

100 Hours with Light TACFIRE

by Captain Richard A. Needham and Major Russell Graves

“This is going to be close,” the 142d Field Artillery Brigade S3 said, “I can’t believe it. We’ve been working on this prep for more than a week, and now *this*.”

The brigade S3 had good reason for concern. The two-and-one-half-hour preparation fires to support the 1st Infantry Division’s breaching operations into Iraq planned for ground war day plus one (G+1) had been changed to a one-half-hour prep and moved up a day. The division’s current G-Day advance had gone faster than expected.

The preparation started in less than an hour. Both 142d Brigade cannon battalions were still moving and wouldn’t be in place for at least 30 more minutes.

Deleting the two-and-one-half-hour preparation, the brigade operations cell recomputed the fire plan from a completely new target list. The sweat beaded on the Assistant S3’s forehead as he shouted orders and coached the operations section to complete the computations—thank God for light TACFIRE (LTACFIRE). He had reason to sweat—this wasn’t another exercise or Army training and evaluation program (ARTEP), it was combat in Operation Desert Storm.

A few short weeks ago, the task would have been impossible. The brigade would have computed the preparation manually and then sent the information to the battalions by voice communications. The battalions then would have sent it to their firing batteries by voice. At each battery fire direction center (FDC), the battery computer system (BCS) would have computed the data and sent it to the guns. But there wasn’t time for that now.

The minutes ticked by too fast. Suddenly the radio broke squelch on the brigade command fire net 2 (CF2). It wasn’t voice. . . it was the eerie sound of digital communications. The operations section started transmitting the preparation to the moving battalion tactical operations centers (TOCs).

As the battalion acknowledgements (“Acks”) came resounding back, the S3 smiled for the first time in hours. “That has to be the sweetest sound in the world right now,” he said.

Minutes later, a printer came alive in the operations van. AFU:UPDATES (ammunition and fire unit updates) from the battalions started coming in. Everyone watched the clock and held his breath. The concussions rocked the vans before the radio announced, “Shot Over.”

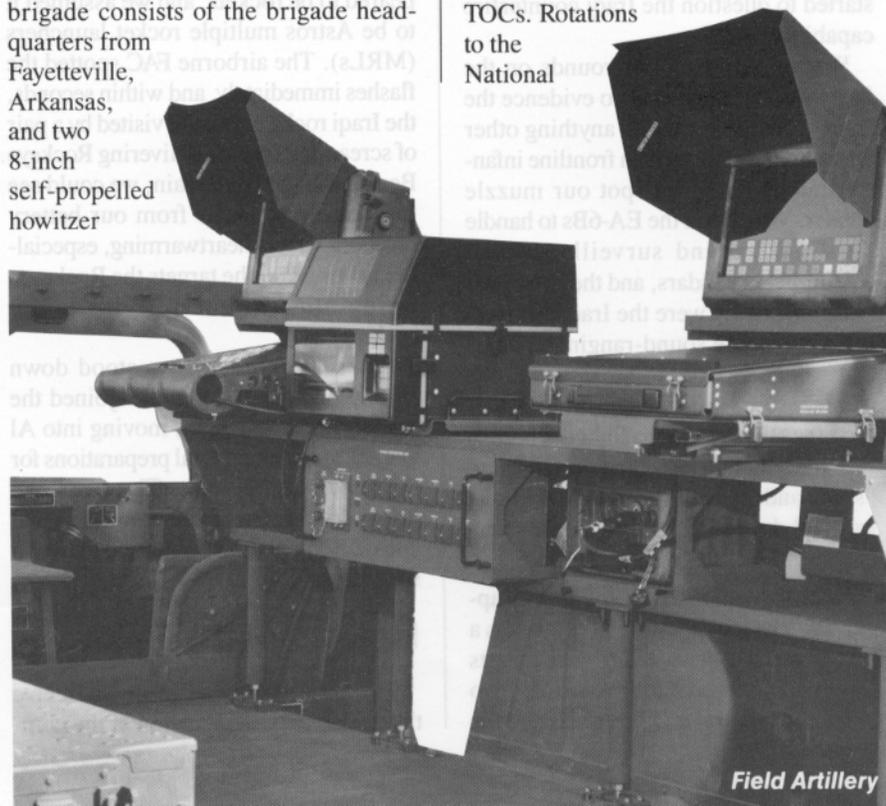
The S3 looked up from his watch—“Right on time.”

