



Field Artillery

A Professional Bulletin for Redlegs

December 1991

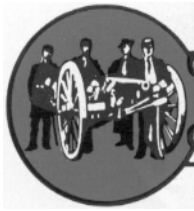


The Red Book

An Annual Report

Approved for public release;
distribution is unlimited.

HQDA PB6-91-6



Field Artillery

A Professional Bulletin for Redlegs

December 1991

HQDA PB6-91-6

ANNUAL UPDATES

1 State-of-the-Branch Address 1991
by Major General Fred F. Marty

8 Silhouettes of Steel
Reports by Army Corps and Division Artilleries and the Marines

US Field Artillery Units Worldwide
A Centerfold Pull-Out Map of Army Active and Reserve Component and Marine Active and Reserve Units

29 US Field Artillery Commanders and Command Sergeants Major
A List of Battalion and Higher Commanders and Command Sergeants Major in the Total Branch and Marines

33 Field Artillery Assignment Branches
A List of PERSCOM and ARPERCEN Assignment Managers

47 Field Artillery Bulletin Readership Survey

49 1992 Field Artillery Author's Guide

56 1991 Redleg Reference
A List of Articles and Features Published in Field Artillery in 1991.

INTERVIEW

4 NTC: The Ultimate Training Experience
An Interview with Brigadier General Wesley K. Clark, Former Commander of the National Training Center

ARTICLES

34 When It Becomes Routine, Wrench It Up
by Colonel Larry D. Aaron

37 1-41 FA in Desert Storm: A Test Bed for Doctrine and Equipment
by Lieutenant Colonel John P. Floris

42 Legal Mix VII—Directions for the Field Artillery
by Major B. Wroth

50 Iron Rain: MLRS Storms onto the Battlefield
by Captain Gary D. Langford

55 Formal and Support Channels of Communications
by Command Sergeant Major Harold F. Shrewsberry

Special thanks to Captain Paul C. Eskridge and Second Lieutenant Seven A. Bergosh of "Task Force Red Book" for their invaluable assistance with this edition.

DISCLAIMER: *Field Artillery*—a bimonthly professional bulletin for Redlegs (ISSN 0899-2525)—is published by Headquarters, Department of the Army under the auspices of the US Army Field Artillery School, Fort Sill, OK. The views expressed are those of the authors, not the Department of Defense or its elements. *Field Artillery's* content doesn't necessarily reflect the US Army's position and doesn't supersede information in other official Army publications. Use of news items constitutes neither affirmation of their accuracy nor product endorsement.

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

SUBSCRIPTIONS: May be obtained through the US Field Artillery Association, P.O. Box 33027, Fort Sill, OK 73503-0027 Telephone numbers are AUTOVON 639-5121/6806 or commercial (405) 355-4766/8745. Dues are \$16.00 per year (\$31.00 for two years and \$46.00 for three years) to US and APO addresses. All others add \$11.00 per subscription year for postage.

SUBMISSIONS: Mail to Editor, *Field Artillery*, P.O. Box 33311, Fort Sill, OK 73503-0311. Telephone numbers are AUTOVON 639-5121/6806 or commercial (405) 351-5121/6806. Material submitted for publication is subject to edit by the *Field Artillery* staff; footnotes and bibliographies may be deleted due to space limitations.

REPRINTS: *Field Artillery* is pleased to grant permission to reprint articles. Please credit the author and *Field Artillery*.

POSTMASTERS: Second-class official mail postage is paid by the Department of the Army at Lawton, OK 73501. Send address changes to *Field Artillery*, P.O. Box 33311, Fort Sill, OK 73503-0311.

Hotlines

Redleg Hotlines:

AUTOVON 639-4020
Commercial (405) 351-4020



ARTEP/MTP Hotline:

AUTOVON 639-5004
Commercial (405) 351-5004

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

Patricia P. Hickerson
Brigadier General, United States Army
The Adjutant General

Fred F. Marty
Major General, United States Army
Field Artillery School Commandant

Staff

Editor:

Lieutenant Colonel Colin K. Dunn

Managing Editor:

Patricia Slayden Hollis

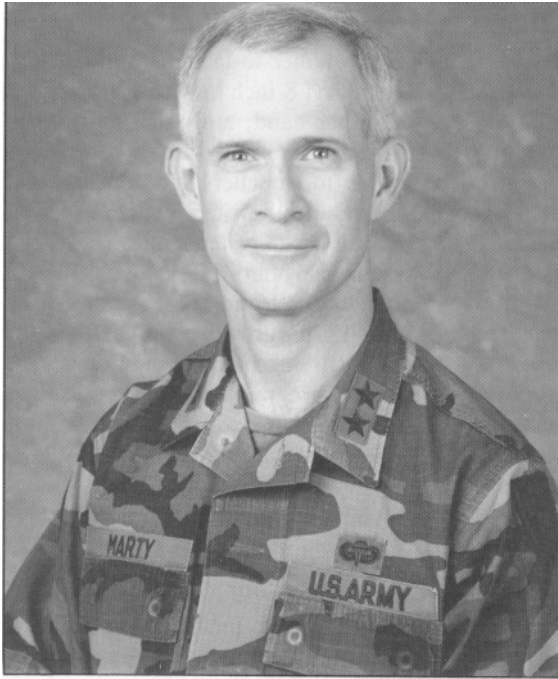
Art Director:

Donna Jeanne Covert

Assistant Editor:

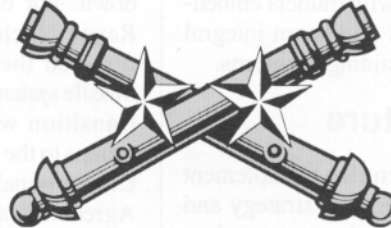
Joanne Alexander Brown

Field Artillery



State-of-the-Branch Address 1991

by Major General Fred F. Marty



This has been another banner year for Field Artillerymen everywhere. During Operation Desert Storm, fire support captured the world's attention as our forces participated in the largest military campaign since World War II. Once again, today's Redlegs proved they are combat-ready warriors and remain the "King of Battle."

Doctrine

While AirLand Battle exists as our published warfighting doctrine, Desert Storm provided a cameo demonstration of the principles contained in evolving AirLand Operations doctrine. Our forces applied those principles to maximize their warfighting potential.

AirLand Operations doctrine will continue to evolve. The Field Artillery School must work together with field commanders to capitalize on innovative approaches designed to focus our training programs on meeting the needs of our future Army.

Training

Training remains the cornerstone of our readiness and was proven a major combat multiplier in Desert Storm. We must remain firmly committed to continuing tough, realistic training as our top priority.

The Combat Training Centers (CTCs) are the heart of the Army's combat

maneuver training program. Our mission of providing accurate and timely massed fires must be practiced and integrated with the combined arms team during rotations at the CTCs.

Previously, the CTCs have used fire markers to "show" the effects of indirect fires. This not-always-timely, labor-intensive method tends to degrade the effects of indirect fires and close air support. A fire marker must drive to the exact point on the ground where the fires are predicted to impact, and he occasionally fails to arrive at the grid while the target is present.

The introduction of the combined arms training integrated evaluation system (CATIES) to the National Training Center (NTC) at Fort Irwin, California, has revolutionized the portrayal of indirect fire effects. CATIES simulates real-time, indirect fires and allows fire support systems to engage and destroy enemy forces realistically on the battlefield.

CATIES will be operational at NTC until replaced by a programmed enhancement, the simulated area weapons effects/multiple integrated laser engagement system II (SAWE/MILES II).

SAWE/MILES II will increase further the realism of fire support on the training battlefield. Linked with the global positioning system (GPS), SAWE/MILES II will direct the simulator to accurately replicate the area weapons effects on the ground. When incorporated into all the CTCs beginning in 1993, SAWE/MILES II will significantly increase real-time fires and assist maneuver commanders in synchronization task training.

Operation Desert Storm validated tough, realistic training programs for our combat units. Using situational training exercises (STXs), field training exercises (FTXs) and drills, maneuver commanders have learned how to synchronize fire support with maneuver forces.

“ We must remain firmly committed to continuing tough, realistic training as our top priority. ”

For future training programs, fire supporters must learn to rely more on training aids, devices, simulators and simulations (TADSS). TADSS offers the means to mitigate increasing public environmental concerns for noise abatement while concurrently allowing a means to offset diminishing resources for operating tempo (OPTEMO). The combination of TADSS with trainers embedded in new systems will be an integral part of our future training programs.

Force Structure

The Army is structuring to implement our new national military strategy and accommodate force and resource reductions. Shifting from the strategy of *forward deployment* in worldwide locations to *power projection* of our forces in contingency operations, without question, our Army will be smaller with more of it based in the continental US (CONUS). By 1995, the Army will consist of four corps and 20 divisions. Overall, Field Artillery will mirror the drawdown of the Total Force.

	1990	1995
Corps Artillery	5	4
Field Artillery Brigade	30	20
Division Artillery	28	20

The Transition of the Field Artillery Force Structure to 1995. In four years, the Field Artillery Active Component will be reduced by 42 percent and our Reserve Component by 36 percent. These percentages mirror the drawdown of the Total Army, taking into account our previously programmed force reduction plans.

During the next four years, the Active Component Field Artillery will be reduced by 42 percent and our Reserve Component by 36 percent. At first glance, these reduction percentages appear to be higher than the rest of the Army, but they incorporate several reduction schemes already programmed or in-progress before the announced drawdown. For example, the Intermediate-Range Nuclear Forces (INF) Treaty directed the demise of the Pershing missile system. Also, we had arranged to transition warhead detachments and groups to the Ordnance Corps before the Conventional Forces in Europe (CFE) Agreement and the subsequent reductions to the Army budget.

Furthermore, plans already had been announced to compress Lance battalions to 3x4 organizations; and in 1988, after rigorous analysis, we decided that 8-inch howitzers and the remaining Lance missile systems would be replaced with multiple launch rocket systems (MLRS) and Army tactical missile systems (Army TACMS).

While the Field Artillery may be smaller, the fire support lethality available to corps and division commanders will not diminish. Conversion to Paladin and the advanced Field Artillery system (AFAS) in 3x8, 155-mm howitzer battalions, combined with the fielding of additional MLRS battalions, offer the potential for much greater lethality, flexibility and survivability.

Concurrently, our efficiency improves with the advent of our newer weapons systems. MLRS requires a dramatically smaller crew than older systems. MLRS is a far more lethal and efficient system

with a soldier-to-launcher ratio of 16:1. Lance and 8-inch howitzer systems, on the other hand, are much more manpower-intensive. Lance requires a soldier-to-launcher ratio of nearly 75:1 while 8-inch howitzer battalions have a 28:1 soldier-to-cannon ratio. The MLRS system also offers the clear advantage of providing both mid-range and deep fires, as well as the growth potential for future smart (fire and forget) munitions. The result of programmed fire support force structure changes will be both a more lethal and efficient force.

Modernization

Modernization must continue as a major effort in the fire support arena. Studies, such as the recently concluded Legal Mix VII and the ongoing Study of Artillery Effects (SAE) series, have given us a solid foundation to express the needs of our 21st century Army.

The Legal Mix VII Study, to be presented to Headquarters DA this month, recommends we heavily invest in smart munitions, both for tactical and operational fires. Study results provide combat developers clear decisions to guide their pursuit of future systems.

SAE continues to produce startling results regarding the effects of indirect fires on both US and Soviet weapons. Against certain hard targets (for example, armored vehicles), SAE shows that artillery is at least three times more effective than reflected presently in the Joint Munitions Effects Manuals (JMEMs).

Several key Field Artillery systems we are pursuing offer the means to achieve study recommendations.

- Paladin production and fielding remains within budget and on schedule.
- The AFAS, our future cannon, enjoys strong Congressional support.
- An Army TACMS Block II variant, featuring the BAT anti-armor submunition, will allow us to attack moving armored vehicles at depths beyond 100 kilometers.
- A high-mobility artillery rocket system (HIMARS) is under consideration. HIMARS provides the corps commander an ability to support forced-entry counterfire and deep-fires requirements in a regional contingency environment.
- The sense and destroy armor munition (SADARM), now in full-scale development, continues toward fielding



The 7th Infantry Division (Light) Artillery in action with the new 105-mm M119 light howitzer.

in the mid-1990s in both cannon and rocket applications.

- The advanced Field Artillery tactical data system (AFATDS) software design reviews concluded recently. The program remains within cost and on schedule.

- The USMC is spearheading a joint service pursuit of a lightweight 155-mm cannon. Meanwhile, the Army is managing the development and fielding of a more lethal suite of 105-mm munitions for our light units. The M119 extended-range munition begins production in FY 92. A dual-purpose improved conventional munition (DPICM) for the M119 is under development.

- The new 105-mm, M119 light howitzer has been fielded in the 82d Airborne Division and the 7th Infantry Division (Light).

Clearly, AirLand Operations concepts demand fresh responses from the fire support system. We are re-emphasizing the fundamentals of fire support as we look for ways to meet the increasing demands for fires on the nonlinear battlefield.

Leader Development

No substitute exists for leaders who are competent in the skills of their profession, confident in their abilities, responsible for their soldiers and committed to the defense of our nation. The leaders of Operation Desert Storm, developed through well-designed and executed leader-development programs, epitomized these characteristics.

Our officer and NCO programs focus on progressive and sequential education and training to produce qualified leaders who can exploit the full potential of future Army doctrine, equipment and force structure.

NCOs

We have implemented a number of significant changes to our NCO education system (NCOES) courses. The advanced NCO course (ANCOC) and basic NCO course (BNCOC) have been converted entirely to small group instruction (SGI) in all technical tracks. A 48-hour, end-of-course FTX—stressing leadership skills and providing a realistic environment to evaluate common leader combat tasks—has been added.

Our NCOs must realize their future success demands self-development. The

“ Clearly, AirLand Operations concepts demand fresh responses from the fire support system. ”

Army's self-development test (SDT) moves to the forefront in the NCO evaluation system during 1992. For this decade, the SDT promises to serve as the vehicle for NCOs to measure and guide their professional growth. The impact of the SDT is pervasive; leaders at all levels must fully understand the significance of this new program.

Officers

The officer basic course (OBC) and officer advanced course (OAC) continue to graduate technically and tactically qualified Marine and Army officers.

Beginning last January, each officer graduating from OBC gained the skills necessary to operate cannon systems. Those officers designated for assignments to Lance or MLRS units attend follow-on courses to learn specific system requirements.

The preponderance of the OAC curriculum is imparted to students using SGI techniques. The 12-week SGI phase focuses on leader development in fire support, battery command and battalion, brigade and division artillery operations.

OAC reflects the Total Army by incorporating Army Reserve and National Guard officers during the entire SGI phase. By our course design, Army and Marine officers afford each other the opportunity to replicate in the classroom the joint environment of the field, while allied officers from more than 50 nations bring the experience of coalition warfare to the SGI group. Infantry and Armor branch officers are integrated into each small group to provide our fire support leaders a better perspective on the combined arms team. This experience assists all OAC officers when they get to their next units and begin integrating all fire support assets into the planning and execution phases of an operation.

The small groups are carefully constructed to incorporate officers with varied backgrounds and experiences.

This mix of officers has led to invaluable interaction and professional growth for all the students.

Responses from students, instructors and the field indicate we're on track with the OAC revisions.

Conclusion

We face a watershed time in the history of our Army. The victory in the Persian Gulf gives the Army a popularity unparalleled in recent decades. Our maneuver forces received lethal, timely and accurate fires in Southwest Asia. Not since World War II has fire support earned such credibility among leaders at all echelons.

But we cannot rest on our laurels. Decisions affecting the drawdown of the Army continue at a rapid pace. We must remain trained and ready today and build the fire support structure our smaller Army requires to preserve the lethality, deployability and survivability demanded for the battlefields of tomorrow. *Field Artillery—On Time, On Target!*



Major General Fred F. Marty, Chief of Field Artillery, commands the US Army Field Artillery Center and Fort Sill, Oklahoma. He has served extensively in Field Artillery troop leadership assignments, including two tours in Vietnam and four in Germany. He also has commanded V Corps Artillery/Frankfurt Military Community and the 41st Field Artillery Brigade/Babenhausen Military Subcommunity, both in Germany; the 30th Field Artillery Regiment, Fort Sill; the 1st Battalion, 16th Field Artillery at Fort Hood, Texas; and two batteries of the 6th Battalion, 77th Field Artillery at Fort Irwin, California, and in Vietnam. Among other assignments, Major General Marty has served as Assistant Division Commander of the 1st Cavalry Division, Fort Hood; Chief of Staff of the US Army Combined Arms Center, Fort Leavenworth, Kansas; and Assistant Commandant of the Field Artillery School, Fort Sill.

Brigadier General Wesley K. Clark, Former Commander
of the National Training Center, Fort Irwin, California

NTC: The Ultimate Training Experience

Interview by Lieutenant Colonel Colin K. Dunn, Editor

Are there general tenets for units to employ at the NTC that will make them victorious or, at least, more successful?

There's a recipe for success at the NTC, and I'll give it to you. It's a simple one: only soldiers can win—commanders can't. Commanders can lose, or they can set the conditions that enable soldiers to win. But only soldiers can win.

A corollary to that is it doesn't take all your soldiers and weapons systems to win. Actually, a very small number can win. For example, in a battalion attack, you want to go 3:1 against the enemy. Say you have 40 tanks while the enemy has about 15 to 20 defending anti-armor systems. Just one of your tanks has enough combat power to take out every one of the his anti-armor systems. Just *one*. So you're really attacking at a 40-times redundancy.

If you can get five tanks in the right position on the enemy's flank, undetected, then *Boom*—you've got him. That's the secret to success. The problem is you can't determine in advance which of your tanks is going to be in the right position at the right time.

The same applies in the defense. For example, if the enemy's coming at you with 160 armored vehicles and you only have 30 tanks and 30 Bradleys [fighting vehicles] in the defense, he's 3:1 against you. Okay. But each of your tanks has 40 or more rounds. Even if you only have the older M1 tanks that, say, only hit 50 percent of their targets, eight to 10 of your

tanks still can destroy the entire enemy regiment.

On every rotation, some soldiers learn this. They're the ones who bring success to the unit on the NTC battlefield. It comes down to a very few soldiers being in the right place at the right time with the right equipment. But you don't know who those soldiers are going to be, so you have to train them all. If there's a single recipe for success at the NTC, it's build well-trained and motivated platoons and crews.

The examples I've used are for the direct-fire battle, including Army aviation. But what about fire support? The NTC is a combined arms battlefield.

At the NTC, we have to, in some sense, worst-case the battlefield. If we had our "druthers," we'd locate the enemy, mass tens of battalions of artillery on him, blaze away indefinitely and destroy him. And when we'd marched through, we'd see nothing but smoldering hulks. In effect, there would be no direct-fire battle. In the history of warfare, man has tried to destroy his adversaries at greater and greater distances. So, in that sense, if we can destroy the enemy with indirect fire before we ever come close to him, so much the better.

But we can't train the combined arms team to believe that's the way all wars will play out. We have to train for the worst-case scenario, the one in which you only have some artillery or air power available. So you have to learn to budget your fire support. You use your indirect fires

to destroy the enemy's artillery, so he can't fire on you. But it wouldn't be smart to train our forces to expect that, habitually, they'll never have enemy artillery falling on them. So it's an integrated combined arms battlefield.

The Field Artillery and other means of fire support are critically important. But because the NTC is a training battlefield, not a simulation of what we believe the next war will be like, the key to success remains the direct-fire battle as the primary, single arbiter of decision.

I told you the recipe for success at the NTC. The main "ingredient" of crew proficiency is soldier proficiency—and in a broader series of tasks than simply applying firepower on the target. Such proficiency helps compensate for what Clausewitz called the "friction of war." Ultimately, the way you alleviate friction is to have the highest possible degree of proficiency at the lowest possible level—soldier proficiency. It's having proficient gun crews, forward observers and FDC [fire direction center] personnel to handle TACFIRE [tactical fire direction system] and BCS [battery computer system]. It's infantrymen, truck drivers, medics—everyone proficient in all the tasks that 4,000 individuals do to make the team go. No leader is so empowered that he can overcome the collective weight of soldier-level failures in war.

Another important ingredient of that success recipe is for commanders and staffs to have simple, understandable orders and plans.

What OPFOR [opposing force] tactics have been the most successful against the Blue Force?

The battle that causes the Blue Force the greatest difficulty is the meeting engagement. This battle of advancing reserves is a key area for growth in our Army's training and doctrine. It's one dealt with much more extensively in other armies' literature than in our own. And yet it's a battle that's increasingly likely to be the one we'll fight in the next war because it presumes both forces are moving.

How can fire supporters help our maneuver units succeed in the meeting engagement?

The challenge for the fire supporter is to be as good tactically as he is technically. The maneuver commander not only wants accurate, timely rounds on target

once the guns are in position and the target is prescribed, but he also wants the Field Artillery to maneuver its batteries, battalions, command posts and COLTs [combat observation lasing teams] effectively to contribute to the fight in an optimal fashion. So the challenge of the meeting engagement (and the challenge of AirLand Operations as well) is to attack and beat a moving enemy force when you are moving.

When all parts are in motion, everything is constantly changing. You must know when to quickly halt and mass fires or strike a moving target or when to maneuver your batteries forward to be able to fire deep against enemy targets in support of the maneuver task force. That's a real tactical challenge. I believe our artillery is better technically than it is tactically.

The Field Artillery has a technical challenge also—making the best use of the current TACFIRE systems. I've been told that AFATDS [advanced Field Artillery tactical data system] in the midterm will solve *all* fire support execution problems, that it's a perfect system, that the "check's in the mail." But in the meantime, the units are left with TACFIRE.

So the issue is how best to use TACFIRE in battle. First, technically, it's difficult to know which fire missions are not being received and processed that should have been. We have to ensure that TACFIRE is receiving the appropriate fire missions through the DMDs [digital message devices]. Second, it's difficult to know whether the missions being fired are in queue or priority order. In other words, are those the missions that would, in fact, be fired in that sequence if a man were fully in the loop?

Those are the two problems with TACFIRE execution. There are potential, partial solutions to both problems. But the Field Artillery and maneuver communities have yet to satisfactorily solve either.

The shock effect and lethality of the modern Army was evident in Operation Desert Storm. How should the combined arms team train at the NTC to capitalize on these strengths?

One of the issues we've always had at the NTC was when you're training to win, do you have to win in training? In other words, should you fight an opponent who's the toughest possible one in training—understanding you may not

defeat that opponent very often, which might damage your ego? Or, should you fight a less capable opponent, having a better chance of defeating him? What we've picked up from Desert Storm is it's better to train tough to fight easy, as opposed to the other way around.

Units have come to the NTC and other combat training centers over a period of years, and by all conventional measures and in the after-action reviews, you wouldn't have considered their battles models of military art. Nevertheless, those same units can go to war and completely destroy an adversary.

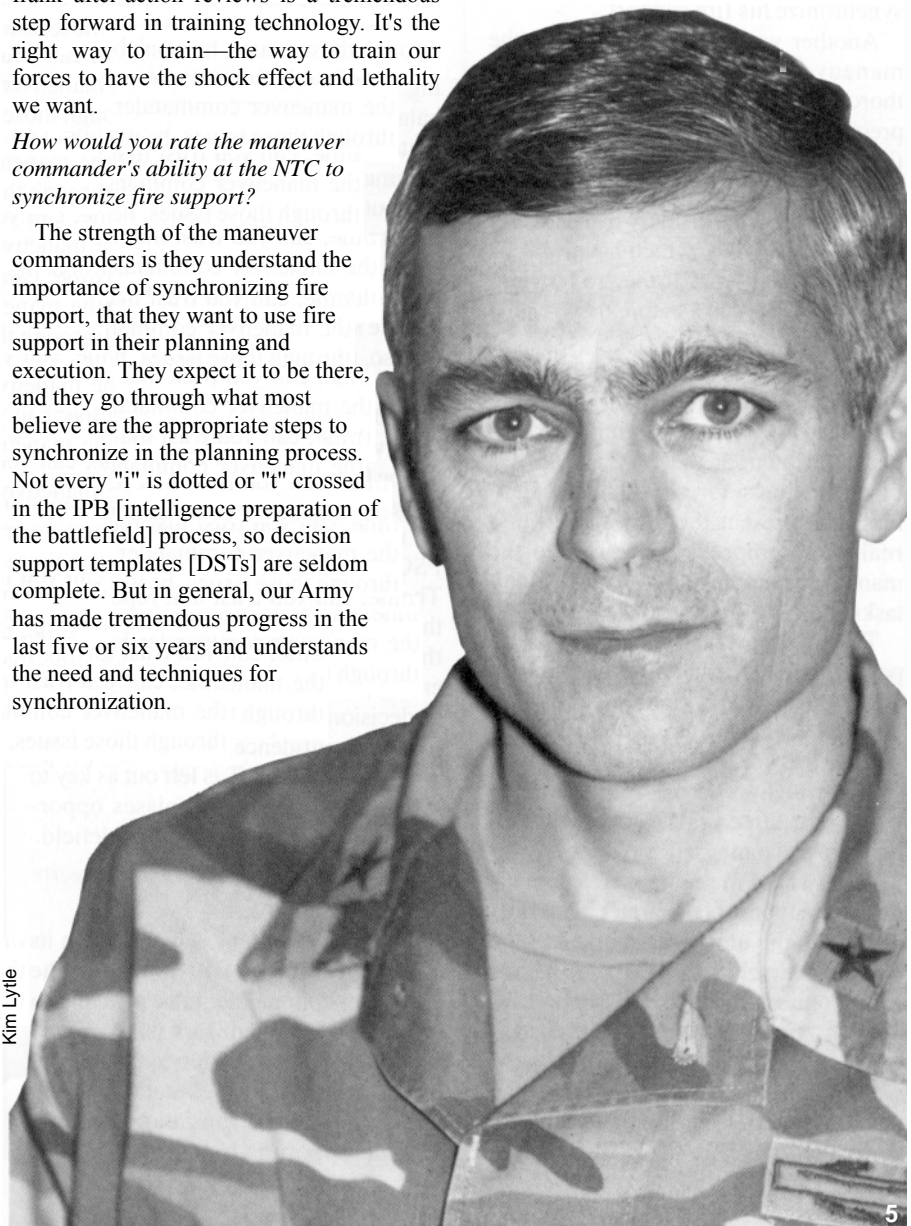
Facing a tough, uncompromising opponent fighting to win in accordance with another army's doctrine and participating in frank after-action reviews is a tremendous step forward in training technology. It's the right way to train—the way to train our forces to have the shock effect and lethality we want.

How would you rate the maneuver commander's ability at the NTC to synchronize fire support?

The strength of the maneuver commanders is they understand the importance of synchronizing fire support, that they want to use fire support in their planning and execution. They expect it to be there, and they go through what most believe are the appropriate steps to synchronize in the planning process. Not every "i" is dotted or "t" crossed in the IPB [intelligence preparation of the battlefield] process, so decision support templates [DSTs] are seldom complete. But in general, our Army has made tremendous progress in the last five or six years and understands the need and techniques for synchronization.

“ We need to balance top-down fire planning with the bottom-up requirements of subordinate commanders. ”

Kim Lytle



One weakness is that synchronization is more difficult than most maneuver commanders anticipate. It's more difficult, in part, because the commander is forced to make decisions on the basis of incomplete and inaccurate information.

When he "war games" the synchronization process, he says, "if the enemy is here, then I'll do this." But he needs to go a step further. He needs to go into "How will I know the enemy is here?" and "What are the criteria that will lead me to believe this?" Are two spot reports good enough? Does one spot report from a major equal two spot reports from privates or three? If a helicopter pilot says, "Give me fire at Whale Gap," and doesn't submit the time, can you trust that report? Unless the maneuver commander has thought through those issues, he won't be able to synchronize his fire support.

Another weakness is that unless the maneuver commander is especially thorough or experienced, he won't appreciate the tactical difficulties Field Artillerymen have maneuvering fire support assets. To maneuver them, you have to know where the artillery batteries are, which are moving, which have various kinds of rounds and if they're moving, how long it will take before they're able to fire.

Also, there are a number of these things that even Field Artillerymen have difficulty fully visualizing until they actually do them at the NTC. Field Artillerymen must foresee all this in planning and present the information in a realistic, comprehensible way to the maneuver commanders—very difficult tasks.

There are several things the fire support community can emphasize to help synchronize fires. One of the most important is to capture the commander's intent for the fire support plan. That's an area in which we've made strides in the last two or three years, along with top-down fire planning.

Also, what I'm seeing increasingly is that fire support plans aren't being forwarded to the units with the rest of the orders in a timely fashion. The maneuver order comes out, and the fire support annex is a "promissory note." We need to get the fire support plan out at exactly the same time as the maneuver plan.

Then we need to be faithful to the FIST [fire support team] concept of fire planning.

“No leader is so empowered that he can overcome the collective weight of soldier-level failures in war.”

We went to the top-down fire planning system when it was clear that if you didn't put some order in the fire planning initially, you'd have chaos; in the uncoordinated efforts of 15 FISTs and three or four FSOs [fire support officers], they'd all clamor for targets in roughly the same areas without understanding the intent behind the targets. You'd have a measles sheet.

But the top-down planning process shouldn't preclude specific targets picked by subordinate commanders from being put into the fire plan. We need to balance top-down fire planning with the bottom-up requirements of subordinate commanders. If we concentrate on getting out a timely fire plan, there's enough time to be complete and still leave time for subordinates to request changes and put in their targets without producing a measles sheet.

Also, the Field Artillery is doing much better about having fire support rehearsals. But you still need COLTs and other observers more involved in the rehearsals.

The COLT potentially is an incredibly valuable asset. It can be the eyes and ears of the brigade commander or the FSCOORD [fire support coordinator]. That means the team needs to understand the commander's intent; be involved in the fire planning process; rehearse enough to know where it's going, when, its decision criteria and trigger lines; and have the confidence of the commander. Too often, the COLT is left out as key to the planning team and misses opportunities to contribute on the battlefield.

How can the Field Artillery improve fire support?

The Field Artillery is not alone in its responsibility for fire support. The maneuver commander must articulate a clear intent and then work the system to ensure his intent is understood and processes are underway to execute that intent at all levels of the organizations working for and supporting him. The Field Artillery

issues a timely fire support plan in consonance with the commander's intent; briefs it to the commander for his approval, understanding and incorporation into his thought processes; presents it to subordinates for modification recommendations; and rehearses it before the battle.

And in execution, there's a great deal of work to be done to improve the tactical flexibility and agility of Field Artillery elements on the battlefield. I don't want to be critical of just the Field Artillery. I could say the same to Armor, Infantry, Air Defense, Engineers—all are far from optimizing the potential of their hardware, organizations or soldiers. There's always room for improvement.

Based on our experiences in Operation Desert Storm, what changes do you see happening at the NTC?

Overall, the NTC has received a large vote of confidence that our training was precisely what units needed to prepare for Desert Storm. But there are some things we need to emphasize. We'd like to see continuing emphasis on the distances of the LOCs [lines of communication], on the speed of the operational tempo of the battlefield and on unit reconstitution.

In the past, units complained the LOCs were too long, and doctrinally, they were too long. Our doctrine calls for the FSB [forward support base] to only be about 20 kilometers from the FEBA [forward edge of the battlefield]. At the NTC, the FSBs typically are up to 40 kilometers or more behind the FEBA. As it turns out, Desert Storm taught us that they could be 60 or 80 kilometers behind the FEBA.

We usually move the FSBs three or four times during a 14-day rotation. Realistically, we could move them six or seven times, based on the mobility we now see is requisite in warfare. What units will see at the NTC is more of the same, only better.

One more area we're looking at is communications redundancy. Some Desert Storm units say we allow too many communication systems at the

NTC, that they won't have those available in war. We're looking at that.

How effective is the NTC at training Field Artillery battalions?

It's probably at least as effective as it is for training other battalions. In some respects, the Field Artillery battalions get the best training of all at the NTC. They're trained in DS [direct support], GSR [general support reinforcing] and GS [general support] roles and have seven or eight days of almost continuous live-fire operations. They have the chance to go through the scenario twice with some modifications. The ammunition they fire at the NTC is about equal to what they fire the rest of the year at home stations. Beyond that, they can train tactically, which is done better here than any where.

The howitzers we're issuing—by the way, we're issuing 24—have MILES [multiple integrated laser engagement system] devices for full participation in the battle, not only defensively, but offensively. They can exercise direct-fire functions. In a recent rotation, for example, a Field Artillery battalion killed some OPFOR vehicles with direct fire from its 155s. The NTC is a tremendous opportunity for the fire support community to train both technical and tactical skills.

What advice would you give a Field Artillery battalion commander a year or six months out to make his unit most effective at the NTC?

You've got to train the *bottom* of your organization. When commanders think about coming to the NTC, each fears he'll do something wrong, be embarrassed or be judged personally. But he has to break through that and train the bottom echelons of his organization.

It doesn't matter how good the battalion commander is, if his batteries can't maneuver or if his soldiers can't operate under MOPP-4 [mission-oriented protective posture gear, level 4] at night or run the FDC 24 hours straight, then he won't be effective. So first things first—he's got to train the bottom to win.

In addition, when he's in battle, he'll be in a high-stress environment. It'll be more difficult for him to assess and strengthen the performance of his organization at the bottom than it is at home station. He'll have a tremendous opportunity for growth, but he won't be able to impact on the acquisition of skills by his subordinates at the battery

level and below to nearly the extent he'd like to. For both reasons, it makes sense to concentrate the training at home station on proficiency at the bottom of the organization and then come to the NTC and put it all together on the battlefield.

