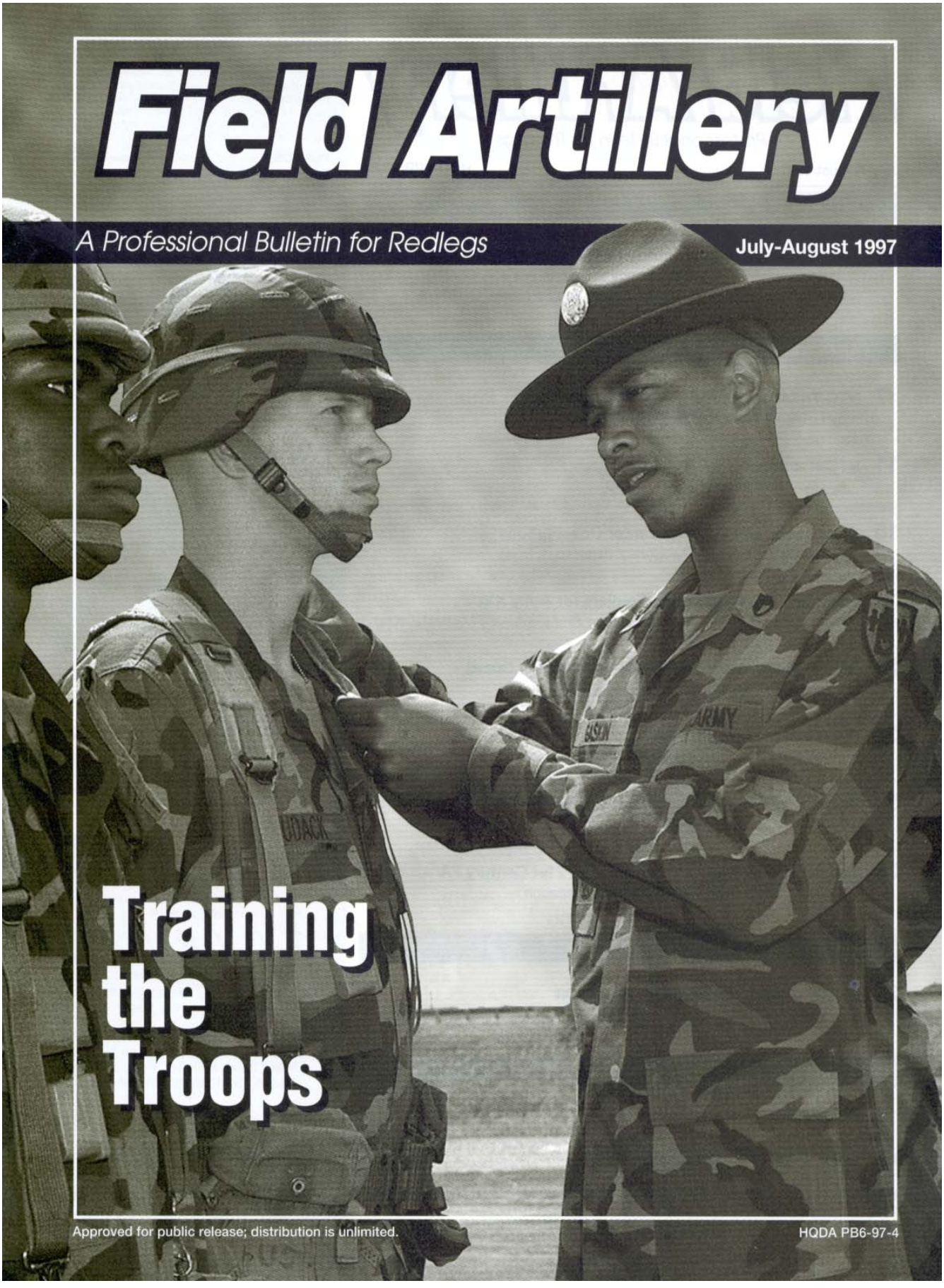
# Field Artillery

A Professional Bulletin for Redlegs

July-August 1997



# Training the Troops



HQDA PB6-97-4

# Field Artillery

*A Professional Bulletin for Redlegs*

**July-August 1997** **HQDA PB6-97-4**


## INTERVIEW



## ARTICLES—Training



## ARTICLE



## DEPARTMENTS



**Cover:** *The US Army Field Artillery Training Center Drill Sergeant of the Year, Staff Sergeant Barry D. Gaskin, Battery A, 2d Battalion, 80th Field Artillery, inspects some of his charges.*



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**JOEL B. HUDSON**
*Administrative Assistant to the Secretary of the Army*
03736

**Leo J. Baxter**
Major General, United States Army
Field Artillery School Commandant

**Editor:**
Patrecia Slayden Hollis

**Art Director:**
Bob T. Coleman

**Assistant Editor:**
Joanne Alexander Brown

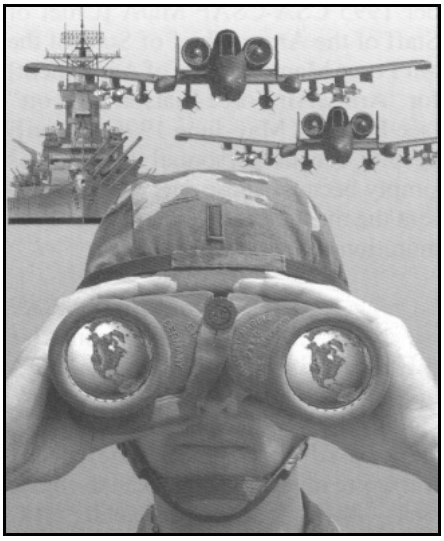
# *CHANGE* to Senior Fire Support Conference Dates

The dates of the Senior Fire Support Conference (16 through 19 September) are being changed so the conference can capitalize on emerging insights of the November Division XXI Army Warfighting Experiment (AWE) at Fort Hood, Texas. As soon as the new conference dates are determined, interested parties will find the announcement on the Fort Sill Home Page at the internet address listed on the inside front cover page of this edition and in later editions of this magazine.

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

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

# Response to "Punching Our FIST into the 21st Century"



"Punching Our FIST into the 21st Century" by Major Vance J. Nannini [May-June edition] is a thought-provoking article. I fully support the author in his advocacy of making the FIST [fire support team] a more capable and viable component of the fire support system. But I also feel that many problems involved in achieving this goal are not adequately addressed in the article.

Conceptually, Major Nannini makes several good points. Obviously, a "universal observer" capable of *effectively* coordinating all fire support assets offers greater efficiency than the present system where enlisted tactical air controllers (ETACs), air liaison officers (ALOs) and air naval gunfire liaison company (ANGLICO) personnel must augment and assist the FIST within their respective areas of expertise. But before we endorse the universal observer as a valid concept, certain issues must be addressed.

Major Nannini's comment that "Jointness is a good thing but not at the company level" alludes to the obvious advantages of a ground combat team composed of members of one service who share a commonality in communications and operational perspective. Implicit in this comment is the assertion (also correct) that "jointness" poses some additional complications because the desired common frame of reference is more difficult to achieve. However, fixed-wing close air support (CAS), by its nature, is unavoidably joint (except for Marine air supporting Marine surface units).

Given the joint nature of most CAS, the usual complications inherent in joint operations (terminology, frame of reference, etc.) are much easier to work out between a soldier and an airman working over a map on the ground than between an earthbound universal observer and an airborne CAS pilot several miles away.

Because airmen and soldiers have different perspectives and communicate differently, we must place the potential for misunderstandings where it is most easily detected and resolved. Direct face-to-face discussion is still our most effective means of communications, and it's far more practical to place an airman on the ground with maneuver forces than to put a forward observer (FO) in the flight leader's cockpit. In effect, we've placed the most likely point of communications breakdown in an environment where it most easily can be resolved. An ALO (or ETAC) can work more effectively with a CAS pilot because he shares commonality in communications and operational perspective.

I agree "you do not have to be a pilot to control a CAS strike." Under the right conditions (good weather, clear communications, experienced pilots, limited air defense requirements, etc.), any trained FO should be able to direct a CAS strike successfully.

However, even in good conditions, CAS is one of the most challenging and difficult air missions because it is closely associated with the danger of fratricide. Terminal control of CAS demands a specialist. An aircrew member experienced in air-to-ground operations invariably will do a better job than a nonflyer simply because he is a specialist with a unique skill and a more complete

understanding of all the variables associated with CAS.

Even experienced ALOs encounter situations that challenge their skills. As conditions become more demanding (i.e., darkness/marginal weather, closer proximity of friendlies to the target, poor communications, etc.), the need for specialized skills increases significantly. There is much more to terminal control operations than simply identifying a target for a pilot.

Despite having little or no flying experience (usually), ETACs are still better equipped to control CAS than most junior FOs because ETACs are mid- to senior-level tactical air command and control ($C^2$) specialists with many years experience in the career field who are selected by their commanders for this special responsibility. These NCOs are dedicated specialists with in-depth knowledge of CAS procedures from the initial request to post-strike battle damage assessment (BDA). They have a comprehensive understanding of the theater air control system $C^2$ architecture, air-to-ground communications and CAS aircraft tactics/ordnance and are better equipped to assess surface-to-air threats to CAS aircraft.

When the company commander tells his fire support officer (FSO) to engage a target, the FSO should be able to turn to the most capable person to do the job. Where CAS is concerned, proficiency is more important than familiarity.

Some individuals will argue that these concerns can be alleviated to some degree with proper training (as Major Nannini points out). It should be evident that major revisions in training are needed. Some comments in the article suggest that training in basic artillery fire direction skills is presently inadequate—if so, this should be corrected before taking on the challenges of training universal observers.

For example, if an FO has difficulty calling in artillery fire in dense woods, urban and nonlinear battlefield situations, what are his chances of controlling an air strike? What if he must orchestrate suppression of enemy air defense (SEAD) fires, marking rounds or other fire missions while controlling CAS missions? What about situations requiring "push CAS" where aircraft are constantly arriving on station and must be utilized efficiently as soon they appear?

Conventional fixed-wing CAS aircraft operating in high-threat environments have less loiter time and must be able to execute their attacks soon after arriving on station. There may be no time for a CAS pilot to patiently "extract" the information he needs or verify its accuracy with a relatively inexperienced controller. The threat situation may dictate a single weapons delivery pass—there may be no second chance to get it right.

To some extent, I share the author's support for simulator training. This is certainly better than nothing, but even the best simulators offer only procedural training and cannot guarantee acceptable performance in combat.

As the declining budget tightly restricts flying hours available for training in a variety of missions that joint air forces must perform, any increase in CAS training will come at the expense of other mandated Air Force missions. Both history and the future plans for the joint employment of air power indicate that the current mix of flying hours expended in training for various air missions is realistic and should be not be changed.

If more CAS training is desired, a simple solution might be to utilize Army attack aviation to support the CAS mission. Helicopters offer significant advantages in urban areas and dense foliage. This way, the surface units can train at their own level and employ their own fire support arrangements as they choose on a frequency they feel is appropriate.

In conclusion, I concur with most of the information in the article and the overall thrust is noteworthy, but I take exception to Major Nannini's assertion that "Air Force parochialism" is the biggest obstacle to the universal observer concept. Quite the contrary—the Air Force has continuously accepted the burden of manning ALO and ETAC positions (reaffirmed by the 1 November 1995 CSA-CSAF MOA [Chief of Staff of the Army-Chief of Staff of the Air Force Memorandum of Agreement] for "Army/Air Force Liaison Support" [see Page 17, May-June 1996 edition]) despite recent personnel drawdowns simply because these specialists represent the most effective way to put CAS munitions on the target.

LtCol H.A. Carter, USAF
Air Force Representative
Field Artillery School, Fort Sill, OK

# Cyberspace Techno Geek

I'm an artillery officer. If you read my professional journal, *Field Artillery*, you'd have to classify me as some sort of cyberspace techno geek. But I'm not. First and foremost, I am a leader of men. I prepare them for combat. I will be in front of them when the spit hits the fan. I am committed to their development, professionally and personally. Why does my professional journal not regularly address the most important aspects of my trade?

Reading the journal's purpose statement [inside front cover] may be part of the problem. Although it talks of "progress," "common understanding" and "interdependence," it doesn't address leadership. As such, I see the journal's editors as not seeing artillery leadership as part of their subject material.

Flow charts, figures, diagrams, graphs and acronyms abound in our journal. Technical papers on IFSAS [initial fire support automated system] and battle calculus ["Battle Calculus and Fire Support Planning" by Major Thomas L. Kelly in the March-April edition], Force XXI and the tireless Red Book fill us with gobs of information—but how much do the majority of us apply each day? I venture to say, very little.

We do have an extremely technical, maturing profession that is advancing daily based on technical innovations. But we're missing our mark in the brass tacks—the uniqueness of leading artillery. I believe this is our profession's Achilles heel where we're the weakest. This is where our sister combat branches look at us and our journal and chuckle.

Where are the historical novels [sic] and articles detailing artillery battle leadership? Where is the information sharing on current leadership challenges? Are hate groups prevalent in our community? Is there a race war? Do our young NCOs have the authority we say they do? Do our officers know the basic techniques for fulfilling their leadership responsibilities—from leading an FST [fire support team] to leading a

battery? I have experienced and continually observe the "wheel reinvention" syndrome. An ongoing dialogue on leadership topics applying to our community could lessen or eliminate such.

My point: I recommend *Field Artillery* incorporate into every publication a leadership section. Topics should come from across the leadership spectrum addressing the myriad of challenges, successes and trends so we share experiences, learn different styles and read about artillery combat leadership. Articles like "Reflections—Admiration of an NCO" in the March-April edition [by Major Danny Ray Hill] must abound. Issues like "the moral courage to stand up for what I believe," "always care for your men," "integrity" and "accept responsibility" must be recurring themes with practical application and situational exercises. Leadership problems and ethical lapses abound at all ranks and will increase as our valueless society and youth digress.

We need a journal that's the center of small group discussions and so used by our Marines and soldiers that its covers are torn and WTR-greasy fingerprints mar its print. We need a journal that's used by all levels of artillery leadership, that's seen in the gun parks, classrooms and in the field. Give our young Redlegs something they can practically apply, then maybe they'll read the technical stuff. We don't need pristine copies of the *Field Artillery* sitting on office bookshelves next to issues of *ASME, Nova* and *Proceedings*. We need our journal to offer a leadership section.

Capt Robert J. Terselic, USMC
Former Commander, I Battery, 3d Battalion, 11th Marines
Twentynine Palms, CA

*Captain Terselic, never try to read the mind of an editor. Top-quality leadership articles such as "Reflections—Admiration of an NCO"—even merely "good" leadership articles—are hard to come by. And I'd give my editorial eye-teeth for more.*

***Editor***

# Response to "Maintaining the Q-37 Firefinder in Bosnia"

I was tremendously impressed by Staff Sergeant William J. Parker's letter on maintaining the Q-37 Firefinder in Bosnia that appeared in your January-February 1997 issue. Sergeant Parker's brief piece vividly portrayed the value of fully integrated alertness, action and resourcefulness at the level of a single soldier in a single job. He shows a hunger for information and practical solutions, ranging from his reliance on "the book" [*TM 11-5840-355-20-1 Organizational Maintenance Manual (Functional Description and Maintenance) for Radar Set AN/TPQ-37(V)*], to the PX gadget shelf, to his own practical methods for keeping information available where it is needed.

His desire to "better understand the system as a whole," including its operational context, showed a proactive approach to gaining and using information to accomplish his and his unit's mission. I suspect that his students at Fort Sill will learn the same versatility and creativity from him. I hope so. It's an approach to soldiering that will be priceless wherever the mud and the "fog" begin to thicken.

Bruce E. Barrett
Dir, Applied Programs, Gestalt Global
Duxbury, MA

# Chiefs of FA and Assistant Commandants Change

Major General Leo J. Baxter, former Commanding General of Officer Personnel Management at the US Total Army Personnel Command in Alexandria, Virginia, took over as Chief of Field Artillery and Commanding General of Fort Sill in ceremonies 6 June. He replaced the Chief of Field Artillery since 1995, Major General Randall L. Rigby, who became the Director of Program Analysis and Evaluation for the Office of the Chief of Staff of the Army at the Pentagon. Major General Baxter, among other assignments, served as the Assistant Commandant of the Field Artillery School and Deputy Commanding General for Training of the Field Artillery Center and, earlier, Chief of Staff of Fort Sill.

In another change, Brigadier General William J. Lennox, Jr., who was the Assistant Commandant of the Field Artillery School and Deputy Commanding General for Training of the Field Artillery Center, left in mid June for Fort Hood, Texas, where he became the Chief of Staff of III Corps and Fort Hood. Brigadier General Toney Stricklin left his position as the Assistant Chief of Staff for Combat Developments at Training and Doctrine Command (TRADOC) Headquarters at Fort Monroe, Virginia, to replace Brigadier General Lennox. Among other assignments, Brigadier General Stricklin served as Director of the Combat Developments Directorate at the Field Artillery School.

Brigadier General William S. Wallace, Commanding General of the National Training Center (NTC) and Fort Irwin, California

# **The Challenge:** Synchronizing Fires, Maneuver and Intel

Interview by Patrecia Slayden Hollis, Editor

**Q** *In terms of fire support at the NTC, what do we need to work on?*

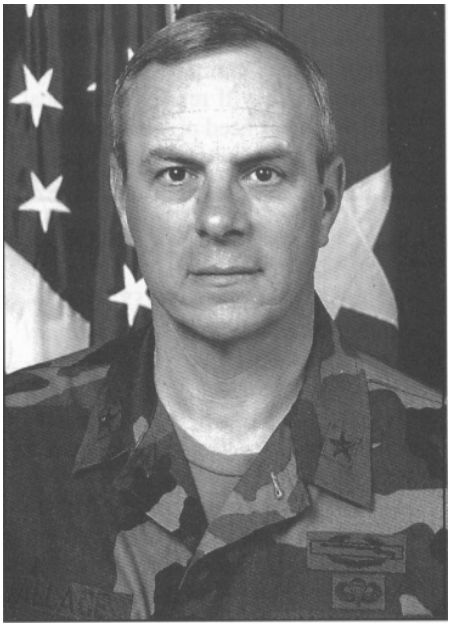
**A** You asked the right question. People don't necessarily understand that, generally, the problems we see at the National Training Center are not Field Artillery problems but fire support problems—quite different. Our artillerymen are technically competent and very good at what they do. The real challenge is to integrate fires with maneuver while taking full advantage of intelligence and synchronizing it all to make the most of combat power. And that's the maneuver commander's responsibility.

Commanders are pretty good at planning; it's the execution piece that needs work. If fires or maneuver slows down or speeds up or intel gives extra information, then the commander has to adjust the other parts of the triad.

For example, let's say, as the maneuver commander, I determine my Number One critical fire support task is to destroy the southern platoon of the defending enemy so I can conduct a penetration of his obstacle. Through battlefield calculus, I figure out it's going to take me 12 battalion volleys to do that. So what if I don't achieve the effects planned in 12 volleys? What if it's going to take 15 or 20 battalion volleys to get the effects I need?

At that point, I have to huddle with my FSCOORD [fire support coordinator]. Then I have to resynchronize the battle: fire more artillery, employ CAS (if available) or slow down my maneuver formation before it drives into the obstacle with the enemy platoon still intact. And slowing maneuver might be the best decision at that point. I have to make continuous adjustments.

**Q** *How do commanders work on that at home station training?*



**A** First, the commander has to understand philosophically that there's a very delicate balance between reconnaissance, fires and maneuver. Employing that triad is not a linear process. Sometimes we think, "Okay, to defeat the enemy, we'll find the enemy, shoot a lot of artillery at him and then maneuver over him."

But it's a circular process. When the force starts maneuvering, it provides additional reconnaissance information that leads to more targets for fires, which in turn, when fired, lead to a greater ability to maneuver.

Brigade-level simulations at home station can help us with the science part of warfare—simulations are scientific by nature. But there's an art to our business that simulations don't address: the way a particular commander fights, interaction of a staff in the decision-making and synchronization processes, etc. I can tell you one rule of thumb: everything takes longer and more than you think.

**Q** *Precision munitions with longer ranges are coming into the force, specifically SADARM [sense and destroy armor] in FY 99. What impact will* ***SADARM*** *have on play at the NTC?*

**A** None if we don't figure out how to use it right. I say that kind of flippantly, but our experience is we don't use the precision munitions we have very well. Copperhead is frequently ineffective out here.

It's not because Copperhead isn't a good munition; I think it's because units aren't training at home station on Copperhead under the same conditions as at the NTC or combat. For example, if units don't use standard PRF [pulse repetition frequency] codes or don't know them, there's no way in hell Copperhead's going to work. Units have problems with angle-T, with positioning of observers and lasing targets within the range and capabilities of their laser designators. I think it's just a matter of practice.

When SADARM is fielded, I suspect it will be played at the NTC. We'll develop ROE [rules of engagement] and SAWE [simulated area weapons effects] to go along with it. But like any other system at this training center, if units can't employ it effectively, then they certainly aren't going to "get credit" for it on the battlefield.

**Q** *During your six years at the NTC as Senior Armor Task Force Trainer, Chief of Staff, Commander of the Operations Group and, for two years, Commanding General of the NTC, what are the most significant changes you've seen in the way units fight at the NTC?*

**A** That's a tough question—the NTC is so dynamic. One significant change that has had a positive impact was our transition to brigade operations during the entire 14-day rotation.

Three years ago, a brigade commander only commanded his entire brigade for the last three or four days of a rotation. The rotation was really for battalion-level live-fire and force-on-force operations with MILES [multiple integrated laser engagement system] running simultaneously. The brigade commander had a role, but he was only in command of one of his maneuver battalions at any time. And the brigade commander and his staff never went to live-fire. In many cases, the brigade commander over controlled the battalion because it was the only maneuver unit he had.

In brigade operations, he now has a more realistic and greater challenge. He controls two maneuver battalions, an artillery battalion, a forward support battalion, an engineer battalion and all the separates that come along with them.

Under the old battalion operations model, the FA battalion stayed in live-fire—it live fired for both maneuver battalions, only one of which was force-on-force at a time. So the FSCOORD only worked for his brigade commander the last three or four days of a rotation. Now the FSCOORD works for the brigade commander throughout the 14-day rotation.

Brigade operations at the NTC have brought new challenges to light for brigade commanders. It isn't an easy transition for a young colonel to command a brigade; it's a tough mental transition. A commander often tries to take the lessons he learned in the brigade fight as a battalion commander and apply them directly as the brigade commander, but his role is different. It isn't the same "only bigger." It's much more complex.

For example, a battalion commander frequently can command just by force of will—"reach out and touch" subordinate commanders at the front line of the fight. At the brigade level, the commander can't do that. He has different combat systems to employ and a deep fight to be concerned with. He works on different decision-making time lines to make sure his subordinates can execute his decisions. He has to ensure his intent is well understood because he isn't going to check with each company commander—he doesn't have time.

Now, intellectually, we understand all that. But the commander *really* doesn't understand all the implications of brigade operations until he has lived it for 14 days in this type of environment.

Another change at the NTC that has had significant impact is the revision of the first week, the week where units generally just drew equipment and took care of administrative tasks. When operations changed to the brigade level, units began drawing equipment while conducting RSO&I [reception, staging, onward movement and integration] wrapped up in a scenario as part of deployment training. Very subtly, we extended the length of the rotation by seven days.

Stability operations is a small part of that, but not the driving factor. By the time the we deploy a heavy force, chances are that a force has preceded it and stability operations have started to unravel. So, the heavy force should focus on deploying quickly and dealing immediately with a volatile geopolitical situation instead of on stability operations. But that same force better be able to conduct stability operations—be a "jack of all trades" relevant to the world we live in—because if the US Army is in a country, somebody's going to ask us to do something, and we probably can't even anticipate what that "something" is.

Of course, the most dramatic change at the NTC has been in the way the OPFOR [opposing force] fights. Units used to train against a Soviet-style enemy in doctrine, organization and tactics. With the fall of the Berlin Wall, the OPFOR is more generic, more flexible. In some ways, he's more challenging because he's less predictable.

**Q** *When the NTC transitioned to brigade operations, what did units learn about fires?*

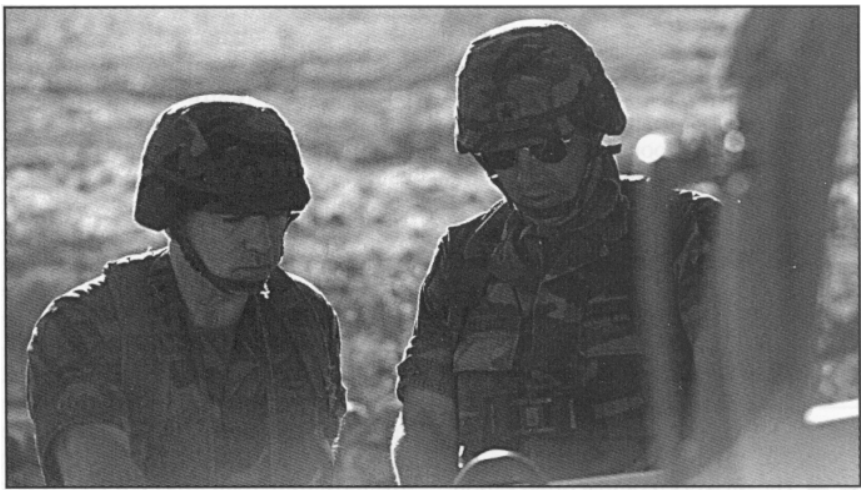
**A** Interesting question. In brigade operations, the brigade and battalion commanders compete for fires. If the brigade commander is prosecuting a deep fight and there's a close fight going on at the same time, he frequently won't relinquish fires to the battalion commander who's in the close fight. Now, I'm not saying that's good or bad because it's the brigade commander who shapes the battlefield for his battalion commanders. But the battalion commander must understand that there will be times when he's in a fight and the only fires asset he'll have available will be his organic mortars.

It's very painful for maneuver commanders to understand that because we all like to think commanders will get all the fires they want whenever they want them. But if the brigade has a direct support artillery battalion and a reinforcing artillery battalion for the counterfire and deep fights plus controlling CAS [close air support], may be, just maybe, maneuver battalions won't get the fires they've come to expect as routine.

There's a balance that all must understand and plan for; fires will be prosecuted to benefit the brigade as a whole.

**Q** *In general, what did you see as some of the more surprising or insightful aspects of the March 1997 Task Force XXI Advanced Warfighting Experiment (AWE) rotation at the NTC?*

**A** The tendency is to focus on the technologies because they're so dramatic and so visible—have the potential for such great impact on the



Brigadier General Wallace (right) briefs General John H. Tilelli, Jr., who at the time was Commander of Forces Command, on an NTC battle in progress.

battlefield. But the AWE also opened our eyes to some of the requirements for battle command in the 21st century.

Battle command is going to be different. The commander who has access to real-time information on the digital battlefield must decide what out of the volume of information available to him that he needs to make a decision. It very well could be a personal choice—just like a commander's deciding how he wants his command post configured; command posts are not standardized. We're also going to have to teach commanders more precisely what decision making in a very fluid environment is like. If not, we'll have a generation of commanders who are overwhelmed by information.

In terms of fires, we had some real successes during the AWE. The UAV [unmanned aerial vehicle] as an observing platform for fires is a winner if we can figure out how to use UAVs routinely at the brigade or battalion level. Whoever owns the fires ought to be linked to the platform that's providing the eyes to those fires.

But having access to a UAV doesn't mean fires can be more complicated. Simplicity still counts. The fact that you have several "gizmos" that can see a lot of targets doesn't necessarily mean you want to fire all those targets. As a commander, you have to focus on what fires you want where and when and why you want them there.

**Q** *Do you think the brigade needs its own UAV for targeting and intelligence?*

**A** Yes. The brigade commander in the close fight or in his battlespace needs to be able to dynamically re-task his looking platforms—just like he re-tasks his scout platoon. The UAV is just one of many information gathering means he has access to—scouts, down links with theater assets, etc.—and they all complement each other. He shouldn't gravitate toward a single system for all his eyes or intelligence.

**Q** *What about the performance of other fire support assets at the AWE?*

**A** The Strikers [combat observation lasing teams, or COLTs] were very successful during the AWE. They survived very well, which is the first thing you have to do out there. Second, they gave the brigade the ability to target deeper, which threw the enemy off a bit. It threw him off enough to lose a fair amount of combat power before he could get into the direct fire fight.

Did Strikers run the fight? No. But combined with the "dirt" fire fight, Apache helicopters and other combat power, Strikers performed very well.

Paladin also did well. Paladin's "shoot, scoot and applique"—its shoot and scoot capability combined with its applique's situational awareness—allowed battery commanders to rapidly move Paladins into position areas. A commander did not have to play "Mother, May I." He could see from his applique computer that an area from which the howitzer could range the targets was empty and moved a Paladin into it.

So terrain management, which has always been a problem with artillery, maneuver and all the other pieces moving around the battlefield, was partially solved by the marriage between the applique's situational awareness and the Paladin's ability to move and shoot quickly.

**Q** *In addition to implementing brigade-level operations, you created the Leader Training Program (LTP) by revising the pre-rotational training for commanders and their staffs at the NTC. What were the revisions and advantages gained?*

**A** The program used to be a "gentlemen's course"—loosely structured training for 16 or 17 people. LTP now includes about 75 leaders, including some company commanders, and is six days of more structured training. In a Janus exercise linked to a division order, the brigade commander and his staff and subordinate commanders go through the orders process. We conduct an AAR [after-action review] on their process and products.

The brigade leaders and staff receive this training about four months before the brigade's NTC rotation. In the program, they get to concentrate on warfighting without any interruptions and give each other feedback during the exercise—generally build a team. But the most important aspect of LTP is not how they perform during the program, but what they do when they leave. The challenge is to go home and apply what they learned. This is true of the NTC in general.

**Q** *What are the fire support challenges for the 21st century?*

**A** The challenge to synchronize fires and maneuver with intelligence will remain. Also there might be an ever-increasing tendency to want to fire golden bullets—precision-guided munitions. They are inherently more difficult to employ than just plain old dumb projos [projectiles]. So, along with the advantages of technology comes an obligation to train to get the maximum out of it.

A third challenge may well be our ability to deploy whatever we build. If we're truly going to be a force projection army, we have to be able to project ourselves. And unless we concentrate on smaller, quicker, "get-there" systems, then we might find ourselves with the absolute best army, best artillery and best fire support in the world, but we can't get to the fight.