LTACFIRE had passed the first of many tests it would face in the next 100 hours.

The 142d FA Brigade, Arkansas Army National Guard, received its mobilization orders on 21 November 1990. The brigade consists of the brigade headquarters from Fayetteville, Arkansas, and two 8-inch self-propelled howitzer

battalions: the 1-142d FA and 2-142d FA, from Harrison and Fort Smith, respectively. The 1-158th FA (MLRS) from the 45th Oklahoma National Guard Division, Lawton, Oklahoma, rounded out the heavy artillery brigade.

Until mobilization, the brigade had strictly manual TOCs. Rotations to the National



Training Center (NTC) at Fort Irwin, California, with the 1st Infantry Division (Mechanized) and the 3d Armored Cavalry Regiment (ACR) had uncovered a serious flaw in the Army's Total-Force concept. Manual TOCs don't have a place in the digital realm. Heavy TACFIRE-equipped units don't have the time or assets to interface with manual TOCs.

To keep up during NTC rotations, we borrowed a heavy TACFIRE system with operators to interface with our active Army counterparts. But because of the deployment of artillery units to the Persian Gulf, we couldn't "borrow" heavy TACFIRE systems with operators.

Getting LTACFIRE

The brigade's only hope was to find enough LTACFIREs for the brigade headquarters and two battalion TOCs. The search began immediately. Litton, the LTACFIRE manufacturer, sent instructors to train our operators with LTACFIREs on loan. On 10 December, the search ended. Then on 28 December, less than a month before we deployed to Southwest Asia, the equipment arrived.

The LTACFIRE briefcase terminals (BCTs) are very lightweight, mobile and self-contained. They require only a printer as a peripheral device. The BCT operates with either a commercial or a heavy TACFIRE's electric line printer (ELP). One much needed peripheral device was a separate keyboard. Without the keyboard, our operators would have to perform all operations by finger-pushing the screen, much like the digital message (DMD) device. This slows down most operations, especially plain-text messages (PTMs).

The BCTs at the operations and counterfire cells have marked advantages over the variable format message entry device (VFMED) in the heavy TACFIRE system. The BCT's software contains its own message formats and memory storage files, alleviating reliance on the FDC computer for this capability.

Their ability to operate independently of the FDC computer added redundancy to our operations. When problems occurred with one BCT, another could do its tasks with minimum loss of operational capabilities. This reduced the likelihood of operating in a degraded mode.

At the brigade TOC, each BCT had four modems or net capabilities, except the counterfire BCT, which had two modems. This allowed the brigade TOC to operate on 14 separate digital nets, either directly or through the relay function.

We were breaking new ground. To our knowledge, we were the only brigade-sized unit to use LTACFIRE.

Initially, we operated by trial and error. We first configured the BCTs for TOC operations. The package we received included one dual-station and six single-station BCTs. Our young group of soldiers, specialists through staff sergeants, trained intensively at Fort Sill, Oklahoma, to learn to operate the LTACFIRE system.

Interfacing with Heavy TACFIRE

The first critical problem was to interface with heavy TACFIRE. Our battery BCSSs were using Version 9 software tapes, and Litton conducted our LTACFIRE training with Version 9 software. But the already deployed VII and XVIII Corps were using Version 7 software, which wouldn't interface with our Version 9 tapes.

The LTACFIRE's current Version 5 software was inadequate. While it could interface with heavy TACFIRE's Version 7, it had serious shortcomings in its capabilities. Litton developed Version 8.5 software for us, which was a revision of LTACFIRE's Version 8 software that was never fielded. By deployment time, it was approved for our use. Although it isn't as good as Version 9, it interfaces well with heavy TACFIRE systems.

One major shortcoming of Version 8.5 is it doesn't have the capability to operate as a division artillery (Div Arty) or brigade computer system. Therefore, the brigade FDC had to operate as a "battalion" computer. The Version 8.5 software did include an FM;CENTER file, allowing us to mass fires.

Another software deficiency for the brigade FDC computer was the lack of an artillery target intelligence (ATI) memory storage capability. This meant we had to rely on a heavy TACFIRE computer for our ATI data storage. Message formats and some terminology with LTACFIRE was slightly different than heavy TACFIRE's, but posed little difficulty.

