



Field Artillery

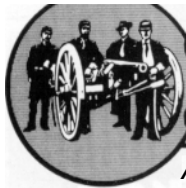
A Professional Bulletin for Redlegs

August 1994



Reflections





Field Artillery

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August 1994

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DISCLAIMER: *Field Artillery*—a bimonthly professional bulletin for Redlegs (ISSN 0899-2525)—is published by Headquarters, Department of the Army, under the auspices of the US Army Field Artillery School, Building 746, 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.

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Redlegs Looking Forward

The old axiom that "Armies always prepare to fight the last war" is only partially true. The history of the American Field Artillery is replete with leaders of vision—catalysts who helped shape the Army for the next fight. They established our tradition of looking forward and shaped the future by breaking the paradigms of the past.

Founding a Tradition. Take, for example, the founding of the US Military Academy at West Point in 1802, the Army's first great experiment in building the future force. Colonel Henry Burbeck, the Chief of Field Artillery, argued vigorously that the next generation of military leaders needed the skills to apply science and new technology to war. Thanks in part to his efforts, West Point became not only a school, but also a center for critical thinking about fighting future battles.

In the academy's ordnance laboratory, artillerymen experimented with combinations of shot and powder. Cadets and faculty formed a club for the study of military science. Members presented papers on new technologies and weapons and studied tactics that might be used in the future. From this modest start, the Army established a place for critical thinking, including the mental agility to break with outdated methods.

World War I. Another example of a Redleg with the vision to break with the past occurred during World War I. American commanders realized the inadequacy of the 19th century American division. Even though the American Expeditionary Force (AEF) had already deployed, commanders were determined to redesign the division structure. Rather than simply adopting European ideas, they used the American 1st Division as a grand tactical laboratory for determining the optimum mix of combat power.

Foremost among the AEF's creative leaders was the 1st Division's artillery brigade commander, Brigadier General Charles P. Summerall. He focused on organizing his artillery to provide responsive, accurate fire support. Employing new tactics, he used artillery in

short, intense preparatory strikes and massed counterfire to gain maximum surprise. Summerall's innovations reflected his technical expertise, mental agility and uncompromising dedication to improving combat performance.

World War II. Before World War II, leaders at the Field Artillery School realized that the Army would have to reshape again to face future warfare. Instructors inspired by the initiatives of Major Carlos Brewer developed one of the most important innovations of modern combat: the battalion fire direction center (FDC). The FDC gave the Americans a unique capability—the means to quickly mass and shift accurate fires.

Post-Vietnam. Even the difficult years of the Korean and Vietnam Wars did not destroy the Army's commitment to looking forward. Out of the turmoil of adjusting to an age of limited war emerged a generation of leaders ready to consider radical ideas and concepts, such as the doctrine of Active Defense. Active Defense challenged commanders to defend against a numerically superior enemy in an age of high-tech weaponry.

future force. General Jack N. Merritt, as the Commandant of the Field Artillery School and, later, as the Commander of the Combined Arms Center at Fort Leavenworth, Kansas, played a pivotal role in shaping the Army's vision for deep attack. The significance of the innovations that emerged from the deep attack concepts became apparent during Operation Desert Storm when new artillery weapons and tactics proved decisive in battle.

Tomorrow. We stand at the doorstep of the next revolution: Force XXI. General Gordon R. Sullivan, the Chief of Staff of the Army, initiated this capstone effort to design the force for the 21st century. Force XXI will bring new organizations, doctrine, systems and training methods to meet the challenges in a world of conflict that futurists call "Third Wave Warfare." The agrarian and industrial ages were the first and second waves. In this third age of war, armies will use computer technology to gain a decisive advantage over the enemy by controlling access to information.

We'll all play a part in designing Force XXI. Artillerists educated in a tradition of looking forward will help design the force of tomorrow and teach the techniques of information warfare. Soldiers in the field will test and train the new organizations, technologies and tactics. It will be a team effort focused on a joint battlefield.

To help make the transformation to the next age, we can learn a lesson from the past. We must be innovative and mentally agile. We must be critical thinkers and have the courage to break with tradition. We must focus our vision on the future—on building a more versatile, deployable and lethal force. And we must erect this future force on the foundation of sound leadership and disciplined, well-trained soldiers.

The path to the future is always difficult. Yet throughout our history, America's Army has found leaders of character and vision to secure and preserve this great nation. The next century will be no different.

“ Artillerists educated in a tradition of looking forward will help design the force of tomorrow and teach the techniques of information warfare. ”

Major General David E. Ott, Commandant of the Field Artillery School, played a central role in developing capabilities to implement this new doctrine. Combined arms commanders, General Ott believed, needed better tools for coordinating the rapid massing of fires. Among his several innovations, he developed the fire support team (FIST) to fight with fires on a dispersed, fast-moving battlefield.

The 1980s. In 1982 when AirLand Battle replaced Active Defense as the Army's doctrine, artillery leaders again played an important role in shaping the



Response to "Maneuver with Fires—Give Me a Break!"

Editor's Note: Colonel Reitz is responding to the letter-to-the-editor published in the June 1994 edition by Lieutenant Colonel Patrick J. Flynn, Armor. In his letter, Colonel Flynn discussed his disbelief in "maneuver with fires" as he saw the concept presented in Colonel Reitz's article "A Fire Supporter's Guide to FM 100-5" in the December 1993 edition.

Give him a break? The point is to give the enemy no breaks. I do not know where Colonel Flynn picked up his pithy "maneuver

with fires," but he certainly did not get it from my article. I studiously avoided that meaningless phrase, just as I avoided other short cure-alls, such as "perfect intelligence," that are not only devoid of meaning, but also get in the way of clear thinking.

There is a short phrase that captures the essence of my article: "The key is effects." A single tank can generate multiple combinations of maneuver, firepower and protection effects when employed by a competent commander; a

combined arms force commander can generate many more. We want to grow commanders who can apply the combat power model—achieving advantage in maneuver, firepower, protection and leadership effects—over the enemy throughout the spatial, temporal and intellectual depths of the battlefield.

COL John W. Reitz, FA
Editor-in-Chief, *Military Review*
Fort Leavenworth, KS

Response to "A Boundary is a Boundary by Any Other Name"

I would like to respond to the letter-to-the-editor by Lieutenant Colonel Harold T. Harvey in the April 1994 edition. The letter was titled "A Boundary is a Boundary by Any Other Name." As an AFS-COORD [assistant fire support coordinator] in III Corps, I have been working the issue of deep operations deconfliction during many exercises. As Lieutenant Colonel Harvey stated, "the concept of the BCL [battlefield coordination line] makes more sense" than the use of the FSCL [fire support coordination line] to delineate between the division and corps deep operations. I agree wholeheartedly.

His argument against using the non-doctrinal BCL is that every time the corps works with a new division, it would have to explain the use and meaning of the term. (Simply explained, the corps may fire and maneuver beyond the BCL without coordination and the division may do the same short of the BCL. Each would have to coordinate with the other to fire or maneuver outside those terms.)

He calls this dialogue "dysfunctional and unnecessary." I would think it is absolutely functional and necessary that any time a division is working with a corps for the first time, the planners and operators would sit down with each other and discuss issues of just this nature during the TACSOP [tactical standing operating procedures] exchange process.

Lieutenant Colonel Harvey's bottom line recommendation is "to call this thing exactly what it is—a boundary." Obviously, there are some advantages to using a boundary to separate corps and division deep operations. One is that the inarguable ownership ensures maximum responsiveness

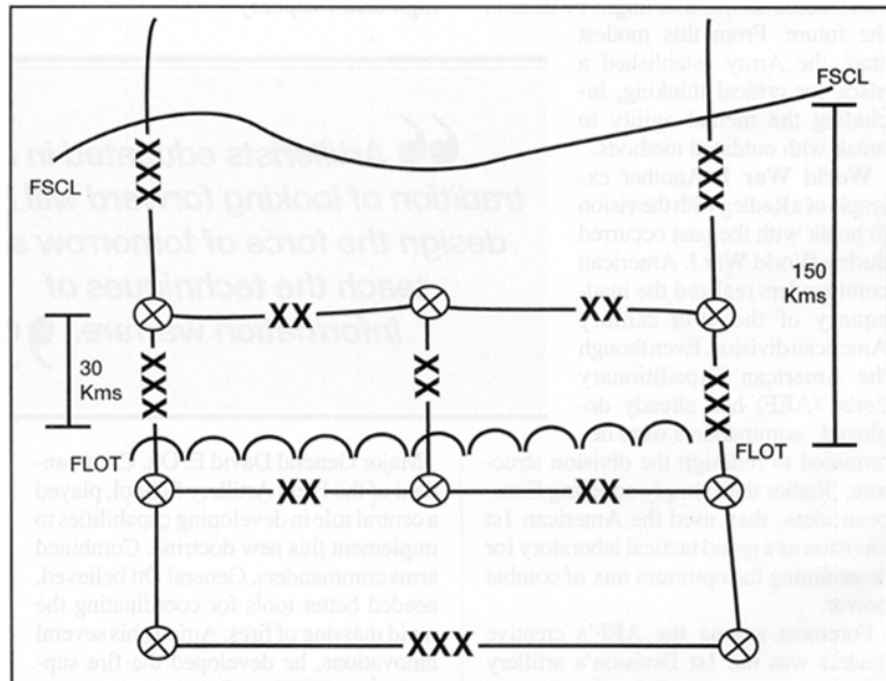
and engagement by the owning units.

But there are many reasons why III Corps has intentionally avoided the use of the term "boundary" when discussing corps and division deep operations. First, it takes considerable time and coordination to change boundaries, and the pace of the battle may make that a limiting factor. Secondly, the use of the heretofore unheard of "forward boundaries" would require the same "dysfunctional and unnecessary"

coordination for units working together for the first time.

Thirdly, what if the division commander's ultimate objective is beyond this forward boundary? He has no ownership, only a significant interest in what is going on out there. In order for him to conduct his normal business (for example, reconnaissance of the objective area), he would have to coordinate with the owning commander anyway.

Fourthly, what if the corps has multinational



This figure portrays a forward boundary to delineate between corps and division deep operations. One problem with the forward boundary is the doctrinal requirement to coordinate fires and maneuver at the inter-divisional coordinating point, even though the enemy owns the terrain.

divisions in its organization? Because of the different intelligence collection and lethal and non-lethal attack capabilities, the corps commander would be forced to place this forward boundary at different distances from the FLOT [forward line of own troops], forming a non-contiguous line. This would cause confusion for the collectors as well as a duplication of effort in some areas.

I refer to the figure to make my final point. As you can see, this graphic portrays using a forward boundary to delineate between corps and division deep operations. Many problems exist, but I

will highlight the problem presented by the inter-divisional coordinating point at the forward division/corps boundary. The doctrinal requirement to coordinate fires and maneuver at that location makes no sense, considering the enemy owns the terrain. This situation is exasperated in the NATO environment where physical contact between adjacent units is required (according to *FM 101-5-1 Operational Terms and Symbols*, Page 1-20).

In analyzing how I, III, V and XVIII Corps deconflict deep operations, I have determined that none of them use

the forward boundary. If the warfighting corps don't use it, maybe there's a good reason, and the boundary isn't the simple solution to this dilemma.

The BCL, as used in III Corps, is a simple, if currently non-doctrinal, approach to solving this coordination problem. Instead of forcing old terms to meet the needs of evolving technology, let's move forward and incorporate this new term into doctrine.

MAJ Richard C. Longo, FA
AFSCCOORD, III Corps
Fort Hood, TX

On the Mark—Give or Take Seven Million

As usual I read with interest *Field Artillery* and, in particular, the April 1994 issue, which stimulated me to make a short commentary.