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

**A** The Field Artillerymen coming to the National Training Center are absolutely wonderful—we have the best artillery in the world. FA leaders, take good care of those Redlegs and train them hard.

**Brigadier General William S. Wallace until recently commanded the National Training Center and Fort Irwin, California. Also at the National Training Center, he served as Commander of the Operations Group, Chief of Staff and Senior Armor Task Force Trainer. Currently, he's the Commander of the 4th Infantry Division (Mechanized) at Fort Hood, Texas. He commanded the 11th Armored Cavalry Regiment and the 3d Squadron, 2d Armored Cavalry Regiment and served as the S3 and Executive Officer of the 2d Armored Squadron, all in Germany. In 1972, General Wallace was an Assistant District Advisor and Assistant S3 Advisor in the Bac Lieu Province of Vietnam. He's a graduate of the Naval War College at Newport, Rhode Island, and holds a Master of Science in Operations Research from the Naval Postgraduate School, Monterey, California.**

# NTC Truisms—

## Fighting with Effective Fires

**by Lieutenant Colonel Marcus G. Dudley, Wolf 07**

And there we were...*Training Day 8*, the last force-on-force battle....artillery fires and close air support (CAS) kill more than two battalions of opposing force (OPFOR) combat power in the brigade deep fight. Another unit, another day—*Training Day 14*....Field Artillery destroys six T-80 tanks, 21 BMPs and two BRDMs. *Training Day 6*...in a single fire mission, artillery kills three BRDMs, eight BMPs, a T-80, AT-5, SA-14 and a ZSU-23-4. And more....*Training Day 4*, obscuration and suppressive fires at the breach site allow the rotational unit to penetrate the OPFOR defense....the unit completes the rotation with no firing incidents.

These are stories from the National Training Center (NTC), Fort Irwin, California, of just how successful fires can be. The challenge to fire supporters and our maneuver brothers is to make these stories an everyday occurrence.

It's a common misperception that fires are ineffective at the NTC. The truth is, fires can (and do) kill and suppress the OPFOR at the NTC—successful breaches *only* occur when fires provide obscuration. Other truisms about fires are: you must mass to kill, and all successful battles with fires started with a simple fire support plan based on clear intent and guidance on fires from the supported maneuver commander.

But after 21 NTC rotations as the Senior Fire Support Trainer and two rotations as a fire support coordinator (FSCOORD), I'm convinced the single biggest challenge to providing effective fires is our observers' ability to provide accurate target locations. All the success stories mentioned at the beginning of this article were made possible by observers' calling in first-round, fire-for-effect (FFE) target accuracy.

Those same success stories have one other thing in common. The missions were fired at an enemy who was either stopped at an obstacle and (or) in restricted terrain where he had to move slowly in column formation.

### Why Fires are Successful

Let's analyze the battle on Training Day 14. The unit looked at all the possible avenues of approach available for the enemy to enter its battlespace and used family of scatterable mines (FASCAM) and light infantry to deny him as many of the avenues as possible. The unit then focused its deep fires plan on the avenues still open to the enemy. The combat observation lasing team (COLT) plan was designed to track the enemy on both sides of the restricted terrain. The COLTs were very effective at passing the enemy from one observer to another.

Once the unit had the enemy where it wanted him, it massed fires and continued to shoot until the formation was no longer in the target area. Additionally, the unit massed its CAS in the restricted terrain or at the entrance to a choke point, thus maximizing the effects of both CAS and artillery in one battle.

(Photo by Muriel Marcum, Fort Irwin TSC)

Wait, there's more. The real impact of fires in this battle was they caused the attacking enemy regiment to lose momentum. Fires took the initiative away from the enemy and gave it back to the defending rotational unit commander. That gave the rotational commander enough time to reposition his forces, get his attack helicopters into the fight and defeat the attacking regiment.

So what made fires successful in that battle? Everyone was on the same sheet of music: lookers, shooters and leaders all understood the enemy and plan and knew their roles in execution. (See Figure 1.)

## Home Station Training: Never Say "Maneuver" without "Fires"

Successful battles do not happen by accident; they're the results of a lot of hard work by a lot of dedicated soldiers. Success in battle starts with home station training programs with maneuver and—always—fires. Training plans that integrate and synchronize all the battlefield operating systems (BOS) go a long way toward promoting success at the NTC. For the fires BOS, the training must realistically exercise the fire support system, to include mortars and Air Force aircraft.

Here are some other training truisms that facilitate effective fires at the NTC.

• *Units must understand how the enemy fights*. What is his mission? Is he force- or terrain-oriented? What is the mission, task and purpose of each enemy formation?

Understanding how the enemy fights allows units to develop maneuver and fire support plans that address how to defeat each enemy formation. This is critical during mission analysis because it provides the foundation for the commander to develop his intent and guidance for both maneuver and fire support.

• *FSCOORDs must understand the capabilities and limitations of their units and provide the maneuver commander an accurate estimate of what fires can and cannot do in a battle*. And, in the absence of guidance, FSCOORDs must be willing to tell the maneuver commander what fires can and should do to support the maneuver plan.

Battlefield calculus quantifies capabilities and limitations. For example, if it takes a battalion five minutes to shoot a battalion-three round and seven minutes to shift to the next target, then the average time per mission is 12 minutes. Under *ideal* conditions, this battalion can shoot five battalion-threes in an hour. Telling the commander the unit can do more than that gives him an unrealistic expectation of what his artillery can add to the battle.

But what if the conditions are not ideal? What if within 12 minutes the enemy will have moved four kilometers—can the artillery still fire five battalion-threes before the enemy is in the task force's engagement area and the commander needs to focus his fires on the close fight?

- The maneuver commander provided clear guidance on how he envisioned fires would support this battle.
- The brigade staff developed a simple, but executable, fire support plan.
- The unit understood how the enemy would fight and focused its efforts to capitalize on the advantages terrain provided.
- The brigade combat observation and lasing teams (COLTs) were well-trained. They consistently provided accurate target locations with their operational Hellfire ground simulation systems (HGSS). Their observation plan put them in the best spot on the battlefield to execute their missions, and they understood the commander's intent, the concept of fires and the scheme of fires.
- The unit had excellent communications among the observers, fire support elements (FSEs), direct support (DS) battalion fire direction center (FDC) and the fire support coordinator (FSCOORD).
- The FSCOORD was on the net, in charge, and kept fires focused on the enemy.
- The fire plan fully integrated close air support (CAS) and had airspace coordination measures that allowed the simultaneous attack of the enemy with CAS and artillery.
- Both artillery battalions were properly positioned with adequate ammunition to execute the fire plan.

Figure 1: Anatomy of Successful Fires at the NTC—"Training Day 14" Battle. The key to success was that everyone one was on the same sheet of music: lookers, shooters and leaders all understood the enemy and plan and knew their roles in execution.

If the fire supporter *knows* his unit, he can "run the numbers" and answer the question.

The last question that must be answered by calculation is, if the battalion can shoot five battalion-threes, what will they accomplish? The bottom line is that if all target locations and triggers are accurate, the most the artillery battalion can kill is approximately five T-80s or 15 BMPs, or some combination of the two.

The same calculation process applies to determining the effects of family of scatterable mines (FASCAM), smoke, Copperhead—all the missions an artillery battalion can be expected to execute in battle. (For more information, see "Battle Calculus and Fire Support Planning" by Major Thomas L. Kelly in the March-April 1997 edition.)

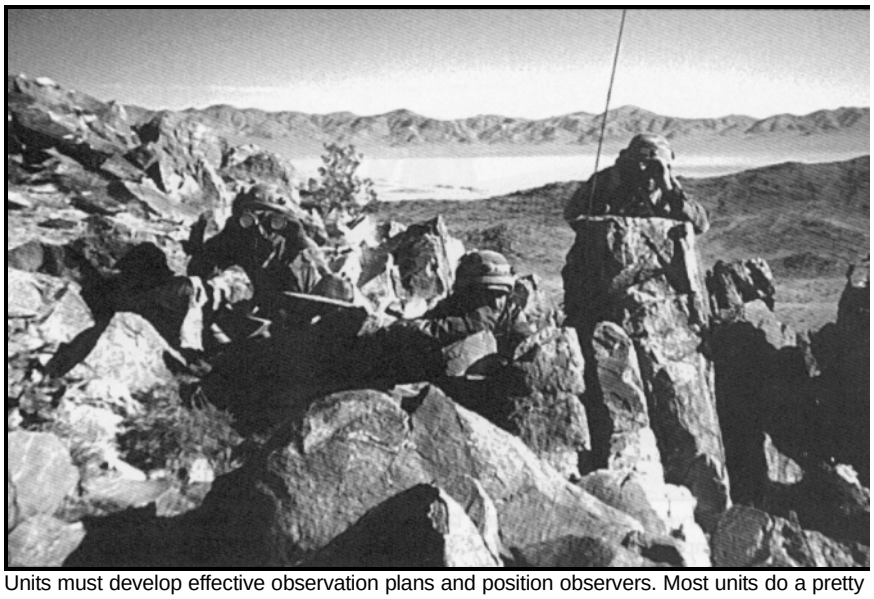
FSCOORDs typically overestimate their units' abilities to contribute with fires. Each FSCOORD must understand his battalion's capabilities and limitations, couple that knowledge with battle-field calculus and then develop a simple, executable fire plan that's realistic—and, therefore, most effective for the maneuver commander

• *Units must develop effective observation plans and position observers*. Most units do a pretty good job of positioning their COLTs to best observe the enemy. Historically, inserting COLTs by air has a better probability of effective positioning than by infiltrating them on the ground.

The biggest breakdown in observation planning is at the task force level. Do the fire support teams (FISTs) work for the maneuver company commander or are they a task force asset? The answer to this question is based on mission, enemy, terrain, troops and time available (METT-T). Whoever they work for, the critical questions is where do they need to be and by when to accomplish the mission?

The task force staff plays a critical role in developing the observation plan. It must pick observation posts (OPs) that allow the observer to see the target area, coordinate the routes and get the observer into position in time to be effective—whether the observer is a FISTer, scout or maneuver shooter.

For example, let's say a forward observer (FO) with the support-by-fire (SBF) team must initiate and adjust smoke for the breach and is traveling with his company-team; the line of departure is five kilometers from the trigger to initiate the smoke. The challenge



Units must develop effective observation plans and position observers. Most units do a pretty good job of positioning their COLTs to best observe the enemy. *Photo by MAJ Chip Hester*

is to get the observer to his OP and properly oriented to identify the target and process the fire mission before his company-team reaches the trigger to initiate the mission. If these time-distance factors aren't considered, the lead company will be under enemy direct fire in the Red Zone before the FO ever gets to his OP. Planning where our observers must go and deciding who they'll work for are important, but getting them to the OP is also a vital aspect of any successful observation plan.

• *Units must provide accurate target locations and avoid an FFE mentality*. Although accurate target location is the biggest challenge to providing effective fires at the NTC, a related issue is our FFE mentality. If observers can't provide first-round FFE accuracy, why execute all fires as FFE missions?

The use of target selection standards (TSS) should apply to observers. If the call-for-fire comes from a scout or a FIST whose Hellfire ground simulation system (HGSS) or ground/vehicular laser locator designator (G/VLLD) isn't working, then the mission should be processed as an adjust fire mission. Knowing the capabilities of unit observers is just as important as knowing the battalion's capabilities to deliver fires.

True, the additional time required to adjust fire can affect the maneuver force's momentum or reaction time to the enemy. But the commander can adjust his maneuver timing if he knows going into the battle which missions will be adjust fire and which FFE, based on the observer's assignment and capabilities.

For example, let's take a scenario for one of the NTC's critical fire support tasks: kill the enemy platoon at the unit's point of penetration of the enemy obstacle. During the planning process, the unit determines it will take four battalion-threes to kill four vehicles in a platoon. With first-round FFE accuracy, it would take approximately 48 minutes to kill the platoon. If the observer is not a first-round FFE shooter, the fire support officer (FSO) must add in the time it will take to adjust each mission. This could vary anywhere from 10 minutes to 30 minutes per mission. The time to kill the platoon at the point of penetration could take up to two hours.

This time is critical because the enemy won't come out of hiding or occupy his battle positions until our maneuver forces him to. Nine times out of ten, the enemy's trigger to occupy his battle positions corresponds to the unit's trigger to initiate the obscuration and suppression missions, which allows the SBF unit to get into position. If the FO must adjust fire on the platoon at the point or zone of penetration, then the plan must take into account the impact this will have on the scheme of maneuver or include other means to accomplish this task, i.e., CAS or Copperhead.

Ideally, home station training will develop first-round FFE shooters. But the unit also must train for adjust fire missions. A first-round FFE-capable COLT with a dead HGSS battery is back to adjusting fire using 1930's technology—binoculars, a compass and a map.

In general, few observers who come to the NTC are first-round FFE shooters. In most cases, they have trouble operating the G/VLLD and HGSS, especially in the dismounted mode. Observers are also unfamiliar with how to execute polar plot and adjust fire missions and engage moving targets.

An effective home station training program will solve these problems. Training on the G/VLLD is like training on a "direct fire" weapon because of its laser. However, setting up a G/VLLD accuracy certification course is not that difficult and, with a little imagination, can be a fun and effective training tool.

Training to engage moving targets is much simpler than it used to be with the proliferation of global positioning system (GPS) devices. Units can set up a target with a trigger and have a vehicle with the precision lightweight global positioning system receiver (PLGR) drive at various speeds toward the target. The observer calls the mission and when the rounds would have impacted (based on time of flight), the vehicle stops. You then compare the grid where the vehicle stopped in relationship to the grid where the rounds would have impacted.

These are just a couple of ideas to help observers become first-round FFE shooters.

Well-trained shooters and good brigade and task force observation plans allow the unit to execute a simple plan that might work. The key is to fight the plan and not the enemy. (See Figure 2.)

- Lookers and shooters are in position and understand the plan.
- Lookers, shooters and approvers can communicate.
- Observers get accurate target locations.
- Leaders believe what lookers tell them.
- Fires are focused on the right targets to accomplish the commander's intent, regardless of who has priority of fires.
- Fire supporters can anticipate the next fire support event and posture lookers and shooters to execute it.
- The artillery battalion is technically competent and can move and shoot.
- The artillery is in the right place at the right time with the right ammunition.

Figure 2: Keys to Execution—Fighting the Enemy and Not the Plan

## NTC Update—with a Few "Firsts"

In coordination with the Field Artillery School, the NTC updated the probability of kill (PK) tables in the simulated area weapons effects (SAWE) system this past year. We discovered that the PK tables in SAWE automatically gave credit to a unit for taking protective measures after the first volley of artillery impacted. We fixed this problem by changing the PK tables to a constant value for all volleys. Now, if a vehicle has a near-miss with the first volley and does nothing, it will likely be killed on a second or third volley. This change enhanced the suppressive effects of artillery on the NTC battlefield.

The last year also saw major changes in live fire. The NTC no longer conducts the day and night live-fire defense. Due to reductions in training ammunition, units now execute only one live-fire battle. In July of 1996, the NTC started executing the battery defensive situational training lanes again. This is a live-fire exercise that gives the battery chain of command the opportunity to establish and test its defense against an attacking enemy. The unit fires rocket-assisted projectiles (RAP), Killer Junior, self-illumination and direct fire and uses its crew-served weapons against radio-controlled aircraft. The exercise is intense and has been rated by participating units as the highlight of their rotations.

In June 1997, the NTC began executing a new live-fire offensive scenario with the brigade's objective in the vicinity of the Arrow Head.

But the most exciting fire support change at the NTC during the past year is the reduction of live-fire firing incidents. After the first four rotations this fiscal year, there has been only one firing incident. This compares with 45 in FY 95 and 24 in FY 96. The reduction in firing incidents is a testimony to the discipline, dedication and professionalism of units coming to the NTC.

Another first at the NTC is the use of multiple-launch rocket system (MLRS) battalions in the reinforcing role. Rotation 96-07 was the first rotation in which an MLRS battalion staff fighting a simulated MLRS battalion performed the reinforcing mission. MLRS at the NTC provides an invaluable training opportunity for not only the participating MLRS units, but also for the DS battalions and maneuver units they support.

The two-day Observed Gunnery Program began in August 1996. The training is primarily for task force company-team FISTs and COLTs. *(Photo by Fort Irwin TSC)*

Another initiative—Observed Gunnery Program—began in August 1996. This training is run by the unit and supported by the NTC. The training is primarily for COLTs and task force company-team FISTs. The two-day program provides opportunities to train observers on HGSS and G/VLLD and force-on-force effects; help observers understand the NTC fire marking system; train observers on techniques to execute accurate, predicted fires; help the unit assess the first-round FFE capabilities of its observers; and exercise the fire support system from observer to the guns.

The NTC gives the brigade FSO a memorandum providing the details of the training. The unit determines the training objectives, sets up the training schedule, identifies who will train and provides at least two battery or platoon FDCs and three fully instrumented vehicles.

We strongly recommend the unit include both FA and maneuver shooters in the training, have the DS battalion FDC support the exercise and, if at all possible, have at least one platoon of guns support the training. We also encourage the brigade (at least a battalion) FSE to participate. This allows the unit to exercise the entire fire support system from observer to guns.

The NTC provides firemarkers for all missions, shoots the missions in the computer, sends out the SAWE signatures, and has observer/controllers help supervise the training and provide feedback. With NTC support, the unit runs the exercise until it meets all its training objectives.

The feedback on each mission is the actual target location, the location called in by the observer and an assessment of whether or not the mission would have been effective, suppressive or ineffective. This training has been well-received and appears to pay big dividends.

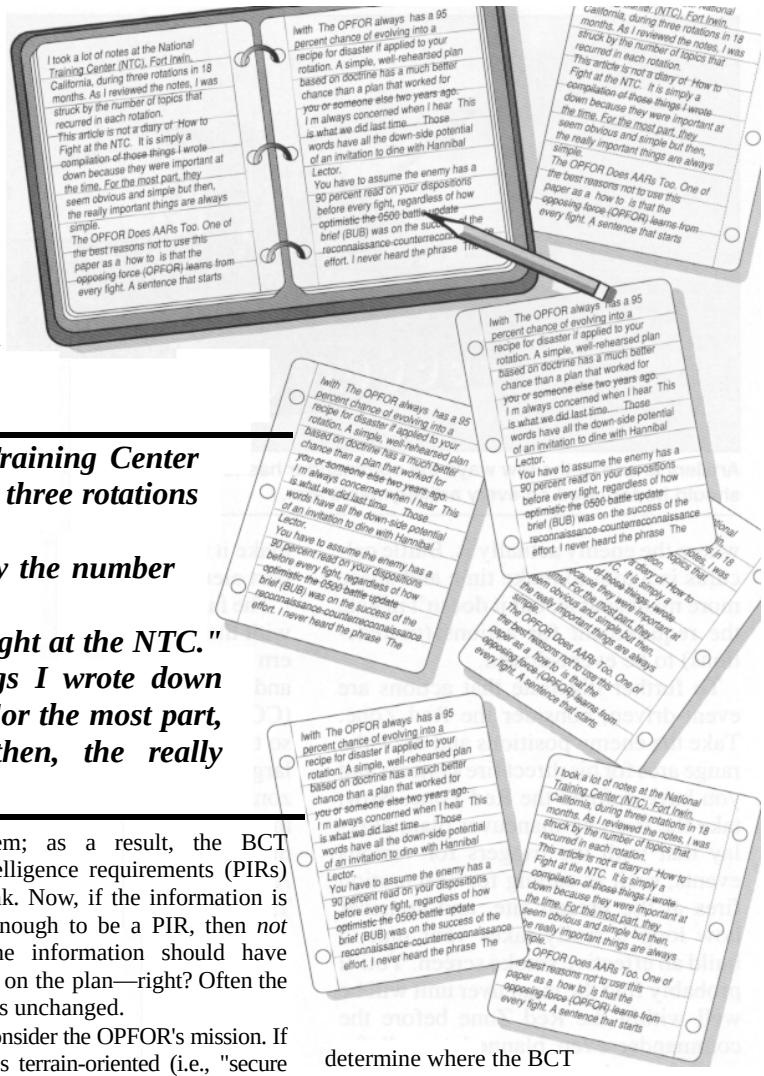
There are many success stories and some challenges yet at the NTC. Although there's no substitute for a well-trained unit, if FA units want the single most value added to fires effectiveness, they can train observers at home station to be first-round FFE shooters. On many occasions, OPFOR commanders have stated that a well-trained COLT with an operational HGSS is worth at least a company's worth of combat power.

At the NTC, things fire support and things Field Artillery continue to show steady improvement. Fires are not broken—they just need a lot of tender loving care.

**Lieutenant Colonel (Retired) Marcus G. Dudley, Wolf 07, until recently was the Senior Fire Support Trainer at the National Training Center (NTC), Fort Irwin, California. In his previous assignment, he commanded the 3d Battalion, 82d Field Artillery in the 1st Cavalry Division, Fort Hood, Texas. At the time he wrote this article, he had observed and evaluated 21 NTC rotations and served as Fire Support Coordinator (FSCOORD) for two rotations. Other assignments include serving as Chief of the Cannon Division in the Gunnery Department, Field Artillery School; S3 of the 212th Field Artillery Brigade, III Corps Artillery; and S3 of the 2d Battalion, 18th Field Artillery, also in the 212th Field Artillery Brigade, all at Fort Sill, Oklahoma. Lieutenant Colonel Dudley recently retired from the Army and now lives in Texas.**

# NTC Notebook

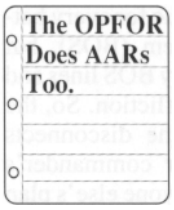
by Lieutenant Colonel R. Mark Blum



***I took a lot of notes at the National Training Center (NTC), Fort Irwin, California, during three rotations in 18 months.***

***As I reviewed the notes, I was struck by the number of topics that recurred in each rotation.***

***This article is not a diary of "How to Fight at the NTC." It is simply a compilation of those things I wrote down because they were important at the time. For the most part, they seem obvious and simple—but then, the really important things are always simple.***



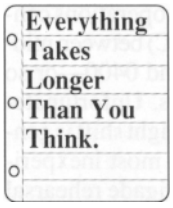

One of the best reasons not to use this paper as a "how to" is that the opposing force (OPFOR) learns from every fight. A sentence that starts with "The OPFOR always" has a 95-percent chance of evolving into a recipe for disaster if applied to your rotation. A simple, well-rehearsed plan based on doctrine has a much better chance than a plan that worked for you or someone else two years ago. I'm always concerned when I hear "This is what we did last time...." Those words have all the down-side potential of an invitation to dine with Hannibal Lector.

You have to assume the enemy has a 90-percent read on your dispositions before every fight, regardless of how optimistic the 0500 battle update brief (BUB) was on the success of the reconnaissance-counterreconnaissance effort. I never heard the phrase "The OPFOR was completely frustrated by your clever deception plan" in any after-action review (AAR).

If the enemy's recon assets are destroyed in zone, then more recon assets will be pushed forward to get the information required. On the other hand, my experience with our brigade combat teams (BCTs) is that once we lose friendly ground recon, we generally don't push other elements forward to replace them; as a result, the BCT priority intelligence requirements (PIRs) remain blank. Now, if the information is important enough to be a PIR, then *not* knowing the information should have some effect on the plan—right? Often the plan remains unchanged.

Always consider the OPFOR's mission. If the enemy is terrain-oriented (i.e., "secure the eastern passage points out of the division zone toward Baker"), he's not going to drive on-line into your carefully prepared engagement area (EA). And he isn't going to drive down the middle of East Range Road to secure those "eastern passage points" either. Still, S2s love to draw a big division-sized avenue of approach (AA) arrow down the middle of the Central Corridor, and more than one EA has been planned astride that AA. *The OPFOR goes to weakness. He is not compelled to help the BCT train multiple integrated laser engagement system (MILES) gunnery*.

Another example: if the BCT has constructed a deliberate, static defense with a small reserve against an enemy oriented on terrain that's 15 kilometers behind the brigade's rear boundary, you can bet the BCT will have the opportunity to demonstrate "flexibility" in fire and maneuver. I'd recommend every fire support coordinator (FSCOORD) determine where the BCT is "accepting risk" and pay attention to that area. Artillery is one of the few ways the commander has to react immediately. "No Idle Guns" should be tattooed on every artilleryman's arm.




Battle calculus is a phrase we use a lot, usually in terms of enemy time lines. Often an S2 briefs, "At H+30, the enemy's CRPs [counterreconnaissance patrols] should cross PL [Phase Line] Oscar, so the FD [forward detachment] will be 15 to 30 minutes behind them." The maneuver commander then says something like, "Okay, then based on our LD [line of departure] time, we'll meet the enemy at Hill 780 at 0745—so, FSCOORD, fire the FASCAM [family of scatterable mines] at 0645." And, like lemmings into the sea, the artillery faithfully fires the FASCAM at the designated point at 0645, regardless of

Artillery is one of the few ways the commander has to react immediately. "No Idle Guns" should be tattooed on every artilleryman's arm.

where the enemy actually is. Battle calculus is a tool to make time and space more manageable, but it doesn't negate the requirement for actions (or reactions) to be event-driven.

To further illustrate that actions are event-driven, consider the Red Zone. Take the enemy positions and draw the range arcs for his direct fire systems and you have defined the Red Zone. Now, take the friendly maneuver plan, overlay that with the triggers for various events, such as calling for obscuration fires at the breach site, and consider how long it really takes your unit to build an effective smoke screen. You'll probably find the maneuver unit will be well within the Red Zone before the commander even planned to call for smoke, much less have any hope of building the smoke into an effective screen. The point is, things are all interrelated and event- not time-driven.

**The "Night Shift" Shouldn't Mean "Second Shift."**

Most important information arrives in the tactical operations center (TOC) between midnight and 0400—or so it seems. Unfortunately, the night shift is generally the shift with the most inexperienced personnel. The brigade rehearsal ends after dark and everyone goes into the TOC to work the issues identified during the rehearsal and then retreats in a near-coma to grab some sleep before the 0430 BUB for the 0600 LD.

At that point, the senior officer left in the TOC often is a captain who's going to a command as soon as the rotation is over. Cross-talk ceases. Intelligence summaries arrive in the S2 cell, are logged and passed without analysis to the battle captain (sometimes) but rarely make it to the engineers or the fire support element (FSE).

The fact that no one can communicate with the task force scouts in the northern sector is noted but not acted upon, and the combat observation lasing teams (COLTs) are still moving into position, so the shift can't talk to them either. A large volume of fire is noted at a grid in zone, but because no friendly units are there, it never occurs to anyone that it might be a persistent chemical strike. About 0400 the first string returns to the TOC, and even if they do pick up on the significance of certain intelligence, it's too late to change the plan.

The BUB proceeds with upbeat, cliché-laden reports and no one tells the task force commander we couldn't contact the scouts all night ("they're on the net now—must have been a solar flare-up during that time") and we still don't have COLTs 3 and 4 in position to observe their named areas of interest (NAIs) because the pilot dropped them off at the base of Matterhorn, not the top.

So, we congratulate ourselves on the great recon effort, brush off the fact that only 20 percent of the PIRs were satisfied, give a big team "Hooah!" and move out to kick some OPFOR butt using the same maneuver and fire support plan we rehearsed eight hours before. (I'm exaggerating some, but not much.)

The TOC (at every level) must have someone available at all times with enough experience to at least know when to wake the boss. Commander's critical information requirements (CCIRs) are great, but every commander must have some wake-me-if-this-happens or this-does-not-happen criteria. The night shift must know when to call the task force and pass intelligence and be able to demand someone work on the communications problems with the scouts.

The night shift is a great time for the FSE to synchronize details. Just making sure every element in the BCT has the same no-fire areas (NFAs), the same target list and the right FASCAM aim points is an all-night job. The light-weight computer unit (LCU) holds seven NFAs, but when you have scouts and COLTs out front plus others who require NFAs, you run out of automated room quickly. It's difficult to synchronize everyone, especially when it's a pencil drill at some levels.

Bottom line: get a few hours of uninterrupted sleep when you can, but a bad time to do it is late at night before LD. That's your last chance to adjust the plan.

**The Fire Support Plan Can't Be Too Simple.**

Most of the effort required for effective fire support is expended in synchronizing and checking the details of the plan. That's probably true for every battlefield operating system (BOS), but few others cross so many BOS lines and require so much deconfliction. So, the difficulty in finding the disconnects between the maneuver commander's intent for fires and everyone else's plan is multiplied by how complex the plan is at the start. As a result, I don't think it's possible for a fire support plan to be too simple.

The commander's intent for fires is the first indication your plan will be either too complicated or the fire support system will have too much to accomplish. As the FSCOORD, you should help the commander develop his intent for fires (issued at the end of the mission analysis briefing) so you'll get the information you need to plan. There's not much time to get this right so 5x8 card checklists, one for offensive and one for defensive fire support missions, are helpful, especially when you're tired.

Out of this guidance you develop the critical fire support tasks (CFSTs). If you can take the brigade commander's intent for fires and crosswalk it through the task force commander's plan without disconnect, you're making progress.

How CFSTs are written is important. If poorly written, they are little more than a list of things to do at an unspecified time and place—unfortunately, the norm. (See Figure 1.) If developed correctly,

CFSTs clearly restate exactly what the maneuver commander wants fires to do for him. (See Figure 2.) CFSTs aren't rocket science, but they do take some thought to be useful.

CFSTs are mission-specific. CFST "play books" are a good tool to develop; when you're tired, they help you focus. For example, in a deliberate attack, you'll probably have to provide obscuration fires at the breach site, suppress the enemy positions at x point and kill x vehicles in x position with Copperhead rounds or dual-purpose improved conventional munitions (DPICM). In the deliberate defense, you might have to fire a FASCAM minefield to deny the enemy use of an AA, provide killing fires at an obstacle, provide close air support (CAS) into EA x, etc. The point is, don't wait until "the division's movement-to-contact orders briefing" to figure out what you might have to do.

In addition, train your task force fire support officers (FSOs) to write CFSTs correctly. Most of all, train your maneuver commanders to recognize and confirm that the CFSTs accurately reflect their intent for fires.