How do you see the future smart and brilliant anti-armor munitions impacting on the play at the NTC?

First, we have to do our homework and be ready to accept additional weapons in NTC simulations. As with other weapons, they have been heralded as being able to end the battle. In all likelihood, smart—even brilliant—munitions won't end the battle, even in the Mojave Desert, because the challenges, again, will be tactical.

Yes, a few brilliant munitions in the right place might win the battle like the few tanks I described. But the trick will be to get the munition at the right place and time with the right designated code to do the job. That will be a big tactical challenge.

As AirLand Operations becomes our doctrine, what do you see the NTC looking like in the year 2000?

We'll always need stressful, realistic training—the basic framework of the combat training centers will remain intact. That's validated by Desert Storm, and I think we can retain that even in a budget-constrained Army.

There are going to be a lot of changes. Obviously, we're going to have the new weapons incorporated—LOSAT [line-of-sight anti-tank system], NLOS [nonline-of-sight missile system], smart and brilliant munitions for the Field Artillery, Apache longbow [mast-mounted sight system similar to that on the OH58D helicopter] and unmanned aerial vehicles [UAVs]. All those will play in our combat training centers.

Instrumentation is going to be more precise; we're going to have a linkage of the air with the ground battle that's absent right now. We're also going to have better position location. Some "killing" will be done through simulation rather than by MILES laser technology.

We'll need additional maneuver space at Fort Irwin because the extended range of the new sensor technology will affect the brigade battle. Then add MLRS [multiple launch rocket system] with smart and brilliant munitions and forces simply can't butt heads in the current space continuously and survive. Land at the

NTC is going to be at a premium because, in keeping with AirLand Operations, we're going to start forces some distance apart from each other and then work in.

The OPFOR will continue to modernize; you'll see somewhat equivalent capabilities, at least within five years, of the most sophisticated technology of an adversary we'll face. Perhaps the OPFOR will even be a composite adversary to ensure we train tougher than we expect to have to fight.

I think you're going to see a greater linkage of the NTC with the testing community. Testing will focus more tightly on asking the right questions of and taking the right lessons from the NTC and the other combat training centers to help guide the evolution of the Army.

What message would you like to send to Field Artillerymen worldwide?

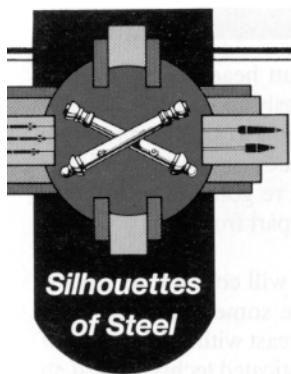
There are two primary things I've seen at the NTC, and I'd like to pass them on. The first is to reinforce what I've said: only soldiers win battles. An Army is no better than the quality, training and motivation of the men and women at the bottom of its organizations.

The second is a rule that's really as old as the Army. When you're in charge, take charge. Be innovative, take the initiative, make things happen—don't let them happen to you.

These are two lessons that come out of the NTC in battle after battle. They're principles, when applied, that can turn the tide of battles in war, the ultimate goal of the NTC.



Brigadier General(P) Wesley K. Clark commanded the National Training Center (NTC), Fort Irwin, California, until late September when he was selected for his second star. Currently, he's the Deputy Chief of Staff for Concepts, Doctrine and Developments at Headquarters, Training and Doctrine Command, Fort Monroe, Virginia. In a previous tour at the NTC, he commanded the Operations Group, bringing the total number of NTC rotations he has either participated in or evaluated to 45. Brigadier General Clark also has commanded the 3d Brigade and 1st Battalion, 77th Armor, both in the 4th Infantry Division (Mechanized), Fort Carson, Colorado. He commanded three companies, including a mechanized infantry company in Vietnam.



I Corps Artillery

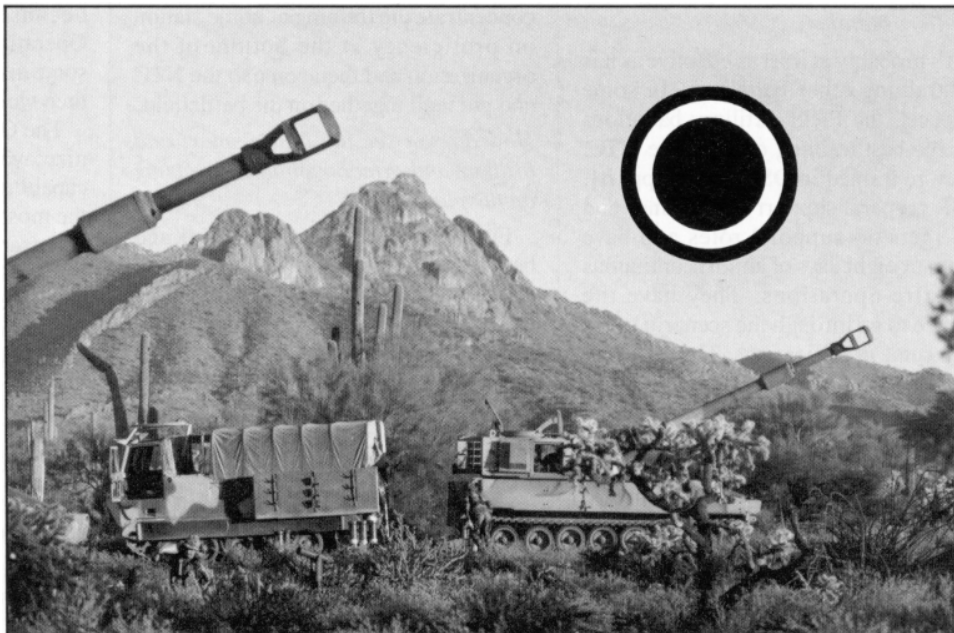
I Corps Arty, headquartered in Salt Lake City, Utah, continues to provide the full range of expert fire support to "The First US Corps." We're totally committed to providing fire support to "America's Corps" and serving as a major subordinate command for the Utah Army National Guard. For the ARNG, we provide administrative, logistical, operational and training support for three in-state FA battalions.

Our mission also includes providing guidance and training assistance to six Capstone FA brigades, which control 24 FA battalions located throughout the US. Participation with these brigades during Capstone conferences and working with them during training exercises continues to be one of the highlights of our responsibilities. We're proud to be associated with such high-quality soldiers who are so committed to the defense of our country.

Honors and Training

One of our ARNG in-state battalions, the 2-222 FA, won this year's Milton A. Reckord Award, given annually to the outstanding ARNG unit in Sixth Army. The award made 2-222 FA eligible for the Walter T. Kerwin Award for the most outstanding large unit in the ARNG or USAR. This is the second time the battalion has won the Kerwin Award.

I Corps Arty hosted the very successful Ninth Annual I Corps Arty Fire Support/Capstone Conference in Salt Lake City in January. Representatives from all levels of the fire support community attended and shared their expertise, including about



Headquartered in Utah, I Corps Arty provides the full range of expert fire support to the "First US Corps."

Operation Desert Storm. BG Columbus "Buck" Womble, Chief of Staff of I Corps, Fort Lewis, Washington, and BG Frank Miller, Commander of III Corps Arty, Fort Sill, Oklahoma, captured the audience with their excellent presentations about units deploying to Southwest Asia.

Plans are underway to host the 10th Annual Conference in January — "Focusing on the Future" — with representatives from maneuver commands and I Corps support units as well as the fire support community attending.

Future Challenges

The Corps Arty is planning innovative and realistic training opportunities. Realizing the limited training resources of the future, we're renewing our "Cabin Fever" exercise—an artillery CPX using the Battle Simulation Center (BSC). In conjunction with the 75th MAC and the 1st MTC, I Corps Arty will host the first iteration at Camp Williams, Utah, this month. All our Capstone brigades and cells from each of

I Corps' Div Artys will participate. In future Cabin Fever exercises, units will participate from their home stations, greatly reducing travel costs.

I Corps Arty also is planning a large-unit LFX for June. The LFX will train a team of CS and CSS units in the desert of Utah's Dugway Proving Ground and includes a fire support FTX and a maneuver CPX. The LFX has been tentatively approved by all concerned agencies.

This was an interesting and

challenging year for I Corps Arty, with the promise of more to come. The reduction of forces, Capstone realignments and reduced resources will provide us new challenges next year.

We'll continue to institute effective and modern methods to train and equip our units and ways to fully integrate and train our commanders and staffs. Safe, mission-oriented, realistic training is our constant goal. We're proud to be—**America's Corps Artillery!**



Safe, mission-oriented realistic training is I Corps Arty's constant goal.

III Corps Artillery



III Corps Arty, Fort Sill, Oklahoma, entered Fall 1990 in a massive deployment to the Persian Gulf for Operations Desert Shield and Storm. When the dust settled, III Corps Arty had deployed 5,182 of its soldiers and 2,267 major pieces of equipment. In addition, we deployed almost 4,000 Reserve Component soldiers from 26 units.

Battery B, 6-27 FA, deployed to Saudi Arabia in early September, becoming the first Army TACMS-capable unit to arrive in theater. The FA brigades arrived in Saudi Arabia during September and October. The 75th and 212th FA Bdes were attached to the XVIII Abn Corps Arty and conducted various live-fire exercises. Our brigades were the most forwardly deployed US artillery units at the time.

75th FA Brigade

The 75th FA Bde, attached to VII Corps Arty, marched more than 100 miles west along the infamous Tapline Road and joined the 1st IN Div (Mech) at TAA Roosevelt as the Air War began (15 January 1991). On 18 January, A/6-27 FA executed an

"Army TACMS hip shoot," firing two missiles at an SA-2 site in Kuwait. The damage assessment was described as "astounding" for the first shots fired in anger by VII Corps since World War II.

The 75th FA Bde reinforced the 1st IN Div Arty for G-Day operations (24 February) that breached the Iraqi lines. The 75th consisted of the 1-17 FA, reinforcing the 4-5 FA (DS to the 1st IN Division's 2d Brigade); 5-18 FA with the GSR mission; and 1-158 FA (Oklahoma ARNG) and A/6-27 FA (Army TACMS) with GS missions.

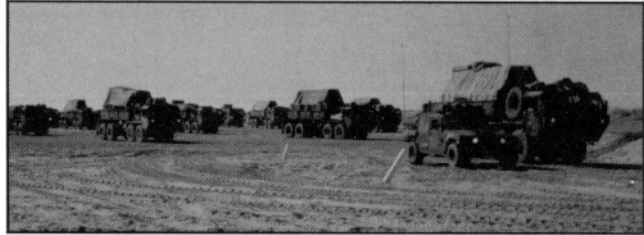
On 25 February, the 75th Bde changed to reinforce the 1st Armored Div Arty (1st AD), thus beginning the "Mother of all Road Marches." After dashing more than 150 miles, the 75th Bde participated in the 1st AD's reduction of two Republican Guards Forces Command divisions, firing more than 6,000 rounds, 1,100 rockets and 25 Army TACMS missiles. The 75th Bde redeployed, closing on Fort Sill in April.

212th FA Brigade

The 212th Bde, attached to the XVIII Abn Corps Arty, reinforced the 24th IN (Mech) Div Arty. It consisted of the 2-17 FA; 2-18 FA; 3-27 FA, a Fort Bragg, North Carolina, battalion attached since September 1990; and C/25 FA (TA). During the Air War,



MLRS "Steel Rain"—III Corps Arty units en route to Republican Guards positions in the 1st AR Division sector.



The 1-17 FA ammunition trains depart TAA Diamond during Operation Desert Shield.

the brigade displaced 300 miles to the west and just south of the Saudi-Iraqi border, and its 2-17 FA fired the first Copperhead round in anger.

The 212th advanced with the lead brigade of the 24th Division as it charged into Iraq on G-Day, making contact with the enemy 120 kilometers later. The 212th participated in the attacks into the Euphrates River valley and on Jalibah Airfield and the advance on the Basra, culminating in the devastating Battle of Rumaylah, which cut off the Iraqi escape across the Hawr al Hammar Causeway. The brigade fought and helped defeat elements of the Iraqi 26th Commando Brigade, 47th and 49th IN Divisions, Al Faw and Ad Nam Divisions and, finally, the Nebuchadrezzar and Hammurabi Divisions.

The 212th Bde's 3-18 FA became the force FA headquarters for the 3d ACR as it screened the XVIII Abn Corps' right flank. On G-Day, the 3-18 FA crossed into Iraq as a six-firing battery battalion. After advancing 100 kilometers the first day through a raging sandstorm, it captured 58 EPWs and fought as part of the now famous "end sweep." The 3-18

FA finished the war some 20 kilometers outside Basra.

When it was over, the 212th FA Bde had marched over 370 kilometers in 100 hours, firing more than 900 rounds and 1,000 rockets against Iraqi forces. The 212th FA Brigade redeployed, closing on Fort Sill in early April.

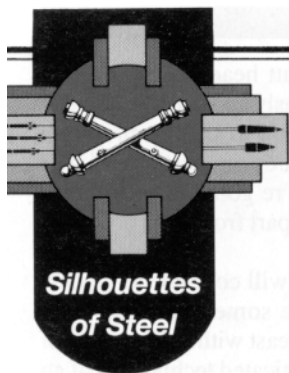
214th FA Brigade

The 214th FA Bde supported III Corps Arty units during deployment and for the six months they were in the Persian Gulf. The 214th Bde also deployed more individual soldiers to Southwest Asia than any other III Corps Arty brigade. The brigade set the Army standard for caring, proactive support for families of soldiers deployed in Desert Shield and Storm. In addition, it was responsible for three FA battalions (the 6-32, 1-12 and 2-2 FA), the 4-31 IN and all III Corps Arty rear detachments.

III Corps Arty demonstrated its strategic deployability and ability to fight in fast-paced desert warfare during Desert Storm. We remain ready for any national emergency or worldwide contingency as the **Phantom Corps Artillery!**



A 1-17 FA, 75th Bde, M109A3 howitzer passes a dug-in T54 Iraqi tank in the 1st Armored Division's sector during Operation Desert Storm.



V Corps Artillery



During Operation Desert Shield, The 42d FA Bde—redesignated the 292d FA (Incoming) on its way to Fort Lewis—lines up its vehicles for convoy.

CPT Robert Gilpin, 42d FA Bde



This year has been one of tremendous change for V Corps Artillery, headquartered in Frankfurt, Germany. We witnessed significant changes in the Threat, in our mission and within artillery organizations in USAREUR. We deployed the 42d FA Bde and several artillery battalions to Southwest Asia (SWA). Remaining V Corps Artillery Redlegs supported from Europe and prepared for future deployments. Throughout the year, the Corps Artillery continued to support the traditional Army and artillery missions while responding to new, unprecedented requirements.

Unprecedented Changes

The downsizing of USAREUR and reorganization associated with it and Operation Desert Storm temporarily caused V Corps Artillery to grow from two to five brigades and to consist of, at one time, 22 artillery battalions. Although the end state of the artillery in Europe is yet to be finalized, it certainly will be much less, perhaps only one or two brigades. Turbulence and uncertainty notwithstanding, V Corps Artillery continues to train to be ready to fight and will execute

with distinction the final missions of those artillery units inactivating or redeploying.

Artillery units that didn't deploy to SWA were busy providing, not only significant numbers of artillerymen and equipment to plus-up deploying battalions, but also many sections as crew replacements. Our units helped man the ports to load out VII Corps, some trained CONUS Individual Ready Reserve crews and others continued to inactivate or train for NATO missions. All guarded against an increased terrorist threat, including protecting every installation and housing area.

Corps Artillery Reorganization

The 17th FA Bde, "Thunderbolt," moved from VII to V Corps

and inactivated its four battalions this year. While in transition, the brigade sent 232 Redlegs and a great deal of equipment to units deploying to Saudi Arabia. In early 1992, the 17th FA Bde HHB will move to III Corps Artillery, Fort Sill, Oklahoma.

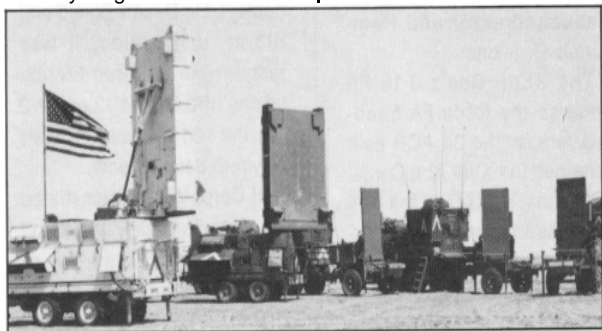
The "Railgunners"—41st FA Bde—also reshaped this year, inactivating two battalions, compressing two Lance battalions and acquiring an MLRS battalion. The reorganization turmoil took a "back seat" to deploying its MLRS battalion (1-27 FA) to support VII Corps in Saudi Arabia.

The Desert Storm veteran 42d FA Bde, "Wheelhorse," was temporarily redesignated the 42d FA (Incoming) in September and will move to Fort Lewis, Washington, in early 1992. By early October, the unit had no battalions in USAREUR. The brigade distinguished itself in Desert Storm. Moving 13 January to support the 1st Cavalry Division in the defense of the Wadi al Batin, it subsequently provided reinforcing fires to the 1st Cav and 1st Infantry Divisions during the artillery prep and breach of the Iraqi border and to the 3d Armored Division during the assault to free Kuwait and its aftermath. The brigade fired 210 missions for a total of 6,726 rounds without losing an American life.

Also a Desert Storm veteran, the 3d Armored Div Artillery, "Spearhead Steel," was inactivated in September and redesignated the 42d FA Bde, assigned to V Corps Artillery. It, too, showed its mettle during the Storm. Deployed to SWA in late December 1990, the 3d Div Artillery attacked into Iraq in February as part of VII Corps' great "left hook." Reinforced by the 42d FA Bde, the Div Artillery fired more than 4,000 rounds and 750 rockets in 100 hours. After the war, the Div Artillery remained in Iraq, guarding the demarcation line separating Iraq and Kuwait and providing humanitarian assistance until relieved by the UN in early May.

The "On Time, On Target" 72d FA Bde deployed 4-27 FA to SWA, transferring it to the 41st FA Bde upon its return. In addition, this year the brigade was reassigned to V Corps and, after battalion inactivations and reassignments, will retain three 8-inch battalions with 5-17 FA to be assigned to Fort Sill in early 1992.

With the reconfiguration and the rearming with MLRS of V Corps Artillery and inactivation of VII Corps Artillery in spring of 1992, the structure of artillery firepower in USAREUR is dramatically changing. We're closing a chapter in US Army history—the one on the Cold War. As V Corps Artillery moves forward, our nation can rest assured that the quality training and high motivation of the finest soldiers she has ever known will remain **Steadfast and Strong** in Europe—ready to defend freedom here and throughout the world.



CPT W. Turner

Q36 and Q37 radars of B/25 FA, 3d AR Div Artillery (redesignated the 42d FA Bde), on display in Kuwait for the US Secretary of the Army.

VII Corps Artillery



SPC K. Benjamin Quigley

PFC Anthony Gibson slides a 155-mm round from his ammo carrier to the howitzer in Operation Desert Shield

This year began fast-paced as the largest corps arty since World War II deployed for war with Iraq. Upon notification to deploy, BG Creighton W. Abrams, Jr., the VII Corps Arty commander organized a mix of 155-mm and 8-inch artillery with enough MLRS to support the corps commander's plans: four FA brigades with units from both USAREUR corps, the XVIII Abn Corps and Arkansas ARNG. HHB, VII Corps Arty, closed on TAA Juno by Christmas Day 1990 as remaining FA units continued deploying from USAREUR home stations and initial staging areas into TAAs in the Saudi Arabian desert.

In the second week of December 1990, the 210th FA Bde was deployed and assigned DS



to the 2d ACR. The 42d FA Bde, less one battalion, took up positions in support of the 1st Cavalry Division defending the Wadi al Batin approach. On 15 January, the Corps Arty gained the 75th FA Bde, previously attached to the XVIII Abn Corps, with an additional Army TACMS battery.

During the Air War while the possibility of an Iraqi spoiling attack in the Wadi al Batin sector loomed, the 42d and 75th Bdes planned concentrated artillery fires for the 1st Cav; because no attack materialized, the on-order missions were never executed.

By the end of January, brigades were dispersed throughout the VII Corps area. The 75th was chopped to the 1st IN Div (Mech) in a GS role.

VII Corps Artillery in the Storm

As the VII Corps plan to run an end sweep around Iraqi positions began to take shape, artillery planners placed an MLRS battalion with each armored division and the 210th FA Bde with the 2d ACR. The 42d and the 75th Bdes aligned to support 1st ID breaching operations. As February began, the 142d FA Bde (Arkansas ARNG) rounded out the Corps Arty and was assigned to reinforce the 1st (UK) Armoured Div Arty.

On G-Day minus one, the pace of operations accelerated as the 1st ID moved forward ahead of schedule. The US FA brigades and 1st (UK) Div Arty fired a barrage of 6,136 cannon

rounds and 414 rockets in 30 minutes for the breaching operation.

As the grand sweep began, the 42d and 75th FA Bdes moved from reinforcing the 1st ID across the battlefield to reinforce the 3d and 1st Armored Divisions, respectively. The 75th Bde crossed through the 3d AD sector to connect with the 1st AD in time for the division's fight on PL Tangerine against the Republican Guards.

By 1800 on 26 February, both US armored divisions faced Republican Guards units across PL Tangerine. The 1st ID passed through the 2d ACR, acquiring the 210th FA Bde as it went. The 142d FA Bde still reinforced the 1st (UK) Div Arty. The brigades continued these missions until the cease fire.

During the 100-hour offensive, Corps Arty assets fired 12,821 cannon rounds, 5,634 MLRS rockets and 25 Army TACMS missiles at Iraqi forces. A captured Iraqi artillery officer credited VII Corps Arty with destroying nearly 90 of his Div Arty's 100 guns in the 24 hours before the 1st (UK) Division's attack.

The Passing of an Era

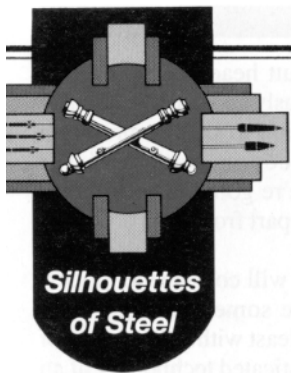
On 20 May, VII Corps Arty redeployed to USAREUR to continue its mission as a part of the Conventional Forces in Europe (CFE) closure. As of 1 November, with inactivations and transfers, the Corps Arty has only the 210th FA Bde HHB and one of the brigade's battalions, 3-17 FA (155-mm, self-propelled), remaining. The 17th FA Bde has been transferred to V Corps Arty and remains only as a headquarters until it moves to Fort Sill, Oklahoma, in early 1992. The 72d FA Bde has been transferred to V Corps with its five 8-inch battalions: 5-3, 3-5, 5-17, 2-14 and 2-20 FA. The VII Corps Arty, formerly the **Free World's Largest Corps Artillery**, officially inactivates in March 1992, and with its inactivation passes an era unique in US Army history.



VII Corps Arty's CSM Harold Shrewsbury poses for the folks back home in front of a French-made GCT 155-mm gun abandoned by Iraqis as VII Corps units rolled toward them.



A VII Corps Arty unit command post in Desert Storm. Note the oil wells burning in the background.



**Silhouettes
of Steel**

As demonstrated in Operation Desert Storm, the XVIII Abn Corps Arty, headquartered at Fort Bragg, North Carolina, is prepared for battle across the full spectrum of combat intensity. As the nation's contingency force, the corps amply demonstrated its unique capabilities in light-heavy operations in the joint environment.

Desert Operations

The Corps Arty began the year in Saudi Arabia, deployed in defensive positions for Desert Shield and conducting joint operations with the 1st Marine Expeditionary Force. Within a short time, it accomplished a number of historic firsts. In moving to Desert Storm attack positions, Corps Arty units crossed from 700 to 1,200 kilometers in two weeks. During Desert Storm, the Corps Arty conducted combined operations with the French, fired the corps' first Army TACMS, controlled the fires of three FA brigades over a 120 by 200 kilometer zone and moved farther and faster than any corps arty in history. We accomplished these feats by using main, tactical and assault CPs. The corps FSE worked closely with the Air Support Operations Center (ASOC) to ensure deep targets were successfully engaged by the US Air Force. Our intensive training during Desert Shield ensured our success.

The Corps Arty redeployed to Fort Bragg to prepare for other contingency missions and reinforce our parachute proficiency. By July, we were ready and conducting training, which culminated in the Corps Arty "Dragonfire III" exercise at Fort

XVIII Airborne Corps Artillery



18th FA Bde soldiers put steel on the target with their M198 howitzer during Desert Storm.

Bragg. This exercise included five FA brigades, five Div Artys and one Marine artillery regiment, as well as several corps CS and CSS assets. As the year ended, we prepared for the corps BCTP exercise with the 101st Abn Div (AAstl).

18th FA Brigade

The brigade began the year in defensive positions in Saudi Arabia, reinforcing the 24th IN (Mech) Div Arty and participating in many FTXs and CPXs with the 24th IN and 82d Abn Divisions and the XVIII Abn Corps Arty. The 1st FAD was attached to the brigade. During Desert Shield, the MDS and Light TACFIRE were fielded in the brigade, enhancing our ability to perform our mission.

As Desert Storm began, the brigade conducted a 280-mile road march to the extreme western boundary of the XVIII Abn Corps to reinforce the 6th Light Armored Division (French). The 1-201 FA (155, self propelled), West Virginia ARNG, and the 6-27 FA (MLRS/Army TACMS)

were attached to the brigade to provide additional firepower for the corps' main attack. After supporting the French attack, the brigade attached the 1-39 FA (Abn) to the 82d Division and the 5-8 FA to the 101st Division. The brigade (-) then moved 150 kilometers to the east to support the 24th Division in its destruction of the Republican Guards.

In March, the 18th Bde began redeploying and spent the remainder of the year training in FTXs and Dragonfire III and applying product improvement packages to our howitzers.

Corps MLRS

The 3-27 FA, the Corps' deep-strike artillery, proved its capability

to deploy rapidly anywhere in the world to provide rocket fires in support of corps contingency operations. One of its firing platoons deployed by air to Saudi Arabia with the initial elements of the 82d Division in Desert Shield.

The 3-27 FA supported the 24th Division in its rapid, deep attack of Republican Guards forces in the Euphrates River valley. The battalion demonstrated the mobility, reliability and destructive power of MLRS by moving more than 350 kilometers in four days to provide deadly fires. The 3-27 FA is credited with suppressing or destroying numerous artillery units, as well as destroying numerous enemy tanks and infantry fighting vehicles. Iraqi prisoners described the deadly MLRS fires as "Steel Rain," which moved the battalion to adopt the motto "Desert Rain."

The XVIII Abn Corps Arty is ready, willing and able to go anywhere, anytime as the **Contingency Corps Artillery!**



US Army Field Artillery School



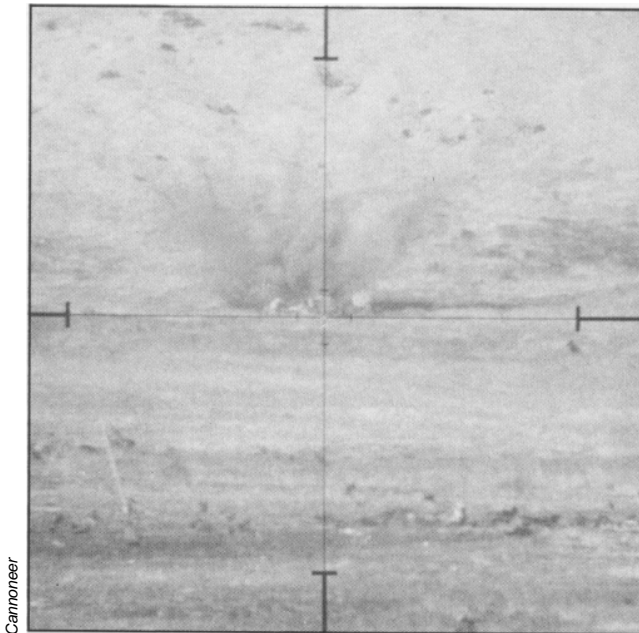
The mission of the Field Artillery School, Fort Sill, Oklahoma, is to train Army and Marine Redlegs to provide timely, accurate fires for our maneuver forces. And, as validated in Operation Desert Storm, fulfilling our mission is critical to success on the battlefield. With force reductions and resource cuts Army-wide, it's our responsibility, with continuing feedback from the field, to forge the future of our Branch—a "lean, but mean" Field Artillery.

Instruction

We've expanded small group instruction (SGI), the hallmark of OAC, to ANCOG and BNCOG in all technical tracks. In addition, we've added to the courses 48- to 72-hour FTXs that stress leadership skills. Our NCO graduates are now more competent to serve the field, both tactically and technically.

To correct a long-standing problem, we're developing a course to transition MOS 13E soldiers to MOS 13C. This will train 13E soldiers promoted to sergeants first class in 13C tasks before they attend 13C ANCOG. They'll receive a thorough grounding in 13C Skill Levels 1,2 and 3 Fire Support Specialist tasks in this seven-week course, starting in FY92.

We've also redesigned the Fort Sill phase of the PreCommand Course (PCC) for our future battalion and brigade/division artillery commanders. The course now includes a Command Sergeants Major Seminar, more interaction with the Fort Sill senior leadership and expanded tactical instruction. The latter better prepares



Cannoneer

With feedback from the field, it's the School's responsibility to forge the future of our Branch—a "lean but mean" Field Artillery.

our future commanders for the Fort Leavenworth, Kansas, phase of PCC.

Force Development

The School continues its field research and studies to fix field problems today and design the force of tomorrow. We're working with senior artillery leaders worldwide and DA to ensure the Branch is organized and equipped to be more lethal, versatile and deployable to meet the demands of future battlefields. To that end, we're fielding and developing systems to best equip the Field Artillery.

The Army tactical missile system (Army TACMS) made its debut in Operation Desert Storm, demonstrating the devastating prowess of its deep fires. This year, we also fielded the meteorological data system (MDS), the light tactical fire direction system (Light TACFIRE) and the M119 light howitzer.

The M109A6 Paladin, a major upgrade for our M109 howitzer fleet, is in production and on schedule. The next-generation cannon system, the AFAS, is



Army TACMS made its debut in Operation Desert Storm.

under development and will give us the firepower and mobility we need for the Year 2000 and beyond.

Other future systems include the high-mobility artillery rocket system (HIMARS), a wheeled version of the multiple launch rocket system (MLRS). A lighter weight, more deployable system, HIMARS will give our contingency forces the firepower of the MLRS' Desert Storm "Steel Rain" at the beginning of any conflict.

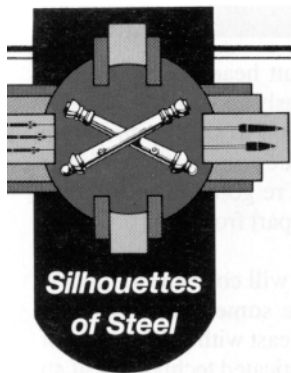
Training

To enhance training yet keep costs to a minimum, the School is developing Field Artillery simulators and training devices. One simulation system, the combined arms training integrated evaluation system (CATIES), is now operational at the National Training Center, Fort Irwin, California. CATIES assesses and simulates the effects of indirect fires. It helps Field Artillery units assess the effects of their fires at the NTC and gives maneuver commanders a better understanding of the devastating capabilities of fire support.

Another system we're developing is the closed-loop artillery simulation system (CLASS). Designed to train the entire gunnery team, CLASS will link the observed fire trainer with current fire direction equipment and a howitzer simulator. A computerized monitoring system will tie the system together, providing timely feedback to the user. CLASS is scheduled to be fielded in FY95.

Field Feedback

In the Redleg tradition, the Field Artillery School continues to provide quality support to our units worldwide. But to best serve you, the field users of our products and trainees, we need your questions, problems and good ideas. With your feedback, we'll stay on the right azimuth and the Field Artillery will remain the **King of Battle**.



**Silhouettes
of Steel**

1st Armored Division Artillery

For the Iron Gunners of the 1st Armored Division, Germany, 1991 opened dramatically in the midst of deployment to Southwest Asia. The Div Arty—consisting of 2-1 FA; 3-1 FA; A-94 FA (MLRS); B-25 TAB; HHB, 2-41 FA attached from the 3d Infantry Division (Mechanized); and 4-27 (-) FA (MLRS) attached from 210th FA Brigade—closed into our TAA in Saudi Arabia by 21 January.

To maximize training time, we trained in multi-echelons, focusing on technical and survival skills and spending endless



The 1st AR Div Arty's 2-1 FA on the move during Operation Desert Storm.

hours practicing movement formations and live-firing. The Div Arty TOC focused primarily on counterfire, and we had several division-level fire support exercises to enhance synchronization and teamwork.

On 24 February, the division crossed into Iraq and attacked

218 miles in 87 hours. Reinforced by the 75th FA Brigade, we enjoyed outstanding success in providing the division all aspects of fire support. Iraqi POWs attested to the effectiveness of our "Iron Rain" artillery preparations, and our counterfire destroyed 96 tubes

in six Republican Guards artillery battalions.