The training culminated in two rigorous command post exercises (CPXs) integrating LTACFIRE with BCS, multiple launch rocket system's (MLRS) fire direction system (FDS), Firefinder radar, meteorological data system (MDS) and heavy TACFIRE. With help from Fort Sill's III Corps Artillery, we digitally integrated all these systems into the CPXs. As the exercises progressed, we found more to do to increase our proficiency before deploying. The decision to transport LTACFIRE with our troops by air instead of shipping it with the other equipment gave us more time to solve problems.

The brigade soldiers' knowledge of manual gunnery helped them learn LTACFIRE. All they needed to learn was the technical aspects of the system. These dedicated soldiers spent long hours of their own time to hone their digital skills.

As the deployment deadline quickly approached, we made changes daily. When something didn't work, we changed it. When it worked, we added it to our newly developed standing operating procedure (SOP)—see Figure 1 for the LTACFIRE configuration we settled on.

142d Brigade TOC
FDC: One Dual-Station BCT
Counterfire: One Single-Station BCT
Operations: One Single-Station BCT
Cannon Battalion TOC (Times Two)
FDC: One Single-Station BCT
Operations: One Single-Station BCT

Figure 1: This is the LTACFIRE configuration the 142d FA Brigade settled on for deployment after much training and trial and error.

The brigade FDC controlled all fire mission processing along with digital communications to higher, lower and supporting FDCs. The brigade operations cell processed all fire plans and command and control information to the battalions. The brigade counterfire cell handled the expected high volume of targets generated by Firefinder's Q-36 and Q37 radars.

All things worked well, resulting in a highly trained crew and a good TACFIRE SOP. Now, after shedding their regular professions as college students, farmers, accountants and lawyers to "Answer the Call," these digitally trained civilian soldiers were ready to help defeat Saddam Hussein's army.