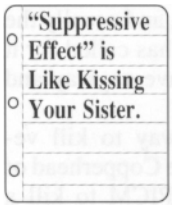
| Critical Fire Support Task |
|---|
| **Task:** Fire SEAD [Suppression of Enemy Air Defenses] |
| **Purpose:** Destroy Enemy ADA [Air Defense Artillery] |
| **Method:** Artillery |
| **End State:** Enemy ADA Destroyed |

Figure 1: Example of a Poorly Written Critical Fire Support Task

And don't write or execute CFSTs in BOS isolation. For example, if "killing Task Force Angel" is a CFST, the air defense artillery (ADA) and S2 reconnaissance and surveillance (R&S) plan play parts in identifying where and when you can accomplish this task.

By extension, if an event is important enough to be a critical task, then not accomplishing it must have some effect on the friendly plan. If not, then the task isn't critical.

One additional note: there's a difference between high-payoff targets (HPTs) and CFSTs—don't make the mistake of thinking they are synonymous.




COLTs can rescue the most screwed-up plan, but a lot of thought needs to go into their employment. COLTs don't do well with mission orders like, "Get out there and tell me what you see."

A COLT needs someone, such as a COLT platoon leader, whose only duty is to work its employment. It's easy to make a grease pencil mark on the map and say, "Go there." Meanwhile, the COLT could have a 700-meter vertical climb if the air insertion doesn't drop the team off at the right point—at best, the team will have to move some distance to find the proper vantage point from which to observe its NAI(s).

And the COLT has other challenges. Take a look at what it carries to accomplish its mission. In addition to the normal gear to survive at the top of some mountain, each COLT has a weapon, a radio with enough batteries for maybe 48 hours, possibly a tactical satellite (TACSAT), a ground/vehicular laser locator designator (G/VLLD) (with a Hellfire ground support simulator, called HGSS, to make the G/VLLD eye-safe) with extra batteries, binoculars, a precision lightweight global positioning system receiver (PLGR), food and a five-gallon can of water—among other things. Small wonder COLTs feel like pack animals.

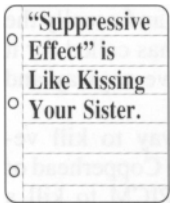
Pre-combat checks (PCCs) for COLTs are critical. I've had a COLT inserted and felt pretty good about its position only to find out it had just enough battery power to get to LD time or didn't have an operational HGSS, meaning the G/VLLD wouldn't work either. Sometimes bad things just happen, but most can be prevented with good PCCs.

With their great information, I think COLTs belong on the brigade fire support net, but that net gets crowded quickly. One technique is to define who has priority during different phases of the fight. For instance, COLTs should have priority during the deep fight.

However, net priority is a rule of thumb—be careful about telling someone to get off the net. Sure enough, that guy will be trying to tell you the entire OPFOR regiment just passed by his location at Warp Factor 1 while the S2 thinks they're still in the motor pool.

In live-fire, COLTs are even more important. If you site them correctly and they have the right equipment, then they receive ground-truth intelligence as if the OPFOR forces were out there instead of pop-ups. Pay attention to what they send—it's exact.

One area of COLT employment that needs work is extraction. COLTs are HPTs for the OPFOR. If COLT members get wounded and there's no plan for extraction, they die and you lose them for 48 hours. That's a significant loss to future operations, is contrary to our doctrine and erodes soldiers' confidence. Extraction of wounded COLTs should *never* be placed in the "too hard" box.




Artillery loves to get credit for killing stuff. It is manly to be on the AAR battle damage assessment (BDA) slide in the T-80 column. However, don't lose sight of the other ways artillery contributes to the fight. Don't bother with the

| Information | Example |
|---|---|
| **Task:** What enemy formation and function you want to affect and the desired effects. | Obscure the N. MRP [northern motorized rifle platoon] on Objective Cowboys for 40 minutes. |
| **Purpose:** The friendly maneuver reason for the effects, where and when. | Limit enemy direct fire and observation of TF 1-67 AR [Task Force 1-67 Armor] while it breaches the obstacles at the point of penetration. |
| **Method:** Who does the task and when it's accomplished. | TF FSO [fire support officer] calls for smoke as lead company team crosses PL [Phase Line] Dog. 2-5 FA fires 750-meter screen x 30 minutes. TF smoke generators augment smoke at POP [point-of-penetration]. |
| **End State:** The definition of success for this task. | TF retains freedom of maneuver as it approaches POP, and breach forces obscured from enemy fires while breach is set. |

Figure 2: Correctly written, critical fire support tasks (CFSTs) should contain the level of detail found in this figure.

our-suppressive-fires-would-have-had-more-effect-if-they-had-been-real-bullets argument. While that may be true, it is not part of the rules of engagement (ROE), and by the way, the OPFOR's fires would have had more effect also.

Instead, when planning, think through what you can deny the enemy using artillery: keep him off a key piece of terrain, close and AA into your flank, make him move and other options that don't appear on the BDA slide but may have more overall effect.

It takes a battalion-three to kill a tank, *assuming* of course the target location is accurate. It will not be accurate. Routine first-round fire-for-effect (FFE) in the desert is a myth. We can't do it and the OPFOR can't either. It isn't the firemarkers who are slow or lost, it's us.

Now, given that target locations are generally inaccurate, how do we clear fires with confidence and eliminate the danger of fratricide? Answer: you can never totally eliminate the possibility of fratricide. For instance, the guy clearing the fires for the task force generally isn't the one observing the targeted area. So, if there's any doubt about friendly locations in relation to the target (and sometime in every battle there will be), don't shoot the target. Get clearance from the lowest level possible.

The NTC ROE say it takes 54 rounds of DPICM to kill an OPFOR tank. *One* round into your own formation will probably result in a tank kill assessment, and that's the way it should be.

> Most FA Missions Have All the Delicacy of a Meat Ax.

We're not performing eye surgery; we're hurling 100-pound chunks of exploding metal long distances at big targets.

Take smoke screens, for example. Artillery continually tries to "adjust the smoke," resulting in a 40-minute effort before the smoke is effective. Get on with it—take the enemy defensive positions that intelligence developed, add 500 meters and throw the screen out there. It will land between the enemy and his obstacle belt. Draw his Red Zone if you need more assurance, but get it going. Smoke has area effects, and usually the maneuver commander has called for it later than he should have anyway and needs it *now*.

Copperhead is the way to kill vehicles. Do the math: one Copperhead or a battalion-three of DPICM to kill a tank. Copperhead requires thinking ahead and situational awareness, but Paladin makes it easier in both the offense and the defense. Angle-T is no longer the "long pole in the tent." Generally the long pole is getting the observer far enough forward to lase the target. So, find the fire support team (FIST) section that's really motivated—it'll find a way to get into position.

CAS is something else we make harder than it should be. Airspace coordination areas (ACAs) require planning and thought or you will shut down the artillery, regardless of whether or not a "meeting engagement" between the aircraft and your bullets is possible. ACAs should be on a clock with fires shut down only for the 30 seconds aircraft are over the target.

The time-hack between the aircraft and FSE is critical. Usually the air liaison officer (ALO) drives the time-hack. He yells over to someone in the FSE, who gets the battalion fire direction center (FDC) on the radio, and they force-feed a "Five minutes from....3, 2, 1, now" hack, regardless of what artillery missions are going down in the zone.

Instead, consider reversing that process and having the FSE give the ALO the time-hack: "Be at the target five minutes from.....3, 2, 1, now." It forces the pilot to already have the target information and keeps the artillery firing potentially critical missions.

> The Fewer Spontaneous Opportunities the Artillery Has, the Better.

That doesn't mean artillery shouldn't be flexible. But there are a lot of moving parts to fire support, and changing one has a domino effect on the others. A standing operating procedure (SOP) understood by everyone—not one published the week before the NTC deployment—makes flexibility a lot easier to attain.

Volume of fire is a pet peeve of mine. It's a shock to find out the battalion-six you thought you fired resulted in some odd number of rounds on the target, a number less than the 108 rounds you expected and not even a multiple of the guns available. That occurs for many reasons, none of which are acceptable.

As the FSCOORD, you expect a volume of fire, and it's up to the FDC at whatever level to make up for guns' being out of action or falling out of a mission. No excuses. This requires platoon FDCs to be aware of what's going on.

Standard fire orders are important. If a first-round FFE has little chance of being accurate on NTC terrain, don't shoot a battalion-12 just because the target description is "an MRB [motorized rifle battalion] stacked like cordwood in the pass." A battalion-three is about right for a standard fire order. If a miracle happens and you're on target, then repeat the mission. If not, then adjust fire and you haven't lost much time.

Another issue to check: management of powder lots. The FDC carefully specifies what lot to use on each mission. However, the soldier in the FA ammunition supply vehicle (FAASV) may be pulling whatever red/white/green bag lot is closest out of the rack and handing it through the door. The gun chief might not be checking it closely enough—if it's the right color and has the right number of increments, it may be going into the breech. So, in essence, you could have the most junior member of the section determining the relative accuracy of your mission because your unit lacks a simple, easy-to-follow method for ammunition segregation and lot management.

Also, train your observers to use "Cease loading, end of mission" instead of just "End of mission." Saying only "End of mission" could result in crews' having to punch a loaded round out of the tube or find a safe place to dump the round. Either way, in live-fire it can bring you to your knees.

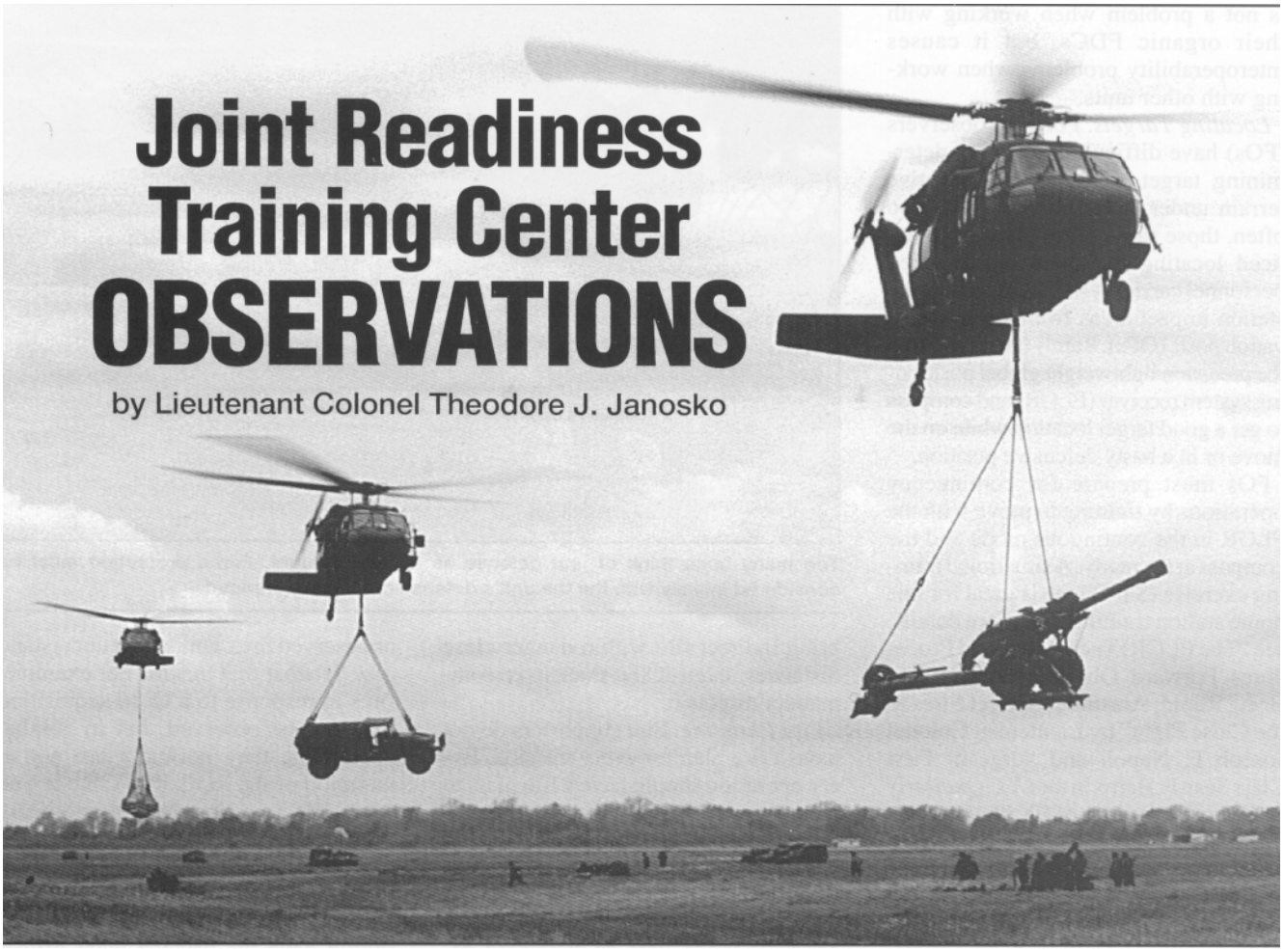
Disciplined crew drill is still the best indicator of a unit's training status. You can't take shortcuts—someone will get hurt. Enough said on that.

A rotation at the NTC is still the best training you'll get, and it isn't carved in stone that you have to learn all the lessons the hard way. Hopefully, this article will help you avoid some of the simple ones.

**Lieutenant Colonel R. Mark Blum commands the 2d Battalion, 5th Field Artillery, part of the 212th Field Artillery Brigade, III Corps Artillery, Fort Sill, Oklahoma. He served with the 3d Infantry Division (Mechanized) in Germany where he was Assistant S3 of the Division Artillery; S3 of the 3d Battalion, 35th Field Artillery; and Executive Officer of the 6th Battalion, 1st Field Artillery. He commanded A Battery, 2d Battalion, 11th Field Artillery in the 25th Infantry Division (Light) at Schofield Barracks, Hawaii. He also served twice as a Battalion Fire Support Officer, Battalion Fire Direction Officer (FDO), Battery FDO and Executive Officer, and as a Company Fire Support Officer, all in the 25th Division and the 197th Infantry Brigade (Separate) at Fort Benning, Georgia.**

# Joint Readiness Training Center OBSERVATIONS

by Lieutenant Colonel Theodore J. Janosko



All Photos by 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 in the country of "Cortina." JRTC exercises the light infantry brigade task force in contingency operations with emphasis on company and platoon operations. In addition, the JRTC conducts specialized rotations, including the NATO Partnership for Peace exercises (the Cooperative Nugget series), and mission rehearsal exercises for units deploying to Haiti and Bosnia.

During the past two years, fire supporters have demonstrated superb attitudes and learned a great deal during their JRTC rotations. Every unit improved and departed Cortina more combat-ready. But there are several areas units need to emphasize in home station training.

In this article, I discuss only four of those areas, given the realities of home station taskings, personnel turbulence and other commitments that make training time premium: indirect fires in the close fight, the targeting process, digital fire planning and unit defense.

**Fires in the Close Fight.** At the JRTC, indirect fires in the close fight are generally ineffective. Figure 1 lists the primary reasons for their ineffectiveness, which I discuss as follows.

*Integrated Battle Drills.* Infantry squads and platoons often fail to initiate indirect fires upon contact. Although *FM 7-8 Infantry Rifle Platoon Squad* includes the use of indirect fires in Battle Drills 1, 2 and 4, maneuver units often lack the combat patience or training to involve indirect fires in the contact. This must be a battle drill practiced at home station—first with key leaders and then with the entire element. These drills could be perfected during situation training exercise (STX) lanes, which also would permit the fire supporter to practice his call-for-fire (CFF) procedures and target location drills.

- Lack of Integrated Battle Drills
- Poor Call-for-Fire Procedures
- Poor Target Location
- Lack of Understanding of Minimum Safe Distances (MSDs)
- Lack of Fire Planning
- Timeliness of Missions/Clearance of Fires
- Lack of Understanding of the Rules of Engagement (ROE)

Figure 1: Primary Reasons for Ineffective Indirect Fires in the Close Fight

*Call-for-Fire Procedures*. Fire supporters often fail to give the six elements of a CFF when they make contact, which forces the fire direction center (FDC) to make repetitive queries as to the nature of the target. The six elements from *FM 6-30 Observed Fire* are observer identification, warning order, target location, target description, method of engagement and method of fire and control. Training in the classroom or the training set fire observation (TSFO) at home station can help fix this problem.

In their standing operating procedures (SOPs), some units have changed the basic CFF from the six elements in three transmissions to a shorter format. This

is not a problem when working with their organic FDCs, but it causes interoperability problems when working with other units.

*Locating Targets*. Forward observers (FOs) have difficulty in rapidly determining target locations in restrictive terrain under adverse conditions. Too often, those same FOs only have practiced locating the same old armored personnel carriers (APCs) in their home station impact areas from static observation posts (OPs). Rarely have they used the precision lightweight global positioning system receiver (PLGR) and compass to get a good target location while on the move or in a hasty defensive position.

FOs must prepare for contingency operations by training to move with the PLGR in the continuous mode and the compass at the ready. A situational training exercise (STX) lane is ideal for this home station training. For more details, see "The PLGR: Techniques and Procedures Forward Observers can use to Bring Rapid, Accurate Indirect Fires to the Close Fight" by Lieutenant Colonel Joseph F. Napoli and Sergeant First Class Sean F. Harris in the *CTC Quarterly Bulletin*, 4th Quarter of FY 96 (Oct 96).

*Minimum Safe Distances (MSDs)*. Many fire supporters are unsure of MSDs or what to do during "danger close" missions. The March-April 1997 edition of *Field Artillery* had an excellent article on MSDs: "Risk Estimate Distances for Indirect Fires in Combat" by Major Gerard Pokorski and Lonnie R. Minton. This article describes the variables that affect the MSD. For the infantryman and fire supporter in the field, we often suggest the 1-2-3-4-5 rule to estimate MSDs (See Figure 2).

At the JRTC, we emphasize that the MSD is just a guide and that maneuver leaders can bring fires inside the MSD, if necessary. We also emphasize to maneuver leaders and fire supporters that danger close is a warning, not a restriction. But fire supporters are hesitant to

| MSD (Meters) | Weapon System |
|---|---|
| 100 | 40-mm (M203, Mark 19) |
| 200 | 60-mm Mortar |
| 300 | 81-mm Mortar |
| 400 | 105-mm Howitzer |
| 500 | 155-mm Howitzer,<br>5-inch -54 Naval Gunfire |

Figure 2: The 1-2-3-4-5 Guide for Minimum Safe Distances (MSDs)

Too many units think of unit defense as an afterthought. Force protection must be considered initially with the the unit's defense continually impared

bring indirect fire within danger close distances, even if the maneuver commander directs it.

*Fire Planning*. Fire supporters do not have a fire plan for every mission. Every operation should have a fire plan, to include tactical assembly areas (TAAs), road clearance operations, patrols and search and attack missions. Continuous fire planning should be stressed at every echelon. In the cases where maneuver conducts inadequate or disjointed deliberate decision making, a hasty fire plan is better than no fire plan at all.

*Timeliness of Fires*. Often fires are requested during contact, and the highly mobile opposing force (OPFOR) target disengages before the rounds arrive. Occasionally the cause of this is gun and FDC mission processing times. To help solve this time problem, indirect fire delivery units should consider decentralizing their assets, especially in search and attack operations. But the majority of the delays are due to clearance of fire problems.

Too often units employ cumbersome clearance of fire procedures that make fires completely unresponsive. Occasionally, even a CFF from a platoon FO with eyes on the target in his platoon's area of operations is not executed until the fires are cleared by company, battalion and brigade. Units need to better understand the clearance process, streamline it and then rehearse that process.

*Rules of Engagement (ROE)*. Another problem fire supporters face during contingency operations is understanding the ROE. Often the ROE do not allow unobserved fires. Units must understand *exactly* what that means. For example, fires in response to a Q-36 acquisition may not be observed, but in combat operations, they normally are not in violation of the ROE. The same is true of an FO adjusting fire on an enemy force. He should be permitted to adjust a round over the target, even if unobserved, because it's a combat operation. Maneuver leaders and fire supporters should have the brigade legal officer clarify such restrictions in the ROE.

**Targeting Process.** The JRTC included the targeting process as one of the top areas in the Trends Reversal Program. The targeting process is critical at both the brigade and battalion levels. At the JRTC, we emphasize using *FM 6-20-10 Tactics, Techniques and Procedures for the Targeting Process* and the $D^3A$ methodology (*decide, detect, deliver, assess*). We know there are units that want to include *track* or another "D" for a second *decide* in the case of peace enforcement operations; but their inclusion depends on the mission, enemy, terrain, troops and time available (METT-T). The key is that everyone must understand the process and how it fits into the unit's battle rhythm.

*Targeting Meeting*. The targeting meeting is the most important event in the brigade's battle rhythm to focus the brigade's combat power to meet the commander's intent. The brigade executive officer should run the meeting, and the entire staff should be represented and come prepared. Many maneuver leaders

would like the meeting renamed "synchronization meeting" to help maneuver soldiers claim ownership of it.

The targeting meeting must concentrate on a specific time period or event and use $D^3A$ methodology (or a METT-T-determined variant). A fragmentary order (FRAGO) should result from each targeting meeting with at least an updated reconnaissance and surveillance (R&S) plan and target synchronization matrix attached to the FRAGO.

Several brigades that conducted successful targeting at their JRTC rotations held their targeting meetings in the early mornings to get the FRAGO to the battalions before noon. The battalions usually conducted their targeting meetings in the early afternoon so their companies could have the battalion FRAGO by late afternoon.

The JRTC produced a "How to Conduct Targeting Meetings" video available from the Center for Army Lessons Learned (CALL). The script "The Targeting Process" is available in the *CTC Quarterly Bulletin*, Second Quarter, FY 97 (Mar 97).

Fire supporters often are asked to facilitate targeting meetings because we understand the process. This is not a problem as long as maneuver leaders accept responsibility for the process and use it to focus the combat power of the brigade or battalion

*Counterfire Fight*. Maneuver leaders often must be reminded that the counterfire fight is a brigade fight, not just a Field Artillery fight. Enemy indirect fire systems (usually 82-mm mortars) are just one of the categories to be considered under the *decide* function during the targeting meeting. All the target acquisition (*detect*) and weapons (*deliver*) systems must be considered to counter the enemy's indirect fire systems.

The FA battalion S2 needs to take an active role in the enemy indirect fire intelligence preparation of the battlefield (IPB). He should be the brigade expert in the enemy indirect fire systems and continually update his pattern of analysis. He must share his expertise with the brigade S2 and attend the brigade targeting meetings. The Q-36 radar and howitzers are just a part of the brigade counterfire fight, not the whole show.

**Digital Fire Planning.** Many units easily establish digital communications among their elements and exchange many useful plain text messages (PTMs), but few use all the fire planning capabilities of the lightweight tactical fire direction system (LTACFIRE) or initial fire support automated system (IFSAS). The battalion fire direction officer (FDO) is often observed struggling with several handwritten and digitally sent target lists during the technical rehearsal, trying to make sense of them all.

Units need to be more imaginative and insistent on meaningful LTACFIRE training at home station. No one should be content with just setting up systems and checking communications. During those training sessions, they should create fire plans, track ammunition, resolve duplicate targets, etc. Many recommend changing the name of this type of training from LTACFIRE training to fire support training.

**Unit Defense.** Too many units still think of unit defense as an afterthought. Force protection must be considered during the initial selection of positions and the positions continually improved.

Many leaders are only familiar with peacetime live-fire restrictions and place road guards on roads to man single strands of concertina. Units must be proactive and use listening posts (LPs), OPs and active patrolling.

The letter, "Through the Eyes of the 1SG: Battery (Light) Defense," by Command Sergeant Major Edward Judie. Jr., in the March-April 1997 edition is a good source for defensive measures batteries should employ. Leaders must properly position all weapons; in addition to crew-served weapons, units should consider using howitzers in the direct fire mode. Units will have to stand-down some gun sections to provide for adequate security and crew down-time.

Some believe that observer/controllers (O/Cs) at the JRTC dictate units use a firebase configuration—not true. METT-T may dictate the firing batteries occupy a firebase configuration. This is often observed during search and attack operations when the enemy air threat is minimal and small guerrilla forces are the primary threat. The new *FM 6-50 The Field Artillery Cannon Battery* (23 December 1996) expanded the firebase appendix (F-10) and provides excellent guidance.

**Conclusion.** These are just a few of the Joint Readiness Training Center observations that may benefit the Army. Observations and tactics, techniques and procedures recommended by the JRTC O/Cs are available in several media, to include the internet (see Figure 3).

The possibility of both light and heavy forces participating in contingency operations is increasing. As Redlegs, we all must continue to emphasize force protection and rapid, effective fires to keep fire support and the Field Artillery *The King of Battle*.

**JRTC Fire Support Division Tactics, Techniques and Procedures (TTP):**
http://call.army.mil:1100/call/ctc-bull/jrtcttp/toc.htm

***Quarterly Fire Support Review:***
http://call.army.mil:1100/call/ctc-bull/jrtcnews/lan97.htm

**Ordering the "How to Conduct Targeting Meetings" Video:**
http://call.army.mil:1100/call/forms/videord.htm

**Fort Polk Home Page:**
url:http://www.jrtc-polk.army.mil

***E-Mail:*** Senior Fire Support O/C: bartelam@polk-emh2.army.mil
Brigade Fire Support O/C: beachga@polk-emh2.army.mil
FA Operations O/C: harpgw@polk-emh2.army.mil
Fire Support Data Analyst: inmanjp@polk-emh2.army.mil

***DSN*** 863-0105/0107 — ***Commercial*** (318) 531-0105/0107

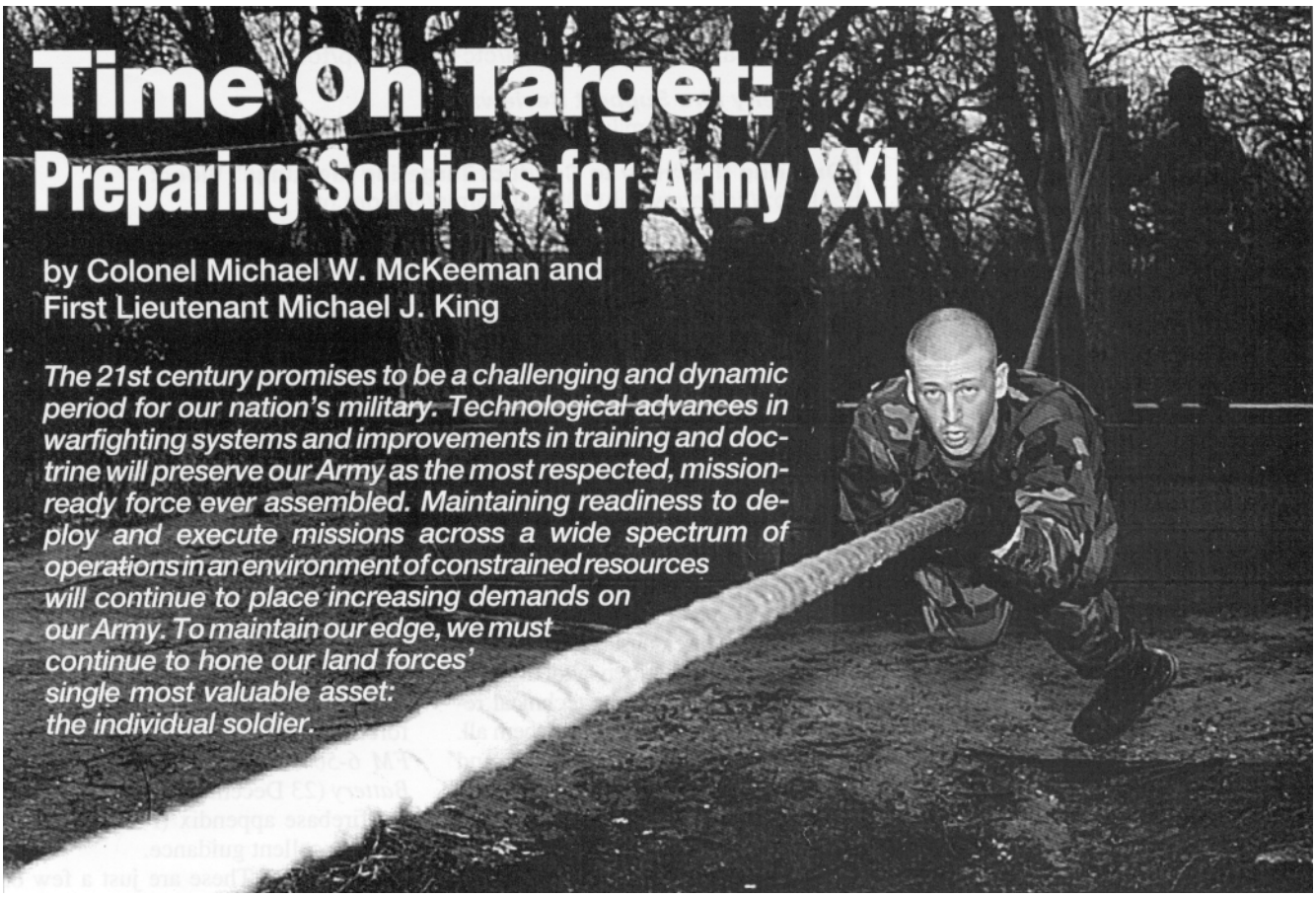
Figure 3: Addresses of JRTC Fire Support Products and O/Cs Available via the Internet

**Lieutenant Colonel Theodore J. Janosko until recently was the Senior Fire Support Observer/Controller at the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana, serving at the JRTC for two years. Currently, he's an Army War College Fellow studying at the University of Texas in Austin. In other assignments, he commanded the 1st Battalion, 319th Airborne Field Artillery Regiment and served as an Assistant Fire Support Coordinator (AFSCOORD) for the 82d Airborne Division at Fort Bragg, North Carolina. He briefly commanded and inactivated the 2d Battalion, 41st Field Artillery and then served as the Division Artillery Executive Officer, both in the 3d Infantry Division (Mechanized), Germany.**

# Time On Target: Preparing Soldiers for Army XXI

by Colonel Michael W. McKeeman and
First Lieutenant Michael J. King

*The 21st century promises to be a challenging and dynamic period for our nation's military. Technological advances in warfighting systems and improvements in training and doctrine will preserve our Army as the most respected, mission-ready force ever assembled. Maintaining readiness to deploy and execute missions across a wide spectrum of operations in an environment of constrained resources will continue to place increasing demands on our Army. To maintain our edge, we must continue to hone our land forces' single most valuable asset: the individual soldier.*



Kevin Tucker, Fort Sill TSC

This article describes how the United States Army Field Artillery Training Center (USA-FATC) at Fort Sill, Oklahoma, prepares new artillery soldiers to maintain that edge. It outlines the responsibility of USAFATC to transform teenagers into soldiers and turn them over to warfighting units to develop those young soldiers into warriors.

