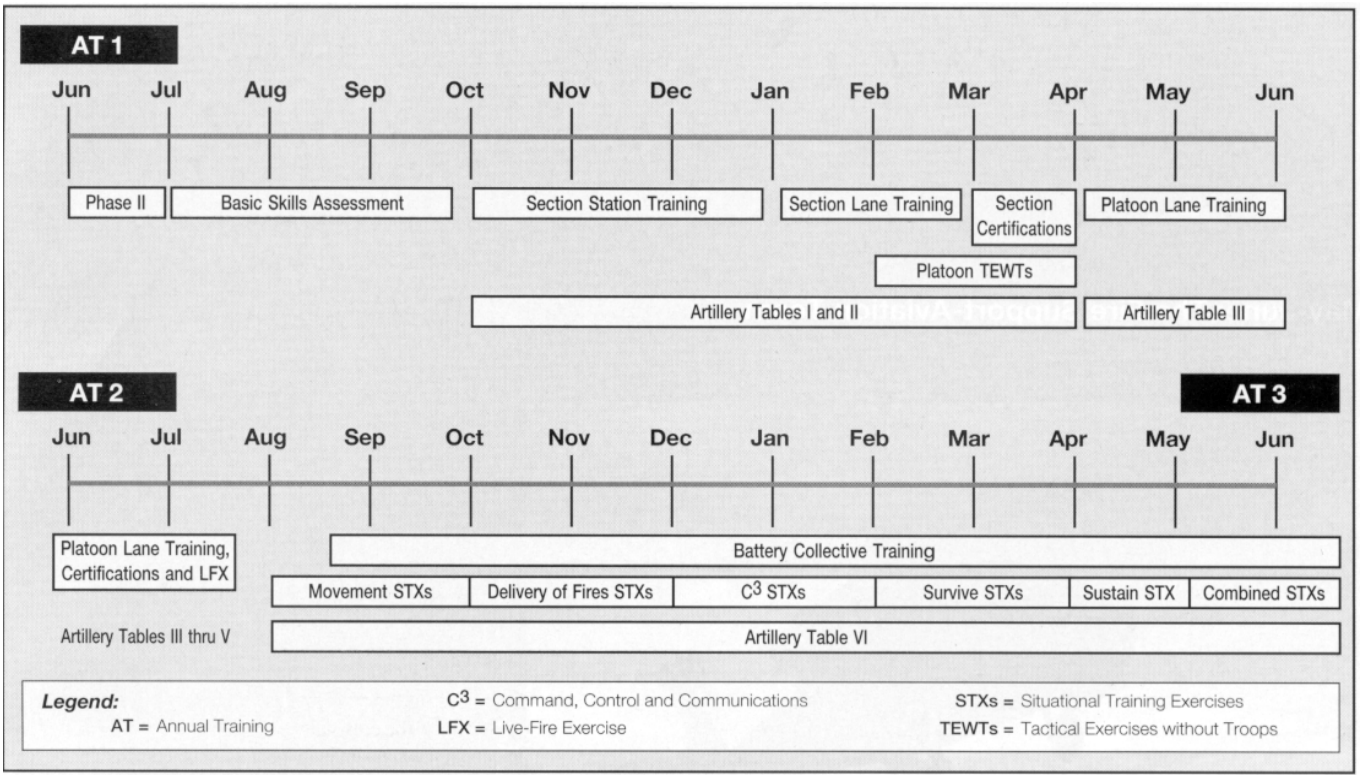
Shortly after the second AT, units begin battery-level training (Artillery Table VI). The key is to focus on a small number of tasks during each IDT. The battalion must support each battery with a tactical operations center/administration and logistics operations center (TOC/ALOC) cell that drives the exercise and message play.

During the third AT, batteries conduct a six- to eight-day train-up for battery certifications (Artillery Table VII.) The NET detachment, readiness group and regional training detachment (RTD) support the battery during the situational training exercise (STX) in AT.

Phase IV—Battery Certifications—is the final phase. The battalion's higher headquarters with the assistance of a Forces Command (FORSCOM) unit (identified six to eight months out) evaluates each battery during the third AT. The evaluation is based on Artillery Table VII and additional tasks designated by the commander. The units complete their certification with a live-fire exercise (Artillery Table VIII).

Challenges to National Guard Units. The NETs have made several observations that may be helpful for ARNG units preparing for NET.

- Before receiving equipment, the unit should ensure it has adequate land available to train an MLRS battalion. An MLRS



Phase III Training Calendar. MLRS transition training for ARNG battalions takes three years with Phase III, Collective Training, taking weekend drills and AT periods for two years.

platoon needs a 3x3-kilometer OPAREA for training. If this amount of land isn't available, the unit must get access to as much land as possible for training. The unit must ensure that all environmental requirements associated with live-firing (starting with platoon certifications in Phase III) can be met in its state.

• The unit must carefully plan the training time during IDTs. It must assemble the battery at the armory, issue equipment and travel to the training site (which can take several hours). With equipment preparation, recovery, AARs and training meetings, the unit is hard pressed to conduct 14 hours of training in an IDT. The unit must plan to maximize bite-sized training focused on specific tasks.

• During NET, the unit still must actively recruit and retain soldiers. The transitioning battalion should be at 100 to 115 percent strength during NET with at least 95 percent of personnel present for collective training. Training on a new weapon system with new tactics, techniques and procedures (TTP) is difficult enough with maximum personnel and resources.

• The unit must strive to keep its leadership—senior NCOs and officers—who may see the change to an entirely new weapon system as time to leave. They are experienced leaders and trainers who are crucial to the stability and welfare of the unit.

• The state must allow the battalion leaders to attend officer and NCO education schools *in addition* to unit ATs for transition training. (Typically, leaders attend schools during AT and wouldn't be present during collective training.)

• The Active Guard Reserve (AGR) soldiers in the battalion must closely coordinate with the organizational maintenance site (OMS) or mobilization and training equipment site (MATES) to ensure equipment has routine maintenance and is repaired and ready for training. The MLRS is a maintenance-intensive weapon system, and if vehicles become non-mission capable (NMC) during an IDT, there is little time to repair them.

• Commanders should tap all the external sources they can. Readiness groups and the RTDs must assist the transitioning battalions during all phases of training. Readiness groups with units converting to MLRS in the near future (Florida, South Carolina and Kansas) should review their tables of distribution and allowances (TDA) and gain 13M and 13P soldiers.

Without question, the Army is relying more on ARNG units to provide America's land force indirect fires. The transition of some ARNG FA units to MLRS is a significant part of the modernization and training of that force. The transitioning ARNG battalion, Gunnery Department NET detachment, readiness groups—we're all in this together.

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Captain Michael A. Sharp commands the Tennessee MLRS NET Detachment in Chattanooga, Tennessee. Previously, he commanded Headquarters and Headquarters Battery, 212th Field Artillery Brigade, and C Battery, 6th Battalion, 32d Field Artillery (MLRS) and also served as Adjutant in the 6th Battalion, 32d Field Artillery. Additionally, Captain Sharp served as a Company Fire Support Officer, Battery Fire Direction Officer, Battery Executive Officer and Adjutant with the 7th Battalion, 8th Field Artillery, 25th Infantry Division (Light), Hawaii.