Field Artillery

sill-www.army.mil/famag

A Joint Magazine for US Field Artillerymen

November-December 2003

Fires and Effects in Worldwide Environments

Approved for public release; distribution is unlimited.

HQDA PB6-03-6

Field Artillery

A Joint Magazine for US Field Artillerymen

November-December 2003 HQDA PB6-03-6

ARTICLES: The FA in Worldwide Environments

Front Cover: While in Afghanistan, the 3d Battalion, 319th Airborne Field Artillery Regiment (3-319 AFAR), 82d Airborne Division, fires one of its six M119 105-mm howitzers. Currently, 3-6 FA of the 10th Mountain Division (Light Infantry) Artillery is in Afghanistan with eight of its M119s and E/319 FA's six M119s—for a total of 14 M119 howitzers in country under 3-6 FA. In addition, 3-6 FA mans eight 120-mm mortars. *(Photo of BFIST in combat by David Leeson,* Dallas Morning News.)

DISCLAIMER: ***Field Artillery***—is published bimonthly by Headquarters, Department of the Army, under the auspices of the US Army Field Artillery School (Building 758), 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 endorsements.

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.*

OFFICIAL DISTRIBUTION: US Army and Marine Corps Active and Reserve Components FA units: seven copies to corps artillery, division artillery, brigade and regimental headquarters; 13 copies to battalions; and seven copies to separate batteries or detachments. In addition, other Department of Defense or government agencies that work with Field Artillery or fire support personnel, issues, material, doctrine, training, organization or equipment may request a limited number of free copies of the magazine. These include, but are not limited to, other coordination and support units, training centers and branch schools, recruiting commands, readiness groups, libraries and education centers, program/project managers, military arsenals and laboratories, state adjutant generals, liaison officers, military academies, ROTCs, major command headquarters, military attaches and public affairs offices.

PAID SUBSCRIPTIONS: Those ineligible for Official Distribution may subscribe through the US Field Artillery Association, P.O. Box 33027, Fort Sill, OK 73503-0027 or usfaa@sirinet.net. Telephone numbers are (580) 355-4677 or FAX (580) 355-8745 (no DSN). Dues are $20 per year to US and APO addresses. The international rate is $55 for a one-year subscription.

SUBMISSIONS: Mail to Editor, ***Field Artillery***, P.O. Box 33311, Fort Sill, OK 73503-0311. Telephone numbers are DSN 639-5121/6806 or commercial (580) 442-5121/6806 or FAX 7773 with DSN or commercial prefixes. Email is famag@sill.army.mil. Material is subject to edit by the ***Field Artillery*** staff.

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

ADDRESS CHANGES: ***Field Artillery*** (ISSN 0899-2525) (USPS 309-010) is published bimonthly. Periodicals postage is paid by the Department of the Army at Lawton, OK 73501 and an additional mailing post office. POSTMASTER: send address changes to ***Field Artillery***, P.O. Box 33311, Fort Sill, OK 73503-0311.

Redleg Hotline
(Organization, Material, Doctrine and Training)
DSN 639-4020 or (580) 442-4020 (24-Hours)

Tactical Software Hotline
DSN 639-5607 or (580) 442-5607 (24-Hours)

Field Artillery **Home Page**
sill-www.army.mil/famag

By Order of the Secretary of the Army:

Peter J. Schoomaker
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army, 0329002

Michael D. Maples
Major General, United States Army
Field Artillery School Commandant

Editor:
Patrecia Slayden Hollis

Assistant Editor:
Reta L. Rogers

Art Director:
Bob T. Coleman

Relevant and Ready
The FA Now and in the Future

By MG Michael D. Maples
Chief of Field Artillery

We are a nation at war and an Army transforming for the future. Our current operational commitments dictate that we provide our soldiers the best capabilities available to enable them to accomplish the difficult tasks they have been given. At the same time, the Army must restructure itself to ensure the right competencies and capabilities are available to sustain the nation's long-term commitments around the world.

The world in which we are engaged is changing—as is our National Security Strategy. We are experiencing an unprecedented pace of technological development that will impact our ability to conduct warfare. This period of strategic change requires the Armed Forces of the United States to evolve as well. Posturing for the future while fully engaged in current operations, the Army must remain *relevant and ready*—and so must its Field Artillery.

The Field Artillery certainly demonstrated its readiness to deliver devastating firepower during our most recent major combat operations (MCO) in Operation Iraqi Freedom (OIF). Field Artillerymen made a tremendous contribution to combat success and again reinforced the principle that the effects of joint fires, including Field Artillery fires, win our wars.

Our doctrine and the emerging threat both clearly indicate that indirect fires and effects will become increasingly important in future MCO. To remain relevant, the Field Artillery must sustain the ability to provide fires in close support of maneuver, adapt our organizations and capabilities to meet future requirements and become the joint fires and effects integrator for the land component on future battlefields.

As Artillerymen, fire supporters and joint fires integrators, we must be absolutely competent and confident in the planning and application of the full range of joint fires and effects. Our institutional and unit training programs as well as the employment and replication of joint fires and effects in our Combat Training Centers (CTCs) must enable this proficiency. A transformation in training is essential to achieving the fires and effects outcomes we seek for the force today and for the joint force of the future.

Transformation into the Future Force with its related fires and effects concepts is ongoing now. Change for the Army and for the Field Artillery is with us today.

The Army and FA at War. Many of the immediate changes we are experiencing are driven by the lessons learned in Operation Enduring Freedom (OEF) and OIF that can be disseminated quickly and applied in the field. Likewise, the requirements of soldiers and units engaged in current operations and those scheduled for rotational deployments are driving near-term materiel acquisition, unit training programs and organizational restructuring.

The FA was crucial to OIF I's success. Our soldiers, Marines and FA units did a *magnificent* job in combat—are continuing to do so in OIF II's security operations and stability operations (SOSO) with the attendant combat operations. After-action reports (AARs) from these units have provided numerous implications for the development of

> ***"Analysis will demonstrate that the dominant tactical weapon on the Iraqi Freedom Battlefield was artillery....Artillery responds in seconds, lands within minutes, is impervious to weather, never runs out of fuel, provides smoke cover, illuminates targets, and suppresses the fires of poorly located and identified enemy guns."*** *GEN(R) Barry R. McCaffrey*

Field Artillery doctrine, organizations, training, leaders and materiel solutions.

Our Army is focused on expeditionary and offensive operations—so must the Field Artillery. For example, the AARs show we must improve joint fires doctrine and procedures, achieving common standards throughout the joint force. Also, targeting in the contemporary operating environment (COE) is challenging, and we must refine procedures to better prepare our observers, particularly in complex urban terrain. We must better prepare and equip our units to conduct SOSO.

Field Artillery organizations must increase modular capabilities. Fires and effects coordination cells (FECCs) should be established and properly manned and equipped at all levels. We require additional target acquisition units in the force. Combat service support (CSS) for FA organizations must be fixed.

Realistic training systems must be sustained and improved upon, wherever possible. If we are going to truly train as we intend to fight, joint fires must be included in our CTCs and the effects of all forms of indirect fire must be replicated effectively. We have to train our units to transition between MCO and SOSO. Finally, we require trained "universal observers" who are competent in the coordination and application of all indirect fire systems.

Our current leader training and development programs have produced outstanding leaders who proved exceptionally adaptive in the full-range of operational environments. Likewise, Field Artillery leaders at all levels must be experts in joint fires integration and competent in the application of the full range of fires and effects.

FA units require long-range communications and improved command and control vehicles. Our digital systems must be reduced in number and complexity. Our delivery systems demand longer range, and our munitions require improved precision. Mounted and dismounted targeting capabilities can be improved. Soldiers and units require greater self-protection capabilities. Munitions effects can be improved—sensor-fused munitions, such as sense and destroy armor munitions (SADARM), were extremely effective in OIF. We must solve the challenge of unexploded ordnance (UXO).

While we learned numerous lessons in OIF, the key lesson was stated by General (Retired) Barry R. McCaffrey, Commanding General of the 24th Infantry Division (Mechanized) during Operation Desert Storm: "Analysis will demonstrate that the dominant tactical weapon on the Iraqi Freedom Battlefield was artillery….Artillery responds in seconds, lands within minutes, is impervious to weather, never runs out of fuel, provides smoke cover, illuminates targets and suppresses the fires of poorly located and identified enemy guns" ("Joint Firepower Wins Wars," *Armed Forces Journal*, October 2003).

The Army's Transformation Focus. As should be expected, a change in the senior leadership of the US Army resulted in changed direction for the force. The new Chief of Staff of the Army (CSA) General Peter J. Schoomaker has directed the detailed examination of 15 focus areas to determine the azimuth for the Army and, ultimately, changes for the Field Artillery.

Properly Training and Equipping Soldiers and Growing Leaders will remain fundamental to our Army. Four CSA focus areas relate to this purpose: developing soldiers with a Warrior Ethos, preparing future generations of senior leaders, training and educating Army members of the joint team and focusing training into the joint and expeditionary context in which we expect to conduct future operations. Field Artillerymen will be critical in the future joint warfight and must be trained accordingly.

The Army will continue its core capability of *Providing Relevant and Ready Land Power* to the nation. The CSA has focused on evolving the Current Force into a Future Force, enabled by network-centric battle command. Key components under examination include leveraging/enabling interdependent, network-centric warfare; creating modular, capabilities-based unit designs; developing a joint and expeditionary mindset; aligning the Army's Active and Reserve Components within the current security context; and exploiting Army Aviation's role on the joint battlefield. These focus areas likely will accelerate change in Field Artillery structures and command and control systems.

To better enable the Current Force, the CSA has focused studies on ensuring unit stability, continuity and predictability; enhancing the ability of installations to project power and support families; redesigning resource processes to be flexible, responsive and timely; clarifying authorities, responsibilities and accountability; and, finally, on communicating the Army story. Field Artillerymen can expect that personnel policies and assignment patterns will be changed as an outcome of these studies.

While near-term change should be expected, the Field Artillery has established a solid foundation from which to make a substantial contribution to the future warfight where integrated joint fires are expected to lead to battlefield dominance.

The Army and FA in Transformation. The Secretary of Defense stated our warfighting objective: "…the outcome we must achieve is fundamentally joint, network-centric, distributed forces capable of rapid decision superiority and massed effects across the battlespace" ("Transformation Planning Guidance," April 2003). "Joint, network-centric…massed effects"—these are the business of Field Artillerymen, fire supporters and joint fires integrators.

Transforming Fires and Effects. The Army's extensive Future Force and future combat system (FCS) analyses are enabling the Army's evolution into the Future Force. The FA's fires and effects concepts and warfighting requirements are firmly nested in this work.

The "Fires and Effects Operational and Organizational Concepts" developed for the Future Force as a part of the Army's transformation effort support the outcome sought by the Secretary of Defense: fully integrated joint, interagency and multinational fires and effects.

Networked fires, a critical component of the future battle command system, will provide the network-centric linkage of sensors and effects producers to achieve massed effects across the battlespace.

The Future Force must have continuous, all-weather, all-terrain fires and effects—joint air-, sea- and land-based—enabled by networked fires and pervasive, redundant target acquisition capabilities.

Field Artillery close supporting fires and effects as well as counterstrike capabilities will support tactical engagements and battles in a symbiotic relationship with maneuver forces. Operational and shaping fires and effects will be employed to destroy key enemy capabilities, isolate the battlespace and deny the enemy an ability to reinforce.

Fires and effects organizations must be modular, tailorable and able to integrate lethal and nonlethal effects at all levels and in any environment.

Transforming fires for the Future Force will require extensive command, control, communications, computers, intelligence, surveillance, and reconnaissance (C^4ISR) capabilities. Our targeting capabilities must extend from "space to mud" and be complementary to our effects producers.

The Army requires munitions that can produce desired effects in all types of terrain and environments. We must have increased precision with area-fire options, nonlethal effects applicable across the spectrum of military operations and, ultimately, discriminating munitions that will enable us in complex targeting environments.

The Future Force will be required to accomplish a wide range of fires tasks: long-range precision strike, shaping fires, fires at depth, fires to isolate, fires to protect the force and close supporting fires. A full range of fires and effects capabilities—land-based fires, air-delivered munitions, sea-based fires and rotary wing attack—will be required to accomplish all tasks and produce massed effects against all target sets in all environments.

Having a range of complementary fires delivery systems and effects producers ensures the joint force commander and land force commander can account for battlefield and system variables, such as the availability of delivery means, speed of responsiveness, risk, environment, weather, range, type of threat, dwell time of the target and required effects. A full range of joint fires capabilities is *essential* to the success of all elements of the joint force.

For the land force, delivery platforms must include a full range of deployable systems—mortars, cannons, rockets and missiles—to complement joint delivery systems and ensure immediately responsive fires for the land force, particularly in the close fight. Mortars are critical to the maneuver forces as a close supporting system, especially in the tactical assault. Cannons truly enable maneuver by providing an immediately responsive capability to kill and suppress targets that are the most dangerous to the force as it moves. Rockets enable the precision engagement of point and area targets at range. Finally, missiles enable the attack of high-payoff targets (HPTs) throughout the depth of the battlefield.

The Joint Training Center for Fires and Effects Integration, Fort Sill. OEF and OIF demonstrated the warfighting potential of integrated joint fires. These operations, likewise, highlighted the challenges of conducting complex military operations involving the application of fires from each of the services. Coordinating the joint attack of targets, synchronizing fires with maneuver, providing land fires to support aviation, achieving synergistic fires and effects, executing time-sensitive targeting and deconflicting joint fires are all operations that require joint standards and joint training.

To achieve the intent of our emerging doctrine and realize the full potential that indirect fires and effects can bring to the future warfight, the Army and the joint force must train extensively on the integration, coordination and application of joint fires. At the lowest tactical level, commanders require individuals fully competent to access and apply the full range of joint fires. Battle staffs at every level must be proficient in planning, coordinating and synchronizing the effects of indirect fires. To help achieve these requirements, the FA Center and School, Fort Sill, has joined in a cooperative effort with the Institute for Creative Technologies (ICT) to develop transformational joint fires and effects training for individuals and battle staffs.

The Joint Fires and Effects Trainer System (JFETS) is being designed to produce a universal observer from any service or from special operations forces (SOF) who is capable of applying any effect from any service in any environment. JFETS also will serve as a collective training capability for battle staffs at every echelon to coordinate and integrate fires and effects.

JFETS will leverage virtual reality and artificial intelligence to create immersive,

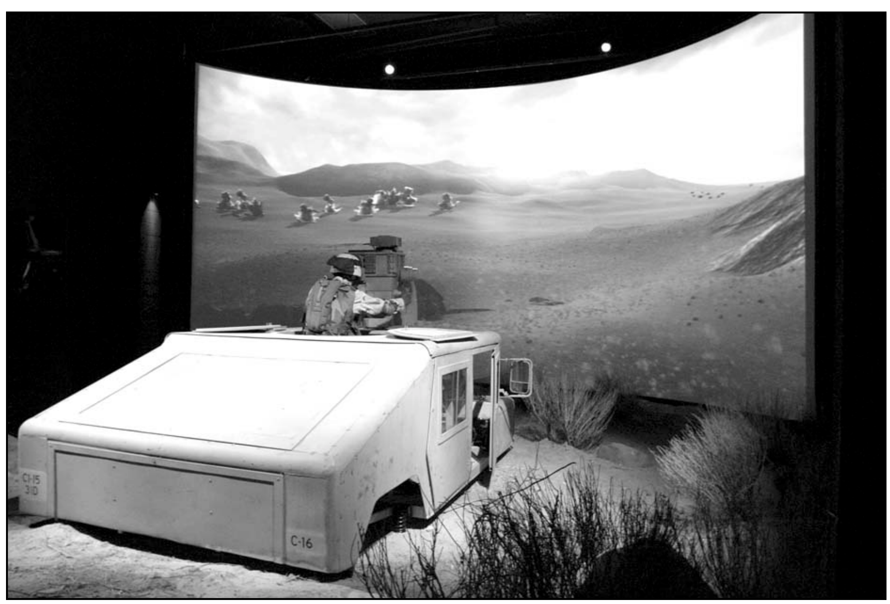


Photo by Fred W. Baker III, *Fort Sill* Cannoneer

The Joint Fires and Effects Trainer (JFETS) System Open Terrain Module (OTM). To train universal observers, the OTM has a 150-degree screen that is 15 feet high by 30 feet wide, with easily changeable battle scenarios. JFETS incorporates real-time, photo-realistic graphics, surround sound and artificial intelligence. Service members should begin training on mounted and dismounted calls-for-fire using the system in 2006.

experiential training situations. The trainees will have to exercise their cognitive decision-making skills under the stresses of simulated combat situations.

JFETS will replicate any environment and weather condition, offering the opportunity to train observers in a specific terrain before they deploy to that terrain. By linking JFETS to simulations and field training, multi-echelon training is achievable with a potential for live-fire outcomes.

JFETS will consist of three primary training modules. The open terrain module (OTM) will enable the universal observer to master the skills to sense HPTs and engage adversaries with an appropriate mix of joint fires and effects. The urban terrain module (UTM) will train the employment of fires and effects in complex urban terrain while requiring the observer to limit collateral damage and avoid noncombatant casualties. The fires and effects command module (FECM) will train commanders and battle staffs to plan and coordinate the application of lethal and nonlethal joint fires, thus enabling joint, interagency and multinational fires and effects integration.

JFETS offers a revolutionary training capability. Completing its development will greatly enhance our ability to properly train the application and integration of joint fires. Because of the importance of joint fires in the future warfight, I believe that a Joint Training Center for Fires and Effects Integration, leveraging the training advantages of JFETS and our ranges, should be established at Fort Sill.

FA Initiatives Now and for the Future. Future Force and joint concepts are clearly important; however, the FA Center and School is providing priority of fires to support our operationally engaged and mobilized forces. Together with our partners in industry and the Army, we fielded the M270A1 multiple-launch rocket system (MLRS), the sensor-fused SADARM, and the advanced Field Artillery tactical data system (AFATDS) Version 6.3.1 software to units about to execute OIF.

Additionally, we supported work to ensure the interface between AFATDS and the automated deep operations coordination system (ADOCS) being used extensively by V Corps. We supported the decision to deploy high-mobility artillery rocket systems (HIMARS) for SOF and the first combat employment of the Army tactical missile system (ATACMS) unitary missile.

The FA Center and School is actively participating in several CSA focus area studies, particularly those that address organizational modularity and relevant force structure. But we also are playing an active role in addressing near-term capabilities for FA soldiers through Soldier as a System (SaaS), the Rapid Fielding Initiative (RFI), and Rapid Equipping of the Force (REF) programs. (See the figure.) For example in RFI, we have purchased commercial off-the-shelf dismounted range-finding and target-location optics to support our deployed and deploying light forces and, in REF, are aggressively pursuing getting a lightweight countermortar radar (LCMR) into the hands of our deployed units. We continue to provide a wide range of training support and new equipment fieldings to units identified for rotational deployments and mobilization.

Field Artillery systems to modernize the force that are being fielded or soon will be fielded include Paladin upgrades, the M777 lightweight 155-mm cannon (LW 155), M270A1, HIMARS, hand-held-digital devices, AFATDS, the lightweight laser designator rangefinder (LLDR), fire support sensor system (FS^3) and dismounted optics.

Additional systems are clearly achievable in the near term, including the Phoenix radar, potential enhancements to the Q-36 Firefinder radar, Profiler (meteorological system), the improved position and azimuth determining system (IPADS), Excalibur (family of precision-guided munitions), the advanced cannon artillery ammunition program (series of 155-mm and 105-mm conventional ammunition with enhanced range and lethality), guided MLRS (GMLRS) and ATACMS unitary. The potential for course-correcting fuzes and smart submunitions are also evident.

In order to enhance our Stryker Brigade Combat Teams (SBCTs), we will field the LW 155 to modernize the M198 and increase the SBCTs' lethality by moving to a 3x6 organizational structure. Efforts are underway to address shortcomings in the SBCTs' fire support structure, better train fire supporters to integrate nonlethal effects and improve target acquisition capabilities.

Transformation of Field Artillery training and education is critical to our future. We have improved the development of a Warrior Ethos by implementing demanding realistic training in institutional events, such as the Redleg War and "walking-shoots." The tenets of the COE are being included in our training programs to better prepare soldiers and leaders to make an immediate contribution in their units. Revisions to

Non-Line-of-Sight (NLOS) Cannon. This approximately 20-ton demonstrator fired at Yuma Proving Ground in August. *(Photo courtesy of United Defense)* the officer, warrant officer and NCO education systems are well underway as are our plans to train the Basic Officer Leadership Course (BOLC) at Fort Sill.

A full-spectrum FA training aids, devices, simulators and simulations (TADSS) strategy has been implemented that will improve our units' abilities to train at home station. The call-for-fire trainer (CFFT) will replace the guard unit armory device, full-crew interactive simulation trainer (GUARDFIST) and include an additional functionality to train the employment of close air support (CAS). The fire support combined arms tactical trainer (FSCATT) and the FSCATT-towed (FSCATT-T) will remain critical crew training capabilities.

We are fully engaged in the development of concepts and capabilities for the Field Artillery in the Future Force. These have been documented in Training and Doctrine Command (TRADOC) work to date and will soon be published in a formal "Fires and Effects Operational and Organizational" document. Our work in support of unit of employment (UE) and multifunctional unit of action (UA) fires organizations continues. A major effort is underway to develop the fire support concepts and capabilities required for our forcible entry units.

Future Force systems, including the non-line-of-sight cannon (NLOS cannon), NLOS launch system (NLOS-LS), loiter attack missile (LAM), precision attack missile (PAM), multi-mission radar (MMR) and unmanned aerial vehicles (UAVs) dedicated to targeting are all under development.

An NLOS cannon demonstrator was produced as directed by Congress and began firing at Yuma Proving Ground, Arizona, in August 2003. It proved that a 155-mm cannon system with auto loading and a sustained rate-of-fire of six to 10 rounds per minute is achievable on a platform that weighs approximately 20 tons. The NLOS cannon shows great promise for accelerated fielding into the Current Force.

The Depth and Simultaneous Attack Battle Lab at Fort Sill is fully engaged in collaborative experimentation and our science and technology (S&T) efforts to validate Future Force and networked fires requirements. Nonlethal capabilities to achieve personnel suppression, equipment disablement and area denial are being developed. Additionally, the Battle Lab is deeply involved in improving the replication of fires at our CTCs, including suppressive effects.

The Field Artillery Center and School has an increasing role to play in the joint fires arena and is actively engaged in the Joint Forces Command's (JFCOM's) Joint Fires Initiative and its supporting Joint Fires Working Group (JFWG). The Joint Fires Initiative is developing doctrinal recommendations and training packages to enhance current and future joint fires capabilities. We will introduce a Joint Fires Integration Course to be taught at Fort Sill in the spring of 2004. A joint CAS (JCAS) training exercise to be conducted in conjunction with III Corps Artillery is likewise planned for the spring. Our intent is to continue to promote universal observer training and a Joint Training Center for Fires and Effects Integration at Fort Sill.

To improve strategic FA communications and the ability to rapidly disseminate tactics, techniques and procedures (TTP) to the force, we are developing a collaborative web-based tool as a prototype for the Army—the Fires Knowledge Network—that will be part of Army Knowledge Online.

Improved communications about the capabilities of the Field Artillery and our role in joint warfighting concepts will remain critically important. There are those with competing views that air-delivered fires can replace the Field Artillery, that cannons are no longer needed, and that the Field Artillery is not a full-spectrum capability. OIF demonstrated otherwise.

The Field Artillery soldiers of Iraqi Freedom clearly demonstrated our Army's continuing requirement for the immediately responsive close supporting fires provided by our cannons and launchers. In Iraq today, our Field Artillery soldiers continue to display the Warrior Ethos that the Army seeks in all its soldiers.

Clearly the Army is changing and the Field Artillery will change as well. We will have a substantial role in the Army's Future Force and in the integration of joint fires in the future. Our Army will continue to require modernized, trained and ready FA units.

To Field Artillerymen everywhere, my thanks for what you do for the Field Artillery, for our Army and Marine Corps and for our nation. May Saint Barbara always be with you and may you always *Create the Thunder!*

☆☆

Major General Michael D. Maples became Chief of Field Artillery and Commanding General of Fort Sill, Oklahoma, on 23 August 2001; his change of command is 9 December, after which he will become the Vice Director of the Joint Staff at the Pentagon. He served as the 43d Commandant of the Field Artillery School and 34th Chief of Field Artillery. In prior assignments, he was the Director of Operations, Readiness and Mobilization and Director of Military Support, both in the Office of the Deputy Chief of Staff for Operations and Plans at the Pentagon; and Assistant Division Commander of the 1st Armored Division in Germany. As the Deputy Chief of Staff for Operations in the Allied Command Europe Rapid Reaction Corps (ARRC) and for the Kosovo Force (KFOR), he planned and executed the entry of NATO forces into Kosovo. He also served as the Assistant Chief of Staff, G3, for V Corps and Deputy Chief of Staff for Operations for the US Army Europe (Forward), Taszar, Hungary, during Operation Joint Endeavor. Among other assignments, he commanded the 41st FA Brigade in Germany, and the 6th Battalion, 27th Field Artillery, 75th Field Artillery Brigade, during Operations Desert Shield and Storm—the only Army Tactical Missile System (ATACMS)-capable battalion in theater.

Soldier as a System (SaaS)—Program to identify and develop the minimum level of lethality and force protection capabilities needed by all soldiers. In addition, combat service support (CSS), combat support (CS) and combat arms (CA) will receive some unique equipment. Field Artillerymen are receiving the additional CA equipment.

Rapid Fielding Initiative (RFI)—Initiative that fielded SaaS equipment to soldiers deployed in Iraq and Afghanistan and is fielding to those preparing to deploy.

Rapid Equipping of the Force (REF)—Initiative that is pushing mature or nearly mature government or commercial off-the-shelf technologies into development and fielding in Iraq or Afghanistan—those technologies that can be fielded in one year or less.

The Field Artillery Center is active in addressing near-term and future FA capabilities through the Army's SaaS, RFI and REF programs.

A Case for Howitzers in Afghanistan

By Captain Joshua D. Mitchell

C/1-319 FA firing an M119 howitzer in Kandahar, Afghanistan. Photo by SGT Sean A. Terry, 55th Signal Company

In the last two years, the Army has fought unique enemies in unique terrain across the globe, and it has had to adapt to ever-changing battlefields—the contemporary operating environment (COE). For example, in Afghanistan, artillerymen started out fighting with and continue to fight with 120-mm mortars. Today, there also is an M119 105-mm battery in Afghanistan firing multiple rounds daily. The M119 is the indirect fire weapon of choice for range, lethality and accuracy in Operation Enduring Freedom (OEF).

The artillery has been largely successful with many of the tactics, techniques and procedures (TTPs) it has had to develop to fight the War on Terror. In Afghanistan, A and B Batteries (minus) of the 1st Battalion, 319th Airborne Field Artillery Regiment (1-319 AFAR), 82d Airborne Division, (and several batteries since) seamlessly transitioned into mortar platoons and fought with a new weapon system: the M120 mortar. The artillerymen of A and B Batteries each had one mortar platoon of four 120-mm mortars. In Afghanistan, one mortar platoon conducted combat operations while the other pulled security.

In OEF, C/1-319 AFAR was the first US artillery battery in Afghanistan. After C/1-319 AFAR deployed as a minimally manned and equipped howitzer battery without ammunition trucks, it had to adapt its standing operating procedures (SOPs).

The Army learned a lot in Afghanistan. Soldiers are adaptable and flexible enough to deal with a variety of nontraditional demands and succeed. The battery's TTPs also were successful: ammunition resupply without ammunition carriers, air assaulting M119s via internal loading in Chinooks and counterfire in urban areas against an enemy who used civilians as protection and time fuzes to remotely detonate rockets.

But we must learn from our mistakes. Not taking howitzers into Afghanistan from the beginning was a mistake. A small amount of additional airlift would have brought in howitzers that had twice the indirect firepower, were more accurate and had three times the range—a decided advantage for our infantry forces in Afghanistan, especially during Operation Anaconda.

Redlegs Manning Mortars. The 82d Airborne Division received its initial deployment order during the spring of 2002 specifying that the direct support (DS) artillery not be deployed with its infantry brigade. With the support of the division commander, the 82d Division Artillery (Div Arty) developed a plan to train artillerymen on the 120-mm mortar. The M120 is lighter, more maneuverable and quicker to emplace than the 105-mm howitzer, and so it was believed it would perform better in the rougher Afghanistan environment.