**Teenager to Soldier.** To facilitate a teenager's transition to soldier, USFATC adheres to a philosophy that sets the conditions for success: *Spirit + Discipline + Teamwork = Time On Target*. "Time On Target" is—to borrow from Carl von Clausewitz in *On War*—"The end for which a soldier is recruited, clothed, armed and trained, the whole object of his sleeping, eating, drinking and marching is simply that he should fight at the right place and the right time."

As important as the basic and technical military occupational specialty (MOS) skills are, our graduates also must demonstrate spirit, discipline and teamwork to qualify as "soldiers." Spirit is defined as pride in properly wearing the uniform, serving our nation and assuming responsibility for protecting our families. We emphasize the commitment each recruit made when he swore to defend the Constitution of the United States and affirmed his allegiance to the President—the foundation of selfless service to our nation.

The essence of discipline is doing what's right when no one is watching. In initial entry training (IET), soldiers learn military discipline by adhering to performance and conduct standards. Ideally, during the training, a soldier transitions to self-discipline to continue to develop himself morally, mentally and physically.

Teenagers are not accustomed to standards that prescribe every waking activity—from before sunrise to after sunset. Teaching discipline is tough on the new soldier and the leader.

Aerial view of a USFATC "Star Ship" where trainees live and train. *(Photo by Kevin Tucker, Fort Sill TSC)*

We instill in each soldier a sense of teamwork—an understanding that the individual does not succeed unless and until the team succeeds. From battle buddies to the squad, platoon and battery levels, soldiers learn to draw from each others' strengths and compensate for each others' weaknesses to accomplish their missions.

The Time On Target philosophy applies to every soldier, regardless of skill level or MOS. In addition, each must pass the Army physical fitness test (APFT), qualify with his M16A2 in basic rifle marksmanship and hand grenade and pass the end-of-cycle (EOC) proficiency tests to graduate.

**Physical Training.** For most new soldiers, our rigorous physical fitness training program significantly changes their life styles. To leave the 95th Adjutant General Battalion (Reception) and proceed to their IET unit, each male must execute 13 pushups or be assigned to the 95th's Fitness Training Battery (FTB). In the FTB, a trainee undergoes intense PT, cardiovascular endurance training and nutritional instruction for

up to three weeks. When a male soldier can execute 20 pushups, he's ready to begin IET and is assigned to a basic combat training (BCT) or one-station unit training (OSUT) battery.

Within 72 hours of arriving in the battery, all soldiers undergo a diagnostic PT test. A final APFT is administered before the last week of training. As indicated in the figure, our IET soldiers make remarkable progress in their level of physical fitness. This accomplishment

**Basic Rifle Marksmanship** *(Photo by Kevin Tucker, Fort Sill TSC)*

Hand-Grenade Qualification Course Range *(Photo by Kevin Tucker, Fort Sill TSC)*

is a great source of pride for the trainee, increasing his self esteem and confidence as a new soldier.

**Basic Rifle Marksmanship (BRM).** After a progressive two-week training program, soldiers must qualify with their M16A2 rifles. The training is comprehensive, beginning with familiarization and maintenance of the weapon, fundamentals of marksmanship, dry-fire followed by live-fire range procedures, zeroing, downrange feedback and, finally, engagement of fleeting targets on a qualification course. The training is reinforced with continuous practice.

One way we help our soldiers identify BRM problems is with the multipurpose arcade combat simulator (MACS), an indoor weaponeer that simulates a range. The system uses video game-type technology to produce a training aid for trainees to zero in on targets.

In all, the total BRM training program includes 14 classes with 62 hours of instruction and practice. New soldiers leave USAFATC as qualified marksmen, well-grounded in the use and maintenance of their individual weapon.

**Hand-Grenade Qualification.** Presented during the fifth week of training, this instruction introduces new soldiers to a variety of hand grenades and their tactical employment. Soldiers become familiar with methods of hand-grenade delivery and crucial safety factors. The training culminates when the soldier qualifies on the hand-grenade qualification course and throws two live grenades—a definite confidence builder.

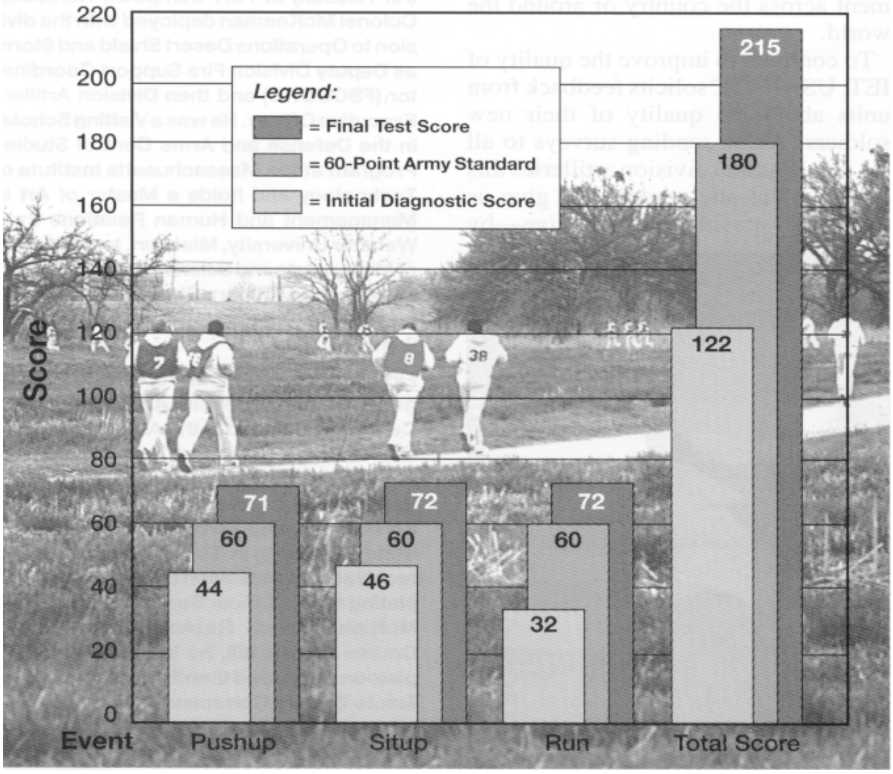
**End-of-Cycle (EOC) Testing.** The last requirement for graduation is EOC testing. The tasks tested are derived from the IET Soldiers' Handbook—Training and Doctrine Command (TRADOC) Pamphlet 600-4, dated 1 January 1996—and generally follow the common tasks all soldiers must perform. A trainee must receive a "Go" in each category to be eligible for graduation.

USAFATC also trains new soldiers in other areas to better prepare them for military service. These include personal and professional awareness; first aid and combat lifesaver skills; nuclear, biological and chemical (NBC) defense; drivers' training; and artillery weapons system familiarization.

**Personal Awareness.** USAFATC's personal awareness classes include financial and stress management, environmental awareness. Army family team building and equal opportunity policies.

**First Aid.** IET soldiers learn to identify and treat a variety of injuries or medical situations. Emphasis is on prevention during these classes. Some OSUT trainees attend the combat lifesavers course (CLC) that builds on basic first aid techniques and teaches soldiers what to do in life-threatening situations. With this training, units gain a CLC-qualified soldier who can augment combat medical personnel.

**NBC Defense Training.** New soldiers learn to identify, react to, protect themselves from and decontaminate themselves and their equipment from




USFATC physical fitness training results in new soldiers' overall performance improving 76 percent. *(Photo by Kevin Tucker, Fort Sill TSC)*

NBC agents during this training. Once a soldier is proficient in NBC tasks, he's introduced to the gas chamber where he quickly learns to appreciate the capabilities of the M40 protective mask.

**Drivers' Training.** Comprehensive drivers' training prepares new soldiers to operate the equipment they'll employ in their first units. Ten percent of all OSUT trainees participate in this program, which includes preparing DA Form 348 Equipment Operators Qualification Record, undergoing physical evaluation of their sight and reaction abilities, and defensive drivers' training. A soldier must receive a score of 70 percent or higher to drive several military vehicles, to include the M998 high-mobility multipurpose wheeled vehicle (HMMWV), M35A2 2 1/2-ton truck and the M925 5-ton truck. He will be able to perform operator preventive maintenance checks and services (PMCS) on the vehicles.

**Artillery Systems Familiarization.** During the last few weeks before OSUT graduation, we tailor training to the weapon system of the unit to which the soldiers will be assigned. For example, a soldier going to the 10th Mountain Division (Light Infantry) at Fort Drum, New York, is trained on the M119 105-mm howitzer. We also cross-train soldiers on other towed and self-propelled artillery systems. At Fort Bragg, North Carolina, and Fort Campbell, Kentucky, for example, the division artilleries and FA brigade have M119 (105-mm) and M198 (155-mm) howitzers, so our trainees must be familiar with both. We also ensure soldiers are familiar with Paladin as well as other self-propelled artillery howitzers. USAFATC's intent is to prepare the soldier for integration into his first unit, giving him a head start on learning his duties.

Once a soldier is proficient in NBC tasks, he's introduced to the gas chamber where he quickly learns to appreciate the capabilities of the M40 protective mask. *(Photo by Richard Sapcutt, Fort Sill TSC)*

Upon graduation, each new skill-level 10 soldier departs USAFATC with a training packet that facilitates his reception and integration into his gaining unit, including a record of his training strengths and weaknesses. At that point, the unit expands the soldier's skills and knowledge, preparing him for deployment across the country or around the world.

To continue to improve the quality of IET, USAFATC solicits feedback from units about the quality of their new soldiers. We're sending surveys to all FA brigades and division artilleries this summer, but any reader may give us feedback—positive or negative—by writing or calling us at the address and numbers listed below.

*(Photo by Kevin Tucker, Fort Sill TSC)*

Commander
US Army Field Artillery Training Center
Fort Sill, Oklahoma 73503-6200
Commercial (405) 442-2011/6198
DSN 639-2011/6198
Fax (405) 442-6118
E-Mail: McKeeman@tngcmd.army.mil

Feedback for USAFATC

We, in the United States Army Field Artillery Training Center, set the conditions for Redlegs' success—we begin the process of instilling spirit, discipline and teamwork into every soldier to be Time On Target. In conjunction with FA units, we'll meet the training challenges of the next century.

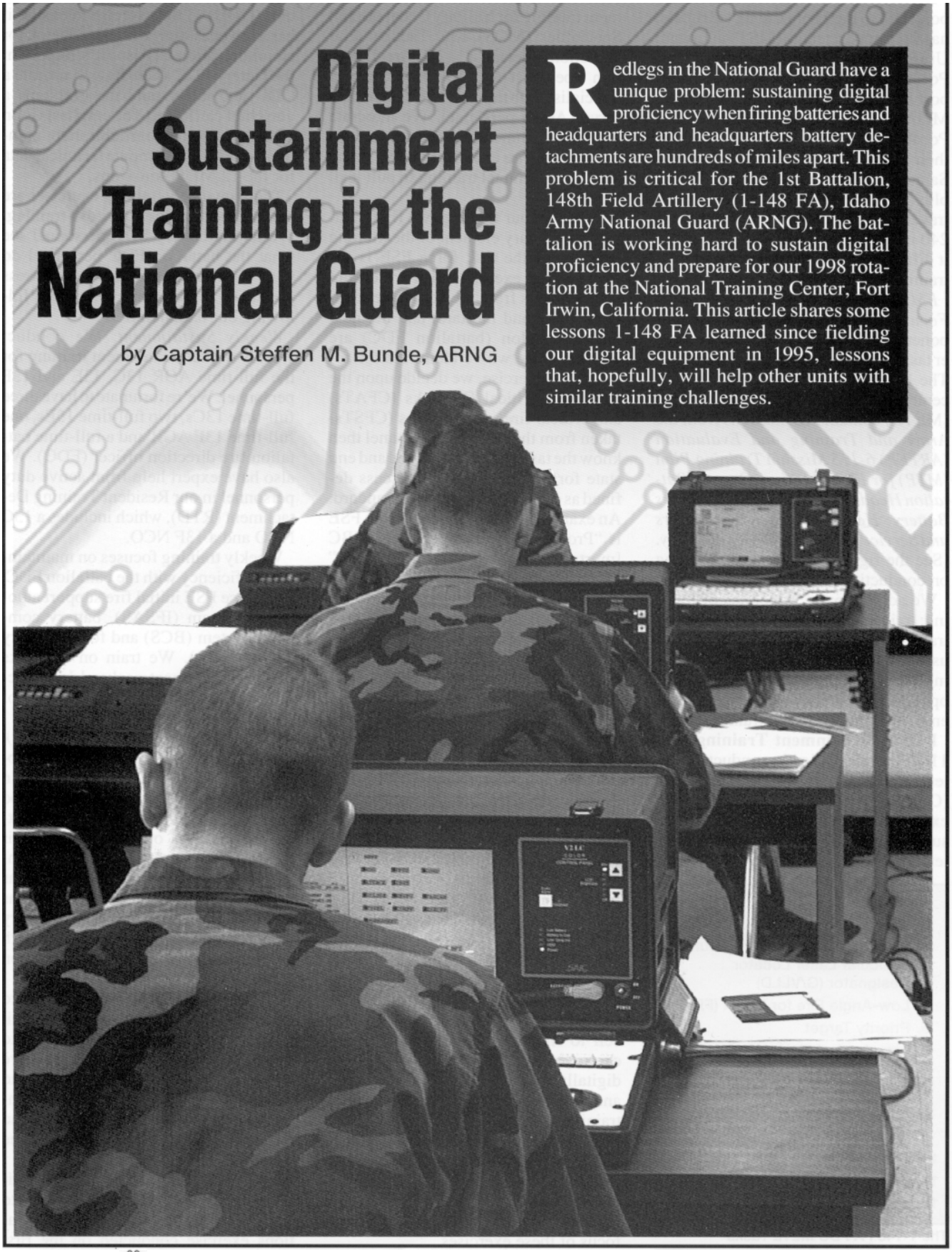
**Colonel Michael W. McKeeman has commanded the United States Army Field Artillery Training Center (USFATC), Fort Sill, Oklahoma, since June 1996. From 1992 to 1994, he commanded the 3d Battalion, 320th Field Artillery in the 101st Airborne Division (Air Assault) at Fort Campbell, Kentucky. Colonel McKeeman deployed with the division to Operations Desert Shield and Storm as Deputy Division Fire Support Coordinator (FSCOORD) and then Division Artillery Executive Officer. He was a Visiting Scholar in the Defense and Arms Control Studies Program at the Massachusetts Institute of Technology and holds a Master of Art in Management and Human Relations from Webster University, Missouri, and a Master of Military Arts and Science from the School of Advanced Military Studies at the Command and General Staff College, Fort Leavenworth, Kansas.**

**First Lieutenant Michael J. King is the Brigade S2 for the Field Artillery Training Center. He enlisted in the Army in 1989 and attended Basic Combat Training and Advanced Individual Training at USFATC at Fort Sill. He was awarded the Green to Gold Scholarship and attended Sam Houston State University in Texas, graduating and receive his commission in 1994. After completing the FA Officer Basic Course and the Multiple-Launch Rocket (MLRS) Cadre Course at Fort Sill, he became an MLRS platoon leader and then 2d Infantry Division Salute Battery Commander in the 6th Battalion, 37th Field Artillery in Korea. Lieutenant King is scheduled to complete his Master of Public Administration (MPA) from the University of Oklahoma in February 1998.**

# Digital Sustainment Training in the National Guard

by Captain Steffen M. Bunde, ARNG

Redlegs in the National Guard have a unique problem: sustaining digital proficiency when firing batteries and headquarters and headquarters battery detachments are hundreds of miles apart. This problem is critical for the 1st Battalion, 148th Field Artillery (1-148 FA), Idaho Army National Guard (ARNG). The battalion is working hard to sustain digital proficiency and prepare for our 1998 rotation at the National Training Center, Fort Irwin, California. This article shares some lessons 1-148 FA learned since fielding our digital equipment in 1995, lessons that, hopefully, will help other units with similar training challenges.



**Background**. 1-148 FA, direct support (DS) to the 116th Cavalry Brigade, has fire support teams (FIST) in Logan, Utah, and in Salmon, Boise and Pocatello, Idaho. Task Force fire support elements (FSEs) are in Bozeman, Montana; Pendleton, Oregon; and Pocatello; the FSEs are 500 miles from their FISTs. Our firing batteries are in Saint Anthony and Blackfoot, Idaho, plus Smithfield, Utah; the maximum traveling distance between batteries is 240 miles. These great distances make it difficult to conduct collective digital training.

*FM 25-101 Training the Force: Battle Focused Training* tells a Reserve Component (RC) unit to concentrate on fewer tasks while training them to standard. The 1-148 FA's battalion fire direction center (FDC) mission-essential task list (METL) contains 12 missions from the *Army and Training and Evaluation (ARTEP) 6-115 Mission Training Plan (MTP) for Field Artillery Cannon Battalion Headquarters and Headquarters Battery; Headquarters, Headquarters and Service Battery; or Service Battery.* (See the figure.) We focus all training on conducting these 12 missions.

We adhere to the principles of training: train as we fight, train to challenge, train to sustain proficiency and train using multi-echelon techniques. Applying these principles, we found many opportunities in the yearly training calendar to conduct digital training.

**Digital Sustainment Training.** The 116th Cavalry Brigade conducts quarterly Janus command post exercises (CPXs) for each task force—a perfect exercise in which to integrate digital sustainment training. We conduct quarterly training for units in the state of Idaho. We also conduct weekly sustainment training for Military Occupational Specialties (MOS) 13C Tactical Fire Direction Specialist, 13E Fire Direction Specialist and 13F Fire Support Specialist full-time Active Guard Reserve (AGR) personnel. We integrate digital sustainment training into all our battery live-fire exercises (LFXs). And last, we use annual training to pull it all together.

1. Radar Registration
2. Laser Registration
3. Low-Angle Adjust with Ground/Vehicular Laser Locator Designator (G/VLLD)
4. Low-Angle Fire for Effect (FFE)
5. Priority Target
6. Low-Angle Adjust with Forward Observer (FO)
7. High-Angle Adjust with FO
8. Time-on-Target (TOT)
9. Simultaneous
10. Copperhead (Dry Fire)
11. Schedule of Fire (Six Targets)
12. Adjust Fire Quick Smoke

The 1-148 FA FDC METL Tasks

To design our training, we first identify the primary element of the training exercise. If the task force FSE is the focus of the exercise, then we ensure that elements from the next lower echelon (FIST and mortars) and the next higher echelon (battalion FDC) are present. Once we've identified the focus of the exercise, we decide upon the exercise's critical FA tasks (CFATs) and critical fire support tasks (CFSTs) taken from the ARTEP. Personnel then know the task, purpose, method and end state for the training with success defined as completing the task to standard. An example of a CFAT for, say, an FSE is "Process area fire mission to MBC [mortar ballistic computer] digitally." CFATs for FISTs include sending all fire missions digitally. For a successful exercise, it's important to define which element is the focus of the exercise.

*FSE Digital Proficiency*. Each maneuver task force conducts quarterly Janus exercises to train the tactical operations center (TOC). We send a section from the battalion FDC to these exercises. Our focus is to practice digital communications with the FSE and practice the 12 METL missions.

Our digital standing operating procedures (SOP) call for decentralized FIST employment. Therefore, we send four FISTs to support the maneuver task force (train as you'll fight). The FIST sends a fire request (FR;GRID) to the task force FSE. The task force FSE sends a digital call-for-fire (CFF) to the mortars (MBC) or to the battalion FDC. Then the battalion FDC sends a voice CFF order (CFF;O) to the Janus control cell to fire the mission. These Janus exercises are the only time we can train digitally with the FSEs in Pendleton and Bozeman, except during annual training.

*FDC Quarterly Training.* We conduct quarterly digital sustainment exercises in Pocatello to train the battery FDCs, battalion FDC and Task Force 2-116 Cavalry FSE. The battery FDCs are the focus of these exercises.

Each battery FDC brings a gun display unit (GDU) to the exercise to ensure it has a lower as well as higher echelon for communications. (Also, it's important the battery FDC know how to operate a GDU and understand the problems a gun chief can have.) The emphasis is on training batteries to troubleshoot communications and compute technical data for the 12 METL missions.

These quarterly training exercises are good opportunities for cross-training. We let the battery FDC personnel see what the battalion FDC personnel do with their messages. Last, we stress practicing digital communications following our battalion SOP.

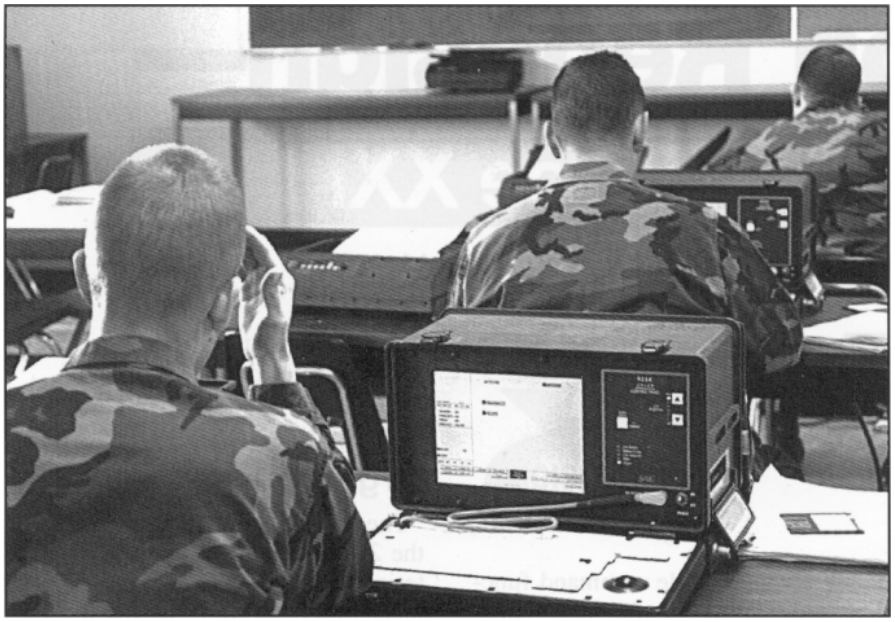
*Weekly Sustainment.* We conduct weekly digital sustainment training for the full-time AGR 13C, 13E and 13F personnel. We're fortunate to have three full-time 13Cs, two full-time 13Es, one full-time 13F AGR and a full-time battalion fire direction officer (FDO). We also have expert help from active duty personnel in our Resident Training Detachment (RTD), which includes a 13C NCO and a 13F NCO.

Weekly training focuses on maintaining proficiency with the battalion FDC, task force FSE initial fire support automated system (IFSAS), battery computer system (BCS) and forward entry device (FED). We train on the tasks required for the next weekend drill. Practicing crew drills is an important part of the weekly training.

*Battery Live-Fire Exercises (LFXs).* Battery LFXs are the best training opportunities for digital sustainment. In the process, we learned it isn't a good idea for battery FDCs to train conducting autonomous operations with their FISTs. In the past, we had trouble transitioning from autonomous operations at the LFXs to decentralized operations at annual training. Therefore, a battery always conducts live-fire training with (at least) a section from the battalion FDC.

Because we have to travel 250 miles to our live-fire area, we use multiple unit training assembly (MUTA) 7 drills to conduct battery live fires. Soldiers leave for the field on a Thursday night and then have Friday and Saturday to complete the key METL live-fire tasks and Sunday for clean up and return to home station.

*Annual Training.* All training culminates in annual training. One key to success is the battalion's communications exercise conducted on the first



Army National Guard Redlegs work hard to sustain digital proficiency when their FDCs are located hundreds of miles apart.

day. We get all vehicles with a digital device together in a central location and verify frequencies, subscriber tables and net settings. This ensures everyone is able to communicate digitally. Also, it forces us to troubleshoot digital problems.

The next key to success is having a plan of the firing missions you want to fire and then digitally executing the plan during an FA technical rehearsal the night before you shoot the missions. Each night we rehearse down to the gun level the following day's expected missions.

Another technique we use is to fire an 0800 time-on-target (TOT) mission every day of live fire. TOTs ensure a battery is ready to fire early in the day.

***Training Tools.*** Great training tools help with digital sustainment. We have Janus; the digital systems test and training simulator (DSTATS), a 486 computer that can simulate any Army fire support digital device; and the guard unit armory device full-crew interactive simulation trainer (GUARDFIST II) that replaces the training set, fire observation (TSFO).

We use Janus FA battalion digital sustainment training. Each firing battery runs a workstation, radar has a workstation, the combat observation lasing teams (COLTs) have a workstation and the maneuver unit with each FIST has a workstation.

Planning is the key to a successful Janus simulation. All communication nodes must be set up and tested well in advance of the exercise. The FED operators at their workstations send in FR;GRID or ATI;GRID on the enemy "seen." The Task Force FSE, talking to FISTs, receives the message and passes it to the battalion FDC. The battalion FDC, set up in its tracked vehicle, receives the message and processes it to the batteries. Each battery FDC processes the mission in its tracked vehicle and passes the fire commands over wire to the battery workstation. The workstation relays back when the guns have fired, and then the batteries process "Shot," "Splash" and "Rounds Complete." The messages relay back to the FEDs, and the observers can assess effects.

Using the DSTATS computer, the radar workstation can send FM;CFF or ATI;GRID to Janus for radar sensings from the workstation. The radar must be cued on the workstation.

Janus exercises require a lot of planning, but they are an excellent driver for a CPX. Janus is also a good computer to include a battery FDC section and run a simulated battle. This allows a section to see a much bigger digital commo picture than it otherwise would get a chance to see.

DSTATS is a great tool to train computer operators. It can simulate messages from any Field Artillery digital device. It uses scripted scenarios and can communicate over wire, radio or telephone lines.

In DSTATS, we have scenarios for each echelon of our 12 METL missions: FIST, FSE, battalion FDC and battery FDC scenarios, the latter for section training during monthly drills. Because it's hard to send training messages through a Q-36 radar, DSTATS helps train battery FDCs to conduct radar registrations.

DSTATS also solves other training problems. For example, DSTATS can replicate a reinforcing unit. DSTATS can receive a request for additional fires (FM;CFF;X) to train an operator in reinforcing unit operations. Also, we use DSTATS to act as a higher FA headquarters, such as a division artillery.

GUARDFIST II interfaces with the FED to train 13F soldiers. It's the training tool for the individual soldier.

For digital sustainment training to be successful, first the battalion commander must be committed to it—his support is vital. Second, the battalion's SOP must support the training. It must have a crew drill for the FIST and procedures for the battery FDC, battalion FDC and task force FSE for each type of mission. Third, the battalion must have combat checklists handy to ensure all levels can execute the missions quickly and accurately.

National Guard Redlegs have 39 days a year to train. To maintain our digital proficiency, we have to make the most of that training time. If other Redleg National Guard battalions integrate digital training into every FTX and CPX, it will pay many dividends, as it has for our battalion.

**Captain Steffen M. Bunde, Idaho Army National Guard (ARNG), is the Battalion Fire Direction Officer for the 1st Battalion, 148th Field Artillery (1-148FA), of Pocatello, Idaho. Also in the 1-148 FA, he commanded B Battery and served as Battalion S1, Battery Executive Officer, Firing Platoon Leader and Battalion Maintenance Officer. In other assignments, he was a Platoon Leader in E Troop, 116th Armored Cavalry Regiment, Idaho ARNG; and Mortar Platoon Leader for C Company, 2d Battalion, 162d Infantry, Oregon ARNG. Captain Bunde is a graduate of the Combined Arms and Services Staff School, Fort Leavenworth, Kansas; Field Artillery Officer Advanced Course and Battalion Tactical Fire Direction System (TACFIRE) Officer Course, both at the Field Artillery School, Fort Sill, Oklahoma; and the Armor Officer Basic Course at the Armor School, Fort Knox, Kentucky.**

# Division Redesign—

## Fires for Force XXI

**by Colonel David P. Valcourt and Lieutenant Colonel Lester C. Jauron**

In November, the 4th Infantry Division (Mechanized), Fort Hood, Texas, will participate in the Division XXI Army Warfighting Experiment (AWE). This will be a corps battle simulation (CBS)-driven command post exercise (CPX) administered by the Battle Command Training Program (BCTP). The focus will be on leveraging information to gain agility, flexibility and simultaneity on the future battlefield.

The AWE objectives include validating the interim division design, organizing division battle command functions and facilities around information and determining the effects of future weapons systems and munitions. This article describes the role of fires in the organization, battle command structure and tactics for the Division AWE.

## Division XXI Proposed Organization

The construct for the Division AWE is the 2003 battlefield employing the interim division shown in Figure 1. Augmentation from corps usually includes the two reinforcing (R) Field Artillery brigades and an attack helicopter battalion—the Apache Longbows.