In early May, the Iron Gunners returned to Germany and, after a welcome stand-down period, rapidly focused on USAREUR's draw down and realignment. The 6-1 FA and 3-1 FA were reassigned to the 3d Infantry Division, Germany. Our A-94 (MLRS) was reassigned to the 72d FA Brigade's 2-14 FA, and B-25 TAB was reassigned to the 3d Armored Division, both in Germany. Our 2-1 FA cased its colors in October with its final destination unknown at this time. The Div Arty's HHB completes its draw down this month, but the division colors will remain in Europe flying over another Div Arty.

With ceremonies culminating our long, proud history of commitment to excellence, there's a feeling of satisfaction that we met the challenge of combat through hard work and realistic training. **Iron Gunners!**

1st Cavalry Division Artillery

The past 12 months have been some of the most eventful and historic in the 1st Cav's long legacy.

As the winds of the Gulf War began to blow in August 1990, America's First Team Div Arty, Fort Hood, Texas, initiated its deployment operations, culminating in its arrival in Saudi Arabia by the end of October.

The next four months provided the Red Team a myriad of challenges and training opportunities, as the 1st Cav eventually played a crucial role in the Desert Storm deception plan. On 7 February, we fired the first Copperhead rounds ever fired in anger and hit our target.

Six days later, the first of our nine artillery raids sent the resounding message to both Iraq and the world that the ground offensive was soon to follow. This raid served as the debut for the MLRS launchers of A/21 FA as well as two batteries from the 1-27 FA (42d FA Brigade). The

next raid, fired two days later, included the first-ever cross-FLOT SEAD operation and was fired in support of the 2-6 Cav's AH-64 attack helicopters. In all, we fired more than 6,000 155-mm rounds, 2,200 MLRS rockets and some 300 8-inch projos from our section of the Wadi al Batin.

More than just a firing opportunity, Desert Storm and the preparation for it gave us a chance to exchange ideas and reunite with many of our fellow Redleg warriors. While learning much ourselves, we pioneered the "desert wedge" as the only viable way to conduct movements and experimented with

the M2 Bradley vehicle as a substitute for the M981 FSV, among other innovative ideas.

By mid-July, we were back at Fort Hood, preparing to fight the next war. We continue to seek challenges and innovative ways of providing the First Team the best in fire support. **Red Team—First Team!**

MAJ Howard T. Stryon, 1-3 FA



In Kuwait, Iraqi soldiers carrying white flags surrender as the 1st Cav's A/1-3 FA moves north behind them with the 1st (Tiger) Bde, 2 AD Division (Forward), part of the 2d Marine Division.

1st Infantry Division (Mechanized) Artillery

Victory over Saddam Hussein during Operation Desert Storm dominated 1991 events. The 1st Infantry Div Arty, from Fort Riley, Kansas, was central to VII Corps' overwhelming success against well-entrenched Iraqi forces on the Saudi border and their Republican Guards west of Kuwait. As the corps' main effort, we orchestrated the fires of the Div Arty, 4-3 FA of the 2d Armored

Division (-), 42d FA Brigade, 75th FA Brigade, 142d FA Brigade (Arkansas ARNG), and the 1st Armoured Div Arty (UK)—a most successful union of professionals.

On 17 January, we conducted deep attacks with A/6-27 FA firing Army TACMS. We then conducted artillery raids for eight days, each including about

three cannon battalions and three MLRS batteries. These raids delivered more than 9,200 cannon rounds and 1,600 MLRS rockets, shattering the artillery command, control and communications and Iraqi frontline logistics.

Before our ground attack, we fired a 30-minute prep in which our 13 battalions and nine

MLRS batteries fired more than 6,100 cannon rounds and 1,400 MLRS rockets. As a result, the division attacked into ruptured enemy defenses and sustained minimal casualties.

We then thrust across Iraq to attack the Tawalkana Republican Guards, including providing close fires during a forward passage of lines through the 2d Armored Cavalry Regiment at night. Simultaneously, we received the supporting fires of the 210th FA Brigade as we attacked into Kuwait. When the cease fire was signed at Safwan Airfield in Iraq, the Div Arty's guns were there to remind the Iraqi generals we were ready to resume hostilities.

The 1st Infantry Division, back at Fort Riley, is training for our next worldwide mission. **Drumfire!**



CPT Dave Fowles, B/1-5 FA

B/1-5 FA prepares to "fire up" Iraqi positions during Desert Storm.



PFC Kevin K. O'Dell, B/6 FA

B/6 FA (MLRS) rains some steel on Iraqis.

2d Infantry Division Artillery

Still "Second to None," the Warriors' Div Arty continued to maintain its vigilant, combat-ready posture in South Korea. In addition to sending a number of Redlegs to support Operation Desert Storm this past year, Div Arty soldiers were also "Stop Loss" extended beyond their normal one-year tour. Although we couldn't be out front with our desert fighters, our sacrifices helped contribute to the victory. Our battalions performed superbly throughout the year.



Final certification of 6-37 FA, the Army's only divisional MLRS battalion.



B/1-5 FA's FAASV moves out in support of the 1st Bde during Team Spirit 91.

The 8-8 FA and 1-15 FA upgraded their self-propelled howitzers with SINCGARS and successfully tested the concept during many FTXs with their maneuver brigades. The 1-4 FA's support of the DMZ included interoperability exercises with Republic of Korea (ROK) FA units and maintaining its air

assault capability. The 6-37 FA completed its upgrade and certification to full MLRS. By the end of the year, Army TACMS will complete the modernization.

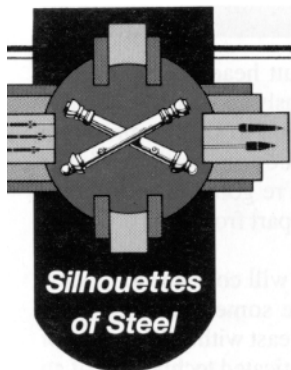
Our separate batteries stay as busy as their "big brothers." B/6-32 (Lance) maintains its mission-ready posture in support of the Commander-in-Chief

and will live-fire for only the second time this coming year. F/26 FA (TA) maintained its vigilant counterfire watcher the DMZ's Western Corridor and supported the MLRS certification with two Q-37 radars. HHB Div Arty closed out a significant survey challenge in support of our wartime positions.

All of the Div Arty's fire support elements stayed extremely busy with DMZ patrol support, maneuver EXEVALs and putting steel on target during battalion shoots.

Close another chapter in Redleg Korean history—Fire Base 4P3 is no more. In October, the Div Arty turned over the Army's only active fire base to the 1st ROK Div Arty in conjunction with the division's withdrawal from the DMZ.

We are proud professionals in the most powerful Div Arty in the world, forwardly deployed against a real Threat and ever-ready and prepared to provide—**Warrior Thunder!**



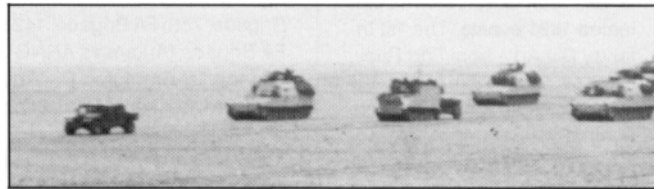
**Silhouettes
of Steel**

3d Infantry Division (Mechanized) Artillery

inactivated in October.

Meanwhile, the Div Arty headquarters rebuilt the team, receiving 6-1 FA from the 1st Armored Division and 3-35 FA from the 72d FA Brigade. Both battalions, along with 5-41 FA, A/76 FA (MLRS), A/25 FA (TA) and HHB Div Arty, supported the deployment, provided soldiers for Southwest Asia in replacement packages, maintained and secured communities and cared for the families of our deployed soldiers.

Concurrently, Div Arty units conducted intense battle-focused training throughout the year. The battalions provided DS fires to their maneuver brigades at the CMTC in Hohenfels, while all units supported the efforts or delivered precise and timely fires at Grafenwoehr. Having returned from Southwest Asia, 3-1 FA of



3d IN Div Arty FAASVs and other vehicles move out on the Iraqi desert.

The "Marne Thunder's" METL-based, battle-focused training prepared more than 1,400 Redlegs for combat in Southwest Asia and provided the "glue" that bonded the 3d IN Div Arty, Germany, after it was rebuilt during the first six months of the year. The 2-41 FA and 6-41 FA answered the call to war and deployed to the Persian Gulf, providing responsive and deadly fires in support of maneuver forces. They then returned with every soldier who deployed with them. Both battalions redeployed without equipment and

the 1st Armored Division joined the Div Arty in June.

During the year, the Div Arty transitioned from VII Corps to V Corps and forged a new relationship with the V Corps Arty, exercising command and control during the V Corps exercise "Caravan Guard" in July. During the exercise, the Div Arty refined its counterfire program, which we had begun developing during the division BCTP Warfighter exercise in August 1990. The Div Arty fielded MSE and validated it—both voice and

digitally—during these V Corps and division exercises.

The Marne Div Arty closed a turbulent, challenging and exciting year proud of our soldiers, dedicated to tough training and fully committed to excellence in all that we do. "Mission Accomplished!" "Raider Thunder!" "Steel!" "Warbonnets!" "Cannon Battalions!" "Peacemakers!" "Rockets of the Marne!" "Wolfpack!" "Fulfill Your Mission!". . .we are the **Thunder of the Marne Division!**

4th Infantry Division (Mechanized) Artillery

The Ironhorse Artillerymen of Fort Carson, Colorado, again met the challenges of a very demanding year. We focused on realistic training at every level to provide first-rate fire support to the Ivy Division. We also played a key role in the success of Operations Desert Shield and Storm.

Starting in December, the Ivy Division helped train the 155th Armored Brigade, Mississippi

ARNG, to prepare for deployment to the NTC and then Southwest Asia. The Div Arty provided training teams from 3-29 FA and the separate batteries to help train and evaluate the 2-114 FA, a DS battalion of the 155th Armored Brigade. Initial training was at Fort Hood,

Texas, followed by a rotation to the NTC in March.

The Div Arty deployed 4/A/26 FA (TA), a Q-37 radar section, to Southwest Asia. There, it came under the operational control of the 10th Marine Regiment, 2d Marine Division, providing critical targeting information.

The Div Arty also deployed the 172d Chemical Company to Southwest Asia where it was attached to the 2d Armored Cavalry Regiment and the 3d Armored Division, seeing action in both Iraq and Kuwait.

The 5-29 FA Eagles and 3-29 FA Pacesetters again successfully completed two NTC rotations and performed well during force-on-force exercises at the Pinon Canyon Maneuver Site. C/10 FA (MLRS) successfully completed a SEE and served as the Ivy Division Salute Battery.

During the 4th Division's BCTP, the Div Arty played a crucial role. We massed our fires and those of the reinforcing FA brigade, crippling the opposing force before it could engage the division with direct-fire assets.

Steadfast and Loyal is the 4th Div Arty—**Have Guns, Will Travel!**



A/26 FA's Q37 acquires an Iraqi D-20 during Desert Storm; counterfire destroyed the target.

5th Infantry Division (Mechanized) Artillery

The major focus for the 5th Mech Div Arty (Devil's Fires), Fort Polk, Louisiana, as for everyone during the past year, was reaching and sustaining war readiness in preparation for commitment to Operations Desert Shield and Storm. We devoted all our efforts toward that end.

A major part of that for the Div Arty and division was bringing our round-out units to full war readiness. It was a challenging time for us all, but the Washington Artillery (1-141 FA) was equal to the task.



An MLRS live fires in an exercise at Fort Polk.

We managed our NTC rotations in the fall of 1990 and spent the remainder of the time from fall through spring in accelerated training, primarily at Fort Hood, Texas.

Somewhere during all that preparation for war, the 5th Div Arty conducted an Army test of SINGARS radios with TACFIRE. SINGARS proved to be an excellent communications link with our TACFIRE system.



A Q37 radar acquires targets at Fort Polk.

Since April and May, the Div Arty has focused on conducting collective training—SEEs, battalion collective training and a full Div Arty live-fire exercise.

During the year, we developed and implemented a 3x8 SOP, a FIST battle drill, a FSV crew drill and standard section battle tasks for every type of section in the Div Arty. The SOP, drills and standardized tasks have greatly enhanced our training program and combat readiness.

We also had two late summer NTC rotations, giving all battalions in the Div Arty the opportunity for full rotations and training.

We've demanded a great deal from our soldiers and leaders this year, and they've responded magnificently. **Red Devils!**

6th Infantry Division (Light) Artillery

The 6th Div Arty, stationed at Forts Richardson and Wainwright, Alaska, had a challenging, productive year. The Div Arty continues to carry on the arctic tradition of training in Alaskan weather extremes, ranging from -30 to 90 degrees, and deploying worldwide to train and support US interests. The Arctic Redlegs of the 6th Div Arty maintain the high standards expected of all artillerymen.

In the past year, elements of the Div Arty deployed to the JRTC, NTC, Colorado, Minnesota, Wisconsin, Japan, Egypt and the Persian Gulf. In addition, demanding, realistic arctic training was conducted to exact standards in a variety of locations throughout Alaska. Much of our focus continues to be on Alaska's harsh, mountainous environment, and much of our training was done in field training exercises in Alaska's Yukon Training Area, Tanana Flats, Aleutian Islands and Fort Greely. We also participated in

many large-scale emergency deployment readiness exercises to sustain our ability to execute our worldwide deployability mission.

The major training event for the Div Arty this year was exercise "Arctic Warrior" in January and February. This was an Alaska Command (ALCOM)-level exercise in which all major elements of the Div Arty deployed to Fort Greely and the Aleutian Islands. During Arctic Warrior, every level of FA and fire support was exercised and evaluated—from the section to division. This training tested our ability to mass and synchronize artillery, Army aviation and Air Force fires to standard. The highlight of Arctic Warrior 91 was a division-level, live-fire synchronization exercise that included coordinated maneuver and fire support operations in -30 degree temperatures.

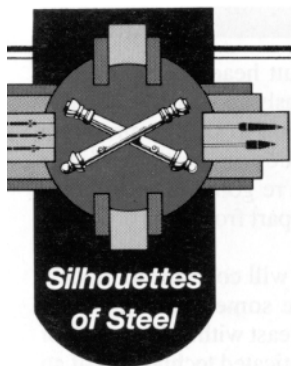
The division's Warfighter BCTP in June was an invaluable learning experience for the Redlegs of the 6th Div Arty. An aggressive, flexible counterfire program and the Div Arty's ability

to synchronize and mass all fires contributed greatly to the division's success.

The Redlegs of the 6th Infantry Division (Light) stand ready to provide **Arctic Thunder!**



In -30° weather, a B/4-11 howitzer crew fires in Arctic Warrior 91.



**Silhouettes
of Steel**

The "Bayonet Artillerymen" of Fort Ord, California, continue to support LightFighters on operations throughout the world. Highlights of this past training year include three rotations to the JRTC, Light TACFIRE testing and fielding, one rotation to the NTC and deployment of personnel to support Desert Storm.

The "On-the-Way Battalion," 7-15 FA, fired the first ever CALFEX at Fort Chaffee, Arkansas, in support of its maneuver brigade. This rotation also was the first to use Light TACFIRE at the JRTC. The "Automatic Battalion," 2-8 FA, participated in the force development test and

7th Infantry Division (Light) Artillery

evaluation (FDTE) for Light TACFIRE in November. The "Automatic Light Battalion," 6-8 FA, and 7-15 FA's GS B/15 FA (155-mm) deployed to Twenty-nine Palms, California, in January for live-fire exercises. The training at the NTC for 6-8 FA in June highlighted the capabilities of the M119 howitzer in support of 7th ID operations.

In addition, the Div Arty's fire support personnel trained with their infantry battalions during three rotations to the Jungle Operations Training Center in Panama.

The Div Arty's TA assets continue to set the standard for light forces. "Search and Destroy" 3d FA Det participated in both the 6th ID (L) and the 7th ID BCTP Warfighter exercises, contributing to the success of each. Currently, The Div Arty is reconfiguring its AN/TPQ-36 radars onto HMMWVs to make DS Q-36s transportable by

C-130 aircraft.

December 1990 was a great month for the Div Arty. We participated in the world's first Div Arty-level LTACFIRE/M119 howitzer live-fire exercise. Key events included Div Arty mass missions and TOTs, two-gun raids, C-130 gunship shoots and a direct-fire competition.

In January, 50 Redleg LightFighters deployed to Southwest Asia and fought with six different units. All returned safely.

Lastly, Bayonet Artillery participated in the division's BCTP Warfighter exercise in August. Massive counterfire and effective deep-battle operations proved decisive. The 3d FA Det's integration into the reinforcing artillery 153d FA Bde headquarters was a great success.

Tough, realistic training marked the past year for the 7th Div Arty. We continue to prove we're ready to deploy—anywhere,

anytime and can provide high-quality fire support. **Bayonet Artillery!**



7th LightFighters lay an M119 howitzer.

8th Infantry Division (Mechanized) Artillery



CPT Elverson, B/6-29 FA

The first MLRS (B/6-29 FA) arrives in the 8th IN Division in March.

The 1991 training year was extremely challenging and rewarding for the soldiers of "Pathfinder's Power," Germany, who distinguished themselves in peace and war.

During the year, 6-29 FA completed its restructure, changing from a 155-mm to a MLRS battalion and absorbing the division's MLRS battery. The 2-3 FA, a 155-mm DS battalion from the 3d Armored Div Arty (Germany), a veteran unit of Operation Desert Storm, joined Pathfinder's Power in July as a new DS battalion.

The 2-29 FA demonstrated its mettle in the crucible of combat in Southwest Asia. Throughout the war, 2-29 FA sustained combat operations in support of the 1st Cavalry, 1st Infantry and 3d Armored Divisions' defeat of Iraq's Republican Guards forces. The "Battle Ready" battalion was the first cannon unit to fire artillery into Iraq.

In January, the soldiers of 4-29 FA also answered the call to arms. Two of "Warhawk Thunder's" firing platoons deployed to Southwest Asia and fought with distinction with the 42d FA Brigade, 75th FA Brigade and 2d Armored Cavalry Regiment.

Force protection for the families and soldiers of our Baumholder community was a major focus of the 8th Div Arty during this tumultuous time.

Our soldiers spent endless hours pulling guard duty, serving as the cutting edge of our defense against terrorist attacks in Europe. These Redlegs, too, share in the triumph of Desert Storm.

Throughout the year, the Div Arty participated in training exercises to prepare us for our

warfighting mission worldwide. "Caravan Guard" allowed us to refine our staff fighting and planning skills, and REFORGER 91 helped the Div Arty hone its fire support and targeting skills.

As always, the 8th Div Arty stands ready to provide devastating fire support as **Pathfinder Power!**



An M109A2 howitzer from B/2-29 FA fires across the Saudi border into Iraq on an artillery raid for the 1st Cav.

10th Mountain Division (Light) Artillery

The LightFighters of the 10th Mountain Div Arty, Fort Drum, New York, have had a very rewarding training year.

On March 16, the Div Arty activated the 10th Target Acquisition Detachment (TAD). The TAD has two Q-37 radars and PADS, providing the division commander another set of "eyes" on the battlefield. Steel the Thunder!

In April, the Div Arty fielded LTACFIRE. Subsequently, we've used digital communications in many FTXs, CPXs, JAATs and a JRTC rotation. Mountain artillerymen validated LTACFIRE training during the division CPX "Mountain Rampage." In this exercise, the 1-7 FA, 1st Brigade, 10th Division FSE, Aviation Brigade FSE and the 10th Div Arty FCE participated in a JRTC rotation with dual- and single-station CPs. Additionally, the

division received MSE and validated its use during "Mountain Peak 91-4," a division-level CPX.

In September, the 2-7 FA and the 2d Brigade participated in REFORGER under the control

of III Corps. In this exercise, these Mountain Redlegs validated the heavy-to-light TACFIRE communications link.

The Div Arty takes advantage of the quarterly division-level "Mountain Peak" exercise to

rehearse all fire support nodes. Replicating a JRTC rotation, the division fields a brigade TF and an observer/controller team to focus unit training.

In keeping with the Total-Army concept, Mountain Redlegs provide mobile training teams to Reserve Component units throughout the year. We work regularly with the 1-156 FA (New York ARNG), the 10th Div Arty's round-out battalion, to further develop its warfighting skills. Our E/7 FA (M198), the division's GS asset, enjoys an excellent relationship with G Co, 104th AV (Pennsylvania ARNG), conducting airborne training on a regular basis.

Honing skills for worldwide rapid deployment and warfare in cold weather operations, the 10th Mountain Div Arty continues to seek tough, realistic training. **Climb to Glory!**



CPT Jack Pritchard

The 10th Div Arty's 2-7 FA in air assault operations during Redleg Thunder III.

24th Infantry Division (Mechanized) Artillery

The 24th IN Div Arty, Fort Stewart, Georgia, was the Army's first heavy division to deploy to the Persian Gulf to defend Saudi Arabia in Operation Desert Shield. While in Saudi Arabia, the Div Arty's three DS battalions (1-41, 3-41 and 4-41 FA) trained extensively on long-distance movements,

tested new tactics in the vast desert, fired at the King Faisal Range Complex and participated in a multitude of brigade and division exercises.

On 24 February, the Div Arty charged across the border into

Iraq and, within four days, attacked nearly 275 miles behind Hussein's front line. The Victory Artillery rushed Iraqi opposition through preparations and counterfire missions, using G/333 FA (TA) Firefinder radars and observed-fire missions. Simultaneously, we maintained a protective fire support umbrella over the division's maneuver forces.

Within days of the cease fire, we returned to Saudi Arabia for deployment to Fort Stewart. Since coming home, we have participated in many homecoming ceremonies. Our M109A2 howitzers and MLRS rumbled down the streets of Washington, DC, and soldiers marched in New York City. A mobile display team exhibited our equipment from Michigan to

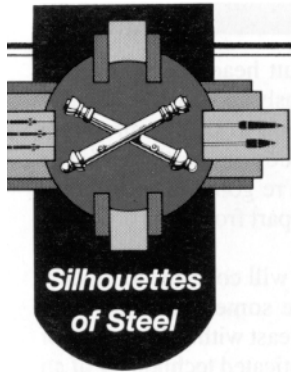
Florida. A/13 FA (MLRS), our salute battery, performed in many ceremonies, including Central Command's (CENTCOM's) change of command. In June, when the 197th Separate Infantry Brigade became the Division's 3d Brigade, 4-41 FA, Fort Benning, Georgia, officially joined the Div Arty.

The Div Arty battalions continue to lead the division's preparation for war by being the first division elements to conduct live-fire exercises after returning to Fort Stewart. We also are participating in a series of division and XVIII Airborne Corps Arty CPXs. Units soon will be returning to the NTC to apply the lessons they learned in Operation Desert Storm.

As always, the 24th Infantry Div Arty stands ready to provide fire support for the Victory Division—**First to Fight!**



A 24th Div Arty M109A3 howitzer fires during Desert Storm, swirling clouds of dust around it and its ammo carrier.



**Silhouettes
of Steel**

25th Infantry Division (Light) Artillery

The "Tropic Thunder Artillery" of the 25th Division at Schofield Barracks, Hawaii, stands ready to deploy anywhere in the Pacific within 18 hours of notification. The Div Arty is abundantly flexible in supporting the division's diverse missions and can shoot, move and communicate in all spectrums of conflict.

This year, Tropic Thunder Redlegs participated in several exercises worldwide, including "Tiger Balm" in Singapore, "Cabin Fever" in Utah, "Orient Shield" in Japan, "Calm Thunder" in Wyoming, "Cobra Gold" in Thailand, "Pacific

Bond" and "Tropic Prelude" in Australia and a rotation to the JRTC in Arkansas. We also deployed all battalions and our separate battery to the Pohakuloa Training Area on the "Big Island" of Hawaii for realistic and intensive EXEVALs. Training for soldiers to understand rules of engagements (ROEs) and their application to timely, accurate and necessary fire support has been integrated at all levels.

The Div Arty has had major force modernization changes. We received Light TACFIRE and SINGARS and instituted a comprehensive training plan to incorporate this new technology. Additionally, the 1-8 FA completed its transition to a 3x8 155-mm (M198) battalion, and the 25th FA Detachment (TA) fully activated with Q-37 Firefinder radars. These upgrades enhanced the Div Arty's ability to



A howitzer in A/2-11 FA, the "On Time" battalion, live fires during a joint exercise.

provide fire support to our maneuver counterparts.

Culminating the exciting year, the Div Arty participated in "Cascade Peak 91" at Fort Lewis, Washington, as a division embedded in the corps-level BCTP. Our imaginative counterartillery program developed in several division exercises

was very effective in synchronizing and massing all available fire support assets in BCTP.

The 25th Div Arty—deploying most frequently and having the Army's largest artillery units—is prepared for our varied and challenging missions. **Tropic Thunder!**

26th Infantry Division Artillery

The 26th "Yankee" Div Arty, with elements in Massachusetts, Connecticut and Vermont, continued

to pursue excellence in Training Year 91. This led to extremely successful annual training periods for all Div Arty

elements at three different times and locations: Fort A.P. Hill in Virginia; Camp Edwards, Cape Cod, Massachusetts; and Fort Drum, New York.

The 26th Div Arty consists of the 1-101 FA (Massachusetts ARNG), a 3x6 M198 DS battalion; 2-192 FA (Connecticut ARNG), a 3x6 M114A2 DS battalion; 1-86 FA (Vermont ARNG), a 3x6 M109A3 DS battalion; 1-211 (Massachusetts ARNG), a 3x4 M110A2 GS battalion; and E/211 FA (TA) (Massachusetts ARNG), a Firefinder battery.

During the past year, the Div Arty concentrated on learning and reinforcing battery-level skills for all firing elements and conducted external evaluations for the 1-211 FA and 2-192 FA. These evaluations also tested two sections of the Firefinder TAB, E/211 FA. Additionally, we conducted intensive staff battle training. As a result, the Div Arty

had an excellent training year, testing the skills of our Redlegs and reinforcing the basics. The Yankee Artillery is well-prepared for the challenges that lie ahead.

During Training Year 92, we'll concentrate on battalion-level skills, conduct two ARTEPs, "up-gun" one battalion to the M198 system, increase the tempo of staff training and continue integrating fire support with maneuver. As Citizen Soldiers and active members of our local communities, we continue to participate in and support our neighbors in their activities and react to any emergency activations. Our testing and reinforcing skills at the battalion-level will further prepare us for future challenges.

We continue to lead the 26th Infantry Division through emphasis on soldier and crew skills at every level as the—**Yankee Artillery!**



SGT Ronald Drolett, 130th FA Det

SGT Andrew McDow, C/2-192 FA (Connecticut ARNG), loads a powder charge into his 155-mm howitzer during AT at Fort Drum.

28th Infantry Division Artillery

The 28th Infantry Div Arty (Pennsylvania ARNG) conducts year-round training and is dedicated to providing devastating fire support for "America's Oldest Infantry Division." From our headquarters in Hershey, the Div Arty commands and controls direct support 105-mm battalions in Pittsburgh (1-107 FA), Carlisle (1-108 FA) and New Castle (1-229 FA). Our general support composite battalion (155-mm and 8-inch) is located in Wilkes Barre (1-109 FA). Targets are acquired for these battalions by our target acquisition battery, F/109 FA, in York, which is equipped with the Firefinder radar.

Pennsylvania Redlegs demonstrated they can shoot more than artillery. The Headquarters and Headquarters Battery, 28th Div Arty, won first place in the Army National Guard combat rifle team competition, which was held in Nashville, Tennessee.

In Little Rock, Arkansas, Div Arty soldiers placed third and fourth in the National Guard individual air rifle competition.

This year, the 28th Div Arty hosted the First Army's "Best Howitzer" competition at Fort Indiantown Gap. We were gracious hosts but gave no quarter

on the field of competition as we defended our 1991 training year title.

A Warfighter staff BCTP exercise at Fort Leavenworth, Kansas, and a division fire support conference in Hershey will be the training highlights of FY92. We'll also continue to conduct

joint air attack team (JAAT) operations throughout the year.

As always, the 28th Div Arty concentrates on the big four; shoot, move, communicate and coordinate. These priorities ensure that fire support for *America's Oldest Infantry Division* is timely, accurate and devastating.



An 8-inch howitzer section in 1-109 FA is ready for action during a training exercise.

29th Infantry Division (Light) Artillery

The 29th Div Arty (Virginia ARNG) enhanced readiness in spite of significant challenges this year, including equipment transfers at the beginning of the training year to Reserve Component units deploying to Southwest Asia. The challenge was to transfer fully mission-capable

equipment with minimum degradation of our readiness and training programs—especially for units undergoing SEEs. With minor adjustments to the plan, we met our training goals and conducted all SEEs, even though we lost our Active Component support.

The 2-111 FA (DS), Richmond, and E/111 FA (GS), Emporia, both passed their SEEs. Although they had little difficulty achieving ARTEP standards, this wasn't the case for our headquarters. Having to simultaneously support evaluation teams and the division CPX "Razor Panther IV," it was stretched to the limit. Additional support came from the 1-246 FA (DS), Danville, and the 1-111 FA (GS), Norfolk.

Our attached 129 FA Detachment (TA), Sandston, had just received its first AN/TPQ-37 Firefinder radar. Having the chance to incorporate the Q-37 radar into the SEE's tactical scenario and our TOC operations proved key in exploiting this combat multiplier.

Additionally, the 2-110 FA (DS), Pikesville, Maryland, supported JRTC Rotation 91-8 with its headquarters and a firing

battery. Deploying by rail and air, the battalion completed its second exercise at Fort Chaffee. We also had two batteries train in Honduras.

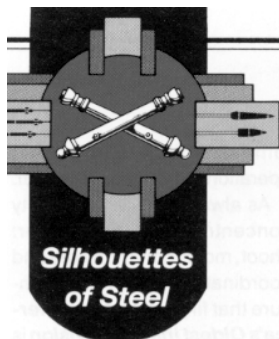
Other new equipment training (NET) was mandated. The attached 1-111 FA (GS), reorganizing to a 3x8 configuration will replace its aging M114A2 howitzers with M198s. We fielded organic NET teams to prepare crews to receive the howitzers in November.

NET will carry over into the next training year as we receive Light TACFIRE in January and the DMD and FED. Also, once received, MSE will enhance our command and control.

As we learn to employ these new systems, our focus remains on preparing for our BCTP Warfighter exercise next August. **We Stand Ready** to support the division with synchronized fires as the only light Div Arty in the Reserve Components!



An M102 howitzer crew of the 29th Div Arty performs well during gunner's qualification testing.



34th Infantry Division Artillery

This year is a milestone in the history of the 34th Infantry Division (Minnesota ARNG) with the redesignation of the division from the 47th Infantry ("Viking") Division to the 34th Infantry ("Red Bull") Division. The redesignation on 11 February was the 50th anniversary of the 34th Division's call to active duty before World War II.

Our three DS battalions trained this year at different levels and separate sites. The 1-151 FA attended AT at Fort McCoy, Wisconsin, and participated in a division-assisted mobilization exercise. The battalion trained

together for the first time since its JRTC rotation in 1990; it will have a winter AT in 92.

The 1-194 FA (Iowa) attended AT in August at Camp Guernsey, Wyoming. The battalion provided fire support for maneuver elements of the 2d Brigade, 34th Infantry Division at four training sites, including the NTC. Its firing batteries live-fired using graphic resections and simo for day occupations and Polaris Kochab for establishing direction during limited visibility

operations. An additional highlight was firing SEAD for two CAS missions.

The 2-123 FA (Illinois) had a SEE at Camp Ripley administered by the 34th Div Arty with the 7th Infantry (Light) Div Arty, Fort Ord, California. The SEE proved to be an extremely effective training tool to focus on combat readiness and prepare for the battalion's 1992 overseas deployment training in Honduras.

Our GS battalion, 1-175 FA, also had a SEE; the battalion's

performance and subsequent TAVs attest to its aggressive training program and verify its METL. It's preparing to convert to a 3x4, 8-inch battalion, beginning in April 1992.

The 34th Div Arty and E/151 FA (TA) assisted the 7th Div Arty in a CPX at Fort Ord and was involved in a CPX with the 85th MEC. Both exercises focused on the relationship of the Div Arty with a reinforcing FA brigade. These events and support to the division's train-up exercise "Charging Bull" prepared us for our Warfighter BCTP exercise at Fort Leavenworth, Kansas, in August.

In the next couple of years, we'll be involved in exercises with I Corps. We continue in the proud traditions of the Red Bull Storm Artillery and support the division's motto and battle cry — **Attack, Attack, Attack!**



In June, Red Bull Redlegs of D/1-175 FA train at Camp Ripley during AT.

35th Infantry Division (Mechanized) Artillery.

The 35th Infantry Div Arty (Kansas, Nebraska and Kentucky ARNG) significantly improved the division's warfighting ability by focusing on fire support at the brigade and division levels as the top priority for FY 91.

During annual training at Fort Carson, Colorado, the Div Arty participated in a nine-day, joint field training exercise with the division headquarters and one mechanized brigade task force. The Div Arty controlled fires for three FA cannon battalions (1-168, 1-161 and 2-130 FA) with E/161 FA (TA) providing Firefinder radar support and the 138th FA Brigade (Kentucky ARNG) working in a reinforcing role. This was the first opportunity for the Div Arty to work with a reinforcing FA brigade in a field exercise, and the interaction significantly enhanced the Div Arty's ability to employ an FA brigade.

The 1-127 FA continued to strengthen the brigade fire support

system through the dedicated efforts of its FISTs. Throughout annual training at

Fort Riley, Kansas, the 1-127 FA controlled the mortars of the 69th Infantry Brigade (Kansas

ARNG) with the FISTs integrating live mortar and artillery fires into the maneuver scheme.