The M120 mortar already was being fielded to units in Afghanistan—only one additional mortar platoon's worth of equipment had to be deployed. The one platoon of four 120-mm mortars required fewer airlifts to deploy than the alternative M119 battery of six howitzers.

Training artillerymen on the 120-mm mortar instead of using the crews in organic mortar platoons increased the division's firepower. The organic mortar platoons would have followed the 75th Ranger Regiment's arms room concept in which soldiers switched between mortar calibers, depending on the mission. With the artillerymen in mortar platoons, the infantry could have all three calibers of mortars firing at once: 120-mm, 81-mm and 60-mm.

Why Take Howitzers. Although A and B Batteries performed exceptionally on the mortars in Afghanistan, it is fortunate the division persisted in requesting a 105-mm howitzer battery to deploy as well.

Although the M120 does not require a trailer and is, therefore, more easily transported, the 105-mm howitzer shoots nearly three times the distance of the 120-mm mortar and can hit targets closer to friendly forces with risk estimate distances (REDs) nearly half that of the 120-mm mortar. In addition, a mortar platoon only has four tubes while the howitzer battery has six. (See Figure 1.)

Despite concerns to the contrary, the howitzers in Afghanistan also have had an outstanding track record. C/1-319 AFAR met all its 24 in-position-ready-to-fire (IPRTF) times in its 13 combat missions from August 2002 to January 2003. The battery traveled thousands of kilometers by ground and air through unforgiving Afghanistan terrain and always was ready to support its infantry brothers with danger-close fires. The battery supported every mission called for from its forward operating base (FOB).

Since C/1-319 AFAR redeployed, C/3-319 AFAR, also part of the 82d Division, and other M119 batteries from the 10th Mountain Division have deployed to Afghanistan and have been just as successful in an environment that many believed was too rugged for artillery.

Interestingly, the M120's maneuverability advantage was never significant in Afghanistan. During Task Force (TF) Panther's combat operations in OEF, the combat mortar platoon arrived at the battlefield in the same manner as the howitzers, usually in the same convoy. The mortars missed IPRTF times because they had to continue on after the howitzers emplaced in order to get within range of the target. In fact, the infantry's preference for the firepower of the 105-mm howitzer led to C/1-319 AFAR's supporting all three infantry battalions as they rotated through combat operations. In addition, the howitzer battery supported more operations out of the FOB than any other TF unit.

Although all three batteries certified on the required Infantry Mortar Leadership Course (IMLC) tasks in the allotted two weeks, they encountered issues when using the mortars in the field. For example, Charlie Battery was practicing hipshoots when it realized it could not support a target that was well within the mortars' maximum range. Unlike a howitzer that can shoot any target within its maximum range immediately upon emplacement, a mortar can't reach certain ranges until the baseplate is seated firmly into the ground—either by shooting rounds or digging it in with a shovel. Until then, the mortar tube cannot reach its maximum elevations and, therefore, cannot reach the targets associated with those elevations.

What *did* help A and B Batteries fight with mortars was the similarities between the systems in gunnery and fire direction. It was easy for the gunners in the battery to switch to the M120's sight and aiming procedures. Similarly, although a plotting circle is normally used, the fire direction center (FDC) could use the same chart it used for howitzers to compute manual solutions for the mortars. The mortar ballistic computer also was easy for the FDC to learn, especially because it accounts for fewer nonstandard conditions than the ballistic computer system.

One of the primary concerns about taking artillery into Afghanistan seemed to be a lack of available airlift. Initially, the artillery howitzers weren't allowed to deploy in order to save airspace. With the support of the division, the 82d Div Arty "sold" higher headquarters on the concept of deploying the smaller 120-mm mortar platoon that would not take much additional airlift room to give the division more indirect firepower.

Once the Div Arty sold the idea of the 120-mm mortar platoons, it then argued that taking a minimally manned and equipped 105-mm artillery battery only would require slightly more airlift.

The 120-mm mortar platoon (provisional) that deployed to Afghanistan took six high-mobility multipurpose wheeled vehicles (HMMWVs), 26 personnel and 4 quadruple containers, requiring just less than one C5 (or one and one-half C17s) to airlift them.[1] (See Figure 2.) In order to deploy Charlie Battery (minus) with eight HMMWVs (six prime movers, an FDC and a battery operations center, or BOC), six howitzers, a generator, seven quadruple containers and 44 personnel, it took two C17s (or a little more than one C5). Using almost the same airspace as a mortar platoon, the division could have had an M119 battery (minus) with 50 percent more firepower and three times the range.

Even after the division was able to send one firing battery, higher's guidance did not allow it to send the battery

Weapon System	Max Range (Meters)	RED for Max Range and .1% Incapacitation (Meters)	Maneuverability
M120 120-mm Mortar	7,200	400	HMMWV/Gator
M119A2 105-mm Howitzer	20,000	235	Towed by HMMWV

Legend: **HMMWV =** High-Mobility Multipurpose Wheeled Vehicle **RED =** Risk Estimate Distances

Figure 1: Comparison of M120 Mortar and M119A2 Howitzer. Although the M120 does not need a trailer and is more transportable, the M119 has almost three times the range and can be fired almost twice as close to friendly forces as the M120. In addition, the M119 can shoot at low angles.

Deploying Package	Personnel	Tubes	C17 (or)	C5
120-mm Mortar Platoon	26	4	1.5	1
105-mm Minimally Manned and Equipped Battery	44	6	2	1.2
105-mm Fully Manned and Equipped Battery	61	6	3	2

Figure 2: Airlift Requirements for a Mortar Platoon as Compared to a Battery (Minus) or an Entire Howitzer Battery

fully equipped. To deploy a battery with ammo trucks (everything except the supply light medium tactical vehicle and a couple of miscellaneous HMMWVs) only would have required three C17s. With two C5s, the *entire* battery could have deployed.

While these airframes are twice that of a 120-mm mortar platoon, it still only would have taken one and one-half more C17s to bring in an entire battery, significantly increasing firepower, range and ammo-carrying capacity and allowing the howitzer battery to conduct 24-hour and split-battery operations.

According to the air loading personnel, by the time Charlie Battery deployed into Afghanistan, there were enough aircraft available to at least piecemeal the battery's extra vehicles into theater. Further, there was enough space for all battery personnel to be air lifted into theater. During deployments to and from Afghanistan and in five months of moving around in country, the battery never flew on a full aircraft—either by weight or seat limit.

The 10 more personnel needed to fully man the battery would not have impacted the support requirements in theater. There never was a lack of water or meals ready to eat (MREs) at the firebase.

Yet, the number of personnel the battery was allowed to deploy was limited, decreasing its capabilities. The battery had the minimum number of people needed to man howitzers without taking into account advanced party procedures, security or other battery functions. In essence, to provide security on the battery's position, the battery had to pull crews from its howitzers.

Combined Joint TF 180 (CJTF-180) decided to have two howitzers with prime movers remain in another location without their C/1-319 AFAR crews. So the two sections of personnel supplemented the manning of the other four howitzers, and C/1-319 AFAR had enough people to secure its position. This is the only way the battery was able to support combat operations with all four howitzers.

Carrying Ammo Without Ammo Carriers. Because the ammunition carriers were left at Fort Bragg, the battery was limited in the number of rounds it could bring for an operation. The battery only could carry 120 rounds internally—30 rounds per howitzer. These 30 rounds had to be mixtures of high-explosive (HE) rounds with Charge 8, rocket-assisted projectiles (RAP), smoke and illumination rounds to provide a 6400-mil capability and support multiple objectives. This meant the battery only could fire one battery-six before running out of ammunition (on the average).

It was essential to have contingency plans in place in case an operation required heavy firing. The battery prerigged A-22 bags with ammo before leaving the FOB. These A-22 bags were either loaded in one of the TF's light-medium tactical vehicles traveling on the mission or placed near the airfield for TF aviation assets to fly in as emergency resupply. If the rounds had been needed, there would have been a delay—but at least the ammo ultimately would be available.

TTPs for Internal Loading Air Assault. Soon after arriving, the battery conducted its longest air movement from Bagram to Khowst slung under CH-47s operated by the 18th Airborne Corps' TF Shark—more than 200 kilometers. Because the 82d Division has no CH-47s, the supporting aviation unit at the FOB was elements of TF Corsair with CH-47s from the 101st Aviation. Although TF Shark slung load M119s on a regular basis, TF Corsair would not because of hazards caused by the higher elevations of the area. (See the map on Page 12.)

This affected the battery's ability to conduct rapid insertion missions.

Soldiers from 1-319 AFAR set up a 120-mm mortar firing position near Khowst, Afghanistan.
Photo by SPC Patrick Tharpe, 55th Signal Company

Charlie Battery worked with the aviation personnel, however, to perfect techniques to internally load a howitzer into the body of a CH-47. The howitzer was driven next to the CH-47, unloaded by section personnel and rolled to the tailgate of the helicopter. With the help of the CH-47's winch system, the section personnel guided the howitzer into the body of the helicopter. A piece of plywood was used underneath the towing pindle of the howitzer as it was pulled with the winch.

The technique took significantly more time at the pickup and landing zones than sling loading would have, which limited the howitzers' movement into areas that could not be secured.

Internal loading allowed the Chinooks to be more maneuverable and move more quickly when they flew the howitzers to position areas and smaller firebases in the adjoining regions. In addition, this technique disguised the fact that a howitzer was being positioned on a firebase, an advantage when surprise was essential to the success of the infantry's mission.

TTP for Counterfire in Urban Areas. Another challenge for the TF in Afghanistan, which will continue to be a challenge in the future, was developing TTPs to counter an elusive indirect fire threat in an urban environment. The most dangerous threat to allied forces in Afghanistan was the 107-mm rocket. From nearby villages, the enemy regularly shot rockets at elements of the TF stationed in Khowst, including C/1-319 AFAR and the 1-319 AFAR radar; one impacted in the middle of the firebase.

The enemy often used homemade time fuzes to launch a rocket remotely. In most cases, by the time the rocket ignited, no one was at the launch site. In addition, the launch sites were often close to urban areas, which increased the risk of collateral damage if the TF responded with counterfire.

These situations highlighted the advantage of having observers in the area to confirm what was on the ground. The radar is a very useful tool for giving the counterfire battery an accurate grid location of launch sites or enemy position areas. However, the radar cannot determine whether or not the launch site is in the middle of a town square or if the enemy is still in the area. Before executing a counterfire mission, the question was whether or not the possible collateral damage was worth neutralizing the threat with lethal artillery fire.

To counter the threat in Afghanistan, the TF developed techniques to send patrols out to the area in lieu of automatically sending counterbattery fire to grids acquired by the radar. An Army aviation quick-reaction force (QRF) could sweep the area quickly and identify any personnel still on the ground. Aviation and infantry patrols in an area after a rocket attack also resulted in some captured enemy personnel.

The TF experimented with shooting illumination rounds as part of its counterfire SOP. Shooting illum had advantages and disadvantages. The advantage was that it immediately alerted the enemy (if he was still present) that we knew where he was and could rain indirect fire on him if he didn't stop. The disadvantage was that it also gave the enemy a chance to escape before a patrol reached the area. Shooting illumination never seemed to decrease the amount of indirect fire incidents at the FOB while aggressive patrols did.

Internal loading allowed the Chinooks to be more maneuverable and move more quickly when they flew the howitzers to position areas and smaller firebases in the adjoining regions. In addition, this technique disguised the fact that a howitzer was being positioned on a firebase.

Operation Anaconda. Even with the difficulties the howitzers encountered after deploying, it was worth sending them. The six M119A2 howitzers from C/1-319 AFAR saw 13 months of combat operations while sustaining more than 95 percent operational readiness in extremely harsh terrain. They would have been valuable indirect fire assets for Operation Anaconda, had they been in country.

On 1 March 2002, Operation Anaconda began as elements of C/1-87 IN exited from the back of their CH-47 as it touched down in the Shah-e-Kot Valley and started looking for places to set up planned blocking positions. Almost immediately, small-arms fire started coming from al Qaeda fighting positions dug into the mountainsides around the landing zone. A 120-mm mortar section on the valley floor was only able to shoot 16 rounds before it started receiving small-arms fire. Soon after, mortar rounds came in as well, sending the mortar team running.[2]

Without an artillery battery to support them, the infantry was left without an effective indirect fire support asset.

When the Army first tested its air assault procedures in the jungles and mountains of Vietnam, it quickly learned to prep landing zones with artillery fire before bringing in infantry by air—a tactic that applied to forces in Operation Anaconda. At the very least, a battery should have been in place before H-Hour in the Shah-e-Kot Valley to support on-call targets that might arise in the fluid environment of an air-assault mission. Just like the maneuver units in Vietnam, C/1-87 IN could have used the howitzer's firepower as it took small arms and mortar fire on the landing zone. Unfortunately, higher headquarters required the 101st and 10th Mountain Divisions to leave their howitzers back in the states.

C/1-319 AFAR conducted a string of operations just west of the valley six months later, easily reaching its position areas. There is no question that a howitzer battery, if it had been in country, either could have been pre-positioned before the infantry air lifted into Anaconda or brought in on the first lift afterward. The artillery battery would have been out of range of the small arms and mortar fire and more available than air support for on-call missions.

Although the Air Force was very effective on a number of occasions during OEF (the Army never should "leave home" without it), one infantry unit was without air support for nearly 24 hours during Operation Anaconda because its tactical air control party (TACP) was absent. In other cases, the al Qaeda escaped into cave complexes whenever they heard the aircraft approach, making targeting them by air support difficult. Air support, although often the right weapon at the right time, cannot do it all—including the job of the land force commander's own all-weather artillery.

While it is impossible to go back and replay the battle during Operation Anaconda, it is reasonable to assume that supporting artillery would have saved infantry lives.

Senior officials were willing to leave artillery out of OEF initially because they thought the artillery took up too much airlift space—that they could replace the artillery's firepower with mortars and air support. Operation Anaconda proved otherwise.

These officials thought howitzers couldn't perform in the rugged, mountainous terrain. C/1-319 AFAR's operational record as well as the records of the batteries that followed Charlie Battery have shown otherwise.

In OEF, 1-319 AFAR manned mortars and developed howitzer battery and mortar TTPs to deal with the unique enemy and terrain. It moved its howitzers by ground and air all around Afghanistan and fired them accurately in support of combat missions—giving the infantry greater range, lethality and accuracy than the mortars.

Field Artillery is the maneuver forces' all-weather, land-based firepower—the Army *never* should leave home without it.

Endnotes:

1. All airframes computed by Sergeant First Class Frank Luedtke, the S3 Air for 1-319 AFAR during deployment and redeployment to/from Afghanistan.
2. Ann Scott Tyson, "Anaconda: A War Story," *Christian Science Monitor* (Boston: Christian Science Publishing Society, August 1, 2002), 1.

Captain Joshua D. Mitchell was the Fire Direction Officer (FDO) for C Battery, 1st Battalion, 319th Airborne Field Artillery Regiment (C/1-319 AFAR), 82d Airborne Division, Fort Bragg, North Carolina, and deployed to Afghanistan for Operation Enduring Freedom (OEF) II. Currently, he is deployed to Iraq as the Battalion FDO for 1-319 AFAR in Operation Iraqi Freedom II. In other positions with 1-319 AFAR, he was the Executive Officer for C Battery and the Fire Support Officer for B Company, 2d Battalion, 505th Parachute Infantry Regiment. He holds bachelor's degrees in Biomedical Engineering and Mathematical Sciences from Johns Hopkins University. He was a Distinguished Graduate of his Field Artillery Officer Basic Course and the recipient of the Gunnery Award at Fort Sill, Oklahoma.

Decentralized Fires in Afghanistan: A Glimpse of the Future?

By Lieutenant Colonel Dennis D. Tewksbury and Major Joel E. Hamby

The 1st Brigade, 504th Parachute Infantry Regiment (PIR) of the 82d Airborne Division, Fort Bragg, North Carolina, deployed to Afghanistan in support of Operation Enduring Freedom III (OEF III) from December 2002 until August 2003. It deployed with its direct support (DS) battalion headquarters, 3d Battalion, 319 Airborne Field Artillery Regiment (3-319 AFAR); one six-howitzer 105-mm battery; and two mortar batteries, each with four 120-mm mortars crewed by Field Artillerymen.

The enemy, theater and mission were challenging for the paratroopers of the *Gun Devil Battalion*. The dispersed and elusive enemy, the distances between units of up to 300 kilometers and the mission required Redlegs to operate in an extremely decentralized mode.

Two four-mortar batteries in Afghanistan were manned by Redlegs who had been trained on the standard M120 120-mm mortar fielded to mechanized infantry battalions.

As frustrating as this decentralization was for the senior leaders of the battalion, battery leaders and fire supporters found it both demanding and rewarding. Operating in a nontraditional and equally nondoctrinal manner for many missions demonstrated the flexibility of the artillery and our junior leaders.

More importantly, OEF III could be a glimpse of the future of the light artillery in support of distributed, noncontiguous operations. This article provides lessons learned in Afghanistan and notes the missions and capabilities the artillery must have to remain relevant in the low-intensity fight.

Organization for Combat. 3-319 AFAR deployed to Afghanistan as a hybrid battalion composed of a tactical command post/administration and logistics operations center (TAC/ALOC) element, two mortar batteries, a countermortar radar (Q-36) section and an understrength M119A2 105-mm howitzer battery. A total of 280 personnel of the authorized battalion strength of 449 (including fire supporters) deployed.

Due to a theater-level force constraint, 40 percent of our assigned strength and 12 howitzers were left behind at Fort Bragg along with the battalion executive officer (XO) and headquarters and services battery (HSB) commander.

The battalion's organization was a legacy of previous rotations. We relieved the 1-319 AFAR. Its organization for combat, in turn, was based on experiences during OEF I. The Rakkasan Brigade Task Force (TF) from the 101st Airborne Division (Air Assault) deployed with its forward observers (FOs) and organic mortars, leaving its DS artillery battalion behind at Fort Campbell, Kentucky.

During OEF II when the 82d Airborne Division assumed the mission in July 2002, deploying artillery support was a "tough sell" and, consequently, low in the competing demands for airlift space into theater. A rough compromise was established: our sister battalion deployed one six-howitzer firing battery with crews for four sections and two firing batteries, each with four 120-mm mortars. The mortar batteries deployed as additional mortar platoons under the infantry battalion TFs. This was a last-minute compromise to get firing assets into the fight. A special mobile training team (MTT) from the Infantry School at Fort Benning, Georgia, trained Redlegs on the mortars.

Our battalion followed the legacy organization and fell in on the equipment in theater but brought a more robust personnel structure and a TAC and skeleton ALOC for our headquarters. (See Figure 1.)

Our experiences at the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, before deploying were invaluable; that rotation forced us to increase the number of personnel within the mortar battery to be able to operate autonomously. The 26 personnel allocated an infantry battalion mortar pla-

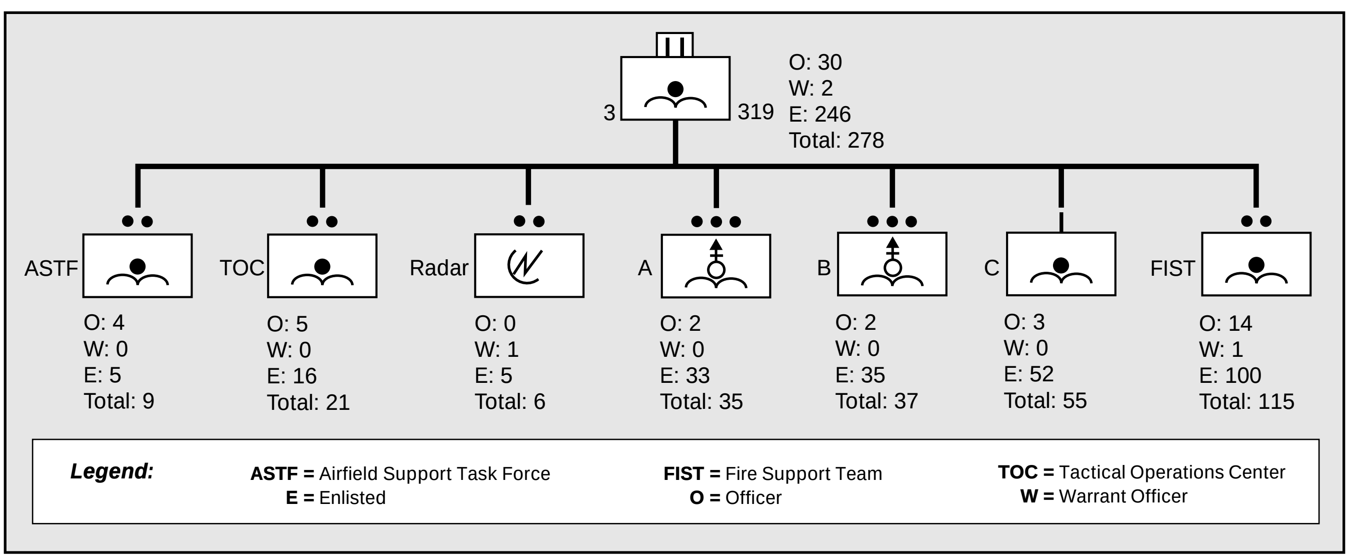


Figure 1: 3d Battalion, 319th Airborne Field Artillery Regiment (3-319 AFAR) Organization for Combat in Operation Enduring Freedom (OEF) III

toon that is organic to the infantry headquarters company (the model we organized around), was not enough to allow the battery to take care of itself during most operations. After the JRTC rotation, we expanded the mortar battery to 35 personnel.

Much of our headquarters battery and four complete gun sections remained at Fort Bragg along with all of our heavier transport trucks.

A look at the numbers deployed tells the story of capability provided at a price. Stripped of most of our headquarters, the battalion could not sustain itself in the field and, as a consequence, had to set up headquarters permanently on Kandahar Airfield. The TAC/ALOC became the logistical hub for FA operations throughout southeastern Afghanistan during OEF III. We deployed the S3 and an assistant S3 along with small numbers of other staff sections to support our batteries while based in fixed locations. (See the map in Figure 2.)

While we retained the ability to move a TAC to the field for operations, logistically we could not sustain a field headquarters for any length of time. Our ammunition platoon did not deploy from Fort Bragg, leaving all ammunition operations to the ammunition platoon sergeant at Kandahar and an ad hoc detail whenever 105-mm and 120-mm ammo was needed.

Our ability to move paratroopers, guns or ammunition was limited to what aircraft the brigade could allot. Essentially, this made the artillery battalion headquarters' mission one of support vice command and control (C^2) for the duration of the deployment. The FA battalion headquarters served as a force provider, not a C^2 node. Because of these limitations, we never deployed an FA TAC out on an operation while in country.

Our 120-mm batteries were manned by howitzer crews from two firing batteries who had been trained on the standard M120 120-mm mortar fielded to mechanized infantry battalions. This weapon is a fine addition to the firepower of an infantry TF with its increased range of 7,200 meters and significant firepower, but it is a step in the wrong direction for the artillery.

Still, our crews were able to master the weapons drill easily, and the system's portability (approximately 400 pounds) made it a choice indirect weapon for lift-constrained air assaults. Our paratroopers did a magnificent job of manning the systems during many operations, and our infantry companies grew attached to their responsiveness and firepower, but the weapon is just a larger variant of the other mortars already available to infantry battalions. Our experience was that an organic infantry mortar platoon already does this job well; there is no need for FA to take over the role.

For firepower and range, the M119A2 was more than the M120's match, except in weight. We chose the 105-mm howitzer when we needed range, lethality and the most accuracy.

Figure 2: Map of Afghanistan

A small but significant portion of the battalion's leadership was tied up with the mission as the airfield support TF (ASTF). The battalion commander served as the ASTF commander and was assisted by the battalion command sergeant major. Essentially, the ASTF was the garrison staff for the Kandahar Airfield, providing installation-level management for the day-to-day activities and freeing the brigade commander to focus on combat operations. This responsibility required approximately 70 percent of the FA battalion commander's time. Targeting boards, mission analysis or other parts of the military decision-making process (MDMP)—even rehearsals—often competed with ASTF demands.

FA Operations. Our operations in Afghanistan were in three categories: large operations (TF-plus); firebase or forward operating base (FOB) support (Shkin, Orgun-e, Asadabad and FOB Salerno); and logistical support (via helicopters) from fixed installations (either Kandahar or Bagram). These operations were conducted with minimum essential equipment and, for artillery operations at least, below modified table of organization and equipment (MTOE) strength. The primary limiting factor was the number of rotary-wing aircraft available to support either long-term operations in a province or routine life support at the particular firebase.

Major Combat Operations. During eight months in Afghanistan, Combined Task Force (CTF) *Devil* conducted more than 18 major operations of various durations: from 10 hours to three weeks. During this flurry of constant combat operations, 3-319 AFAR supported missions with a wide variety of assets inserted into the operation by ground assault convoy (GAC) or air assault. Often a combination of both was used.

Because the FA battalion could not support itself in the field and usually could not justify the space on aircraft during an air assault, 3-319 FAR began attaching assets DS to maneuver battalions. Most of these operations were a single battalion fight with some brigade direction with little need for an FA TAC. The fire support officers (FSOs) learned to step up and perform some of the basic C^2 functions for the firing unit, and our commanders and XOs learned to work within a maneuver battalion.

During early operations in January and February 2003, such as Operation Mongoose, we inserted a pair of 120-

mm mortars by air into the Adi Gahr mountain range 50 kilometers southeast of Kandahar Airfield and supported cave clearance operations. We soon learned that air assaulting mortars with ammo and a single gator for transport into the area of operations (AO) was insufficient to support the maneuver force or to reposition without outside help.

During overall operations, the firing elements grew enough to be effective in support of the force. However, the altitude and weather often forced us to choose different methods of getting mortars and howitzers into and out of the fight.

For example, during Operation Viper in February and March, we inserted a two-gun package of howitzers and a two-gun mortar platoon to support the clearance of the Baghran and Baghni valleys 100 kilometers northwest of Kana. The mortars air assaulted in with a pair of gators, and the howitzers with their prime movers were loaded internally into CH-47Ds (Chinooks) and inserted into the AO. Due to constant moves along these tough valleys in the Helmand Province, C Battery (105-mm) had trouble maintaining the pace of the anti-tank company ground movement and other air assault assets; the large amount of howitzer ammunition had overloaded the trucks (we only brought two). The B Battery platoon of mortars also experienced difficulty in repositioning with just gators for transport and had to rely on help from the maneuver battalion's supply and transport (S&T) platoon.

After Operation Viper, we slung the howitzers out of the operation under UH-60L Blackhawks and ground assault convoyed the prime movers out of the valley and back to Kuwait Air Base several hundred kilometers away.

For a few operations, we deployed a full battery of mortars and a battery (-) of howitzers, but the standard package for long-distance operations became 120-mm mortars and a two-gun howitzer package.

Despite the large number of operations, firing was limited. Overwhelming firepower and force on the ground occasionally yielded large caches of ammunition and equipment but little contact with the enemy. Emergency resupply was prepositioned either at an intermediate firebase or at Kandahar, but an emergency never arose during our time in theater.

Most of the M119 missions were either presence illumination or show-of-force high-explosive (HE) missions to demonstrate resolve to a sometimes recalcitrant local population.

A Q-36 radar section operates in Shkin, Afghanistan.

Firebase Support. For most of our tour in Afghanistan, the majority of our firing units were stationed at firebases throughout the country, providing fires in support of maneuver forces, Special Forces or other government agencies (OGAs). At times during the spring and summer, we had mortars or artillery stationed at Firebases Shkin and Orgun-e on the Pakistani border in support of 3-504 PIR and Special Forces, a battery supporting operations at FOB Salerno just north of Khowst for a few months and mortars supporting 2-505 PIR at Asadabad in Kunar Province near the Pakistan border.

During our rotation, two Q-36 Firefinder radars were positioned at the various firebases to mitigate the indirect threat from 107-mm rockets launched by either BM-12 (Type 63) and BM-1 systems or simply propped on a rock or angle iron and detonated by timer. Rockets were the most common threat and pattern analysis was key to determining a launching pattern and our vulnerable times, although casualties due to rockets were nonexistent during our deployment. When a radar and howitzers were stationed at a vulnerable base, they reduced the rocket attacks significantly.