The second paragraph of the April "On the Move" by Major General John A. Dubia describes the World War II era in which I served with the 26th (Yankee) Infantry Division; it was a National Guard division federalized in 1941 along with many other National Guard units. Lieutenant General Lesley J. McNair was the Commanding General of the Army Ground Forces (AGF), not the "Army Group of Forces," as listed in the April column. He was killed July 25, 1944 in Normandy in one of the two bombings of frontline soldiers of the 9th and 30th Infantry Divisions by the Army Air Corps. He is buried in a row of graves at Normandy.

The statement in the column regarding transforming a small peacetime army into "a million trained soldiers, organized as divisions" is certainly misleading as the number of troops was considerably more. Further, the AGF had many Infantry

Replacement Training Centers, called IRTCs—Fort Hood [Texas] and Camp Blanding, [Florida] to name two—that graduated IRTC replacements by the thousands for subsequent processing through replacement units and assignments to divisions as fillers.

The often mentioned training centers at Hohenfels and Grafenwoehr [Germany] were captured by the 26th Infantry Division in April 1945 en route to the Danube River. If I recall, Grafenwoehr had large stocks of gas artillery shells.

It was surprising to note that there is only one unit, the 2d Battalion, 17th Field Artillery of the 212th Field Artillery Brigade there at Fort Sill [Oklahoma], outfitted with the Paladin. I participated in the late 1970s with the Human Engineering Lab's HELBAT [Human Engineering Laboratory Artillery Tests] series of exercises, particularly HELBAT 6 that lead to Paladin's development.

At the same time, the M198 howitzer developed by the Marine Corps, the Firefinder ALR TPQ-37, DMD [digital message device] and the North-Finding

Module were being evaluated. MLRS [multiple-launch rocket system] was being developed along with Copperhead, the G/VLLD [ground/vehicular laser locator designator], followed by the FISTV [fire support team vehicle]. SINCGARS [single-channel ground and airborne radio system] was also underway then, but it ran into trouble. It is depressing to realize that more than 15 years passed before many of the items we evaluated were "issued to the field."

William Leesemann, Jr.
Radio Operator, Recon Section, 101 EN
26th IN Div in WWII
Safety Harbor, FL

Editor's Note: Thank you for calling the errors in the April "On the Move" column to our attention. In fact in World War II, the "small peacetime army" was transformed into "eight million trained soldiers, organized as divisions." We apologize for the typographical error of mistaking an "8" for an "a." Further, AGF does stand for "Army Ground Forces"—again, our error.

We depend on our readership to keep us straight, and you do.

We Need a Joint Fire Support Center

Artillerymen lead the way in joint warfighting. Partly through innovative leadership and partly due to exploding combat capabilities, the fire coordination expert has inherited a major role in the nuts and bolts of joint warfighting.

Major General John A. Dubia [Chief of Field Artillery] set the azimuth in his October 1993 column ["Preparing for the Purple Battlefield"] when he said, "Joint training is the steel that welds the fighting force together....Our success depends on leaders who are willing to meet the challenge and forge the steel bonds of

training." Our senior leadership and the schoolhouse have a long history of endorsing joint firepower.

Operational units are pressing ahead. Commander of the Combined Arms Command, Lieutenant General John E. Miller's June 1994 interview ["Leadership XXI"] was crystal clear on the ability of the 101st Division Artillery to master all the tools available to cover, by fire, operational depth air assaults, as was proven in combat in Operation Desert Storm.

The artillery has a good record. But, as Yogi Berra says, "The future ain't what it

used to be."

Fire support capabilities are growing across the spectrum in precision, concentration and responsiveness. Land, sea and air ordnance and platforms continue to multiply and improve, as well as service and country combinations.

More significantly, although the reduction of cannoners is proportional to the Army as a whole, the capabilities, complexity and the availability of the joint firepower they are expected to command and control is growing. There's more to do with fewer to do it. What's more, there is mounting testimony that we have an expanding duty to avoid complacency,

step up the pace and meet the challenge.

Brigadier General Lawson W. Magruder III, Commander of the JRTC [Joint Readiness Training Center, Fort Polk, Louisiana], was emphatic in his April 1994 interview ["Drill the Basics Under Diverse Conditions"]. He said, "The synchronization of all fire support assets—I'm not just talking artillery, I'm talking mortars, naval gunfire, close air support, attack helicopters—remains a challenge.... One way to measure [fire and maneuver] integration success is the number of OPFOR [opposing force] casualties from fire support. It's low. *We're not getting the results we should*" [emphasis added].

Finally, in his December 1993 interview ["America's Army: Versatility, the Key to our Future"], General J.H. Binford Peay III, Vice Chief of Staff of the Army who came up through the artillery ranks, was most clear: "Redlegs must lead the integration of all fire support assets available to the joint team."

Embracing Responsibility for All-Source Fires. Being all we can be is not a slogan—it's a duty. The onerous task of making joint fire support work is our responsibility. The bad news is, it won't be a quick and easy job. The good news is we are well-postured to assume the leader's role.

Doctrinally, joint and combined fire support coordination belongs to the ground commander. *Joint Pub 3-0 Doctrine for Joint Operations* is straightforward. In summary, if the ordnance explodes on the ground in the land component commander's area of interest, it's his responsibility to determine when, where, how much and for what purpose, regardless of the platform from which the ordnance is launched.

Technologically, artillerymen have the lead on deep and simultaneous attack and the proven capability.

Professionally, artillery officers and NCOs (Army and Marines) are the best in the business, especially in the junior grades, when it comes to all-source fires.

With primacy of claim to the doctrine, the technology and, most importantly, the human and intellectual resources, Army and Marine artillerymen are the best prepared to assume responsibility for joint/combined coordination of all-source fires.

Fort Sill as the Joint Fire Support Center. Fort Sill [Oklahoma] is an excellent candidate for the Joint Fire Support Center. It's a premier training site for firing platforms with the most powerful corps artillery in the world,

well-developed ranges, supporting organizations and sound environmental facilities.

Further, Fort Sill can accommodate an attack helicopter battalion now and also use the aviation resources out of Fort Hood [Texas]. In addition, the post is in close proximity to three fixed-wing military air bases with excellent infrastructure and combat power capabilities.

Even naval gunfire [NGF], given sufficiently imaginative use of existing howitzers, can be simulated at Fort Sill as at the JRTC. The NGF spotter in training does not need a ship. He needs to talk to someone who "talks like a ship," and he needs to see the explosion; only a very experienced observer/spotter can tell a 5-inch/54 detonation from a 155-mm detonation.

Further, the Fort Sill has the human, intellectual, organizational and administrative resources to innovate, experiment and integrate all-source fires into current Army and Marine individual, basic and advanced courses and unit training evolutions. Properly planned, coordinated and packaged, there's no reason Fort Sill couldn't train to standard all service personnel in the joint planning, coordination and control of all air-, ground- and seabased fires.

Finally, the subsequent resource consolidation and centralization of fire support training would result in considerable savings to DoD [Department of Defense]. Naval gunfire training is illustrative.

NGF training takes place in three locations, and none are easy or inexpensive to get to: Coronado in California, Bloods-worth Island off Virginia and Vieques Island in Puerto Rico. The training is done in conjunction with naval gunfire qualification and is a one-time, significant emotional event in the life of a ship's commander. Ship's crew training takes priority. Scheduling is limited and execution is expensive. The limited OPs [observation posts] and maneuver space severely restrict training realism from a landpower perspective. None of the locations have the space to use a FISTV [fire support team vehicle] realistically or in conjunction with armored vehicles as in a CALFEX [combined arms live fire exercise].

The advantages of training at a CONUS [continental US] site with simulated ships (but real ordnance) is obvious—increased flexibility, realism and room for imaginative training for NGF spotters in all services and at lower cost. NGF ship qualifications would still go on but with

trained, experienced joint spotters with greater benefit to the ship's training. The predictable result is more effective training at lower cost.

Meeting the Challenges of Implementation. Regardless of the advantages, resource competition and our response to a rapidly changing future make success uncertain.

Doctrinally, the final draft of *Joint Pub 3-09 Doctrine for Joint Fire Support* is under review. There's a broad ranging inter-service discussion on the FSCL [fire support coordination line] and other proposed fire coordination measures. These include a battlefield coordination line (BCL) at MLRS range, a deep battle synchronization line (DBSL) as used in Korea, the reconnaissance and interdiction phase line (RIPL) used in NATO and others. To be the coordinators of all-source fires, we must have the leading voice in determining the control measures we will work under.

Technologically, the future is also ambiguous. New capabilities are developing continuously. Their uses are growing even faster, and their impact on tactics, techniques and procedures is yet to be determined.

Professionally and intellectually we may be closest to our goal. We have accepted our responsibility; it remains to act on it.

Will we do it? We have to be smart because we're in sharp competition for resources. We have to be convincing, given service rivalries and prejudices, especially our own. We have to be determined because it will not happen quickly or easily.

The alternative, however, is even more difficult and much more dangerous: continuing frustration with incomplete knowledge, blunted cooperation and weakened combat power as the challenge of controlling expanding joint fires passes by unmet.

Inevitably, someone will solve the challenge of all-source fire support. The organization that does will shape the future of landpower. The organizations that don't adapt will be marginalized.

More ominously, an aggressive enemy, impatient for progress, may beat us to the punch. Then the awesome capabilities of joint/combined fires will be an asset for our enemies and not our own.

LTC Donald H. Zacherl, FA
Commander, 3-321 FA
FA Training Center, Fort Sill, OK



1994 History Contest Winners



First Place: "To Teach A Man to Shoot: Dan T. Moore and the School of Fire, 1909-1914" by Captain Steven A. Stebbins, USAR

Second Place: "Testing the Principles of Fire Support: The Meuse-Argonne Offensive of 1918" by Major Scott R. McMeen

Third Place: "WWII: Artillery in a Jungle Environment" by Captain Kevin J. Dougherty, IN

Judges of the 1994 History Contest

Brigadier General (Retired) Jack L. Capps holds a Ph.D. in Literature from the University of Pennsylvania and was a Professor in the English Department of the US Military Academy at West Point for 29 years, serving as Head of the Department for the last 11 years until his retirement in 1988. He also served as Visiting Professor at the American University at Beirut, Lebanon, and the Royal Military Academy at Sandhurst, England. General Capps is the General Editor of *The Faulkner Concordances* (36 volumes), a member of the Fortress Study Group of the United Kingdom and served as a judge for the Daughters of the American Revolution National Historical Essay Competition. His last troop assignment before becoming part of academia was as a battery commander in the 86th Army Anti-Aircraft (Missile) Battalion in Chicago, Illinois.

Lieutenant Colonel David T. Zabecki, US Army Reserve, is the author of more than 100 magazine or encyclopedia articles and has twice won this contest. He's currently the Commander of the Rear Tactical Operations Center (RTOC) of the 21st Theater Army Area Command (TAACOM) in Germany. Among other assignments, he commanded the 303d Support Group (Rear Area Operations Center), 3d Infantry Division (Mechanized), also in Germany. Colonel Zabecki is a Contributing Editor of *Military History* magazine and is Editor of the *Encyclopedia of World War II in Europe*. He's the author of the book *Steel Wind: Georg Bruchmuller and the Birth of Modern Artillery*, published this year, the subject of his 1990 contest article that won first place.

Lieutenant Colonel Roger Kaplan is Chief of the Historical Services Division in the US Army Center for Military History, Washington, DC. He holds a Master of Arts in History from the University of Michigan and taught Military History at the US Military Academy at West Point. Lieutenant Colonel Kaplan is completing his dissertation on the American Revolution for the University of Michigan and has published several historical articles in the *William and Mary Quarterly* and other journals. Among his other military assignments, he has served as a Battery Commander in the 194th Armored Brigade, Fort Knox, Kentucky, and as Deputy Fire Support Coordinator and battalion Executive Officer in the 10th Mountain Division (Light Infantry) at Fort Drum, New York.