With activities in the Persian Gulf occupying many of the Active Component FA organizations, the Div Arty assumed the mission of controlling and conducting two battalion-level external evaluations for subordinate units, even to the extent of providing the evaluation teams. This was an excellent opportunity for "cross-fertilization" between the battalions, with the evaluators gaining new perspectives.

In the coming year, we'll continue to build and refine the brigade and division fire support system, relying on the skills and enthusiasm of our solid corps of NCOs. The Field Artillery continues to lead the way for all the soldiers of the historic 35th—**The Santa Fe Division!**



An M110 howitzer of 1-161 FA moves to a new position at Fort Carson, Colorado, during AT 91.

38th Infantry Division Artillery

Fifty years ago, the 38th Division (Indiana ARNG) mobilized for World War II at Camp Shelby, Mississippi. AT 91 was at Camp Shelby to commemorate the event with scores of past members visiting the site. We had a division review and firepower demonstration for these outstanding soldiers.

The trip to Camp Shelby was conducted as a motor movement. The 38th Div Arty, minus the 1-119 FA, conducted the 700-plus mile trip in two days without significant incidents.

At AT, the Div Arty evaluated each battalion's ability to put timely and accurate steel on target under varying conditions, such as night, smoke, NBC and emergency situations. Each had to move, resupply and maintain during the annual training period.

The 1-163 FA from Evansville had a SEE with evaluators from the Div Arty staff and the Div Arty's 3-139 FA and 2-150 FA—Div Arty units not undergoing a

SEE. The SEE was written, administered and controlled by the 38th Div Arty. The unit attained approximately 70 percent GOs on initial fires, 100 percent GOs



Cyclone's Thunder Redlegs prepare to fire their M114 howitzer in training.

on all firing tasks and 96.4 percent GOs on operational tasks before the end of the 72-hour period. It was a very difficult SEE that pushed the battalion personnel to their maximum—it was planned that way.

At the same time, the division had an FTX that was excellent combined arms training. The 3-139 FA was airlifted to support one of the maneuver brigades conducting an attack on an objective. It used blank 105-mm rounds for realism. For approximately eight hours, the ground troops moved in and around the artillery while we supported them with fires.

Our training program gave us outstanding FSO training and the maneuver commander a better feel for what the artillery can do for him. The Division remains "The Avengers of Bataan" with its Redlegs *Cyclone's Thunder!*

40th Infantry Division (Mechanized) Artillery

The "Sunburst Div Arty," the 40th Division Artillery (California ARNG) had another exceptionally busy year. One of our cannon battalions (1-143 FA) successfully completed its standardized external evaluation (SEE) and technical validation inspection

(TVI) while the other three battalions prepared for their upcoming SEEs. Additionally, the Div Arty was involved in providing personnel and equipment to other California Army National Guard units mobilized in support of Operation Desert Storm.

The training highlight of the year was a very realistic nuclear, biological and chemical (NBC) exercise coupled with a division-level command post exercise (CPX) that tested the Div Arty's ability to exercise command and control over its subordinate

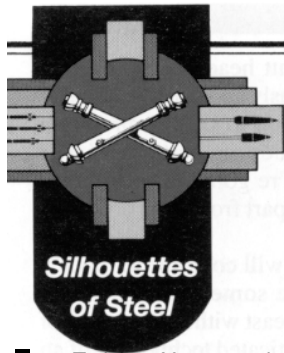
battalions in an NBC environment. The experience gained among the personnel of the Div Arty tactical operations center (TOC), the fire support element (FSE) and the G2 and G3 shops will better prepare the Sunburst Division for its Capstone mission.

In the near future, the Sunburst Div Arty will play a significant role in I Corps' BCTP Warfighter exercise known as "Cascade Peak." This will be a superb opportunity for the Div Arty to work with other fire support and maneuver agencies assigned to our corps and will further refine our relationship with our habitually reinforcing Field Artillery brigade.

The Sunburst Div Arty looks forward to another challenging year of bringing quality fire support to the *Fighting Fortieth Infantry Division!*



Redlegs of the 40th IN Div Arty in a briefing during a field training exercise.



Silhouettes of Steel

In Training Year 91, the 42d Div Arty (New York ARNG) focused on individual skills as many soldiers had to re qualify because of the Div Arty's reorganization. As a result, the Div Arty planned and organized 13B10 and 13F10 MOS-producing schools with the 1154th and 1163d USARF Schools, respectively. In addition, we set up a Fire Support Planning and Coordination School at Camp Smith for those NCOs who became 13F20s or 13F30s.

The entire 42d Div Arty participated in an enhanced ARTBASS at the High Technology Training Center, Fort Dix, New Jersey. We also conducted a

42d Infantry Division Artillery

non-resident Nuclear and Chemical Target Analyst Course during inactive duty training (IDT), which culminated in a five-day resident phase at Fort Sill, Oklahoma. Thirteen Div Arty officers were awarded ASI 5H.

During AT, our battalions conducted weapons qualification, common-task testing for record and live-fire exercises at the section, battery and battalion levels.

A Best Howitzer Section competition ended in a direct-fire shoot-off. The winner participated in the First Army competition at Fort Indiantown Gap, Pennsylvania, in October. Also, the New York Empire State Military Academy conducted a Basic Course for 21 of our NCOs during AT.

Ceremonial activities for the 42d Div Arty included supporting

many Memorial Day and Desert Storm celebrations. In a three-month period, the 2-104 FA participated in more than 25 community projects, highlighted by the battalion's firing a salute for "Fleet Week 91" at Governor's Island in New York Harbor. In conjunction with Radio WADO-New York, the Div Arty also participated in "Operation Tarjeta de Navidad" (Operation Christmas Card) by providing volunteers who got more than 80,000 people to write holiday messages on a gigantic Christmas card shipped to our troops in the Persian Gulf.

In 1991, the 42d Infantry Div Arty got the job done! The upcoming training year will bring many challenges. We will continue on the road to excellence by training highly competent and motivated artillerymen for service to the nation and community in both peace and war—we are the **New York Artillerymen!**



New York artillerymen sign a giant Christmas card for US soldiers in the Gulf during Operation Tarjeta de Navidad.

49th Armored Division Artillery

The "Fit to Fight" Texas Artillery is prepared to deliver deadly fire support to the 49th Armored Division (Texas Army National Guard)—the World's largest armored division.

During the training year, our 4-133 FA successfully completed a nuclear standard external evaluation (SEE) administered at Fort Hood by III Corps and the 49th Armored Div Arty. The 3-132 FA successfully underwent a mini-SEE administered by the 49th Armored Div Arty, also at Fort Hood.

This year's annual training saw the Div Arty successfully deploy all four battalions from all corners of the state to Fort Hood during the same period. The units participated in various activities, ranging from a joint air attack (JAAT) and providing support for a major river crossing to section-level common task training (CTT).

The Div Arty continues to

receive new and improved equipment to support its wartime mission. This was evident by the fielding of the fire support team vehicle (FISTV), an armored track vehicle; the ongoing A-5 conversion of all M109 howitzers; and the fielding of the new 5-ton truck M939 series.

Employer support of the National Guard in Texas continued to receive high emphasis in 1991. Forty-seven employers traveled to Fort Hood to observe annual training. Each year the Div Arty hosts local battalion area employers who travel to annual training sites to observe their citizen soldiers as they train for their wartime missions. This year's visitors observed artillery firepower and static displays of the latest in Div Arty equipment. Employers were equally impressed with the 49th Div Arty's commitment to excellence and timely and accurate "Balls of Fire."

For the 1992 training year, the 49th Div Arty will concentrate on improving its solid base of artillery skills by using skill qualification tests (SQTs) and CTT activities to exercise soldiers' skills and tactical operations center (TOC) and command post exercises (CPXs) to strengthen the unit's higher headquarters command and control capabilities. These efforts will climax with a nuclear SEE during Annual Training 92 with 3-132 FA at Fort Hood putting steel quickly and accurately on target. The Div Arty also will be participating in the upcoming battle command training program (BCTP) program of the 49th Armored Division as a brigade-level player.

As always, the Texas artillerymen stand ready to provide the **Free World's Largest Armored Division** lethal, pinpoint firepower to ensure its victory.



A Q37 radar on display for 47 employers of the Texas ARNG.

50th Armored Division Artillery

For the 50th Div Arty (New Jersey ARNG), Training Year 91 was an unqualified success. Our Redlegs participated in many exercises that challenged their technical skills and abilities to support division maneuver elements in general support and reinforcing roles.

We conducted operations that emphasized battery and crew sustainment training, culminating in division annual training exercises at Fort Hood, Texas; Fort Drum, New York; and Fort A.P. Hill, Virginia.

Our fire support system was enhanced through the conduct of the initial division fire support conference, sponsored by the Div Arty Headquarters and supported by the division staff. The conference was instrumental in establishing coordination relationships between fire support staff and maneuver personnel.

The Div Arty completed emergency action training for its batteries and higher headquarters staff. Additionally, we focused

on survey and counterfire operations training.

Our command emphasized combined arms training to reinforce the awesome power of the "Big Guns" to support division operations in AirLand Battle.

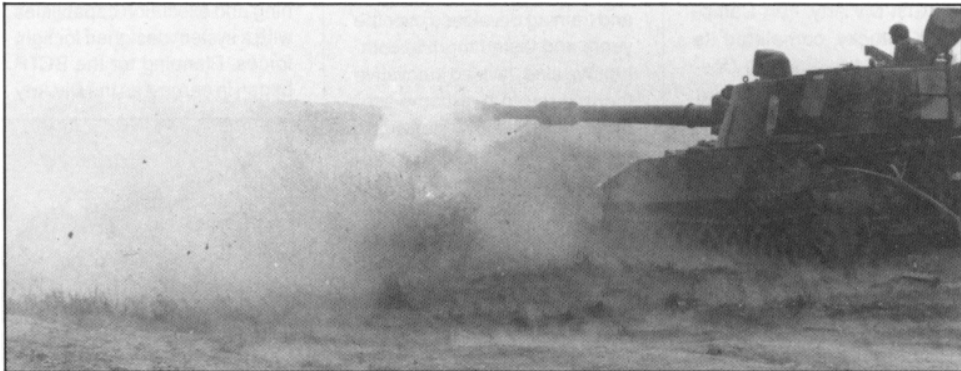
Again this year, the Div Arty staff supported the division's CPX at Fort Dix. The integration of MSE among our commands is complete, and users are

rapidly gaining confidence in this sophisticated battlefield communications system.

Div Arty members attended mobilization training, which became a precursor to operations in the Persian Gulf. Although no Div Arty units activated for Operations Desert Shield or Storm, many Redlegs volunteered and were selected to augment gun batteries serving in

Saudi Arabia; our troops proudly represented this command and the 50th Armored Division.

Our upcoming training programs will highlight the tenets of move, shoot and communicate. The quality of the traditions of Redlegs as integral to the 50th Armored Division continues to be evident. The Div Arty accepts and can meet the challenge to *Make It Happen!*



A/3-112 FA of the 50th Div Arty is "Making It Happen" at Fort Drum, New York.

82d Airborne Division Artillery



Ssg Spurgeon

With the Euphrates River in the background, Iraqi children get gum and candy in March from MAJ Jay Hood, Div Arty S3.

The unique mission of the 82d Abn Div Arty, Fort Bragg, North Carolina, is to deploy anywhere in the world within 18 hours, fight and win. Twice in the last 24 months (Panama and Southwest Asia), the course of world events has dictated we demonstrate our capability to execute that mission.

The past year saw pages written into the Div Arty history with our participation in campaigns designed to deter Iraqi aggression and liberate Kuwait. During Operation Desert Shield, we conducted a demanding desert training program, including several battalion external evaluations and numerous danger-close CALFEXs, which served to hone gunnery and fire support skills for combat operations.

In division operations for

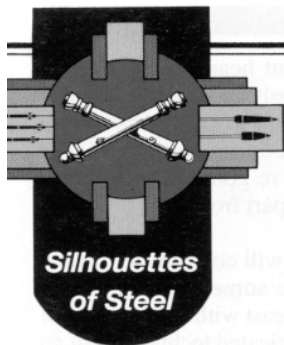
Desert Storm, we orchestrated all fire support assets (lethal and nonlethal) for the first conventional deep-attack operation conducted in the Kuwaiti Theater of Operations. These extremely effective attacks were conducted up to 100 miles into Iraqi territory and included Air Force assets in a deep-JAAT role. The attacks helped pave the way for the 6th (FR) Light Armored Division in its rapid advance on G-Day.

After the cease fire, elements of the Div Arty remained in south central Iraq for 28 days, during which we established two live-fire ranges at Tallil and Jalibah Airfields to maintain our training edge and demonstrate our continued presence in this sector. Throughout operations in Southwest Asia, our soldiers performed magnificently and our weapons and equipment proved to be the finest in the world.

Since our return to Fort Bragg, we have undertaken a massive force modernization effort with the fielding of SINGARS radios, Light TACFIRE and the M119 105-mm howitzer. This new equipment, coupled with an aggressive training program focused on individual skills and section-level drills, has enhanced our ability to perform in any no-notice contingency operation.

The upcoming year promises to be an exciting one for the Div Arty. A calendar of events ranging from individual section competitions to participation in JCS-sponsored exercises will provide realistic challenges for the Airborne Redlegs of the 319th FA Regiment.

Regardless of the challenge, the proud professionals of the 319th can be counted on to go *All the Way* in providing fire support to the "All American Division."



101st Airborne Division (Air Assault) Artillery

vividly demonstrated during Desert Storm as our battalions conducted successive deliberate air assaults deep into Iraq in support of brigade-sized operations.

The year 1991 was one of unique challenges and dramatic successes as the 101st Div Arty, Fort Campbell, Kentucky, completed its latest "Rendezvous with Destiny" during Operations Desert Shield and Storm.

In Desert Shield, the Div Arty, augmented with two FA brigades, supported divisional covering force operations in Saudi Arabia. As the fury of Desert Storm unfolded in January, Div Arty units focused on planning and training to prepare for offensive combat operations. The power, speed and mobility of the air assault division was

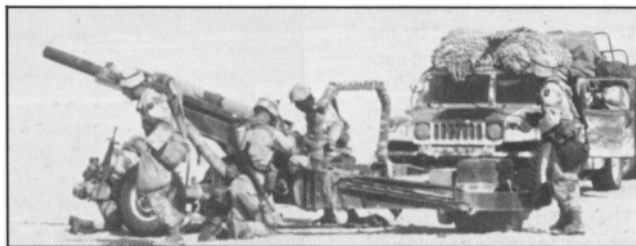
Our units executed their missions as they had trained—intensely, quickly and aggressively. We validated the air assault doctrine, techniques and training developed over the years and tested them in combat. We also devised innovative techniques to overcome problems caused by operations over wide areas of a harsh desert environment. Our Screaming Eagle Artillerymen performed superbly, adding to the proud Redleg heritage established in past conflicts.

Redeploying to Fort Campbell in April, we began an intensive recovery phase after many long, hard months in the desert. At the same time, we turned our

attention to sustaining the high level of technical and tactical proficiency we attained during Desert Shield and Storm. A rotation to the JRTC involving batteries from all three battalions highlighted our training accomplishments as we prepared for other worldwide contingencies. The fielding of LTACFIRE enhanced our fire planning and execution capabilities with a system designed for light forces. Planning for the BCTP began in earnest as the Div Arty

staff prepared for this challenging and exacting exercise. A program of CPXs, FTXs and intensive command inspections rounded out an exciting and productive year.

As exemplified by our deployment to and subsequent operations in Saudi Arabia and Iraq, the 320th FAR stands ready to provide fire support to the Army's only air assault division. Pride, esprit and professionalism are hallmarks of Redlegs in the **Guns of Glory**.



A howitzer crew of the 101st Div Arty hustles in training during Desert Shield.

Field Artillery Training Center

The FATC, Fort Sill, Oklahoma, trains all cannonneers, including those in the Reserve Components, and the US Marine Corps. In BCT, AIT and OSUT, the FATC trains approximately 20,000 soldiers a year in all artillery and several communications MOSs and ASIs. To support this training, the FATC operates and maintains 130 howitzer systems and 20 range complexes. The FATC's

IET goals are battle-focused training to produce motivated, disciplined and physically fit soldiers; train soldiers in common tasks and MOS and ASI skills; and train soldiers to be proficient members of a combat team immediately after arriving at their permanent duty stations.

The primary emphasis this year was training soldiers for and supporting Operations

Desert Shield and Desert Storm. The FATC activated a Reserve brigade headquarters and five battalion-sized elements to augment its eight Active Army battalions. These Reservists received, trained and deployed more than 2,000 Individual Ready Reserve soldiers mobilized for Desert Storm.

The FATC's active battalions absorbed an enormous number of new soldiers to train and send to units rotating to Southwest Asia. In less than two months, our training load doubled. Christmas leaves were canceled, and we trained through the holidays.

The FATC continues to streamline its organization, relocating most units and the headquarters to new facilities. What is emerging is a leaner, more efficient organization that can keep Army and USMC units

in the field combat ready through an uninterrupted flow of qualified cannonneer replacements. Additionally, the FATC recently accepted responsibility for BCT for all MOS 16 series (Air Defense Artillery) soldiers.

Our realistic, field-oriented training continues to improve. We have an integrated FTX for AIT and OSUT soldiers in MOS 13B (Cannon Crewmember), 13E (Fire Direction Specialist), 13F (Fire Support Specialist) and 82C (Surveyor).

For other AIT specialties, the FATC conducts demanding FTXs, emphasizing basic battle skills. This training not only contributes to technical proficiency, but also teaches soldiers they're not just individuals doing a job, but members of a team that must work together to win. **Mission First—People Always!**



Summertime Training at Sill. FATC students practice crew drills on an M102 howitzer.

59th Ordnance Brigade

With more Redlegs than a Div Arty, the 59th Ordnance Brigade in USAREUR is the largest and among the most unique brigades in the US Army. Deployed in more than 30 installations, ranging from the Alps to the North Sea and from the inner German border into the Netherlands, the brigade is uniquely configured to continuously support current missions and meet the ever-challenging future NATO requirements.

The brigade provides special weapons and guided missile support to five NATO nations and two US corps. With five FA groups and two ordnance battalions, the 59th has uniquely meshed the two branches and earned the praise of being called the "Backbone of NATO," a title our Redleg-Ordnance team wears proudly. During the past year, the 59th Team executed a historical move—one of the largest peacetime logistical munitions movements ever in

Europe. We traveled more than 700 miles across German roads and railroads and retrograded more than 100,000 rounds of 8-inch and 155-mm chemical munitions. This involved several hundred brigade soldiers working and coordinating daily with German civil, political and military officials.

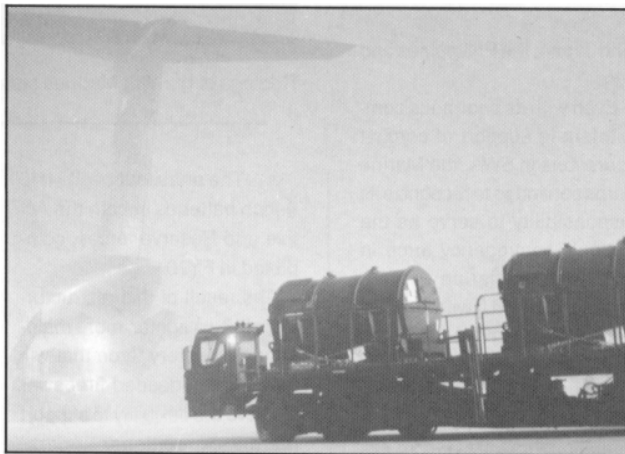
The brigade also retrograded the Pershing P1A munitions this past year and contributed significantly to Operations Desert Shield and Storm by loading Patriot and Hawk missiles for deploying US corps. Many brigade soldiers were called upon to serve in the Gulf War, and subsequently, many others participated in "Operation Provide Comfort."

The brigade takes great pride in its tradition of joint training, partnership activities and cultural exchanges with its NATO Allies. Such activities include a semiannual Tactical Operations

Tournament, an annual 10-kilometer Redleg Run and an annual NATO Fly-In, involving various NATO rotary-winged aircraft.

The artillery-ordnance soldiers of the 59th Ordnance

Brigade continue to lead, think and train as a cohesive, combat-ready team in harmony with our NATO Allies. We remain the largest and most unique brigade in the Army with—**Power to Spare!**



Last of Pershing II Components Leave Europe. An USAF K-loader transports two stage containers to 59th Ordnance soldiers waiting to load them on an aircraft.

Leatherneck Artillery



In the aftermath of the Gulf War and as a result of the Department of Defense's drawdown of forces, the Marine Corps continues to evaluate force structure options and their

impact on the Marine Air-Ground Task Force (MAGTF).

Operations During the Gulf War

This year saw the Marine Corps heavily committed in support of Operations Desert Shield and Storm—the largest Marine Corps combat force assembled

since World War II. Early in Operation Desert Shield, Marine artillerymen of the 7th Marine Expeditionary Brigade (MEB) were part of the first heavy US force on the ground in position to defend the Kingdom of Saudi Arabia. Deployed to Saudi Arabia by air from Southern California, Leatherneck Artillerymen married up with their howitzers and other equipment as they rolled down the ramps of the MEB's Maritime Prepositioning Ship (MPS) Squadron. The Marine Corps, once again, demonstrated its prowess as a premiere force in readiness.

As Operation Desert Shield continued into the new year, the Marine Corps was committed to a second major deployment of combat forces to Southwest Asia (SWA) to strengthen its offensive capabilities. Leatherneck Artillery was substantially committed in support of combat

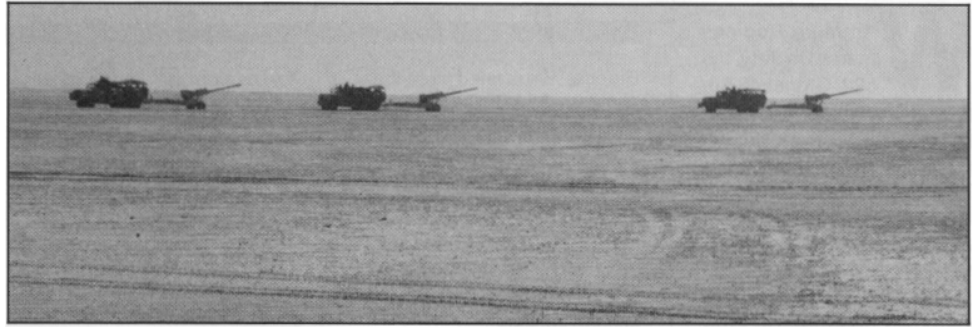
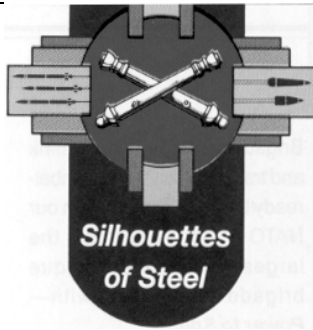
operations in SWA with two of the three active duty regimental headquarters and 11 of the 12 active duty battalions deployed. Leatherneck Reserve Artillery also was well-represented with six firing batteries called to augment active duty battalions.

In addition to the Reserve batteries and individuals that served in SWA, two additional batteries and a battalion of the remaining Reserve artillery units were mobilized and provided worldwide support for Marine Corps contingency operations.

Despite having the majority of its operating forces deployed to SWA, the Marine Corps continued to maintain a credible force projection capability throughout the world. Reserve artillery deployed in support of NATO exercises in Norway and France and provided forces for Pacific Basin contingency operations in Okinawa, mainland



A Ready Marine. One of the 10th Marines' survey section soldiers perches on his PADS vehicle in the Saudi desert with his .50 caliber machinegun ready for all comers.



Redlegs of the 11th Marines cross the first minefield in Kuwait during Desert Storm.

Japan, the Philippines and Korea.

Even with its enormous commitment in support of combat operations in SWA, the Marine Corps continued to recognize its responsibility to serve as the Nation's contingency force in readiness. A Marine expeditionary unit (MEU) with supporting artillery provided security and assistance to Kurdish refugees in Northern Iraq throughout the duration of Operation Provide Comfort. Additionally, the 5th MEB, returning to its home base in Southern California, was rerouted to Bangladesh to support Operation Sea Angel to help the international relief effort provided that country in the wake of a devastating typhoon.

Reorganization

During the past year, the reorganization and modernization of Leatherneck Artillery began. major revisions to structure associated with this plan include:

- The reorganization of all artillery battalions to a 4x6 M198 155-mm configuration. This reorganization will start in the second quarter of FY92.
- All active battalions configured for a direct support (DS) mission with organic forward observer (FO) and liaison teams.
- The retention of 48 M101A1 105-mm howitzers within each Marine expeditionary force (MEF) as contingency weapons.
- The redesignation of the remaining two M109 155-mm (self-propelled) battalions in the Reserve forces to 4x6 M198 155-mm battalions during FY93.

- The phaseout of all M110 8-inch batteries in both the Active and Reserve forces, completed in FY90.

The result of this restructuring will be a lighter, more maintainable artillery force that will retain much-needed firepower yet have the flexibility to support Marine expeditionary operations throughout the globe.

Materiel

Due to the requirement to meet downsizing guidance, a recent study group recommended to the Commandant of the Marine Corps (CMC) that one battalion of the multiple launch rocket system (MLRS) be bought for the active forces as a Corps-level weapon system.

The Marine Corps continues to aggressively participate in the research and development of new technologies while actively upgrading its current inventories of equipment.

Of major importance is the continued emphasis on developing a lightweight 155-mm howitzer. The objective is to develop a 155-mm howitzer with M198 characteristics that weighs less than 9,000 pounds. There are two companies that have prototypes under development. Evaluation of these prototypes will continue during FY92 with a shoot-off between the competitors scheduled for early FY93.

A product improvement program (PIP) for the M198 howitzer is scheduled to begin in

FY93. The purpose of this PIP will be to reduce maintenance and improve the braking system for the Corps' primary indirect fire weapons system. Included in this PIP will be modifications to the air brakes, equilibrators and trails and improvements to reduce corrosion.

The Marine Corps continues to participate in the advanced Field Artillery tactical data system (AFATDS) program. In addition to defining required capabilities, our initial emphasis is on ensuring compatibility with Marine tactical communications and to ensure Marine Corps requirements are included in the software development. AFATDS initial operational capability (IOC) is FY95.

As an interim solution, the Marine Corps Combat Development Command (MCCDC) and Marine Corps Research, Development and Acquisition Command (MCRDAC), both at Quantico, Virginia, continue to work to field the Marine Corps fire support system (MCFSS) linking Marine Corps tactical data systems together in one fire support network. Additional hardware and software enhancements for MCFSS are being pursued under our evolutionary acquisition strategy. User tests of the system are slated to begin during FY93. Battlefield computer terminals (BCT)/LTACFIRE bought to support combat operations in SWA form the foundation for MCFSS. FY92 will see the fielding of lightweight computers to provide automated support and

data-link communications for artillery liaison officers assigned to maneuver units at the battalion through division levels and for all MAGTF headquarters. Digital communications terminals (DCT) are being fielded throughout the artillery community to provide all FO teams a capability to link directly into MCFSS.

Marine artillery survey and meteorological sections also will see enhancements of their capabilities with the addition of new equipment. The global positioning system (GPS-Survey) will be fielded to each regiment to augment the position and azimuth determining system (PADS). Procurement of the meteorological measuring system (MMS) for each artillery battalion is slated for FY94. Fielding of an improved survey chip for the back-up computer system (BUCS) also will enhance the Corps capabilities.

Conclusion

Challenged by the largest combat operation in more than 20 years and continued restructuring, Leatherneck Artillery continues to prepare for the future while maintaining its ability to meet the demands of the present.

Our mission takes us throughout the world in support of our national interests. Marines remain above all **Semper Fidelis**—Always Faithful!





Field Artillery Commanders and Command Sergeants Major

As of 1 November 1991

Active Army

Training and Doctrine Command

US Army Field Artillery School and Fort Sill

MG Marty, Fred F.
Commandant/CG

CSM Stewart, David P.
Fort Sill

BG Franks, Tommy R.
Asst. Commandant

COL Jones, John A.
SGM Carmichael, Kidaen E.
(Acting)
30th FA Regiment

LTC Barber, George F.
CSM Horsley, Johnny L.
TF 2d-2d FA

LTC Munden, Ronald L.
CSM Hawkins, Joseph A.
1st Bn, 30th FA

LTC Murati, George J.
SGM Jones, Benjamin R.
3d Bn, 30th FA

COL Monko, Joseph P., Jr.
CSM Noel, Thomas E.
USAFATC

LTC Abel, Stephen G.
CSM Meridith, Henry R.
1st Bn, 19th FA

LTC Boynton, John G.
CSM Prothro, Randolph A.
2d Bn, 30th FA

LTC Zahorsky, Michael, Jr.
CSM Niccum, William W.
1st Bn, 31st FA

LTC Mackiewicz, Thomas L.
CSM Shimizu, Antonio T.
1st Bn, 33d FA

LTC Condit, Howard R.F.
CSM Haynes, Ellis J.
1st Bn, 78th FA

LTC Brinkley, Phillip L.
CSM Camel, Enos, Jr.
2d Bn, 80th FA

LTC Hendrickson, James A.
CSM Howard, Preston B.
3d Bn, 321st FA

Forces Command III Corps

BG Miller, Frank L., Jr.
CSM Carr, Thomas E.
III Corps Arty

COL Cline, Dennis C.
CSM Young, Richard A.
75th FA Bde

LTC West, Steven R.
CSM Dunn, Michael A.
1st Bn, 12th FA

LTC Bryant, Byron D.
CSM Blackwell, Glenn A.
1st Bn, 17th FA

LTC Morton, Gregory V.
CSM Speichinger, Robert
5th Bn, 18th FA

LTC Taylor, Joe G.
CSM Stockton, Gaylen
6th Bn, 27th FA

COL Banks, Floyd T.
CSM Williamson, Guy
212th FA Bde

LTC Valcourt, David P.
CSM Santos, Angel, Jr.
2d Bn, 17th FA

LTC Morris, Robert G., III
CSM Evans, Kenneth
2d Bn, 18th FA

LTC Furloni, Joe F.
CSM Causby, Mal E.
3d Bn, 18th FA

LTC Guillory, Kenneth D.
CSM Williams, Felton
6th Bn, 32d FA

COL Elder, Robin L.
CSM Marable, Joseph L.
214th FA Bde

LTC Waite, Harold G., Jr.
CSM Mabry, Jimmy L.
3d Bn, 9th FA

XVIII Airborne Corps

BG Halley, Fred N.
CSM Deese, Gary W.
XVIII Abn Corps Arty

LTC Thrasher, Alan W.
CSM Boone, Robert L.
3d Bn, 27th FA

COL Sakuma, Steven M.
CSM Murrell, Angelo B.
18th FA Bde (Abn)

LTC Wood, John R.
CSM Melvin, Richard L.
3d Bn, 8th FA

LTC Johnson, Lonnie L., Jr.
CSM Stewart, Ouenten M.
5th Bn, 8th FA

LTC Rose, Lawrence C., Jr.
CSM Harris, Sherman W.
1st Bn, 39th FA (Abn)

Division Artilleries

COL Byrnes, Kevin P.
CSM Cates, David L.
1st Cav Div Arty

LTC Starry, Michael D.
CSM Brodeur, Albert J.
1st Bn, 3d FA

LTC Idiart, Philip L.
CSM Tavares, Michael D.
1st Bn, 82d FA

LTC Brown, Herbert G.
CSM Tolleson, Gordon C.
3d Bn, 82d FA

COL Dodson, Michael L.
CSM Manning, Curtis E.
1st IN Div (Mech) Arty

LTC Hill, Robert D.
CSM Snell, Stephen A.
1st Bn, 5th FA

LTC Cuff, Michael V.
CSM Irving, Herman E.
4th Bn, 5th FA

COL Gloriod, John A.
CSM Wright, Daniel E.
4th IN Div (Mech) Arty

LTC Bourn, Guy M.
CSM Villines, Kenneth M.
3d Bn, 29th FA

LTC Heilman, William P.
CSM Powell, Twin L., Jr.
5th Bn, 29th FA

COL Ripley, Ralph R.
CSM Woods, Dave
5th IN Div (Mech) Arty

LTC Kane, Robert P.
CSM Honea, Tony
4th Bn, 1st FA

LTC Murphy, Thomas J.
CSM Dade, William E.
5th Bn, 1st FA

LTC Kent, Richard F., Jr.
SGM Mitchell, Joseph A.
(Acting)
9th Bn, 1st FA

COL Ryneska, John J.
CSM Perry, William J., III
7th IN Div (L) Arty

LTC Oslin, David R.
CSM Flores, Francisco R.
2d Bn, 8th FA

LTC Emison, Steven A.
CSM Ostos, Joseph M.
6th Bn, 8th FA

LTC Reese, Robert J.
CSM Bostick, Clyde J.
7th Bn, 15th FA

COL Gaddis, Evan R.
CSM Smith, Walter L.
10th Mtn Div (L) Arty

LTC Ervin, Kent E.
CSM Peterman, Thomas J.
1st Bn, 7th FA

LTC Rash, Charles R.
CSM Cunningham, Jackie L.
2d Bn, 7th FA

COL Townsend, Ronald E.
CSM Hall, Robert E.
24th IN Div (Mech) Arty

LTC Decker, Robert L.
CSM Cruz, Arthur E.
1st Bn, 41st FA

LTC Turner, Albert F.
1SG King, Bruce J.
3d Bn, 41st FA

LTC Bell, Donald C.
CSM Kirchhoff, Lyle R.
4th Bn, 41st FA

COL Marcello, John J.
CSM Austin, Johnny J.
82d Abn Div Arty

LTC Brant, Bruce A.
CSM Johnson, Shelton
1st Bn, 319th FA

LTC Svitak, George M.
CSM Sexton, Frederick E.
2d Bn, 319th FA

LTC Spohn, Edward A., III
CSM Lugo, Luis A.,
3d Bn, 319th FA

COL Miller, Geoffrey D.
CSM Devoe, Walter
101st Abn Div (AA) Arty

LTC Zachariasen, Craig Z.
MSG Freeman, Lesley, Jr.
1st Bn, 320th FA

LTC Moore, Gordon K.
CSM Unroe, James P.
2d Bn, 320th FA

LTC Costello, Thomas J.
CSM Douglas, Lawrence
3d Bn, 320th FA

Separate Commands

LTC Viet, Rudy T.
CSM Yancy, Andrew C.
1st Bn, 11th FA
(199th IN Bde (Sep))