On 8 January 1991, we packed the BCTs for shipment. Thanks to LTAC-

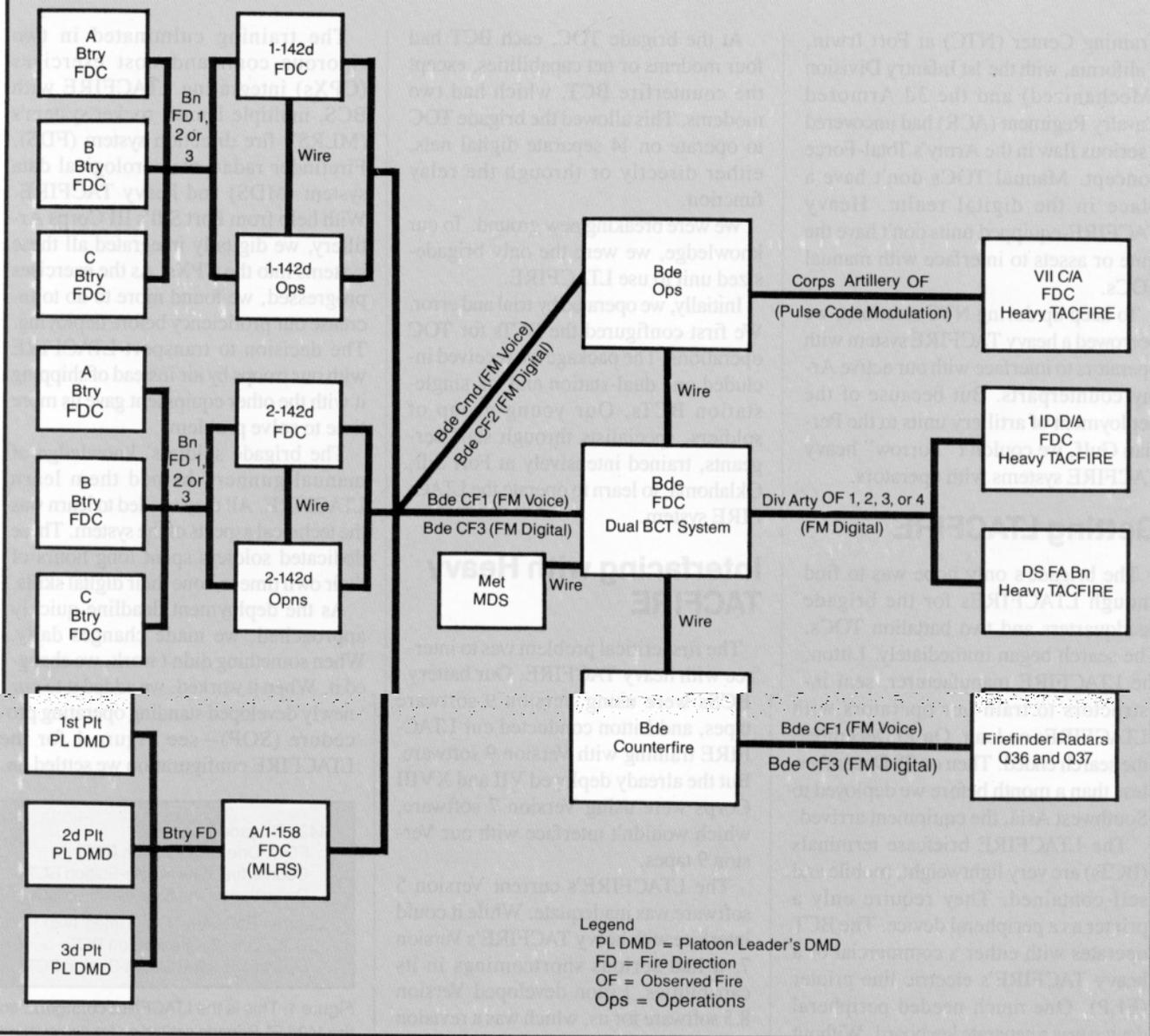


Figure 2: The 142d FA Brigade's Communications Net. At TAA Hawg, before linking up with the 1st Infantry Division, the brigade finalized its LTACFIRE-Heavy TACFIRE digital communications structure.

FIRE's being "user-friendly," we completed the initial training in about a month, a feat that usually takes 13 weeks for heavy TACFIRE operator training. The credit goes to the quality of our soldiers and help from III Corps Artillery and Litton. They did everything in their power to help us acquire the equipment and provided training materials and technical expertise on short notice.

Deploying with TACFIRE

The brigade deployed to Saudi Arabia in mid-January 1991. Carefully, the soldiers loaded the LTACFIRE crates on 5-ton trucks and transported them more than 300 miles northwest to Tactical Assembly Area (TAA) Hawg. There we installed the BCTs in the vehicles that

would carry them into battle. (We didn't install the BCTs at Fort Sill because we had to ship the vehicles before we received LTACFIRE.)

Never having LTACFIRE BCTs mounted in expandable vans, our soldiers installed them in one day, to include establishing the digital communications with the VII Corps Artillery heavy TACFIRE via pulse code modulation (PCM). Establishing PCM communication was a challenge. Our operators never had seen or used a PCM and never had learned four-wire communications. Through their persistence, the soldiers established and maintained this vital link.

Training with LTACFIRE continued at TAA Hawg with the brigade fine-tuning its digital skills. The training consisted of

dry-fire missions, fire plans, command and control and FM and PCM communications troubleshooting.

Like heavy TACFIRE, FM digital communications with LTACFIRE proved to be a difficult task. Using multiplexers and the PRM-34 helped us establish and maintain FM communications. By using one four-pack and one five-pack multiplexer, the brigade TOC only needed to erect two OE-254 antennas to operate its nine FM radios. The PRM-34 device made radio troubleshooting quick and easy. At TAA Hawg, we finalized the digital communications net structure (see Figure 2). The FM nets were extracted from the brigade's wartime signal operating instructions (SOI).

On 17 February, the brigade moved forward and linked up with the 1st Infan-

try Div Artillery. Prior coordination for subscriber information and radio net assignments facilitated our establishing initial TACFIRE communications. When the brigade FDC went "on the air," it had instant digital communications with the Div Artillery. Now the brigade could receive combat intelligence, battlefield geometry, fire plans and command and control information.

The 1st Infantry Div Artillery delivered the original two-and-one-half-hour preparation fire plan to the brigade. The Div Artillery had developed the fire plan by using heavy TACFIRE. But because of the fire plan's length and the number of fire units, the plan exceeded heavy TACFIRE's capabilities. Therefore, the Div Artillery modified the fire plan and provided a draft copy to each supporting artillery brigade. The artillery brigades entered the fire plan into their TACFIRE computers and computed it for their units. Entering the two-and-one-half hour preparation "from scratch" into LTACFIRE, the brigade computed it in two hours. We produced a clean schedule of fires ready for digital transmission to our battalions.