Field Artillery Themes for 1995

Month	Theme	Copy Deadline
February	Joint and Combined Operations	3 Oct
April	Fire Support for Power Projection	5 Dec 94
June	The Field Artillery Leader	6 Feb 95
August	History	6 Feb (Contest) 3 Apr (Other)
October	Fire Support Tactics, Techniques and Procedures	5 Jun
December	Red Book Annual Report	7 Aug

1995 History Writing Contest

The US Field Artillery Association is sponsoring its tenth annual History Writing Contest with the winners' articles to be published in the August 1995 edition of *Field Artillery*. To compete, submit an unpublished, original manuscript on any historical perspective of Field Artillery or fire support you chose by 6 February 1995.

The Association will award \$300 for the First Place article, \$150 for Second Place and \$50 for the Third. Selected Honorable Mention articles also may be published in *Field Artillery* or the Association's "Forward Observer" newsletter.

Any US armed service member, ally or civilian is eligible to compete—you don't have to be a member of the Field Artillery Association.

Your submission should include the following:

- A double-spaced, typed unpublished manuscript of no more than 3,000 words; it should include footnotes and a bibliography.

- Comprehensive biography.
- Graphics, maps, photos, slides, charts, etc. to illustrate your article, if possible.

The article should include specific lessons or concepts that apply to Redlegs today—it should not just record history or document the details of an operation. You may write about any historical period you choose.

A panel of three expert historians will judge the manuscripts, which will not include the authors' names. The panel will determine the winners based on writing clarity (30%), application to today's Redlegs (30%), historical accuracy (30%) and originality (10%).

By 6 February 1995, send the manuscript to the US Field Artillery Association, ATTN: History Writing Contest, P.O. Box 33027, Fort Sill, Oklahoma 73503. For more information, call *Field Artillery* at DSN 639-5121 or 6806 or commercial at (405) 442-5121 or 6806.

Lieutenant General (Retired) David E. Ott,
Former Chief of Field Artillery and VII Corps Commander

Massing Fires—Our Enduring Imperative

Interview by Patrecia Slayden Hollis, Managing Editor

Q *What were the most significant changes in the Army from your commissioning in the Field Artillery in 1944 until your retirement as VII Corps Commander in 1978?*

A I was commissioned on D-Day and wound up in Europe with the 868th Field Artillery, part of the 65th Infantry Division, moving through Germany and Austria. Initially, I was the commander of a provisional battery of four British 25-pounder cannons. As a second lieutenant, I was allowed to command those British guns because our front lines were static, the guns were surplus to the British and they had lots of ammunition. We left the 25-pounders behind when we broke through the Siegfried Line, so I then became Assistant Executive Officer of C Battery and, later, FO [forward observer]. The 65th Infantry Division was on the Danube River past Linz, Austria, the easternmost unit in the US Army, when the war ended. Artillery-wise, my mission as a young FO was routine—do all I could to bring in fire.

When you ask how the Army changed from that time until I retired, you really are looking at a number of different armies: the Army of World War II, the Army between the wars, the Army of the Korean War and post-Korean War and the Army in Vietnam and post-Vietnam. All were somewhat different with different goals. The common thread through them all was the commitment that "This is the Army; we do as we're told and do it to the best of our ability."

The majority of those "Armies" were strong in terms of the quality and dedication of the troops. We had a tough period at the end of the Vietnam War—very tough. The nation had turned against the soldier and it showed. Our soldiers were much harder to work with than before or



1978

after. But that was not a long period, and we became a very good army again rather quickly. The things I saw change during my career were concepts, weapons and tactics, including cooperating with the other armed services.

Q *How did the challenges of coordinating fire support with our sister services change?*

A As a young officer, I was not the least bit concerned with the other services or how to coordinate with them; the concept of fire support as an integrated system came after World War II. We went into war with the idea that the Field Artillery had its role, the Air Force had its role and coordination was at very high levels. Those of us down at the operating edge weren't involved.

Today, the coordination flows through all levels from top to bottom. We look to

our young officers to pull together all fire support available to them: Army, Navy, Air Force, Marine Corps—whatever. The job of a young Field Artillery officer during my time wasn't as complex, and our weapons didn't lend themselves to the degree of interlocking capability that they do today in terms of range, lethality or bringing in close air support really close. As a young lieutenant, I didn't worry about fighter bombers, only how to put Field Artillery fire where we wanted it.

In the Korean War, we first really tried to coordinate artillery with Air Force fires. I served the last year of the Korean War in 1952 with the 64th Field Artillery, part of the 25th Infantry Division, and we fired many "flack suppression missions" to pin down enemy air defenses. Just before our fighters came in, we'd mark the targets we wanted them to bomb or attack with the cannons mounted on their airplanes. It was a coordinated effort, but, of course, I was a major in Korea and working at a higher level.

Since then, a great deal of effort has been put into coordinating the firepower of the various services. In 1963, I worked for STRICOM—Strike Command—at Mac-Dill AFB in Florida, which had an organization called the Joint Test and Evaluation Task Force. Its sole mission was to work out better coordination techniques between the Army and Air Force—the Navy wasn't a player at that time. When I commanded VII Corps in Germany [1977-1978], we had all kinds of concepts and systems for joint coordination.

With all that effort, I was disappointed in 1983 in Grenada with the difficulties in joint cooperation, some of which was communications. By that time, *anybody* should have been able to talk to anybody else in a world of modern electronics and radios. We just didn't pull it all together as



well as we could have. We succeeded, but that only shows that overwhelming firepower and strength can overcome any thing. By contrast, Desert Storm orchestrated the power of the Army, Air Force, Navy and Marines very well. We worked to develop the shared

knowledge and skills to synchronize all our efforts.

So, have I seen changes? Absolutely. Fire support is now a multi-service business, ensuring a single, coordinated fighting force from the strategic level on down. And that demands the fire supporter be the master of everything—quite a challenge for Field Artillerymen. But you have to know the full spectrum of fire support capabilities to coordinate them.

Q *What lessons did we learn in South Korea that apply today?*

A Two things come to mind, one of which we've already talked about: the real beginnings of synchronizing combat power with the Air Force. The second was employing battery defense techniques on a nonlinear battlefield.

In the early days of fighting in South Korea, we had Field Artillery positions encircled and overrun by enemy forces—something we simply had not experienced in World War II. In World War II, we had a cohesive line in front of our gun positions. In Korea, the "front" was nonlinear. Techniques to defend the battery on such a battlefield grew out of the Korean War after we lost a lot of guns and a lot of soldiers. Of course, those defense techniques were invaluable in Vietnam.

Each battery's position was recognized as a target for the enemy, and you had to depend on your own soldiers to defend your battery. For example, we carried carbines, a light rifle, in World War II. They were discarded in Korea for rifles, so cannoners could fight as infantrymen. We also put machineguns around our

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“ Fire support is now a multi-service business, ensuring a single, coordinated fighting force from the strategic level on down. ”

perimeters.

The point is, Korea forced us to focus on defending our guns. If a battery is in a survival mode, it's too busy to provide fire support—it has to save the guns to use them.

The real threat, as we saw it later, wasn't ground attack but counterbattery fires. The need to avoid counterbattery fires gave birth to the "shoot and scoot" concept MLRS and Paladin employ.

Q *As the Commander of the 25th Infantry Division Artillery in Vietnam, what were your most significant fire support challenges and how did you overcome them?*

A By far the most difficult part of the Vietnam War for an artilleryman was target acquisition—I believe that's still our greatest weakness today. We have developed excellent weapons, good munitions, good command and control. We're doing better and better in coordinating fire support for combined arms, joint and even coalition operations, but target acquisition is still the frustratingly weak link. We have all kinds of capabilities to take out a target—if we know where it is.

When I was the Commandant of the Field Artillery School [1973 to 1976], we looked for technology to acquire targets in a timely manner and with precision. Finding targets accurately is still a problem. Perhaps, Desert Storm made target acquisition look a little too easy because targets in the desert are easier to find than in the jungle.

We need remotely piloted vehicles with sensors sophisticated enough to provide target acquisition, not just military intelligence. We need a passive TA system—heat detection, seismic, sound or some other passive system. The frustration is that we're a nation of tremendous high-tech capabilities, but it's

hard to capture those capabilities to apply where we need them.

Q *Facing what kind of threat or under what conditions would you advocate FA units employ Vietnam-style firebases?*

A A firebase in Vietnam protected the battery against a low-tech enemy who was all around the position, and our infantry operated toward a specific target within range of the artillery. Firebases were an absolutely necessary part of operations in Vietnam, but they are only effective under those limited conditions.

The key to employing them is ensuring they're mutually supporting. A firebase must be positioned within range of friendly artillery, perhaps another firebase—the best way to protect your guns is to ensure others can shoot around your firebase. Then, in Vietnam, the infantry never operated beyond the range of our guns.

Q *What cautions would you give about centralized versus decentralized artillery command and control using firebases?*

A I don't care for decentralized control of artillery, although there are times when you have to employ it. Decentralization gets away from massing fires. The tendency is for the decentralized commander to



“ Perhaps rather than designing entirely new systems, we need to keep on product improving what we have to get capabilities into the soldiers' hands faster. ”

use only the artillery that's part of his force—he doesn't think in terms of massing all available artillery.

In Vietnam, coordinating and massing fires from a number of firebases was difficult. The Div Arty [division artillery] or group—whatever higher level headquarters—wasn't always in the right position or didn't have the communications to orchestrate the fires of the firebases.

Sometimes firebases just called on each other. When you're up to your ears in problems, you tend to shoot immediately and lose awareness of other artillery out there to help—artillery you can mass for the best effect.

Under centralized control, a higher level commander sees the big picture and brings in all the guns.

Q *Do you have any cautions to give about applying new technology while maintaining our basic skills and low-tech capabilities?*

A The lesson is to apply all of the technology you can. Don't be afraid of something because it has vacuum tubes, beepers or buttons and what not. If it will do the job, apply it.

We had a lot of reaction against TACFIRE [tactical fire direction system] in its early days because it was such a "foreign" system—young officers today think TACFIRE is Stone Age. It's a generational change in attitude about high-tech.

But you have to balance the desire for, perhaps futuristic, high-tech with making the most of the capabilities of the moment—that which you can apply today. Perhaps rather than designing entirely new systems, we need to keep on product improving what we have to get capabilities into the soldiers' hands faster.

We're slow in applying technology. Very. Sometimes we keep toying with technology we think we can make work, so instead of taking a half step of improvement, we hang onto the old system until we can take a big step.

A classic example is liquid propellant. We have two or three interim ways to improve our howitzer ammunition:

unicharge, the modular charge and so on. All have been pushed aside while we work to develop the liquid propellant, which is clearly the best—but we're not there yet. The technology dream of what we want to be in the future holds us back from what we can be today—marginally improved, but still improved.

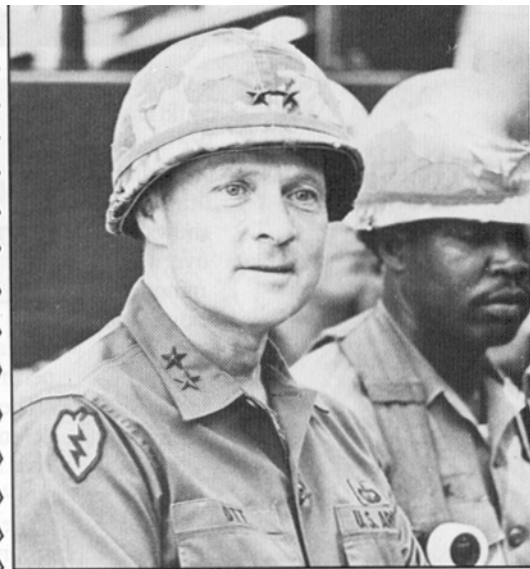
Q *The creation of the FIST [fire support team] was your initiative while Commandant of the Field Artillery School. What prompted you to create the FIST?*

A The increased frontages assigned maneuver units. Traditionally, we had had an FO with every infantry or armor company. When the company's front became very wide, one Field Artillery observer simply could not adjust the fires on targets of opportunity across the entire front. The FIST increased the number of eyes and radios to deliver artillery fire.