LTC Kirin, Stephen J.
CSM Phillips, Richard A.
3d Bn, 11th FA
(I Corps Arty)

COL Borland, William A.
CSM Havron, William
TEXCOM FA Board



Command Update

COL Webb, Myrt W., Jr.
SGM Hafler, Phillip H.
US Army Garrison,
Fort Chaffee

United States Army, Europe

V Corps

BG Miller, Leonard D.
CSM Woodley, John L.
V Corps Arty

COL Fox, Alan A.
CSM Higginbotham, Walter D.
17th FA Bde

COL Newman, George E., III
CSM Stanislas, Rawle B.
41st FA Bde

LTC Rasmussen, Raymond E.
CSM Marlow, Charles
4th Bn, 18th FA

LTC Vallario, Richard A.
CSM Wood, David C.
1st Bn, 27th FA

LTC Cerutti, Edward A.
CSM Tillman, Melvin L.
4th Bn, 27th FA

LTC Waller, Thomas G.
CSM Thompson, Donald
3d Bn, 32d FA

COL Aaron, Larry D.
CSM Underwood, Johnny W.
42d FA Bde

LTC Odell, John C.
CSM Quandt, David T.
2d Bn, 12th FA

LTC Brzozowski, Mark A.
CSM Brooks, Ernest L.
1st Bn, 32d FA

LTC Retzlöf, Curtis L.
CSM Mitchell, Sammie L.
2d Bn, 32d FA

LTC Davis, M. Thomas
CSM Henson, Melvin R.
4th Bn, 82d FA

COL Jefferson, Kenny J.
CSM Barber, David P.
72d FA Bde

LTC Rudman, John F.
CSM Adams, Paul C.
5th Bn, 3d FA

LTC Danner, Stephen A.
CSM Kraus, Lawrence H.
3d Bn, 5th FA

LTC Melville, Edmond K.
CSM Lopes, Lucio O.
2d Bn, 14th FA

LTC Canton, Raymond P., Jr.
MSG Walley, Marion
5th Bn, 17th FA

LTC Vanderbeek, Walter A.
CSM Morales, Jorge E.
2d Bn, 20th FA

Division Artilleries

COL Corn, Vollney B., Jr.
MSG Freeman, John F.
1st AR Div Arty

COL Baxter, Leo J.
CSM Warrick, Ronald E.
3d IN Div (Mech) Arty

LTC Hahn, Daniel A.
CSM Smith, James F. L.
3d Bn, 1st FA

LTC Collier, John A.
CSM Dixon, Donald L.
6th Bn, 1st FA

LTC Godwin, James B., Jr.
CSM Duncan, Gary A.
3d Bn, 35th FA

LTC Swartz, Leonard G.
CSM Speeks, Rickey D.
5th Bn, 41st FA

COL Shoemaker, Christopher C.
CSM Allen, Bobby W.
8th IN Div (Mech) Arty

LTC Treharne, Richard J.
CSM Munoz-Rivera, Gilberto
2d Bn, 3d FA

LTC Stratman, Henry W.
CSM Stewart, John T.
2d Bn, 29th FA

LTC Moon, Alan B.
CSM Eason, Guy R.
4th Bn, 29th FA

LTC Cribbs, John M.
CSM Hornsby, Winston A., II
6th Bn, 29th FA

VII Corps

COL Bourne, Garrett D.
CSM Vacant
VII Corps Arty

COL Bourne, Garrett D.
CSM Vacant
210th FA Bde

LTC McCausland, Jeffrey D.
CSM McFadden, Joseph J.
3d Bn, 17th FA

59th Ordnance Brigade

LTC Cerami, Joseph
CSM West, Joseph C.
294th Arty Group

LTC Kaylor, Charles R.
CSM Thompkins, Carroll E.
512th Arty Group

LTC Grimes, Richard A.
CSM Smith, Robert C., Jr.
552d Arty Group

LTC Megorden, Frank M.
CSM McClain, Robert L.
557th Arty Group

LTC Berry, Guy A.
CSM Kermode, William J., Jr.
570th Arty Group

Southern European Task Force

COL Cameron, Thomas B.
CSM Vogt, David E.
528th Arty Group

COL Gallivan, James J.
CSM Bodish, Michael F.
558th Arty Group

COL Berry, Frederick S.
CSM McNair, Liddell
559th Arty Group

Separate Command

LTC Smith, Robert L.
CSM Williams, L.C.
4th Bn, 3d FA
(2d AD (-))

US Army Pacific

COL Elliott, James E.
CSM Archbold, Cecilio M.
2d IN Div Arty

LTC Stringham, Shand H.
CSM Thomas, E.J.
1st Bn, 4th FA

LTC Perkins, Elbert N.
CSM Green, Gary R.
8th Bn, 8th FA

LTC Tulkki, Burton W.
MSG(P) Inman, Paul M.
1st Bn, 15th FA

LTC Hoffer, Edward E.
CSM Purdy, Karl L.
6th Bn, 37th FA

COL Rigby, Randall L.
CSM Montgomery, Roger L.
6th IN Div (L) Arty

LTC Hardin, James R.
CSM Boyles, Terry W.
4th Bn, 11th FA

LTC Rambow, David J.
CSM Skipper, Wendell K.
5th Bn, 11th FA

COL Shane, James E., Jr.
CSM Graves, Roy L.
25th IN Div (L) Arty

LTC Northrop, John H.
CSM Perry, Sidney G.
3d Bn, 7th F

LTC Davis, Lawrence E.
CSM Najar, Joe C.
1st Bn, 8th FA

LTC Peterson, Timothy A.
CSM Lewis, Harold E.
7th Bn, 8th FA

LTC Johnson, David E.
CSM Lunceford, Danny L.
2d Bn, 11th FA

Army National Guard

I Corps

BG Ence, Randy J.
CSM Nelson, John W.
I Corps Arty

LTC Johnson, James D.
CSM Boyington, Richard L.
1st Bn, 140th FA

LTC Bertolio, William D.
CSM Williams, Brock H.
1st Bn, 145th FA

LTC Fuellenbach, Mark A.
1SG Walbeck, William
B. (Acting)
2d Bn, 222d FA

Division Artilleries

COL Russell, James W.
CSM Beirne, John E.
26th IN Div Arty

LTC Huskes, Richard W., Jr.
CSM Leggett, Ronald L.
1st Bn, 86th FA

LTC Leite, Abel C.
CSM Sampson, Richard M.
1st Bn, 101st FA

LTC Raphael, John
CSM Tassone, Vincent J.
2d Bn, 192d FA

LTC Taylor, Thomas E.
CSM Engler, Paul D.
1st Bn, 211th FA

COL Babb, Heinrich N.
CSM Sheard, James J., Jr.
28th IN Div Arty

MAJ(P) Irvine, John C.
CSM Honkus, Thomas D.
1st Bn, 107th FA

LTC McClintock, Charles F.
CSM Nett, David L.
1st Bn, 108th FA

LTC Ormando, John J.
CSM Sauer, John J., Jr.
1st Bn, 109th FA

LTC Messina, Michael R.
CSM Houston, David J.
1st Bn, 229th FA

COL Vick, William A.
CSM Yeager, Thomas E.
29th IN Div (L) Arty

LTC Rodier, Edward A., Jr.
CSM Perando, Scott A.
2d Bn, 110th FA

LTC Bramlitt, Carl W.
CSM Sparkman, Miles E.
2d Bn, 111th FA

LTC Grant, Rorer J.
CSM Ferguson, Lowell T.
1st Bn, 246th FA

COL Bode, Louis O.
CSM Benda, Charles J.
34th IN Div Arty

LTC Raschke, John S.
CSM Huber, Gary L.
2d Bn, 123d FA

LTC Trost, Jon L.
CSM Ibberson, Steve P.
1st Bn, 151st FA

LTC Halverson, Ronald L.
CSM Hodge, Harold L.
1st Bn, 175th FA

LTC Warnock, Tracy L.
CSM Peterson, Leslie D.
1st Bn, 194th FA

COL Mitchell, John W., Jr.
CSM Rudder, John L.
35th IN Div (Mech) Arty

MAJ Johansen, Forrest R.
CSM Gorman, Jerry F.
1st Bn, 127th FA

LTC Tritsch, Thomas M.
CSM Vacant
2d Bn, 130th FA

MAJ Jones, Michael A.
CSM Bush, Robert J.
2d Bn, 138th FA

LTC Smith, Dennis E.
SGM Stevens, George E.
1st Bn, 161st FA

MAJ Grandstaff, Curtis G.
CSM Langhofer, Ronald E.
1st Bn, 168th FA

COL Henry, Ronald W.
CSM Osborne, John D.
38th IN Div Arty

LTC Vadnais, Gregory J.
CSM Pennell, Wayne G.
1st Bn, 119th FA

LTC Montgomery, Michael B.
CSM Nicholson, Jerry D.
3d Bn, 139th FA

MAJ(P) Thomas, Stempson A.
1SG(P) Parsons, Jackie P.
2d Bn, 150th FA

LTC Austin, Larry L.
CSM Mattingly, James R.
1st Bn, 163d FA

COL Schmidt, Eugene W.
CSM Marschall, Josef O.
40th IN Div (Mech) Arty

MAJ Newman, Randall H.
CSM Tafoya, Raymond A.
1st Bn, 143d FA

LTC Ramsey, Edwin P., Jr.
CSM Franco, Anthony J.
1st Bn, 144th FA

LTC Starich, Jack G.
CSM Andrews, Gary W.
2d Bn, 144th FA

LTC Foster, Edward A., Jr.
1SG Christoffen, Norman J.
(Acting)
3d Bn, 144th FA

COL Alesia, Pasquale A.
CSM Murfitt, Arthur A.
42d IN Div Arty

LTC Riggio, Frank X.
CSM Adinolfi, Albert A.
2d Bn, 104th FA

LTC Lundell, Carl F.
CSM Santovito, Ronald J.
1st Bn, 258th FA

COL Avila, John, Jr.
CSM Wesch, Larry
49th AR Div Arty

LTC Timmermann, Thomas G.
CSM Talbot, Joseph E.
2d Bn, 131st FA

LTC Ortiz, Victor M., Jr.
CSM Black, Clyde D.
3d Bn, 132d FA

LTC Kreger, John W.
CSM Shamy, Robert G.
3d Bn, 133d FA

LTC Goodwin, William
CSM Belyeu, Leonard W.
4th Bn, 133d FA

LTC Apgar, William I.
CSM Wagner, Roy R.
50th AR Div Arty

LTC Chiste, Ronald L.
CSM Szymborski, Stanley
1st Bn, 112th FA

MAJ Petersen, Edward J.
CSM Newman, Frank T.
3d Bn, 112th FA

LTC Lippke, Lawrence A.
CSM Smith, Charles W.
1st Bn, 133d FA

Brigades

COL Bray, Kenneth W.
CSM Plaster, Gerald S.
45th FA Bde

MAJ Haub, Larry D.
CSM Spruill, James D.
1st Bn, 158th FA

LTC South, Arthur R.
CSM Ahrens, Lewis E.
1st Bn, 171st FA

LTC Morford, Jim E.
CSM Ray, Robert F.
1st Bn, 189th FA

COL Strawn, Marvin I.
CSM Koehler, Lowell M.
57th FA Bde

LTC Friedl, Michael J.
CSM Paul, James L., Jr.
1st Bn, 121st FA

LTC Krug, Randall E.
CSM Villnow, William W.
1st Bn, 126th FA

COL Kanaczet, Richard P.
CSM Iannelli, Paul A.
103d FA Bde

LTC Zifcak, Dennis J.
1SG Fiske, Harold L., Jr.
1st Bn, 103d FA

COL Sexton, Paul W.
CSM Hoover, Harold W.
113th FA Bde

LTC Stallings, Jack B., Jr.
CSM Ingram, Larry G.
4th Bn, 113th FA

LTC Bowling, Wallace D.
CSM Ellington, Orman B.
5th Bn, 113th FA

LTC Sharp, Robert C.
CSM Cash, Jack H.
115th FA Bde

LTC Wilkerson, Terry G.
1SG Marosok, James E.
(Acting)
1st Bn, 49th FA

COL Gaudry, Jordan B., III
CSM Tant, Kenneth
118th FA Bde

LTC Tinley, Henry E.
CSM Nicora, Barry D.
1st Bn, 214th FA

LTC Reddick, Terrell T.
CSM Vacant
2d Bn, 214th FA

COL Gottschalk, Dempsey D.
CSM Blair, Charles M.
135th FA Bde

LTC Griffey, Bobby G.
CSM Heinzler, James J.
1st Bn, 128th FA

LTC Courtney, John M.
CSM Dew, Larry E.
1st Bn, 129th FA

COL Doyle, Earl L., Jr.
CSM Derman, Robert E.
138th FA Bde

MAJ Smith, John W.
CSM Hoffman, William F.
1st Bn, 623d FA

COL Linch, Charles J.
CSM Fondren, Bobby D.
142d FA Bde

LTC Halton, Larry W.
CSM Jordan, Alda
1st Bn, 142d FA

LTC Danehower, Ronald K.
CSM Fagala, Robin F.
2d Bn, 142d FA

COL Hansem, Michael H.
CSM Logan, Richard L.
147th FA Bde

LTC Goldhorn, Donald J.
CSM Hurney, Richard J.
1st Bn, 147th FA

LTC Davies, James R.
MSG Kraus, Dennis J.
(Acting)
2d Bn, 147th FA

COL Sipe, Nicholas P.
CSM Floyd, L. Hinson
151st FA Bde

LTC Richardson, Andrew L.
CSM Davis, Albert E.
3d Bn, 178th FA

LTC Richardson, Henry B., Jr.
CSM Smith, James D.
4th Bn, 178th FA

COL Davila, Manuel, Jr.
CSM Wright, Gerald A.
153d FA Bde

LTC Jenson, Paul E.
CSM Lara, Ysabel S.
1st Bn, 180th FA

LTC Perry, Gerald
CSM Ditsch, Thomas D.
2d Bn, 180th FA

COL Stacks, Jesse T., III
CSM Miller, Dave
169th FA Bde

LTC Stremme, Lynn R.
CSM Curtis, James M.
1st Bn, 157th FA

LTC Kroeker, Philip R.
MSG Craver, Kenneth E.
2d Bn, 157th FA

COL Darling, James P.
CSM Davis, Bobby G.
196th FA Bde

LTC Tipps, Jerry W.
CSM Pratt, John F.
1st Bn, 115th FA

LTC Bean, Dennis N.
CSM McDaniel, John C.
1st Bn, 181st FA

COL Kehr, T.W.
CSM Ziarko, Stanley W.
197th FA Bde

LTC Dupee, Bradley S.
CSM O'Brien, John B.
1st Bn, 172d FA

LTC Lemoine, Ronald R.
CSM Hammell, Leonard D., Jr.
2d Bn, 197th FA

LTC Thibault, Jean R.
CSM Barrett, Stephen W.
3d Bn, 197th FA

COL Losel, Glenn W.
CSM Flye, Gerel E.
209th FA Bde

COL Lorenzo, Leo A.
CSM Van Kessel, George H.
227th FA Bde

LTC Capitano, Nick V.
CSM Currier, Robert A.
1st Bn, 116th FA

LTC Conner, Thomas W.
CSM Danley, Dwight L.
3d Bn, 116th FA

COL Hyneman, John M.
CSM Jones, Jerry A.
631st FA Bde

LTC Shields, Roger L.
CSM Cummins, Ancle W.
1st Bn, 114th FA

LTC Farris, Joe P.
CSM Cooley, Donald L.
4th Bn, 114th FA

Round-Out Battalions

LTC Triplett, Michael W.
CSM Marshall, Ben A.
2d Bn, 114th FA
(1st Cav Div Arty)

LTC Schuster, Donald D.
CSM Murphy, Patrick W.
1st Bn, 148th FA
(4th IN Div (Mech) Arty)

LTC Appe, Glenn M.
CSM Schmidt, William C.
1st Bn, 141st FA
(5th IN Div (Mech) Arty)



LTC Lamback, James H.
CSM Gleidman, Jeffrey A.
1st Bn, 156th FA
(10th Mtn Div (L) Arty)

LTC Rigdon, Robley S.
CSM Slaughter, Joseph E.
1st Bn, 230th FA
(24th IN Div (Mech) Arty)

Separate Battalions

LTC Wray, Cannon S.
CSM Perrson, Kenneth V., Sr.
3d Bn, 49th FA

LTC Young, John L. III
CSM Halfacre, Howard E.
1st Bn, 111th FA

MAJ(P) Montague, Harry W.
CSM Eddins, William H.
1st Bn, 113th FA

LTC Greer, David E.
CSM Turner, William B.
3d Bn, 115th FA

LTC Hall, James E.
CSM Porterfield, Robert W.
2d Bn, 116th FA

LTC Sewell, James P.
CSM Keeney, John D.
1st Bn, 117th FA

LTC Brossett, Wayne R.
CSM Youngblood, Enoch J.
2d Bn, 117th FA

LTC Crutchfield, Jerry
CSM Snyder, Pugh K.
3d Bn, 117th FA

LTC Kilcoyne, Robert J.
CSM Diedrich, Mathew G.
1st Bn, 120th FA

LTC Kelly, Gregory W.
CSM Frazier, Robert L.
2d Bn, 122d FA

LTC McRoberts, Ronald E.
CSM Forelich, Kirby
1st Bn, 125th FA

LTC Higgins, John W.
CSM Woody, Joseph E.
1st Bn, 136th FA

LTC King, Craig S.
CSM Leggett, Tommy D.
2d Bn, 146th FA

LTC Bernard, Reginald T.
CSM Martin, Roland S.
1st Bn, 152d FA

LTC Bills, Christopher P.
CSM Lemons, Winford H.
1st Bn, 160th FA

LTC Valdejuli, Alberto L.
CSM Vacant
1st Bn, 162d FA

LTC Molano, Jesus M.
CSM Reyes, Ruben
2d Bn, 162d FA

LTC Mabry, Buford S., Jr.
CSM Sexton, Jimmie R.
1st Bn, 178th FA

LTC Johnson, Sheldon D.
CSM Bradley, Joseph C.
1st Bn, 182d FA

LTC Christian, Dennis R.
CSM Harman, John E.
1st Bn, 201st FA

LTC Cox, Norman T.
CSM Grisham, Walter E.
5th Bn, 206th FA

LTC Griggs, John C.
CSM Stephen, Garvin K.
2d Bn, 218th FA

LTC Mimura, Dennis
SGM Gibo, Raymond M.
1st Bn, 487th FA

Army Reserve

Brigades

COL Noirot, George V.
CSM Edmonds, Ollard D.
428th FA Bde

MAJ Reyes, Rosendo C.
CSM Cleasby, Gerry L.
4th Bn, 20th FA

MAJ Inman, William T.
CSM Kimble, David L.
4th Bn, 38th FA

LTC Greene, Robert L.
CSM Dorman, Terry L.
4th Bn, 333d FA

COL Kuhar, Edward H.
CSM Mosier, James A.
479th FA Bde

LTC Clark, Bruce R.
CSM Holland, Gregory M.
4th Bn, 92d FA

Training Brigades

COL Thompson, Carleton K.
CSM Prucha, Edward C.
3d Bde (FA-OSUT)
84th Div (Tng)

LTC Klem, Bruce T.
SGM Thompson, John L.
(Acting)
1st Bn, 334th FA

LTC Graham, Alfonso J., Jr.
SGM Clark, Charles A.
2d Bn, 334th FA

LTC Geib, Donnell H.
CSM Pelishek, Daniel L.
3d Bn, 334th FA

COL White, Larry A.
CSM Brown, Paul L.
402d Bde (Tng)(FA)
95th Div (Tng)

MAJ Cushman, Paul D.
CSM Young, Kendall
1st Bn, 89th FA

MAJ Jester, James
CSM Anders, William
2d Bn, 89th FA

LTC Gill, Robert L.
CSM Duryea, James W.
3d Bn, 89th FA

LTC Unwin, Jerry
CSM Cleveland, Gerald
4th Bn, 89th FA

LTC Puthhoff, Earnest R.
CSM Bailey, William
5th Bn, 89th FA

LTC Bradford, Jerry J.
CSM Bouffard, James M.
402d Tng Spt Bn

LTC Ellis, Garry
CSM Griffin, Gayland V.
402d Rcpn Bn

Separate Battalions

MAJ Labruski, Walter
CSM Harden, Frank L.
7th Bn, 1st FA

LTC Edin, Joseph H.
CSM Mari, Daniel J.
5th Bn, 5th FA

LTC Chavez, Robert M.
MSG Seither, Mathias
(Acting)
7th Bn, 9th FA

LTC Guenthner, Jack E.
CSM Pearson, Andrew L.
3d Bn, 14th FA
(Round-Out Bn, 6th IN
Div (L) Arty)

LTC Zimmerman, Raymond C.
CSM Vacant
3d Bn, 15th FA

LTC Roney, Benjamin E., Jr.
CSM Braswell, Freddie E.
4th Bn, 17th FA

LTC Poling, Kenneth E., Jr.
CSM Clendenin, Jerry A.
5th Bn, 28th FA

LTC Charles, Buckley A.
CSM Tobin, Joseph A.
3d Bn, 42d FA

LTC Strom, Charles P.
CSM Lenox, Chester A.
3d Bn, 75th FA

MAJ Woodley, Kent
CSM Suarez, Frank R.
4th Bn, 75th FA

LTC Younger, Jack R., Jr.
CSM Kirk, William J.
3d Bn, 83d FA

MAJ Martin, John T.
CSM Hanna, Richard M.
3d Bn, 92d FA

US Marines

Col Palm, Leslie M.
SgtMaj Felts, Dossy B.
10th Marines

LtCol Asodoorian, Levon S.
SgtMaj Holding, Phillip J.
1st Bn, 10th Mar

LtCol Turner, David J.
SgtMaj Kapper, Thomas J.
2d Bn, 10th Mar

LtCol Williams, Hensley C.
SgtMaj Ridgeway, Harvey W.
3d Bn, 10th Mar

LtCol Mazzara, Andrew F.
SgtMaj Rudolph, George M.
5th Bn, 10th Mar

Col Howard, Patrick G.
SgtMaj Bacht, Thomas E.
11th Marines

LtCol Stuart, Lynn A.
SgtMaj Hunter, Dennis W.
1st Bn, 11th Mar

LtCol Supko, Leonard M.
SgtMaj Coffee, Royce G.
2d Bn, 11th Mar

LtCol Booker, James L.
SgtMaj Garr, Cecil T.
3d Bn, 11th Mar

LtCol Sachtleben, James L.
SgtMaj Eff, Richard H.
5th Bn, 11th Mar

Col Turner, Frank L.
SgtMaj Barnes, T.R.
12th Marines

LtCol Priddy, John R.
SgtMaj Beckner, Duane L.
1st Bn, 12th Mar

LtCol Lennox, Dyer T.
SgtMaj Mersino, John M.
2d Bn, 12th Mar

LtCol Adair, Charles
SgtMaj Cox, Melton E.
3d Bn, 12th Mar

LtCol Macak, Richard J.
SgtMaj Barnes, Thomas R.
4th Bn, 12th Mar

Col Canario, James M.
SgtMaj Barker, Robert L.
14th Marines (USMCR)

LtCol Studebaker, Roger J.
SgtMaj Lyvere, Douglas C.
1st Bn, 14th Mar

LtCol Copeland, Larry B.
SgtMaj Havens, Merwin H.
2d Bn, 14th Mar

LtCol Gorian, John D.
1stSgt Beckermeyer, John R.
3d Bn, 14th Mar

LtCol Ragsdale, James T.
SgtMaj Hayen, Lee J.
4th Bn, 14th Mar

LtCol Sager, Roger A.
SgtMaj Holmes, Phillip J.
5th Bn, 14th Mar





Field Artillery Assignment Branches

As of 1 Oct 91


Active Army Branch Teams

Officers


COL John N. Paolucci
Colonels Division
Colonels Assignments
LTC(P) Richard E. Evans
Field Artillery
Branch Chief
MAJ(P) Donald W. Browne
Lieutenant Colonel
Assignments
MAJ(P) James H. Gant
CPT(P) Brian T. Camperson
Major Assignments
CPT(P) Donald G. McMillian
CPT David C. Martino
Captain Assignments:
Company-Grade Qualified
CPT Curtis H. Nutbrown
Captain Assignments: OAC
CPT Jonathon A. Bell
Lieutenant Assignments:
Accessions/OBC
CPT David D. Haught
Future Readiness/Functional Area
Designation/Professional Development
CW4 Curtis Atkins, Jr.
Warrant Officer Career Manager
Assignments
Fort Sill Representative for OBC/OAC
Follow-On Assignments: MAJ Michael L. McMath
AUTOVON 639-4511/5206 or
Commercial (405)
351-4511/5206.

Addresses and Telephone Numbers

Lieutenant Colonels (P) and Colonels:

Commander, PERSCOM
ATTN: TAPC-OPC
200 Stovall Street
Alexandria, VA 22332-0412
Telephone: AUTOVON 221-7862/7863
 Commercial (703) 325-7862

Lieutenant Colonels to Lieutenants:

Commander, PERSCOM
ATTN: TAPC-OPE-F
200 Stovall Street
Alexandria, VA 22332-0414
Telephone: AUTOVON 221-XXXX
Commercial (703) 325-XXXX
 Company Grade 0187/0116
Field Grade 7817/0118

December 1991

Warrant Officers:

Commander, PERSCOM
ATTN: TAPC-OPW-FA
200 Stovall Street
Alexandria, VA 22332-0420
Telephone: AUTOVON 221-5245/5241
Commercial (703)325-5245/5241



Officers' Microfiche Records. Request your microfiche in writing; include name, rank, SSN and address; and sign the request. Mail to:

Commander, PERSCOM
ATTN: TAPC-MSR-S
200 Stovall Street
Alexandria, VA 22332-0444

Enlisted

LTC Roy L. Edwards
Field Artillery
Branch Chief
SGM Kenneth Larimer
Branch Sergeant Major
SFC Melquiades DeLaConception
13B (E1 thru E6)
MSG Michael J. Patton
13B(E7) and 13Z (E8)
SFC Richard L. Woods
13C, 13E, 13F/AFSO Program
SFC Gordon W. Ambrosek
13N, 13R 82C, 93F/Recruiting
Duty/Drill SGT Duty
SFC Louis Klein
13M and 13P
SFC Miguel Quinones
Reclassification/Qualitative
Management/Retirement
Mr. William E. Wagner
ANCOC/Schools

Address and Telephone Numbers

Commander, PERSCOM
ATTN: TAPC-EPK-F
2461 Eisenhower Avenue
Alexandria, VA 22331-0452
Telephone: AUTOVON 221-0304
Commercial (703) 325-0304



Army Reserve Branch Teams


Officers

LTC Robert E. Matthews
Colonels (0-6 Only)
LTC John A. Haas
Field Artillery
Branch Chief
Lieutenant Colonels

MAJ Alan E. Ruegamer
Majors
MAJ Thomas N.J. Schellingerhout
Captains
MAJ Robert T. Marsh
Lieutenants
CW4 Warren A. Stowell
Warrant Officer Branch Chief
CW4 Robert P. Gruver
Personnel Management Officer

Address and Telephone Numbers


Colonels:

Commander, ARPERCEN
ATTN: DARP-OPS-COL
9700 Page Boulevard
St. Louis, MO 63132-5000
Telephone: AUTOVON 892-3431
 Commercial (314) 538-3431
Toll Free 1-800-325-4387

Lieutenant Colonels to Lieutenants:

Commander, ARPERCEN
ATTN: DARP-OPC-FA
9700 Page Boulevard
St. Louis, MO 63132-5200
Telephone: AUTOVON 892-3871/3351
Commercial(314)538-387
 1/3351/3302
Toll Free 1-800-325-4950


Warrant Officers:

Commander, ARPERCEN
ATTN: DARP-OPF-WO
9700 Page Boulevard
St. Louis, MO 63132-5200
Telephone: AUTOVON 892-3763
Commercial (314) 538-3763
 Toll Free 1-800-325-4361

Enlisted

MSG Charles A. Thompson
Field Artillery/Air Defense
Branch Chief
SFC George M. Little
Last SSN Digits of 00-27
SFC Francis L. Christian
Last SSN Digits of 28-45
SFC Johan H. Kohler
Last SSN Digits of 46-72
SFC Johnny R. Fisher
Last SSN Digits of 73-99

Address and Telephone Numbers

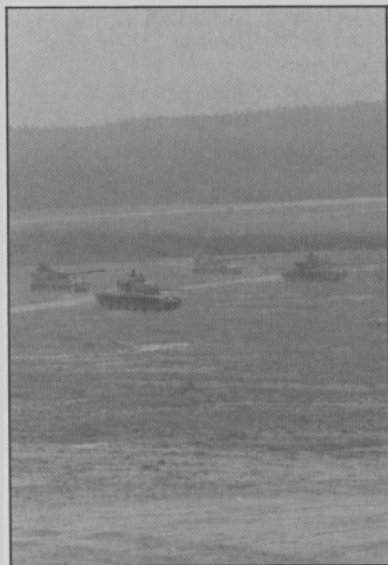
Commander, ARPERCEN
ATTN: DARP-EPA-FA/AD
9700 Page Boulevard
St. Louis, MO 63132-5200
Telephone: AUTOVON 892-2219
Commercial (314) 538-2219
 Toll Free 1-800-325-4730





When It Becomes Routine, Wrench It Up

by Colonel Larry D. Aaron



At the National Training Center (NTC), Fort Irwin, California, I've worked with artillery units from 11 different divisions, three corps artilleries, one separate brigade, one armored cavalry regiment and two National Guard brigades. We conducted rigorous field training with 40 different artillery battalions and 50 battalion commanders. Although most units were from heavy forces, we also trained with artillery units from two light divisions and the airborne, air assault and motorized divisions.

The variety and repetitive experiences of this training taught me this: even though training can always get better, Redlegs are superb soldiers and leaders. You accomplish missions that a few years ago units couldn't comprehend. Not since World War II have we seen more emphasis on the requirements for effective fire support. What's more, you fire and coordinate fires on a faster, expanded and more lethal battlefield.

But you don't hear this good news from the observer-controllers (OCs) at the NTC, and there's a good reason for that. NTC evaluators report problems and emphasize the need for improvements because a unit's meeting a standard doesn't ensure it's as good as it can get.

When a unit routinely meets the standard within a set of conditions, then the OCs make the conditions more difficult—they "wrench it up." At the NTC and throughout the force, leaders don't want to see units fail in training. But they do want soldiers returning from combat to say their tasks in combat weren't as tough as their tasks in training.

Here are some examples of how the NTC has wrenched-up training for Field Artillerymen as they became more capable. In 1985, while the artillery battalion at the NTC trained in the live-fire areas, direct support (DS) was the only standard artillery role the trainers required of the battalion. At some point in each defensive scenario, the battalion had to move one firing battery forward about 10 kilometers to fire in support of the brigade deep fight. The battalion had to manage approximately 2,000 155-mm rounds of various types. No live M2 and M60 machinegun or M16 rifle ammunition was issued.

Further, the OC team had no combat service support (CSS) trainers, so analysis of the battalion support system was cursory, at best. A service battery often established its support base in the rear of the brigade area and didn't move it for eight to 10 days of a 14-day rotation.

Today, things are different because meeting the training challenges had become routine. Currently, a battalion commonly trains while assigned any of the four standard artillery missions—and does it on the move. While in a general support (GS) role, the entire battalion may move from 30 to 50 kilometers to successfully execute the division's offense. The tactical operations center (TOC) must be trained to execute the DS mission but will find times when the battalion may be reinforcing (R), general support reinforcing (GSR) or GS.

While moving forward, a firing battery may have to fight a live-fire blocked ambush where, to be successful, the battery must direct fire and maneuver the howitzers and all available crew-served and individual weapons. While well forward, batteries may have to conduct live-fire battery self-defense operations against enemy reconnaissance vehicles and dismounted infantry at night. Often the battery will receive an air attack by the radio-controlled miniature aerial target (RCMAT) and must successfully

execute small-arms live fire against the attacking aircraft.

The CSS system is severely stretched as the battalion supports a fluid operation. Ammunition management challenges battalion leaders with the requirement for more rounds of different types and lots. The battalion has the opportunity to fire approximately 3,600 rounds of 155-mm and can evaluate unit and individual abilities to fire and control their M16s and M60 and M2 machineguns.