At Shkin Firebase in particular, the infantry TF faced a multi-faceted threat of anti-Coalition militant (ACM) ambushes, mines and the ever-popular rocket attacks. Most of our contacts and casualties came from attacks at Shkin with the ACMs quickly filtering across the Pakistani border to attack a patrol or launch rockets and moving quickly back to their sanctuary with relative impunity.

After a particularly bad ambush in April, the TF applied a combined arms approach to the contacts and rocket attacks during the spring and early summer. The enemy suddenly discovered the superiority of our infantry when combined with accurate indirect fires. Every contact thereafter was treated to a good mix of infantry, both mounted and dismounted, and a healthy portion of HE rounds from the 105-mm howitzers. ACM attacks tapered off after a number of rough contacts.

But not all of our infantry companies had this combined arms experience at the hottest firebases, and some bad lessons persisted. Continuing to stress combined arms warfare to our young company commanders and platoon leaders in all training and operations is an absolute *must*. As the Chief of Infantry Major General Paul D. Eaton said in an interview, "the first thing we [infantrymen] need to do is call for indirect fire…by reflex" ["Indirect Fires First—The American Way of War," July-August 2003].

The bottom line: we need to fight as a combined arms team.

Logistical Operations. Everything logistical in Afghanistan was by fixed- or rotary-wing aircraft. Combined Joint Task Force-180 (CJTF-180) supported the various firebases throughout the AO by using a series of resupply rings with resupply conducted by helicopters.

Each firebase was supported with mail, ammunition and perishables based on color-coded rings flown by CH-47Ds or UH-60Ls out of either Kandahar or Bagram. All FA resupply operations hinged on these ring aircraft, considering how far apart firebases were from each other and from Kandahar. Items for firebase support either waited for the regularly scheduled ring or, if important enough, were flown in on a separate mission request.

For major operations, the prepositioning of systems and infantrymen began weeks beforehand and required great thought and coordination. Emergency resupply requests bumped other lower priority cargo off the ring aircraft but rarely rated a separate mission. On only three occasions in eight months did the artillery rate a special air mission request: one for emplacing howitzers and the Q-36 at a threatened firebase and two for emergency howitzer ammunition resupplies during critical contacts. Everything else rode out to the firebases by the rings or did not go at all. We were totally dependent on the ring system of resupply.

Impact and Issues. Operations supporting OEF III raised several important issues. In our combat experience in Afghanistan, too much of the light community has learned that it's easy to leave the FA behind.

Deploy with all assigned equipment and personnel. Having a cap placed on the number of soldiers deployed on a mission has a definite impact on operations. Instead of stating a desired capability, the Army has listed the number of personnel allowable and then figured out what missions can be accomplished within that strength. If the assets deployed are too low, this assumes the enemy won't fight or influence friendly actions.

An example of this in Afghanistan was placing a limit on the number of cannon crewmembers. MTOE strength for an M119 crew is seven. The *Gun Devils* could bring only six-man crews for our howitzers. While occupying FOB Salerno, C Battery not only was responsible for manning howitzers, but also for manning guard towers that surrounded their portion of the perimeter. With the addition of a few more details, crewmembers were being pulled away from their guns.

This is significant when you add in the task of maintaining a "hot platoon" for 24-hour operations or when missions demanded a two-gun package to support a maneuver operation. At times, degraded gun crews were down to four men.

At Fort Bragg or the Combat Training Centers (CTCs), we don't train that way. We need to deploy just as we train—with all our troops and equipment.

Light artillery units need to stay light. Our howitzers need to be light enough to be slung by UH-60Ls or internally loaded or slung by CH-47Ds. Lack of lift aircraft often prevented the *Gun Devils* from getting howitzers into the fight in Afghanistan while a lighter system was employed, which may or may not have been the best system for the specific mission.

As the weather in Afghanistan warmed and missions were conducted at high elevations, the lift capacity of rotary-wing aircraft diminished. The road network throughout Afghanistan is extremely poor with streambeds often passing for trails. Large vehicles had a difficult time negotiating the narrow streets, tight turns and the often remarkably tough terrain. Our systems must be prepared to insert into such a theater, one way or another.

We need long-haul communications. This deficiency had a significant impact on how the battalion prosecuted the fight in country. The *Gun Devils* had crews of 120-mm and 105-mm sections several hundred kilometers away from the battalion tactical operations center (TOC) with very limited and, in some cases, no communications. Communication was through digital non-secure voice telephone (DNVT), secure Internet protocol net (SIPRNET), my Internet relay chat (MIRC), Force XXI battle command brigade and below ($FBCB^2$) or Iridium phones.

Practically speaking, the battalion couldn't command and control its assets and had to rely on reports from fire supporters in the infantry battalions for ammunition resupply and other information. This is not a good way to integrate into the combined arms team.

Junior leaders can do the job. Afghanistan taught us that our junior leaders can handle the tough missions. Lieutenants, young sergeants and our enlisted soldiers demonstrated competencies and talents that are often unappreciated, over supervised or neglected in garrison. Battery XOs were often in charge of a platoon of guns at a remote firebase or operated as the senior artillerymen supporting a maneuver operation with no oversight by the battalion or battery commanders. Specialists and privates first class served as platoon forward observers (FOs) with great results. These young Redlegs stepped up and met challenges head-on.

Senior leaders Armywide need to challenge soldiers by giving them more responsibilities and less micro-management. All they need is the intent and some guidance with follow up.

We need more enlisted tactical air controllers (ETACs). During OEF II,

Ammo	Max Range (Meters)	Max Ord Low (Meters)	Max Ord Low (Feet)	Min Range (Meters)	Max Ord High (Meters)	Max Ord High (Feet)
HE (M1)						
Chg 1	3,500	591	2,000	2,500	1,723	5,700
Chg 2	4,000	642	2,200	2,500	2,077	6,900
Chg 3	5,000	931	3,100	3,000	2,526	8,400
Chg 4	6,000	1,018	3,400	3,500	3,161	10,500
Chg 5	8,000	1,792	6,000	4,000	4,076	13,500
Chg 6	9,500	2,431	8,100	5,000	4,924	16,300
Chg 7	11,000	2,346	7,800	6,000	6,198	20,500
HE (M760)						
Chg 8	13,500	3,210	10,600*			
RAP (M913)						
Chg7/RO	20,000	7,129	23,600	11,500	12,330	40,700

*Combat Emergency Situation *Only*

Legend: **Chg =** Charge **FT =** Firing Table **HE =** High Explosive **Max =** Maximum **Min =** Minimum **RAP =** Rocket-Assisted Projectile **RO =** Rocket On

Figure 3: Maximum Ordinate Cheat Sheet for the 105-mm Howitzer. All data was extracted from "Firing Table (FT) 105-AS Table G."

TF Panther had approximately nine ETAC teams. When CTF *Devil* assumed the mission in January, only six ETAC teams were on hand along with their brigade air liaison officer (BALO) and air liaison officers (ALOs). This package is a standard brigade tactical air control party (TACP), but we rarely see it outside of combat.

For example, at a JRTC rotation in September 2002, our brigade only had the BALO and a single ETAC team. With robust deployments to Kuwait for Operation Iraqi Freedom (OIF), we had lost some of our TACP assets.

Our TACP professionals were excellent, but there were not enough of them. During a major operation, planners usually allotted an ETAC to each of three maneuver companies with the BALO at the battalion TOC. Once the routine firebase ETAC support was added, we ran out of ETACs before we ran out of missions. Additionally, two ETACs always supported the quick reaction force (QRF) at Kandahar and Bagram, further limiting the number of forward air controller-qualified personnel.

As several recent interviews, columns and articles have stated, in the short term, we must train fire supporters to serve as terminal controllers for emergency close air support (ECAS) and, in the long term, train them as universal observers to control joint fires as a supplement to ETACs. The second part of the solution is to provide company fire support teams (FISTs) at least one AN/PRC-117F for long-distance communications with aircraft and as an additional satellite capability.

We need precision-guided munitions. We need precision-guided munitions for our lightweight cannons to restrict collateral damage and protect populated areas—considering the rules of engagement (ROE) we face in modern combat scenarios.

At Firebase Orgun-e, the enemy launched multiple rockets at Coalition Forces that could not engage him because the launch sites were in populated areas. A global positioning system (GPS)-guided projectile for our light howitzers using targeting information from a Q-36 would have been effective.

Army Airspace Command and Control (A^2C^2). While we were in Afghanistan, A^2C^2 for simultaneous execution of air and artillery missions was not executed, mainly by choice. During many operations, due to the lack of enemy opposition, maneuver forces and Army aviation chose the easy way to deconflict airspace: either guns shoot or aviation flies, one at a time.

In home station training and at the CTCs, A^2C^2 is not a challenge because of the restrictive safety regulations and the inability to replicate complexities. Aircraft follow their routes and stay away from the gun-target line, attack aviation stays in its battle positions and all players know and understand the maximum ordinate for indirect systems, especially in a scripted live-fire exercise.

The problem is that the control measures and "range" regulations in training don't exist in a combat zone. Early in OEF III, indirect fire was shut down to execute an air assault or allow a C^2 aircraft to land because we did not set up procedures to facilitate those joint operations.

After a while we developed A^2C^2 deconfliction matrices as a goal for the FSO and aviation elements to deconflict airspace other than by altitude or formal and informal airspace control areas (ACAs).

Each FSO also carried a quick-reference card with the maximum ordinate of each type of round by charge (Figure 3), so with the ETAC, he could determine the mean sea level (MSL) altitude above which to keep fixed-wing. The FSO overlaid the matrix on his map to help keep the firing assets and Army and Air Force aircraft separated.

The high elevation we operated at in Afghanistan made this critical as FSOs had to clear all fires above 10,000 feet MSL through the USAF TACP. We operated at 7,000 feet elevation for long periods of time; that, in effect, meant *all* indirect fires had to be cleared through the Air Force. Careful planning was necessary to set the preconditions for this type of coordination; early on, it was either not done or not done well.

Another part of the problem was that pre-assault fires were not used because of ROE considerations (identify the hostile intent before engaging the target) and the fact that our maneuver elements never encountered a hot landing zone (LZ). We attribute the latter to the amount of friendly combat power incoming during major operations—we had no need to fire in conjunction with an air assault. Therefore, there was no pressing need to deconflict air and artillery.

These procedures and restrictions could teach maneuver commanders they cannot use or don't need to use artillery in conjunction with aviation—the wrong lesson to impart. Future conflicts may not present as many cold LZs as OEF III did.

Although conditions have changed with the 10th Mountain Division (Light Infantry) Artillery (minus) out of Fort Drum, New York, now supporting operations in Afghanistan, we can learn from OEF III. We must ensure we continue to improve indirect fire operations for all allied and US servicemen in demanding theaters, such as Afghanistan. First, we must train as we fight—be prepared to conduct operations across the entire spectrum of conflict.

3-319 AFAR did provide critical fire support, and the timely fires of our *Gun Devils* saved soldiers lives. But we did not set our Infantry brethren up for success as well as we could have.

Lieutenant Colonel Dennis D. Tewksbury commands the 3d Battalion, 319th Airborne Field Artillery Regiment (3-319 AFAR), 82d Airborne Division, Fort Bragg, North Carolina, which redeployed in August from Operation Enduring Freedom III (OEF III) in Afghanistan. His previous assignments include serving as the Executive Officer to the Vice Director of the Joint Staff at the Pentagon and as Assistant Fire Support Coordinator (AFSCCOORD) for the 10th Mountain Division (Light Infantry) at Fort Drum, New York. Also at Fort Drum, he was the S3 for 2-15 FA. In other assignments with the 82d Division, he was the S4, Commander of Headquarters and Services Battery and a Battalion Fire Support Officer (FSO), all with 1-319 AFAR. He holds a Master of Administration from Central Michigan University.

Major Joel E. Hamby is the S3 of 3-319 AFAR at Fort Bragg. He served as both the Combined Task Force *Devil* FSO and 3-319 AFAR S3 during OEF III in Afghanistan. In previous assignments, he was the Brigade FSO for the 1st Brigade, 504th Parachute Infantry Brigade, 82d Division; Fire Support Observer/Controller at the Joint Readiness Training Center, Fort Polk, Louisiana; and Commander of B/1-320 FAR, 101st Airborne (Air Assault) Division, Fort Campbell, Kentucky. Also in the 101st Division, he was an Aviation Battalion FSO, Battalion S2 and Company FSO. He holds a Master of Arts in Liberal Arts from Louisiana State University and a Master of Military Studies from the Marine Corps University at Quantico, Virginia.

First Lethal FA Fires in Afghanistan: Lessons Learned at Firebase Shkin

By Captain James A. Sink

On 25 April 2003, the two M119 105-mm howitzers of Team Gold at Firebase Shkin on the Afghani-Pakistani border fired the first lethal artillery rounds of Operation Enduring Freedom (OEF). Team Gold was part of C Battery, 3d Battalion, 319th Airborne Field Artillery Regiment (C/3-319 AFAR), 82d Airborne Division.

On the morning of 25 April, elements of B Company, 3d Battalion, 504th Parachute Infantry Regiment (B/3-504 PIR) and the 1st Platoon of the 82d Military Police Company (1/82 MP) made contact with 25 to 30 enemy personnel during a routine patrol approximately eight kilometers from the firebase. Shouting his transmission over the clatter of small arms fire, Sergeant Konrad Reed, B Company's FA forward observer (FO), called for fire on a planned target and reported he had been "hit" by grenade fragmentation.

On the radio, the fire direction center (FDC) attempted to reach the infantry battalion executive officer (XO) who had the authority to clear high-explo-

C/3-319 AFAR on Firebase Shkin

sive (HE) fires, but high-volume traffic prevented the FDC from contacting him. The C Battery XO then checked the target location against friendly unit locations on the map and, despite the target's being danger close to the FO's observation post (OP), determined it was safe to fire and commanded the FDC to send the data to the guns.

The FO and his company fire support officer (FSO), First Lieutenant Mike Dolan, who also was injured by the grenade, adjusted the rounds and used "creeping fires" during three subsequent volleys to bring the rounds within 100 meters of their position. The FSO then established the location of the final volley as a priority target.

Team Gold's 25 April fires resulted in one enemy killed in action (KIA) with signal intelligence (SIGINT) and human intelligence (HUMINT) sources later indicating more had died of wounds.

Although this first lethal FA engagement was brief and only two howitzers fired, we can learn from such small-unit operations in extremely harsh terrain. We first learned that M119 fires were responsive and accurate in combat operations in Afghanistan—often making them the fires of choice for immediate close support and blocking or suppressing the enemy. Also, a land force could face similar circumstances as the FA helps fight the War on Terrorism in other equally challenging locations around the globe.

3-319 AFAR M119s on Firebases. C/3-319 AFAR deployed in support of OEF III in January of 2003 and remained in Afghanistan until August 2003. It deployed with six howitzer sections, one FDC section and a battery headquarters and conducted split-battery operations during the entire deployment.

A portion of the battery, Team Black, consisted of four 105-mm howitzer sections; four FDC personnel, including the fire direction officer (FDO); and a majority of the battery headquarters, including the battery commander, first sergeant and chief of firing battery. Team Black, after being positioned in several locations, settled in July at Firebase Orgun-e along the Afghani-Pakistani border. (See the map on Page 12.)

The remainder of the battery, Team Gold, consisted of two howitzer sections; four FDC personnel, including the fire direction NCO (FDNCO); the gunnery sergeant; and the battery XO.

Before Team Gold arrived at Shkin, elements of the 504th PIR relied on CAS to provide indirect fire support, often waiting long periods for aircraft to arrive. As a result of Team Gold's performance in its first engagement, maneuver leaders used the howitzers to provide close supporting and blocking fires during all subsequent engagements.

Team Gold initially occupied a firebase at Bagram Airfield and then, in April, moved to Firebase Shkin, which is 40 kilometers south of Firebase Orgun-e, also on the Afghani-Pakistani border.

Throughout the deployment, the battery's two elements operated great distances from each other, sometimes exceeding 400 miles. To communicate, the two teams had to depend on long-range devices, such as tactical satellite (TACSAT), Force XXI battle command brigade and below ($FBCB^2$) and other devices.

When Team Gold occupied Firebase Shkin, it emplaced the two howitzers at the northern and southern corners of the firebase with the FDC/command post (CP) approximately 75 meters from the northernmost gun. To facilitate 24-hour operations, the team manned the howitzers at 33 percent and the FDC at 50 percent (one NCO and one soldier awake at each howitzer and in the FDC) during hours of limited threat and manned them 100 percent during hours of increased threat. The threat assessment was based on enemy patterns/trends and the firebase maneuver element's patrol schedule. Members of the howitzer sections not on duty slept in crew tents or improved shelters at the howitzer positions while FDC personnel slept in the FDC/CP (an improved mud-hut shelter), allowing the team to gain 100 percent manning quickly.

Team Gold operated a fully automated FDC using the handheld terminal unit (HTU) with battery computer system (BCS) software and maintained a manual back up. It fought a constant battle to meet some of the five requirements for accurate, predicted fire. Team Gold provided its own survey using the gun laying and positioning system (GLPS) and precision lightweight global positioning receiver (PLGR) and calibrated every powder lot.

With no meteorological section, the team employed a technique to use Air Force Met to improve firing data. (See the article "Afghanistan: Firing Artillery Accurately with Air Force Met Support" by First Lieutenant Joshua D. Mitchell, January-February 2003). With no Internet access to download the Met information, the team relied on resupply aircraft to deliver the information, and, at times, went seven to 14 days without receiving updated Met data. Because of this, the howitzers had to register often.

Unique to Firebase Shkin was the close working relationship the artillerymen maintained with their maneuver unit: two rifle platoons, one anti-tank (AT) platoon and two MP sections (later replaced by another AT platoon), as well as scout and long-range surveillance detachment (LRSD) elements.

The rifle company commander commanded the maneuver elements in the firebase, and the infantry battalion XO provided command and control (C^2) for all firebase elements. The battery XO on Team Gold reported directly to the battalion XO and served as sort of a "fire support coordinator" (FSCOORD) for the firebase. The battery XO participated in planning and briefings for every mission, providing input on the battery's capabilities and limitations and maintaining situational awareness.

Lessons Learned 25 April. Team Gold learned several lessons firing on an elusive enemy in extremely rugged terrain during the engagement at Firebase Shkin.

Preplanned Targets and Hasty Fire Planning. A key lesson was the importance of establishing and using planned targets and conducting hasty fire planning. On the morning of 25 April, the FSO had conducted a quick mission analysis for the day's patrol and determined the existing targets were not adequate. The FSO then conducted hasty fire planning with the battery XO.

During the 25 April patrol, the FO directed the FDC to lay on the target planned by the FSO that morning. Within seconds, the FO gave the command to fire. Although the target was approximately 300 meters beyond and 200 meters left of where the FO wanted the fires (along the observer-target line), he knew that firing the planned target would increase the response time and block and suppress the enemy as friendly forces maneuvered.

Situational Awareness and Battle Tracking to Clear Fires. The 25 April contact also proved the importance of situational awareness and battle tracking in the FDC and the firing unit leader's involvement in the maneuver planning process.

After the engagement, the firebase developed standing operating procedures (SOP) to rapidly clear fires in support of troops in contact. Under this SOP, if troops made contact and the battalion XO was not immediately available on the net, the howitzers could execute fires as long as the senior maneuver leader on the ground cleared the fires and the battery XO performed a secondary check by plotting the target against friendly unit locations. For the battery XO to assume partial responsibility for clearing fires, he had to understand the maneuver plan and the FDC had to maintain situational awareness through detailed battle tracking. Using this SOP, Team Gold provided responsive, accurate fires in support of troops in contact eight times at Shkin.

*Maneuver Tactics, Techniques and Procedures (TTPs).*The maneuver ele-

A/3-6 FA at Firebase Shkin in Afghanistan—NOW

From the rocky, desolate firebase where the Alpha *Steel Battery* Redlegs have positioned their guns, you can hit Pakistan with a rock. Instead, the 3d Battalion, 6th Field Artillery (3-6 FA) *Centaurs* of the 10th Mountain Division (Light Infantry) choose to spend their time throwing cold steel "rain" at unfortunate enemies.

In the months since their arrival on the barren Afghani mountain range, the men of 3-6 FA have learned the call to duty can come at any time, and they don't always have time to dress for the occasion. Fire missions called in by their fire support team (FIST) brothers out walking with the 10th Mountain Infantry can come at all hours, and when the calls come, the missions are fired. A tedious day suddenly can be punctuated by another call-for-fire on the enemy.

The missions turn night to day as illumination rounds hang swinging in brilliant globes beneath lazy parachutes or fill the rocky hillsides with the rolling thunder of unforgiving barrages of jagged steel fragments. US infantry and artillery soldiers witness the power of the *Centaur* Redlegs on a daily basis.

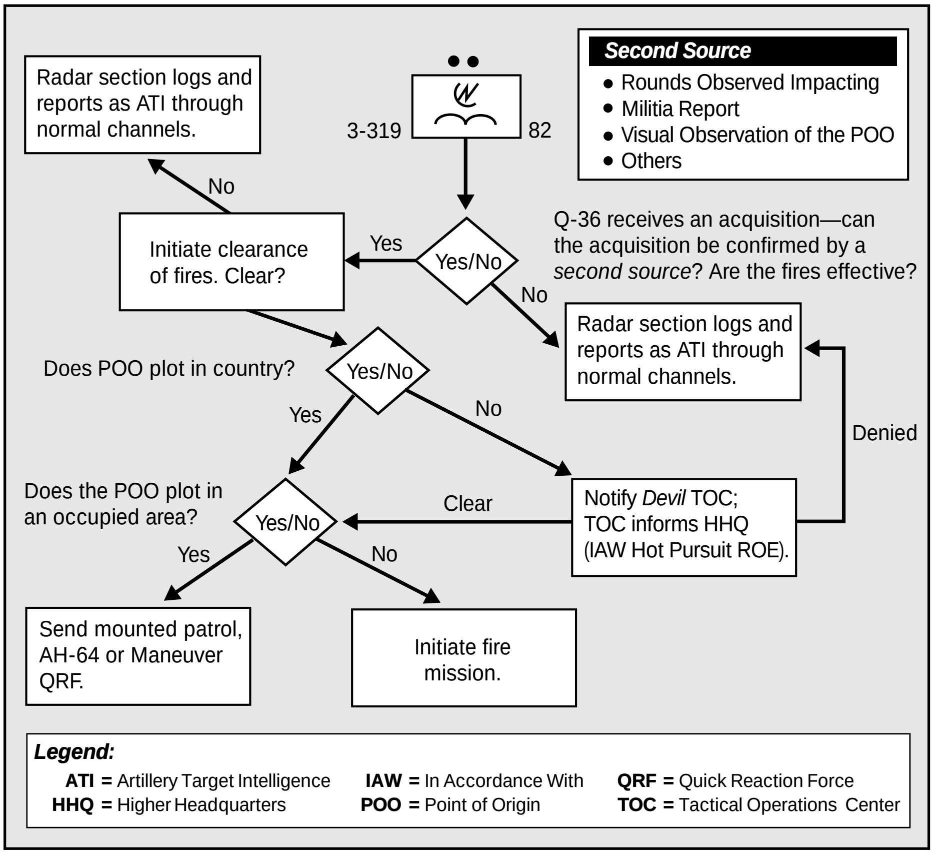
The roaring recoil of the guns billows clouds of the tan talcum dust that covers everything on the firebase. The dust slowly settles when the mission is over, but the Redlegs don't just walk back to what they were doing when the call came. These days, they *swagger.*

The day-to-day successes have done little to change the fact that each man misses home and family. Everyone knows his job is important—that he could save US lives on each mission. At the same time, phone calls, letters and packages are pearls beyond price at *Alpha Steel's* redoubts. Each arriving mailbag is impatiently eyed as if it were Santa's own bag of toys.

The *Centaurs* have learned much from the past months, but most of all that the ability to answer the call any time, day or night, is what they've trained for. Whether the mission comes in at Shkin, Orgun-e or any of the remote firebases across the vast Afghani countryside, the Redlegs of 3-6 FA are ready. Each day brings challenges, and the *Centaur* Redlegs meet those challenges with honed skills and steady vigilance. And they *know* it.

1LT Matthew A. Seibert
Reconnaissance-Survey Officer, 3-6 FA
10th Mtn Div Arty, Afghanistan

A/3-6 FA Redlegs interrupt physical training (PT) to fire a mission.



C/3-319 AFAR Acquisition Decision Matrix. This is a simple response matrix that clarifies the rules of engagement (ROE) and maneuver actions.

ment then developed new TTPs to capitalize on Team Gold's ability to provide timely, accurate fires. Before Team Gold arrived at Shkin, maneuver elements relied on close air support (CAS) to provide indirect fire support, often waiting long periods for aircraft to arrive on station. As a result of Team Gold's performance in its first engagement, maneuver leaders used the howitzers to provide close supporting and blocking fires during all subsequent engagements.

Another important TTP developed by the maneuver unit after 25 April was employing howitzer fires as, what the maneuver battalion XO called, the "decisive effort." To keep enemy forces from massing in the area, the maneuver battalion XO began placing scout and LRSD teams out in OPs for 48 to 72 hours, directing them to call-for-fire before engaging the enemy with direct fire weapons. The battalion XO's intent was to use the scouts and LRSD elements to find the enemy and howitzer fire to either finish or fix him until the quick reaction force (QRF) arrived—indirect fire as the decisive effort.

The FDC planned targets to support scout and LRSD OP missions. Once the maneuver observers were in position, they refined the targets; developed a hasty fire plan, based on the surrounding terrain; and established a priority target. On four occasions, Team Gold fired priority targets for scout and LRSD teams who had eyes on the enemy, resulting in five enemy KIA.

Enemy forces operating in the vicinity of Shkin used hit-and-run tactics, expending large amounts of ammunition in a short time, and then concealed themselves in the rugged terrain to break contact. These tactics highlighted the need for situational awareness and responsive fires and made the quick-response SOP crucial for the success of operations.

Radar Acquisition Counterfire TTP. One of the greatest threats at Firebase Shkin was enemy attacks with 107-mm rockets. During an attack on 21 June, the Q-36 Firefinder on Shkin made the first radar acquisition of a 107-mm rocket.

For Q-36 acquisitions, the battalion XO used the acquisition decision matrix to clear fires. (See the figure.) This is a simple, graduated response matrix that clarifies the rules of engagement (ROE) and maneuver actions and works well when drilled.

When the radar received an acquisition, the FDC processed the fire mission and sent it to the howitzers as "Do Not Load." The battalion XO then either cleared or did not clear the mission.

On 21 June, the FDC processed the mission and had the guns laid on Do Not Load data within 45 seconds of receiving the point-of-origin (POO) data from the radar. Once the battalion XO cleared the fires, the guns fired an initial volley and one repeat volley. Maneuver elements sent to investigate the launch site found one unexpended rocket surrounded by shrapnel from the artillery rounds.

To expedite clearing fires in the future, the FDC could create graphical control measures to identify areas on the map that are cleared or not cleared in accordance with the decision matrix (i.e., unpopulated or populated areas). These control measures will allow the FDC to plot the POO on the map and, after confirming enemy fires by a second source, know immediately if counterfires are cleared. If the Q-36 receives an acquisition and the firebase receives incoming fire (the second source of confirmation in accordance with the decision matrix), the senior maneuver leader plots the POO on the map; if the POO plots inside one of the "pre-cleared" areas, counterfires can be initiated immediately.

At Firebase Shkin, we decentralized the clearance of fires drill as much as the situation allowed.

One of the most rewarding parts of operations at Firebase Shkin was Team Gold's constantly receiving positive feedback from its maneuver brethren. After each engagement, soldiers came to the FDC or the guns to thank them for the indirect fires. Team Gold's response—"That's our job."

Captain James A. Sink was the Executive Officer of C Battery, 3d Battalion, 319th Airborne Field Artillery Regiment (C/3-319 AFAR), 82d Airborne Division, and deployed to Afghanistan for Operation Enduring Freedom III, participating in the engagement at Firebase Shkin on 25 April 2003. Currently, he is the S1 of 3-319 AFAR at Fort Bragg, North Carolina. Also with 3-319 AFAR, he was the Fire Support Officer for B Company, 1st Battalion, 504th Parachute Infantry Regiment, and Fire Direction Officer for A Battery. He is a graduate of the US Military Academy at West Point, Class of 2000.