The FIST structure is designed to provide fire support within the observation levels of the front line of the maneuver force. New systems such as remotely piloted vehicles and smart munitions with increased ranges and the impending digitization of the force will help find targets deep or, perhaps, off to a flank. But the FIST structure will remain valid at the operating edge with its maneuver forces.

Q *You were instrumental in shifting the responsibility for the counterfire mission from the corps artillery to the division artillery and giving the division artillery "operational command" of the artillery in its sector. What were your arguments for the shift?*

A There were two issues that drove that decision. One, again, was increased frontages. A division front in a NATO-type situation (which we had in



mind) was bigger than the old corps front. To try and coordinate counterbattery across a corps front was nearly impossible—communications, range of guns and so on.

The other issue was there's always a tendency for the corps artillery to become heavily involved in "its war"—interdiction and counterbattery. The division artillery tends to stay involved in close support to its maneuver. As a result, not all guns are used for all missions.

By putting all the cannons under the control of the Div Arty commander, a single manager could use them for whatever mission was compelling—all guns fighting all the time.

And the same arguments apply today. The desire is to have the guns under the control of someone whose sector corresponds roughly to the range of the guns and to have all guns available to support wherever the hot spot is.

Q *In your "1980 Oral History Interview" conducted by the US Army War College, you said the next war we had to prepare to fight was a "mobile, mounted war...an armored-type war—fast-moving, scoot and shoot...in a series of [meeting] engagements" and that it was going to be very violent and over quickly. The Gulf War proved you correct. How would you characterize the next generation of warfare we must prepare to fight?*

A I need a crystal ball to answer this question. The Army must be ready

“ We should lean toward rockets and missiles, the Field Artillery weapons of the future. ”

“ When artillery becomes organic, commanders and artillerymen think about their fire differently; they lose the innate wish to mass fires. ”

across the spectrum of military operations. The threat that would involve massive use of heavy forces has more or less gone, at least for the time being.

In the future, the more likely is light action involving the 82d [Airborne] or 101st [Air Assault] Divisions and then backing them up quickly with heavier forces.

I don't know where we're going next—that's a political decision. We're the military, and we better be able to conduct operations anywhere at anytime—be flexible—because you can't predict the conditions under which you'll operate next.

Q *In 1979, you wrote the article "Battery Positions Are Out-of-Date" published in Army and reprinted in Field Artillery. The article basically describes the need for the howitzer now being fielded as Paladin. What weapon, system or other capability do you envision the Field Artillery will need for the next generation of warfare?*

A One of the things we've talked about quite a few times and really haven't made the progress I'd like is the lightweight version of MLRS [multiple-launch rocket system]: HIMARS [high-mobility artillery rocket system]. HIMARS will give us the MLRS range and flexibility on a lighter weight carriage so we can go anywhere quickly and have more firepower when we get there. Some kind of a HIMARS would be very useful.

We need to continue developing rockets and missiles. Cannons are big, heavy and tough. They're accurate and reliable, but it would be nice to have simpler, lighter systems to support our forces. That's our job—supporting forces, not pulling lanyards. We should lean toward rockets and missiles, the Field Artillery weapons of the future.

Q *How does the down-sizing of the Army that occurred after Korea and, then again, after Vietnam compare with our present situation? What advice would you give senior military and political leaders as they draw down the Army?*

A The comparison is pretty straightforward. Twice before, America felt she no longer needed the military force

structure and, therefore, whittled it down. In both drawdowns, we whittled the force down too fast and too far and paid a penalty the next time we had to use our armed forces.

The advice I'd give senior military personnel is "Hang in there" and keep pointing at history." History shows that we cannot—simply cannot—predict the future; therefore, it's prudent to have a robust enough structure to be prepared for whatever we conceivably might have to do. Our leaders must allow enough force structure and money for weapons and training to ensure the military can cope with a variety of situations.

We're down-sizing the Army for the third time in recent history. It's always painful, and it's always too far, too fast.

Q *One structure the Army is experimenting with to design Force XXI is a mobile strike force ("division") that has sub-units ("brigades") with organic artillery and no division artillery, allowing the sub-units to be "self-tailoring" and flexible. Given your experience with the Army changing to the Pentomic, ROAD, Division 86, Army of Excellence, etc., what advice would give Force XXI planners?*

A This all goes back to decentralized versus centralized artillery control that we've already talked about.

Combat leaders must avoid fragmenting their artillery—keep it under centralized control as much as possible. They can parcel it out on the battlefield, if necessary. But the minute it becomes organic to a brigade or any "sub-unit," that brigade thinks it no longer needs outside artillery support. It has its artillery. Well, it does, but it doesn't have enough.

When artillery becomes organic, commanders and artillerymen think about their firepower differently; they lose the innate wish to mass fires. We saw this in the Pentomic Division when we put a battery of 4.2 mortars in each battle group. It was a *terrible* structure—I'm glad we never had to fight using it. The groups didn't even think to use outside support.

The problem may be solved by a really good fire control system—AFATDS [advanced Field Artillery tactical data system], if you will—that can overcome the insulated thinking. If AFATDS automatically triggers artillerymen to look for other support and tells him what's available, we may be able to overcome the problems with organic artillery.

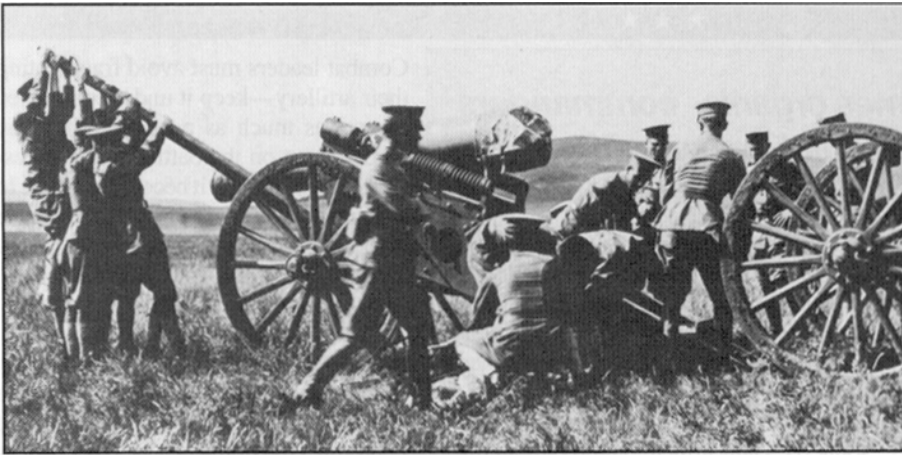
Regardless, fragmenting artillery assets is psychologically bothersome. You tend to figure you've got what you need, and you're wrong.

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

A Mass the fire. The effectiveness of artillery is in its ability to mass fires. If you stray from that concept, you're going the wrong way.



Lieutenant General (Retired) David E. Ott was commissioned in the Field Artillery in 1944 and retired as Commanding General of VII Corps in Germany in 1978. During his career, he served as Commandant of the Field Artillery School and Commander of the US Army Field Artillery Center and Fort Sill, Oklahoma; Director of the Vietnam Task Force for the Secretary of Defense, Washington, DC; Commanding General of the US Army in Thailand; Field and Air Defense Artillery Branch Chief and then Field Artillery Branch Chief after he initiated the separation of the two branches, Washington, DC; Commander of the 25th Infantry Division Artillery in Vietnam, the same division in which he served as a battalion Executive Officer and S3 during the Korean War; and commander of an 8-inch howitzer battalion in V Corps Artillery, Germany. General Ott is the author of many articles and the book *Field Artillery, 1954-1974*.



TO TEACH A MAN TO SHOOT:

Dan T. Moore and the School of Fire, 1909-1914

by Captain Steven A. Stebbins, USAR



On 25 January 1907, President Theodore Roosevelt signed a bill separating the Artillery Corps into the Coast Artillery Corps and the Field Artillery branch. This act marked the birth of the modern US Army Field Artillery and was the result of increased technical and tactical specialization in each arm. Henceforth, American Redlegs transformed themselves from a small and poorly trained supporting arm into the 20th century's King of Battle.

Critical to this transformation were Captain Dan T. Moore's actions as the founder of Fort Sill's School of Fire for Field Artillery. Moore's initiative, determination and clearheaded focus on gunnery began the long tradition of exacting hands-on gunnery training. American gunners have built on Moore's legacy to establish a world renown record of excellence.

A Branch in Name Only

The new Field Artillery branch gained little beyond independence in 1907. Coast

Artillerymen retained the Artillery School at Fort Monroe, Virginia, the *Journal of United States Artillery* and the Chief of Artillery, the Army's only general officer assigned to artillery duties. The act organized Field Artillery's 36 batteries into six regiments, but it didn't authorize any centralized administrative or training institutions for the branch.¹

Field Artillerymen, dispersed in separate batteries on scattered posts since after the Civil War, were pleased with this overdue reorganization. New battalion and regimental commands offered training and career opportunities to Field Artillerymen frustrated by decades of isolated garrison duty. As leaders struggled to build cohesive and proficient regiments, however, some quickly discovered the branch needed more than mere autonomy.

Redlegs needed institutions. Regiments alone could not bond gunners into a coherent branch, formulate and disseminate Field Artillery information, promote and coordinate Field Artillery interests in Washington, DC and, perhaps most important, develop and standardize gunnery training.

After decades of decentralization, regimental commanders had their hands full simply organizing their own units. Field Artillerymen were accustomed to operating as beleaguered batteries competing

with the more numerous coastal gunners, cavalry troopers and infantrymen for scarce resources.²

Learning to function as cooperative members of battalion and regimental teams was no easy task. Team building demanded the concentrated effort of commanders at all levels and competed with the detailed focus on gunnery training that new indirect fire techniques demanded.

Preoccupied with developing battalion and regimental operating procedures and spirit, lacking a strong tradition of rigorous and exacting training and without the support of formal Field Artillery institutions, individual Field Artillery commanders had difficulty meeting the demands of 20th century gunnery training.

A Field Artillery Revolution

The gunnery training demands were many and largely unperceived. A technological revolution in artillery that began in the 1860s had, by the early 1900s, completely changed the nature of Field Artillery combat.

Rapid-firing, rifled breech-loaders had replaced slow-firing, smoothbore muzzleloaders as the standard field gun. Recoil mechanisms, optical sights and smokeless powder had become commonplace.

Lightweight field telephones made it possible for artillery observers to position themselves outside the battery area and batteries to communicate with each other and with higher headquarters. Together, these advances made the widespread use of indirect fire possible.

Earlier guns' slow rate of fire, violent displacement after each firing and absence of accurate optics and durable rifling had, along with the volatility and obscuration of black powder, limited indirect fire to unhurried siege operations. Beginning in the 1860s with the Wars of German Unification and the American Civil War, however, the improved range and accuracy of rifled small arms began to take a heavy toll on exposed Redlegs employing direct fire at close range.

Thus inspired, Field Artillerymen, particularly French and German gunners, developed better weapons and indirect fire techniques. After the Russo-Japanese War of 1904-1905 demonstrated the effectiveness of these improvements, indirect fire gained prominence in all modern armies' training and doctrine.³

Indirect fire demanded much more rigorous training than direct fire. Procedures for communications, computation of firing data and adjustment of fire were far more complex than simple direct fire techniques. Accustomed to performing tasks that required relatively little sophisticated training, most Field Artillerymen adjusted slowly to the greater demands of indirect fire.⁴

Poor gunnery scores throughout the Army drew attention to Field Artillery training problems. "The first and most crying need is that our batteries should be taught how to shoot," declared Major William J. Lassiter, a Field Artillery officer detailed to the Inspector General, after an inspection tour in 1909.⁵ Fortunately, Major General J. Franklin Bell, the Army Chief of Staff, had already begun a program of Army-wide training reforms.⁶ Increasingly sensitive to the need for training improvements, the War Department had sent Captain Dan T. Moore on a one-year mission to observe European artillery training in 1908.⁷

The German Influence

Dan T. Moore was an energetic officer with experience in Washington and the field. A distant cousin of President Theodore Roosevelt and his military aide in 1905 and 1906, Moore was so energetic that he accidentally blinded the President in one eye during a recreational boxing

match.⁸ Trusting Moore to help find solutions to the Field Artillery's training problems, one of the Army's leading readiness deficiencies, the War Department clearly appreciated his hard-charging qualities.