The 1st Infantry Div Artillery revised the fire plan several times. For each revision, the master digital fire planners took only about 30 minutes to recompute and produce another clean schedule of fires. The two-and-one-half-hour fire plan was actually two fire plans—one for 120 minutes and the other for 30 minutes. We had to plan the fires in segments because of the 120-minute limitation for a fire plan in the software.

On 19 February, the tracked vehicles of 1-142d, 2-142d and 1-158th arrived at the Damman port. Seventy-two hours later, they were all sitting in TAA Hawg, 314 miles away. Within 12 hours, the cannon battalions installed the BCTs in their command post carriers, making the total digital TACFIRE link complete. For the first time, the brigade practiced the fire plan digitally down to the guns. The speed with which LTACFIRE disseminated the fire plan digitally was *much* faster than manually.

On 22 February, less than 24 hours after the three battalions arrived at TAA Hawg, they journeyed another 70 kilometers to join the brigade TOC and fire in the artillery raids. For the 142d FA Brigade, it was the first rounds ever fired using LTACFIRE and the first fired in combat since the Korean War.

On 24 February 1991 at 0300, the 1st

Infantry Div Artillery finalized the preparation fire plan, and the brigade participated in the prep at 1430, a day earlier than originally planned. The much-trained-for 100 hours began.

Assuming the mission of general support reinforcing (GSR) to the 1st Infantry Div Artillery, the 142d FA Brigade roared into combat. Digital music soared through the airwaves with command and control information, AFUs, fire missions, meteorological messages and more. When voice communications failed, the digital link prevailed, providing continuous communications for commanders and S3s.

The battalions received the fire plan digitally, then the guns and launchers fired. The accurate and deadly fire from our 8-inch howitzers and MLRS devastated the enemy's positions and their will to fight. The 1st Infantry Division, aided by the 142d's cannon and missile fires, rolled virtually unopposed through the breach area.

After passing through the breach, the VII Corps Artillery commander sent the brigade, with its two 8-inch howitzer battalions and one MLRS battery, to reinforce the British 1st Armored Div Artillery. On 25 February, the brigade continued its offensive march to battle with the British 1st Division. The Div Artillery didn't have TACFIRE; therefore, it positioned liaison officers (LNOs) inside the brigade FDC van.

The brigade FDC received the fire missions by voice from the British LNOs. As the target was being plotted manually, the fire control BCT operator furiously punched in the data. Upon receipt of the fire order from the fire direction officer (FDO), the BCT operator then transmitted the fire mission digitally. A clean battalion "Ack" brought a grin to the communications BCT operator's face. The distant thunder of the units firing brought smiles to all, for they knew the 142d's "Steel on Target" quickened the drive in smashing Saddam's army.

A few minutes of silence prevailed in the LTACFIRE FDC van, only to be broken again by the words "Fire Mission." Moving, shooting and communicating, 24 hours a day—such went the 100-Hour War.

The timely, accurate fires from the brigade's long-range artillery brought high praises from the British. The 142d's support for their drive through Saddam's forces enhanced Anglo-American relations.

The British 1st Armored Division quickly routed the enemy with minimal friendly casualties.

Conclusion

On 28 February 1991 at 0700, the 100 hours ended with notification of the cease-fire. In those 100 hours, the brigade had fired more than 1,000 rounds of 8-inch and MLRS. It moved 12 times and fought in three countries, stopping in northwestern Kuwait. It provided artillery support to both the US TACFIRE-equipped and Allied non-TACFIRE-equipped divisions. It maintained a 100 percent operational readiness rate on all digital systems and a 100 percent interface and communications link between its LTACFIRE computers and heavy TACFIRE systems. Without the use of LTACFIRE, none of this could have been possible.

Though 100 hours is short as wars go, the fast pace of the mobile armored warfare in Desert Storm and the demands to constantly "Move, Shoot and Communicate" challenged the US Artillery. The perfection of the brigade's digital execution resulted from numerous hours of training and the determination of our soldiers to make the system work. The 142d FA Brigade, Army National Guard, proved we're ready to "Answer the Call."



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Major Russell Graves is the S3 of the 2d Battalion, 142d Field Artillery Brigade, Arkansas Army National Guard. During Operations Desert Shield and Storm, he was the 142d Brigade Assistant S3. In the brigade, Major Graves also has served as brigade Fire Control Officer; Battalion Fire Direction Officer for the 1st Battalion, 142d Field Artillery; and Commander of B Battery, also in the 1st Battalion, 142d Field Artillery.