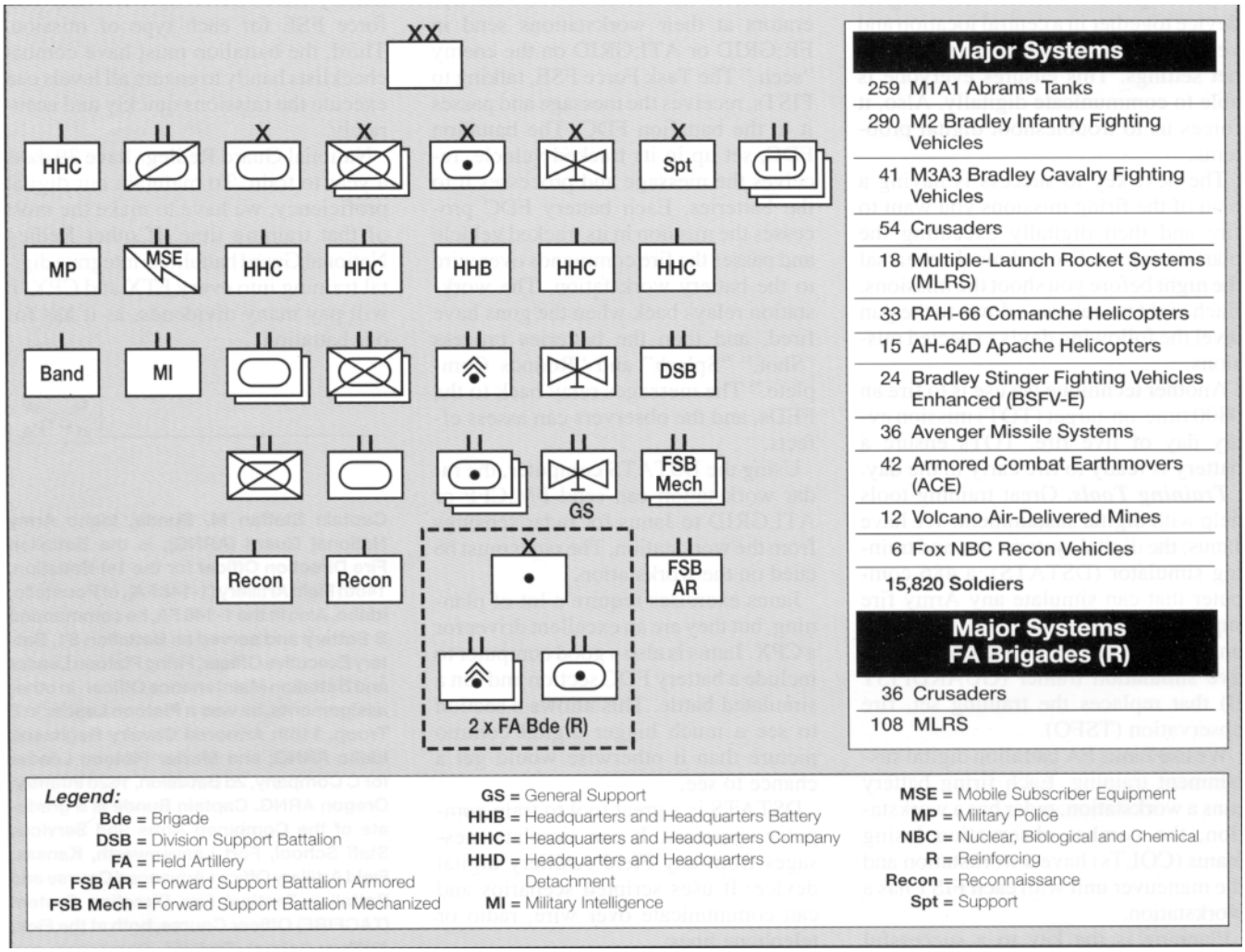



Figure 1: Division XXI Structure. Note that two FA brigades (the 214th and 138th FA Brigades) will be reinforcing (R) the division during the November AWE.

| Munition | Delivery System | Range | Submunitions | Seeker Radius | Target |
|---|---|---|---|---|---|
| ER-DPICM | Crusader | 45.6 km | 85 | N/A | All |
| SADARM (PI) | Crusader | 26.9 km | 2 | 150 m | Moving/Stationary Light Armored Vehicle |
| MLRS-ER (G) | MLRS | 60/15 km | 500 | N/A | All |
| MSTAR | MLRS | 60/15 km | 3 | 4 km | Moving/Stationary |
| ATACMS I | MLRS | 165/25 km | 950 | N/A | Armored Vehicle Soft/Stationary |
| ATACMS Ia | MLRS | 300/70 km | 300 | N/A | Soft/Stationary |
| ATACMS II | MLRS | 140/35 km | 13 | 4 km | Moving Armor |
| ATACMS IIa | MLRS | 300/100 km | 6 | 4 km | Moving/Stationary Armor |

***Legend:***

**ATACMS** = Army Tactical Missile System

**DPICM** = Dual-Purpose Improved Conventional Munition

**ER** = Extended Range

**G** = Guided

**MLRS** = Multiple-Launch Rocket System

**MSTAR** = MLRS Smart Tactical Rocket

**SADARM (PI)** = Sense and Destroy Armor (Product Improvement)

Figure 2: This chart lists the capabilities of the munitions the division will use during the upcoming Division XXI AWE.

The division artillery (Div Arty) has three direct support (DS) battalions with three six-gun batteries of Crusaders and the command and attack battalion. The latter has two M270A1 multiple-launch rocket system (MLRS) batteries of nine launchers each and the target acquisition battery.

The two FA brigades—214th FA Brigade, III Corps Artillery, and 138th FA Brigade, Kentucky Army National Guard—each has two M270A1-equipped MLRS battalions and one Crusader battalion. Significantly, both will employ the initial fire support automation system (IFSAS) rather than the advanced FA tactical data system (AFATDS) in the AWE.

The division commander has an impressive array of precision-guided munitions to help him shape the battlefield to create the conditions for employing dominant maneuver. Additionally, the corps commander controls the Army tactical missile system (ATACMS) Blocks I, Ia, II and IIa missiles and can allocate these to the division, as necessary. (See Figure 2.)

However, the division's most important combat multiplier is its enhanced ability to gain, process and distribute information. The division has access to a robust suite of sensors fully integrated as the five components of the Army tactical command and control system (ATCCS); IFSAS (in lieu of AFATDS); maneuver control system-Phoenix (MCS-P); all-source analysis system (ASAS); forward area air defense command, control, communications and integration system (FAADC$^3$I); and combat service support control system (CSSCS). The division also can distribute information to the lowest level over the tactical internet.

This ability to share information, while not perfect, gives the division tremendous agility and flexibility. When combined with its enhanced weaponry, the division can mass combat power at decisive points throughout its battlespace almost simultaneously. This will allow the division to control the tempo of the operation, dislocate enemy strength and create the conditions for asymmetrical maneuver fights.

## Battle Command Structure

The division's battle command structure is designed to leverage gaining, processing and distributing information. The concept is to enhance synchronization by using two small tactical command posts (TAC1 and TAC2) to synchronize and execute all current operations in the division's battlespace.

Simultaneously, a larger, more robust division main command post (DMAIN) maintains the relevant common picture, plans branches and sequels and conducts the *decide* portion of the *decide-detect-deliver-assess* targeting process from a fixed location beyond the range of enemy rocket artillery.

**TAC1.** The two tactical command posts are organized somewhat differently. As shown in Figure 3 on Page 26, TAC1 is configured in M1097 high-mobility multipurpose wheeled vehicles (HMMWVs) with rigid-wall standard integrated command post system (SICPS) tents for rapid deployment and is designed to synchronize and execute all current operations. It's the larger of the two TACs and is resourced for continuous operations.

The rationale for incorporating subordinate unit headquarters into TAC1 is to create a flatter architecture for planning and execution and eliminate the need for a deep operations coordination cell (DOCC) and rear operations cell. Additionally, we have proposed adding an AFATDS-equipped liaison officer (LNO) from the command and attack battalion (2-20 FA).

**TAC2.** This TAC operates from five command and control vehicles ($C^2$Vs) to facilitate $C^2$ and operations on the move (see Figure 4 on Page 27). It isn't resourced for continuous operations. As a result, TAC2 only deploys as needed to control a collateral operation, such as a river crossing, to assume control if the enemy destroys TAC1 or as a jump-CP when TAC1 displaces.

**DMAIN.** The DMAIN is responsible for most of the functions previously performed by the DMAIN and the division rear command post (DREAR). Significantly, it has no current operations execution responsibilities.

The DMAIN has four cells: the information, intelligence and plans cell (IIPC); the targeting and fires cell; the mobility and survivability cell; and the sustainment cell.

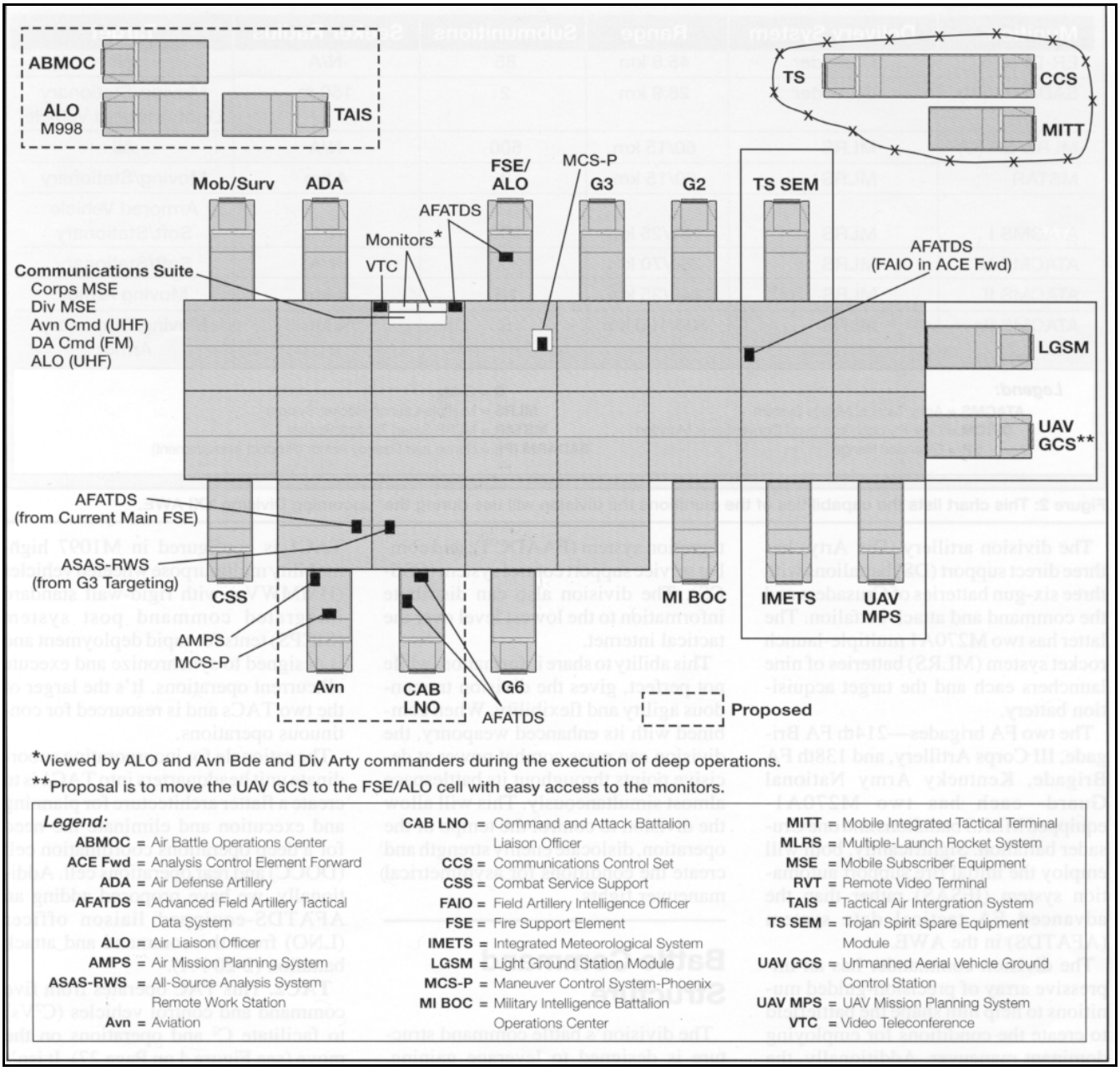



Figure 3: TAC1 Design. Note the integration of the military intelligence battalion operations center (MI BOC), air defense battalion (ADA) operations center, aviation (Avn) tactical command post and command and attack battalion (2-20 FA) LNO into TAC1. All vehicles are M1097 high-mobility multipurpose wheeled vehicles (HMMWVs) with the standard integrated command post system (SICPS) except as noted.

• *IIPC.* This cell includes the command information center, G3 plans, G3 operations, G6 public affairs, psychological operations (PSYOP), G2 operations and the analysis and control element (ACE). The cell maintains the division's relevant common picture; develops the division's daily reconnaissance, surveillance and security (RS&S) plan; and plans branches and sequels to current operations.

• *Targeting and Fires Cell.* The cell includes G3 targeting, air defense artillery (ADA), Army airspace command and control ($A^2C^2$) and the DMAIN fire support element (FSE). The ADA and the air liaison officer (ALO) in HMMWVs are collocated with but not "counted" as part of the DMAIN.

The targeting and fires cell develops the fire support, air defense and aviation annexes to the operations order (OPORD); refines targeting products; and develops attack plans for aviation deep attacks, close air support (CAS) and artillery strike force operations. Precise alignment of sensors and shooters is so critical that a full-time G3 targeting section is resourced under the new division structure and operates from this cell.

Because shaping the battlespace requires close synchronization among planning, targeting and information operations, we've proposed combining the targeting and fires cell with the IIPC.

• *Mobility and Survivability Cell.* This cell includes the engineer brigade headquarters and chemical officer and is responsible for mobility and force protection throughout the division's battlespace.

• *Sustainment Cell.* The division support command (DISCOM) command post, G4, G1, G5/civil affairs battalion, surgeon, chaplain, staff judge advocate (SJA), inspector general (IG) and support operations center (SPOC) are in this cell. Close by in HMMWVs but not included as part of the DMAIN are the mobile subscriber equipment (MSE) nodes and weather center.

## Division XXI Tactical Operations

The division will fight much differently than a division organized under the Army of Excellence (AOE) design. An AOE division conducts separate deep and rear operations to set the conditions to defeat the enemy in the close maneuver fight. Division XXI will leverage information to attack the enemy simultaneously throughout the battlespace, establishing the conditions that allow maneuver brigades to conduct decisive operations. Mass characterizes an AOE division's fight while simultaneous, distributed operations are the norm for Division XXI.

The 4th Infantry Division sequences its operations differently as well. First, it fuses intelligence to gain information dominance over the enemy. Second, it executes shaping fires from aviation, CAS and artillery throughout its battlespace to precisely set conditions for dominant maneuver. Only after intelligence and fires have established conditions does the division employ the bulk of its maneuver forces to complete the destruction of the enemy. Force protection and sustainment occur throughout the operation.

Given this sequence of operations, the precise application of fires is key to successfully implementing the division commander's guidance. This section of the article describes a concept for using the Div Arty and the two reinforcing FA brigades in these operations.

**Protecting the Force.** Counterfire is one of the most important contributions fires make to protecting the force. The 4th Infantry Division combines proactive and reactive counterfire, to defeat the enemy fire support system early in the fight.

The Division XXI Simulation Exercise 1 (SIMEX 1) AWE in early June at Fort Hood, Texas, for the first time pitted the division against the simulated BCTP opposing force (OPFOR). During SIMEX 1, the division used fires from artillery, aviation and CAS along with intel to attack the OPFOR's 9A52 multiple rocket launcher (MRL) battalion that accompanied his independent tank regiment. This first critical fire support task was essential in order to "level the table"—reduce the division's vulnerability to the MRLs' ten-kilometer range advantage.

Another important aspect of force protection concerns information operations, a Division XXI mission-essential task list (METL) task. In order to limit the information the enemy can gather on the division, fires attempt to "blind" the enemy by attacking his special purpose forces (SPF), unmanned aerial vehicle (UAV) airfields and other enemy information feeds.

• *Proactive Counterfire.* Our objective is to conduct 75 percent proactive counterfires—it's better to kill the enemy's artillery before he can use it. The division centrally plans and then task-organizes subordinate units to accomplish proactive counterfire.

The Div Arty TOC usually is task-organized with a common ground station-prototype (CGS-P) and a global broadcast system/battlefield dissemination display (GBS/BADD). These systems allow the Div Arty S2 and S3 to battletrack. They help the S2 cross-cue available sensors—UAV, joint surveillance and target attack radar system (JSTARS), advanced Quick Fix (AQF), Apache Longbows and our own Firefinder radar—to locate OPFOR artillery.

To defeat the OPFOR deception and use of decoys while maximizing targeting resources, cross-cueing is essential. For example, JSTARS moving target indicators (MTIs) detect the OPFOR's initial movement and then vector the detection into the telescope eye of the UAV, which provides the data required for targeting. To date, the UAV has proven

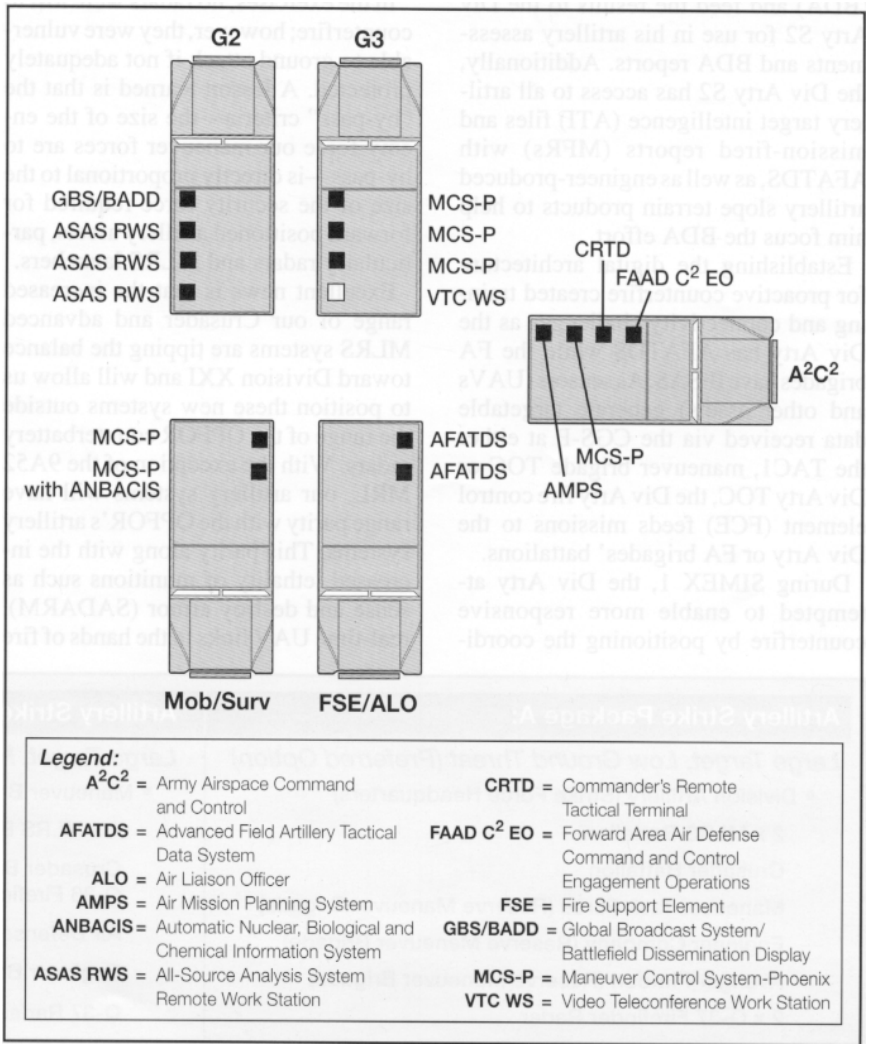



Figure 4: TAC2 Design. This small, mobile command post can control collateral or jump operations for limited periods. It isn't resourced for continuous operations.

a powerful tool—the best "eyes" to help the division seize the initiative with fires by attacking targets out to the limits of our weapons systems and fire support coordinating measures (FSCM).

Because the UAV is a limited resource, the decision of how, when and for what purpose the UAV needs to be employed is a green-tab decision. Our experience, both in the recent SIMEX 1 and the March 1997 Task Force XXI AWE at the National Training Center, Fort Irwin, California, is that the UAV can collect intelligence or targeting data for fires, but it can't do both simultaneously. Therefore, in the TAC1, command and control of the UAV ground control station (GCS) should move to the FSE/ALO cell (see Figure 3 on Page 26); in that location, it will help the ALO, Div Arty commander and aviation brigade commander execute the deep attack.

The ACE and the S2s use UAVs to conduct battle damage assessment (BDA) and feed the results to the Div Arty S2 for use in his artillery assessments and BDA reports. Additionally, the Div Arty S2 has access to all artillery target intelligence (ATI) files and mission-fired reports (MFRs) with AFATDS, as well as engineer-produced artillery slope terrain products to help him focus the BDA effort.

Establishing the digital architecture for proactive counterfire created training and connectivity challenges as the Div Arty has AFATDS while the FA brigades have IFSAS. As sensors (UAVs and other assets) generate targetable data received via the CGS-P at either the TAC1, maneuver brigade TOC or Div Arty TOC, the Div Arty fire control element (FCE) feeds missions to the Div Arty or FA brigades' battalions.

During SIMEX 1, the Div Arty attempted to enable more responsive counterfire by positioning the coordinated fire line (CFL) closer to the forward line of own troops (FLOT), opening more area for sensor-to-shooter engagements and using our improved situational awareness to rapidly adjust the CFL. Although this effort was not as successful as we had hoped, we believe continued training will improve this Force XXI capability.

Each FA brigade establishes an IFSAS-equipped LNO team at the Div Arty TOC to quickly pass missions to the FA brigades. The LNOs also ensure the FA brigades know the location of the CFL and no-fire areas (NFAs) beyond the FLOT.

• *Reactive Counterfire.* The 214th FA Brigade provides reactive counterfire. During SIMEX 1, The brigade had six Q-37 radars—two organic to the division, two from the corps target acquisition battery and two decoys. The decoys were positioned near the radars in an attempt to deceive enemy acquisition systems.

In the exercises, no radars were lost to counterfire; however, they were vulnerable to ground attack if not adequately protected. A lesson learned is that the "by-pass" criteria—the size of the enemy force our maneuver forces are to by-pass—is directly proportional to the size of the security force required for forward positioned artillery assets, particularly radars and MLRS launchers.

Excellent news is that the increased range of our Crusader and advanced MLRS systems are tipping the balance toward Division XXI and will allow us to position these new systems outside the range of the OPFOR counterbattery radars. With the exception of the 9A52 MRL, our artillery systems will have range parity with the OPFOR's artillery systems. This parity along with the increased lethality of munitions such as sense and destroy armor (SADARM), real-time UAV links in the hands of fire supporters and the extended range of our Firefinder radars have given the OPFOR much to think about before firing his artillery. Perhaps the BCTP staffer said it best at SIMEX 1: "The OPFOR artillery expires before it fires!"

• *Hunter-Killer Teams.* The division uses task-organized hunter-killer teams to prevent enemy artillery from interfering with air assaults, penetrations and other critical division operations. It also employs the teams to prevent the enemy from using artillery-delivered scatterable mines and chemicals to block critical choke points or delay friendly units.

The hunter-killer team is usually an MLRS battery armed with MLRS smart tactical rockets (MSTARs) or MLRS-extended-range guided rockets (MLRS-ER) (G) munitions. It's task-organized with a Q-37 radar, engineer assets, ADA coverage and a security force to defeat ground threats. It's placed under the operational control (OPCON) of the maneuver unit for movement.

By participating in the synchronization of the operation, establishing a direct link to cuing agents inside the executing unit and ensuring accurate critical friendly zones (CFZs) and call-for-fire zones (CFFZs), the hunter-killer team can kill enemy artillery before it can react to affect the supported operation. A direct digital link between the firing unit and the Q-37 allows the hunter-killer team to rapidly shut down enemy fires directed against a critical division operations, such at the landing zone of a friendly air assault.

The Div Arty S2 uses MFRs, ATIs, UAV BDA feeds and munitions effects analysis (MEA) to keep a near-real-time running estimate of the enemy volume of fires and the status of enemy artillery groups. This is invaluable intelligence for the division commander.

| **Artillery Strike Package A:** | **Artillery Strike Package B:** |
|---|---|
| *Large Target, Low Ground Threat (Preferred Option)* | *Large Target, High Ground Threat* |
| • Division Artillery (Strike Force Headquarters) | • Maneuver Brigade (Strike Force Headquarters) |
| 2 x MLRS Battalion | 2 x MLRS Battalion |
| Crusader Battalion | Crusader Battalion (DS to Maneuver Brigade) with |
| Maneuver Task Force (Reserve Maneuver Brigade) | Q-36 Firefinder Radar |
| Engineer Company (Reserve Maneuver Brigade) | Air Defense Battery (DS to Brigade) |
| Avenger Platoon (Reserve Maneuver Brigade) | Engineer Battalion (-) (DS to Brigade) |
| 2 x Q-37 Firefinder Radar | Q-37 Radar Battery |

Figure 5: Artillery Strike Packages A and B. The division artillery tactical operations center (TOC) provides command and control for Strike Package A; a maneuver brigade controls Strike Package B.

The Div Arty S2 provides a detailed assessment of projected enemy artillery actions before major decisions or every six hours. Additionally, the Div Arty S2 provides a "tube count" of each enemy artillery group every 12 hours. This product is merged with the division ACE's enemy estimate and provided to the force.

**Fusing Intelligence.** The division's objective while conducting intelligence fusion is to gain information dominance over the enemy. Fires support this effort using sensor-to-shooter links to provide timely, accurate and lethal fires to division security forces and by destroying critical enemy sensors and command and control facilities.

• *Sensor-to-Shooter Fires for Security Forces.* Normally the division cavalry squadron provides security for the division. The Crusader battalion from the 138th FA Brigade usually is assigned a DS mission to the cavalry squadron. When DS to the cavalry, this battalion provides an IFSAS-equipped LNO team to the squadron TOC.

Another option is for a divisional Crusader battalion or an MLRS unit from one of the FA brigades to establish a quick-fire channel with the cavalry squadron. If the aviation brigade is the security force, the divisional command and attack battalion is the best choice because it supports the aviation brigade during division-controlled attack aviation operations.

• *Sensor-to-Shooter Fires for Critical Targets*. Using sensor-to-shooter links to destroy enemy counterbattery radars, air defense radars and command and control facilities is critical to achieving information dominance. The division planning team identifies sensor-to-shooter requirements, and the targeting team refines these during the targeting process.

The division's only MLRS battalion with AFATDS, the command and attack battalion (2-20 FA), currently is the obvious choice for conducting sensor-to-shooter attacks. The integration of the command and attack battalion LNO into TAC1 facilitates establishing and rehearsing the digital mission path for these targets and clearing targets short of the CFL through the TAC1 FSE. In the digital architecture, the sensors send target data to TAC1, which sends the mission immediately to the MLRS battalion and an MFR to the Div Arty TOC.

**Executing Shaping Fires.** To establish conditions for dominant maneuver, the division attacks high-payoff targets (HPTs) throughout the depths of its battlespace. These shaping actions are usually the division's initial main effort. In addition to fires, the division uses artillery strike packages, aviation deep attacks and CAS to shape battle-space. Nonlethal fires are integrated into each of these operations. Each requires detailed planning, synchronization and coordination. Shaping operations are planned at the DMAIN and synchronized and executed from TAC1.

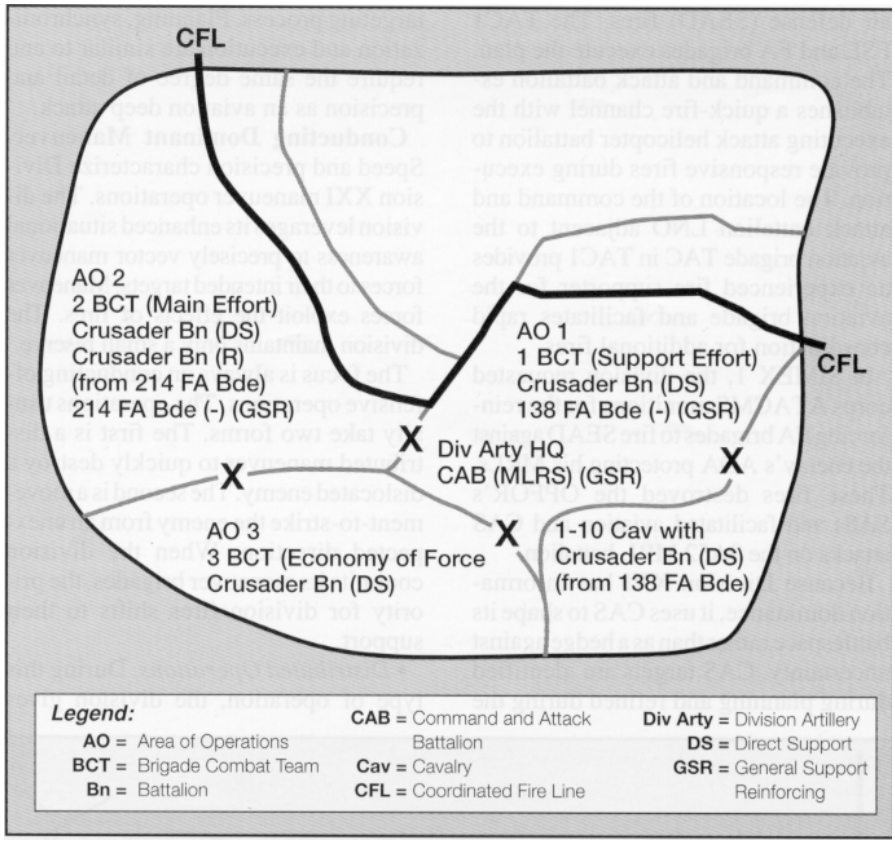



Figure 6: Division Area of Operations in the Distributed Attack, Each brigade has a large AO to facilitate applying distributed combat power throughout the battlespace simultaneously. An FA brigade is GSR to the main and supporting attacks; a division CFL facilitates rapid engagement of division high-payoff targets.

Shaping operations require a clear delineation of responsibility between the division and corps. Experience suggests that deconflicting by target is the best option. In addition, procedures are in place to facilitate rapid, real-time deconfliction of fires, airspace and engagement areas during execution. *ST 6-20-30 Fire Support for Division XXI* offers some outstanding techniques for deconflicting joint, corps and division operations during planning and execution.

• *Artillery Strike Packages.* The division uses two standard packages to conduct artillery raids near or beyond the FLOT. (See Figure 5.) The division planning and targeting teams use these packages as a start point as they plan and synchronize the operation. The package chosen depends on the target, ground threat and distance the strike force must go to accomplish its mission.

Strike packages usually use precision-guided munitions to complete the mission before the enemy can react. Sensors send feeds directly to the strike force headquarters or to the strike force through TAC1. Signal elements, air and ground cavalry, logistical elements and the ACE provide additional support as required. The 214th FA Brigade provides reactive counterfire, if necessary.