Joint Fires

A BCD Perspective in Operation Iraqi Freedom

By Lieutenant Colonel Thomas L. Kelly and Lieutenant Colonel (Retired) John P. Andreasen

Operation Iraqi Freedom (OIF) demonstrated the awesome lethality of joint land and air power when brought to bear in a coordinated and synchronized fashion—the most effective execution of land-air power in history. The Army's 1st Battlefield Coordination Detachment (BCD), part of the XVIII Airborne Corps out of Fort Bragg, North Carolina, proved to be key to the integration of land and air operations.

During OIF, the 1st BCD functioned at the seam between the land and air components. It was located at Prince Sultan Air Base, Saudi Arabia, at the headquarters of the Coalition Forces Air Component Command (CFACC) as the liaison for the Coalition Forces Land Component Command (CFLCC) headquartered at Camp Doha, Kuwait.

The BCD served as a conduit for information for CFACC support of CFLCC operations. It provided visibility of CFLCC operations to the joint force as a whole and helped coordinate joint capabilities to maximize effects in support of the Coalition Force Commander (CFC).

Never before have land operations enjoyed such visibility at the joint force level. Army and Marine aircraft and other land component airspace users operated with joint-assigned call signs, identification friend or foe (IFF) codes and airspace documented on the airspace control order (ACO); Army tactical missile systems (ATACMS) were tracked and coordinated for airspace; counterfire radars were tracked and their frequencies were coordinated; the fire support coordination line (FSCL) movement was coordinated between air and land components before implementation; there was innovative use of kill boxes to coordinate component battlespace; and land unit movements were tracked with blue force tracker (BFT).

Never before have the air and land forces supported each other as effectively. The CFACC provided flexible combat power in support of the land forces marching rapidly toward Baghdad by both shaping the battlefield and providing close air support (CAS). The land component had a solid effects-based targeting scheme incorporating land and air capabilities, while the Air Force's air battle plan leveraged the impact of operational maneuver. Operational maneuver secured battlespace that permitted air to position command and control (C^2) and support assets, extending the reach of air power farther into Iraq. Land provided direct support to air with long-range suppression of enemy air defense (SEAD) fires and indirectly by rolling up portions of the enemy integrated air defense system (IADS) as a by-product of rapid, combined arms maneuver.

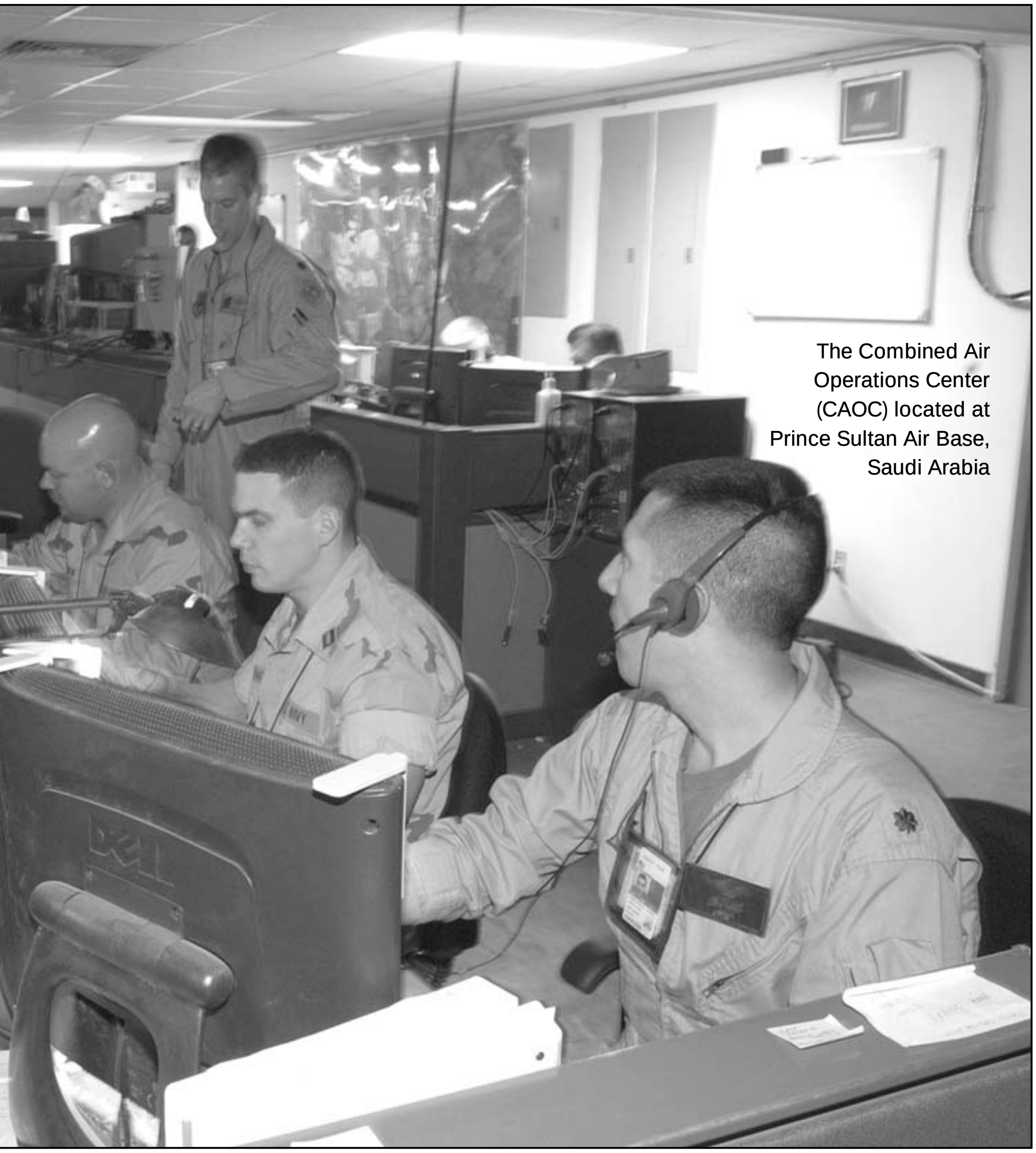
When the land force's momentum was slowed by weather and heavy enemy action south of Karbala and around An Nasiriyah, the CFACC provided sustained air power against the Republican Guard divisions south of Baghdad to set conditions for the final push to Baghdad. When the enemy countered the effects of air power by dispersing his forces, the CFLCC's operational maneuver forced the enemy to either mass to defend the land approaches and be susceptible to joint fires or remain dispersed and be defeated in detail by the land juggernaut.

Despite these many successes, OIF also provided significant examples of poor communications and joint system integration that in future wars against a more capable enemy may prove disastrous. Many of the processes and systems designed to support joint targeting and operational fires interfaces between the land and air components proved unwieldy, ineffective and inefficient.

CFLCC units had to transmit detailed air support requests (ASRs) against mobile enemy forces three days in advance with little knowledge of the status of the last two days' air requests. The land component's daily air requests far exceeded the entire theater's capacity for all available air power.

The fielded command, control, communications, computers and intelligence (C^4I) systems did not support automated target updates or status tracking. The digital interface between the land and air components required tremendous human intervention to work.

The land component frequently rescheduled the target, timing and duration of support requests for aviation deep attack operations or CAS. These changes at times required the Coalition Air Operations Center (CAOC) to completely rework the executing air tasking order (ATO) to provide the requested



The Combined Air Operations Center (CAOC) located at Prince Sultan Air Base, Saudi Arabia

Photo by Master Sergeant Michael E. Best, USAF

support. While the CAOC did so, it was often at the cost of air support for other service components or other CFC objectives.

For the first days of the war, the CAOC struggled to track and communicate the effects of air power. It could not tell with confidence what missions had flown or where or if the aircraft had dropped their ordnance—much less what effects may have been achieved.

The systems and processes did not adequately provide for effective communications within the air component or between the components in the early days of the conflict. As a result, when the weather cleared after the land component's operational consolidation south of Karbala, the CFLCC directed a movement-to-contact instead of a deliberate attack. This occurred, in part, because the commander lacked sufficient knowledge of the enemy's disposition or the effects of operational fires to do otherwise.

The "bad" of the air-ground efforts during OIF was due, at least in part, to the complexity and pace of the operations, many communications challenges and inherent difficulty of planning, coordinating and executing joint operations over significant distances. Most of the bad of the operational fires peaked in the first days of OIF. Operations improved dramatically over time but often only through the Herculean efforts of joint and Coalition warfighters throughout the force who addressed the major problems before the final offensive push to secure Baghdad.

In the final analysis, OIF secured an impressive military victory for the Coalition Force. In the flush of our OIF victory, however, the joint force must not forget that in this conflict we enjoyed the luxury of abundant operational fires resources and enough time to overcome our initial operational fires challenges. In future conflicts, we may not enjoy such luxuries. As we assess OIF operations and prepare the force for future conflicts, we must address the joint operational fires challenges identified in OIF, so we can start the next joint campaign as effectively as we finished OIF.

Although operational fires and maneuver between the land and air components likely will never be completely seamless, there are several areas the joint force can improve in the near-term to significantly aid the planning, coordination and execution of air-ground integration at the operational level: invest in joint and service C^4I systems to improve the processes and interfaces for communications and coordination between components and improve the way the Army and Air Force train together at the operational level to allow both services to become even more effective in the joint fight. In addition, the Army needs to reinforce the BCD organizational structure as a critical interface between the land and air forces.

Joint and Service C^4I Systems. The BCD in OIF had Army battle command systems (ABCS) as well as a number of other Army, Air Force and adapted civilian systems. ABCS includes the Army FA tactical data systems (AFATDS), the all-source analysis system remote workstation (ASAS-RWS), The Army air and missile defense workstation (AAMDWS) and the theater air integration system (TAIS).

BCD personnel also operated several applications in the Air Force theater battle management core system (TBMCS), the Air Force's system to build and distribute the ATO. The BCD was responsible for migrating data from AFATDS to TBMCS.

In addition to these systems, the 1st BCD displayed C^2 functions and blue force tracking on C^2 personal computers (C^2PC), which is a subset of the global C^2 system-Army (GCCS-A), and the automated deep operations coordination system (ADOCS). The BCD had secure Internet protocol net (SIPRNET) and non-secure Internet protocol net (NIPRNET) and access to sensitive compartmented information (SCI)-level email, web sites and many chat programs: my Internet relay chat (MIRC), Microsoft (MS) Chat, intelligent workstation chat (IWS) and ADOCS chat. It also had daily access to SIPRNET and

SCI-level video teleconferencing (VTC) facilities.

Information received from many of these sources was integrated into the ATO process through a series of briefings, meetings and transfers of electronic data. Data relating to targeting and the ATO process flowed from AFATDS into TBMCS where air planners accessed it using a software application called the interim targeting solution (ITS). 1st BCD personnel had to be proficient in specified functions on all these interrelated and partially redundant systems to ensure the Air Force received CFLCC input to the ATO accurately and in a timely manner and the input was funneled into the appropriate ATO processes.

As a general observation, the proliferation of partially redundant software tools that handled only a portion of the data management requirements created a C^{4}I system that was unwieldy and inefficient. For example, various headquarters established different chat programs as their standard; every headquarters used one or more of the chats but none of these systems communicated with the other. In order to liaison between these elements, the BCD had to monitor all of them simultaneously.

Similar challenges existed with the varied common operating picture (COP) systems: C^{2}PC, GCCS, ADOCS and Falcon View. Despite the multitude of systems, most headquarters defaulted to MS Office software to create decision products or to communicate ideas most effectively.

While the Army and Air Force faced a number of interface and process challenges, four stand out in OIF's joint war fight: (1) the TBMCS-AFATDS interface, (2) modernized integrated database (MIDB) management, (3) battle damage assessment (BDA)/operational analysis and (4) mobile targeting.

TBMCS-AFATDS Interface. The good news is that the TBMCS (Version 1.1.1) and AFATDS (Version. 6.3.1) interface functioned as designed. The bad news is that the design was largely inadequate to support the requirements of the Army and Air Force at the operational level during OIF.

By design, TBMCS only parsed AFATDS information that was related to air interdiction (AI) targets. As a result, all ASRs other than AI requests remained as US message text format (USMTF) messages that TBMCS users could read but not action. In order for the Air Force CAS or electronic warfare (EW) planner to use these reader-unfriendly formats, he had to pull them up from a mailbox (that had no message alert system) and manually cut and paste the data into TBMCS data fields.

To fix this interface shortfall, the CFLCC and BCD developed standing operating procedures (SOP) during the pre-OIF training exercises. The CFLCC transmitted all ASRs as AI missions. The SOP used an ASR numbering convention to identify the actual mission type. The SOP also dictated CFLCC transmit information in a number of specific fields that the air component needed to process the requests.

The SOP decreased the amount of manual intervention by the BCD and Air Force planners but only at the expense of the lower echelon Army operators who had to follow detailed data input requirements.

AFATDS' design also prevented the BCD from editing most of the submitted ASRs without losing the ability to provide the ASR originator feedback on his request. As a result, when the BCD found even a minor error, it had to get the message originator to edit and resubmit the ASR, significantly increasing coordination and processing time.

AFATDS only provides ASR status feedback to the requestor chain and only when a completed ATO is transmitted by the CAOC. Most division and higher units not only need visibility of their own ASRs, but also need to understand the joint fires planned within their areas of interest.

The static nature of the USMTF interface also prevents the Army from tracking the status of requests as they work their way through the two-to-three day ATO planning process. The Army cannot transmit automated target updates via AFATDS after the initial requests have been transferred into the TBMCS. The current AFATDS tools to receive, view and display ATO or ACO data are inadequate for joint fires visibility, tracking or updating.

Some TBMCS-AFATDS interface problems arose because the Air Force used ITS software. Although AFATDS was designed to input selected data elements to the target weaponeering module (TWM) in TBMCS, Air Force planners wanted to use the ITS planning tool. ITS was not in the TBMCS suite but drew data from TWM in TBMCS to perform its baseline functions.

The problem for BCD planners was AFATDS did not talk directly to ITS, and the data fields in ITS were not the same as those in TWM. As a result, the BCD had to enter the additional data manually, which required approximately a minute per target. With 200 to 300 ASRs per ATO, the effort was significant.

TBMCS-AFATDS interface problems surfaced at the "push" side of the ATO process as well. Central Command (CENTCOM) has long advocated a kill-box interdiction system for mobile targets. The entire CENTCOM theater is subdivided into discrete 30-minute-latitude-by-30-minute-longitude kill boxes. Each kill box is further subdivided into

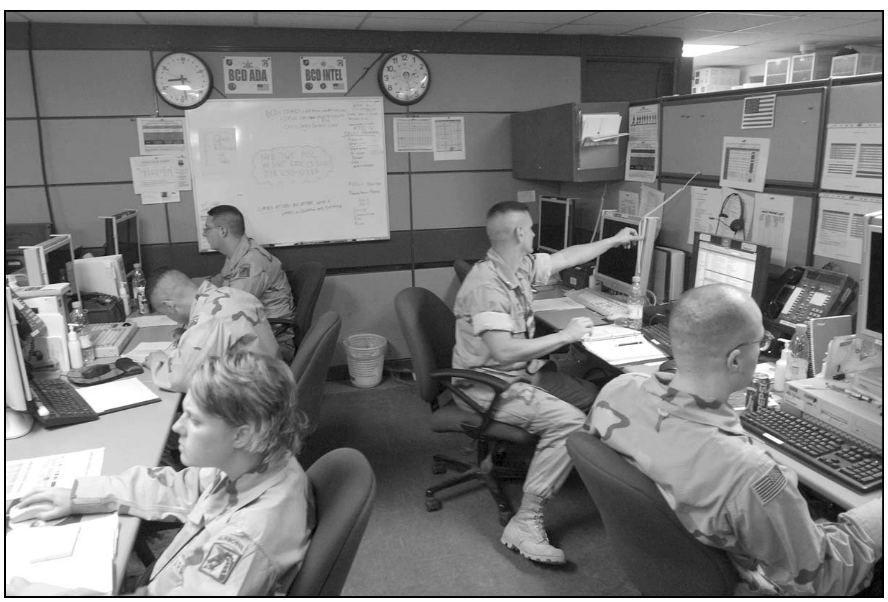


Photo by Master Sergeant Michael E. Best, USAF

The 1st BCD was a 40-person, combined arms Army organization commanded by a colonel and was located in the CAOC at Prince Sultan Air Base.

10-by-10-minute boxes using the "telephone keypad" system. The kill-box keypad system greatly facilitates rapidly orienting aircraft on mobile target areas and provides flexibility to change the location during execution of the mission, if required. Unfortunately, the software systems designed to communicate targets earmarked for strike are not designed to communicate kill-box information.

Kill boxes within the TBMCS constitute airspace. Missions planned to airspace within the ATO do not retain the ASR number in the USMTF message sent back to AFATDS; therefore, CFACC missions to attack CFLCC targets planned to kill boxes do not parse in AFATDS to show the CFLCC and his staff the air support planned. As a result, the CFLCC could not get automated feedback from the CFACC on which of the targets he had nominated that the CFACC planned to service. This lack of feedback was a source of great consternation as the war kicked off.

The BCD developed several workarounds to address this issue. These included an attempt to get Air Force planners to include the ASR numbers for kill-box targets in the "Remarks" area of the ATO. The BCD plans section then could sort the ATO looking for the ASR numbers and manually enter data into AFATDS to show the mission was being serviced. While this allowed the BCD to identify the missions supporting the CFLCC, it did not allow the automated TBMCS-AFATDS feedback loop to work.

The BCD developed a second workaround using an MS Excel spreadsheet with graphic illustration and addressed the number of sorties and types of bombs being flown against CFLCC-nominated priorities based on the counterland apportionment. (The "counterland apportionment" are those sorties apportioned for CFLCC missions.) While this product reduced some of the initial anxiety at the CFLCC headquarters, it did not totally assuage CFLCC headquarters concerns about the level of the air support it would receive.

Although the TBMCS and AFATDS system engineers have tried to resolve the TBMCS-AFATDS issues, the reality is that changing software in a system as ubiquitous and multi-echeloned as AFATDS is not simple. The joint force must reevaluate some of the fundamental aspects of the current joint and component interfaces. All services must be able to share data dynamically on the status of operational fires while planning, preparing for, executing and assessing them.

...the Army and Air Force need to make a coordinated effort to reevaluate the process of joint fires planning and execution in effects-based operations and revamp the C^4I systems and architecture to support the requirements of all services.

Until mandated by the Department of Defense, the Army and Air Force need to make a coordinated effort to reevaluate the process of joint fires planning and execution in effects-based operations and revamp the C^4I systems and architecture to support the requirements of all services.

MIDB Management. A related problem involved identification of targets using basic encyclopedia (BE) or unit identification codes (UIC) from the MIDB. All fixed-facility targets in the MIDB are assigned a BE number, so everyone has a common reference on a facility being targeted. A mobile target in the MIDB is assigned a UIC. If the CFLCC wanted to attack the same target more than once on any particular day or decided to attack the target and then drop leaflets on it, only the first use of a MIDB or UIC data would pass between the systems. The data would not pass into the TBMCS because, by MIDB design, a target only can be addressed one time in a designated ATO period in TBMCS.

One can strike the same BE multiple times as long as he attacks different desired mean points of impact (DMPIs). Fixed targets have multiple DMPIs but not mobile targets (UICs). Furthermore, ITS will not recognize a target BE or UIC for which there isn't a DMPI in the system. In order for TBMCS-AFATDS-ITS to interface better, the BCD manually built a DMPI for every mobile target in the MIDB related to the Iraqi Order of Battle.

Another MIDB issue was a debate that raged between the national intelligence community, CENTCOM and its components over control of the targeting database. The national intelligence agencies and CENTCOM wanted to control this database centrally while CENTCOM components needed to manipulate the data for targeting purposes. Ultimately, the components won the fight and modified the mobile targeting data during OIF.

The issue still looms because intelligence and component targeteers have not reconciled how different MIDB users use the data. The intelligence analyst is concerned with where a mobile target is currently located to understand the battle being fought "today." The target analysts are concerned with where a target will be in 48 to 72 hours. Because a single unit can't be in two different locations in the MIDB database, the mobile target planners needed either two databases or a multi-tiered system that would accommodate more than one location. Because targeteers work two or more future target lists in addition to fighting today's battle, the ideal MIDB database would be separated into multiple 24-hour blocks to give the targeting process fidelity.

BDA and Operational Assessment. A lack of BDA of any type from initial strikes contributed to the CFLCC's consternation in the early days of the conflict. In many cases, while the air component achieved significant air-to-ground effects on the enemy, its inability to provide Phase I BDA hindered the land component's ability to act upon those effects. A lack of usable weapon system video and poor pilot and mission reporting (MISREP) initially limited any assessment on targets struck.

The theater SOP and C^4I automation did not support standardized MISREPs, so even when reporting did occur, it required excessive manual human effort to organize and analyze it. Better reporting discipline and the adoption of a MS Access database to manage the volume of MISREP information eventually improved the system, but the land component's realistic appreciation for air power effects came only when ground forces reached the outskirts of Baghdad.

BDA continues to be a huge issue. The joint force must develop and implement

> *The enemy unit's identity is not visible from 15,000 feet, and the precise coordinates and detailed target information so carefully built and tracked in AFATDS and TBMCS are not relevant when the aircraft arrives because mobile targets have, likely as not, moved.*

technical and system solutions to this problem if joint and component commanders are going to be able to see, decide and act faster than the enemy.

Mobile Targeting. Some air-land integration challenges stemmed from training and process shortfalls. The land component suffered a disconnect between its well-constructed effects-based targeting scheme and the reality of the daily target nominations submitted by AFATDS. While the CFLCC daily effects board (DEB) provided clear Power Point-based products that communicated desired effects and priority over time, the actual nominations transmitted via AFATDS did not reflect this same focus or priority and often requested air resources exceeding the entire theater capacity.

Portions of this problem resulted from the bottom-up AFATDS-based ASR system. The ASRs flowed from the lowest echelons to the highest with each intervening echelon responsible for eliminating duplication and ensuring consistency with the effects-based objectives. The reality is the same that the fire support community discovered years ago from many rotations at the National Training Center (NTC): the bottom-up planning process is unworkable both because it assumes the lower echelons have the best targeting data and requires an unsupportable amount of time at every echelon to collate, validate and eliminate duplication.

A second contributor to the disconnect between the CFLCC DEB and the air support nominations flowed from a poor understanding of the realities of the theater's air capabilities and the total demands placed on the air component by the joint force as a whole as reflected in the apportionment decision. Typically, the OIF apportionment was planned based on a daily ATO capability of around a thousand strike sortie equivalents. This included bombers and fighters from all three US services—Marine Corps, Navy and Air Force—and our British allies.

On a daily basis, the CFLCC requested and the BCD processed many more targets than could be serviced by the air power available. Although the written guidance and commander's intent tightly focused CFLCC and DEB targets, the focus was broadly diluted when the target nominations were submitted. In the end, the BCD had to tie the commander's intent to the target list. Through many discussions with the CFLCC deep operations coordination cell (DOCC), the team reworked the nominations to ensure the missions met the commander's priorities and intent and focused on the targets the CFLCC most wanted struck.

The reality of Air Force attack of mobile targets is that a tasked sortie flies to a geographic area, tries to identify the target type, conducts the required C^2 to deliver the ordnance and moves on to the next target area or returns home. The enemy unit's identity is not visible from 15,000 feet, and the precise coordinates and detailed target information so carefully built and tracked in AFATDS and TBMCS are not relevant when the aircraft arrives because mobile targets have, likely as not, moved.

The USAF Central Command (CENTAF) kill-box interdiction/CAS (KICAS) SOP reflected this reality by tasking mobile target sorties *not* to a specific mobile target coordinate but to a geographic area with a desired target effect. It focused on providing the forward air controller-airborne (FAC-A) sufficient intelligence, surveillance and reconnaissance; an appropriate weapon system and a C^2 plan to maximize the efficiency of the attack.

Current C^4I systems drive users to focus on unneeded detail. Instead of nominating 180 to 250 unit type targets in painful detail, the CFLCC needed to focus on fewer effects-based targets. This might have accomplished what the CFLCC wanted better while reducing the amount of effort put into hand-jamming UIC-based target information into Army and joint systems.

The basis for a different approach to mobile target execution may be found in the time-sensitive targeting (TST) cell. The CFACC instituted the TST cell on the floor of the CAOC to fuse current intelligence from all sources for near-real-time strikes of potential weapons of mass destruction (WMD) delivery systems, leadership targets and other time-sensitive targets.

A potential exists for a broader scoped "TST-like" cell in the CAOC to make the ATO far more responsive to mobile targeting requirements than it currently is. As all services begin to flood the battlespace with more robust ISR platforms, the opportunities for real-time targeting will skyrocket. A shorter targeting execution process will be possible by focusing air power in specific geographic areas and relying on the ISR capability to fine-tune targeting while aircraft are en route to the area.

Reinforce the BCD. Few Army and Air Force personnel truly understand what the BCD does or its importance to the success of the joint team. In order for the Army and the Air Force to work more effectively together at the operational level, the BCD must be manned with the right personnel and trained to build strong relationships with both the Army and Air Force headquarters it supports.

Manning and Training. The BCD during OIF was a 40-person, combined arms Army organization commanded by a colonel and was located in the CAOC in Prince Sultan Air Base. The four BCDs are doctrinally designed and organized to provide liaison with all the major divisions within the air operations center. (There are three active BCDs and one reserve BCD: 1st at Fort Bragg, 3d in Korea, 19th BCD in Europe and the 2d headquartered in Anniston, Alabama.)

By design, the BCD is "a mile wide and an inch deep" to cover the broad range of areas of coordination between the land and air component. Working in the BCD demands knowledge of operational and joint warfare not learned in the normal course of a soldier's career and, as a result, the learning curve for new BCD personnel is unusually steep. It is not enough for the BCD to simply have all its authorized personnel—the BCD needs the right people with the right backgrounds and the right training.

Leading up to OIF, the BCD manning fell to 65 percent, and while eventually filled, the BCD only was able to integrate the new people successfully because it had adequate time before OIF began and relevant training exercises already scheduled.

The Army should consider establishing an additional skill identifier (ASI) for former BCD personnel to rapidly reinforce a deployed BCD with additional trained personnel, as required.

Habitual Relationships. One key to BCD success in OIF was the good working relationships and shared experiences built between the 1st BCD and the CAOC personnel before OIF as a result of Operation Enduring Freedom (OEF). A lesson for the Army is that time may not be available in future conflicts to build this trust before the fight.

The number and alignment of BCDs should allow for better opportunities to establish habitual relationships between the BCDs and the Army and Air Force organizations they support. Similarly, the length and intensity of operational-level joint exercises need to be realistic and stressful to develop skills and joint relationships.