Captain Moore also proved to be an observant and intelligent officer with lots of common sense. While he observed training in several armies, Moore focused his efforts on the German artillery school at Juterborg. This was a sound decision because the Imperial German Army was acknowledged widely as the world's best. Spending almost a year at Juterborg, Moore studied the German style and method of training eagerly.

In 1909, Moore returned to the United States where he reported his observations in detail. His 33-page report dealt exclusively with practical gunnery training as conducted at Juterborg. Moore stressed that the instruction was almost "entirely of a practical nature, only such theoretical instruction being given as is absolutely necessary."

Unlike the classroom-focused garrison schools that were the bedrock of American company-grade officer training, the German School of Fire was a hands-on school. Furthermore, the German Army required new general officers without artillery experience to attend the school as observers—a stark contrast to the American Army in which most generals were ignorant of Field Artillery details. This approach was very different from the American Field Artillery's decentralized schoolhouse-based training methods and, apparently, more effective.⁹

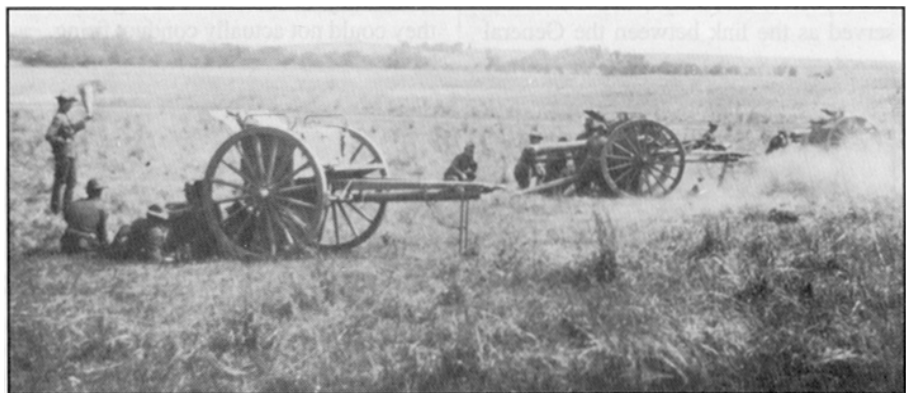
Moore noted several German training techniques that seemed particularly successful. Officers began with battery firing in simulated tactical situations, progressing to battalion firing as their skills improved. To facilitate detailed critiques, instructors maintained precise records of

firing results. Both instructors and students participated openly in all critiques, from the first informal ones in the field through the more detailed formal critiques back in garrison. All students observed and analyzed each mission, maximizing every round's training value. To develop tactical judgment, instructors presented a variety of targets and required students to prioritize them. German gunnery training was challenging, systematic and performance-oriented.¹⁰

Most important, Moore stressed that Juterborg's main purpose was "to teach a man to shoot." In-depth tactical training was a subject for field maneuvers—not the artillery school. While Moore admitted the importance of tactically based firing problems, he also recognized that this was "very difficult and generally [led] to very unnatural conditions." Complex tactical problems detracted from conduct of fire training, which contrasted sharply with the precise and clear-cut standards of cannon gunnery. Observing that simultaneous tactical and gunnery training "tended to make a farce of the school work," Moore returned to the United States determined to teach Redlegs to shoot and let others resolve the finer points of tactics.¹¹

Building a School

By mid-1909, Dan T. Moore's European tour had made him one of the Field Artillery's most knowledgeable trainers. The War Department quickly put that knowledge to work when it appointed Moore to a planning committee for the Army's new School of Fire for Field Artillery. Moore's observations and opinions guided the committee, thus beginning the aggressive captain's lasting impact on Field Artillery training. The committee chose Fort Sill, Oklahoma, for the school, based its plan on Moore's description of



Battery in action at Fort Sill in 1909.

Juterborg and recommended Moore as the first commandant.¹²

Fort Sill was a post with great potential, but little else, when Captain Moore arrived in 1911. An old Indian Wars post and already home to an infantry regiment, Fort Sill did not have enough facilities to support both existing units and the new school.

Dominated by the infantry colonel commanding the post and weakened by meager War Department funding, Moore struggled through a myriad of logistical problems during the summer of 1911. Housing shortages, water supply troubles, a minimal staff and a chronic shortage of up-to-date Field Artillery literature taxed Moore's abilities and patience to the limit.

Although terribly frustrated with the War Department's apparent lack of support, Moore was determined to start classes before the year's end. Aided by only four instructors, Moore labored tirelessly through the scorching Oklahoma summer to develop a curriculum and resolve his administrative and logistical problems. He made remarkably fast progress, supported in Washington by the senior Field Artillery officer on the General Staff, Lieutenant Colonel Edwin StJ. Greble.

Colonel Greble was Moore's cheerleader, coach and War Department lobbyist. He advised and encouraged Moore, spurring him to press on with the school despite the many obstacles in his path. Recognizing the Army's pressing need for a permanent Field Artillery gunnery school, Greble worked to compensate for the lack of official Field Artillery representation or leadership in the War Department. Indeed, in the early years of Army staff reorganization, only the Coast Artillery Corps had an official chief; the Infantry, Cavalry and Field Artillery had no general officer branch leadership. Hence Greble presented Moore's requests and reports to the Army Chief of Staff and served as the link between the General Staff and the

School of Fire. In essence, Greble performed many of the functions of a Chief of Field Artillery but without the rank, authority or staff required.

Two factors constrained Greble's actions as "Chief of Field Artillery": his position and the knowledge that Field Artillery was not a top priority in the War Department. An astute politician, Greble dared not risk losing support for the School of Fire by pressing all of Moore's demands on the Army leadership. Greble moderated Moore's strident calls for more ammunition, instructors and other resources. He secured more ammunition for school training but only at the expense of the Army's field batteries. Although some support for the School of Fire did exist in Washington, budget limitations compelled the Field Artillery to support the school out-of-hide.¹³

Aware that money was tight and large requests for funds could lead to the school's cancellation, Colonel Greble was an effective complement to the blunt-spoken and often abrasive Captain Moore. "Don't hunt trouble," Greble advised Moore in May 1911—"things will straighten out all right."¹⁴ Greble's patience kept the school alive while Moore's aggressiveness ensured it would grow. Together, they enabled the School of Fire to start its first classes on 15 September 1911.

Teaching the Basics

The school's first students showed Moore that he had more than just resource problems—he had a training problem. His students could not shoot. Several officers were recent transfers from the Coast Artillery, reassigned when the Artillery Corps split in 1907. Even captains with years of experience in Field Artillery batteries proved thoroughly incompetent; while they could cite drill regulations, they could not actually conduct firing.

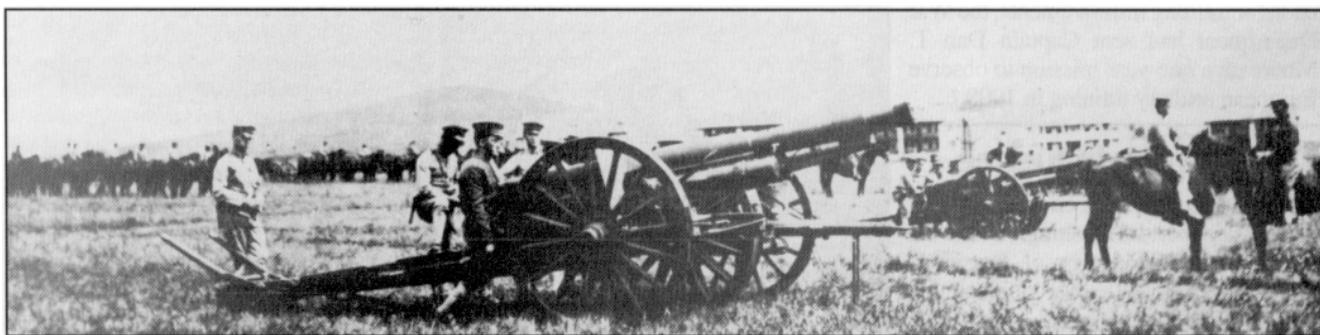
Many of these officers had never attended target practice, having contented themselves with theoretical instruction in garrison schools. After decades of garrison duty in the West where Field Artillerymen were often used as cavalry or infantry, many Redlegs had allowed gunnery training to slip in priority.

Moore reacted quickly to this startling revelation. Although he had wanted to include battalion firing and some simple tactical work with infantry in the curriculum, he revised his program immediately to focus on the basics. With limited time and training ammunition, Moore decided to drop battalion firing and stress battery fundamentals instead. Reversing decades of neglected gunnery training involved changing attitudes as well as developing skills, and Moore's Juterborg experience had taught him that hands-on practice was the surest route to success.¹⁵

Moore's enthusiasm for practical gunnery training permeated the School of Fire. Four courses taught Regular Army battery and field-grade officers, militia officers and enlisted soldiers the basics of conduct of fire skills and Field Artillery materiel.

Students spent long hours on the range perfecting their shooting skills. As in Germany, instructors kept detailed records of each firing problem and conducted both informal and formal critiques, first in the field and then again in garrison. Not a round was wasted, and students made steady progress under Moore's precise, systematic and performance-oriented training program.¹⁶

Innovation kept School of Fire training interesting and effective. Denied sufficient ammunition to execute his training program, Moore devised methods to simulate firing. To simulate shell and shrapnel bursts, soldiers concealed downrange ignited black powder charges on command, either on the ground or hoisted on poles.



A regimental review of Battery C at Fort Sill sometime between 1910 and 1920.

Fort Sill Museum Archives

Even without ammunition, Moore ensured hands-on gunnery training continued. He also challenged students to identify and prioritize their targets using silhouettes to simulate various types of enemy and friendly troops. Before students even could attempt to hit a target, they had to decide if it was friend or foe. Moore conducted top-notch hands-on training, and he strove constantly to make it better.

Still, the School of Fire did have limitations. Resource constraints and the low proficiency of new students kept the school from advancing beyond battery fundamentals. Combined infantry-artillery training exercises at Fort Sill might have done much to expose the difficulties of combining indirect fires with maneuvering infantry. Until his students could shoot, however, Moore decided that any advanced tactical skills they might develop would be largely useless. It was a hard decision but a wise one. Until Redlegs mastered the technical aspects of their craft, there was no point in seeking tactical insights while at Fort Sill.

Almost immediately, School of Fire graduates began to reform Field Artillery training throughout the Army. With trained instructors returning to units, garrison schools improved markedly. Annual target practice scores also improved significantly, prompting Major General Leonard Wood, Bell's successor as the Army Chief of Staff, to praise the progress made in Field Artillery training between 1911 and 1913.¹⁷ An editorial in the *Field Artillery Journal*, itself a 1911 innovation, proclaimed "The establishment of the School of Fire marked the beginning of a new era" with the end of "haphazard methods and accidental efficiency."¹⁸

Beginning a new era was hard work, especially for a hard-driving captain. By 1914, Moore was exhausted. The only Army service school commandant under the rank of major, Moore was one of only two who were also instructors. In addition, he commanded a firing battery and, after 1913, served on the Field Artillery Board. "[T]o do any one [of these jobs] thoroughly would take all my time," Moore lamented. "I have to jump from one question to another...which naturally tends to make one's work less efficient."¹⁹ With the school functioning well, Moore asked to be reassigned. On 15 September 1914, Lieutenant Colonel Edward F. McGlatchlin replaced Captain Dan T. Moore as commandant of the School of Fire.²⁰

Moore's Legacy

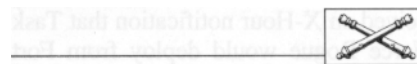
In 1916, the War Department closed the school to free troops for the Punitive Expedition to Mexico in pursuit of Pancho Villa. Re-opened in 1917 after America entered World War I, the School of Fire became the bedrock of that war's massive US Army Field Artillery expansion. That remarkable 16-month explosion from six to 234 regiments was possible because the Field Artillery had a core cadre trained or influenced by the School of Fire.