• *Division-Controlled Aviation Attacks.* The division conducts aviation deep attacks separately or in combination with artillery strike force operations. Deep attacks are planned in the DMAIN and executed from TAC1. Because there's no DOCC, the division staff and subordinate units synchronize the operation and oversee execution. Each of the executing units has a command post in TAC1, making collaborative planning easier.

The aviation brigade fire support officer (FSO) plans suppression of enemy

air defense (SEAD) fires. The TAC1 FSE and FA brigades execute the plan. The command and attack battalion establishes a quick-fire channel with the executing attack helicopter battalion to provide responsive fires during execution. The location of the command and attack battalion LNO adjacent to the aviation brigade TAC in TAC1 provides an experienced fire supporter for the aviation brigade and facilitates rapid coordination for additional fires.

In SIMEX 1, the division requested corps ATACMS munitions for the reinforcing FA brigades to fire SEAD against the enemy's ADA protecting his MRLs. These fires destroyed the OPFOR's SA8s and facilitated aviation and CAS attacks on the 9A52 MRL battalion.

Because Division XXI has information dominance, it uses CAS to shape its battlespace rather than as a hedge against uncertainty. CAS targets are identified during planning and refined during the targeting process. Planning, synchronization and execution are similar to and require the same degree of detail and precision as an aviation deep attack.

**Conducting Dominant Maneuver.** Speed and precision characterize Division XXI maneuver operations. The division leverages its enhanced situational awareness to precisely vector maneuver forces to their intended targets. Maneuver forces exploit the effects of fires. The division maintains only a small reserve.

The focus is always on conducting offensive operations. The operations usually take two forms. The first is a distributed maneuver to quickly destroy a dislocated enemy. The second is a movement-to-strike the enemy from an unexpected direction. When the division commits its maneuver brigades, the priority for division fires shifts to their support.

• *Distributed Operations.* During this type of operation, the division gives maneuver brigades large zones to provide maximum flexibility. Normally, an FA brigade is general support reinforcing (GSR) to the Div Arty. The division keeps the command and attack battalion in general support (GS) and arms it with MLRS-ER (G), MSTAR or ATACMS to range division HPTs.

This organization maximizes the fires available to the maneuver brigades while providing responsive fires against division HPTs. The division often weights its main attack with precision-guided munitions (PGMs) rather than additional maneuver battalions. It task-organizes each Field Artillery brigade with Q-37 radars and establishes a division CFL to facilitate the rapid engagement of division HPTs. Figure 6 on Page 29 shows how the division might organize a distributed attack.

• *Movement-to-Strike.* This operation attacks an enemy force from an unexpected direction. The division often

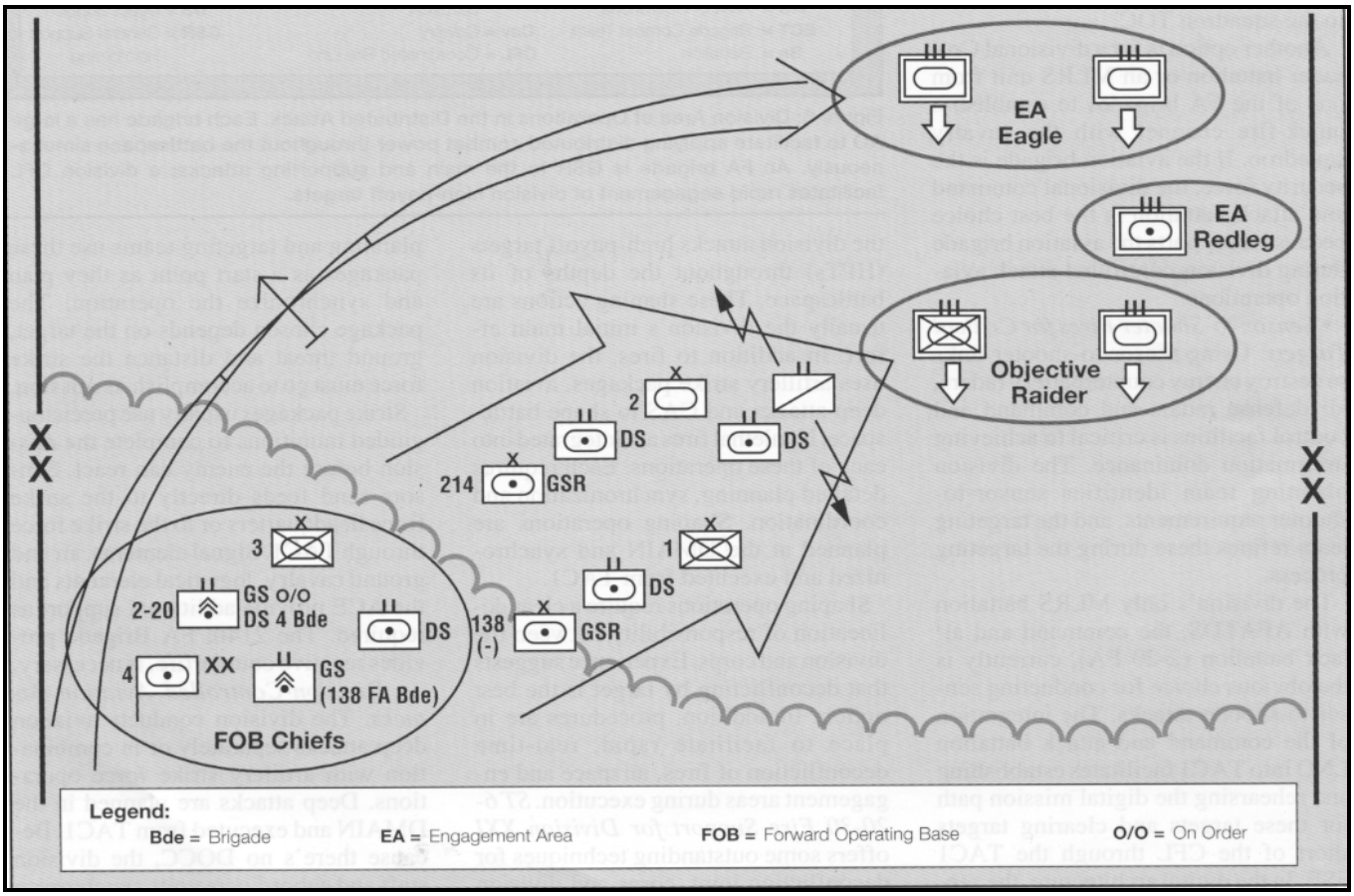



Figure 7: Movement-to-Strike Illustration. Under the control of 3d Brigade Combat Team's (3 BCT's) FOB Chiefs, Artillery Strike Package B begins attritting the moving enemy division. The strike package includes 2-20 FA (MLRS) and an MLRS battalion from the 138th FA Brigade. On order, the aviation brigade with 2-20 FA DS attacks to destroy the enemy's second-echelon regiments in EA Eagle. A division (-) moving in echelon attacks through the FOB Chiefs to destroy the enemy's first-echelon regiments in Objective Raider. The Crusader battalion from the 138th FA Brigade is DS to the cavalry squadron. The 214th FA Brigade and 138th FA Brigade (-) are GSR to the maneuver brigade DS battalions. Under division artillery control, GSR elements destroy the enemy's division artillery group (DAG) in EA Redleg.

conducts this operation in two phases. Figure 7 shows how the division might organize a movement-to-strike operation.

The first phase is an artillery strike operation to shape the battlespace for the employment of ground maneuver. The 4th Infantry Division configures the strike force to set conditions using fires and gain a secure forward operating base (FOB) for employing ground maneuver forces in the future.

As conditions are set, the division commits ground maneuver forces through the FOB to attack the enemy, which begins the second phase of the operation. Normally the division employs an echelon formation or wedge to provide maximum combat power forward. The cavalry squadron provides security forward and maneuver brigades provide flank security.

The Crusader battalion from the 138th FA Brigade is DS to the cavalry squadron, and maneuver brigade DS battalions are integrated into the brigade formations. The aviation brigade, with the command and attack battalion DS, strikes second-echelon formations simultaneously with the ground maneuver attack. The reinforcing FA brigades are GSR to the Div Arty and are integrated into the maneuver formations as required to range HPTs.

The concept is to conduct a massive ambush striking the enemy simultaneously with fires, aviation and ground maneuver throughout the depth of his formation. The division and brigades deconflict fires by target and clear fires over the division voice fire support net.

**Sustaining the Force.** Division XXI's most significant logistical challenge is ammunition resupply. Computer simulations and Task Force XXI experience demonstrate that the availability and use of the UAV and other deep sensors resulted in increased ammunition consumption.

Initial required supply rates (RSRs) often will exceed organic haul capability. The division uses a combination of logistically tailored packages throughput to units, supply point distribution and flexible asset management to meet the ammunition challenge. Sustainment operations are transportation-based rather than supply-based.

• *Logistical Package Distribution.* The corps and division precisely tailor logistical assets to meet expected tactical requirements. A forward logistics element (FLE) from a corps support group (CSG) supports each FA brigade. Additionally, the DISCOM develops a tailored logistical package to support each artillery strike operation and throughputs this to the strike force after it completes its mission.

• *Supply Point Distribution.* Division XXI also uses supply point distribution. The DISCOM establishes ammunition transfer points (ATPs) in each forward support battalion (FSB) and in the division support battalion (DSB). It configures these based on anticipated requirements.

Battalion administration logistics operations centers (ALOCs) use situational awareness to vector ammunition vehicles to the correct ATPs based on future requirements. Battalion ammunition sections establish upload areas for rearming on the move or pushing ammunition directly to the batteries.

• *Flexible Asset Management.* Situational awareness allows the division to maximize the capabilities of its limited transportation assets. Crusader ammunition carriers don't always accompany their guns. So using situational awareness, empty ammunition carriers can return immediately to the ATP or battalion trains for resupply.

The Division XXI DISCOM uses air resupply to deliver critical, low-density ammunition such as MSTAR, SADARM or MLRS-ER (G) precisely where and when required. Additionally, the phased nature of the division fight—intel fusion, shaping fires, dominant maneuver—enables logisticians to task-organize transportation assets early to assist in the ammunition resupply effort.

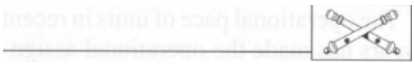
## Conclusion

Organizing around information rather than combat systems is the essence of the Division XXI AWE. This article lays out a blueprint for organizing fires to support Division XXI. It will change as we gain experience. The schedule ahead provides many challenges and learning opportunities: a complete TOC rebuild; a connectivity exercise; four battle staff exercises to refine our tactics, techniques and procedures (TTP); battle staff drills; and the Division XXI AWE in November. One lesson we've already learned is that our superb soldiers and outstanding NCOs will find innovative solutions to the problems we encounter during the AWE.

Equally important is the tremendous opportunity for this experiment to blend an active component Div Arty and FA brigade with an outstanding Army National Guard FA brigade, "Kentucky Thunder," and prove the concept for our future force.

As former Chief of Staff of the Army General (Retired) Gordon R. Sullivan wrote in his book *Hope Is Not A Method,* "...our task is...to take the best Army in the world and make it the best Army in a different world—a world moving into the information age." The *real* objective of these experiments is to empower soldiers to leverage information to survive and win on the future battlefield.

Our creed in the 4th Infantry Division, the Ivy Division, is "Take care of soldiers as we transform the best Army in the world into an even better Army for the 21st century."



**Colonel David P. Valcourt has commanded the 4th Infantry Division (Mechanized) Artillery, Fort Hood, Texas, since June 1996. He also commanded the first battalion in the Army to be fielded the Paladin M109A6 howitzer, the 2d Battalion, 17th Field Artillery, III Corps Artillery, Fort Sill, Oklahoma. He served as the Chief of the Field Artillery Branch at the Total Army Personnel Command, Alexandria, Virginia; G3 of III Corps Artillery, S3 of the 212th Field Artillery Brigade, also part of III Corps Artillery; and Executive Officer of 2d Battalion, 17th Field Artillery, part of the 2d Infantry Division in Korea. He's a graduate of the Naval War College, Newport, Rhode Island, and holds a master's degree from Springfield College in Massachusetts.**

**Lieutenant Colonel Lester C. Jauron until recently was the Deputy Fire Support Coordinator of the 4th Infantry Division (Mechanized). He now commands the 409th Base Support Battalion in Vilseck, Germany. His previous assignments include commanding the 9th Battalion, 1st Field Artillery, in the 4th Infantry Division and A Battery, 2d Battalion, 41st Field Artillery and A Battery, 25th Field Artillery, both in the 3d Infantry Division (Mechanized) in Germany. He also served as a Small Group Instructor for the Field Artillery Officer Advanced Course at the Field Artillery School, Fort Sill, Oklahoma. He holds a Master of Business Administration from Oklahoma City University and a Master of Military Art and Science from the School of Advanced Military Studies, Command and General Staff College, Fort Leavenworth, Kansas.**

# Open Letter to New FA Officers

by Lieutenant Colonel Douglas G. Beley

## Dear Lieutenant:

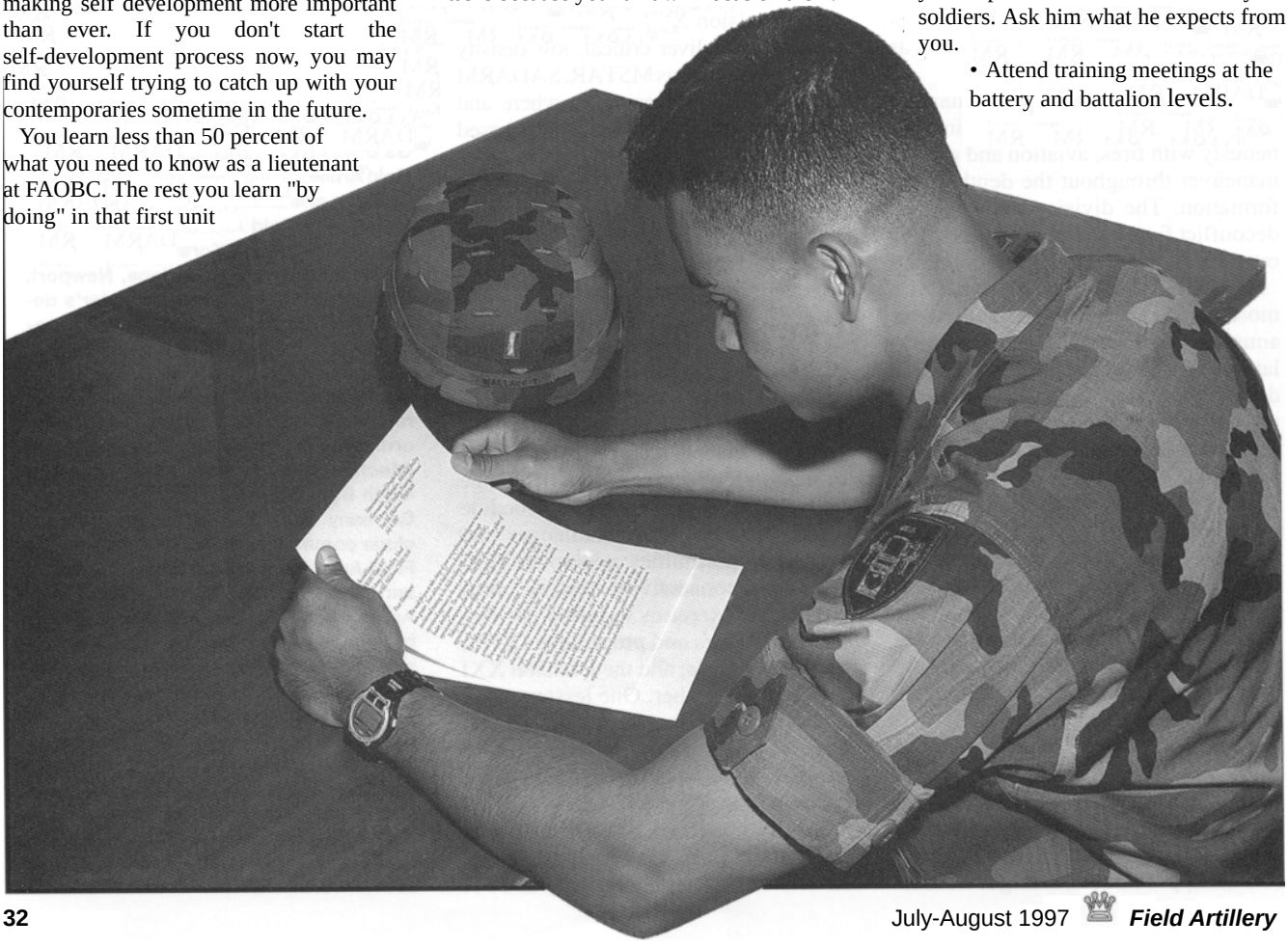
The need for you to take charge of your professional development has never been greater. Your ability to lead soldiers is developed and honed through institutional training in the Field Artillery Officer Basic Course (FAOBC) at Fort Sill, operational experience in units and self development—the three pillars of leader development.

The operational pace of units in recent years has made the operational assignment pillar especially challenging. Today's soldiers and leaders are deployed from home station approximately 134 days each year. I submit that this pace will continue for at least the immediate future, making self development more important than ever. If you don't start the self-development process now, you may find yourself trying to catch up with your contemporaries sometime in the future.

You learn less than 50 percent of what you need to know as a lieutenant at FAOBC. The rest you learn "by doing" in that first unit after graduation. Your challenge is to know what to do and seek opportunities to learn and perform key leader tasks. (To minimize the number of surprises new officers face, many commanders have leader certification programs.)

The objective of this letter is to provide a list of tasks not accomplished in FAOBC but expected of lieutenants—"certification" tasks, if you will. Although the list is not all-inclusive, it will provide an azimuth to follow early in your career.

You'll learn many other tasks naturally as you prepare and execute combined arms training in exercises such as situational training or combined arms live-fire with the maneuver unit your battalion supports. I did not address these tasks because your unit will focus on them.



## In the First 30 Days—

• Read your battalion's policy letters, standing operating procedures (SOPs) and table of organization and equipment (TOE) and modified table of organization and equipment (MTOE). This is a lot of reading but fundamental to your early success.

• Visit Army Community Services (ACS). You need to know what's available to your soldiers.

• Conduct property inventories. You need to know the equipment your section must have to accomplish its mission and whether it's all there. Your battery supply officer or sergeant can help.

• Zero and qualify with your weapon. All your soldiers already have done so.

• Meet the battery and battalion family support group coordinators. They can help you learn what the pressing issues are for your soldiers and their families.

• Seek counsel with your battery commander (BC). Understanding his priorities for the unit will help you formulate your own.

• Counsel your NCO. Let him know your expectations for both him and your soldiers. Ask him what he expects from you.

• Attend training meetings at the battery and battalion levels.

## In the First 60 Days—

• Achieve safety certification for artillery or rocket firing. Your studies at FAOBC will serve you well here—but do *not* put this task off. Do it early, if possible.

• Perform risk analysis and brief risk management techniques for a training event. You need to do this for *every* training event. Brief your BC or task force fire support officer (FSO). Risk analysis and management together are an art you learn through repetition.

• Perform preventive maintenance checks and services (PMCS) on your tracked and wheeled vehicle types. Get to know your equipment. Your platoon sergeant or section chief are good sources of expertise.

• Perform PMCS on the section's communications equipment. An artilleryman who cannot communicate cannot shoot.

• Study the battalion training guidance. You need to know your battalion commander's training plan "cold." Additionally, read the division artillery (or brigade) commander's annual and quarterly training guidance.

• Read the mission training plan (MTP) and skill level III soldiers manuals. These will help you begin to develop training goals and ensure you know what to expect of your senior NCOs.

• Review DA Form 2406 Materiel Condition Status Reports for your equipment. Ask yourself, "Does the readiness of my equipment improve the unit's readiness posture?" Get the latest monthly report from the motor officer or sergeant.

• Observe or conduct an after-action review (AAR) following a training event.

• Learn about the Army oil analysis program (AOAP), scheduled services and prescribed load list (PLL) operations. Army standards in these areas are high. Knowledge about them will help you keep your section's equipment readiness high.

• Review the section's maintenance records. You need to know not only what's wrong with your equipment, but also what's being done about it. Don't just look at your vehicles' records; look at the records for *all* section equipment, including radios, protective masks and any sets, kits and outfits.

• Discuss the Uniform Code of Military Justice (UCMJ) with your BC. Observe an Article 15 session.

• Review distinguished leader or small unit competitive programs. These will show you what the chain of command deems important.

• Familiarize yourself with post or unit environmental policies and how they apply to you in the motor pool, the field, etc.

## In the First 90 Days—

• Brief your section on Army training and evaluation program (ARTEP) tasks to complete. Establish and enforce high but realistic standards. Make sure you are in line with your battery and battalion commanders' training guidance.

• Explain the Army weight control program. Talk to the first sergeant (1SG) and BC.

• Explain the alcohol and drug abuse program. Discuss policy with the battery representative.

• Write an awards recommendation. Talk to your platoon sergeant and see the battalion adjutant for guidance.

• Complete the common task test. Your platoon sergeant or section chief will gladly help you prepare.

• Meet the family of each of your soldiers. Show you care. Learn the names of each spouse and child.

• Attend your community's new family orientation. Learn what services the post provides for soldiers.

• Become qualified on the unit-level logistics system. You must understand the systems that influence your unit's readiness. This task may take some time, but it will be time well-spent. Your motor officer or sergeant can help you here.

• Attend the battalion commander's quarterly training brief with the commanding general. This will provide an excellent perspective as you prepare training plans for your battery, section or platoon. This quarterly briefing will give you the "big picture" every officer needs.

## In the First 120 Days—

• Run a small arms zero or qualification range.

• Complete a report of survey investigation.

• Attend a promotion board for sergeant/staff sergeant. You need to understand how soldiers demonstrate they meet standards and are ready to be a part of the NCO corps.

• Conduct a line-of-duty investigation.

• Prepare an NCO efficiency report (NCOER). Discuss policy with your 1SG. Read the last few *NCOER Updates* on the internet on the Army Home Page (http://www.army.mil) under the Sergeant Major of the Army (SMA) portion.

• Determine your section's training status. Learn the battery mission essential task list (METL). Know which of your section's (or platoon's) tasks support the battery METL and rate them as "Trained," "Untrained" or "Needing Practice." Develop a training plan to improve your section's training posture.

• Explain the section's training status to the battalion commander.

• Understand reenlistment policy. Visit the battalion reenlistment NCO. Know both Army policy as well as your battalion and battery incentive programs.

A very good sergeant once told me that "soldiers are attracted by confidence and will follow any leader who is capable of making sound judgments. Confidence and wisdom are felt within by the individual in charge but seen in the form of discipline and respect in the eyes of those he leads."

Use this checklist of tasks to build confidence. The reward for doing so will be that both you and your section routinely meet the standards. Know yourself, your job and your men and you will be a wise young leader.

Take charge of your professional development, Lieutenant. Your future and the Army's depend on it.

**Lieutenant Colonel Douglas G. Beley commands 3d Battalion, 30th Field Artillery (formerly the Officer Student Battalion) in the Field Artillery School, Fort Sill, Oklahoma. His previous assignments include serving as S3 and Executive Officer of the 3d Infantry Division (Mechanized) Artillery in Germany; Assistant Fire Support Coordinator and S3 fo the 3d Battalion, 3d Field Artillery, both in the 2d Armored Division at Fort Hood, Texas; and Commander of A Battery in the 3d Battalion, 9th Field Artillery, 214th Field Artillery Brigade, III Corps Artillery at Fort Sill. Lieutenant Colonel Beley also was a Platoon Leader, Maintenance Officer and Operations Officer for D Battery, 3d Battalion, 84th Field Artillery, part of the 56th Field Artillery Command in Germany. He's a graduate of the Air Command and Staff College at Montgomery, Alabama.**

# Paladin Training Strategy

## Breaking the Paradigm

**by Major Thomas S. Vandal**

Since the 1996 fielding of the M109A6 Paladin howitzer in the 1st Cavalry Division Artillery (Div Arty) at Fort Hood, Texas, the "Red Team" quickly realized the necessity of breaking the howitzer training paradigm. Many of the tactics, techniques and procedures (TTP) practiced by the direct support (DS) battalions were no longer applicable. The meaning of terms such as "advance party," "line of metal" or "artillery maneuver" changed.

For example, Paladin platoons and crews operate in a more decentralized mode. Crews must be able to conduct indirect fire on the move, every move. Paladins truly "maneuver" on the enemy in some operations, such as raids. In addition, survivability moves are conducted more frequently inside much larger position areas.

Other examples: the Paladin's dispersed operations and increased maneuvering result in larger platoon fronts directly impacting platoon command and control. Digital operations are conducted over longer doctrinal distances.

With these and other operational changes brought about by Paladin, we had to adapt TTP and "re-engineer" our training concept to take advantage of Paladin's capabilities. This article addresses some of the significant changes we made to our training strategy, covering such aspects as Paladin artillery tables; our training to prepare for a rotation at the National Training Center (NTC). Fort Irwin, California, and sustain combat readiness; the design of artillery ranges to maximize the versatility of Paladin; and leader training.

**Paladin Tables.** As the Red Team fielded Paladin, the Commanding General of the 1st Cavalry Division directed we align the artillery tables with the M1 Abrams tank and M2 Bradley fighting vehicle tables so division soldiers would share common terms and levels of collective training. The Div Arty assessed the "old" M109A3/A5 artillery tables, analyzed Paladin's new requirements as defined in *Army Training and Evaluation Program (ARTEP) 6-Paladin-30 Mission Training Plan (MTP)* and aligned the requirements with the tank and Bradley tables. The result was 18 new gunnery tables for Paladin that identified the tasks, conditions and standards for every level of collective training from howitzer section through a brigade fire coordination exercise (FCX). (See Figure 1.) These tables became the building blocks for all Div Arty Paladin training.

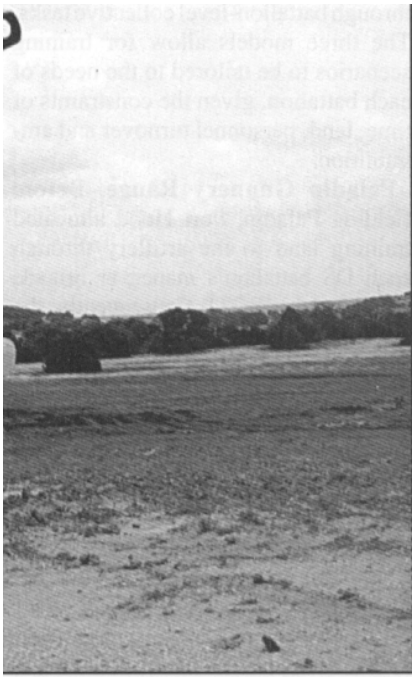
The tables provide leaders from section chiefs to the DS battalion commander a strategy for progressive, sequential gunnery training, including a comprehensive list of both firing and non-firing gunnery tasks for every level. The tables lead training through dry-fire qualification before live-fire qualification. (See Figure 2.) Tables 2, 4, 11, 14 and 17 are the critical gates units must complete before they can live fire in the qualification tables (8, 12, 15 and 18).

Essentially, leaders at the various levels in each DS battalion can build a tactical, mission-essential task list (METL)-based scenario around the

| | | |
|---|---|---|
| **PT 1** | Gunner's Test Training | (Dry) |
| **PT 2** | Crew Gunner's Test | (Dry) |
| **PT 3** | Crew Training | (Dry) |
| **PT 4** | Crew Qualification | (Dry) |
| **PT 5** | MK-19/M2 Training | (Dry) |
| **PT 6** | Direct Fire Training | (Dry) |
| **PT 7*** | Situational Training Exercise Lanes | (Dry/Live) |
| **PT 8*** | Crew Qualification | (Live) |
| **PT 10** | Platoon Training | (Dry) |
| **PT 11*** | Platoon Qualification | (Dry) |
| **PT 12*** | Platoon Qualification | (Live) |
| **PT 13** | Battery Training | (Dry) |
| **PT 14** | Battery Qualification | (Dry) |
| **PT 15** | Battery Qualification | (Live) |
| **PT 16** | Battalion Training | (Dry) |
| **PT 17** | Battalion Qualification | (Dry) |
| **PT 18** | Battalion Qualification | (Live) |
| **PT 20** | Brigade Fire Coordination Exercise/Combined Arms Live-Fire Exercise | (Live) |

* PTs trained at Brookhaven Multipurpose Artillery Range (BMAR).

Figure 1: Paladin Tables (PTs). These are the artillery tables developed for Paladin tasks, conditions and standards and aligned with Bradley fighting vehicle and Abrams tank tables. Note that the Paladin Tables do not include PT 9 or PT 19; these two numbers were omitted to keep Paladin training aligned with Bradley and Abrams training.



Paladin Tables. The result is a training methodology standardized Div Arty-wide that leaders can use to correct specific weaknesses.

**Training for the NTC and After.** Once we defined the "cornerstone" for our training strategy, the Paladin Tables, we adapted the tables to maximize training opportunities for units in the division's Green, Amber or Red status. Obviously, the DS battalion's status has an impact on resources—the personnel and ranges available.

The Div Arty assessed the training methods of its three DS battalions and the lessons learned at the NTC to determine which training events were essential to prepare a battalion for a rotation and—even more important—to assume division ready brigade (DRB) status for deployment. In all, we determined three models for our DS battalions to use in a 12- to 18-month period: NTC training, gunnery and fire support sustainment training, and off-cycle (new team) training.

*NTC Training Model*. Each DS battalion approaches its training for the NTC as the catalyst for developing a program to validate its combat readiness. The Red Team NTC training model defines the Paladin Tables and fire support training events to be executed during the brigade's 17-week train-up window. (See Figure 3.) The model progresses from company fire support team (FIST), combat observation lasing team (COLT) and howitzer section training events during the first two to four weeks and culminates with a brigade-level FCX.