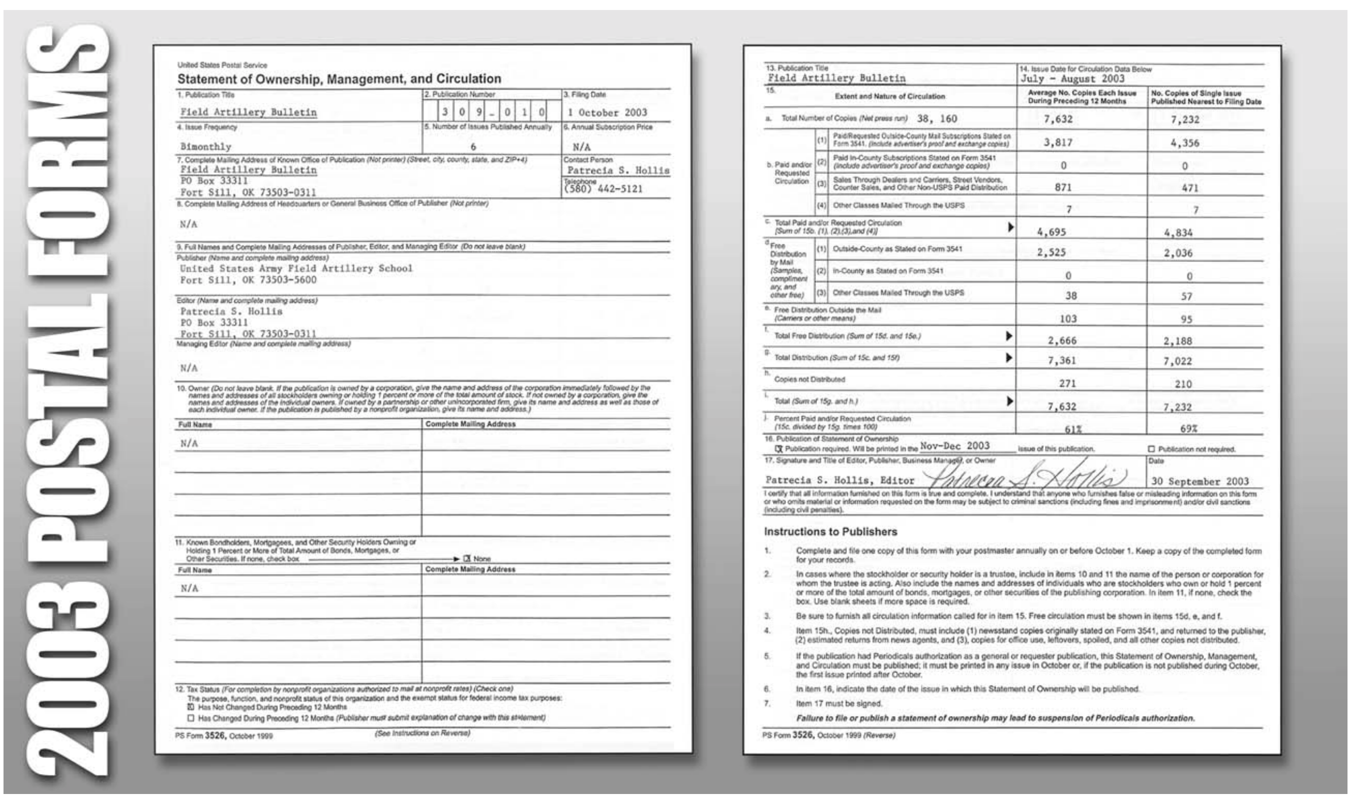
Joint Standardization. Despite the benefits of the OEF experiences and train-up exercises, the 1st BCD still faced some tough readiness challenges. The CFACC decision to split Air Force C^2 operations between Qatar and Saudi Arabia stressed the BCD's ability to execute its mission. The personnel and equipment demands to operate from three locations—Kingdom of Saudi Arabia (OIF), Qatar (OEF) and continental United States (CONUS) for exercises—exceeded the 1st BCD's resources. In the end, the theater required both the 1st and elements of the 19th BCDs to meet the many support requirements.

The fact that CENTCOM and European Command (EUCOM) use different equipment and procedures for planning and coordinating operational fires created a number of hurdles to employing forces from one area of responsibility (AOR) into another. Joint air-ground procedures as well as CAOC and BCD operations should be standardized across all the combatant commands to allow for cross-leveling of people or cross-theater employment of limited BCD units.

Overall, OIF was a tremendous joint force success story. We have focused more on the negative aspects than the positive to highlight some of the critical work that still needs to be done. As we prepare the joint force for future conflict, we must focus on those things that will allow us to start the next joint campaign as effectively as we finished OIF.

Lieutenant Colonel Thomas L. Kelly was the Plans Officer in the 1st Battlefield Coordination Detachment (BCD) at Prince Sultan Air Base, Saudi Arabia, during Operation Iraqi Freedom (OIF). Currently, he is the Chief of the Joint Support Element for the Air Force Command and Control Training and Innovation Group (AFC²TIG) at Hurlburt Field, Florida. Among other assignments, he was the Executive Officer (XO) of the 101st Airborne Division (Air Assault) Artillery at Fort Campbell, Kentucky, plus Division Assistant Fire Support Coordinator and XO of the 2d Battalion, 320th Field Artillery (2-320 FA), all in the 101st Division. In other deployments, he was the Division Plans Officer for the Multinational Division North for Task Force Eagle in Bosnia-Herzegovina and a Battalion Fire Support Officer (FSO) in 2-187 IN during Operation Desert Storm.

Lieutenant Colonel (Retired) John P. Andreasen was the Chief of Plans in the 1st BCD during OIF. He retired after 28 years of commissioned service in July 2003. In previous military assignments, he was the Chief of Staff and, earlier, the Assistant Chief of Staff, G3, for V Corps Artillery. He also was the XO of the 41st Field Artillery Brigade as well as XO of the 4th Battalion, 18th Field Artillery, part of the 41st Brigade in Germany. He commanded the 1st Regional Training Battalion, 1st Regional Training Brigade at New Cumberland, Pennsylvania, and was the US Army Operations Officer for Combat Support Coordination Team 3 in the 3d Republic of Korea Army. Before his retirement, Lieutenant Colonel Andreasen had been deployed to Southwest Asia from September 2001 until May 2003.



United States Postal Service

Statement of Ownership, Management, and Circulation

1. Publication Title: Field Artillery Bulletin
2. Publication Number: 3 0 9 - 0 1 0
3. Filing Date: 1 October 2003
4. Issue Frequency: Bimonthly
5. Number of Issues Published Annually: 6
6. Annual Subscription Price: N/A
7. Complete Mailing Address of Known Office of Publication *(Not printer) (Street, city, county, state, and ZIP+4)*: Field Artillery Bulletin, PO Box 33311, Fort Sill, OK 73503-0311
   Contact Person: Patrecia S. Hollis
   Telephone: (580) 442-5121
8. Complete Mailing Address of Headquarters or General Business Office of Publisher *(Not printer)*: N/A
9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor *(Do not leave blank)*
   Publisher *(Name and complete mailing address)*: United States Army Field Artillery School, Fort Sill, OK 73503-5600
   Editor *(Name and complete mailing address)*: Patrecia S. Hollis, PO Box 33311, Fort Sill, OK 73503-0311
   Managing Editor *(Name and complete mailing address)*: N/A
10. Owner *(Do not leave blank. If the publication is 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 nonprofit organization, give its name and address.)*

Full Name	Complete Mailing Address
N/A	

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box ☒ None

Full Name	Complete Mailing Address
N/A	

12. Tax Status *(For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)*
   The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
   ☒ Has Not Changed During Preceding 12 Months
   ☐ Has Changed During Preceding 12 Months *(Publisher must submit explanation of change with this statement)*

PS Form **3526**, October 1999 *(See Instructions on Reverse)*

13. Publication Title: Field Artillery Bulletin
14. Issue Date for Circulation Data Below: July - August 2003

15. Extent and Nature of Circulation		Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies *(Net press run)* 38, 160		7,632	7,232
b. Paid and/or Requested Circulation	(1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. *(Include advertiser's proof and exchange copies)*	3,817	4,356
	(2) Paid In-County Subscriptions Stated on Form 3541 *(Include advertiser's proof and exchange copies)*	0	0
	(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution	871	471
	(4) Other Classes Mailed Through the USPS	7	7
c. Total Paid and/or Requested Circulation *[Sum of 15b. (1), (2),(3),and (4)]*		4,695	4,834
d. Free Distribution by Mail *(Samples, compliment ary, and other free)*	(1) Outside-County as Stated on Form 3541	2,525	2,036
	(2) In-County as Stated on Form 3541	0	0
	(3) Other Classes Mailed Through the USPS	38	57
e. Free Distribution Outside the Mail *(Carriers or other means)*		103	95
f. Total Free Distribution *(Sum of 15d. and 15e.)*		2,666	2,188
g. Total Distribution *(Sum of 15c. and 15f)*		7,361	7,022
h. Copies not Distributed		271	210
i. Total *(Sum of 15g. and h.)*		7,632	7,232
j. Percent Paid and/or Requested Circulation *(15c. divided by 15g. times 100)*		61%	69%

16. Publication of Statement of Ownership
   ☒ Publication required. Will be printed in the Nov-Dec 2003 issue of this publication. ☐ Publication not required.
17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Patrecia S. Hollis, Editor — Patrecia S. Hollis
   Date: 30 September 2003

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

Instructions to Publishers

1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
4. Item 15h., Copies not Distributed, must include (1) newsstand copies originally stated on Form 3541, and returned to the publisher, (2) estimated returns from news agents, and (3), copies for office use, leftovers, spoiled, and all other copies not distributed.
5. If the publication had Periodicals authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
6. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
7. Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of Periodicals authorization.

PS Form **3526**, October 1999 *(Reverse)*

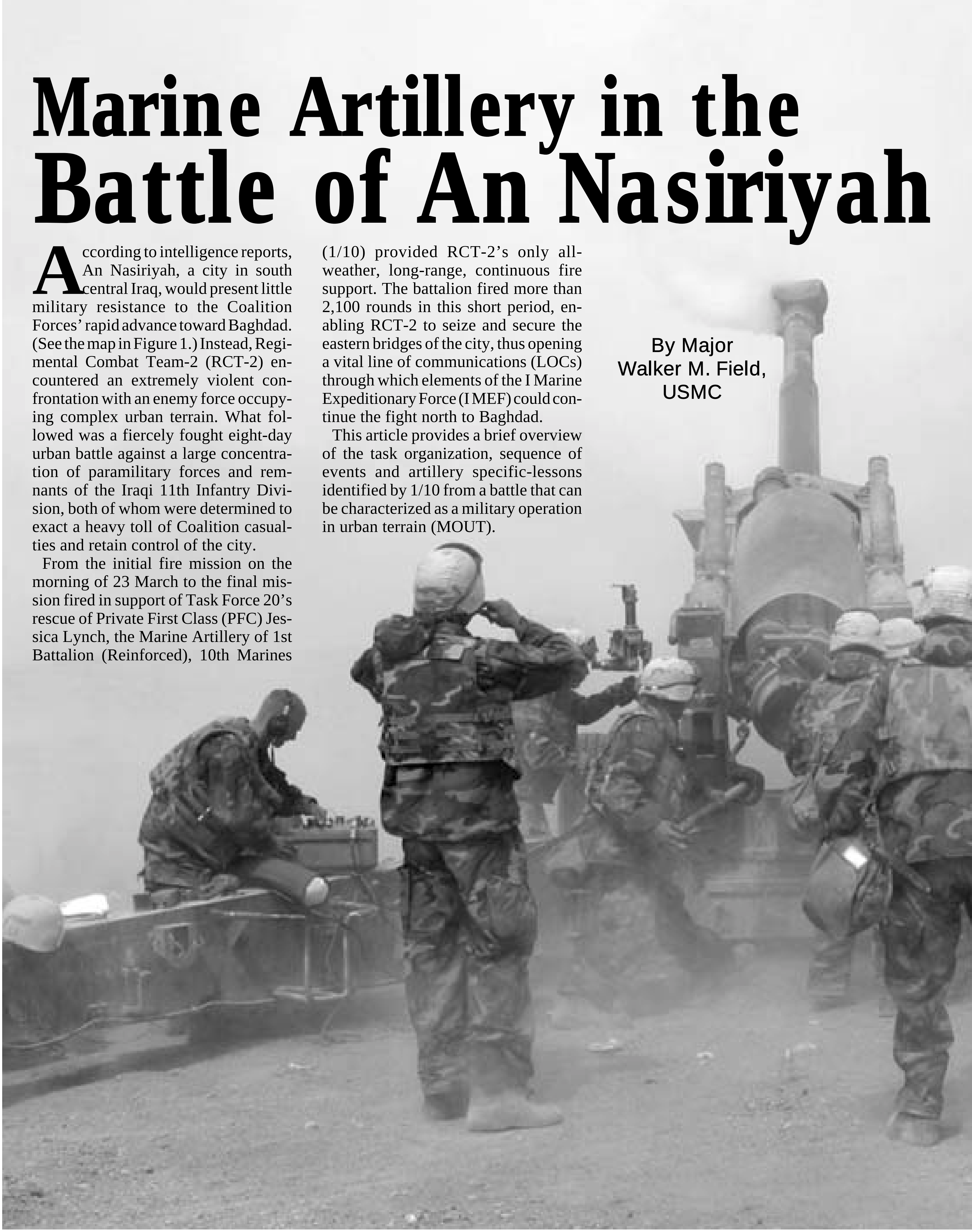
Marine Artillery in the Battle of An Nasiriyah

By Major
Walker M. Field,
USMC

According to intelligence reports, An Nasiriyah, a city in south central Iraq, would present little military resistance to the Coalition Forces' rapid advance toward Baghdad. (See the map in Figure 1.) Instead, Regimental Combat Team-2 (RCT-2) encountered an extremely violent confrontation with an enemy force occupying complex urban terrain. What followed was a fiercely fought eight-day urban battle against a large concentration of paramilitary forces and remnants of the Iraqi 11th Infantry Division, both of whom were determined to exact a heavy toll of Coalition casualties and retain control of the city.

From the initial fire mission on the morning of 23 March to the final mission fired in support of Task Force 20's rescue of Private First Class (PFC) Jessica Lynch, the Marine Artillery of 1st Battalion (Reinforced), 10th Marines (1/10) provided RCT-2's only all-weather, long-range, continuous fire support. The battalion fired more than 2,100 rounds in this short period, enabling RCT-2 to seize and secure the eastern bridges of the city, thus opening a vital line of communications (LOCs) through which elements of the I Marine Expeditionary Force (I MEF) could continue the fight north to Baghdad.

This article provides a brief overview of the task organization, sequence of events and artillery specific-lessons identified by 1/10 from a battle that can be characterized as a military operation in urban terrain (MOUT).



Overview. 1/10 deployed from Camp Lejeune, North Carolina, to Kuwait in January 2003 in support of Operation Enduring Freedom (OEF). The battalion then deployed to Iraq in March in support of Operation Iraqi Freedom (OIF). 1/10 was attached to RCT-2, 2d Marine Infantry Regiment.

RCT-2 was a reinforced motorized and mechanized infantry regiment consisting of two motorized medium tactical vehicle replacement (MTVR) infantry battalions, 2d Battalion, 8th Marines (2/8) and 3d Battalion, 2d Marines (3/2); one reinforced mechanized amphibious assault vehicle (AAV) infantry battalion, 1st Battalion, 2d Marines (1/2); a light armored reconnaissance (LAR) company; and a recon company. RCT-2's higher headquarters was the 2d Marine Expeditionary Brigade (2d MEB), designated Task Force Tarawa (TF Tarawa) upon arrival in Kuwait.

1/10 received the official deployment order on 31 December 2002 to deploy in support of OEF. The order directed the battalion's four batteries (Headquarters, A, B and C), a counterbattery radar detachment (CBR) with two Q-46A radars and a target processing center (TPC), and a heavy engineer squad from the 10th Marine Artillery Regiment deploy with 1/10. Via amphibious ships, the battalion sailed for the Persian Gulf and arrived at Kuwait Naval Base on 15 February. The battalion immediately moved inland to Camp Shoup within Tactical Assembly Area (TAA) Coyote (I MEF's logistical support area, or LSA) and established its base of operations. From 20 February until 19 March, 1/10 focused on combat training and equipment maintenance.

The battalion deployed from Camp Shoup on the morning of 20 March for an assembly area along the northwestern border of Kuwait and Iraq, its final destination before starting offensive combat operations. The 1st Marine Division was on TF Tarawa's right flank while the 3d Infantry Division (Mechanized) (3d ID) was on the left.

On 21 March, 12 hours behind the lead elements of the 3d ID, RCT-2 crossed the border obstacle belt into Iraq. Following a route parallel but slightly east of the 3d ID's route, RCT-2 moved north toward the Al Luhays Oil Facility located southeast of Jalibah Airfield.

1/10 assumed a "desert wedge" formation consisting of three battery columns abreast, each with an element of headquarters battery in trace. It moved behind 1/2 and in front of 3/2. TF Tarawa's mission was to occupy initial defensive positions to enable the 3d ID to clear through Jalibah Airfield.

The next morning, 1/10 continued north and occupied firing positions just north of Jalibah Airfield. That afternoon, the CBR detachment repeatedly detected counterfire targets originating from the same location. Gaining RCT-2 approval, the battalion engaged the target. As a result of 1/10's first fire mission in OIF, CBR received no further detections from that vicinity, and 42 Iraqi Regular Army soldiers surrendered to a nearby LAR unit.

That evening, after TF Tarawa consolidated at Jalibah, it was directed to conduct a relief in place of 3d ID forces in the vicinity of Tallil Airfield and the Highway 1 bridge across the Euphrates River west of Nasiriyah. TF Tarawa also issued orders to RCT-2 to move forces northwest toward Nasiriyah and be prepared to continue the attack to seize and secure the eastern bridges across the Euphrates River and the Saddam Canal within the city of An Nasiriyah.

Photo by Sgt Jose Guillen, 1st MarDiv PAO

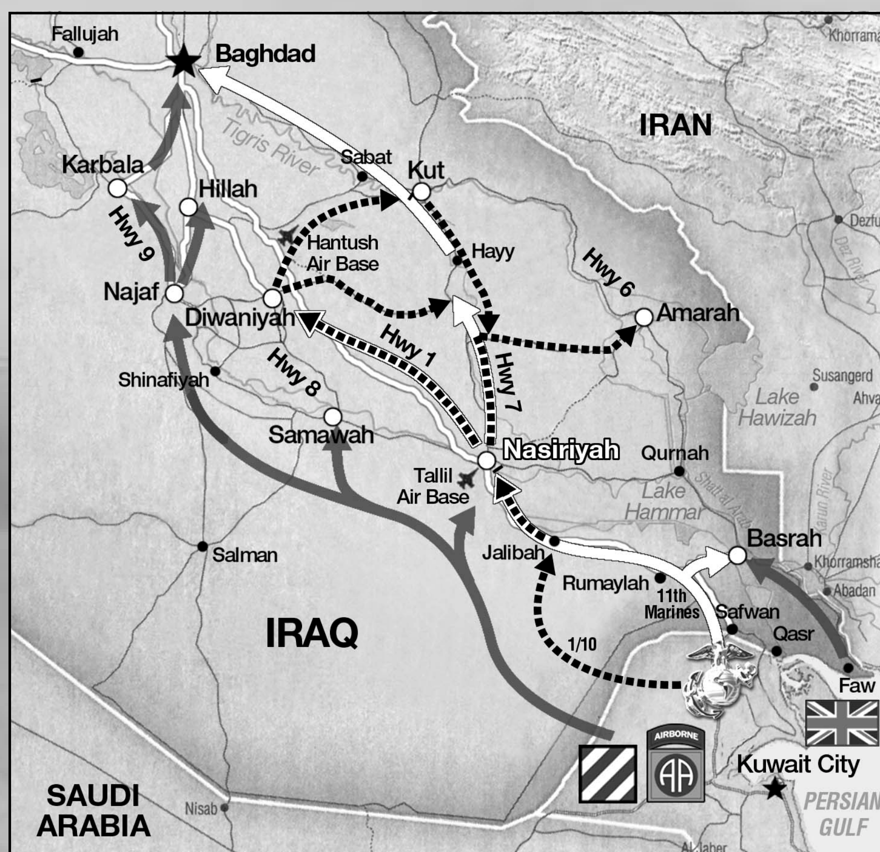


Figure 1: 1st Battalion; 10th Marines (1/10) in Operation Iraqi Freedom—The Battle of An Nasiriyah

Battle for An Nasiriyah: 23 March–2 April. On the morning of 23 March, 1/10 moved in trace of RCT-2's lead element (1/2) when it began receiving indirect and direct fire from covered positions to the east and west of Highway 7, the main road leading into southern Nasiriyah. 1/10 quickly emplaced in restricted terrain and began processing fire missions. Simultaneously, 1/10 provided medical aid to soldiers from the 507th Maintenance Company who had been ambushed in the city and were moving south along Highway 7.

The battle continued throughout the day as 1/10's batteries bounded forward, firing a number of fire-for-effect (FFE) and adjust fire missions in support of infantry companies in contact. The battalion also continued to engage radar-generated targets, totaling five missions and firing 108 dual-purpose improved conventional munition (DPICM) rounds. While actively processing fire missions, Bravo Battery's main body received incoming mortar fire, forcing the battery to conduct an emergency displacement.

During the afternoon of 23 March, the battalion was reinforced with fires from India Battery, 3/10 (attached to 1/11). 1/11 was southeast of the city awaiting orders to either pass through RCT-2 in Nasiriyah or bypass the city to the west.

Dawn on 24 March found RCT-2 heavily engaged throughout Nasiriyah in urban combat operations. 1/10 displaced farther north within the outskirts of the city to achieve a greater range fan north of the Saddam Canal. Proficient azimuth of fire management was critical, as RCT-2's mechanized battalion (1/2) remained north of the city while the two motorized battalions (3/2 and 2/8) operated principally south of the city.

1/10 had to carefully position itself to balance its fire support. The battalion had to be close enough to the city to provide fires well north in support of 1/2, which was about 14 to 30 kilometers from 1/10, but not too close to preclude its supporting the two motorized battalions operating in the southern portion of the city, about five kilometers north of 1/10.

As the fighting intensified, scores of the enemy and indigenous displaced personnel poured out of the city to the south. As a result, the battalion processed a number of enemy prisoners of war (EPWs) and redirected numerous displaced persons.

Although the two motorized battalions were less than five kilometers to the north, an industrial corridor where paramilitary forces could freely maneuver was within the noncontiguous battlespace. Thus, 1/10 was exposed to civilian and enemy foot and vehicle traffic on all sides.

Each of the batteries was responsible for security in all directions. Although well-equipped and trained to perform this mission, it was difficult to man 360-degree security while also processing fire missions 24 hours a day. As the battle raged on, the battalion implemented the firebase concept to economize the security effort and better contend with displaced personnel and EPWs.

On the afternoon of 24 March (35 hours after the attack began), the battalion received its first artillery ammunition resupply of 120 high-explosive (HE) and 100 DPICM rounds per battery. 1/10 had had a significant shortage of HE and had been forced to fire rocket-assisted projectiles (RAP) in the rocket-off mode with Charge Three green bag in lieu of HE.

Just as the ammunition resupply arrived, the remainder of 1/11 arrived to provide forward passage of line (FPOL) and reinforcing fires. The decision had been made to pass RCT-1 through the city north toward Al Kut on Highway 7. The FPOL took a number of hours, and 1/11 supported the passage with reinforcing fires until it was ordered to move north of the city. Although 1/11 provided reinforcing fires to RCT-2 and fires for the FPOL of RCT-1, 1/11 remained in direct support (DS) of RCT-1 and never officially assumed the role of reinforcing (R) to 1/10.

Deploying with 1/11 was Battery G from the 6th Parachute Brigade (UK), an M118 (105-mm) battery with an Arthur radar. This brought the total number of Coalition howitzers trained on Nasiriyah to 42. 1/10 remained the controlling fire direction center (FDC) for all artillery fires in Nasiriyah.

Through the night of the 24th of March, RCT-1 attacked north along Highway 7 to continue the fight toward Al Kut with 1/11 following in support. Battery G remained with 1/10 until first light on 25 March before returning to its unit to prepare for action in Basrah. Battery G and 1/11 expended more than 200 rounds during the night in support of RCT-2's and RCT-1's FPOL.

The fight for Nasiriyah continued with ferocity on the 25th as numerous fire missions were processed during the morning. In a raging windstorm, an enemy T-55 tank dug in to the east of Highway 7 attempted to ambush a 2/8 combined anti-armor team (CAAT) patrol. The wind and dust prevented 2/8 from engaging the enemy tank by anti-tank missile (TOW) or air support, so the patrol initiated a FFE mission to destroy the dug-in tank. Battery C rose to the challenge and destroyed the tank using DPICM.

In the most demanding combat conditions, the artillery once again proved to be the *only* all-weather continuous fire support asset for TF Tarawa.

As if the enemy had been reinvigorated by the sandstorm and heavy overnight rains, on 26 March the urban battle increased in intensity and lethality and proved to be the most prolific day of artillery firing in the battle for An Nasiriyah. Around noon on the 26th, the battalion fired suppressive HE rounds with concrete-piercing fuzes into a hospital that was serving as a paramilitary

B-1/10 firing in support of infantry companies that where in contact near An Nasiriyah.

strongpoint. This fire enabled 2/8 to seize the building.

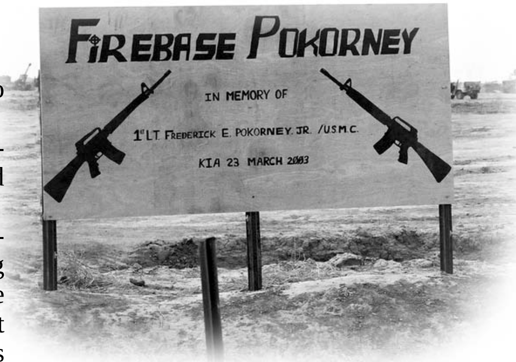
Throughout the battle, aerial reconnaissance reported a number of mortar and artillery pieces in a garrison gun park.

The Iraqi regular forces gave the impression they were capitulating, having staged their equipment in accordance with terms of surrender. By 26 March it was clear the Iraqi paramilitary forces and regular army elements were firing the "surrendered" weapon systems and then quickly vacating the positions and hiding until they wanted to fire another mission.

With unmanned aerial vehicles (UAVs) now on station, TF Tarawa provided accurate, real-time targeting of many of the staged weapon systems. Receiving fire missions from the UAVs and aerial forward observers (FOs) via the RCT-2 fire support coordination center (FSCC), 1/10 prosecuted more than 15 fire missions on the afternoon of the 26th, destroying two Type 59-1 batteries and three D-30 batteries.

As RCT-2 fought in the streets and within neighborhoods of Nasiriyah, CBR continued to detect enemy indirect fire originating from the vicinity of a railroad station in the southern portion of the city. Both US Army Special Forces and human intelligence (HUMINT) sources verified the target as a paramilitary assembly area containing an estimated 1,000 irregular forces. Adding this information to the many radar-detected targets originating from the same location seemed to confirm the validity of the target. The final corroboration came in the form of a report by an element of the 2d Radio Battalion (RADBN) indicating not only that the assembly area existed, but also that the enemy numbered up to 2,000 and was preparing to launch a counterattack. The fire mission, a battalion-10 rounds of DPICM, yielded an estimated 200 enemy dead and broke up the coordinated enemy counterattack. Referring to this mission, the commanding general of TF Tarawa credited the artillery with being instrumental in breaking the back of the enemy defending Nasiriyah.

The morning of 27 March found 1/10 consolidating defensively into a battalion firebase. The firing position was an oval-shaped position one kilometer in diameter with 42 crew-served weapons and five Avenger anti-air defense vehicles protecting it. The battalion christened the defensive firing position Firebase Pokorney in honor of First



Lieutenant Fred E. Pokorney, Jr., a forward observer from 1/10 killed in action on 23 March while calling in artillery fires on the enemy just north of the Saddam Canal.

Throughout the morning, the battalion processed sporadic fire missions and conducted security and reconnaissance patrols around the firebase. Having reached a crescendo on 26 March, the number of missions and enemy forces being engaged was reduced significantly for the remainder of the month.

On 28 March, RCT-2 directed 1/10 to form a task force to reinforce and secure the Highway 1 bridge over the Euphrates River. The mission was important as Highway 1 was the main supply route for I MEF forces advancing north to Baghdad. Commanded by the battalion executive officer, TF Rex (for the King of Battle) numbered more than 300 personnel with Bravo Battery forming the core of the task force as its provisional infantry.

During the last three days of March, the battalion fired three counterfire missions and five adjust fire battalion mass missions in support of 2/8's and 3/2's clearing of pockets of resistance throughout the city. Of the counterfire missions, one resulted in the destruction of a Type 59-1 battery actively firing on 2/8.

On 1 April, Army Special Forces conducted a raid to recover PFC Jessica Lynch, a member of the US Army's 507th Maintenance Company convoy ambushed on 23 March. Battery C fired deception fires in support of the mission, destroying a suspected enemy command post and arms cache as a diversion for the Special Forces. This mission was the last fired by 1/10 in the Battle for Nasiriyah.

During the next three weeks, RCT-2 expanded its battlespace north along Highways 1 and 7. Moving from city to city in search of pockets of resistance and protecting 1st Marine Division's LOC (the MEF's main effort), the battalion traveled more than 700 kilometers.

The combat highlight of this period occurred when RCT-2 was ordered to force the capitulation of the 10th Armored Division in southeast Iraq near Al Amarah. As 1/10 deployed in front of the mechanized battalion but in trace of a LAR company, RCT-2 conducted a movement-to-contact east of Qalat Sakar toward Al Amarah, a maneuver that caused the 10th Division to capitulate.