Rising to command a Field Artillery brigade in World War I, Dan T. Moore had given the Field Artillery the basis of a common training system and a tradition of precise, systematic, performance-oriented gunnery training that has made the US Army Field Artillery the best in the world.

Today's Field Artillerymen face many

of the same daunting challenges that confronted Moore in 1911. Shrinking budgets, changing missions and revolutionary technological advances are driving major changes in Field artillery weapons, tactics and techniques.

Still, it's the sergeants, lieutenants and captains on the line of metal and on the hill who continue to make our arm the King of Battle. Like Dan T. Moore, these leaders have to make hard decisions in pursuit of combat readiness. To set priorities, today's Redleg leaders should remember their fundamental mission as stated 75 years ago by Captain Dan T. Moore: "to teach a man to shoot."²¹



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Deploying for Victory II: The 24th Div Arty in Somalia



PFC Quezada

Indian Ocean

by Colonel William J. Lennox, Jr., and Lieutenant Colonel Charles B. Allen

In October 1993, the 24th Infantry Division (Mechanized) Artillery (Div Arty), Fort Stewart, Georgia, had the opportunity to demonstrate the deployment operations described in the article, "Deploying for Victory" (June 1993). On 032300 October 1993, the division received an X-Hour notification that Task Force Rogue would deploy from Fort Stewart to Somalia. Four days later, the Div Arty received additional orders to send a firing battery with Task Force Rogue (see Figure 1). With its fire support teams (FISTs), the task force had been in the X-Hour sequence four days before the firing battery and was well along in planning vehicle deployment, pre-deployment training and air flow.

When notice came, the artillery units on division ready brigade 1 (DRB-1) status were from two different battalions. The firing battery was from "Glory's Guns," 1st Battalion, 41st Field Artillery (1-41 FA), and the FISTs came from the "Battlekings" of 3d Battalion, 41st Field Artillery (3-41 FA). The task organization reflected the one the units had worked with for a number of weeks. In fact, most FISTs had just returned from a four-week "Victory Focus" training exercise working with 1-41 FA. While the FISTs were loading and training with the task force, the firing battery moved into "first gear" to catch up with the earlier alerted force.

Ammunition. When the Div Arty received the order to deploy a firing battery to Somalia, the Div Arty commander assembled the battalion commander, battery commander and Div Arty battle staff. This group meticulously went through the military decision-making process, analyzing the mission, developing courses of action (COAs) and war-gaming. During this process, they thoroughly scrubbed the 155-mm basic load.

The normal unit basic load (UBL) for one firing battery is shown at Figure 2. This configuration was designed for combat operations against a heavy, mechanized force in a desert environment. Combat

operations in Mogadishu, a city with an urban guerrilla environment, presented an unusual requirement. Whereas the "desert UBL" had more dual-purpose improved conventional munitions (DPICM), the mission analysis determined DPICM

would be ineffective and would cause extensive collateral damage if employed in urban Mogadishu. Therefore, the battle staff developed the UBL for Somalia, making the most of precision munitions and reversing the ratio of DPICM to high-explosive



SPC Paul Policahette

A FIST vehicle from 3-41 FA prepares to move from the airfield in Mogadishu.

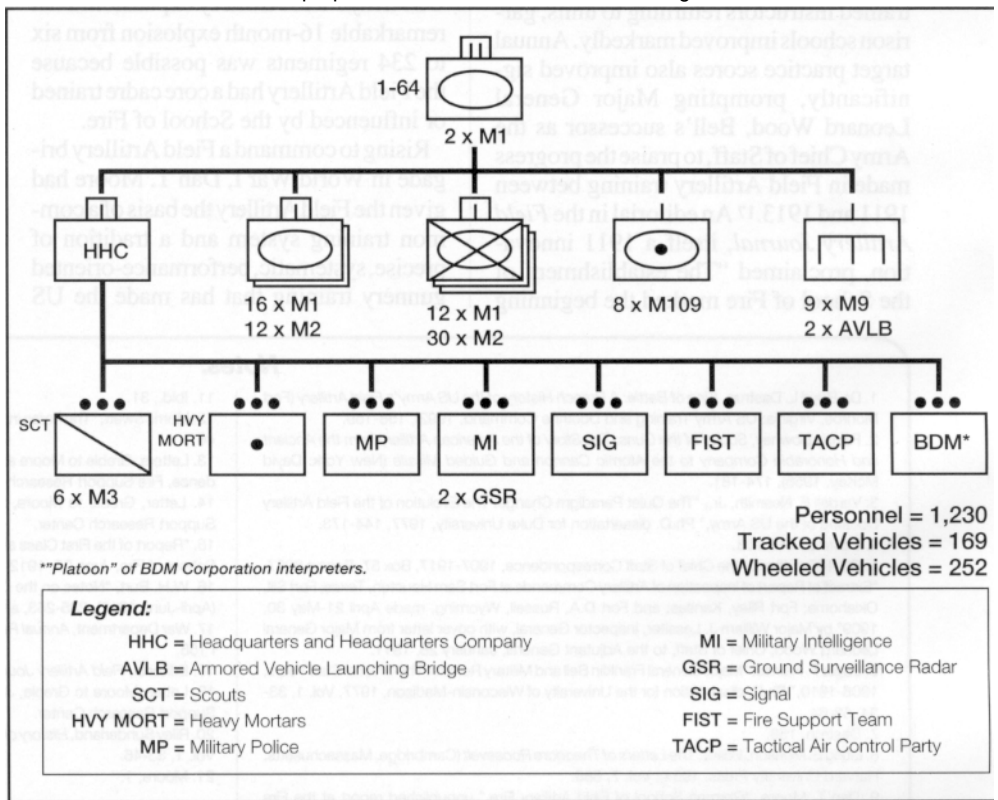


Figure 1: Task organization of the 24th Infantry Division's Task Force Rogue deployed to Somalia.

Description	DODIC	Quantity
DPICM, M483A1	D563	720
RAP, M549	D579	290
HE, M107	D544	160
SMC, M825	D528	56
DPICM, M864	D864	183
ILL, M485	D505	40
CPHD, M712	D510	40
ADAM-S, M731	D502	16
RAAM-S, M741	D509	64
		Total 1,569

Legend:

DODIC = Department of Defense Identification Code	SMC = Smoke
DPICM = Dual-Purpose Improved Conventional Munition	ILL = Illumination
RAP = Rocket-Assisted Projectile	CPHD = Copperhead
HE = High Explosive	ADAM = Area Denial Artillery Munition
	RAAM = Remote Anti-Armor Mine

Figure 2: "Desert UBL." The battery unit basic load in place at N-Hour.

Description	DODIC	Quantity
DPICM, M483A1	D563	80
RAP, M549	D579	32
HE, M107	D544	1,096
SMC, M825	D528	64
WP, M110	D550	32
ILL, M485	D505	112
CPHD, M712	D510	64
ADAM-S, M731	D502	48
		Total 1,528
PROP CHG, RED BAG, M119A2	D533	16
PROP CHG, GREEN BAG, M3A1	D540	1,032
PROP CHG, WHITE BAG, M4A2	D541	640
FUZE, MTSQ, M577	N285	312
FUZE, PD, M557	N335	512
FUZE, PROXIMITY, M732	N464	400
FUZE, PD, M739	N340	256

Legend:

WP = White Phosphorous	CHG = Charge
PROP = Propellant	MTSQ = Mechanical Time, Superquick
	PD = Point Detonating

Figure 3: Battery Deployment UBL

(HE) rounds (see Figure 3). The division ammunition officer relayed it to the ammunition supply point for validation and assembly.

Another key ammunition consideration involved the range at which the firing battery was likely to engage targets. Information on this subject was sketchy, but

the battle staff queried division, corps, and 10th Mountain Division (Light Infantry) sources. The conclusion was that, from the expected battery locations to the north and west of Mogadishu, the battery would be able to range the majority of possible targets with M3 (Green Bag) propellant. However, to enhance the flexibility of the battery to accomplish its mission, the Div Arty commander sent 1,688 propellant charges for the 1,528 projectiles deployed (Figure 3). The assumption was that the logistics base in theater would be immature, causing a supply problem if range-to-target became a factor.

At 082230 October, the reconfigured ammunition was delivered to the rail marshaling area. The task force had loaded out earlier that day. The battery's tracks (M109A2s and M992s) moved through the marshaling area and loaded hundreds of rounds. The upload was completed at 090030 October, and the vehicles were uploaded for rail movement to the Port of Savannah by 090300.

Meanwhile, the battery's wheeled vehicles moved to the port. The battery's heavy expanded-mobility tactical trucks (HEMTTs), including one-third from the battalion ammunition section, loaded bulk ammunition for sea movement before moving to port. The division G4 coordinated for additional ammunition to be shipped to Somalia.

Pre-Deployment Training and Other Homework. While the deploying soldiers waited two weeks for air transportation, the battery completed soldier readiness processing, personal item inventories and storage, privately owned vehicle (POV) parking and training. The training focused on battery security, fire mission processing, crew drill and individual weapons firing.

Several individuals from Fort Sill, Oklahoma, assisted in the training. Instructors from the Fire Support and Combined Arms Operations Department and Gunnery Department at the Field Artillery School reviewed M981 FIST vehicle (FISTV) maintenance and operations and passed on some important advice on FISTV maintenance in an austere environment. Two other individuals, along with a camera crew from White Sands Missile Range, New Mexico, helped prepare the battery and FISTs to fire the Copperhead projectile.

Out of the 72 rounds of Copperhead in the Div Arty's war reserve ammunition, 64 were shipped to Somalia and eight were pulled for pre-deployment training.

With the help of experts from Fort Sill, each gun section fired a Copperhead and each FIST not yet deployed lased a target. The record was seven for eight target hits—but more importantly, battery and FIST confidence in their ability to fire this munition increased significantly.

While the FISTs and battery trained, the Div Arty staff, along with the battalion commanders and their staffs, war-gamed the tactical considerations. Members of the staff coordinated with individuals who had recently been in Mogadishu, including those from the 10th Division, which still had significant numbers of soldiers in Somalia; the staff was able to gather valuable information from members of the 10th Division fire support element (FSE) and AN/TPQ-36 Firefinder radar sections. Div Arty staff officers poured over maps and photographs, plotted enemy mortar locations, studied building heights and looked for potential positions for the battery.

Commanders and staff officers also brainstormed possible challenges involving rules of engagement (ROE) and chains of command. The ROE for indirect fire were not available to the Div Arty, and the battle staff had concerns. Chain of command and fire mission processing procedures also were examined. While the battery was part of the task force, it was the only battery in country and would possibly have to respond to Q-36 radar acquisitions from the Joint Task Force (JTF) in Somalia or from others under the UN Operations in Somalia (UNOSOM). These issues were not to be resolved at Fort Stewart but were issues facing leaders of the JTF and UNOSOM. The staff could only arm the battery commander with recommendations.

Ultimately, the Div Arty sent an additional major with an M577 and crew to act as liaison officer (LNO) and senior Div Arty representative. This field-grade officer represented battery concerns to superiors, acted as the heavy artillery expert and, when the battery split, stayed with one platoon as the senior artilleryman.

Positioning and Tactics. During the X-Hour sequence, the Div Arty commander and his battle staff, along with the direct support Field Artillery battalion commanders, war-gamed COAs dealing with the positioning of the firing battery. They heavily weighted the security of the battery and its ability to engage targets, particularly with Copperhead.