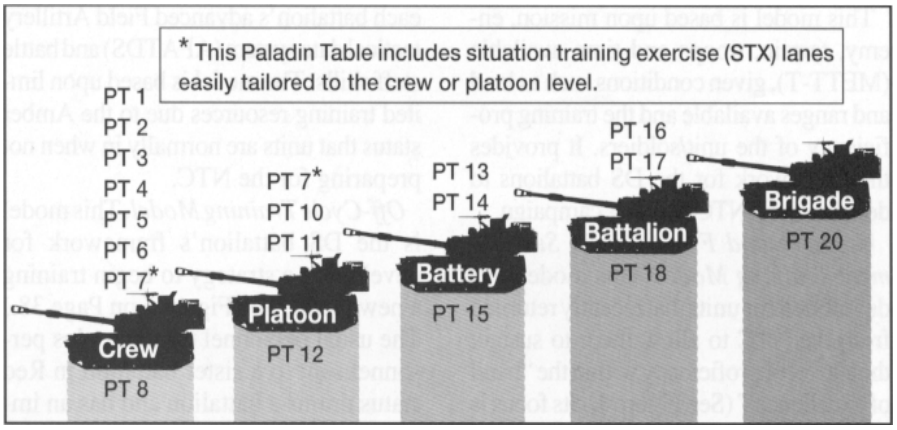



Figure 2: Progressive, Sequential Paladin Tables. The tables are conducted sequentially at each collective level of training. The PTs on the top are "dry" fire tables or gates while the PTs on the bottom are qualification tables.

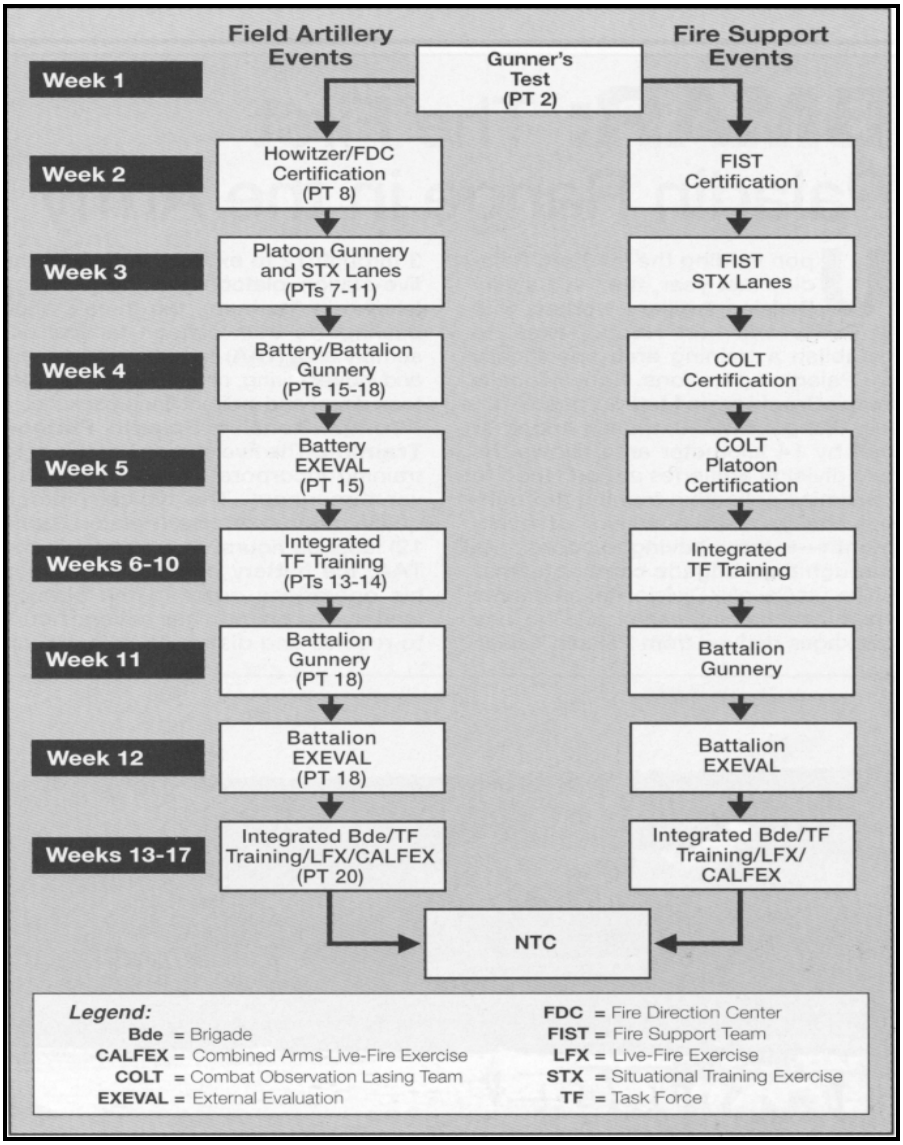



Figure 3: Division Artillery Paladin Training Model for the NTC. The model has progressive training events that a direct support (DS) battalion executes in a typical NTC train-up cycle. The FA and fire support training events are trained during the same weeks.

This model is based upon mission, enemy, terrain, troops and time available (METT-T), given conditions such as land and ranges available and the training proficiency of the unit/soldiers. It provides the framework for the DS battalions to develop their NTC training campaign.

*Gunnery and Fire Support Sustainment Training Model.* This model was developed for units that recently returned from the NTC to allow them to sustain their level of proficiency within the "band of excellence." (See Figure 4.) Its focus is on section and platoon collective tasks (Tables 1 through 12) while maximizing the fire support sustainment training (FSST) and Janus exercises to maintain each battalion's advanced Field Artillery tactical data system (AFATDS) and battle staff skills. The model is based upon limited training resources due to the Amber status that units are normally in when not preparing for the NTC.

*Off-Cycle Training Model.* This model is the DS battalion's framework for developing a strategy to begin training a new team. (See Figure 5 on Page 38.) The usual personnel turnover plus personnel sent to a sister battalion in Red status drains a battalion and has an impact on unit proficiency, often precluding collective training above the section level. The model is progressive, sequential and allows training on section-through battalion-level collective tasks. The three models allow for training scenarios to be tailored to the needs of each battalion, given the constraints of time, land, personnel turnover and ammunition.

**Paladin Gunnery Range.** Before fielding Paladin, Fort Hood allocated training land to the artillery through each DS battalion's maneuver brigade combat team (BCT). Consequently, the artillery was constantly trying to acquire enough land to train. With Paladin, the Red Team needed even more space to train Redlegs to maneuver and fire the weapon from dispersed locations—both integrated into one range "package."

# **BMAR:** The First Paladin Range in the Army

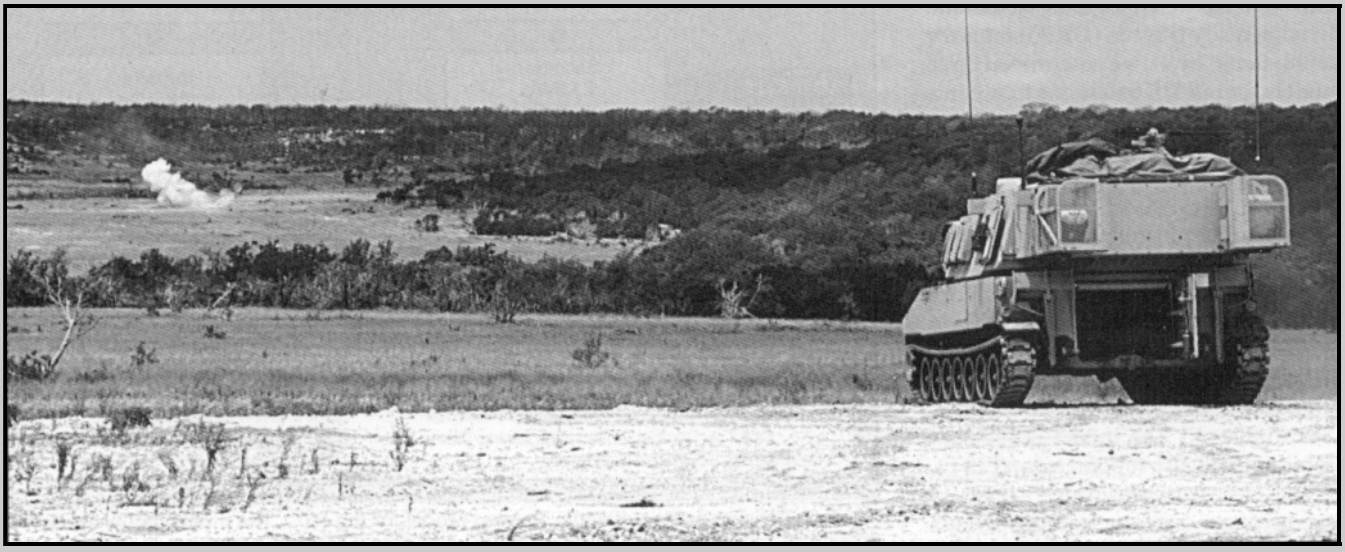
Upon fielding the M109A6 Paladins last year, the 1st Cavalry Division Artillery worked with III Corps and Fort Hood, Texas, to establish a training area specifically for Paladin operations. Known locally as the Brookhaven Multipurpose Artillery Range (BMAR), the six and one-half by 14 kilometer area allows the two division artilleries at Fort Hood to maximize collective training throughout the year—two weeks of every month—without having to coordinate through their brigade combat teams.

The 1st Cavalry Division tailored three situational training exercise (STX) lane packages derived from Paladin Tables 3 through 12 to execute in BMAR: the five-station platoon training package (shown in the map), the three-station package to train platoon tactical assembly area (TAA) operations and direct and indirect firing, or the one-station platoon direct and indirect firing package.

**Comprehensive Paladin Platoon Training.** The five stations of this lane training incorporate fire and maneuver throughout. The typical platoon qualification exercise (Paladin Table 12) lasts 30 hours. At Station 1 in the TAA, the battery commander issues his operations order to the platoon leader. The platoon has several hours to receive and distribute its ammunition, conduct precombat checks and inspections, conduct troop leading procedures, establish communications and initialize to establish a firing capability. The platoon then conducts a tactical move to Station 2 to be evaluated on fire and maneuver.

While in Station 2, the platoon conducts tactical moves, performs position area reconnaissance, conducts deliberate occupations, establishes a firing capability and conducts indirect fire missions and survivability moves.

Station 3—the indirect fire station—is arguably the soldiers' most challenging. It integrates firing all section weapons and includes all tasks from emergency missions and direct fires. To ensure the tactical fidelity of the scenario, the platoon receives its range safety briefings at the start in Station 1. Therefore, when the section arrives at Station 3, it transitions to direct firing without pause.



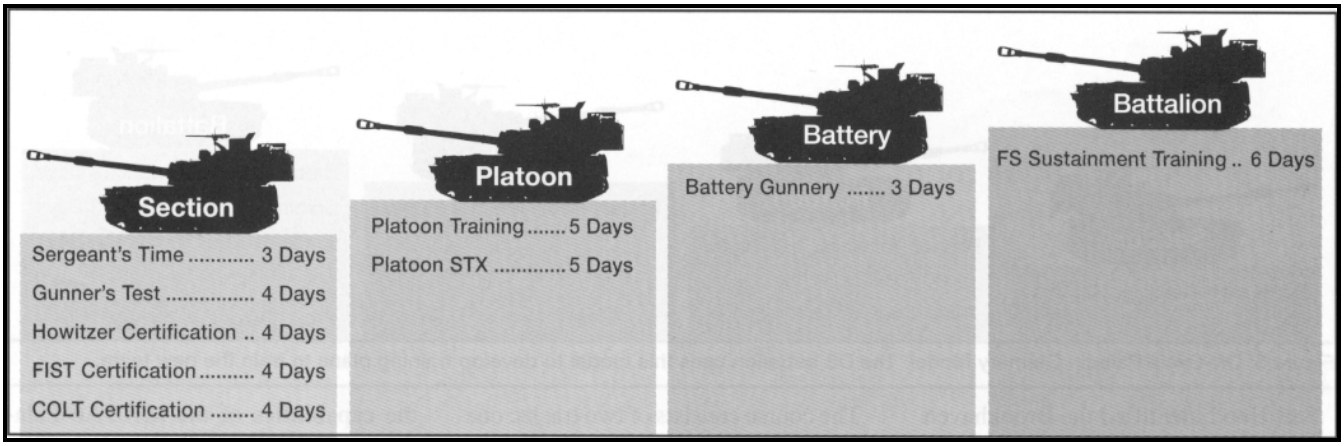
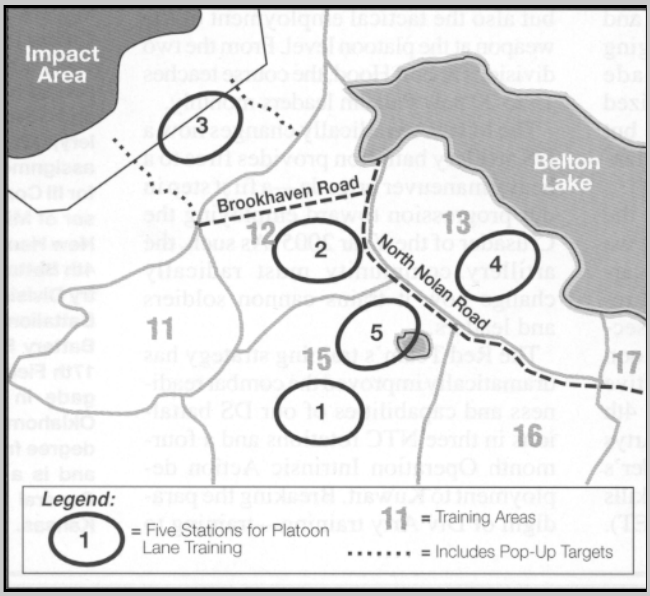



Figure 4: Gunnery and Fire Support (FS) Sustainment Model. The DS battalion uses this model to develop training plans to sustain skills once the unit returns from the NTC.

Station 3 includes three 800-meter lanes abreast with multiple pop-up targets along each lane. A range safety officer occupies a control tower 50 meters behind the start of the three lanes from where he can raise and lower each target upon the command of the senior evaluator.

At Station 3, the platoon occupies its initial position, executes indirect fires, conducts a survivability move and executes an emergency fire mission. The platoon continues its survivability move and, as it arrives at the base of the three direct fire lanes, it receives a warning there may be by-passed enemy forces in the area. The Paladin crews load their .50 caliber machineguns and proceed to their survivability positions under the control of the platoon leader. A safety officer/NCO in a high-mobility multipurpose wheeled vehicle (HMMWV) follows each Paladin, ensuring no section gets too far ahead of the others and that all adhere to safety requirements.

This station allows Paladins the flexibility of traveling in various tactical formations with their FA ammunition support vehicles (FAASVs). The FAASV may travel with its Paladin to provide flank security or remain behind to perform overwatch. (Unfortunately, the FAASVs currently aren't allowed to fire their MK-19s until the end of the lane in accordance with a safety-of-use message not permitting the FAASVs to travel with the MK-19s mounted.)




Brookhaven Multipurpose Artillery Range (BMAR). The 30-Hour Paladin platoon lane training is conducted at five stations in the training areas at Fort Hood. Station 3 has the pop-up targets.

Traveling down the direct fire lanes, the platoon may receive and execute one or more emergency missions while engaging by-passed enemy forces with crew-served weapons. At the end of the Station 3's lanes, the platoon establishes a defensive position. It's here the FAASV crews mount their MK-19s and provide suppressive fires while the Paladins execute main gun direct fires (live), including Killer Junior (dry). Then the platoon conducts a tactical move to Station 4.

Station 4 challenges the platoon on degraded operations. The advance party conducts position area reconnaissance and hasty survey before the Paladins occupy positions. Then the Paladins make contact with the enemy and experience problems that force them into degraded operations. They continue to deliver fires and, eventually, must react to anuclear, biological and chemical (NBC) attack. Upon determining that the attacker used persistent chemicals, the platoon conducts a tactical move to Station 5. While en route, the platoon may receive a call-for-fire and provide indirect fires in mission-oriented protective posture level 4 (MOPP-4) gear.

Station 5 consists of survival and NBC operations. The platoon conducts a deliberate decontamination, including vehicle wash downs and MOPP gear exchange. It then conducts another tactical move, this time to an assembly area where it receives an after-action review (AAR).

In the three- and one-station training packages, the STX lanes follow the same basic format. To some extent, leaders can vary the order and location of the training events in the standardized training packages.

The size of BMAR and surrounding land groups allows artillery to exercise all the training tactics, techniques and procedures (TTP) for Paladin operations. The Redlegs at Fort Hood have enthusiastically embraced the training opportunities BMAR provides to train as they will fight.

LTC Robert M. Algermissen, S3
1st Cavalry Division Artillery
Fort Hood, Texas

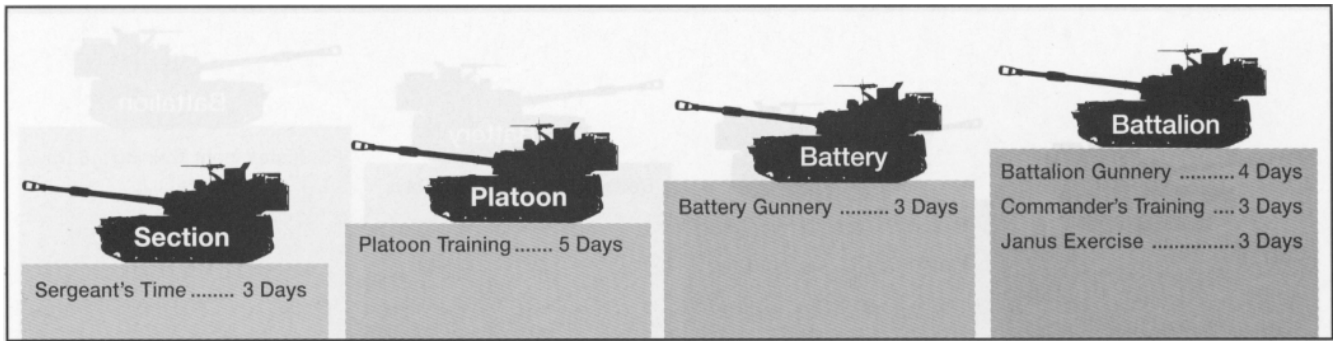



Figure 5: Off-Cycle Paladin Gunnery Model. The DS battalion uses this model to develop training plans to train the new team.

Fort Hood identified the Brookhaven Multipurpose Artillery Range (BMAR) with surrounding land for units to train on the Paladin Tables and fire indirect missions. Units can maneuver Paladins down a single range, engage pop-up targets with the M2 machinegun and direct fire the howitzer while engaging targets with the MK-19 grenade launcher. This artillery range optimized not only our indirect fire training, but our platoon and section synchronization of direct fire systems as well.

**Paladin Leader's Course.** Once the 1st Cav Div Arty fielded Paladin, we realized we needed to train newly arrived leaders before they assumed responsibilities as Paladin gunners, section chiefs, platoon sergeants or platoon leaders. We combined the collective experience of the 1st Cavalry and 4th Infantry Division (Mechanized) Div Artys to develop the one-week Paladin Leader's Course (PLC) to train many of the skills taught in new equipment training (NET).

The course consists of two tracks: one to teach gunner and section chief skills and one to expose senior battery leaders (gunnery sergeants, platoon sergeants and platoon leaders) to not only the technical differences of the M109A6, but also the tactical employment of the weapon at the platoon level. From the two divisions at Fort Hood, the course teaches 15 to 20 new Paladin leaders monthly.

The M109A6 radically changes how a DS artillery battalion provides fires to a heavy maneuver brigade—a first step in our progression toward employing the Crusader of the Year 2005. As such, the artillery community must radically change how it trains cannon soldiers and leaders.

The Red Team's training strategy has dramatically improved the combat readiness and capabilities of our DS battalions in three NTC rotations and a four-month Operation Intrinsic Action deployment to Kuwait. Breaking the paradigm of Div Arty training—training to the capabilities of the M109A6 Paladin—is maximizing the combat effectiveness of the Red Team.

**Major Thomas S. Vandal is the Executive Officer (XO) of the 1st Cavalry Division Artillery at Fort Hood, Texas. He also has served as the S3 for the Division Artillery and S3 for the 2d Battalion, 82d Field Artillery, both in the 1st Cavalry Division. Other assignments include serving as the G3 XO for III Corps at Fort Hood; Assistant Professor of Military Science at the University of New Hampshire; Commander of B Battery, 4th Battalion, 29th Field Artillery, 8th Infantry Division (Mechanized) in Germany; and Battalion Fire Direction Officer (FDO) and Battery FDO and XO in the 1st Battalion, 17th Field Artillery, 75th Field Artillery Brigade in III Corps Artillery at Fort Sill, Oklahoma. Major Vandal holds a master's degree from Webster University, Missouri, and is a graduate of the Command and General Staff College, Fort Leavenworth, Kansas.**

## *Field Artillery* Themes for 1998

| Edition | Theme | Copy Deadline |
|---|---|---|
| Jan-Feb | Fire and Counterfire | 15 Sep 97 |
| Mar-Apr | Joint and Combined Operations | 17 Nov |
| May-Jun | 21st Century Fire Support | 19 Jan 98 |
| Jul-Aug | History | 2 Feb (Contest*)<br>16 Mar (Other) |
| Sep-Oct | TTP for the Close Fight | 18 May |
| Nov-Dec | Red Book | 13 Jul |

*Deadline for the US Field Artillery Association 1998 History Writing Contest. (This year's winning articles and the contest rules will appear in the Sep-Oct edition.)

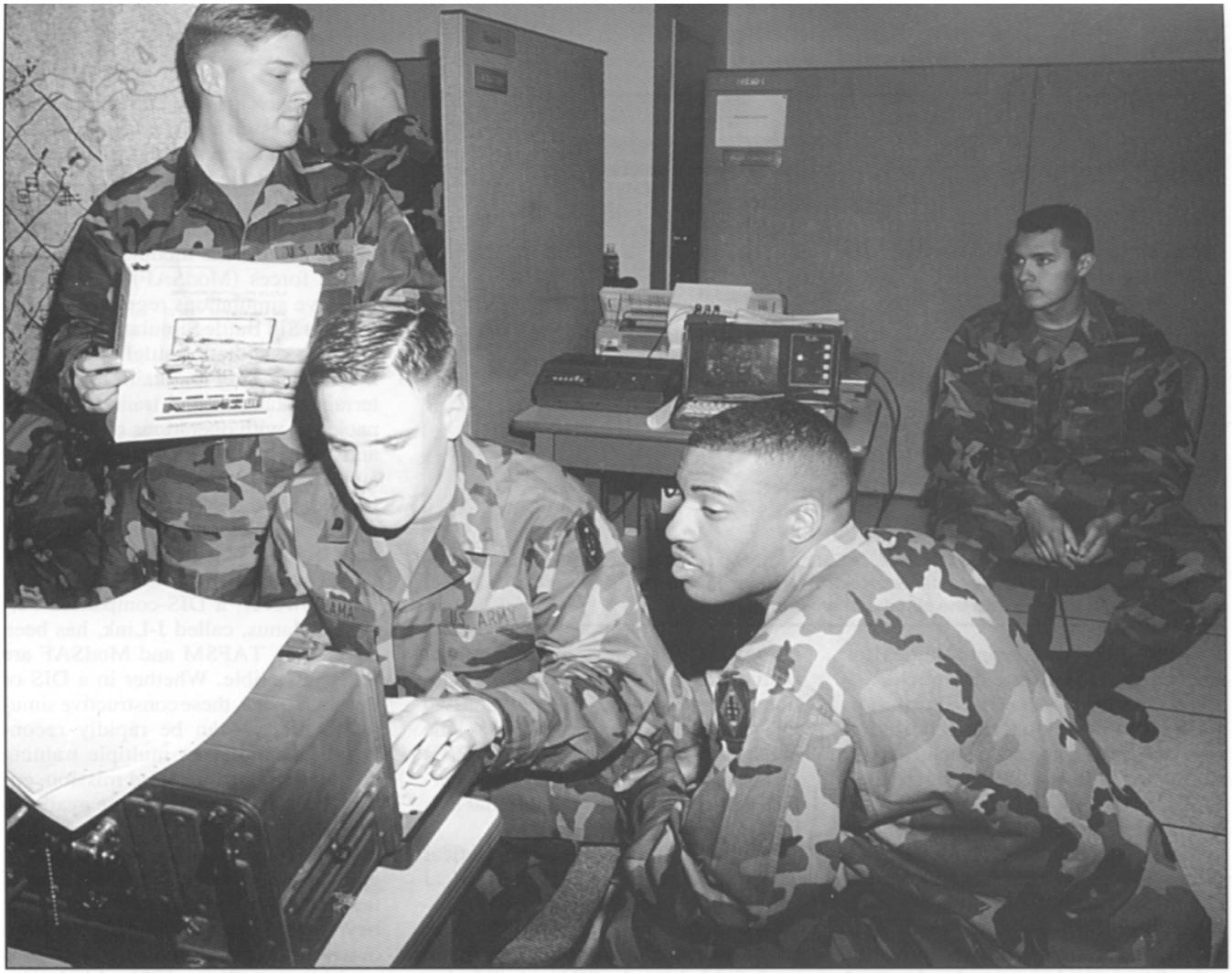
*Field Artillery* accepts articles on subjects related to Field Artillery or fire support leadership; doctrine; tactics, techniques and procedures; training; personnel; materiel; and organization for the Total Army and Marine Corps—Active Component (AC) and Reserve Component (RC).

For publication consideration, authors should submit the following:

- Double-Spaced Typed Manuscript with a Disk in a Macintosh or ASCII Format
- Comprehensive Biography with Current Job, Address and Fax and Telephone Numbers
- Photographs, Crests, etc., for Article Illustration

Send all to the Editor, *Field Artillery* Bulletin, P.O. Box 33311, Fort Sill, Oklahoma 73503.

A more comprehensive "Author's Guide" is printed in the annual "Red Book," the November-December edition. If authors have questions, refer to the 1996 Red Book for more submission details or call the Editor at (405) 442-5121 or 6806 or DSN 639-5121 or 6806. The Fax number is 7773 and works with both the commercial and DSN prefixes.



*BBS, the Army's command and staff trainer for brigade and battalion staffs.*

# Simulations to Train and Develop the 21st Century FA

by Dr. Linda G. Pierce and Walter W. Millspaugh

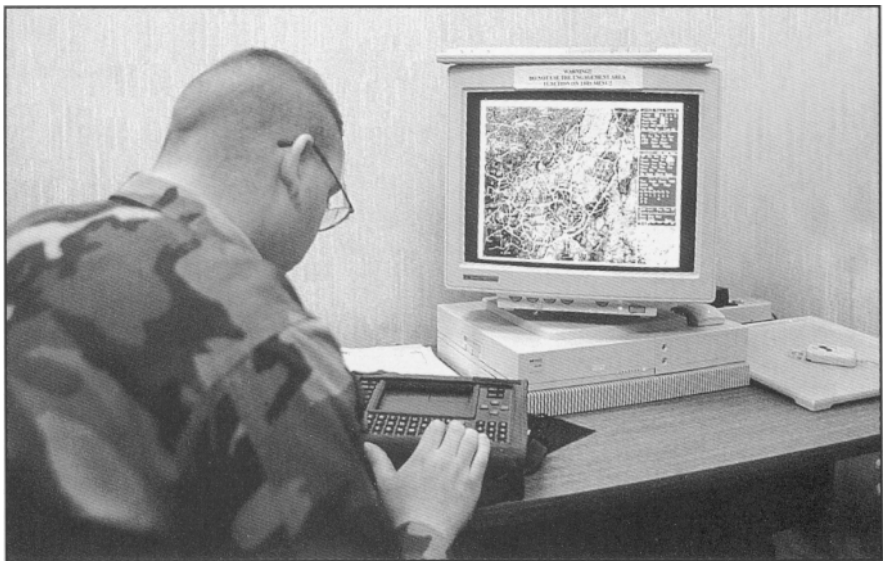
The Field Artillery School and Depth and Simultaneous Attack (D&SA) Battle Lab, supported by the Army Research Laboratory (ARL), is establishing state-of-the-art capabilities in simulations to train and develop the FA of the future. One goal is to decrease deficiencies in collective training noted by the combat training centers (CTCs) by using live, constructive and virtual simulations to create a realistic training environment. The advantage of such an environment is the unit can plan *and* execute combat operations in home station training or the classroom and evaluate the results with data collected during the training. Field artillerymen can operate as a team, focus on synchronization and practice the entire military decision-making process in a relatively low-cost environment.

The strength of this approach is the flexibility to practice in multiple scenarios under a variety of conditions and to do it systematically and routinely. Educational research has shown that learning and retention are enhanced by repeated practice spread over time rather than massed practice.

Simulation technology has advanced to the point that synthetic battlefield environments rival field training and the CTCs in fidelity, functionality and training value. Although the training is not the same as the field or CTC training, simulation technology ensures units are better trained in procedures and tactics and ready to learn the lessons best taught in the field.

Another goal is to examine critical issues in doctrine, training, leadership, organizations, materiel and soldiers (DTLOMS) on the synthetic battlefield to develop the Army and FA for the next century.

This article briefly examines the advanced technology enabling the synthetic battlefield and the constructive simulation software and virtual simulator drivers that, along with live unit (or) soldier play, have created revolutionary



Janus was one of the first simulations to take the soldier beyond the "gateway" of daily field and classroom training into the simulated environment

training and testing opportunities for the FA on the synthetic battlefield.

**Distributed Interactive Simulation (DIS).** The revolution in simulation capabilities is being brought about, in part, through a software technology called DIS. DIS is based on standardized communication protocols, databases and computer architectures. The technology allows live, constructive and virtual simulations to interoperate with each other over local and wide area networks. Warfighters can plan and execute battles using live tactical command and control ($C^2$) systems on synthetic battlefields created by one or more constructive simulations and in interaction with other live troops and virtual simulators. The interaction is transparent and seamless to the soldier.

For example, a soldier can operate a DIS-compatible multiple-launch rocket system (MLRS) fire control panel trainer or virtual simulator at Fort Sill to receive calls-for-fire using tactically formatted messages from a unit (live or simulated). The unit can be at Fort Hood, Fort Knox, one of the CTCs—anywhere it has access to distributed communications via wide area networks, such as the defense simulations internet (DSI). In response to the call-for-fire, the soldier can "fire the MLRS," causing the rocket to impact on the synthetic battlefield. This represents one of many possible scenarios.

One of the first initiatives of the D&SA Battle Lab's new Simulation Management Office was to integrate fire support $C^2$ systems onto the synthetic battlefield. Established to develop new technologies for training, testing and research and development, the Simulation Management Office developed two DIS-compatible interface devices—the personal computer interface unit (PIU) for tactical fire direction and an interface device for the Firefinder radar collective training system (CTS).