There are other examples of how the NTC experience goes beyond the demands described—many of you know what those are. Units improving tactically have made such wrench-ups possible and necessary. You can rest assured that once your OC sees you handle the challenges thrown at you, he'll already have more planned.

Performance

One battalion commander remarked, "At the NTC, if you have a pimple, it will come to a head." His meaning, of course, was that if you have a weakness in your battalion, it'll become obvious and have an impact on sustained tactical operations. Hopefully, every commander recognizes that. The OCs will help you identify strengths and weaknesses in your battalions. Good leaders design home-station training that attacks the weaknesses and not only sustains unit strengths, but also improves them.

Leaders must be very familiar with the NTC rules of engagement (ROE) to ensure they understand the parameters within which they must operate. However, some units make the mistake of focusing on how to manipulate the ROE to their advantage.

There's no "secret formula" for success at the NTC. Some units waste an inordinate amount of time searching for one so they can "win." Units are successful when they've focused home-station training on strict adherence to prescribed standards at the section or crew level. At the NTC, the successful units have things in common: well-disciplined soldiers who know the standards for combat tasks and strong NCOs and mid-level officers who supervise and enforce those standards. Therefore, Field Artillery battalions would be more proficient if they concentrated the majority of their pre-NTC training on well-planned

training directives and strictly supervised section and crew drills.

Well-trained howitzer sections provide safe, responsive fires. Batteries have fast howitzer lay times and reduced ready-to-fire times if gunnery sergeants, chiefs of firing battery and platoon leaders are comfortably proficient at all howitzer lay procedures, hasty survey techniques and correct prepare-for-action procedures.

Fire support teams (FISTs) survive on the NTC battlefield if they've been drilled repetitively on tactical movement and emplacement procedures for the fire support vehicle. Further, FISTs are successful on the battlefield if they focus on pre-combat inspections and pre-combat checks; have repeatedly trained on using the FIST vehicle (FIST-V) targeting station; and have operational night-vision devices, thermal sights, ground/vehicular laser locator designators (G/VLLDs) and radios. It's simple—to succeed, they need the right skills and equipment.

Unit failures in NTC battles are often attributed to weaknesses in their plans. Certainly, weak plans or lack of coordination in planning can be devastating; however, some units fail when they have good plans and understand and rehearse them. It's then that the lack of crew skills or the lack of adherence to prescribed procedures surfaces as a major issue.

Failure is frequently rooted in crew-level problems, even when it isn't obvious at first glance because of weak plans or poor decisions at the battalion or brigade level. Today's soldiers are smart, disciplined and motivated. If you make them proficient as crews and sections on critical combat tasks—no matter how seemingly mundane—they'll make the leaders successful.

Successful NTC rotations occur when commands accurately and thoroughly analyze the unit mission essential tasks, develop a comprehensive list of collective and individual tasks and then seriously train those tasks to standard. That may sound trite, but it's true. It isn't unusual to discover unit mission essential tasks lists (METLs) and training objectives that appear to have received little study or analysis by unit leaders. Units enhance their combat capability at the NTC if they've trained on well-conceived METLs at their home stations.

Some trends in Field Artillery training show the performance of most units has improved. (See Figure 1.) These trends

indicate a better understanding of the requirements for effective fire support and a resurgence of technical understanding of our branch. Satisfying the requirements for accurate predicted fires is again emphasized in the Field Artillery battalion. Firing battery leaders quickly and accurately conduct graphic resections to establish positive locations or they rapidly use hasty surveys from established fourth-order survey control points to establish common grids. They don't hesitate to conduct simultaneous observations to establish common directions when other survey data isn't available. These achievements reduce the demand for the position and azimuth determining system (PADS) and reduce occupation-to-ready-to-fire times.

- FSOs understanding and expressing the capabilities and limitations of fire support.
- Performing target value analysis.
- Managing ammunition lot and muzzle velocities.
- Conducting survey planning and performing hasty survey techniques.
- Conducting secondary checks of firing data in the FDC and on the howitzers.
- Sustaining combat operations using dual trains.
- Planning fires and integrating all fire support systems.

Figure 1: Positive Field Artillery Performance Trends at the NTC.

Unfortunately, battery commanders and platoon leaders too often aren't familiar with the techniques to update survey, based on acquiring improved survey data. Specifically, the gun line and the fire direction center (FDC) are very near to reporting themselves "In order" and ready to fire when a PADS shows up. Instead of merely updating survey in the FDC and continuing fire support, battery leaders decide to re-lay the battery, based on PADS survey data, and the preparation process begins anew. Even though most battery leaders who come to the NTC are skilled at hasty survey techniques, they lack confidence in their abilities or lack understanding of techniques to upgrade survey data for firing.

Just as we can identify positive trends by Field Artillery units training at the NTC, we also can identify performance

trends that need more emphasis in training. (See Figure 2.)

Home-station training needs to emphasize the role of the fire support officer (FSO) or fire support coordinator (FSCOORD) in developing and recommending the commander's intent for fire support. Frequently, FSOs passively wait for fire support guidance from their maneuver commanders. When it comes, it's generally expressed as "Destroy dismounts, neutralize air defense artillery, suppress armor and mass on platoon-sized formations." The guidance lacks specificity and objectivity because the fire supporter didn't give the commander any input.

- FSO/FSCOORDs' developing and recommending the maneuver commander's intent for fire support.
- Synchronizing fire support assets during execution.
- Implementing techniques to positively employ COLTS.
- Improving time from occupation to ready-to-fire status.
- S3s' (and operations and intelligence sections') understanding their roles in coordinating with FSOs or in fire support planning and execution.

Figure 2: Field Artillery Trends at the NTC Requiring Training Emphasis.

Figure 3 gives an example of a maneuver commander's guidance that's specific enough for fire direction officers (FDOs) and Field Artillery S3s to use to begin battalion planning while they wait for the FSOs' fire plans. This isn't the "school solution"; however, Figure 3 is an example of the clarity we need. To get this sort of detailed guidance from their maneuver commanders, Redlegs must educate maneuver commanders about our business—fire support.

Synchronization of fire support assets during execution is the "toughest nut to crack." If the commander's intent for fire support is too general or if guidance for combat observation lasing teams (COLTs), OH-58D observation helicopters, electronic warfare (EW), mortars, close air support (CAS) or Army aviation lacks detail, synchronization will occur only by accident. Those of you who routinely train as a task force know how hard it is to integrate fire support assets into the battle.

Part of synchronization is getting in position to fire. Far too often, Field

Artillery battalion commanders or FSOs unintentionally mislead their maneuver commanders about the time required to establish a firing capability after a battery or platoon occupies a position. Because most units successfully complete a standard external evaluation (SEE) before their NTC training, the leaders believe their units can occupy and be ready to fire by the mission training plan (MTP) standard. As a result, they often tell their maneuver commanders the firing units can be ready to fire much sooner than they actually can.

- Destroy the combat reconnaissance patrol (CRP) and fire support element (FSE) in Engagement Area Snake with all available fire support assets.
- Delay and disrupt the lead battalion with coordinated attacks by CAS and artillery in Engagement Areas Snake and Tiger.
- Neutralize reconnaissance air defense artillery (ADA) and engineer assets. Suppress armor medium targets.
- Position one battery forward to support Engagement Area Snake. Be able to range Phase Line Mace.
- Mass artillery in Engagement Area Tiger and along Phase Line Arrow.
- On order, shift artillery deep to engage the second echelon forces as they enter Engagement Area Tiger.

Figure 3: Example of Clear Brigade Fire Support Guidance.

These leaders fail to realize that MTP standards don't include safety time. Time spent by battery leaders to ensure that firing is safe at the NTC is more time units are "out of action" for fire support.

The average time for a battery to occupy a position and be ready to fire at the NTC is 42 minutes—timed from the first howitzer stopping in position until the FDC safely processes a fire mission. Maneuver commanders often question why the artillery can't deliver what it promised and become distressed or lose confidence in their artillery. We need to advertise our real-world capabilities—but always train to beat our best times.

Another weakness in our training is we don't emphasize the S3's role in fire support. There's a tendency to relegate fire support planning to the FSO and fire support execution to the FSO and the battalion FDO. The S3 traditionally focuses on movement, communications and survival operations. But he needs to review the fire support

plan to understand the requirements and missions that he publishes in his Field Artillery support plan. The S3 has the right—the responsibility—to question fire support planning if portions don't make doctrinal or tactical sense.

When units begin to execute the plan, the S3 must stay current on the fires the battalion delivers. If he's current, then he can help the FSCOORD focus battalion fires to achieve success.

The S3 is key to CSS management during tactical operations and instrumental in the synchronization effort. The NTC will continue to focus on S3 training, and it'll be a subject for discussion in after-action reviews (AARs).

Conclusion

The suggestions in this article are meant to help commanders establish home-station training objectives. Operation Desert Storm proved you're great artillerymen. But even that honed edge developed by those who saw combat will dull as personnel turnovers wreak havoc on units. The NTC is here to help you keep that edge.

As the lessons of Desert Storm become common knowledge, the fire support teams at the NTC will be looking for ways to train units on their weaknesses. As units become more and more proficient in the areas currently needing emphasis, the NTC will identify others. The OCs always will wrench-up your NTC training—you wouldn't want it any other way.



Colonel Larry D. Aaron, until recently, was the Senior Fire Support Combat Trainer at the National Training Center, Fort Irwin, California, and had been for more than three years. He currently commands the 42d Field Artillery Brigade, Germany. He also commanded 2d Battalion, 35th Field Artillery, 24th Infantry Division (Mechanized), Fort Stewart, Georgia, and Headquarters Company, 197th Infantry Brigade, and B Battery, 2d Battalion, 10th Field Artillery, both at Fort Benning, Georgia. A graduate of the Army War College, Carlisle, Pennsylvania, he has served as a Gunnery Instructor at the Field Artillery School, Fort Sill, Oklahoma; G3 of V Corps in Germany; and in the Force Development Directorate of the Office of the Deputy Chief of Staff for Operations and Plans at the Pentagon. In addition, Colonel Aaron served two tours in Southwest Asia with UN and multi-national forces and one tour in Vietnam.



1-41 FA in Desert Storm: *A Test Bed for Doctrine and Equipment*

by Lieutenant Colonel John P. Floris

The 1-41 FA traveled 275 miles during a 96-hour period, controlled the fires of a reinforcing FA battalion (2-17 FA, 155-mm, self-propelled) and coordinated the positioning and fires of the 212th FA Brigade (2-18 FA, 203-mm, self-propelled and 3-27 FA, multiple launch rocket system, or MLRS). The 212th FA Bde was the Force Artillery Headquarters for the 1st Brigade for much of the ground war.

The FA fired 2,104 rounds of mixed munitions in support of 1st Brigade operations during the conflict. FA fires were executed in a timely and accurate manner with effective results. We fought hard over great distances, under adverse weather conditions and under fire.

The combat facts and lessons learned outlined in this article are based on the 1-41 FA's seven-month deployment in support of Desert Shield and Storm. Our operations provided excellent opportunities to examine equipment and doctrine in a desert environment during combat operations. However, it must be noted that the circumstances of both

The 1st Battalion, 41st Field Artillery (1-41 FA), part of the 24th Infantry Division (Mechanized) Artillery, was deployed in Operations Desert Shield and Desert Storm from August 1990 until March 1991. An M109A2 howitzer, 3x8 battalion, the 1-41 FA was in direct support (DS) of the division's 1st Brigade. We entered the ground phase of combat in Desert Storm on 24 February as part of the 24th Division's attack to secure the Euphrates River valley lines of communication (LOCs).

Desert Storm and the 24th Division are indeed unique. Any lesson's impact on doctrine must be weighed within the context of its unique circumstances.

10 Days Before the Attack

The 1-41 FA occupied Tactical Assembly Area (TAA) Victory, approximately 10 kilometers south of the Iraqi border in the north central portion of Saudi Arabia,

10 days before the ground war. (See Figure 1.) We continuously rotated the forward positioning of batteries to support the 1st Brigade's cross-border reconnaissance operations.

On 22 February, Task Force (TF) 4-64 Armor (AR) scouts located an enemy air defense artillery (ADA) site. Battery A/1-41 FA was positioned well forward along the Iraqi border and adjusted suppressive fires to support the seizure and destruction of the ADA site with fires adjusted

by the TF scouts. Battery B/1-41 FA quickly repositioned along the Iraqi border to support the mission but wasn't required to engage enemy targets as elements of TF 4-64 AR quickly overran the site. On 23 February, Battery C/1-41 crossed the Iraqi border with a company team from TF 4-64 and penetrated approximately 20 kilometers to support the scouts' limit of advance. Battery C was the first division artillery unit to cross the border into Iraq.

G-Day—Initiation of the Attack

The 1-41 FA (-) crossed the border into Iraq at 1245 on 24 February following TF 4-64 AR. We moved 15 kilometers into Iraqi territory, occupied a position area and supported the 1st Brigade seizure of its initial objectives. No missions were fired as there was no enemy contact; 100 percent of our vehicles and equipment successfully occupied the initial position.

The battalion was in position approximately two hours, conducted refueling operations and continued movement north over rocky terrain following TF 4-64 AR in a brigade box formation. We traveled in a battalion wedge with batteries in column formation, moving north to secure the next 1st Brigade objective, Objective Red.

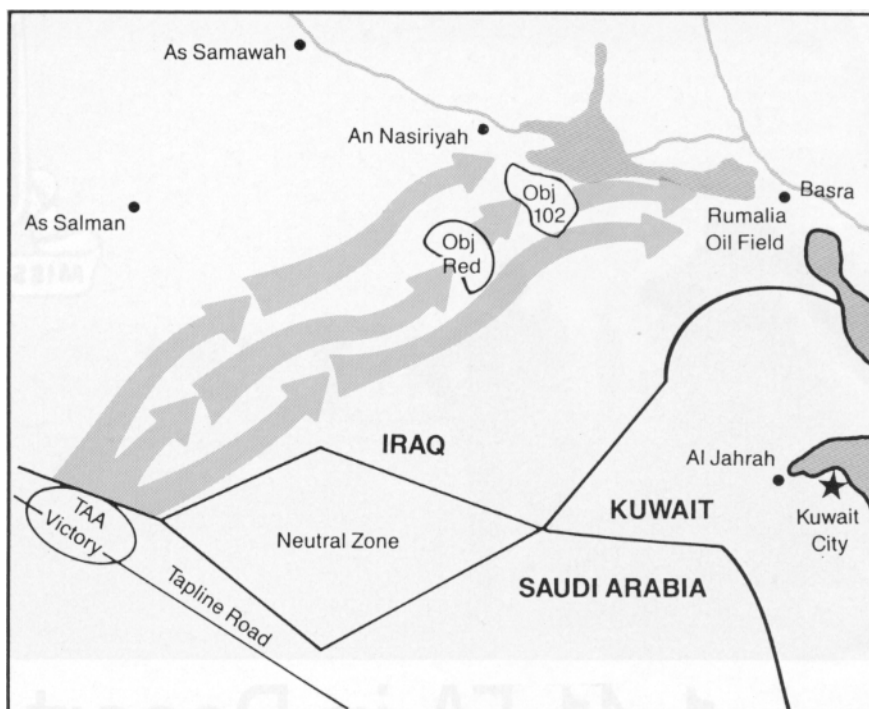


Figure 1: The progress of 1-41 FA during Operation Desert Storm with the 24th Infantry Division from the battalion's TAA through two objectives to the Rumalia Oil Field, its cease-fire position.

Attack to Seize Objective Red

The 1-41 FA moved rapidly as part of the 1st Brigade box formation. On 25 February, the brigade halted to refuel; we

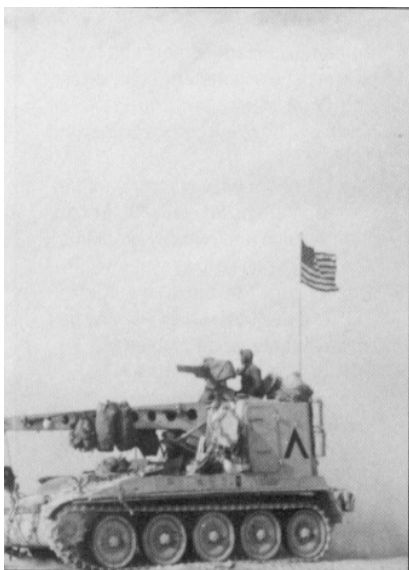
had moved an estimated 175 kilometers at that point. In the vicinity of Objective Red, the 1-41 FA received a mission to fire on dismounted Iraqi infantry. We fired coordinated illumination, observed and adjusted by a TF 2-7 Infantry (IN) scout. Fire-for-effect (FFE) rounds resulted in the suppression and ultimate surrender of a dismounted reinforced Iraqi infantry company. We then displaced forward to occupy a position for preparation fires on likely enemy avenues of approach. At that time, the 212th FA Brigade assumed the force FA headquarters responsibility with the 2-17 FA reinforcing the 1-41 FA.

Attack to Seize Battle Position 102

On 26 February, the battalion attacked from Objective Red to Battle Position 102 in a brigade box formation. The attack was initiated by a 30-minute preparation on enemy positions by 155-mm, 203-mm and MLRS fires. We continued to travel in a wedge formation by battery columns, but sandstorms limited our visibility and resulted in slow and deliberate movement. Numerous wheeled vehicles and trailers bogged down, which later had to be recovered under the direction of the battalion executive officer.



The "Glory Battalion"—1-41 FA's guns ready for action in Desert Storm.



A recovery vehicle supporting the 1-41 FA moves into the Euphrates River valley.

The battalion attacked to seize Battle Position 102 with 23 of 24 howitzers. Incoming mortar and artillery rounds were encountered short of the battle position, so we conducted a hasty occupation and initialized and aligned our attached Q36 Firefinder radar to acquire enemy indirect fire systems. The Q36, supporting the 2-17 FA, was positioned forward to provide additional support. After occupying the positions, the battalion and supporting FA fired numerous counter-fire missions to silence enemy indirect fire systems.

The 1-41 FA, 2-17 FA and 212th FA Brigade then executed preparation fires in support of the brigade attack to seize the battle position. The 1-41 FA massed fires on numerous other targets as acquired by the attached Q36 radar and OH58D observation helicopters from the 24th Aviation Brigade. These fires destroyed at least two Iraqi artillery battalions, ADA sites and numerous wheeled vehicles and dismounted infantry. Our combat power remained 23 of 24 howitzers as the recovery efforts to retrieve wheeled vehicles continued at a rapid pace.

After seizing Battle Position 102, the battalion conducted refueling operations and initial ammunition resupply, primarily rocket-assisted projectiles (RAP). During the early morning of 27 February, OH58D pilots under the cover of darkness and with limited illumination



Mounted on a HEMTT, the battalion's TACFIRE shelter crosses the Saudi border into Iraq.

targeted and executed the fires of 1-41 FA to destroy enemy dismounted soldiers and a wheeled vehicle convoy north of the brigade objective.

Additionally, we captured and processed several hundred Iraqi enemy prisoners of war (EPWs) and treated many enemy wounded who had been caught in US artillery fires.

Attack East to the Rumalia Oil Field

On 28 February, the battalion displaced across Highway 8 following TF 2-7 IN to destroy enemy forces west of the Rumalia Oil Field, executing preparation

fires on the enemy. We also fired numerous counterfire targets in an intense artillery battle lasting nearly two hours. The 1-41 FA was credited with neutralizing two Iraqi D-30 FA battalions during the exchange.

The battalion then repositioned and executed preparation fires on two Iraqi Republican Guards Forces Command (RGFC) infantry brigades as supporting 212th FA Brigade assets engaged numerous deep targets. Refined enemy targets were refired throughout the early morning hours by the battalion and the 212th Brigade, employing the destructive fires of its MLRS battalion and 2-18 FA.

A Presidential cease fire was declared at 0500 hours on 1 March 1991 following a one-hour artillery preparation by the entire artillery force. Intermittent incoming artillery fires continued on 1 March, which we responded to with massed fires that quickly silenced the Iraqi guns.

Rumalia Oil Field Causeway Attack

On 2 March, scouts from TF 2-7 IN identified a division-sized enemy column attempting to cross the Rumalia Oil Field Causeway. Elements of the column fired rocket-propelled grenades (RPGs) on our forces, and a battle ensued. The 1-41 FA and 3-27 FA (MLRS) massed fires on



An Iraqi field gun that "doesn't make it" during Operation Desert Storm.

the leading edge and flanks of the enemy column in an attempt to halt its movement. Our 155-mm and MLRS dual-purpose improved conventional munition (DPICM) fires were accurate in blocking the enemy's movement, and neutralizing fires resulted in enemy forces' abandoning much of their equipment along the causeway. FA fires were instrumental in halting the enemy for complete destruction by the brigade direct-fire assets and AH-64 Apache helicopters of the aviation brigade.

Division battle damage assessment (BDA) as a result of this effort included 24 T-72 Soviet-made tanks, 7 T-55 Soviet-made tanks, 43 Soviet-made infantry fighting vehicles (BMPs), 15 Soviet-made reconnaissance vehicles (BRDMs), 34 artillery pieces, 5 Soviet-made armored personnel carriers (MTLBs), 377 trucks, 40 utility vehicles, an air defense weapon (ZSU-23-4), 9 Soviet-made multiple rocket launchers (BM-21s) and one French-made armored personnel carrier (AMX-10). A permanent cease fire was declared 3 March at 1530 hours.

Lessons Learned

The 1-41 FA learned a great deal in Operation Desert Storm. Training during National Training Center (NTC) rotations at Fort Irwin, California, and Operation Desert Shield were extremely helpful in preparing us for combat.

Based on several combat observations (see Figure 2), we drew lessons for equipment and doctrine considerations.

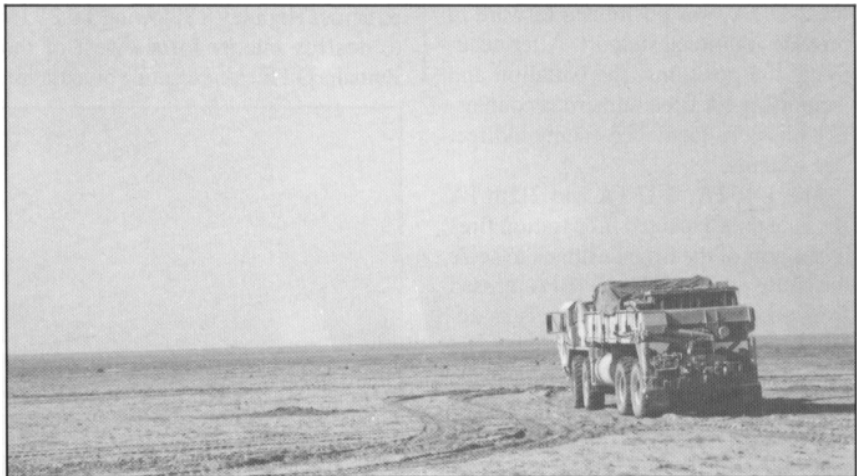
In an offensive battle of this nature, the brigade FSE must collocate with the brigade TACs rather than the TOCs. This places the brigade FSO and his variable format message entry device (VFMED) forward to clear and control fires. For the very same reason, battalion FSOs must fight out of their maneuver battalion TAC or TOC rather than collocating with TF commanders. Such configurations ensure quick, timely and accurate fires initiated at the FIST level.

TACFIRE must be mounted on a HEMTT. We did, and had no mobility problems over rough terrain, maintaining digital communications even on the move. But a 100-amp generator kit must be installed as part of this configuration for continuous operations.

The M548 and FIST-V must be replaced by modern systems designed to keep

- Our FA never was outrun by the M1 tanks and M2 Bradley fighting vehicles, which often moved 25 to 30 miles per hour across open terrain.
- The 1-41 FA completed combat operations with 23 of 24 howitzers operational.
- The battalion operated as batteries rather than by platoons.
- The Q36 Firefinder radar was one of the most critical assets on the battlefield. The Q37 radars were unavailable because of maintenance and mobility problems.
- Fires were planned digitally by the tactical fire direction system (TACFIRE) and executed by voice communications, the latter because of the distances involved. Because of the pace, fire support teams (FISTs) weren't consistently in position to observe fires.
- The fire support team vehicle (FIST-V) couldn't keep up with the M1s and M2s. It maintained a high operational readiness rate because the division commander gave it maintenance priority.
- TACFIRE kept up because the 1-41 FA mounted the shelter and one 15-kilowatt generator on a heavy expanded-mobility tactical truck (HEMTT) that towed the second 15-kilowatt generator.
- Ammunition management and resupply weren't problems. The battalion carried more than 5,000 rounds in 24 howitzers, 24 M548 cargo carriers and 20 HEMTTs.
- The M548 couldn't carry its full ammunition payload without severe maintenance and mobility problems.
- The global positioning system (GPS) and long-range aid to navigation (LORAN) devices worked well and had limited maintenance problems.
- DPICM and RAP were the 1-41 FA's combat munitions of choice.
- For much of the operation, the brigade tactical operations center (TOC) couldn't stay up with the lead maneuver forces, thus, removing the brigade fire support officer (FSO) from the fight. The DS battalion commander had to serve as fire support coordinator (FSCoord) and FSO. The brigade fire support element (FSE) collocated with the brigade tactical command post (TAC) to solve this problem.
- Fire missions were preparations, counterfire or observed fires directed by maneuver scouts, OH58Ds or FA observers and voice cleared by the FSCoord linked with the battalion FSO in contact with observers.

Figure 2: The 1-41 FA Combat Observations During Desert Storm.



Launchers of 3-27 FA (MLRS) fire in the distance while a HEMTT carrying ammo moves toward the front lines.

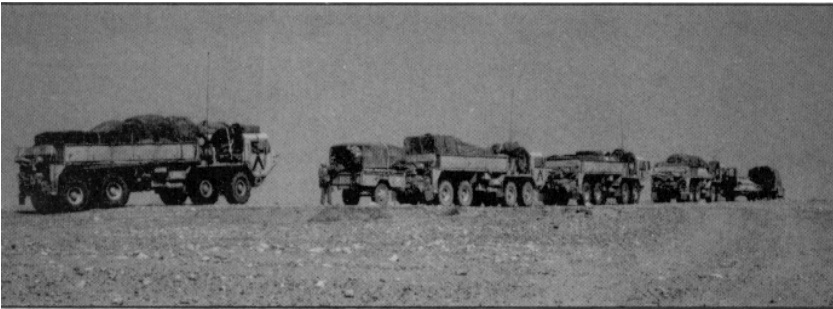
pace with the M1 tanks and M2 Bradleys. Although the M548 and FIST-V were effective during the war, they simply were unable to sustain the pace required of this operation. The M548 should be replaced by the combat ammunition transport vehicle (CATV) or HEMTT and the FIST-V replaced by either the M113A3 armored

personnel carrier or M2 type chassis configured with a ground/vehicular laser locator designator (G/VLLD) and targeting station. Another option that should be considered is to fit the high-mobility multipurpose wheeled vehicle (HMMWV) with kevlar armor protection.

By contrast, the M109A2 howitzer performed



1-41 FA executes fires in Iraq during Desert Storm.



Ammo Dogs "Making It Happen" in Desert Storm.

superbly and kept pace with the M1/M2-equipped brigade.

The GPS and LORAN proved invaluable for desert navigation. We need one GPS for each FIST, combat observation lasing team (COLT) and firing battery platoon leader.

The GPS-9 also was excellent for survey section operations. Seldom did a satellite window close with the system tracking. The GPS-9 provided the battalion a common source for location, and we rotated two different master stations forward in sector for common direction. The position and azimuth determining system (PADS) was effective and dependable during battle.

The Q36 radar was an overwhelming success, yet it had some difficulties with desert mobility. The Q37 radar was never involved in the fight due to mobility and maintenance problems. Both radar systems should be mounted on 900 series 5-ton trucks to improve their mobility. In addition, the same series 5-ton truck should serve as the secondary mover to tow the 15-kilowatt generator trailer assembly.

DS FA battalions need two M-88 recovery vehicles for their battalion maintenance sections. The M578s aren't

powerful enough for track recovery, particularly for the M109A2 howitzer in the desert environment. This also would permit the flexibility of placing one M578 with each battery while maintaining a battalion-level heavy recovery capability.

We didn't conduct independent platoon operations in Iraq. Consolidation of platoons into battery operations maximized command and control, security, movement and execution of timely fires. Platoons never traveled more than 500 meters apart during the conflict and operated with one platoon fire direction center (FDC) hot and one cold. Thus, 24-hour operations were sustained with great effectiveness.

The battalion traveled well in the desert employing non-standard FA movement formations. Rather than moving in a column conducting deliberate occupations, we moved much like the Armor and Infantry in a tactical battalion diamond with batteries in a platoon wedge. Movement was fast, survivability increased and the battalion easily conducted hasty occupations. The 1-41 FA routinely occupied and was safe to fire in less than eight minutes while still meeting the criteria for accurate, predicted fire.

DPICM and RAP, the combat munitions of choice, proved to be highly effective. EPWs pleaded with US forces to halt the "Artillery Rain" (DPICM and RAP). The accuracy of both munitions was excellent.

Charge 7 Red Bag (RB) propellant was very effective. We derived Charge 7 RB muzzle velocities in training before the war, and this paid huge dividends in accuracy during battle.

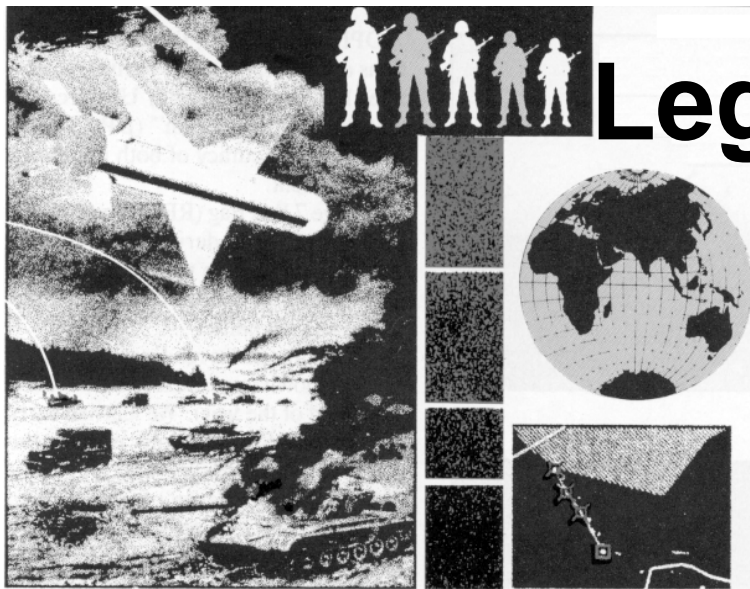
The maintenance readiness rate of the M109A2 howitzer was excellent (23 of 24 at the end of the war). We learned early in Desert Shield that preventive maintenance checks and services (PMCS) alone weren't enough. The system requires long periods of operation in the desert to learn how to maximize the capabilities of the diesel engine and major end items and educate drivers in desert operations.

Early in the deployment, we conducted weekly long-distance road marches over rough terrain to exercise the systems. This stress-tested the system and identified problems that could have affected operations during the combat.

In conclusion, the soldiers of 1-41 FA performed their mission in the greatest spirit of the FA. Their commitment to excellence and sense of professionalism made the difference. Our equipment worked well—some of it much better than advertised. This success largely can be attributed to an aggressive training and maintenance program refined at the NTC and perfected in the Saudi desert during the months leading up to the war.



Lieutenant Colonel John P. Floris is a student at the Army War College, Carlisle Barracks, Pennsylvania. Until recently, he commanded the 1st Battalion, 41st Field Artillery, 24th Infantry Division (Mechanized), Fort Stewart, Georgia. He returned from Saudi Arabia with the battalion after participating in Operations Desert Shield and Storm. Lieutenant Colonel Floris has served with the Joint Chiefs of Staff in Washington, D.C. as a Strategic Policy Planner and in the Office of the Deputy Chief of Staff for Operations and Plans (DCSOPs) at the Pentagon as a Force Integration Action Officers. He also was a Battery Commander and Assistant G3 with the 56th Field Artillery Brigade (Pershing) in Germany and a Battery Commander in the 2d Battalion, 37th Field Artillery, III Corps Artillery, Fort Sill, Oklahoma.



Legal Mix VII

Directions for the Field Artillery

by Major Mark B. Wroth

Legal Mix VII is the latest in a series of Department of the Army (DA)-directed studies by the Directorate of Combat Developments (DCD) at the Field Artillery School (USAFAS), Fort Sill, Oklahoma. Its purpose is to examine the FA's "system of systems" and recommend changes in light of sweeping changes in the threat, the imminent fielding of "smart" (fire and forget) munitions and the drawdown of the armed forces. Directed in the summer of 1990, the DCD study team will present its major conclusions to DA this month.

This article describes the major trends in weapons, missions and organizations that appear to be the future direction of the Artillery.

Dominance of Precision Munitions

In our changing environment, the FA must be organized and equipped to fight as part of a combined arms team in a wide range of contingencies within a reduced force structure. This imposes several imperatives on the force, one of which is exploiting the potential of precision munitions.

Fires will dominate the battlefields of the future, and precision munitions will be at the forefront. Based on computer modeling analyses and the results of Operation Desert Storm, the ability to accurately attack and kill high-value/high-payoff targets, both close and in depth, is an invaluable edge for the force. Further, it makes decisive victories possible with relatively few friendly

casualties. The advent of precision munitions, coupled with other advanced technologies, has been characterized as a revolution in warfare; recent experience bears that out.