They examined several position areas,

selecting Victory Base, the airfield, and the oil refinery (see Figure 4) as the most likely areas to occupy. The Div Arty battle staff provided the battery commander and LNO a list of advantages and disadvantages for each position area and a similar list for split battery operations.

When the battery arrived in theater, the analysis provided by the battle staff proved to be extremely accurate. Employment of Copperhead was the determining factor in the JTF commander's decision to split the battery into two platoons and position them at Victory Base and the Boat Factory. These platoon locations provided optimal Copperhead delivery ranges and multiple lasing angles (to minimize Angle T) for the OH-58D helicopters.

In addition to Copperhead employment considerations, positioning the platoons at Victory Base and the Boat Factory enhanced the battery's security posture. A maneuver company (on a rotational basis) from Task Force Rogue secured Victory Base and the firing platoon located there. The platoon at the Boat Factory wasn't augmented with a maneuver unit for security; however, its location along the coast offered adequate protection when combined with the platoon's organic defensive weapons.

Eventually, the platoon at the Boat Factory was relocated to a firing location south of the airfield along the beach. Its movement was precipitated by an increase in potential targets on the eastern side of Mogadishu and by impending redeployment.

Fire Support Structure. The JTF provided an interesting fire support structure. JTF maneuver units were commanded by the 10th Mountain Division's aviation brigade commander. These units consisted of two light infantry battalions from the 10th Mountain, one attack helicopter battalion (AH-1) and a company of OH-58Ds. The 24th Division's Task Force Rogue with its artillery battery was attached as one of the maneuver units in the Falcon Brigade.

The UNOSOM commander, of course, made the final decisions on employing fire support assets; however, there was no FSE at the UNOSOM level. The rest of the fire support structure was relatively standard: company FIST, battalion/task force FSE, Falcon Brigade FSE and JTF FSE.

Due to personnel shortages, FISTs at Fort Stewart weren't fully manned with forward observers (FOs) at the platoon level. Because the battery would probably have to operate routinely in a decentralized, dismounted configuration, the Div Arty augmented the deploying FISTs with fully manned platoon FO teams. As it turned out, Task Force Rogue platoons conducted dismounted operations while in theater.

Clearance of Fires. It became apparent early in the deployment that the introduction of heavy artillery into the theater would be a deterrent to the enemy activity that had escalated in the preceding months. Several targets had been selected by the JTF commander to be engaged at his

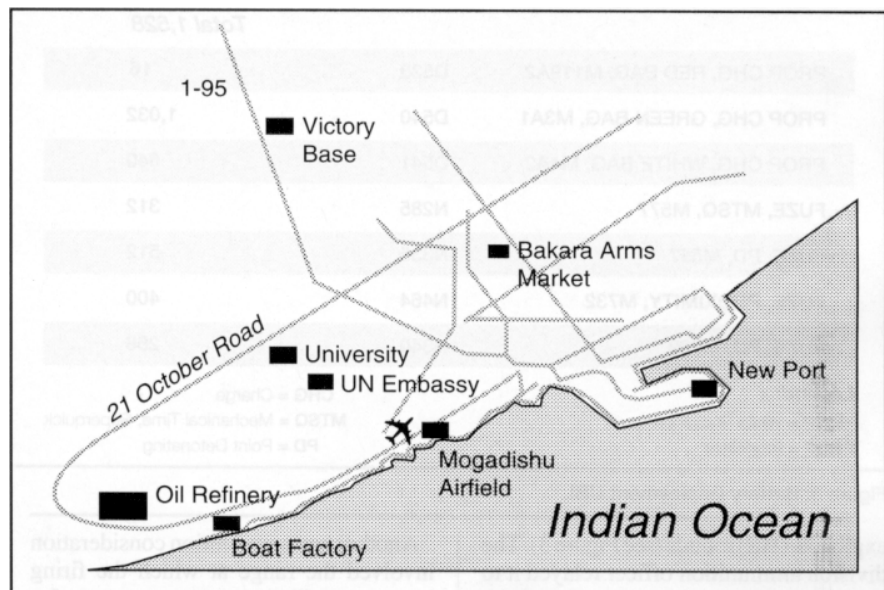
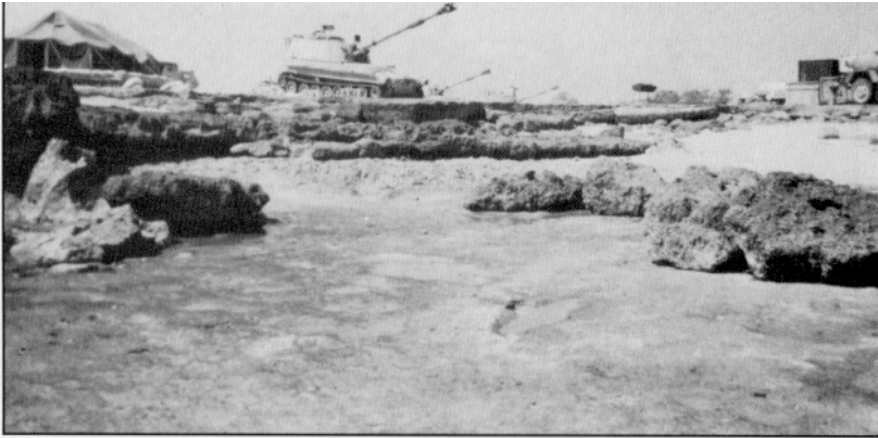


Figure 4: Mogadishu, Somalia



C Battery, 1-41 FA's firing position at the airfield next to the Indian Ocean.

direction in a preemptive or retaliatory strike against the enemy.

Clearance of fires for these targets was a simple process. The JTF commander approved their engagement and the order to fire one or more was to be transmitted from the JTF FSE to the firing battery.

Each target was to be engaged by a gun firing one Copperhead projectile while an OH-58D lased the target. (The OH-58Ds were airborne over Mogadishu 24 hours a day.) The Copperhead's precision and the OH58D's ability to provide eyes on the target and verify it proved to be a reliable combination, one that could avoid causing collateral damage. To maintain that capability, OH-58D crews checked in with the firing battery at the start of every patrol to verify communications. They executed frequent "dry" fire missions throughout the duration of their patrols.

The JTF FSE was the control station for the JTF fire support net. The battery monitored this net 24 hours a day while the JTF monitored the battery's command net. Should a ground or mounted observer call for artillery fire, the JTF FSE would monitor the request and grant clearance to fire over the JTF fire support net.

The firing battery was the JTF/theater indirect fire asset, and in actuality, the general support (GS) battery for the JTF. The JTF commander's priorities for employing fire support assets were as follows: the AC-130 gunship, AH-1 attack helicopters (there were no AH-64s in theater) and the 155-mm howitzers.

Target Acquisition. Three 10th Mountain Division Q-36 radars were deployed to the theater. These radars were dispersed along the beach area to the south of the airfield (Figure 4). Because "the enemy" had no capability to acquire the radars, they cued continuously. With three radars available, the JTF commander arrayed

the sectors of search to cover the entire target area at all times.

The battery was in communication with the radars over the "Firefinder net." The Q-36s were also on the JTF fire support net. If a target was acquired, the radar would notify the JTF FSE and the JTF commander would decide whether or not to engage the target and how to engage it. If artillery were the weapon of choice, the JTF FSE would clear the mission and the battery would fire.

Rules of Engagement. When the task force arrived in theater, it received a packet that set the ROE for individual weapons, tanks, mechanized infantry and indirect fire weapons. The overriding consideration for all these systems was to avoid collateral damage to noncombatants and civilian property.

The three basic principles for applying the ROE were as follows:

1. Soldiers had the right to use deadly force, if necessary, to *defend* themselves, their unit or other US and UN forces or persons and areas under their protection.
2. They were to use the *minimum* force necessary under the circumstances.
3. They were to use force only when the *military benefit* of using force *outweighed* the risk of injury or damage to nonmilitary persons or objects (collateral damage).

Further guidance in the ROE packet provided by the JTF gave examples of the potential employment of indirect fire systems against hostile targets. Firing artillery against targets acquired by Q-36s was authorized so long as it was the minimum force necessary under the circumstances and it was proportional to the threat. Unobserved fires were to be employed only as a last resort. Units were to take all reasonable steps to avoid causing collateral damage.

If the enemy were to attack from a

residential neighborhood, he assumed responsibility for any collateral damage that resulted from the lawful use of force in self defense.

Firing artillery in the immediate suppression of enemy air defense was authorized. Here again, soldiers had to positively identify the origin of the enemy fire and determine that lesser force was not available or would not suffice.

As has always been the case in implementing ROE, executing the rules requires quick decisions by well-trained, disciplined soldiers. Although not required to deliver indirect fires under combat conditions, American soldiers in Somalia were up to this challenge.

Conclusion. The Victory Division's deployment for Operation Continue Hope validated its rapid deployment, worldwide contingency capability. The process worked well. The initial ready company (IRC) was airborne, en route to Mogadishu, within 18 hours of notification. The DRF-1 (Task Force Rogue) made all its time lines and projected power into a hostile, volatile area when it was needed most. The firing battery deployed smoothly and was prepared.

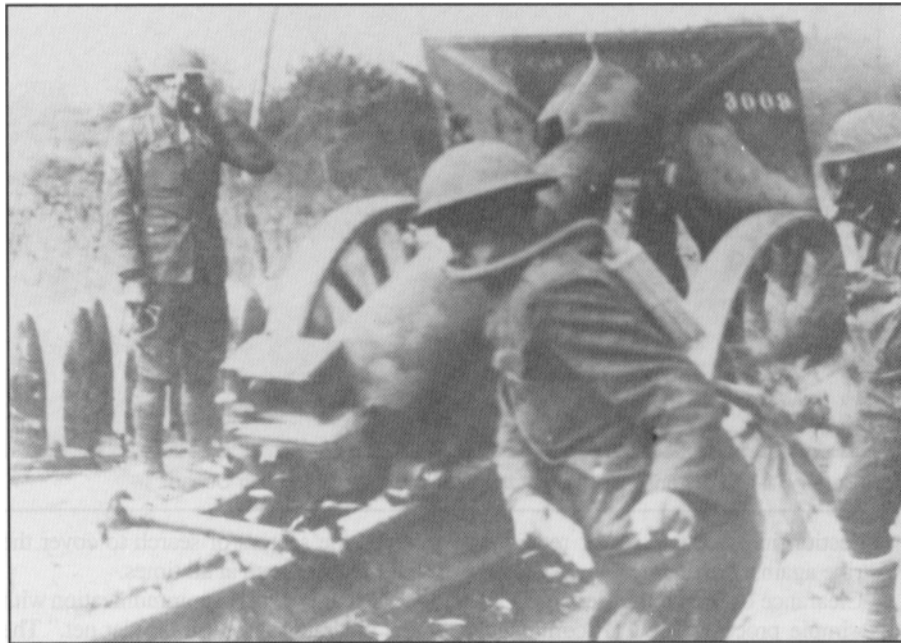
But the true legacy of this deployment lies in the fact that, after the introduction of 24th Infantry Division (Mechanized) units into the theater, not another American soldier lost his life.



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Lieutenant Colonel Charles B. (Ben) Allen is the Executive Officer of the 24th Infantry Division (Mechanized) Artillery at Fort Stewart. His previous assignments include duty with the 9th Infantry Division at Fort Lewis, Washington; the 7th Infantry Division (Light) at Fort Ord, California; and the 101st Airborne Division (Air Assault) at Fort Campbell, Kentucky. He holds a master's degree from Central Michigan University. Lieutenant Colonel Allen will take command of 3d Battalion, 41st Field Artillery (Battlekings) of the 24th Division in the summer of 1995.

Testing the Principles of Fire Support: The Meuse-Argonne Offensive of 1918



by Major Scott R. McMeen

The idea of technology advancing too rapidly to be managed and doctrine writers struggling (usually unsuccessfully) to keep up with it has become a cliché both in and outside our armed forces. Those artillerymen who can remember the Field Artillery digital automatic computer (FADAC) can't help but sympathize with this view.