Returning to An Nasiriyah as RCT-2 began setting the conditions for Phase IV of OIF, 1/10 organized and operated as provisional infantry from 23 April until 12 May. 1/10 established traffic control points, secured a petroleum distribution facility and provided point security of the Highway 1 bridge.

1/10 then began to retrograde by infiltration back to Kuwait for redeployment by amphibious ships, with the last elements departing An Nasiriyah on 12 May.

Lessons Learned. 1/10 identified a number of lessons learned during OIF and has submitted an official compilation in Marine Corps lessons learned (MCLLS) format. The following are a few of the lessons specific to an artillery-supported MOUT battle and applicable to all towed artillery units.

Towed Artillery Keeping Up with Mechanized Infantry. Considering the speed and mobility of the modern main battle tank and armored personnel carriers, some doubted towed artillery's ability to keep pace with mechanized maneuver elements. In the June 2003 *Marine Corps Gazette*, Lieutenant Colonel Clark wrote, "In today's fast paced, fluid maneuver environment, a towed [artillery] system is simply unrealistic."[1] This was clearly refuted during RCT-2's movement over most of central and eastern Iraq; towed artillery proved more than capable of providing accurate, timely fire support in movement-to-contacts that often exceeded 100 kilometers.

Although the M1A1 tank and AAV have greater rates of march over unimproved surfaces than a towed artillery piece, they had to allow their resupply vehicles to keep pace with them. The logistics vehicles necessary to sustain mechanized forces are wheeled, like that of a howitzer prime mover. Although there are logistic variants of the tank and AAV, they can't serve as a stand-alone combat service support (CSS) element for their respective units over a sustained period of time.

Tanks and AAVs need dedicated CSS elements to provide replenishment, replacement, refitting and refueling of the bulk supplies associated with mechanized forces. Planning considerations and movement rates are tempered to accommodate sustaining the force logistically.

Also, the debilitating effects of moving wheeled systems great distances in a very hot climate, even over roads with improved surfaces, caused RCT-2's rate of march rarely to exceed 25 kilometers per hour.

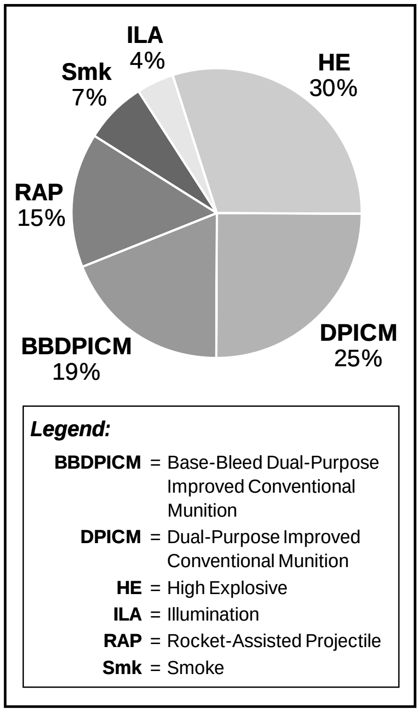


Figure 2: 1/10 OIF Ammo Issued. *Marine Corps Order 8010.1E Class V(W) Planning Factors for Fleet Marine Force Combat Operations* shows the percentages of artillery ammunition 1/10 was issued prior to going into An Nasiriyah, the "go to war ammo."

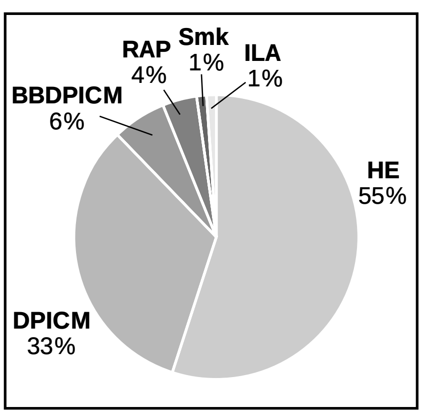


Figure 3: 1/10 OIF Ammo Expended. This chart reflects the percentages of artillery ammunition 1/10 actually expended during OIF, 99% of which was fired during the battle of An Nasiriyah from 23 to 29 March.

1/10's experience in OIF illustrated that, in spite of the inherent raw speed of mechanized vehicles, towed artillery is more than capable of keeping up with mechanized forces.

Artillery Ammunition Apportionment in an Urban Fight. RCT-2's battle in An Nasiriyah was, for the most part, an MOUT fight. Before departing Camp Shoup on 20 March, the initial issue of artillery ammunition was based on a combat planning factor of a composite enemy threat (armor and infantry) and included a much greater mix of "long shooters" than HE munitions—RAP and base bleed DPICM (BBDPICM).

Would a different mix of ammunition have been requested if an urban fight were anticipated? Yes, but based on what planning factor? The primary source for ammunition planning, *Marine Corps Order (MCO) 8010.1E Class V(W) Planning Factors for Fleet Marine Force Combat Operations,* depicts ammunition allocations based on enemy composition (armor- or infantry-specific or a composite of each) rather than terrain, such as the urban environment of An Nasiriyah.

Figure 2 depicts the artillery ammunition 1/10 was issued before going into An Nasiriyah—the battalion's "go to war ammo." This allocation equaled one combat load (CL) and one day of ammunition (DOA) at the assault rate, based on a conventional composite threat.

Figure 3 shows the percentages of ammo that 1/10 actually expended during OIF, 99 percent of which was fired during the battle in An Nasiriyah from 23 to 29 March. 1/10 fired primarily HE in urban operations.

The ammunition allocation percentages derived from the battle of An Nasiriyah could serve as a basis to initiate a planning template for future artillery MOUT engagements.

Resurrection of the Firebase. It was apparent in An Nasiriyah that the noncontiguous nature of the battlefield, namely the battalion's exposure on all sides, would necessitate economizing the local security effort of each battery. Based on a prevailing enemy threat consisting of paramilitary forces with limited indirect fire capability and no air assets, the battalion consolidated into a firebase.

A firebase is defined as an area in hostile territory that requires a 360-degree defense and supports combat patrols or larger operations with combat support and CSS assets.[2] Due to the ground threat, wide dispersion of the batteries was traded for berming and hardening. Fighting positions with overhead cover for crew-served weapons were prepared, exterior and interior berms created and the interior LOCs maximized by wiring-in every element.

During the Battle for An Nasiriyah, the Marines of 1/10 (Reinforced) distinguished themselves by providing continuous fire support to RCT-2 forces. Through driving sandstorms and torrential rains, artillery repeatedly affirmed itself as an all-weather, long-range fire support capability. Artillery fire effectively destroyed the enemy's major indirect fire assets and his ability to influence the battle.

In only eight days of fighting, the battalion processed 112 fire missions while expending more than 2,100 rounds. Counterbattery radar was invaluable to maneuver commanders as "Red Rain" (radar missions) accounted for 30 percent of all fire missions. 1/10 was credited with having broken the enemy's back in the Battle for An Nasiriyah—maneuver endorsement of the effectiveness of Marine artillery in an urban environment

Endnotes:

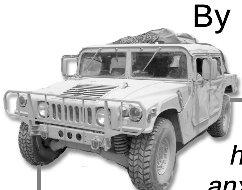
1. Lieutenant Colonel J.E. Clark, "What is the Future of Field Artillery in the Expeditionary Warfare Environment?" *Marine Corps Gazette*, 86, No. 6 (June 2003), 14.
2. *Field Manual 101-5 Operational Terms and Graphics* Marine Corps Reference Publication No. MCRP 5-2A (Washington, DC, Headquarters, Department of the United States Marine Corps, 30 September 1997).

Major Walker M. Field, USMC, was the Commanding Officer of Headquarters Battery in 1st Battalion, 10th Marines (1/10) during Operation Iraqi Freedom and the Battle of An Nasiriyah. Currently, he is the Operations Officer for 1/10. In other positions with the battalion, he served as the Battalion S4 and the Commanding Officer of B Battery. He also served with 1/12 in Kaneohe Bay, Hawaii, as Assistant S3, Battalion Fire Direction Officer (FDO), C Battery FDO, Liaison Officer and Forward Observer. He spent three years in his Secondary Military Occupational Specialty as the Fiscal Officer for the Intermediate Supply Support Activity (ISSA) and Deputy Comptroller, both with the 2d Force Service Support Group (FSST) at Camp Lejuene, North Carolina. He holds an MBA from Campbell University in North Carolina, and, among other schools, is a graduate of the Marine Corps Amphibious Warfare School at Quantico, Virginia.

2-18 FA (MLRS) in Full-Spectrum Operations

Combat to Collecting Ammo and Equipment

By Lieutenant Colonel David J. McCauley and Captain Jay W. Berendzen



As a crowd of civilians approached Sergeant Bloodworth's high-mobility multipurpose wheeled vehicle (HMMWV), his anxiety increased. He did not know if they were hostile or just looking for food, water and a better view of the American's equipment.

As a gunner in a multiple-launch rocket system (MLRS) battery, he participated in combat operations during Operation Iraqi Freedom (OIF) from the familiar confines of his M270 rocket launcher. Now he was exposed, manning his crew-served weapon on the back of his M1026 and navigating through back alleys, crowded streets and treacherous intersections on routes where previous convoys had been attacked by rocket-propelled grenades (RPGs), improvised explosive devices (IEDs), small arms and hand grenades thrown from crowded markets.

He remembered the rules of engagement (ROE) that had been reinforced during his convoy briefing and oriented his weapon toward areas from which previous hostile activity had come, always cognizant of suspicious civilians intermingled in the otherwise passive crowd. His focus and attention to detail were essential as US forces were still taking casualties in the surrounding area.

Sergeant Bloodworth soon realized his role as an MLRS gunner was over. His new mission was to provide a safe, secure environment for the people of this war torn country and help keep his fellow soldiers alive.

The 2d Battalion, 18th Field Artillery (2-18 FA), part of the 212th Field Artillery Brigade from Fort Sill, Oklahoma, played a vital role in stabilizing a post-war Iraq and worked tirelessly to provide a safe and secure environment for its civilian populace. The MLRS battalion's efforts helped set the conditions for the success of civilian organizations providing desperately needed assistance to the Iraqi people.

A quick, seamless transition to stability operations and support operations (SOSO) after major combat was essential in preparing for the operations of the Office of the Coalition Provisional Authority (OCPA) and other non-governmental organizations (NGOs). By removing hazardous ammunition and equipment (primarily large caliber munitions) from military cache sites in and around Baghdad, 2-18 FA helped stabilize the volatile regions in post-war Iraq.

ConductingFull-Spectrum Operations. With daily firefights erupting around Baghdad, current SOSO more closely resembles combat operations than previous SOSO missions in Kosovo and Bosnia. When the US Army units deployed in support of SOSO in the Balkans, soldiers inherited a more stable environment and focused on peacekeeping operations. These forces did not actively engage in combat operations upon their arrival in theater and had the consent of all major parties involved in the dispute.

SOSO in OIF is quite different. All soldiers who crossed the line of departure (LD) before 1 May 2003—the date President Bush declared an end to major combat operations—participated in the full-spectrum of conflict. After major combat operations, units transitioned to peace enforcement operations (PEO) within hours; PEO authorizes soldiers to use force to restore compliance with a new national political structure (*Field Manual 3.0*: *Operations,* Page 9-7).

Coalition Forces in the Iraqi Theater of Operations faced a myriad of challenges. Maneuver units employed more aggressive tactics at checkpoints with increased firepower and armed helicopter coverage during hours of darkness. Soldiers used nonlethal tactics during hostile demonstrations and followed demonstrations with information operations to contradict false information disseminated by local opposition leaders.

Field Artillery commanders tailored force packages to conduct cordon and search operations and other nontraditional missions, to include 2-18 FA's mission to collect enemy equipment and ammunition (CEE/CEA). The battalion developed tactics, techniques and procedures (TTPs) to bridge the gap in transitioning from combat operations to SOSO.

Transitioning to SOSO. 2-18 FA crossed the LD on 6 April 2003 and moved rapidly to a position 25 miles northeast of Karbala. The battalion completed 14 fire plans in support of V Corps operations; however, because the Iraqi forces were beginning to capitulate, the battalion only had to execute two of the fire plans. 2-18 FA executed suppression of enemy air defense (SEAD) plans for the Battle of Baghdad, firing Block I and Block IA Army tactical missile system (ATACMS) missiles. Shortly after the President called an end to major combat operations, the battalion downloaded its missiles and rockets and shifted to SOSO, an unexpected divergence from its standard tactical mission.

2-18 FA had trained meticulously on its mission-essential task list (METL) and related TTP before deploying. After combat operations, 2-18 FA had a nonstandard mission and learned lessons to help meet unforeseen challenges. The battalion executed those lessons daily while collecting enemy equipment and ammunition in and around Baghdad as part of V Corps' Task Force (TF) Bullet I. The TF collected, transported and consolidated enemy equipment and ammunition for destruction or redistribution to the new Iraqi Army.

The battalion received its first TF Bullet I mission just 12 hours after completing its last fire plan. 2-18 FA quickly consolidated its resources and sent 12 heavy expanded-mobility tactical trucks (HEMTTs) to a cache site in the former Iraqi stronghold of An Najaf.

In less than a week, V Corps Headquarters identified many cache sites around Baghdad. Tasked to support logistical resupply in theater, V Corps Support Command (COSCOM) transportation units did not have the assets available to collect and transport equipment and ammunition from more than 20 locations. Due to 2-18 FA's organic hauling capacity, V Corps assigned the battalion and other FA units the mission of removing and transporting ammunition from cache sites scattered throughout the region to temporary ammunition holding areas (AHAs) at different coalition storage facilities.

Identifying the assets required to perform these operations was a vital start for 2-18 FA's post-conflict operations. But coordinating the movement of trucks, ammunition and personnel was

1. Situation:
- a. Friendly/Adjacent Units
- b. Support Units
- c. Enemy Situation

2. Mission: Cargo Type, Origin, Destination, Date-Time-Groups, Why, etc.

3. Execution:
- a. Order of March
- b. Timeline—Start Point, Lineup and Breaks
- c. Routes
- d. Speeds—Convoy and Catch-Up
- e. Vehicle Gaps (Space and Time)
- f. Locations and Times of Halts
- g. Emergency Procedures
- h. Actions on Contact (Ambush/Sniper, Vehicle Breakdown, Accident with Civilian/Military Vehicle)

4. Administration/Logistics:
- a. Control of Personnel
- b. Class I
- c. Refueling
- d. Vehicle Services
- e. Sensitive Items Check

5. Safety:
- a. Route and Weather Hazards
- b. Defensive Driving Principles
- c. Compliance with Civil Traffic Regulations
- d. Obedience to Civil and Military Police Escorts
- e. Critical Points Along the Route
- f. Weapons Status (Red, Amber or Green)
- g. Uniform
- h. Check All Lights

6. Command and Signal:
- a. Command—Location of Convoy Commander and Actions of Security Forces
- b. Signal
  - (1) Internal—Reporting Procedures, Convoy Nets (March Unit/Serial/Platoon), Call Signs, and Hand and Arm Signals
  - (2) External—Reporting Procedures, Convoy Nets (Battalion Tactical Operations Center or TOC, Administration/Logistics Center or ALOC, and Main Command Post), Call Signs/Frequencies (Medical Evacuation or MEDEVAC, Military Police and Maneuver), Radio and Mobile Tracking System (MTS)

Spacing:	
• Cities/Built-Up Areas	25 Meters
• Closed Column	50 Meters
• Open Column/Likely Ambush Areas	100 Meters
• Between March Units	>=5 Minutes
• Between Serials	>=10 Minutes
Speeds: Wheeled Vehicles Only	
• Cities/Built-Up Areas	15 MPH
• Two-Lane Roads	40 MPH
• Limited-Access Expressway	55 MPH
Speeds: Mixed Wheeled and Tracked Vehicles	
• Cities/Built-Up Areas	10 MPH
• Outside Cities	20 MPH
Black-Out Driving	5 MPH
Catch-Up Speed	Plus-5 MPH

Spacing and Speeds for Convoys. A convoy has one to four serials; a serial has one to four march units; and a march unit has no more than 25 vehicles.

Figure 1: 2-18 FA Outline for Convoy Briefings for Collect Enemy Equipment and Ammunition (CEE/CEA) Missions in Iraq. Also, see the Center of Army Lessons Learned Handbook No. 03-6, *Tactical Convoy Operations,* March 2003, at http://callarmy.mil.

not the only challenge in a constantly changing operational environment. Changing the mindset of soldiers was the most significant challenge: focusing soldiers' efforts on establishing a safe and secure environment for Coalition Forces and the local populace. Force protection was the command focus as well: following strict convoy procedures, maintaining long-range communications and situational awareness, establishing disciplined maintenance practices with an emphasis on HEMTTs versus M270 launchers and coordinating with external agencies. Learning from the lessons outlined in this article will help other units transition more smoothly into SOSO.

Changing the Soldiers' Mindset. Of greatest concern for leaders was changing the mindset of soldiers from fighting the Iraqi military and paramilitary forces to helping in PEO throughout the Baghdad region. The pivotal aspect of this change was the soldier's mental transition from being a combatant in a hostile environment to being a stabilizing peace enforcer in a post-conflict scenario.

Maintaining an elevated force protection posture identical to combat operations while conducting nontraditional missions was a daunting task that took focused leadership and disciplined soldiers. They had to remain vigilant about their own safety and keenly aware of the ROE in their operational environment. Rather than drive a vehicle across country or on relatively secure main supply routes (MSRs), soldiers had to convoy through crowded streets, busy market districts and dangerous chokepoints.

Everywhere military convoys traveled, children and adults lined the streets to show their support and satisfy their curiosity. Soldiers had to understand that most of these civilians posed no danger. At the same time, they had to watch for any signs of danger and be prepared to act instantly to handle any potential threat, in accordance with the ROE.

During early operations, a convoy consisting of the battalion commander and his battery commanders entered a village to unexpectedly find hundreds of vendors selling illegal weapons to local civilians. The convoy quickly reacted by conducting a hasty checkpoint and apprehending more than 30 personnel and an array of weapons, including AK-47s, RPGs and hand grenades. Then 2-18 FA conducted a relief-in-place with elements of the 4th Infantry Division (Mechanized).

The discipline displayed by soldiers ensured Coalition Forces were secure while they created an environment in which the local populace could return to normal daily activities.

Religious zealots, radical nationals and regime holdouts were not the only hazards facing soldiers while they conducted CEE/CEA operations. Soldiers had to remain attentive when handling, transporting and storing captured Iraqi ammunition, tasks that 2-18 FA performed daily. Ammunition at cache sites was not always boxed or crated and ready to transport. In many instances, the rounds, land mines and other munitions were not labeled, so soldiers could not identify if they were incendiaries, such as white phosphorus, or other hazardous contents—potentially chemical.

Transporting different unknown types of ammunition led to unexpected repercussions. On one occasion, another unit, transporting ammunition in a HEMTT had an unknown white phosphorus mortar round ignite due to the desert heat. This started a chain reaction that burned the HEMTT down to the hull and injured two soldiers.

Soldiers and their leaders must remain focused to avoid or react to these operational hazards.

Convoying Procedures. The most hazardous part of any CEE/CEA mission was the convoy to and from the cache site. Driving countless miles through major cities and small towns made HEMTT crews easy targets for the handful of scattered opposition forces remaining in sector. Maintaining a robust force protection package and conducting a thorough convoy briefing prepared members of the convoy for the mission and reduced the risks associated with moving ammunition in that environment.

If nothing else, a robust force protection package to act as a deterrent gave convoys the security and confidence to complete missions in non-secure operational environments. The battalion relied on external as well as internal assets to project a lethal force protection package.

Initially, military police (MP) escorted all convoys in and out of the logistical support area (LSA). With daily sporadic gunfire throughout the Baghdad area, MP vehicles in the front and rear of the convoy ensured the convoy could take an offensive posture, as needed.

The battery also placed its crew-served weapons intermittently throughout the convoy. Before deploying, each battery fielded M1026 HMMWVs with .50-caliber machine guns mounted on them. This paid big dividends as the batteries could field a more robust force protection presence on CEE/CEA missions. These internal assets ensured convoys had the protection to accomplish any mission, even during split-battery operations.

Convoy commanders conducted thorough convoy briefings and remained flexible in adapting to changes in security postures throughout the zones in which convoys traveled. (See Figure 1 for the convoy briefing outline and Figure 2 for the convoy commander's checklist.) Increased enemy paramilitary activity led to the development of additional TTPs. Ba'ath Party and former regime loyalists resorted to emplacing IEDs along the highways and using other unconventional tactics to undermine the peace process and target Coalition Forces in Iraq.

1. Start point report and risk assessment prepared?

2. Signs for lead and trail vehicles?

3. Convoy numbers clear and conspicuous on both sides of all vehicles?

4. Commo checks (lead and trail vehicles)?

5. Preventive maintenance checks and services (PMCS) conducted? 5988Es filled out?

6. Cargo and passengers properly loaded? Load plan on hand?
- Cargo must be tied down and/or blocked and braced to prevent shifting.
- Cargo must be separate from passengers.
- Warning triangles, first aid kit and operational fire extinguishers must be in each vehicle.
- Vehicle operators and passengers must use seatbelts, if available.

7. Personnel briefed on the route of march, traffic regulations, speed limits, control procedures, critical points and individual responsibilities? Maps issued?

8. Service lights and rotating amber light warning systems (RAWLS) operational?

Figure 2: Convoy Commander's Pre-Departure Checklist

Commanders restricted nonessential MSR convoy movement to the hours of daylight and improved situational awareness to mitigate the risks associated with the enemy's unconventional tactics.

As of November, Coalition Forces had lost more soldiers in Iraq during stability operations than during major combat operations.

Former regime loyalists continue to target soldiers performing daily nonstandard stability operations. On one occasion, a brick thrown from a Baghdad overpass struck a Coalition vehicle, while in a separate instance, a vehicle hit an anti-tank mine camouflaged by loose trash. In another instance, militants ambushed a unit returning from a routine SOSO mission with small arms fire and multiple RPGs, killing a soldier and wounding others. In all of these cases, Coalition Forces were unable to return fire because the enemy attacked and quickly fled or, in the case of the mine, was not present at the attack. Commanders restricted nonessential MSR convoy movement to the hours of daylight and improved situational awareness to mitigate the risks associated with the enemy's unconventional tactics. Thorough daily convoy briefings conducted before movements ensured soldiers remained vigilant on missions outside of the LSA.

Maintaining Long-Range Communications. As in any operation, maintaining communications during CEE/CEA operations was an essential element of the mission and soldier safety. Traveling beyond FM single-channel ground and airborne radio system advanced system improvement program (SINCGARS ASIP) planning ranges during SOSO operations challenged the battalion's command, control and communications (C^3). Providing batteries with assets to communicate with the tactical operations center (TOC) was a challenge but a necessity to perform the mission.

The battalion's SOSO mission in Baghdad stretched the limits of traditional communications platforms. Batteries routinely moved outside of FM radio range in the first 30 minutes of each mission and never regained FM coverage throughout the operation. To solve communications shortfalls, the battalion relied heavily on Spitfire satellite communications (SATCOM) radios, Iridium and Thuraya satellite phones and the mobile tracking system (MTS) for tactical communications while conducting missions.

The Spitfire took five to 10 minutes to set up due to its tactical satellite antennae. However, once in position, it was a reliable primary means of communications. The satellite cell phones gave commanders a redundant means of communications that was reliable on the move.

Batteries also sent updates to the battalion through MTS computer messages. The MTS, a satellite tracking system, was a reliable and effective means of communicating with battalion headquarters.

Redundant commo platforms guaranteed at least one means of communications with battalion headquarters. As routes became increasingly hazardous, it was essential the battalion TOC maintained communications with the convoy commanders performing the CEE/CEA missions.

Maintaining Situational Awareness. Situational awareness while conducting daily operations was paramount for the safety of soldiers in this unstable environment. Giving a thorough risk assessment briefing to convoy commanders before the convoy left the start point (SP) gave them the tools to execute the mission.

Commanders carried smart cards that included "hopsets" with the corresponding channels, call signs and phone numbers of all units in V Corps' area of responsibility (AOR). Additionally, all convoys carried global positioning systems (GPS) that enhanced their navigation capabilities and increased their reporting reliability.

The battalion staff briefed convoy commanders on potential threats, locations of recent attacks along the route of march and tactics used by local militant groups. The battalion S2 reported threat levels along the local MSRs, labeled Green, Amber or Red, coinciding with the threat estimated by the maneuver commander. These reports indicated the enemy activities along the convoy route in the previous 24 to 48 hours. In addition to intelligence reports, the battalion used automation to identify secured routes and the current operational picture, including the command and control personal computer (C^2PC) and automated deep operations coordination system (ADOCS).

Situational awareness started in the TOC. On one occasion, unexploded ordnance on the MSR leading to the LSA was identified and higher headquarters closed the MSR. Three 2-18 FA convoys were conducting operations in Baghdad when the TOC was notified the route was closed. The TOC quickly warned the convoys of the situation and held them in place, or directed them along a different route until the explosive ordnance disposal (EOD) team removed the hazard.

Maintaining situational awareness enabled leaders and soldiers to avoid unnecessary risks and helped them complete their missions.

Pulling Maintenance. The battalion's maintenance focus changed drastically during the transition to SOSO. During normal combat operations, the battalion's maintenance assets focused on pacing items—the M270 improved position determining system (IPDS) launchers and M577A3 C^2 vehicles. During SOSO, the battalion's HEMTTs and M1026 HMMWVs became the pacing items. Disciplined vehicle maintenance guaranteed the HEMTTs and M1026s remained mission-capable and increased the safety and effectiveness of the missions.

The narrow congested streets and lack of traffic regulations made it imperative that units pay attention to the safety features of their vehicles. Functional lights and mirrors and thorough battery and battalion quality assurance/quality control (QA/QC) inspections were the keys to success during CEE/CEA missions.

Maintenance was a command priority with emphasis on operator preventive maintenance checks and services (PMCS); commanders spot-checked convoy vehicles daily. Battery commanders and maintenance personnel also enforced daily after-action PMCS of each vehicle. After every mission, battery mechanics conducted a QA/QC of all trucks and HMMWVs, focusing on deadline faults and safety features: brakes, lights, mirrors, tires, seat belts, etc.

Operators and mechanics identified not only existing faults, but also potential faults. This proactive maintenance posture was critical, especially with an immature logistics supply line that slowed the pace at which the battalion received parts.

Coordinating with External Agencies. 2-18 FA coordinated with multiple agencies daily to ensure batteries had the assets to complete their CEE/CEA missions: MPs, EOD personnel and contract Iraqi civilian labor. Synchronizing these assets required constant coordination among the battalion, batteries, parent brigade and individual agencies.

The MPs brought valuable firepower to CEE/CEA convoys. At the onset of operations, the MP force structure in country could not support the many V Corps missions. Units had to coordinate at least 12 hours ahead to guarantee link up times, locations and points of contact (POCs). Eventually the battalion established a habitual working relationship with the MP escorts, minimizing the confusion that accompanied first-time link ups.

As a safety precaution, EOD personnel inspected all ammunition before soldiers removed it from the cache sites. Eventually, Iraqi civilians augmented US forces removing, banding and crating ammunition found in unsecured bunkers. Like EOD, the battalion coordinated for the civilians' arrival and ensured they were on site when US forces arrived. Synchronizing the battalion's arrival with EOD and civilian laborers saved time and minimized personnel exposure to hazards around unsecured cache sites.

After OIF, 2-18 FA learned valuable operational lessons not learned since the end of World War II. Units proactively analyzed their operating environment and determined the tasks necessary to stabilize their areas of operations. Because 2-18 FA was executing a new mission that straddled the fence between combat and peace enforcement operations, the battalion continuously assessed the usefulness and effectiveness of its emerging TTPs.

Although not all SOSO missions are the same, following these lessons learned will enable units to make a more seamless transition to SOSO and preserve the greatest assets the Army has: soldiers. Their soldiers' discipline, dedication and flexibility will enable units to perform complex, full-spectrum operations.