Reconnaissance, intelligence, surveillance and target acquisition (RISTA) and command, control, communications and intelligence (C³I) are critical for fire support. The ability of shooters to strike lethally is wasted if we can't acquire targets whose defeat advances the mission. This requires top-quality intelligence to understand the enemy, superb target acquisition to provide accurate locations and sufficient resolution for target attack, and the command and control to "put it all together."

While these aren't new requirements, to take advantage of the extended range and lethality of precision weapons, we

must drastically increase our ability to see and control the battlefield. The need to improve the force targeting capabilities becomes even more critical on the nonlinear battlefield of the future.

Controlling the radio-electronic spectrum is essential to having effective RISTA and C³I. For intelligence gathering, command and control and targeting, the electromagnetic spectrum is critical, with protecting our own command and control system only part of its criticality. With the increasing importance of targeting for long-range fires, we must be able to freely use many parts of the spectrum. Similarly, the enemy's use of the electromagnetic spectrum could make us vulnerable, particularly when we face a technologically sophisticated threat.

Expanding Mission

The roles and missions of the military in general and the FA in particular have undergone a "sea-change" during the past few years—not a radical departure, but a series of shifts. This shifting isn't finished. Changes in roles and missions from the national military strategy down to individual section tactics are likely to continue during the next few years.

Our national military strategy has shifted from a policy of having *forward deployed* forces to contain the Warsaw Pact to having primarily continental US (CONUS)-based forces to *project power* for worldwide contingencies. This shift is important to the FA for several reasons. First, the threat has changed from a focus on the Warsaw Pact in central

Operational Level

- Armies will be smaller and employed on a nonlinear battlefield.
- Battles will be fought to destroy enemy forces, not seize and retain terrain.
- US forces will project power in contingencies worldwide, primarily from CONUS.
- US will have an operational intelligence advantage over the vast majority of threats we could face.
- Wars will be short and violent.

Tactical Level

- High survivability is a must.
- Smart, indirect-fire munitions will dominate the battlefield.
- The counterfire requirement is more critical than before.
- We must conclude engagements rapidly.

AirLand Operations Operational and Tactical Trends.

Europe to many potential regional threats. Next, the shift in posture from forward deployment to power projection increases our emphasis on deployability. Third, planning for regional contingencies rather than "World War III" results in our increased emphasis on keeping conflicts short and minimizing friendly casualties.

Aircraft	War	# of Bombs
B-17	WW II	9,000
F-84/F-105	Korea/Vietnam	176
F-117	Desert Storm	1

By Aircraft, a Comparison of the Number of Bombs Required to Destroy Like Targets in Various Wars (Source: USAF, 1991). In the case of the F-117, its bombs were precision munitions.

The traditional mission of the FA—"To destroy, neutralize or suppress the enemy with cannon, rocket, and missile fires and to help integrate all forms of fire support into combined arms operations"—also is shifting. Emerging technologies tremendously increase in our ability to *destroy* enemy military forces and to do so at vastly greater ranges than ever before. Combined with more emphasis on minimum friendly casualties, our increased lethality expands the role of fires at the tactical and operational levels—indeed, changes how we'll fight at all levels.

At the same time, the enemy will be increasing his lethality, making his destruction by our fire support systems even more important in the future. An enemy equipped with precision munitions (whether locally produced or bought on the world arms market) could inflict unacceptable losses on US forces if allowed to use his fire support system effectively.

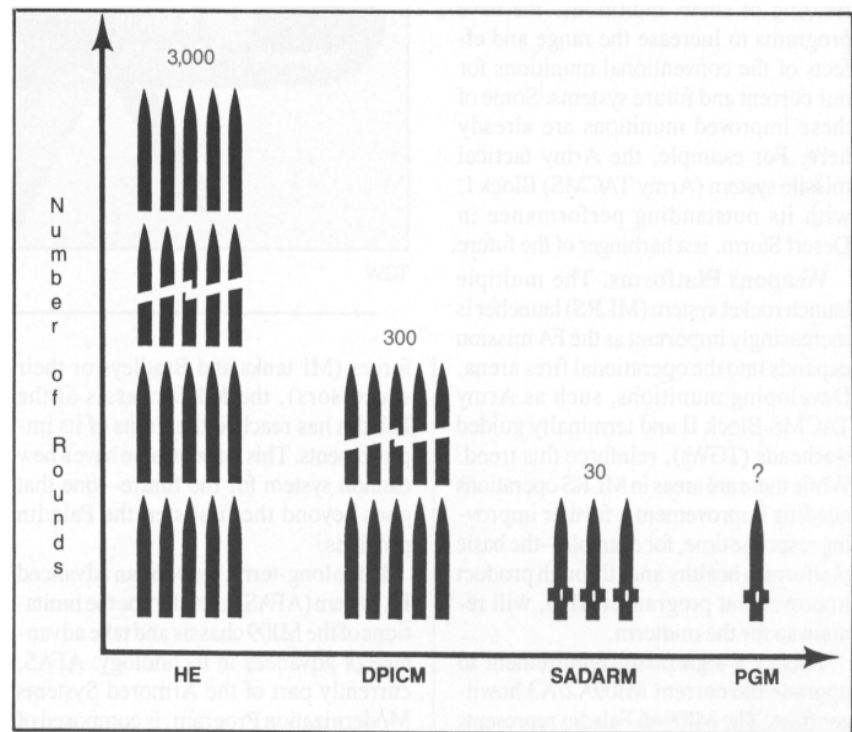
Precluding enemy effectiveness won't be an easy task. We must increase our range and accuracy and expand our ability to exploit "shoot and scoot" tactics. To knock out a sophisticated enemy's fire support system will require an integrated attack of his target acquisition means, command and control assets and firing platforms.

The Enemy Redefined

Changes in Europe decrease the probability of a war between the West and the East. However, such a war would be, if anything, more demanding in the wake of Conventional Forces in Europe (CFE) Agreement force reductions. The Soviet

Union's long-term investment in military research and development allows it to reduce its forces yet greatly improve the overall quality of its smaller force, even in the face of economic problems. While it appears that the likelihood of a central European conflict is considerably lessened, we can't disregard the potential intensity of such a war because of "intentions."

Major regional contingencies, traditionally thought of as mid-intensity conflicts, may be very intense. The size of forces and proliferation of advanced artillery systems worldwide (including surface-to-surface missiles) means that many contingencies could become major wars. Given the profit motive of countries selling high-tech arms, some contingencies may well involve facing an enemy with precision weapons. In fact, precision weapons may become more important than the already proliferating nuclear and chemical arsenals. This seems especially likely considering that the Soviet Union has had an aggressive weapons development program and now needs hard cash in staggering amounts.



The impact of precision guided munitions (PGM), based on the number of rounds required to destroy an artillery battery. Though we don't know the exact impact of PGMs on future battlefields, we do know it will be significant. Starting with high-explosive (HE) rounds and moving through dual-purpose improved conventional munitions (DPICM) and the developmental sense and destroy armor (SADARM), the number of rounds required to destroy a battery already have reduced dramatically.

At the same time, the dominance of well-equipped, well-trained and well-led forces in conventional warfare and the increasing costs of fielding such forces make unconventional warfare more likely in many parts of the world. While fire support plays an important role in unconventional warfare and low-intensity conflict, the FA faces its greatest challenge in mid- and high-intensity conflicts. Accordingly, most of this discussion focuses on those two kinds of conflicts in conventional war.

Impact on Troops

The dominance of precision weapons and the implications of that dominance drive the construction of the force. This is true of the entire force but particularly true for the FA.

Munitions. Munitions development is the most obvious area where advanced technology is transforming equipment capabilities. As programs come to fruition, the FA will be able to attack and destroy enemy forces across their array in depth.

A major part of this ability will be the fielding of smart munitions. We have programs to increase the range and effects of the conventional munitions for our current and future systems. Some of these improved munitions are already here. For example, the Army tactical missile system (Army TACMS) Block I, with its outstanding performance in Desert Storm, is a harbinger of the future.

Weapons Platforms. The multiple launch rocket system (MLRS) launcher is increasingly important as the FA mission expands into the operational fires arena. Developing munitions, such as Army TACMS Block II and terminally guided warheads (TGWs), reinforce this trend. While there are areas in MLRS operations needing improvement—further improving response time, for example—the basic platform is healthy and, through product improvement programs (PIPs), will remain so for the midterm.

There's a significant requirement to upgrade the current M109A2/A3 howitzer fleet. The M109A6 Paladin represents a major upgrade of our cannon fleet. It's also valuable as a transitional weapon; its improvements, including "shoot and scoot" and extended range, greatly enhance our force capabilities in the near and midterm. However, when compared to the fighting vehicles of our ground



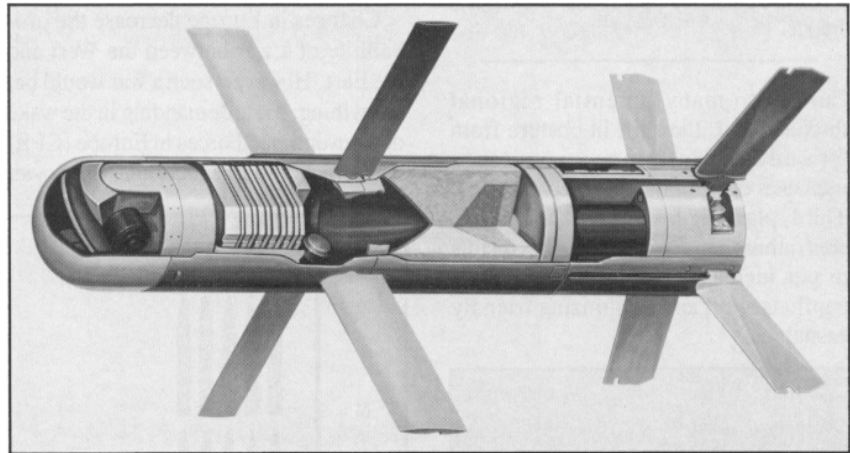
MLRS



Paladin



Army TACMS



TGW

forces (M1 tanks and Bradleys or their successors), the M109 chassis of the Paladin has reached the limits of its improvements. This mandates we have a new cannon system for the future—one that goes beyond the first step the Paladin provides.

In the long-term, we need an advanced FA system (AFAS) to overcome the limitations of the M109 chassis and take advantage of advances in technology. AFAS, currently part of the Armored Systems Modernization Program, is composed of a cannon (AFAS-C), a companion future ammunition resupply vehicle (FARV) and a logistics system to expeditiously upload the FARV.

While ensuring our ability to provide fires for the heavy forces is essential, our emerging national military strategy also

places a premium on the ability to deploy a highly capable force by air. The demand for increased effectiveness in a rapidly deployable fire support system has triggered several initiatives.

A lighter weight, wheeled version of the MLRS launcher, capable of firing the entire MLRS family of munitions (MFOM), will provide the much-needed firepower for air deploying forces. In particular, the high-mobility artillery rocket system (HIMARS) can provide that capability for a force deploying by C-130 aircraft, while the M270 MLRS launcher cannot.

The current 105-mm howitzer family of munitions fails to maximize the contribution of the new M119 howitzer. Fielding a dual-purpose improved conventional munition (DPICM) for the 105-mm howitzer along with an improved



General Dynamics

An artist's rendition of 155-mm precision-guided munitions hitting enemy tanks on a future battlefield.



HIMARS Testing. In April, the Field Artillery School tested the HIMARS concept by launching MLRS rockets from a truck bed at White Sands Missile Range, New Mexico.

rocket-assisted projectile (RAP) will substantially improve its effectiveness as a direct support (DS) weapon; the longer range fires and mix of munitions provided by lightweight 155-mm howitzers will complement the fire support package. In addition, developing a close support weapon capable of autonomous, shoot and scoot operations and air lift by tactical aircraft (fixed and rotary wing) would offer significant advantages.

There are also indications that non-traditional artillery weapons systems can play significant roles in the future. A fiber-optic guided missile, for example, offers significant payoffs under some circumstances and may be a way to achieve weapons performance similar to the delivery of brilliant munitions. (Brilliant munitions, as compared to smart, go

one step further; you can select specific targets, such as a type of vehicle, and fire and forget them.)

In a less exotic application of technology, there are payoffs for increasing the range of our cannon and rocket systems. But the value of that increased range depends on both the threat array and the availability and contribution of other longer range missile systems, such as missiles. Similarly, there are payoffs for increasing the Army TACMS range and developing new warhead options.

RISTA and Electronic Warfare Implications

As much as intelligence is needed for the force to direct its actions, RISTA is absolutely essential to the fire support

system as a primary source of targeting. As the increasing range and lethality of fire support weapons make more attack options available to the force commander, timely targeting—including the intelligence needed to decide *what* to target—becomes more critical to the force. In the past, the artillery's "closed-loop" systems (such as forward observers and counterbattery radars) provided much of the fire support system's target acquisition, but in the future, intelligence and electronic warfare (IEW) systems will have to provide more of the target acquisition.

Systems such as the joint surveillance target attack radar system (JSTARS) offer a glimpse of the future for target acquisition. However, by itself, no single platform can meet all the force's target acquisition needs. To be successful in AirLand Operations, we must have an integrated system of acquisition and fusion assets capable of both observing the movement of tactically significant forces and providing timely targeting data for those elements selected for attack.

Even the first part of this—seeing tactically significant forces in near real-time—is an intelligence capability that tactical and operational level commanders of the past could only dream of. Extending this capability to target high-payoff elements is a still more difficult task. However, these tasks appear achievable, provided the requirements are pursued vigorously.

Coupled with enhanced target acquisition capabilities must be a robust C³ system to deal with the volume of targets generated and the extremely rapid processing required to engage fleeting targets. The C³ system and the target acquisition systems will make unprecedented demands on the electromagnetic spectrum—demands vital to the success of the force.

Organizational Refinements

The design of the future FA is not based on radically different principles than those of today. However, the ongoing changes in doctrine and technology do have some organizational impacts.

The most obvious change is in fire control. Technical fire control (the actual computation of firing data) will be largely decentralized, usually to the firing platform. The role of the fire direction center (FDC)—better described as the "fire control and operations center"—in technical computations will be generally limited to managing the information

required for accurate fires and massing. An example of this would be meteorological data. At the same time, our increased use of automation will allow us to shift more of the tactical fire control function to the supported command post (CP), principally at the fire support element (FSE).

Artillery unit command and control will more closely parallel armor and infantry command and control as the dispersion of our forces and the increased threat on a nonlinear battlefield make the challenge of synchronization even greater.

All these trends imply that the FA CPs will have to be smaller, more mobile and more concerned with maneuvering and protecting their firepower assets than with computing firing data.

The best prototype for artillery organizations of the future may well be the current MLRS battery and battalion. The battery has several small (three- or four-launcher) platoons with some capability for independent operations grouped in one unit. The battalion offers long-term training and the command, control and sustainment needed in both peace and war. This organization is flexible enough to operate dispersed in the high-counterfire threat environment of central Europe or to consolidate into the "wedge" formation of Desert Storm. In combat, artillery and ground combat assets may be cross-attached to provide highly mobile and survivable combined arms task forces.

Brigade. The brigade of the future will be similar to today's armor or infantry brigade, but its battalions will habitually fight together rather than being task organized for each operation. Each combined arms brigade will require an FA DS battalion. This battalion still needs to habitually train and be employed with the other members of its combined arms team. The principal focus of the DS battalion will still be to provide close support for its brigade—the close fires needed to win the close battle. Hence, the battalion's leadership, organization, training and equipment must be closely integrated with the combined arms force, and it must be immediately responsive to fire support needs of the brigade.

Operational Fires

- Planned and executed for campaign objectives.
- Focus on targets that allow us to seize and retain the initiative.

Tactical Fires

- Planned and executed for tactical objectives.
- Focus on targets that immediately impact on the battle.
- Are closely integrated with the action of the ground forces.

The Definition of Operational and Tactical Fires in AirLand Operations. Though fires at the operational and tactical levels are complementary, they're different in scope and application.

Division. Fires in support of the division will continue to be controlled by the division artillery (Div Arty) headquarters. Just as today, the Div Arty will ensure the division fire support team is prepared for war and has the command and control assets and target acquisition means to orchestrate the massive firepower available to the division. The fires of three to four battalions (usually a mixture of cannon and MLRS units but dominated by MLRS) will support the division's fight. These units and any non-divisional headquarters that control them should habitually train and be employed with the same division but retain the flexibility to support other divisions, as required.

FA brigades will be organized, trained and equipped to augment the division's fires, focusing on the tactical deep mission and, usually, will serve as the counterfire headquarters. In addition, the FA brigade must be able to reinforce the fires of the DS battalions. It also may be assigned to reinforce a corps armored cavalry regiment's artillery.

Corps. Each corps will control an FA brigade of three to five MLRS battalions. In contrast to the division's FA brigade, this brigade will be organized, trained and equipped primarily to conduct operational and corps supporting fires—with all the communications requirements, munitions mix and employment doctrine those entail.

Although these organizations are similar to those in the force today, they're designed to dramatically increase the

firepower of our smaller force and facilitate the expanded role of fires in AirLand Operations.

Conclusion

Future armed conflict will be dominated by fires with highly capable firing platforms and precision munitions attacking targets anywhere, anytime, on the nonlinear battlefield. The "battle" for control of the electromagnetic spectrum will be critical in determining victory.

At first glance, these factors seem to paint a vision of war as a soulless, mechanical collision between arrays of machines. As powerful as this vision is, it's fundamentally wrong.

War is a conflict between people; machines are tools in that conflict. To win the wars of the future, the Army and the FA must have highly skilled, motivated and sustained soldiers, who are superbly led by tactically and technically competent professionals. With the tremendous amplification of the individual made possible by automation, long-range intelligence systems and smart, lethal munitions, the role of the soldier in battle becomes even more crucial. We must give future Redlegs the best tools to ensure victory and safeguard our nation.

The Legal Mix VII Study has touched on the improvements we must make in the artillery force as we move into the closing years of the 20th century. From fielding smart munitions to advanced command and control systems, there are a myriad of things we must do. Whether we like it or not, the world is changing. It's our responsibility—our duty—to deal with that change in the face of the constant requirement for national defense.

Major Mark B. Wroth is a Team Leader on the Legal Mix VII Study in the Directorate of Combat Developments at the Field Artillery School, Fort Sill, Oklahoma. His previous assignments include serving as B Battery Commander and Battalion Fire Direction Officer for the 1st Battalion, 27th Field Artillery, 4th Infantry Division (Mechanized), Fort Carson, Colorado; and the Battalion Fire Direction Officer, B Battery Executive Officer and a Fire Support Team Chief in the 2d Battalion, 78th Field Artillery, 1st Armored Division, Germany. Major Wroth also was an Assistant Professor of Mathematical Sciences at the US Military Academy at West Point.

Field Artillery Bulletin Readership Survey

To ensure we continue to meet your needs, we ask you take a few minutes to fill out this survey and return it to us. You can mail it to us through your unit mail room. Thank you.

1. What is your current military status?

<input type="checkbox"/> Active	<input type="checkbox"/> Reserve	<input type="checkbox"/> Civil Servant
<input type="checkbox"/> Retired	<input type="checkbox"/> Army	<input type="checkbox"/> Allied
<input type="checkbox"/> National Guard	<input type="checkbox"/> Marine	<input type="checkbox"/> Other _____

2. What is your current grade?

<input type="checkbox"/> E-1 to E-4	<input type="checkbox"/> W01 to CW4	<input type="checkbox"/> O-7 to O-10
<input type="checkbox"/> E-5 to E-6	<input type="checkbox"/> O-1 to O-3	<input type="checkbox"/> Civil Service Grade _____
<input type="checkbox"/> E-7 to E-9	<input type="checkbox"/> O-4 to O-6	<input type="checkbox"/> Other _____

3. Of the last six issues published, how many have you read?

<input type="checkbox"/> None	<input type="checkbox"/> 3-4
<input type="checkbox"/> 1-2	<input type="checkbox"/> 5-6

4. What do you usually do with Field Artillery after reading it?

<input type="checkbox"/> Pass it on to a friend.	<input type="checkbox"/> Keep it for reference.	<input type="checkbox"/> Throw it away.
--	---	---

5. How useful do you find the material in **Field Artillery**?

<input type="checkbox"/> Very	<input type="checkbox"/> Somewhat	<input type="checkbox"/> Not very
-------------------------------	-----------------------------------	-----------------------------------

6. Which features have you found interesting?

<input type="checkbox"/> On the Move (CG's Column)	<input type="checkbox"/> Redleg Reviews (Book Reports)	<input type="checkbox"/> Right By Piece (Unit Reports)
<input type="checkbox"/> Incoming (Letters)	<input type="checkbox"/> Interviews	<input type="checkbox"/> Redleg News (Items of Interest)
<input type="checkbox"/> View from the Blockhouse (From the School)	<input type="checkbox"/> Fire For Effect (Senior Leaders Speak Out)	<input type="checkbox"/> Not familiar enough to say

7. One of **Field Artillery's** objectives is to provide an open forum for Redleg discussions. Is **Field Artillery** meeting this objective?

Yes No If "No," please comment: _____

8. We want to help you do your job in the field. Are we?

Yes No If "No," please comment: _____

9. What would you like to see more of in Field Artillery?

<input type="checkbox"/> Maneuver commanders' vision of fire support.	<input type="checkbox"/> Battery/Battalion-level articles on operations/fire support coordination.
<input type="checkbox"/> Joint Operations.	<input type="checkbox"/> Interviews or articles by senior leaders.
<input type="checkbox"/> Articles defining the future of the Army/FA.	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Articles on new equipment	

10. What recommendations could you make for improving the quality of the content, appearance or effectiveness of **Field Artillery**?

11. Additional comments: _____

Cut along dotted line, fold in half and mail.



Please fold here.

DEPARTMENT OF THE ARMY
Field Artillery Bulletin
U.S. Army Field Artillery School
Directorate of Training and Doctrine
Fort Sill, Oklahoma 73503-5600

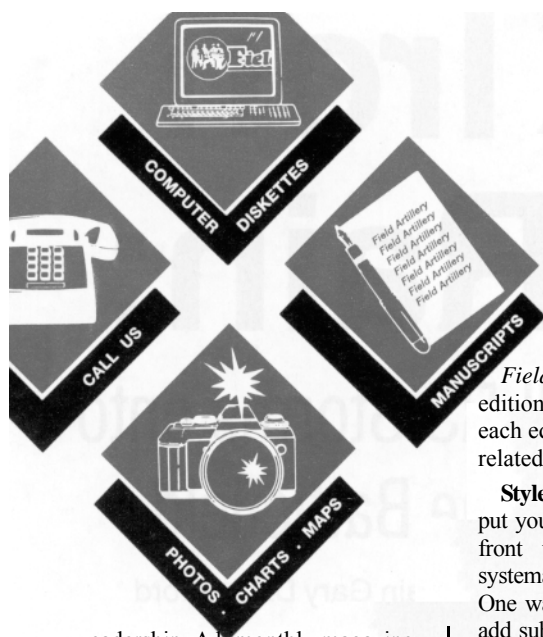
OFFICIAL BUSINESS

ATSF-DFB

Field Artillery
Post Office Box 33311
Fort Sill, Oklahoma 73503-0311

Please tape here.

1992 *Field Artillery* Author's Guide



Readership. A bimonthly magazine, *Field Artillery* is the professional journal for US Army and Marine Corps Redlegs worldwide. Approximately 40 percent of our readership is battery-grade, both officer and enlisted, with the remaining 60 percent more senior Army and Marine personnel, DoD civilians, retirees, members of other branches and services, Allies, corporate executives and our political leaders.

Subjects. We accept articles on subjects related to the tactical, operational and the strategic levels of war as long as the contents affect the *Field Artillery* or are of special interest to our readers. But the majority of our articles address issues at the tactical level.

If an author is writing about the past, he should analyze the events and show how they are applicable to *Field Artillery* today—not just record history. If he's identifying current problems, he must propose solutions. In addressing the future, he should clearly explain his points and their implications.

Since its founding in 1911, one of *Field Artillery's* objectives has been to serve as a forum for professional discussions among the *Field Artillery* Community. Therefore, an author's viewpoint, recommendations or procedures don't have to agree with those of the Branch, Army or DoD. But his article's contents must be logical, accurate, address disadvantages as well as advantages (as applicable), promote only safe techniques and procedures and include no classified information.

Field Artillery has a theme for each edition, but we're not theme-bound. In each edition, we have several articles not related to the theme.

Style. Write clearly and concisely and put your thesis statement (bottom line) up front with the body of your article systematically contributing to your thesis. One way to check your organization is to add sub-heads throughout your article and see if the sequence of your points is logical and contributes to your thesis. Be specific about your points, giving an example when possible.

When writing, always keep in mind your readers, many of whom are not in the Army or Marines—even the military. When using an acronym, spell it out the first time you use it. When mentioning a new or rare concept, system or technique, briefly explain it, even if it isn't your main point.

Submissions. Include—

- A clean, double-spaced, typed, unpublished manuscript of no more than 3,000 words with footnotes and bibliography, as appropriate. If possible, send a Macintosh disk (3 1/2-inch preferred) or IBM disk in ASCII text format with the hard copy of the manuscript.

Except in the case of Army-wide "news" items, please do *not* submit a manuscript to *Field Artillery* while it's being considered elsewhere.

- A comprehensive biography, highlighting experience and training that credentials you as an author on your subject. Include your full name, current job, address and telephone number.

- Graphics with captions to illustrate and clarify your article. These can include black and white or color photographs of any size (no Polaroids, please), drawings, slides, maps, charts, graphs, unit crests or symbols, etc.

By the dates listed in the figure, send your manuscript, biography and graphics to—

Field Artillery
P.O. Box 33311
Fort Sill, Oklahoma 73503-0311

The *Field Artillery* staff will edit all manuscripts and put them in the magazine's style and format. In addition, we'll staff selected articles to subject matter experts to check them for accuracy, safety and classified information. Authors will receive a "check copy" of the edited version before publication. If you have questions, feel free to call the Editor or Managing Editor at AUTOVON 639-5121 or 6806 or commercial (405) 351-5121 or 6806.

1992 *Field Artillery* Themes

Publication Date	Themes	Copy Deadline
February	Targeting	7 Oct 91
April	FA Readiness for Contingency Ops	2 Dec 91
June	FA Logistics	3 Feb 92
August	History Contest	*Contest: 3 Feb 92 Other: 6 Apr 92
October	Training to Win	1 Jun 92
December	Red Book: Annual Report	3 Aug 92

*1992 US Field Artillery Association History Writing Contest Rules are on Page 5 of the August 1991 edition.



Iron Rain:

MLRS Storms onto the Battlefield

by Captain Gary D. Langford

the left and then slightly back to the right in a strange, macabre dance as if vying for some kind of positional advantage over an unseen foe. As she came to rest and the last of the dust settled around her, the shrill whine of her turbine engine rang out across the vast expanse of open desert. The large square box on her back rose slowly, menacingly, and then slewed off to the right side where it finally stopped and settled into position.

Inside her metal hull, her brains, the three crew members of the multiple launch rocket system (MLRS), rapidly yet meticulously went through their battle drill. Staff Sergeant Hollingsworth, the section chief, smiled with pride as the crew he had trained reacted instinctively. The gunner, Sergeant Nor-by, hovered over the fire control panel (FCP). He concentrated fully on the small computer interface that allowed him to bring to bear the awesome firepower of one of the Field Artillery's newest and most lethal weapon systems. Simultaneously Specialist Ontiveros, the driver, continued to ready the launcher for firing operations. Within a matter of minutes, the battle drill was over. "GhostWarrior," the crew's affectionate nickname for its launcher, was laid and ready.

Outside, the desert morning calm disintegrated into a swirling, violent maelstrom of sand and fire as GhostWarrior erupted in a dazzling blast of light and billowing smoke, shrouding her from sight. The first of 12 long, sleek rockets sped down range, chased by a glowing ball of light — a thin, smoky finger of death stretching across the cloudless sky. Again and again, she hurled rockets at her enemies until, finally, she had fired the 12th down range to do its deadly damage.

Her still-smoking tubes fell silent, and the large box on her back turned and sank back to its original position on her frame. Then the first of the low rumbles, much like thunder, were heard on the horizon. With that distant thunder came the rain—the *Iron Rain*.





An MLRS rocket roars down range to ruin Iraqi soldiers' day.

The Persian Gulf War, if nothing else, will live in our memories as a world-class live-fire exercise and test bed for America's latest generation of weapons. Despite the Iraqi Army's best attempt at armed conflict, the US forces' overwhelming superiority in technology, doctrine and training and the individual excellence of our soldiers reduced the fight to little more than a rout and headlong pursuit.

The MLRS represents the technological superiority we enjoyed and played a decisive role in the conflict. It's ability to bring massive firepower rapidly to a point on the battlefield is the living essence of the Field Artillery's mission in combat.

Before Operation Desert Storm, critics claimed the system wasn't accurate at extended ranges, was unreliable and would be unable to haul its own ammunition. The most severe critics cautioned the system might fail in combat.

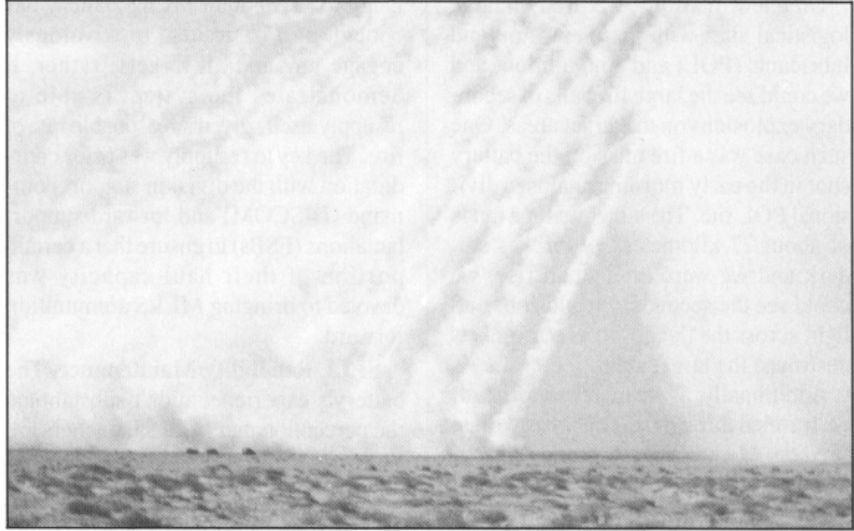
This article provides information and facts that demonstrate the worth of the MLRS system. The information presented comes directly from the combat actions and experiences of A Battery, 94th Field Artillery (A/94 FA), the divisional separate MLRS battery of the 1st Armored Division Artillery (Div Arty).

The Fight

During the span of the conflict with Iraq, A/94 FA was attached to 4-27 FA (MLRS). The battalion was minus one of its organic firing batteries (Charlie Battery), which was supporting the 2d Armored Cavalry Regiment (ACR).

In the war, A/94 FA fired just over 600 rockets on 59 missions and traveled more than 250 miles. We had two launchers that developed not-mission-capable (NMC) faults, both repaired in under 30

CPT Gary D. Langford



All nine A/94 FA launchers fire 12 rounds on a time-on-target against enemy command posts and logistical bases in the 1st Cav Division sector. The battery put 108 rockets down range in 60 seconds.

minutes. These malfunctions occurred with the launcher-loader module (LLM). We encountered no significant mechanical or carrier problems during the war. The experiences of the other two firing batteries in 4-27 FA were similar to that of A/94 FA in terms of number of rockets and missions fired, miles traveled and self-propelled loader launcher (SPLL) NMC failures (predominantly LLM failures).

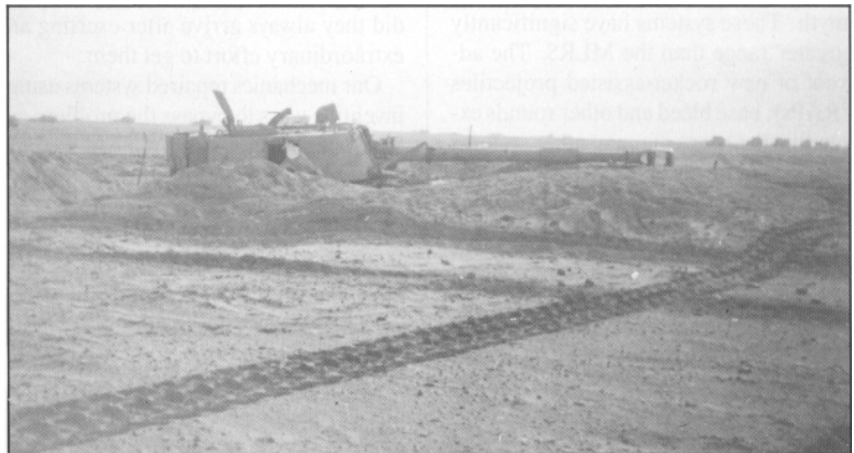
Lessons Learned

Accuracy. Critics claimed the MLRS is inaccurate and, therefore, ineffective at extended ranges (greater than 25 kilometers). The battery fired the vast majority of its missions (about 80 percent) at ranges of between 27 and 30

kilometers. Despite the lack of a complete battle damage assessment (BDA) of every mission, we had many indicators testifying to the accuracy and effectiveness of the MLRS.