*The PIU.* This interface allows tactical data devices that "speak" the tactical fire direction system (TACFIRE) protocols to be integrated into the DIS environment and onto the synthetic battlefield. After the PIU is modified to accommodate the advanced Field Artillery tactical data system (AFATDS) protocols, it will provide an interface for all fire support $C^2$ systems.

Using the PIU device, the synthetic battlefield can be populated by soldiers-in-the-loop operating forward entry devices (FEDs), lightweight computer units (LCUs) running the initial fire support automated system (IFSAS) and fire direction system (FDS) software or AFATDS. The training audience and objectives will determine the appropriate mix of live, constructive and virtual simulations.

*The CTS Device.* In response to III Corps, the D&SA Battle Lab developed a DIS-compatible interface for Q-36 and Q-37 Firefinders. CTS is a software and hardware system developed to stimulate Firefinder at the CTCs. With the DIS interface device, fires on the synthetic battlefield automatically stimulate CTS. The radar operator processes incoming locations, develops target messages and transmits them to live fire direction centers (FDCs) or through the PIU back into the DIS environment to be processed and serviced by virtual artillery on the synthetic battlefield.

**The Synthetic Battlefield.** Janus, the brigade, battalion simulation (BBS), the target acquisition fire support model (TAFSM) and the modular semi-automated forces (ModSAF) are the constructive simulations regularly used in the Fort Sill Battle Simulation Center to create the synthetic battlefield environment. The center maintains a library of terrain databases and training support packages with operations orders, maps and overlays for customers. For example, National Guard units that have limited time to prepare for weekend exercises can tailor the scenarios to meet their training objectives.

Janus and BBS are not DIS-compatible; however, a DIS-compatible version of Janus, called J-Link, has been developed. TAFSM and ModSAF are DIS-compatible. Whether in a DIS or non-DIS mode, these constructive simulation drivers can be rapidly reconfigured to represent multiple training environments with varied mission, enemy, terrain, troops and time available (METT-T).

*Janus.* Named for the Roman god of gates and doorways, Janus was one of the first simulations to take the soldier beyond the "gateway" of daily field and classroom training into the simulated environment. Since 1991, this battle-focused training simulation has trained Redlegs at the Field Artillery School in fire support planning and execution.

Janus is a stochastic, interactive, closed, ground combat simulation. (Stochastic means that battlefield effects, such as hits and kills, are assessed by random sampling of effects probabilities.) Janus achieves full interactivity with a live, thinking opposing force (OPFOR). Although Janus is a closed simulation (battle controlled by trained interactors), participants regularly use digital $C^2$ systems to call for fires and relay information between operational nodes.

In addition to enhancing training realism, the digital $C^2$ systems create a test bed for ARL to investigate battle command issues in information processing and decision making and evaluate advanced collaborative support systems. An enhanced after-action review (AAR) capability makes this simulation a powerful training and performance assessment tool. Janus and the digital test bed provide multi-echelon and combined

arms collective training opportunities to strike at the core of synchronization training issue.

*BBS.* This is the Army's command and staff trainer for brigade and battalion staffs. Like Janus, BBS is a stochastic, interactive, closed, ground combat simulation. Exercises are conducted in a manner similar to those in Janus; however, BBS differs from Janus in that it simulates the maneuver, combat support (CS) and combat service support (CSS) elements while Janus focuses on maneuver and some CS elements. BBS trains staff procedures for all battlefield operating systems (BOS).

Units can get more information about either Janus or BBS through the D&SA Battle Lab Simulation Management Office by calling DSN 442-2662 or commercial (405) 442-2662.

*J-Link, TAFSM and ModSAF.* Fort Sill has used these DIS-compatible simulations primarily to provide the battle context for testing and research and development. D&SA Battle Lab is making extensive use of these simulations in the Training and Doctrine Command (TRADOC) concept experimentation programs (CEPs).

J-Link is a developmental version of Janus that continues to be improved for reliability and usability and to provide a more effective training tool. In research applications, J-Link simulates the maneuver battle in conjunction with TAFSM's simulation of fire support.

TAFSM is a combat simulation model of division (typically) up to corps operations with an emphasis on artillery operations. Developed at the Field Artillery School, TAFSM is the FA's functional area model and primary combat development analysis tool.

The D&SA Battle Lab has adapted TAFSM for training exercises. It simulates friendly and enemy artillery forces to include sensors; command, control and communications; logistics; firing platforms; and munitions. TAFSM can recognize and respond to tactical messages, allowing it to provide virtual fire support in response to live calls-for-fire or calls-for-fire from entities on the synthetic battlefield.

ModSAF is a highly detailed, semiautomated computer-generated forces model that controls systems at the individual platform level. ModSAF contains two-dimensional graphics display software that allows the user to visualize the electronic battlefield.

One of the benefits of DIS technology is the capability to use information generated by the simulations in three dimensions. A combination of hardware and software, referred to as a "stealth" device, allows the battlefield to be observed from a variety of angles with the process totally transparent to participants. For example, an observer can choose an unobstructed position to watch the entire battle unfold or become "attached" to a vehicle and observe the battle from the perspective of the system operator.

**Virtual Simulators.** The D&SA Battle Lab is supporting initiatives to develop and acquire the fire support combined arms tactical trainer (FSCATT), the Battle Lab reconfigurable simulators (BLRSIMs) and, via the Crusader Battle Lab Warfighting Experiments (BLWE), the Crusader crew workstations. These virtual simulators will, for the first time, put FA weapons systems on the synthetic battlefield in seamless interaction with other simulations—live, constructive and virtual.

*FSCATT.* This trainer integrates the forward observer (FO), FDC and firing battery. FOs using the guard unit armory device full-crew interactive simulation trainer (GUARDFIST II) acquire targets and transmit the targeting information and calls-for-fire using a FED to the FDC. The battery FDC then processes the message using the battery computer system (BCS) and sends a fire mission message to a weapons delivery subsystem.

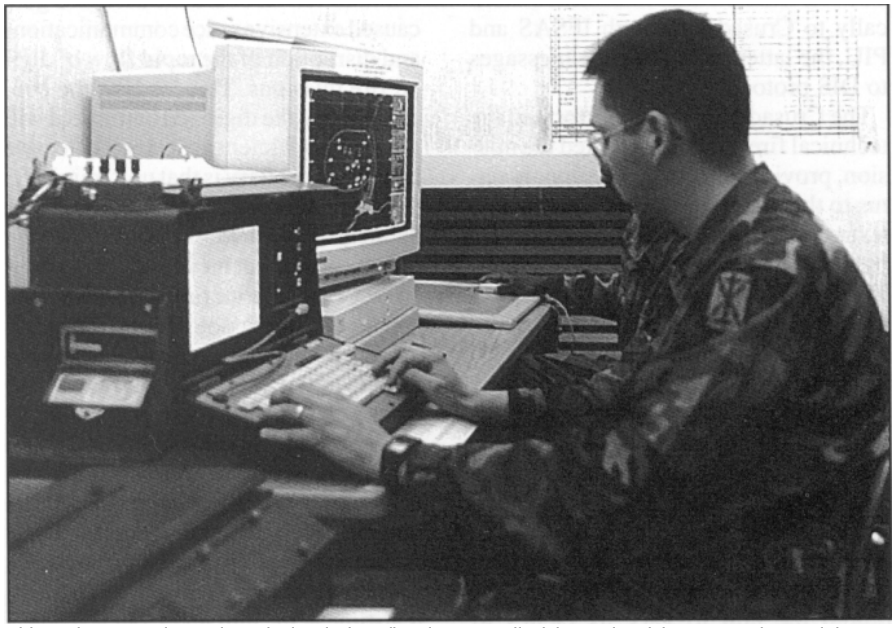
The firing information is automatically transmitted to the data logger in the collective training control subsystem (CTCS). The data logger records all information for immediate feedback and a detailed after-action review (AAR).

With testing this summer, FSCATT will begin fielding in the early part of FY 98 as a platoon-level trainer to the FA School, Active Component division artillery installations, National Guard battalions and Total Army school system sites.

*BLRSIMs.* TRADOC Battle Labs generated a need for a suite of reconfigurable simulators for use in experimentation. The BLRSIMs simulate cannon, rocket and missile systems; FO reconnaissance vehicles; or ammunition resupply vehicles. They easily can be modified to accommodate system changes or introduce new technologies.

The D&SA Battle Lab will receive six simulators, the first two in 1998. BLRSIMs will be integrated into the Battle Lab's synthetic testing and training environment to allow soldiers to operate simulated weapons in combination with live, constructive and virtual simulations. Using these capabilities, D&SA Battle Lab will be able to evaluate new and emerging materiel, training concepts, doctrine or tactics, techniques and procedures (TTP).

*Crusader BLWE.* The power of DIS technology to support both training and experimentation is best illustrated through a description of the Crusader



Although Janus is a closed simulation (battle controlled by trained interactors), participants regularly use digital $C^2$ systems to call for fires and relay information between operational nodes.

BLWE. This is a multi-year experimental program using live, constructive and virtual simulations. The goal is to field Crusader with an operational concept based largely on experience and performance data derived from working with soldiers in a synthetic theater-of-war (STOW) environment.

The D&SA Battle Lab, ARL and the TRADOC System's Manager for Cannon (TSM-Cannon) conducted the first set of experiments in 1996 with the 1st Battalion, 17th Field Artillery, part of the 75th Field Artillery Brigade, III Corps Artillery, as participants. The second experiment will be at Fort Hood in July of this year with soldiers from the 2d Battalion, 82d Field Artillery, 1st Cavalry Division.

The test environment used live fire support $C^2$ systems interoperating with live and simulated tactical systems. A Southwest Asia scenario was used for a mechanized brigade in the offensive. Battlefield conditions and TTP were varied to examine proposed operational concepts.

Task force commanders (role-played by trained interactors) controlled the maneuver battle on J-Link, identified fire support requirements and forwarded the requests to FOs and fire support teams (FISTs). Fire missions were sent tactically from the FO to the battalion FDC through the battery and to the platoon operations center (POC). The firing platoon selected one or more TAFSM Crusaders to fire the mission. The fire mission was transmitted tactically to Crusader through IFSAS and PIU, the latter translating the messages to DIS protocols.

The Crusader howitzer performed the technical fire control, executed the mission, provided updated fire support status to the platoon and FIST, conducted a survivability move and was rearmed by a simulated resupply vehicle (RSV). To complete the loop, the FO observed rounds impacting on the J-Link battlefield.

During the experiment, Field Artillery soldiers employed the simulated Crusader systems to provide direct support (DS) fires for the maneuver task force commander, performing fire support and FA functions. Each offensive engagement included features that demanded resourcefulness by the FIST and required the unit to vary its tactics to satisfy the fire support requirements. As the offensive engagement progressed, the battalion performed collective tasks needed to shift priorities of fires, maintain situational awareness, reallocate resources and sustain operations. Although the experiments' primary purpose is to test and refine the Crusader operational concept, the environment and applications employed during the experimental process clearly have training implications.

During the experiment, computers catalogued and compared events to determine the effectiveness of various TTP and performance trends that could influence Crusader's design and development. Various $C^2$ arrangements were implemented, including upgraded data processing capabilities at $C^2$ nodes, redistribution of assets within firing batteries and reallocation of functions and responsibilities within and between nodes.

Findings from the first experiment provided insights into Crusader operations. For example, one key finding was that the high operational tempo of the digitized battlefield requires increased specialization in the $C^2$ structure to process fire missions and logistical requirements quickly enough to keep up with the battle. The battalion leadership focused primarily on external battle management (keeping the guns shooting and moving forward in support of the offensive battle), and batteries focused on internal resource management (coordinating howitzers and resupply vehicles to ensure timely resupply). Exceptional events, such as a mission denial due to not having the right kind of ammunition on board the assigned gun, caused extensive voice communications and disruption of the rapid flow of digital fire missions. This leads to the conclusion that the digitized battlefield will only be as efficient as its least effective link. The corollary is that unit training is critical to improve coordination between elements of the battalion and reduce the occurrence of such events.

The Crusader experiment validated the merit of training soldiers in the simulated environment, even when the purpose is to develop a future weapon system's operational concept.

A second key finding in this first phase of BLWE was that much more work needs to be done on the ammunition planning process and the effects the evolution of a battle have on resupply requirements. This currently is done in real-time at the unit level, but it seems a natural application for an artificial intelligence algorithm—perhaps a sort of "logisticians'" associate program.

In Phase 2 of the Crusader BLWE, the D&SA Battle Lab is developing workstations to replicate limited Crusader system functionality. The workstations (six howitzers and six resupply vehicles) will be added to the synthetic environment. These workstations will provide man-in-the-loop control of the individual howitzers and resupply vehicles on the virtual battlefield.

**The Challenge.** As training resources at the FA School diminish, great technological strides in simulations are being made—especially DIS to support military operations, materiel acquisition and research and development. With simulations, Field Artillerymen can practice battlefield synchronization and the military decision making process on a realistic battlefield in ways never possible before.

The question is no longer whether or not simulations should be used, but rather, how simulations can best be used to train our soldiers and develop the force for the 21st century.

**Dr. Linda G. Pierce is Chief of the Army Research Laboratory, Human Research and Engineering Directorate, Fort Sill Field Element. She supports the Field Artillery School and the Depth and Simultaneous Attack (D&SA) Battle Lab as Chief of the Simulations Branch responsible for Janus and the Brigade, Battalion Simulation (BBS). Her programs include using simulations to test Crusader operational concepts, evaluating selected division artillery staff training drivers and integrating advanced simulations into the classroom. She holds a Ph.D in Industrial and Organizational Psychology from Texas Tech University.**

**Walter W. Millspaugh is Chief of the Simulation Management Office of the D&SA Battle Lab. He designs and develops architectures and techniques for incorporating fire support live, virtual and constructive simulations onto the synthetic battlefield. From 1986 until the creation of the D&SA Battle Lab in 1992, Mr. Millspaugh was Chief of Simulation Development for the Directorate of Combat Developments at the Field Artillery School where he had been an Operations Research Systems Analyst (ORSA) since 1969. As an ORSA, he developed computer models, conducted weapons system studies and was the architect of the target acquisition fire support model (TAFSM).**

# Safety Data Update for Cannon Gunnery

The Gunnery Department of the Field Artillery School, Fort Sill. Oklahoma, and the 10th Marine Regiment Artillery Training School at Camp Lejeune, North Carolina, are reviewing artillery safety computational procedures. We have identified several deficiencies in Chapter 15 "Safety" of *FM 6-40/MCWP 3-1.6.19 Field Artillery Manual Cannon Gunnery (1996),* the source manual for safety computations. Although none of the manual's deficiencies will cause the computation of unsafe data directly, omissions of certain procedures have caused some confusion.

**The Problem.** Currently, non-Paladin cannon artillery units use a combination of automated systems and manual computations to compute gunnery safety data. The automated range safety system (ARSS), backup computer system (BUCS) Revision 1 and battery computer system (BCS) are in place at all echelons, including the Reserve Components. ARSS and BUCS have become obsolete, and there is no funding for their revision or replacement.

ARSS is a stand-alone, DOS-based system developed in the 1980s. It performs the computational procedures necessary to complete initial (preoccupation) and subsequent (post-occupation) safety data, thereby reducing the time and effort necessary to produce safety diagrams and safety-Ts. ARSS (Version 4.0) is based on the BUCS (Revision 1) "closed form curve fitting" algorithm and incorporates the firing tables available at the time of its production: the AM-2 and AN-1, in particular.

The Firing Tables Branch, Army Research, Development and Engineering Command (ARDEC), Picatinny Arsenal, New Jersey, has produced the AN-2 series of tables (to include updates of all associated addendum) that correct the fire control information (FCI) errors in the AN-1 series of tables and addendum. These tables and addendum are being printed and will be available through the publications distribution system in FY 98. Except for computations involving the AM-2 high-explosive (HE, M107) family of projectiles, the production of these new tables and new projectiles—such as the M864 base-bleed dual-purpose improved conventional munition (DPICM) and sense and destroy armor (SADARM)—renders both ARSS and BUCS obsolete.

BCS employs the modified point mass equation to produce FCI. This is different from the BUCS closed form curve fitting algorithm that produces data that's an order of magnitude less accurate than BCS' data. The two computational models do not provide replicable data between them.

The Army no long supports BUCS, and the USMC only plans upgrades for it. ARSS, also not supported, would require extensive and prohibitively expensive reprogramming. This leaves the Field Artillery with one automated system: BCS.

The Army is adopting the hand-held terminal unit (HTU) to operate BCS software, providing the secondary computational system lost with the phasing out of BUCS. The Marine Corps is reviewing several portable, hardened computers for BCS that will operate within the same parameters. By adopting this hardware, the Army and Marine Corps, effectively, will replace BUCS and provide a true "backup" capability. Operated on the lightweight computer unit (LCU) or HTU, BCS uses the updated FCI for the AN-2 solution (as well as the new projectile family, M864 base-bleed DPICM) and can be used for most safety computations.

The problem with computing safety for expelling charge explosive train projectiles, such as illumination, DPICM, family of scatterable mines (FASCAM), etc., is that the computational methodology used by the computer bases the ballistic solution on affecting the target, not producing graze burst data.

Simply put, the cargo-carrying projectiles function before the minimum range line of the impact area, and the sub-munitions deploy (albeit in the air) before the minimum range line. This assumption could allow the effects of the projectile to exceed the limits of the safety diagram. The workaround to determine graze burst data is excessive and, if incorrectly performed, will result in unsafe computation of safety data.

The complexity of the problem is best illustrated by examining how the M314 series (105-mm) and M485 (155-mm) series of illumination projectiles function and the requirements for each to compute safety. Although they both expell charge munitions with illuminant payloads, the basis of computational procedures is radically different.

The M314 illumination FCI is based on causing the fuse to function at a height of burst of 750 meters directly above the target (see the top part of Figure 1). The parachute deploys and decelerates the flare when the fuze functions and immediately illuminates the target area.

The M485 illumination FCI is based on a completely different sequence of events (see the bottom part of Figure 1). When the M485 projectile was developed, the velocity of the illuminant was too great for a parachute to reliably deploy without shredding due to the weight of the illuminant. To

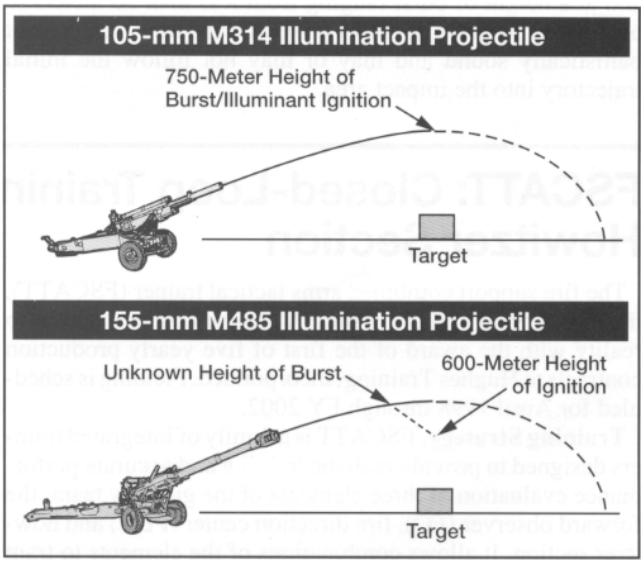



Figure 1: Difference in Fuze Functions. The difference in the ignition of these two illumination rounds is where on the trajectory the fuze functions to eject the flare.

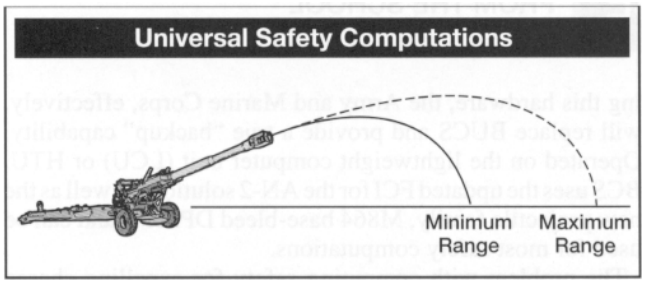



Figure 2: The Gunnery Department is developing a universal safety matrix based on two computations: graze burst data for quadrant elevation and fuze setting at the minimum range line and quadrant elevation at the maximum range line.

eliminate this problem, when the fuze functions, a small drogue parachute deploys that pulls the illuminant from the projectile. The drogue falls away, and the illuminant free falls for eight seconds, decelerating due to atmospheric friction. A small charge then deploys the main parachute and ignites the magnesium flare (which at that time is directly over the target) at a height of 600 meters.

The difference between the two systems is where on the trajectory the fuze functions to eject the flare. For the M314 105-mm round, it's directly over the target. For the M485 155-mm round, it's significantly before the projectile passes over the target and at an unknown height of burst. The height of burst is unknown because the M485 firing tables are based on the need to cause the flare to ignite at 600 meters over the target.) The location on the trajectory where the fuze functions is based on the remaining velocity of the projectile (at the moment of fuze functioning), the angle of fall (the least angle measured clockwise from the base of the horizontal to a line tangent to the trajectory at the level point) and the horizontal yaw of the projectile along the trajectory caused by drift.

Now, if the minimum range line is substituted for the target in the figures, it can create confusion. Even if we reduce the height of burst by 600 meters, the 155-mm illumination projectile may function more than 1,000 meters short of the target and at a height of burst ranging from less than 50 meters to nearly 400 meters. The empty projectile and base plate are not ballistically sound and may or may not follow the initial trajectory into the impact area.

The majority of our base-ejecting projectiles function like the M485 projectile. This means that all the computational procedures are based on *having* the *effects* of the munition occur at the target area, as opposed to *having* the *fuze function* at a specific point on the trajectory. Because these are such different assumptions, we need more effective procedures to address their differences and still produce safe firing data.

**The Solution.** Revisions to Chapter 15 to be published by the end of this year will address safety computations not in the current manual and will simplify the process by reducing the number of matrices used for computations. On the automated side, the Gunnery Department is working with the Directorate of Combat Developments at the Field Artillery School and the battery computer system (BCS) software contractor to develop an embedded safety program for incorporation into BCS Version 12.

Ultimately, the answer to the problem is much simpler than the multitude of matrices we now use. The Gunnery Department is testing all projectiles and projectile families to design a universal safety matrix—to determine if all safety data can be computed on the basis of two computations: graze burst data for quadrant elevation and fuze setting at the minimum range line, and quadrant elevation at the maximum range line—in effect computing data in the same manner as the HE matrix. This would ensure that all data determined are safe and that there's no danger of the fuze functioning before the minimum range line. A disadvantage of this approach is that targets in a portion of the impact area along the minimum range line will not be able to be fired upon due to the computational procedures necessary to produce data at the minimum range line for safety purposes.

The focus of the Gunnery Department's efforts to correct these computational procedures is to produce a set of universal safety computations, eliminating the confusing multitude of matrices we now use.

If units or personnel have questions about this Safety Data Update, call the Officer Instruction Branch of the Gunnery Department (GD) at DSN 639-6379 or commercial (405) 442-6379 or E-Mail the author at gricem@silltcmd-stmp.army.mil.

Capt Michael D. Grice, USMC
Officer Instruction Branch, GD
FA School, Fort Sill, OK

# FSCATT: Closed-Loop Training of the FO, FDC and Howitzer Section

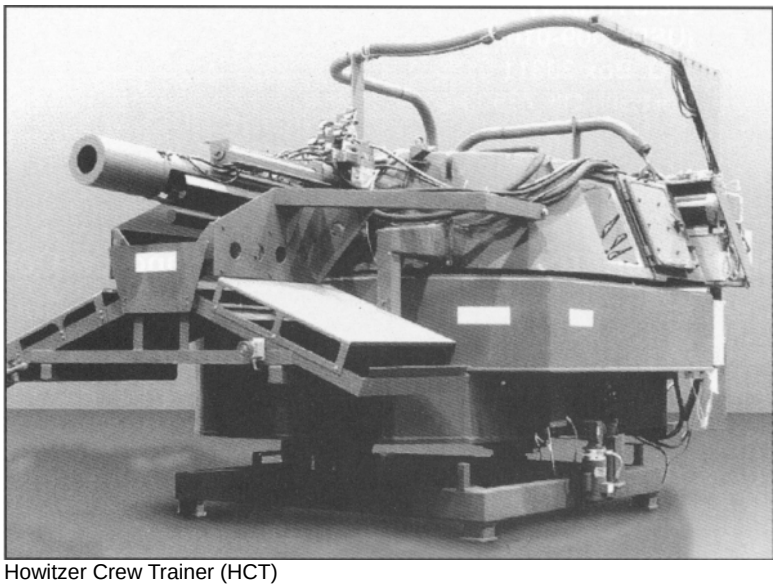
The fire support combined arms tactical trainer (FSCATT), the closed-loop trainer for the FA gunnery team, is closer to reality with the award of the first of five yearly production contracts to Hughes Training, Incorporated. Fielding is scheduled for April 1998 through FY 2002.

**Training Strategy.** FSCATT is a family of integrated trainers designed to provide realistic training and accurate performance evaluation of three elements of the gunnery team: the forward observer (FO), fire direction center (FDC) and howitzer section. It allows combinations of the elements to train together as well as independent training of each element. Importantly, the new system reduces ammunition and operations tempo (OPTEMPO) costs.

Part of the training strategy for FSCATT is to develop both individual and collective delivery-of-fire skills through the platoon level. FSCATT will accomplish crew certification and platoon qualification training in the delivery-of-fire tasks through Artillery Table V. In garrison or local training areas, it will augment field training by sharpening individual, crew and platoon skills before field exercises.

**FSCATT Components.** The system's major components are the howitzer crew trainer (HCT), the howitzer strap-on trainer (HSOT) and the collective training control subsystem (CTCS). These components interact with the already fielded guard unit armory device full-crew interactive simulation trainer-artillery II (GUARDFIST II).

There are two HCTs, an M109A5 version and an M109A6 version. Containing simulated and actual crew compartment components, each of these 13-ton, full-scale simulators replicates an actual turret. They realistically aim, load and fire simulated rounds. These turret trainers recoil when "fired" and automatically sense ammunition type, fuze setting and propelling charge load. Each HCT has an integral instructor-operator station (IOS) for initiating and controlling training, recording and displaying data, evaluating crew member performance and generating after-action review (AAR) reports.



Howitzer Crew Trainer (HCT)

The HSOT consists of an IOS and sensors that attach to the actual weapon's fire control instrumentation. These sensors monitor deflection, quadrant elevation, bubble leveling and aiming data settings entered on the weapon by the crew. Sensor data are fed to the HSOT IOS where they are recorded, displayed and compared to the firing commands for determination of any fire control errors by the crew. The HSOT IOS provides training control, performance measurement, fire mission generation and AAR reports, as well.

Each M102, M119, M198, M109A5 and M109A6 howitzer has an HSOT. The associated IOS share common hardware but contain weapon-specific databases. The HSOT is the primary howitzer trainer for towed units. Self-propelled units use their HSOTs to supplement and expand HCT training.

GUARDFIST II is the FO trainer for FSCATT. In the closed-loop training mode, the observer's call-for-fire is transmitted from GUARDFIST II to the battery FDC, and the resulting fire commands are sent to the guns, i.e., HCT/HSOT. The data set and "fired" by the howitzer crew are transmitted to the GUARDFIST II, which converts them to "did-hit" data. The impact is displayed at the "did-hit" grid on the screen for further correction by the observer. This personal computer-based trainer should be collocated with the CTCS.

The CTCS ties FSCATT together by performing five major functions; interface with the GUARDFIST II, stimulation of the unit's battery fire direction computer for FDC section training, control of collective training, ballistic simulation and computations and consolidation of evaluation data. These functions are for all three of the gunnery team elements. The CTCS' FDC stimulator subsystem (FDCSS) provides both the FDC training capability and the IOS for controlling that function.

The CTCS requires an indoor location in close proximity to the HCT or the HSOTs. It may, however, be used in the field when sheltered by a tent or truck.

**FSCATT Flexibility.** One advantage of FSCATT is the flexibility derived from its three modes of operation: stand alone, interactive and closed-loop. Each of its trainers may be used independently in the stand-alone mode to train individual tasks and functions. For example, the HCT can provide sustainment training in 21 tasks for Military Occupational Specialty (MOS) 13B Cannon Crewman while HSOT and its associated howitzer can train ten 13B tasks. The conduct of 15 types of fire missions is also possible. The FDC trainer has routines for 16 MOS 13E Fire Direction Specialist individual tasks while GUARDFIST II supports sustainment training of 17 MOS 13F Fire Support Specialist tasks.

The interactive mode allows combined howitzer and FDC training by matching several howitzer trainer configurations with organic FDC computers and the FDCSS. Those configurations are the HCT alone, the HSOT with howitzer, and an HCT plus HSOTs with howitzer. Concurrent training of all three gunnery team elements is achieved in the closed-loop mode that integrates the GUARDFIST II into the interactive configurations.

**Basis of Issue Plan.** The BOIP provides two M109A6 HCTs or one M109A5 HCT and a battery set of HSOTs per self-propelled howitzer battalion but shared by up to three battalions in the same geographic location. A battery set of HSOTs, again shared by up to three collocated battalions, is planned for towed battalions. Separate batteries are allocated a platoon set of HSOTs. Each location will receive one CTCS and the appropriate HSOT IOS, as well. The integrated issue of FSCATT to the Active Component and National Guard will follow force support package priorities.

The first production lot will not contain Paladin items. Engineering development of the M109A6 HCT and M109A6 HSOT is underway.

FSCATT is more than a turret trainer. It trains the entire gunnery team in delivery-of-fires tasks. This new system of trainers offers both AC and RC units the opportunity to conduct inexpensive training in an environment of ever-declining funding and limited access to training facilities.

FSCATT also brings the Field Artillery into the era of manned simulators and, eventually, will link FA gunnery team training with other combined arms teams on the synthetic battlefield. (See the article in this edition "Simulations to Train and Develop the 21st Century FA" by Dr. Linda G. Pierce and Walter W. Millspaugh on Page 39.)

FSCATT closes the loop in training the entire FA gunnery team and, via the synthetic battlefield, will link the team's training with that of the entire combat force.

Donald Kraft, FA Training Specialist
Unit Training Division
Warfighting Integration and Development Dir
FA School, Fort Sill, OK