Lieutenant Colonel David J. McCauley commands the 2d Battalion, 18th Field Artillery (2-18 FA), part of the 212th Field Artillery Brigade (212th FA Bde), III Corps Artillery, Fort Sill, Oklahoma. He deployed the battalion to Southwest Asia in support of the 41st FA Bde, V Corps, for Operation Iraqi Freedom on 20 March 2003 and redeployed it to Fort Sill in November. Among other assignments, he was the Chief of Plans at the Warrior Preparation Center, Ramstein AFB, Germany, during the Kosovo Air Campaign. He also was the Executive Officer for 4-27 FA and Division Artillery Adjutant, both in the 1st Armored Division, while deployed to Bosnia-Herzegovina as part of the Implementation Force (IFOR).

Captain Jay W. Berendzen is the Battalion Fire Direction Officer (FDO) in 2-18 FA, 212th FA Bde, and deployed with the battalion to Iraq in Operation Iraqi Freedom. His previous assignments include serving as Assistant Operations Officer, Company Fire Support Officer (FSO), Battery FDO, and Paladin Platoon Leader, all in 4-27 FA, 1st Armored Division, Germany. While serving as Company FSO, he deployed to Albania as part of Task Force Hawk in support of the Kosovo Air Campaign; as a Paladin Platoon Leader, he deployed to Camp Bondsteel in Kosovo in peacekeeping operations.

September-October Edition Corrections:

Wrong Author, Bad Day at the Mag. *For the article "Decisive Fires, Decisive Victory: 1-9 FA in OIF," Pages 29-32, the author inadvertently was listed as Lieutenant Colonel Kenneth D. Gantt, commander of 1st Battalion, 9th Field Artillery (1-9 FA), 3d Infantry Division (Mechanized), during Operation Iraqi Freedom (OIF) instead of the correct author, Major Philip D. Rice, S3 of 1-9 FA in OIF. We apologize for any embarrassment or inconvenience to either officer because of this error.*

Ed

Letter to the Editor—Marines Took Tikrit, Not 4th ID. First of all, I must commend you on a great issue….the September-October issue is a great recap of FA contributions to OIF.

However, the map on Page 3 does contain an error. The red lines/arrows that denote the USMC I MEF [Marine Expeditionary Force] advance through Iraq ends in Baghdad. It should reflect the movement of Task Force Tripoli (from I MEF) up to Tikrit. The 5th Battalion, 11th Marines (Artillery) with elements of 1st, 2d, and 3d LAR [Light Armored Regiment] Battalions attacked and secured Tikrit approximately seven days before the 4th ID [Infantry Division (Mechanized)] arrived to continue operations.

Thanks for your hard work, and keep pushing out the OIF lessons learned!

LtCol Gerald "Jerry" L. Smith, USMC
(Former Commanding Officer of 5/11)
Warfighting Instructor,
Command & Staff College
Quantico, VA

Regrets to the warfighting 11th Marines and LAR elements—we, as all Americans, want to give full credit to our OIF heroes.

The author and map errors have been corrected in the online version of the September-October edition at sill-www.army.mil/famag.

Arctic Ready, Arctic Tough, Arctic Thunder

By Captain Edward R. Herrmann

In today's uncertain world, one thing is certain: the next battle could be fought anywhere in any environment. The need for training in extreme environments is paramount for future success. Fortunately, the Army has units around the world in different extreme training environments.

Alaska is one location where training in an extreme environment is a daily routine. Units in US Army Alaska (USARAK), in particular the 172d Separate Infantry Brigade (SIB), know this routine all too well. The 172d SIB is headquartered at Fort Wainwright, Alaska, just outside of Fairbanks.

Temperatures in this region have some of the broadest ranges in the world. Summer temperatures often reach into mid-90 degrees Fahrenheit, and winter ambient temperatures often fall below -50 degrees. With wind-chill factor, it is not uncommon for temperatures to reach -70 degrees. These extreme temperatures obviously present challenges for maintaining personnel and equipment.

The 4th Battalion, 11th Field Artillery (4-11 FA), which is in direct support (DS) of the 172d SIB, has had the challenge of maintaining personnel and more equipment than any other unit in the brigade. 4-11 FA meets the challenges by strictly adhering to its unit standing operating procedures (SOP) and participating in programs developed by the Northern Warfare Training Center (NWTC) at Fort Wainwright.

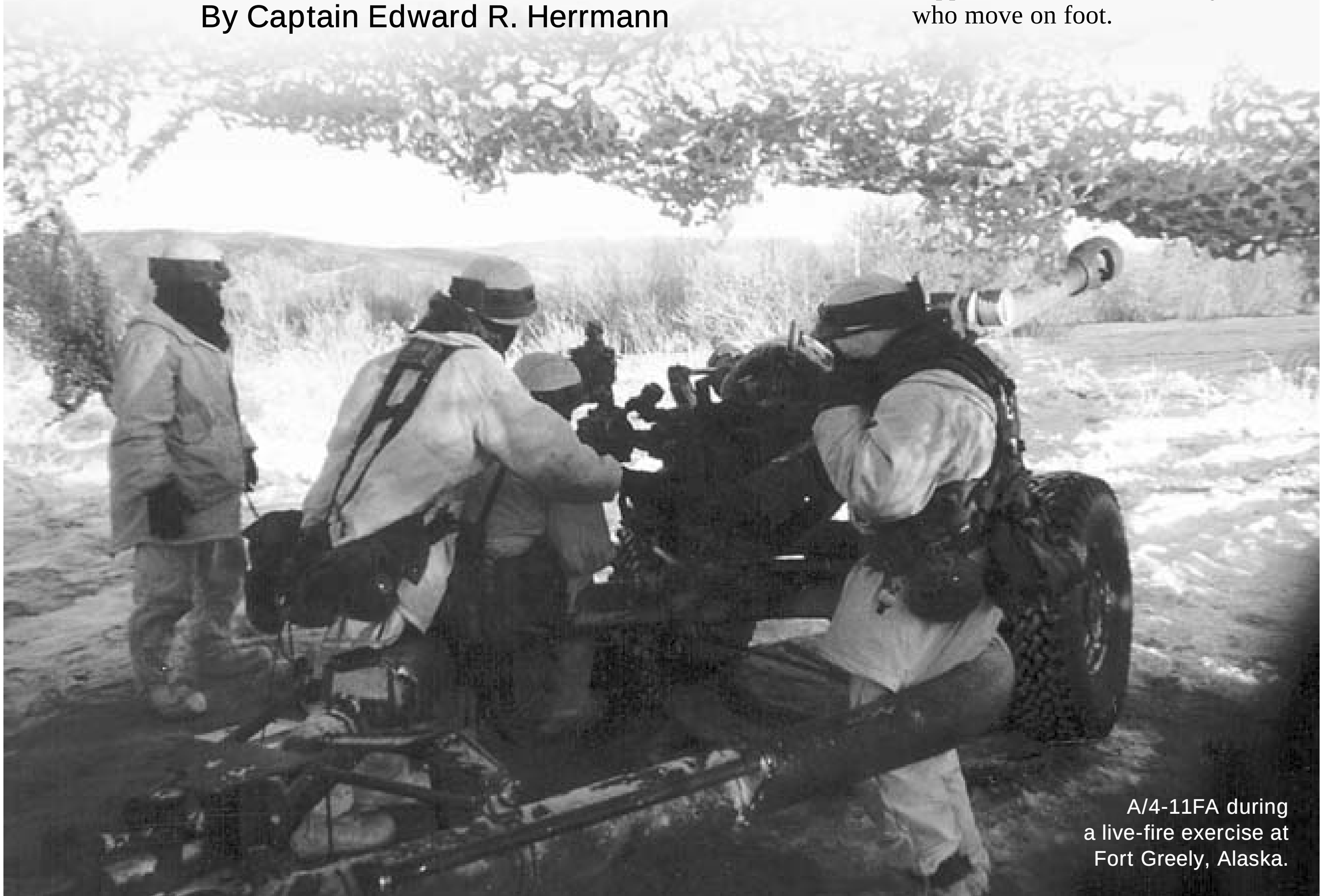
Cold Weather Training. NWTC developed Arctic Light Individual Training (ALIT) training required annually for all personnel in USARAK. This training has greatly minimized cold weather injuries in the command. While ALIT is designed to prepare the individual for extreme cold conditions, it also provides great information to help leaders mitigate the risks associated with the cold.

ALIT normally is taught at the battery level by personnel (E5 and above) who have attended the Cold Weather Leadership Course (CWLC). CWLC is a two-week train-the-trainer course taught by the cadre at NWTC.

The purpose of ALIT is not only to ensure soldiers survive in cold weather, but also to minimize the impact of weather extremes on combat training. In battle, weather and climate do not stop the fight—only hinder its flow.

ALIT is a three-day program conducted in mid- to late-October at the early onset of winter; temperatures usually are 10 degrees or below. These temperatures are ideal for new personnel to test their capabilities in cold weather and gain an understanding of how their equipment works before the risks dramatically increase with more extreme temperatures later in the winter. ALIT instruction includes the information in the figure.

The ALIT instruction covers snow movement. Understanding snow movement is especially important for fire supporters and their Infantry brothers who move on foot.



A/4-11FA during a live-fire exercise at Fort Greely, Alaska.

Cold Weather and the Soldier. Perhaps the most important of the ALIT classes is the one on cold weather clothing and equipment. Soldiers learn the acronym COLD: keep it Clean, avoid Overheating, wear Loose and Layered clothing, and keep clothing Dry.

The extreme cold weather clothing system (ECWCS) is some of the finest cold weather clothing available. It includes polypropylene top and bottom, field jacket liner, new Polar Fleece top and bottom (recently replaced the polyester brown bear suit), Gortex pants and jacket, neck gator, balaclava (a pullover wool hat for the face and neck), vapor barrier boots, trigger mittens and arctic mittens. Soldiers in cold weather should not wear *cotton*, especially against the skin, because it retains water and takes longer to dry.

A common injury in extremely cold conditions is contact frostbite. This is when the bare skin comes in contact with metals, plastics, etc., that are frozen. Common contact frostbite areas include the nose against the charging handle of a weapon, ears and lips against radio hand mikes and hands against any number of pieces of equipment.

When performing tasks that require greater dexterity, such as setting fuzes and operating the sight on the howitzer, soldiers should wear contact gloves, at a minimum. Contact gloves usually are thin liners made of wool but can be made of other materials as long as it puts distance between the skin and the object. Once the task demanding dexterity is completed, soldiers should don their mittens.

While soldiers don't need to wash themselves with a washcloth and an empty ammo can full of water in -20 degree temperatures, it is important that they conduct personal hygiene. This usually comes in the form of clean dry clothes. Soldiers should change polypropylene undergarments daily and wool socks at least twice a day. Most soldiers are only issued two sets of polypro undergarments; however, if a soldier rotates them twice daily, he can use them for field problems or missions for up to two weeks.

Thick, white wool socks with sock liners provide the best means of keeping feet dry while using the vapor barrier boot. A minimum of 10 pairs of socks and liners rotated will suffice for a two-week duration.

Over time, the body produces more oils in the skin to help insulate against the cold. Washing off those oils reduces that insulation. Soldiers also should learn to shave before sleeping. This allows the body time to reproduce those natural oils that help protect the face.

- Characteristics of Cold Weather Environments
- Effects of Cold on Military Equipment
- Cold Weather Clothing and Equipment
- Medical Considerations in Cold Weather
- Cold Weather Bivouacs with a Tent and Stove Drill and Improvised Shelters
- Risk Management in Cold Weather Operations
- Field Craft in Cold Weather
- Snow Movement

Arctic Light Individual Training (ALIT) at the Northern Warfare Training Center (NWTC), Fort Wainwright, Alaska. This three-day training program is required for all personnel in US Army Alaska (USARAK) annually. For more information on the ALIT cold weather training, see the NWTC website at www.wainwright.army.mil/nwtc/alit.htm.

Soldiers should not use face camouflage when temperatures fall below 20 degrees. This makes it difficult to identify the onset of frostbite and other cold weather injuries.

The Type II extreme cold modular sleeping system consists of a moderate weight bag, a heavy weight bag and a Gortex bivy cover. Both the ECWCS and the sleep system enable a soldier to survive and train in temperatures as low as -50 degrees without an additional heat source.

Techniques for sleeping in a tent are somewhat different in a cold snowy environment. For the same reason bridges and overpasses tend to freeze first in the cold, personnel should not sleep on cots because it allows the cold air to circulate around the body. Soldiers should sleep directly on the ground on top of a compressed foam mattress instead of the new air mattress because it provides more insulation.

Every effort should be made to remove all snow in the area where the tent is to be set up. All bottom wind flaps should be pushed to the outside and free from obstruction. This enables soldiers to conduct emergency roll out drills in case of a tent fire.

Cold Weather and Equipment. This is another part of cold weather preparation that is briefly covered in ALIT but is left up to individual units to tailor to their specific needs. For the FA battalion, this is a major part of its SOP. The way soldiers operate equipment and conduct preventative maintenance checks and services (PMCS) is often very different in cold weather.

When this article was being written, the 172d SIB had begun transitioning to the Army's third Stryker Brigade Combat Team (SBCT). During that transition, 4-11 FA will change from the M119 105-mm towed howitzer to the M198 155-mm towed howitzer. While many of the tactics, techniques and procedures (TTPs) in the battalion's SOP will remain the same, 4-11 FA will use this winter to develop new TTPs specific to working with the M198 in the arctic environment.

There are many challenges working with the M119 howitzer system in extreme cold conditions. Because soldiers must wear all their personal equipment in snow and icy conditions, movement times will not be ideal. In fact, movement in general, both personnel and vehicles, will take longer.

While battery occupation times are still feasible, movement to the new firing point takes twice as long in the extreme cold. It also takes twice as long to march order the battery under extreme conditions. This information is important for mission planning purposes, especially when timeliness is an issue. To help minimize movement times, tire chains for all tires should be basic issue items.

On frozen ground, it can be difficult to put a howitzer into operation properly. When the spikes from the base plate initially fail to penetrate the ground, crews sometimes use sandbags to hold the base plate in position, so the crew can more easily move the howitzer onto the base plate. One to two check rounds should be fired to help ensure the base plate spikes seat in properly before firing missions.

In extreme cold conditions, firing high-angle missions becomes more challenging. Because these missions apply more pressure to the base plate, it is not uncommon for base plates to crack.

According to the howitzer training manual, exercising the recoil should be done every 90 days. In extremely cold conditions, however, units should exercise the recoil system of each howitzer three times before each live fire. This technique reduces the number of broken seals and hydraulic fluid leaks in the recuperator by exercising the rubber seals gradually instead of shocking them with a fire mission.

It is easy to take for granted the simple things that often go unnoticed during normal temperatures. But in extreme cold, they can become show-stoppers. Stay-pin holes for the spade, which keeps the howitzer from moving during fire missions, often become clogged with ice. Soldiers should use some sort of corking device to prevent ice from building up in the holes during movements.

The sight system easily can become frozen and inoperable in extremely cold temperatures. The gears or cogs on the sight that enable the gunner to set off the quadrant and deflection can freeze due to condensation and frigid temperatures. One solution is to wrap or cover the sight with some sort of cloth. This helps limit the sight's exposure to the cold and reduces condensation on the sight.

Also, in the extreme cold, collimators often fog up and become unreadable. Section leaders should bring tissue to the field to wipe the collimator lenses.

Most PMCS tasks for the M119 can be performed even in extreme temperatures. The breech block assembly, however, should be removed and warmed in a tent or vehicle before disassembly. This warms the metals and reduces the chance of contact frostbite as most of the work on the assembly requires the dexterity of bare hands. This procedure also helps reduce the loss of small parts, especially when there is snow on the ground.

The dangers of handling artillery ammunition in extreme cold are about the same as in other weather conditions, with a few exceptions. While the most common injuries when handling ammunition are smashed toes and fingers, in the arctic environment it tends to be contact frostbite. Soldiers handling ammunition without gloves easily get contact frostbite. Also, fuze setting can be difficult while wearing cumbersome mittens; however, at a minimum, soldiers must wear contact gloves at all times to prevent frostbite injuries.

Powder temperature is always a concern in any weather. In arctic conditions, however, the temperature margin between powder in the back of the ammunition hauler and the ammunition on the ground can be vast. Every effort should be made to ensure ammunition is consistently stored covered on the ground. This eliminates severe powder temperature variances.

Also, many fuzes have temperature limitations. Gun lines and fire direction centers (FDCs) should be familiar with the temperature limitations of each fuze.

Small arms require some cold weather considerations to operate properly. When operating at lower temperatures, personal weapons should be lubricated with lubricant arctic weather (LAW) instead of the cleaner lubricant protectant (CLP). Condensation is common among metals when exposed to different temperatures; therefore, weapons should be wrapped in cloth covers, not plastic, to reduce condensation.

Metals tend to expand when they are warm and contract when cold. To prevent a mixture of expanding and contracting metals, both weapons and ammunition should be stored at the same temperature outside of tents and warm vehicles.

Also, soldiers should test- fire rifles and machine guns to exercise their recoil and buffer systems before an operation. This helps reduce breakage and improve the rate of fire. Armorers always should be prepared with extra parts during cold weather operations.

Communications and other electronic equipment can become very sensitive in extremely cold conditions. While the cold may be ideal for storing batteries, it does impair their performance. Fire supporters and others who carry manpack systems requiring batteries should make every effort to keep them as warm as possible.

Liquid crystal displays (LCD) tend to freeze at temperatures around -20 degrees and become unreadable. The best way to restore their visibility is to keep them from exposure. Radios should be insulated and packed properly in a rucksack. Other items with LCDs, such as global positioning systems (GPS), can be stored inside one of the layers of clothing of the soldier carrying it.

FDCs should maintain some heat source near digital systems, such as lightweight computer units (LCUs) or advanced FA tactical data systems (AFATDS), for the equipment to function properly. It may be necessary to place antennas, such as OE-254s, closer to wooded or brushy areas to tie them down when stakes cannot be used due to the frozen ground. Rubber and plastic become less malleable in extreme cold; the thinner RG-213 coax cables work easier than OE-254s.

Military vehicles operating in extremely cold conditions require winterization. Block heaters should be installed to prevent engines sitting in motor pools from freezing. While in the field, engines should be allowed to run for at least 10 minutes every hour when temperatures fall below zero.

Engine fluids should be changed to combat the cold. Arctic grade thinner oils and lubricants help engines start and run more smoothly. Extreme -20 degree conditions require a 60/40 antifreeze/water ratio. Tires should be inflated an additional 10 pounds per square inch (PSI) to prevent flat spots when the rubber hardens. Fire extinguishers should be winterized according to the standards outlined in the technical manual (TM).

All passengers riding in any vehicle should bring survival gear, regardless of the distance or duration of travel. In fact, soldiers should keep a survival ruck close at all times.

When handling hazardous materials, such as fuel, special care should be taken. Improper fuel handling easily can result in the loss of fingers and hands. While fuels manage to maintain their liquid state in extremely cold temperatures, the fuel itself is as cold as the ambient temperature. When fuel at -20 degrees makes contact with the skin, even through wool gloves, it has a similar affect as liquid nitrogen—the skin freezes instantly. A simple spill can become devastating. The best safety precaution is to wear non-porous rubber gloves over glove liners when working with fuel.

Units must understand the value of training in extreme environments. There is no room for "summer soldiers and sunshine patriots" in today's Army. Tomorrow's battles won't be fought at convenient times and comfortable locations.

The challenge for today's leaders is to take lessons learned in yesterday's battles and training and take care of their soldiers under any conditions. Extreme weather training will help ensure extreme combat success. *Arctic Thunder!*

Captain Edward R. Herrmann has been serving as Commander of A Battery, 4th Battalion, 11th Field Artillery (A/4-11 FA) for more than a year. In his previous assignment, he was the Battalion Fire Support Officer for 1st Battalion, 501st Parachute Infantry Regiment, Fort Richardson, Alaska. He also served as the Battalion Fire Direction Officer (FDO) and Ammunition Officer for 3-18 FA, 17th Field Artillery Brigade, III Corps Artillery, Fort Sill, Oklahoma; and Platoon FDO for C/2-17 FA, 2d Infantry Division in Korea. He is a graduate of the FA Captain's Career Course, Fort Sill, and the Combined Arms and Services Staff School at Fort Leavenworth, Kansas.

2003 Gruber Award Winner:

SFC Glen R. Washington, FCNCO, 3d ID

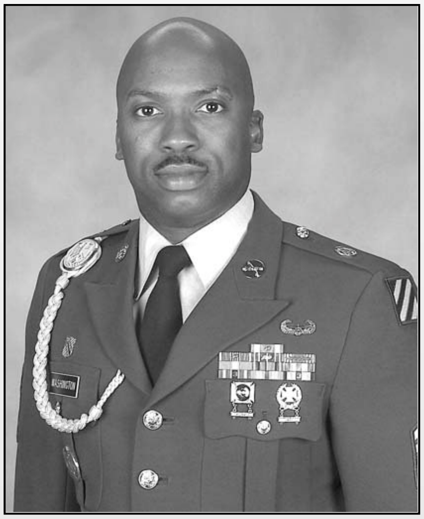
Sergeant First Class (SFC) Washington, the Fire Control NCO (FCNCO) for the 3d Infantry Division (Mechanized) Artillery (Div Arty), Fort Stewart, Georgia, is the winner of the Gruber Award as the outstanding FA professional for 2003. SFC Washington made significant contributions to the success of the 3d Division in combat during Operation Iraqi Freedom (OIF) and developed critical tactics, techniques and procedures (TTP) for the advanced FA tactical data systems (AFATDS) that will benefit the entire FA community.

The Gruber Award, established in 2002, recognizes outstanding individual thought and innovation that results in significant contributions to or enhancement of the FA's warfighting capabilities, morale, readiness or maintenance. The award is named after Brigadier General Edmund L. Gruber, 1879-1941, who, as a First Lieutenant in 1908, composed the *Caisson Song* that the Army adapted as *The Army Goes Rolling Along* in 1952. (For more information, see the website "Knox, Hamilton and Gruber Awards" at http://sill-www.army.mil/awards/default.htm.)

In early 2002, SFC Washington volunteered to deploy to Kuwait as an AFATDS expert in support of the Coalition Force Land Component Command (CFLCC) C3 fire support element (FSE). During this six-month deployment, SFC Washington served with distinction, voluntarily performing the duties of a Battle Captain and Shift NCOIC. He regularly assisted the Continental United States (CONUS) Crisis Response Force (CCRF) artillery battalion when it encountered AFATDS issues.

His most notable achievement was training and planning for the 1-3 Attack Helicopter Battalion's (AHB's) FSE to fire digitally for the first time using AFATDS in conjunction with the airborne target handover system (ATHS) on the AH-64D Apache Longbow. SFC Washington's perseverance and in-depth knowledge enabled 1-3 AH to execute a complex process routinely.

Upon his return to CONUS in September 2002, SFC Washington began preparing the division's final AFATDS fielding for 1-10 FA at Fort Benning, Georgia—considered one of the best to date. He helped the Fort Sill AFATDS



new equipment training team (NETT) field more than 60 AFATDS rapidly across the Div Arty.

As the Div Arty prepared to deploy to Kuwait, SFC Washington received yet another task. He and his fire control element (FCE) fielded AFATDS Version 6.3.1 and, in four weeks, trained more than 120 soldiers on the software on different continents.

The Div Arty commander then picked SFC Washington for a "Do Not Fail" mission—live-fire and validate the software before the division went into combat. SFC Washington immediately established a rigid training program for battalion fire direction centers (FDCs), continually rehearsing combat battle drills and fire missions. He performed brilliantly, personally certifying each battalion FDC as safe to fire.

Through his untiring efforts, the Div Arty massed all cannon and rocket battalions for the first time in 12 years while simultaneously validating Version 6.3.1. SFC Washington flawlessly executed Div Arty mass time-on-target (TOT) and fire-for-effect-"When Ready" (FFE-WR) missions and a schedule of fires that included a live fire of rockets for suppression of enemy air defenses (SEAD). The Assistant Division Commander for Maneuver and Div Arty Commander commended SFC Washington's Fire Control Section (FCS) for exceptional accuracy and timeliness.

SFC Washington's AFATDS expertise in training and exercises resulted in a highly trained, combat-ready Div Arty just weeks before the division attacked into Iraq.

The Div Arty S3 then challenged SFC Washington to maintain digital communications on the move. Thinking "outside the box," SFC Washington suggested building a "jump FCE" in a high-mobility multipurpose wheeled vehicle (HMMWV) with M1113 rigid-wall shelter (RWS). Within 48 hours, he had the mobile FCE operational. He developed TTPs for employing this FCE and maintained continuous digital FM communications throughout the ensuing combat operations.

Upon notification of incoming Iraqi artillery fire near An Nasiriyah, SFC Washington's jump FCE, as part of the Div Arty tactical command post (TAC), emplaced from the march and immediately established communications with radars and firing units, enabling the Div Arty TAC to return fire rapidly. SFC Washington's vision and know-how resulted in a counterfire effort that overwhelmed the Iraqi artillery and ultimately saved US soldiers' lives.

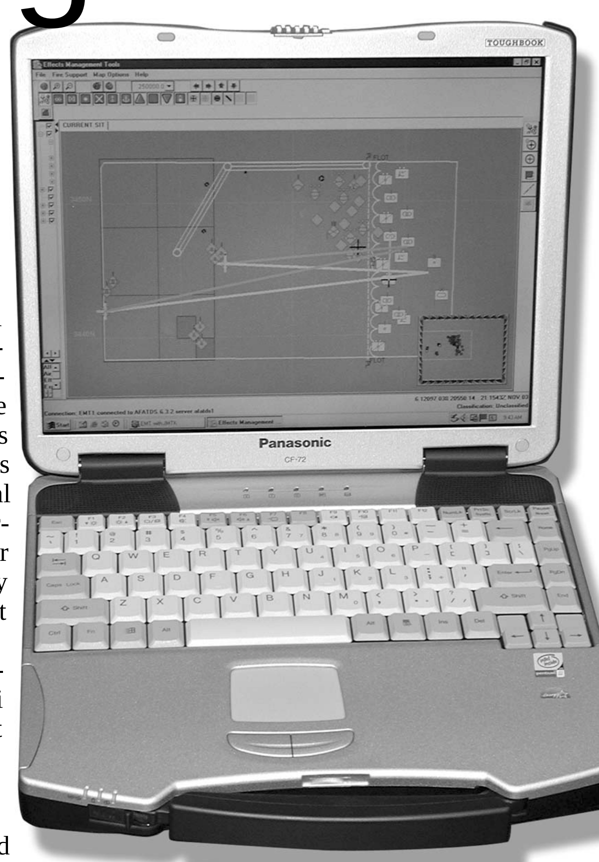
Throughout the conflict, SFC Washington flawlessly executed Div Arty-level artillery preps, to include the initial destruction of nine Iraqi border observation posts at the beginning of major combat operations. He processed countless requests for additional fires from maneuver elements and processed the now famous multiple-launch rocket system (MLRS) strike in support of 2d Brigade's "Thunder Run" into the Palace District of Baghdad.

Always looking for ways to streamline the process, SFC Washington's efforts allowed the Div Arty to reduce the radars acquistion-to-fire time to six minutes and 37 seconds. SFC Washington processed more than 90 counterfire missions that silenced the Iraqi artillery and resulted in no loss of life from enemy indirect fires in the 3d Division.

With his demeanor, confidence and technical abilities, SFC Washington was a beacon for soldiers of Headquarters and Headquarters Battery, Div Arty, during the tumultuous past year. The 3d Division, FA community, US Army and nation are better off today because of SFC Washington's performance in preparing for and executing fires during OIF.

AFATDS Effects Management Tool

By Lieutenant Colonel John L. Haithcock, Jr.



Panasonic Toughbook Laptop

The Advanced Field Artillery Tactical Data System (AFATDS) Version 6.3.1 software currently being fielded was released to the field in January 2003 as units prepared to attack into Iraq. This version improved the technical fire direction features that Version 6.3.0 brought to the user and provided full functionality for the Effects Management Tool (EMT).

While AFATDS was used extensively during Operation Iraqi Freedom (OIF), EMT was not used theater-wide. Some units did not use it because the software came out about the same time they were deploying, and they did not have time to train on it.

As EMT is fielded, the software is getting good reviews. For example, after a recent division Warfighter exercise, Colonel Gary H. Cheek, commander of the 25th Infantry Division (Light) Artillery, Schofield Barracks, Hawaii, wrote, "EMT shows tremendous potential. It was a particularly good tool for me and the Div Arty TOC [tactical operations center]....It made me a believer in the power of such information tools shared throughout the division."