Hard BDA, of course, is always the best indicator. On several missions the MLRS fired on targets more than 25 kilometers away preceding an attack by AH-64 Apaches or A-10 Warthogs. The air assets verified the burning vehicles and secondary explosions caused by the MLRS fires. For example, on 27 February 1991, an observer reported a formation of 65 enemy tanks, and we shot a "FireStrike" at the formation. As the Apaches went in, they reported 25 to 30 burning armored vehicles.

CPT Gary D. Langford



Iron Rain Results. An Iraqi 2S3 152-mm howitzer damaged by MLRS bomblets.

On a few missions, we fired on large logistical sites with petroleum, oil and lubricants (POL) and ammunition, and we could see the large fireballs of secondary explosions on the target areas. One such case was a fire mission the battery shot in the early morning against a divisional POL site. The target was at a range of about 27 kilometers. As it was still dark and we were on a small rise, we could see the secondary explosions and light across the flat desert as our rockets destroyed the target area.

Additionally, as we marched forward, we traveled through several areas we had fired on. Many of the command and control sites, artillery positions and logistical sites we drove through were littered with MLRS rocket motors and some dud bomblets. After climbing up on a few of the 2S1, 2S3 and D-30 artillery pieces, it was easy to tell they had been hit by MLRS dual-purpose improved conventional munitions (DPICM). Again, the MLRS fired most of these targets at near maximum ranges.

The last, and probably the greatest, indicator of the system's effectiveness were the stories of "Iron Rain" told by Iraqi prisoners of war—their nickname for MLRS. Even the British Broadcasting Company (BBC) reported that "MLRS firepower was so intense that those Iraqi soldiers who survived surrendered en masse."

Range. For some time now, the 30-kilometer MLRS range was touted as a major advantage of the system. It would allow us to stand off and "duel" with the enemy's artillery. But the prospects of dueling with the Iraqi GHN45 or G5, both howitzers, or the Astros multiple rocket launchers (MRLs) shattered this myth. These systems have significantly greater range than the MLRS. The advent of new rocket-assisted projectiles (RAPs), base bleed and other rounds extending the range of many other systems has rapidly eroded the MLRS' advantage. If MLRS is to continue to be the Army's main counterfire and deep-target killer, we need to increase its range to 50 or 60 kilometers.

Ammunition Haul Capacity. Bottom line—the MLRS organic ammunition haul assets can carry a lot of ammunition. Despite the fact we shot a relatively high volume of missions and densely saturated the target areas, we only shot about two-thirds of our basic load. This is not to

say that an MLRS battery has enough of a basic load to frivolously engage any and all targets; rather, it demonstrates the system is able to resupply itself, given a reasonable rate of fire. The key to resupply was prior coordination with the division support command (DISCOM) and forward support battalions (FSBs) to ensure that a certain portion of their haul capacity was devoted to bringing MLRS ammunition forward.

SPLL Reliability/Maintenance. The battery's experience didn't substantiate the perception that MLRS launchers are "too hard to maintain" and "break at the drop of a dime." The unit initially did experience severe difficulties with the launchers. Several factors, however, contributed significantly to the problems: the equipment sat on ships for more than a month; repair parts were not available; direct support (DS) maintenance activities weren't fully operational; and the desert environment required modifications to preventive maintenance checks and services (PMCS). After a two-week desert hardening, however, the equipment ran extremely well, and we experienced very few maintenance problems. Our worst maintenance problems centered around three areas: availability of repair parts and unit prescribed load list (PLL) items, the stabilization reference package/position-determining system (SRP/PDS) and the short/no-voltage tester (SNVT) system and MLRS DS repairmen (MOS 27M).

Availability of repair parts was *abysmal*. The myth that you'll get whatever you need in combat was simply not true. In Southwest Asia (SWA), things just didn't magically appear; nor did they always arrive after exerting an extraordinary effort to get them.

Our mechanics repaired systems using inventive ways to bypass the problem or fabricated items. An example of the latter is when one section chief used launcher ablative putty to repair a huge hole (the size of a bowling ball) in a fuel tank. In another example, section chiefs and mechanics used Super glue and tape to hold fragile parts together, such as elevation resolver couplings.

These examples aren't to point out the difficulties or shortcomings of establishing a divisional support base; rather, they emphasize the importance of preparing in peacetime to sustain combat operations with limited logistical support

for an extended period. Our success in this area is due to two things: unit PLL and inventiveness.

The unit PLL is absolutely critical to survival and goes far beyond maintenance management review (MMR) statistics, such as zero-balance percentages. A unit PLL should be consciously tailored to support its major weapon systems for extended periods.

Inventiveness also was essential to our success. The collective inventiveness and "quick repairs" made by crews throughout the theater need to be collected and formatted into a new "Battle Damage" manual for the MLRS system. As time passes, we'll forget several of the hasty techniques that worked. Unit leaders should document these techniques now and submit them to the Tank Automotive Command (TACOM) and Missile Command (MICOM) for future use. Units also should capture these techniques in maintenance standing operating procedures (SOPs).

The only two components we experienced severe problems with were the SRP/PDS and SNVT. The SRP problem stemmed solely from the inability of the line-replaceable unit (LRU) to be repaired by anyone short of *God*. The SRPs had to be evacuated to Europe or the US for repairs. Poor repair turnaround times and the low availability of SRPs could have created severe problems had it not been for our high PLL stockage of this item.

The SNVT system, on the other hand, has major design problems. The SNVT continually failed and required replacement, along with the cables (W17 and W19) that run along the bottom of the LLM to the launcher pod containers (LPCs). The whole system is too exposed to the heat and blast of the rockets to function properly. The SNVT system and the cables need to be insulated better from the effects of the rocket blasts. Fortunately, the 27Ms and our section chiefs found ways around the SNVT problem.

Ablative Panels. The ablative panels don't melt in your mouth, nor in your hands—nor in 10 minutes on the back of the launcher. The new titanium panels are fantastic and a clear move in the right direction. We had six launchers equipped with titanium plates (2d and 3d Platoons) and three launchers equipped with the old neoprene panels (1st Platoon).



CPT Gary D. Langford

A/94 FA fires a mission in Iraq while on the move (27 February).

The platoon without the titanium panels shot the most rockets. It had very few problems with the neoprene panels, which only required small patchwork repair with ablative putty. Multiple firings didn't even scratch the titanium panels. The moral of the story: if you have titanium panels, that's great; if not, you should not "pull your hair out" worrying that the launchers are going to melt into puddles of molten aluminum before you can apply more putty.

Basic Loads. If, as a commander, you haven't given much time to analyzing your basic loads, you have committed a grave error. This, in part, goes back to preparing for sustained operations without support—basic loads of food, fuel, POL, water, etc., become extremely important.

Don't trust that the last commander reviewed it all and "did it right." Chances are, things have changed enough to merit your thorough review. Take water, for example. How many commanders have inventoried their unit's water-haul capacity, SOPs and load plans (where are you carrying all that water) and computed their unit's basic load of water? In our preparation for deployment to SWA, our water-haul capacity was a major deficiency.

Even if your unit is designated to fight in Europe, water isn't guaranteed. Enemy actions or nuclear, biological, chemical (NBC) agents can easily destroy or contaminate water sources. Additionally, water is bulky and heavy. Commanders should take a good look at their water supply status and other basic loads.

MLRS DS Repairmen. There has been a long-standing debate over the ideal location for the 27M DS repairmen. We've repeatedly argued in favor of attaching the 27Ms to the unit, and the DISCOM has repeatedly rebuffed that concept. Our experience in SWA undisputably

argues for attaching 27Ms to the MLRS units.

When we first arrived in theater, we had two 27Ms with the unit. It took nearly a month to get the entire nine-man team assembled and under unit control. During this month, we had our most serious maintenance problems. Had the entire team been attached to the battery, they would have been available with all their equipment to help repair the systems.

On the other hand, 4-27 FA's 27Ms had been attached to the battalion for a long time. Overall, they were more skilled and better integrated, and they understood the unit and its SOPs better than our battery's 27Ms. The individual quality of any one 27M isn't the issue. The 27Ms in 4-27 FA had the time with the unit to identify system problems across the battalion; they knew particular quirks that specific systems seemed to have; and they were much more intimately involved in teaching and inspecting LLM PMCS than in our separate battery. All these factors equated to better service by the battalion's 27Ms and less down-time for their SPLs.

As time progressed, the entire maintenance team was attached to the battery, and the level of proficiency and integration of the our 27Ms dramatically improved. This only can be attributed to the increased amount of time they spent with the crews on the systems. The support battalions that own the 27Ms must realize that attaching these personnel to MLRS units is absolutely vital to their success.

Training Issues

Our experience in the deserts of SWA demonstrated the overriding importance of realistic training. I think back on my home-station live-fire exercises in a heavy division and as a commander in the Grafenwoehr Training Area (GTA) in

Germany and realize how woefully inadequate those exercises were for training us for our war missions.

In Europe, there are severe limitations on MLRS training. The most significant problem is at GTA. The extremely small size of the training area, coupled with unrealistic safety constraints, preclude even minimal training of the system (i.e., employment, maneuver, etc.). A maneuver rights area (MRA) exercise was much more effective for MLRS training.

Live-Fire Massing. The current one-launcher-at-a-time method of live fire for MLRS launchers doesn't replicate combat reality. MLRS must practice massing during live-fire situations. In the continental US (CONUS), there are few excuses for not exercising mass missions. Most large installations have the resources to fire platoons of MLRS and practice live-fire massing the system.

Unfortunately in Europe, I had to use GTA for live-fire exercises. Firing Point 274, a postage-stamp-sized firing point, is the only firing point on GTA where MLRS is allowed to fire. This made massing the system under live-fire conditions impossible. Europe must find a training area that will allow MLRS units to fire as massed elements.

During the missions fired in the desert, the battery and platoon fire direction centers (FDCs) quickly learned to use back-up launchers, if they were available, during "At my command" (AMC) and "Time on target" (TOT) missions. Often one platoon would be firing a FireStrike while the other two were sitting idle. The battery FDC would select another platoon to compute the mission and prepare to fire. In the event that one of the primary launchers in the original platoon was unable to fire due to a malfunction or a crew error, a secondary launcher in the reserve platoon was ordered to engage the target.

Obviously, we couldn't use this technique for every mission; however, it proved extremely effective on the missions for which we did use it. We had to order launchers in the reserve platoon to shoot on four occasions. Most involved synchronization with air assets that were on station. Without a back-up launcher already sitting on the firing point with a computed solution and ready to lay, it would have been impossible to fire on time.

The last major training issue is firing procedures while on the move. This is an absolutely vital task, and we should add it to every MLRS battery mission-essential task list (METL). It's especially important during offensive operations on the modern armored battlefield.

The 1st Armored Division moved an average of 54 miles a day during the four-day war. This more than doubled the movement rates of other historic "blitzkrieg" campaigns, such as Rommel's North African Campaign. This type of movement requires mobile, agile artillery support, which the MLRS is well-suited to provide. The technique we used to fire these missions was sometimes different from the typical hipshoot you envision whenever one mentions shooting on the move.

For example, on the second day of the ground war, the division G2 received targeting information on an Iraqi MRL battery sitting along the flank of the division's axis of advance. None of the division's assets were in a position to attack the target, and critical air assets were already employed elsewhere. The Div Arty received the mission and assigned it to 4-27 FA, which subsequently assigned it to A/94 FA. Because the target was approximately 15 kilometers beyond our maximum range, we engaged it using a hybrid of an MLRS raid and hipshoot. We selected a firing area within range of the target, assigned the mission to a platoon (not a launcher) and directed the platoon to move to the firing area. (We selected the platoon on the same flank of the division as the target.) The platoon assigned the mission to a primary and secondary launcher. The launchers then performed the first computation of the mission. All this happened digitally while they were moving. When the platoon closed on the firing area, it stopped, performed the final computation and engaged the target.

I called this "hybrid" because it contains critical elements of both the MLRS hipshoot and raid. Much like a hipshoot, the time to plan and execute the mission is extremely compressed and occurs while on the move; the general concept employed is "pull off the road and shoot." However, identical to an MLRS raid, you select a unit (platoon) to engage the target, select a firing area (versus a single point) and a safe route, determine where and when the unit will

rejoin the main body and send survey support with the platoon.

In my experience, this mission was unique to SWA. Yet in a fluid, mobile situation such as offensive operations, it's essential to be able to fire on deep targets located along your route with minimum planning time and while on the move.

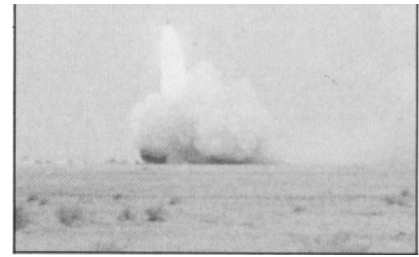
Separate Battery vs. Battalion

Combat experience in Iraq has made me favor the Army's employing MLRS as battalions, not separate batteries. Aside from the obvious difference in firepower, employing MLRS by battalions is more effective.

If you put three—even four—MLRS separate batteries under the control of a Div Arty, they would be less effective than one MLRS battalion. Why? You gain a synergistic effect in a battalion for several reasons. First, and probably foremost, is the staff support. The battalion staff can lift a tremendous amount of the logistical burden off the battery commander's shoulders. The staff's ability to draw assets from less-committed elements, the increased degree of expertise it has and the number of its people with rank to "make things happen" allow the staff to solve logistical problems. This often leaves the battery commander free to lead and fight his firing elements. Conversely, the separate battery, to a large extent, must rely on junior officers and enlisted soldiers to accomplish the same missions.

The theory that the Div Arty staff will act as the separate battery's "battalion staff" isn't realistic. The Div Arty staff, despite heroic efforts, simply can't run an entire Div Arty and play staff to a separate MLRS battery. While they're often forced to help with major survival issues, anything less usually doesn't warrant Div Arty involvement.

Mentorship is also an important aspect of employing MLRS as a battalion versus as a separate battery. By level of responsibility, a battalion commander has a better view of a battery commander and more time to devote to his development than a Div Arty commander has. Fortunately, I was blessed with two excellent Div Arty commanders, Colonels John A. Dubia and Vollney B. Corn, Jr., who took the time to teach me. But this isn't always the case.



At Al Busayyah, A/94 FA fires a mission against Iraqi commando battalions.

Another extremely important benefit of being in a battalion is "idea sharing." Inevitably, you learn a tremendous amount from other batteries. You also have several other battery commanders to give you a "reality check" when contemplating implementing a new concept or system. This idea sharing occurs at all levels—from the battery commander to the youngest soldier.

For these reasons, battalions, not separate batteries, are the more effective and efficient organization for MLRS units. It would have been significantly more difficult to operate alone in SWA than it was as part of a battalion.

Summary

MLRS has come of age. She has proven herself in combat, demonstrating her fires are effective and accurate at short and long ranges. Her launchers are reliable, and she can support herself in sustained operations.

Her value in combat can now be measured by the number of smoking carcasses of enemy vehicles on the desert plains of Iraq and the low number of casualties our forces had while assaulting "MLRS prepped" objectives.



Captain Gary D. Langford commanded A Battery, 94th Field Artillery, 1st Armored Division, during Operations Desert Shield and Storm. He's currently a Dwight D. Eisenhower Fellow at the US Military Academy, West Point, working on a master's degree. His other experience includes serving as a multiple launch rocket system Platoon Leader and Battery Executive Officer (XO) and 8-inch howitzer Battery XO with the 1st Battalion, 13th Field Artillery, 24th Infantry Division (Mechanized), Fort Stewart, Georgia, and Target Analyst, Assistant Fire Support Coordinator and S1 of the 1st Armored Division, Germany.

Formal and Support Channels of Communications



A strong chain of command in peace creates success on the battlefield. The overwhelming combat success of Operation Desert Storm was a direct result of a strong chain of command—from the President on down to the private. Officers and NCOs communicated with each other and focused on the problem at hand: liberating Kuwait and taking care of soldiers. Together, they ensured orders were simple and made sense and that all understood them.

Brigadier General Creighton W. Abrams, commander of VII Corps Artillery during Desert Storm, succinctly clarified the chain-of-command difference between commanders and other officers and officers and NCOs. he said, "Commanders have responsibilities and prerogatives that only they can execute. Officers who are not commanders can issue lawful orders but don't have commanders' prerogatives and responsibilities.

"NCOs are in the chain of command in the sense they can issue lawful orders. Section chiefs are somewhat unique. They are the only ones 'in charge' of the section, the ones who give most of the orders, instructions, advice, etc."

There's always some discussion as to why we have two channels of communications: the formal chain of command and the NCO support channel. The figure helps illustrate the relationship between the officer-NCO channels, and I've used it many times as a training tool. This model is based on several assumptions, the first of which is the definition of "chain of command." It's a two-way communications channel for issuing orders, solving problems and passing information.

It's a continuous chain, flowing from the lowest to the highest levels and highest to lowest or can start anywhere in between. The formal chain of command and the NCO support channel is like a ladder. It has parallel lines of communications connected at precise intervals, allowing communication between the commander and his NCO at each level.

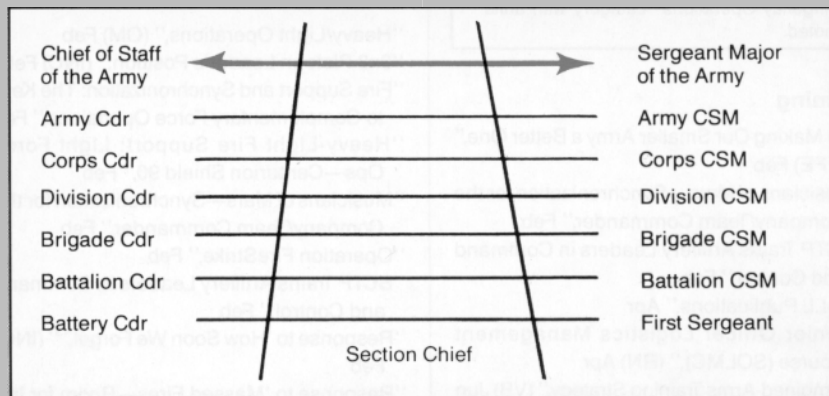
The second assumption is that the chain of command works best when orders are issued, problems are solved and information is passed at the lowest possible level. This allows the chain to be most efficient.

Third, both the officer and NCO channels of communication at each level are most effective when they focus on the issue at hand. "No stone is left unturned" until the problem is solved, correct information is passed and the right order given and understood.

The final assumption involves the strength of those on the ladder. The chain is as weak as its weakest link. If communications between any officer with another officer or NCOs within their channel is poor or nonexistent, that channel suffers exponentially. Simultaneously, if the channels don't communicate clearly and frequently across the steps of the ladder, the entire chain on both sides suffer. It causes unnecessary delays and frustration.

This model helps to dispel the assumption by some—officers and NCOs alike—that there are only officers in the chain of command, it also helps clarify the purpose of this ladder: **maximum communications for making the most of the total organization.**

CSM Harold F. Shrewsberry
Commandant, NCO Academy
Fort Sill, OK



Model of the Channels of Communications. Information passes up and down both the formal and officer chain of command and the NCO support channel of communication. Critical to a most effective Army, officers and NCOs must communicate across each step of the ladder. At the lowest level of the Field Artillery ladder, the section chief has relatively remarkable independence—and responsibility.

February 1991

April 1991

June 1991

August 1991

October 1991

December 1991

1991 Redleg Reference

The following is a list of articles and selected items from "On the Move" (OM), "View from the Blockhouse" (VB), "Incoming" (INC), "Redleg News" (RN), "Right by Piece" (RBP), "Redleg Review" (RR) and "Fire for Effect" (FFE) appearing in **Field Artillery** during calendar year 1991. The entries are categorized by subject and listed chronologically by title and edition.

Unit Reports

- "Heavy-Light Fire Support: Light Force Ops—Centurion Shield 90," (10th Mtn Div Arty) Feb
- "A Light-Heavy TACFIRE Experience—Centurion Shield 90," (1-36 FA, 17th FA Bde) Feb
- "Field Artillery Training Center—Honduran Exchanges," (RBP) Apr
- "Inactivation: The Reality of Building Down," (5-15 FA, 7th IN Div Arty) Jun
- "Moving Into History: The Inactivation of 1-84 FA," (9th IN Div Arty) Jun
- "FA Fast-Track Program," (RBP) (FATC) Jun

Note: Reports from units in Operations Desert Shield/Storm are listed in the "Contingency Operations" category with units noted.

Training

- "On Making Our Smaller Army a Better One," (FFE) Feb
- "Musicians of Mars—Synchronization for the Company/Team Commander," Feb
- "BCTP Trains Artillery Leaders in Command and Control," Feb
- "CALL Publications," Apr
- "Senior Officer Logistics Management Course (SOLMC)," (RN) Apr
- "Combined-Arms Training Strategy," (VB) Jun
- "Soldier's Manual Update," (VB) Aug
- "FA Fast-Track Program," (RBP) Aug
- "Improving the Effectiveness of Artillery at the NTC," Aug
- "Mission Training Plans Update," (VB) Aug
- "Gearing Up To Train Paladin," (VB) Aug

- "Company Fire Support Operations," Oct
- "NTC: The Ultimate Training Experience," (An interview with BG Wesley K. Clark, former NTC Cdr), Dec
- "When It Becomes Routine, Wrench It Up," (NTC) Dec

Target Acquisition and Survey

- "Surveying Problems in Desert Shield," (INC) Feb
- "Tactical Teaser: Low-Intensity Conflict Fire Support Coordination," Apr
- "The Division Deep-Battle Targeting Cell: Thor's Hammer or Rube Goldberg Device," Apr
- "The Impact of Technology on Future Cannons," Aug

Doctrine and Tactics

- "Heavy/Light Operations," (OM) Feb
- "3x8 Platoon Leader's Position," (INC) Feb
- "Fire Support and Synchronization: The Keys to Complementary Force Operations," Feb
- "Heavy-Light Fire Support: Light Force Ops—Centurion Shield 90," Feb
- "Musicians of Mars—Synchronization for the Company/Team Commander," Feb
- "Operation FireStrike," Feb
- "BCTP Trains Artillery Leaders in Command and Control," Feb
- "Response to 'How Soon We Forget,'" (INC) Feb
- "Response to 'Massed Fires—Room for Improvement,'" (INC) Apr
- "Tactical Teaser: Low-Intensity Conflict Fire Support Coordination," Apr
- "Counternarcotics—The Army's Unique Challenge," Apr
- "Low-Intensity Conflict," (OM) Apr

- "Platoon-Based Firing Battery Operations," Apr
- "Command Post Integration or Staff Synchronization," Apr
- "Fire Support Deconfliction of Special Forces Operations," Apr
- "FA and LIC: An Overview," Apr
- "The Division Deep-Battle Targeting Cell: Thor's Hammer or Rube Goldberg Device?" Apr
- "FireStrike Anxiety," (INC) Jun
- "Change, Continuity and the Future Field Artillery," Jun
- "Another Response to 'Massed Fires—Room For Improvement,'" (INC) Jun
- "Reshaping the Field Artillery," Jun
- "The New Heavy Div Arty," Jun
- "Top-Down Fire Planning—Bottom-Up Refinement," (INC), Aug
- "Improving the Effectiveness of the Artillery at the NTC," Aug
- "State-of-the-Branch Address 1991," Dec
- "Legal Mix VII—Directions for the Field Artillery," Dec

Note: Doctrine and tactics are discussed in the Desert Shield/Storm articles listed in the "Contingency Operations" category

Redleg Reviews

- Eyewitnesses at the Battle of Stones River*, Feb
- Firepower in Limited War*, Feb
- Artillery 2000*, Apr
- Caissons Across Europe: An Artillery Captain's Personal War*, Jun

Personnel

- "FA Rangers Needed," (INC) Feb
- "On Making Our Smaller Army a Better One," (FFE) Feb
- "Junior Officers New Career Opportunity—Army Acquisition Corps," (RN) Feb
- "PERSCOM Field Artillery Enlisted Branch Update," (Reclassification 13M/13P MOS, MFOM Course, FA Airborne NCOs Needed and Nuclear Cannon Assembly Course Security Clearance) Apr
- "CSA Guidance on Soldiers' Career Progression, Desert Storm Vets or Not," Jun
- "Moving Into History: The Inactivation of 1-84 FA," Jun
- "Inactivation: The Reality of Building Down," Jun
- "Desert Storm, A Smaller Army and You: One Soldier's Philosophy," Jun
- "Change, Continuity and the Future Field Artillery," Jun
- "Reshaping the Field Artillery," Jun
- "State-of-the-Branch Address 1991," Dec
- "Field Artillery Commanders and Command Sergeants Major" (List of Bn and Above), Dec
- "Field Artillery Assignment Branches," (PERSCOM and ARPERCEN) Dec

Leadership

- "On Making Our Smaller Army a Better One," (FFE) Feb
- "Leadership from an Army Reserve Perspective," (FFE) Apr
- "Desert Storm, A Smaller Army and You: One Soldier's Philosophy," (FFE) Jun
- "Leadership," (A Colonel's Advice to Btry Cdrs) Aug
- "Will the Build-Down Allow Risk-Taking?" (INC) Aug
- "Formal and Support Channels of Communications," Dec

History

- "Pentomic Division of the Mid-1950s," (INC) Feb
- "Fire Support and Synchronization: The Keys to Complementary Force Operations," Feb
- "Response to 'Starting Off on the Right Foot,'" (INC) Apr
- "Nathan Bedford Forrest, A Redleg in Disguise," Apr
- "The Unsung Heroes: Redleg Advisory Efforts in Vietnam, 1965-1969," Apr
- "Historical Vignette: The Philippine Insurrection: Improvising in LIC," Apr
- "Operation Cobra Fire Support Equation: Organization + Flexibility = Victory," Aug
- "Nikolai Voronov and the Defense of Moscow: An Artillery Epoch," Aug
- "The Soviet OMG: Fire Support Lessons for AirLand Battle-Future," Aug
- "History Contest: Results and More" and "1992 History Writing Contest Rules," Aug

Equipment and Technology

- "A Light-Heavy TACFIRE Experience—Centurion Shield 90," Feb
- "TOE Update," (Changes Reflect Current Nuclear Operations, FA Nuclear Warhead Dets to Transfer to Ordnance and TOE Branch Address Change) (VB) Feb
- "Pershing—It Gave Peace a Chance," Feb
- "Army TACMS," Feb
- "Artillery Thirst for Voice and Digital Communications," (MSE, EPLRS and SINGARS) Feb
- "Reshaping the Field Artillery," Jun
- "TOE Update," (Moving Target Locating Radars Deleted from TOE and New Radio Remote Control Units not Compatible with TACFIRE Shelters) (VB) Jun
- "The Impact of Technology on Future Cannons," Aug
- "BCS Communications Cables for Version 9," (VB) Aug
- "Version 9 BCS-MDS Communications Interface," (VB) Aug
- "Blast Exposure Limits for the M119 and M198," (VB) Aug
- "State-of-the-Branch Address 1991," Dec
- "Legal Mix VII—Directions for the Field Artillery," Dec

Note: See Desert Shield/Storm articles in the "Contingency Operations" category.

Contingency Operations

- "True Grit," (Desert Shield) (INC) Feb
- "Response to 'How Soon We Forget,' (Just Cause) (INC) Feb
- "Surveying Problems in Desert Shield," (INC) Feb
- "Redlegs on the Front Line—Operation Desert Shield," (An Interview with BG Richard W. Tragemann, Former XVIII Abn Corps Arty Cdr) Feb
- "1st Cav Div Arty Reports from Operation Desert Shield," Feb
- "Victory Artillery in Operation Desert Shield," (24th IN Div Arty) Apr
- "Question: What Fire Direction Procedures Do Units Use without Maps?" (Desert Shield) (INC) Apr
- "Answer: Here are the Fire Direction Procedures to Use without Maps," (Desert Shield) (INC) Apr
- "The Lightning and Thunder of Desert Storm: Redlegs in the Gulf," (List of FA Units in Operation Desert Storm) Apr
- "Deception, Firepower and Movement: The 1st Cav in Desert Storm," (An interview with BG Tommy R. Franks, Former ADCM, 1st Cav Div) Jun
- "Desert Storm Letters Home," (INC) Jun
- "To Redlegs in Operation Desert Storm: Heroes One and All," Jun
- "Roadrunner Operations in Desert Storm," (5-18 FA, 75th FA Bde) Jun
- "Movement to Contact: Red Dragons in Operation Desert Shield," (3-82 FA, 1st Cav Div) Jun
- "Operation Desert Shield from an FDO's Perspective," (3-32 FA, 1st Cav Div), Jun
- "Desert Storm Safety," (INC) Aug
- "M198 Battery Occupation During an Overland Attack," (Desert Storm, 5-8 FA 18th FA Bde) Aug
- "MLRS in Operation Desert Storm," (1-27 FA, 42d FA Bde) Aug
- "In the Wake of a Storm: Improving the FA After Operation Desert Storm," (1st IN Div Arty) Aug
- "Fire Support 'Silver Bullets,'" (Desert Storm, 1st AR Div Arty) Oct
- "Artillery Raids in Southwestern Kuwait," (Desert Storm 5/11 Mar) Oct
- "Logistical Support for the FA Brigade," (Desert Storm, 75th FA Bde) Oct
- "Field Artillery Desert Facts," Oct
- "Myths and Lessons of Iraqi Artillery," Oct
- "Lessons from BattleKings in the Desert," (Desert Storm, 3-41 FA., 24th IN Div Arty) Oct
- "A View of the Storm: Forward Observations," Oct
- "Company Fire Support Operations," (Desert Storm, 3-41 FA, 24th IN Div Arty) Oct
- "On to War," (Desert Storm) Oct

- "Steel Rain—XVIII Airborne Corps Artillery in Desert Storm," Oct
- "100 Hours with Light TACFIRE," (Desert Storm, 142d FA Bde) Oct
- "The Lightning of Desert Storm," (101st Abn Div Arty) Oct
- "How to Cure the FIST-V Blues," (Desert Storm, 3-82 FA, 1st Cav Div Arty) Oct
- "Muzzle Velocity Management During Operation Desert Storm," (12th Mar) Oct
- "Operations Desert Shield and Storm: A Unique Challenge for the 18th FA Brigade (Airborne)," Oct
- "1-41 FA in Desert Storm: A Test Bed for Doctrine and Technology," (24th IN Div Arty) Dec
- "Iron Rain: MLRS Storms onto the Battlefield," (Desert Storm, A/94 FA, 1st AR Div Arty) Dec
- "Silhouettes of Steel," (Reports by US FA Div Arty and Corps) Dec
- "US Field Artillery Units Worldwide," (Map) Dec

On the Move Columns

- "Heavy/Light Operations," Feb
- "LIC—A Fire Support Challenge," Apr
- "Parting Thoughts: Focus on the Future," Jun
- "Staying on Target," Aug
- "FA On Target in the Storm," Oct



STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION			
1. Title of Publication		2. Issue Frequency	3. Date of Filing
Field Artillery		12	10/91
4. Complete Mailing Address of Known Office of Publication (Street, City, County, State, and ZIP+4)			
Editor, Field Artillery, P.O. Box 33311, Fort Sill, OK 73003-0311			
5. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not a Post Office)			
Commandant, U.S. Army Field Artillery School			
6. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not use M.F. or A.A. initials)			
Commandant, U.S. Army Field Artillery School, SGTAIN, Fort Sill, OK 73003-5000			
Editor, News and Current Events Editor			
Walt Gulin R., News Editor, Field Artillery, P.O. Box 33311, Fort Sill, OK 73003-0311			
Managing Editor, News and Current Events Editor			
Patricia S. Mullis, Managing Editor, Field Artillery, P.O. Box 33311, Fort Sill, OK 73003			
7. Owner (Do not check this box if owned by a corporation; if owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a partnership or other unincorporated firm, give its name and address.)			
Full Name Complete Mailing Address			
DEPARTMENT OF THE ARMY, Department of Defense			
8. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities (Do not check this box)			
Full Name Complete Mailing Address			
Name			
9. For completion by nonprofit organizations authorized to mail at Special Rate (USPS Form 3526) only. The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes (Do not check this box)			
10. Extent and Nature of Circulation (Give average number of copies each issue during preceding 12 months)			
a. Total No. Copies (Net Press Run)		b. Total No. Copies (Net Press Run)	
17,137		25,000	
c. Sales Through Dealers and Carriers, Street Vendors and Counter Sales		d. Sales Through Dealers and Carriers, Street Vendors and Counter Sales	
6,983		6,656	
e. Mail Subscriptions		f. Mail Subscriptions	
0		0	
g. Total Paid and/or Requested Circulation		h. Total Paid and/or Requested Circulation	
6,983		6,656	
i. Free Distribution by Mail (Carriers or Other Means)		j. Free Distribution by Mail (Carriers or Other Means)	
6,656		6,656	
k. Total Distribution (Sum of f, g, i, and j)		l. Total Distribution (Sum of f, g, i, and j)	
13,639		13,312	
m. Copies Not Distributed		n. Copies Not Distributed	
3,500		11,741	
o. Return from News Agents		p. Return from News Agents	
0		0	
q. TOTAL (Sum of l, m, n, and o)		r. TOTAL (Sum of l, m, n, and o)	
13,639		25,000	
11. I certify that the statements made by me above are correct and complete			
Signature and Title of Editor, Publisher, Business Manager or Owner		Date	
Walt Gulin R., News Editor, Field Artillery, 10/11/91		10/11/91	