EMT is a client for AFATDS that was developed jointly by the Army and Marine Corps. It provides an intuitive, easy-to-use interface to access AFATDS data rapidly and perform specific tasks without being overwhelmed by the complexities of the more robust AFATDS interface and administration.

This new client software reads information from the AFATDS database and renders this information on a digital map display. It displays unit symbols, battlefield geometries, fire support coordination measures (FSCM), target symbols and both friendly and enemy firing vectors. Users can manipulate data by "drilling down" on the objects to interrogate them and display information maintained within AFATDS.

EMT's capabilities were developed to address concerns from field units, such as having to manually input target lists and air support lists (ASLs) into AFATDS from Excel spreadsheets and Power Point slides received from targeteers. Operators can import Excel spreadsheets into EMT and send the data to AFATDS. (See Figure 1 for the EMT functionalities in EMT Version 6.3.2, due out in January 2004.)

One of EMT's strengths is the ability to rapidly upgrade and revise the software based on evolving user requirements. During preparations for OIF, the Coalition Forces Land Component Commander (CFLCC) needed to rapidly build a list of restricted and protected targets. This list eventually grew to more than 10,000 targets. The number of restricted/protected targets quickly overwhelmed AFATDS and the operators because the list had to be input into AFATDS as FSCMs. Within two weeks, software engineers revised EMT to allow fire supporters to input the restricted/protected list and check it quickly during fire mission processing without using AFATDS assets.

During OIF, another issue was connection failures between AFATDS subordinate and higher headquarters. Fielding AFATDS Service Packs 1 and 4 corrected this problem. As a reminder, units should install all four service packs in AFATDS to greatly improve connectivity and operations.

EMT also has several worksheets and summaries that enable an operator to track, monitor, input or consolidate data. For example, the "Mission Status" screen provides a snapshot of missions fired, those in progress or those being coordinated for a given time. (See Figure 2.) An operator can select one of the missions and display its status in detail.

The EMT application is primarily in the Java programming language and will run on any Windows-based laptop that has at least a 400 megahertz Pentium processor with 550 MB space available on the hard drive for software installation and 256 megabytes of RAM memory. The operating system is Windows NT 4.0 or Windows 2000. EMT also uses some XML components. Because most users are familiar with the Windows operating system, the EMT interface is familiar to users.

Common Operating Picture (COP). EMT's strength is its ability to view a COP that can be tailored to the user's portion of the battlefield. Its display uses the joint mapping tool kit (JMTK) for the Army or Atlas for the Marine Corps.

JMTK is National Imagery and Mapping Agency (NIMA), Bethesda, Maryland, support software for mapping, charting, geodesy and imagery functionality for the global command and control system (GCCS). JMTK is one of the common support applications of the defense information infrastructure common operating environment (DIL COE). JMTK can import user data embedded in mission applications and display it on map and image backgrounds.

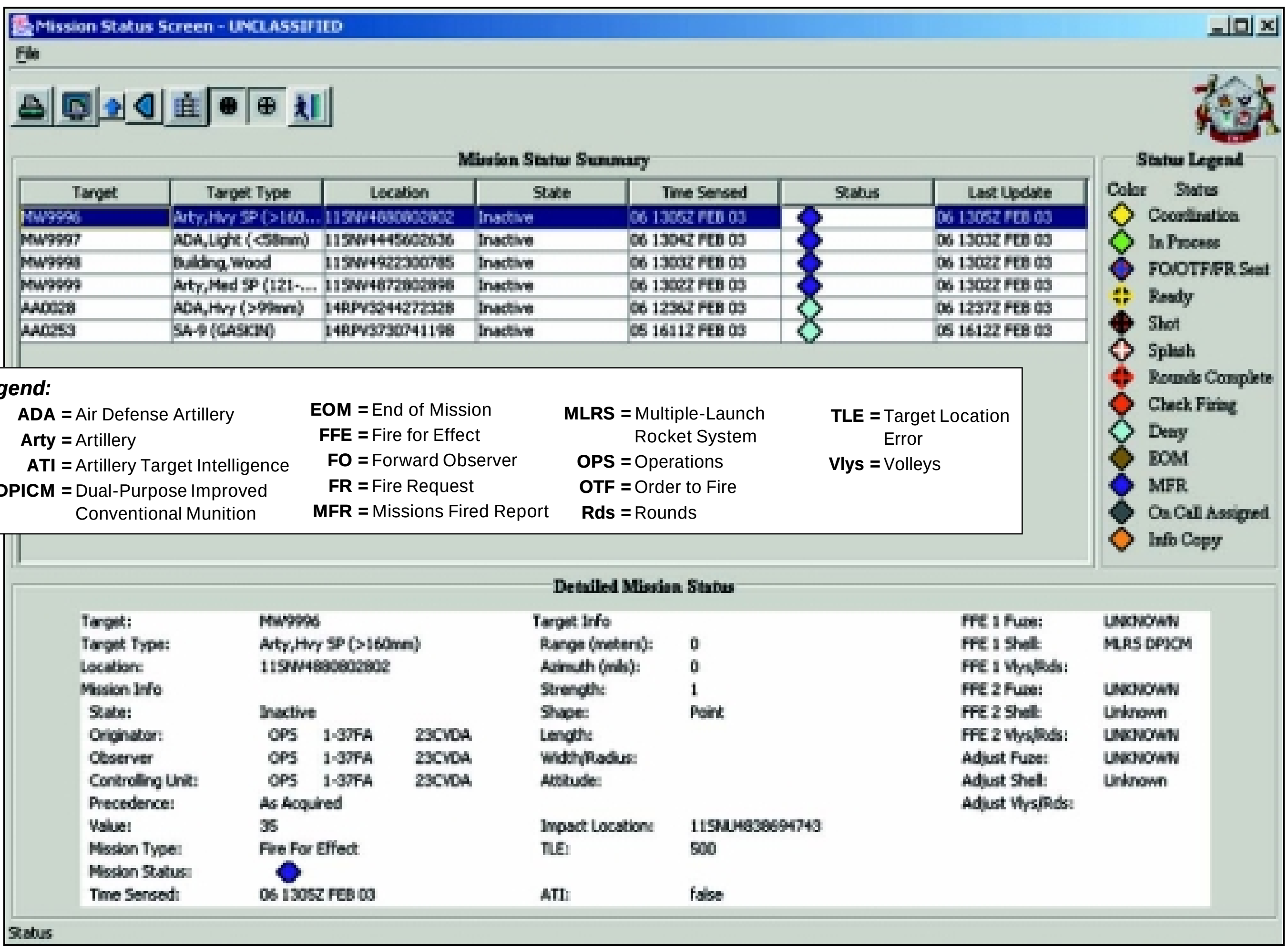
EMT also can access and use other mapping tools, such as the Falcon View, digital terrain elevation data and vector product format. JMTK generates symbols using Military Standard (MIL-STD) 2525 symbols and software developed by the Army Space Program Office, Alexandria, Virginia, and can use standard NIMA digital map products.

This mapping capability helps EMT display the status of various types of missions using color schemes. (See Figure 3 on Page 42 for an example of an EMT "Current Situation" window.) The ability to view mission data and vectors along with the different JMTK maps allows a user to track the fight, including the counterfire fight. During major combat operations in OIF, units used EMT frequently to visualize enemy fires for counterfire. The EMT operator can track radars, friendly and enemy artillery positions, radar zones and display vectors.

- Establishes targets.
- Initiates fire mission.
- Creates a target list worksheet.
- Creates target lists.
- Creates geometries.
- Develops a geometry worksheet.
- Displays geometry data.
- Imports/exports a spreadsheet of geometries.
- Views guidances.
- Displays target data.
- Monitors missions.
- Creates an air support list (ASL).
- Creates air support requests (ASRs) on an ASL.
- Imports/exports a spreadsheet of ASRs.
- Provides tools for collaboration with other systems (video teleconferencing, real-time display of commander's drawing on white board or map, voice or text chat rooms, etc.).
- Shows unit moves.
- Provides a coordinate conversion tool.
- Displays a dynamic filter window.
- Maintains the no-strike list.
- Allows for expanded target types.
- Tracks check fires/cancels check fires.
- Allows user to select role/duties to avoid irrelevant data (targeteers, planners, technical fire direction, tactical fire direction, etc.).

Figure 1: Effects Management Tool (EMT) Functionalities in EMT Version 6.3.2 (January 2004)

The Marines have integrated EMT into their command and control personal computer (C[2]PC) designed in 1995. C[2]PC is Windows-based software that facilitates military command and control. It can be used as a stand-alone tool to produce overlays and operational graphics or be connected to a computer network to depict the locations of friendly and enemy units and share overlays and message traffic instantly. The Defense Information Systems Agency, Arlington, Virginia, has accepted C[2]PC as a joint common tactical picture (CTP) workstation.



Legend:

ADA = Air Defense Artillery
Arty = Artillery
ATI = Artillery Target Intelligence
DPICM = Dual-Purpose Improved Conventional Munition
EOM = End of Mission
FFE = Fire for Effect
FO = Forward Observer
FR = Fire Request
MFR = Missions Fired Report
MLRS = Multiple-Launch Rocket System
OPS = Operations
OTF = Order to Fire
Rds = Rounds
TLE = Target Location Error
Vlys = Volleys

Figure 2: AFATDS EMT "Mission Status" Window

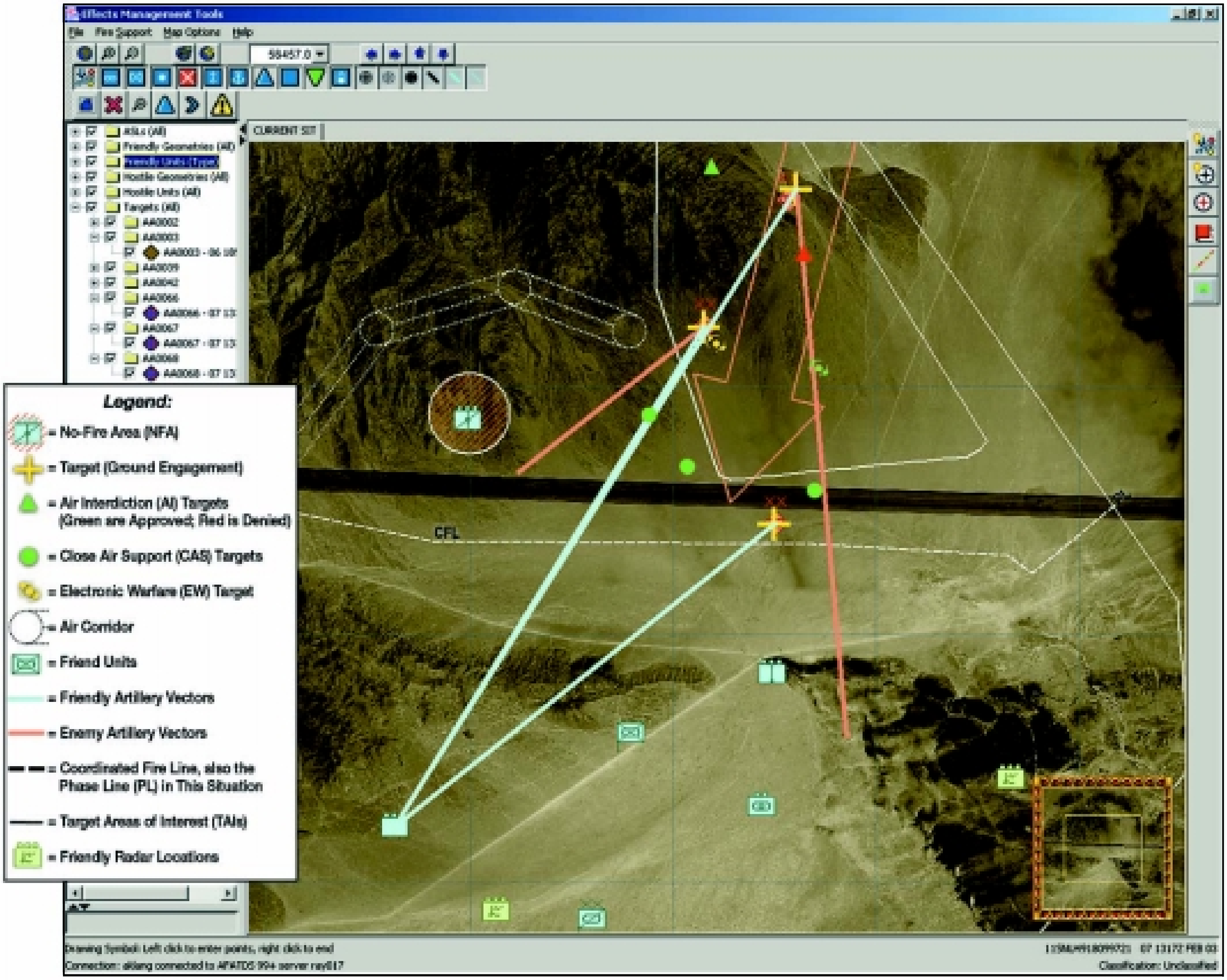


Figure 3: EMT Display of Current Situation

A C[2]PC-based EMT allows the operator to simultaneously view and action information available from multiple sources. C[2]PC-based EMT supports overlaying fire support, maneuver and intelligence data from AFATDS, the USMC's intelligence and operations servers (IOS), GCCS-Army and GCCS-Maritime onto a single Windows laptop display.

Improvements in the Next Two EMT Software Versions. There are many improvements planned for the next two versions of EMT: Version 6.3.2 to be fielded in January and Version 6.4.0 tentatively scheduled to be fielded in October 2004.

Kill Box Tool. EMT Version 6.3.2 will include the common grid reference system (CGRS), a kill box tool. CGRS will allow the operator to build, number and activate/inactivate kill boxes. Once activated, a kill box will send an FSCM to AFATDS to ensure no violations occur.

This tool is being developed using both Central Command's and the Korean theater's standing operating procedures (SOPs) and other tools.

Auto Suppression of Enemy Air Defenses (Auto SEAD). This tool will allow an operator to look for targets along an established air corridor. This function will be in the EMT Version 6.3.2.

Digital Terrain Elevation Data (DTED) Access and Terrain Analysis. AFATDS Version 6.3.2 will improve the way users study and use terrain. EMT will interface directly with the modernized integrated database (MIDB) to allow higher echelon headquarters to build target folders and lists.

Build Fire Plans on Laptops. EMT Version 6.4.0 will allow fire support officers (FSOs) to build fire plans. A task force FSO will be able to generate his fire plan on his laptop while sitting around the planning map without having to wait until he gets back to AFATDS.

Smart Range Fans. This feature in AFATDS Version 6.4.0 will allow the operator to take a firing unit and consolidate its multiple range fans into a single range fan based on ammunition range. The user will be able to visualize multiple enemy battalions quickly and minimize the number of range fans on a display.

Other Improvements. Planned improvements for software versions after 6.4.0 include the ability to update and delete friendly units, enhance the map display and improve vector display and management.

Another improvement will be the ability to check friendly units to enhance clearance of fires procedures and prevent fratricide. Currently, units use FSCMs to clear fires. The new function will look for friendly units in the area of a fire mission and alert the user if a friendly unit is close by.

New Requirements Based on OIF. Some EMT requirements are based on feedback from units in OIF. The following requirements will be incorporated in EMT as quickly as possible with the potential for some to be incorporated into Version 6.4.0.

Edit Target and Unit Data. EMT should allow the user to edit target and unit data for planning purposes, as is the case with EMT geometries.

View Technical Fire Data. EMT currently cannot view the same cannon data that AFATDS displays—it needs to allow the user to view technical fire data.

Modify the ASL and Air Support Request (ASR) Numbers. EMT was used frequently during OIF to generate the ASL, particularly at higher headquarters. However, once EMT sent the ASL to AFATDS, operators could not modify the ASL or assign/change ASR numbers. Future versions of EMT will allow the user to edit targeting information—target locations and types, ASR numbers, etc.

Additional functions will be added as users in the field determine what they need.

Fire Support Coordinator Synchronization Tool (FSCOORD ST). The next evolution in the EMT family of clients will be the FSCOORD ST that is scheduled to be fielded in May of 2005. FSCOORD ST will provide EMT-like functions over the tactical local area network (LAN) or combat net radios, such as the single-channel ground and airborne radio system (SINCGARS) and the enhanced position location reporting system (EPLRS).

This tool will replace the FSCOORD's "shoot board" that typically contains the map, overlays (maneuver graphics; targets, firing positions and range overlays; etc.), target list(s), schedule of fires, fire support execution matrix (FSEM), maneuver synchronization matrix and ammunition status. For the first time, the FSCOORD will have an on-the-move digital capability that will provide him relevant and near-real-time tactical information on fires, targets, units, FSCM/geometries and mission status derived from AFATDS. The FSCOORD ST will provide the user Microsoft applications' look and feel. The software's intent is to link the FSCOORD digitally with the AFATDS-based fires command and control network to improve timeliness and quality of tactical decision making in the delivery of fires and effects.

EMT Fielding. AFATDS/EMT will be in the field for many years to come—well after the first future combat system (FCS)-equipped brigade is fielded in 2010. EMT has the potential for providing an easy and quick fire support interface with combined and joint systems, increasing the responsiveness and effectiveness of fire support.

EMT has been fielded to every active and Army National Guard unit that currently has AFATDS and is being fielded simultaneously with AFATDS to units in new equipment training (NET). The active Army FA is fully fielded while more than 50 percent of the ARNG FA units have been fielded.

EMT is being fielded to fire support elements (FSEs), fire control elements (FCEs), intelligence sections and operations sections at all levels. It can be used with any AFATDS- or C^{2}PC-equipped unit with AFATDS Version 6.3.1.

The Training and Doctrine Command (TRADOC) System Manager for FA Tactical Data Systems (TSM FATDS) at Fort Sill, Oklahoma, is the user representative that gathers feedback from the field to improve AFATDS'/EMT's functionality. Units can provide TSM FATDS comments and recommendations on the FATDS Software Hotline at 580-442-5607 (DSN 639), the FATDS Training Hotline at 580-442-3390 (DSN 639) or fax the suggestions to 580-442-2915 (DSN 639). Units also can visit the TSM FATDS web page at www.army.mil\TSM_FATDS.

History of EMT Development

The development of EMT began in 1997 as an Independent Research and Development project by Raytheon Corporation. The product at that time was known as the "fire support client" and was developed as part of the Joint Warfighter Interoperability Demonstration (JWID) with an MS Windows "look and feel" for ease of use.

The Program Manager for Intelligence and Effects (PM Intel and Effects), Fort Monmouth, New Jersey, then began work on a similar client, called the "air support client" (ASC). ASC provided prototype capabilities to plan, coordinate and synchronize the delivery of surface-to-surface and air-to-surface effects and interfaced with the USAF theater battle management core system (TBMCS) via its host the Advanced FA Tactical Data System (AFATDS). ASC was designed to operate on existing tactical local area networks (LANs) at the division fire support element (FSE), corps FSE, deep operations coordination cell (DOCC), air operations center (AOC) and the air support operations center (ASOC).

In August 2002, the functionalities of FSC and ASC were merged into EMT and several new functions were added.

EMT is a tool for remote users of AFATDS to command and control fires and effects, building on the military's objective of a network-centric warfare environment. EMT provides leaders the information on the AFATDS in a useful, timely manner as part of the command, control, communications, computers and intelligence (C^{4}I) architecture. EMT was first released in January 2003 along with AFATDS Version 6.3.1.

Lieutenant Colonel John L. Haithcock, Jr., is the Assistant Training and Doctrine Command (TRADOC) Systems Manager for FA Tactical Data Systems (TSM FATDS), part of the Futures Development Integration Center (FDIC) at Fort Sill, Oklahoma. In his previous assignment, he was the Plans Officer for the 3d Battlefield Coordination Detachment (BCD), Joint and Combined Forces in Korea. He commanded 3d Battalion, 30th Field Artillery, also at Fort Sill, and A Battery, 6th Battalion, 41st Field Artillery, part of the 3d Infantry Division (Mechanized) in Germany. Among other assignments, he was the Deputy Fire Support Trainer and S3 Combat Trainer at the National Training Center, Fort Irwin, California; Battalion Executive Officer and S3 plus Brigade Fire Support Officer for the 1st Battalion, 9th Field Artillery, 3d Infantry Division at Fort Stewart, Georgia.

B/2-131 FA Wins 2003 Hamilton Best ARNG Battery Award

Battery B, 2d Battalion, 131st Field Artillery (B/2-131 FA), Wichita Falls, Texas, part of the 49th Armored Division, Texas Army National Guard (ARNG), won this year's Alexander Hamilton Best ARNG Battery Award. The senior leaders of this outstanding battery are Captain Todd G. Mitchell and First Sergeant Reuben Rodriquez.

The Hamilton Award, which was established in 2002, is named after Alexander Hamilton, a Revolutionary War artilleryman and American statesman, to recognize a high-performing ARNG battery. The battery was selected based on specific criteria and a narrative of its performance. (For more information about the award and application/deadline for 2004, see the website "Knox, Hamilton and Gruber Awards" on the Fort Sill homepage at http://sill-www.army.mil/awards/default.htm.)

(Photo by Linda Young, Fort Sill TSC)

Captain Todd G. Mitchell, Commander of B/2-131 FA in Iraq, "accepts" the Hamilton Award in abstentia. After LTC Daniel Monrreal, former commander of 2-131 FA, and Mrs. Todd Mitchell (Tara) accepted the Hamilton Award from MG Michael D. Maples, Chief of Field Artillery, on behalf of B/2-131 FA during the FA and Joint Fires Conference at Fort Sill, Tara Mitchell holds up a life-sized photo proxy of her husband.

B/2-131 FA, a multiple-launch rocket system (MLRS) battery, became the *first* ARNG-active component (AC) dual-mission National Guard battery on 2 September 1999, fully integrating it within an AC FA battalion as part of the Army's Force XXI Initiative. It was just the beginning of several "firsts" for the battery—including being the first and *only* ARNG FA battery to deploy to Iraq for Operation Iraqi Freedom (OIF).

In April 2002, B Battery became the *first* ARNG MLRS battery to field and be certified on the M270A1 launcher. The battery also was part of the *first* battalion in the Army to conduct a live-fire exercise with the new equipment during a field problem.

During the last months of 2002, the battery conducted several field training exercises (FTXs) and night live-fire exercises in preparation for a potential activation and deployment in support of OIF. In addition, B Battery conducted a second annual training (AT) exercise from 2 through 17 December 2002 to refine survivability task skills and focus on soldier readiness and operational maintenance. This AT also included a live-fire exercise.

On 24 January 2003, the battery was activated in support of OIF. Battery B was the only ARNG FA battery deployed to the Central Command (CENTCOM) theater of operations. Upon activation, B/2-131 FA was redesignated as D/2-20 FA as part of the divisional general support (GS) command and attack battalion for the 4th Infantry Division (Mechanized).

Within seven days of arriving at the mobilization site, the battery had completed its load plans and rail-loaded all its modified table of organization and equipment (MTOE) to be taken to the port of debarkation. The battery continued to focus on common task training (CTT), sustainment training, theater-specific training and soldier readiness while waiting for its air manifest date.

On 4 April 2003, D/2-20 FA landed at Kuwait City International Airport. The battery moved to Camp Udairi where it prepared for combat operations. The battery crossed the border into Iraq on 26 April 2003 and proceeded to Taji Airfield located about five kilometers north of Baghdad. Battery D then was assigned a GS mission with Task Force (TF) Thunder, the 2d Brigade Combat Team (BCT), 4th Division.

Battery D has played an active role in several major combat operations in the 2d BCT, including Operations MEK Compliance, Balad Occupation, Peninsula Strike, Ivy Serpent and Desert Sidewinder.

As part of TF Thunder, the battery's continuing mission is to provide force protection for Forward Operating Base (FOB) Thunder. Battery D also operates a light quick-reaction force (QRF) to help locate and record large weapons caches, runs traffic control points and provides extra dismounts for target-of-opportunity raids.

Additionally, D/2-20 FA has established and maintains two TF detention centers. It has processed more than 450 detainees since arriving in country. The battery also mans the Civil/Military Operations Center, a liaison group between Coalition Forces and the local Iraqi government to help repair and rebuild the Iraqi infrastructure.

As part of TF Thunder, D/2-20 FA currently is stationed in Tikrit. It remains ready and able to execute its missions as part of America's War on Terrorism.

A/1-9 FA Wins 2003 Knox Best AC Battery Award

Alpha Battery, 1st Battalion, 9th Field Artillery (A/1-9 FA), part of the 3d Infantry Division (Mechanized) Artillery, Fort Stewart, Georgia, won this year's Henry A. Knox Best Active Component (AC) Battery Award. The annual award is named after the first Chief of Field Artillery Major General Henry A. Knox, a Revolutionary War hero, and recognizes an outstanding AC battery based on specific criteria and a narrative of performance. A similar award was established in 1924 and phased out in 1940 as World War II loomed. The Best Battery Award was reestablished in 2002. (For more information about the award and application and deadline for 2004, see the website "Knox, Hamilton and Gruber Awards" on the Fort Sill homepage at http://sill-www.army.mil/awards/default.htm.)

The *Assassins* honed warfighting skills in the swamps of Georgia and the deserts of Kuwait and then unleashed their awesome firepower in support of the 3d Infantry Division during Operation Iraqi Freedom (OIF).

While deployed for 301 days of FY03, the *Assassins* culture of personal and professional pride and selfless service kept the battery highly motivated and ready for any challenge.

The true character of the *Assassins* was demonstrated clearly during the long, difficult and highly successful journey to victory in OIF. On 20 March 2003, after a safe deployment and many months of combat training in Kuwait, Alpha Battery's fires destroyed two Iraqi observation posts (OPs) along the Kuwaiti-Iraqi border, facilitating the attack of the division's lead elements into Iraq.

The 3d Division Artillery (Div Arty) immediately placed A Battery in direct support (DS) of the division's cavalry squadron, 3d Squadron, 7th Cavalry (3-7 Cav), for the duration of major combat operations. More than 350 miles and 48 hours later, the battery was in position and ready to fire in support of 3-7 Cav that was encountering heavy resistance from enemy dismounts and mortar near As Samawah, Iraq. The speed, accuracy and effectiveness of A/1-9 FA's fires

enabled 3-7 Cav to destroy the enemy and continue the attack.

On 25 March, after battling through several ambushes, the *Assassins* received an urgent call-for-fire from 3-7 Cav. B Troop was cut off and under vicious attack south of An Najaf. With no other option, the troop fire support officer called for fire close to friendly forces. As tracers crisscrossed their positions, the *Assassins* fired danger close to the troop, causing the enemy to seek cover so the unit could recover its soldiers and move to a better position. Later that night, A Battery laid down a continuous wall of fire for C Troop as it repelled another strong Iraqi assault.

On 4 April, Alpha Troop called for fire on a Republican Guard tank battalion near the Baghdad International Airport. The *Assassins* responded with dual-purpose improved conventional munitions (DPICM) and the sense and destroy armor munition (SADARM), resulting in devastating effects on the enemy.

Although the *Assassins* encountered both indirect and small arms fire on numerous occasions during the 650-mile journey to Baghdad, they sustained no casualties and lost no vehicles to enemy contact.

Immediately after the fall of Baghdad, A Battery returned to battalion control. 1-9 FA assigned the *Assassins* the mission of establishing the stability and security of a four-square-kilometer sector in downtown Baghdad. Alpha battery conducted countless mounted and dismounted patrols and established checkpoints and fixed-site security around high-value targets in its sector. The battery followed-up these successes by restoring order to a 90-square-kilometer sector in the vicinity of Fallujah, a contentious stronghold for loyalists of the previous regime. Battery A redeployed to Fort Stewart in August 2003 and, after a short leave period, began sharpening its critical warfighting skills.

During 2003, A/1-9 FA trained in peace and was tested in war while consistently performing at a level of excellence making it worthy of inclusion with the finest units in the Field Artillery.

(Photo by Linda Young, Fort Sill TSC)

Chief of Field Artillery MG Michael D. Maples (left) poses with 1SG Joseph A. Henry and CPT William P. Brodany of A/1-9 FA to whom he just presented the Knox Award on 23 October during the FA and Joint Fires Conference at Fort Sill, Oklahoma.