New systems exploiting new technologies continue to appear at a dizzying rate, promising to revolutionize future artillery operations. Smart munitions, automated command and control, exotic new communications systems, automated navigation/survey systems and, most shocking of all, *howitzers that lay themselves* will surely lead to sweeping changes in doctrine and make our past experience all but irrelevant. Or will they?

Our current artillery doctrine in the May 1988 edition of *FM 6-20 Fire Support in the Airland Battle* claims that the basic principles for employing fire support remain constant: "The underlying principles of supporting the maneuver arms with fire and giving depth to the battle have origins which are rooted deep in the universal military experience. These principles are constant, and they will apply to future operations just as they apply to the present."¹

This claim certainly appears to contradict the commonsense view that sweeping technological change must prompt sweeping doctrinal change. Should artillerymen blithely accept the claim of the manual's authors, presented as it is without supporting evidence or explanation? Is there a way to test the constancy of fire support principles?

Experience in the Gulf War would seem to be an obvious means of verifying doctrine. Experience there appears to confirm our basic fire support principles.

But against such a passive and totally overmatched opponent, did we prove anything about our doctrine? Experience in the Persian Gulf should neither be dismissed as a means of testing the constancy of doctrine nor seen as a definitive confirmation of its constancy.

The recency of the Gulf War further weakens it as a means of confirming the constancy of doctrine. The war came just three years after the manual's publication. For the principles expounded in the manual to remain valid for a conflict just three years removed from their promulgation is hardly compelling evidence that they will remain valid well into the future.

It is, of course, impossible to look into the future to test the continued validity of fire support doctrine. But it's relatively simple to look into the past and test the manual's claim of constancy for fire support principles against a distant historical event. If tactical actions from many years before the publication of FM

6-20 confirm the validity of its fire support principles, then the claim of constancy would be greatly strengthened.

This article examines the doctrinal principles espoused in FM 6-20 and uses selected principles to analyze artillery operations during the Meuse-Argonne Offensive of 1918. It examines the First Army Artillery's organization for combat on 1 November 1918 in terms of current doctrine to test the longevity of fire support principles.

Which Principles?

While FM 6-20 confidently asserts that fire support principles will remain valid well into the future, the text is a little vague when it comes to explaining precisely what these enduring principle are. To which principles is FM 6-20 referring when it declares them constant? More to the point, what exactly is meant by the term "principle"?

Principles of War	Principles of Fire Support			
	Command Direction	Tasks	Organization for Combat	Planning and Coordination
Mass	Fire support must be responsive to the needs of the force commander.	Support the force commander's battle plan.	Weight the main effort.	<ul style="list-style-type: none"> • Exploit all targeting assets. • Consider all attack means. • Use the most effective means. • Furnish the type of support requested. • Provide adequate support.
Objective				
Offensive				
Security		Support forces in contact.	Provide adequate fire support for committed units.	<ul style="list-style-type: none"> • Safeguard friendly forces. • Avoid unnecessary duplication. • Use the lowest echelon of fire support available.
Economy of Force				
Surprise		Synchronize fire support.	Ensure fire support is immediately available to influence the action.	<ul style="list-style-type: none"> • Plan early and continuously. • Provide rapid, effective coordination. • Consider airspace.
Maneuver				
Simplicity	Sustain fire support.	Employ fire support to facilitate future operations.	<ul style="list-style-type: none"> • Be flexible. • Use fire support coordination measures (FSCM). 	
Unity of Command				<ul style="list-style-type: none"> • The fire support system must operate as one force. • The Field Artillery commander directs the fire support system.

Figure 1: The Principles in FM 6-20. All are derived from the "Principles of War" listed in the first column.

FM 100-5 Operations, the source document for FM 6-20, says that principles "provide general guidance for the conduct of war...[and] are the enduring bedrock of Army doctrine."² Extrapolating from this definition, fire support principles should provide general guidance for the conduct of fire support operations and serve as the basis for fire support doctrine.

The term "principles" appears in only three places in FM 6-20: in a discussion of the three principles of fire support command direction (Pages 1-2 and 1-3), in a discussion of the nine principles of war as they apply to fire support (Pages 1-5 and 1-6) and in the "principles of fire support planning and coordination" (Pages 3-4 through 3-6). I also would include the four basic fire support tasks (Pages 1-3 through 1-5) and the five fundamentals of organization for combat (Page 2-10) as doctrinal concepts that fit FM 100-5's definition of "principle."

Before flinging this mass of 40 or so principles at the Meuse-Argonne Offensive, can it be reduced to something more manageable? FM 6-20

suggests these sets of principles are closely related. They are derived from one another, starting from the principles of war and working down to the principles of fire support coordination.³ Figure 1 is a matrix depicting the relationship of the five sets of enduring principles found in FM 6-20. If this relationship is valid, then one can use any one of the four sets of fire support principles for analysis as all reflect each other.

Ideally, the set selected should be short, balanced and facilitate objective evaluation. In my view, the set of fire support principles that most closely match these criteria are the five fundamentals of organization for combat as listed in the fourth column in Figure 1.

Artillery Doctrine in World War I

On 1 November 1918, the US First Army conducted one of the last great set-piece attacks of World War I. This attack opened the final phase of the Meuse-Argonne Offensive. It achieved

tremendous success by World War I standards; at the end of the first day, First Army had advanced eight kilometers, and by 11 November, it had advanced a further 25 kilometers and crossed the Meuse River. How did First Army employ its artillery in this last great offensive?

1. Weight the main attack. V Corps, which launched First Army's main attack (see Figure 2 on Page 20), controlled a total of 44 battalions of artillery, while I and III Corps controlled 36 and 31 battalions, respectively. First Army further weighted the main effort by assigning V Corps a narrow zone (six kilometers wide) in the center of the Army's zone, well within the range fans of virtually all medium and heavy artillery pieces in First Army. The 2d Division, the V Corps main effort, controlled 19 battalions of artillery, roughly twice as much artillery as the I and III Corps assault divisions.

The preparation fires of 1 November included a series of heavy concentrations from the corps artilleries. These concentrations were fired in advance of the creeping barrage fired by the light artillery

of the assault divisions. This combination of fires created a beaten zone 1,000 meters deep in advance of the infantry and greatly assisted V Corps in securing its 1 November objectives.⁴

2. Provide adequate fire support for committed units. Each of First Army's seven attacking divisions had at least one Field Artillery brigade in direct support. Each direct support brigade was reinforced with three or more additional battalions of artillery.

3. Ensure fire support is immediately available to influence the action. Although almost 60 percent of the artillery was attached directly to the assault divisions, corps and army commanders retained 63 battalions under their direct control. The divisions received most of the light artillery while the corps and army headquarters retained most of the heavy and long-range artillery, the assets they could most profitably manage. With more than 700 tubes under their control, corps and army commanders had plenty of artillery with which to influence the action.

4. Employ fire support to facilitate future operations. The positioning and mission assignment of divisional artillery brigades facilitated subsequent mission changes (Figure 2). The 1st and 67th Field Artillery Brigades, which normally served as divisional artilleries for the 1st and 42d Divisions, respectively, supported the 2d Division on 1 November while the 1st and 42d Divisions followed the corps attack. On 5 November, the 67th Brigade rejoined and supported the 42d Division when it entered the line in the I Corps zone.⁵ The 1st Field Artillery Brigade did likewise on 6 November when the 1st Division occupied a zone to the left of 2d Division.⁶

5. Centralize fire support control to the maximum extent feasible. Higher headquarters further controlled the employment of artillery through centralized fire planning. The First Army Artillery staff did most of the detailed planning for the operation.⁷ V Corps directed its divisions to submit all fire plans for the 1 November attack to the corps headquarters for approval.⁸

Modern artillerymen would, no doubt, chafe at such a high level of centralization. Nevertheless, this system was well suited to the slow operational tempo and to the primitive communications and target acquisition technology available to World War I armies. Furthermore, the

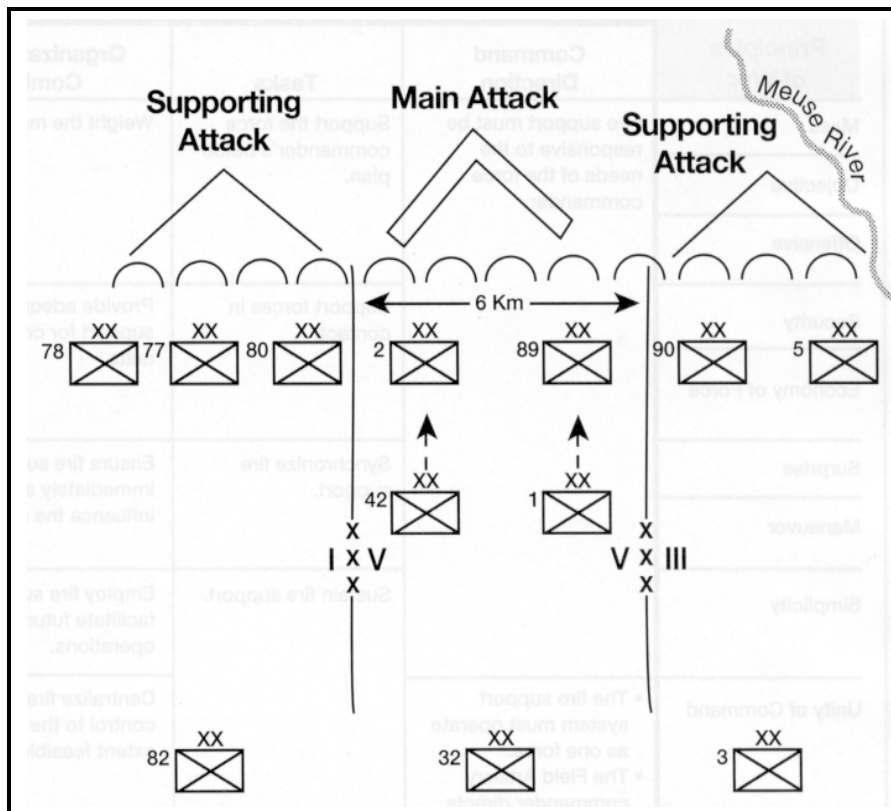


Figure 2: First Army Scheme of Maneuver of 1 November 1918. V Corps launched the main attack and controlled 44 battalions of artillery, while I and III Corps in the supporting attacks controlled 36 and 31 battalions of artillery, respectively.

tremendous density of forces on the Western Front made highly centralized control essential.

The seven US assault divisions of First Army attacked on a front less than 25 kilometers wide on 1 November 1918. The two lead divisions of V Corps attacked on a six-kilometer front. With such a narrow frontage, most of the medium and heavy artillery tubes in First Army could fire into any corps sector. Given so much force in so small an area, highly centralized control and detailed planning made perfect sense.

When the situation warranted, artillery commanders were perfectly willing to adopt a more decentralized method of control. First Army's rapid advance from 2 November onward meant that artillery support had to be quickly improvised rather than carefully planned. The First Army Artillery responded by attaching selected elements directly to its corps.⁹

Artillery officers at lower echelons also adapted to the new circumstances, as illustrated by the after-action report of Colonel Dan T. Moore, commander of the 2d Division Artillery: "The general

character of operations [2d Divisions' advance to the Meuse, 1 to 11 November] proves that in quick advances...the best results can be had...by placing the artillery support for the advance in the hands of the artillery regimental and battalion commanders, who follow the advance closely and solve the problems of enemy resistance through their direct liaison with the infantry."¹⁰

Principles for the Future

This brief analysis of a single operation has proven nothing with regard to fire support doctrine. But the fact that a major operation conducted more than 70 years ago reflects the same principles of organization for combat that we espouse today lends greater weight to the contention in FM 6-20 that the principles of fire support are constant. How does one explain this constancy, and what implications does this continuity have for the future?

Let us deal with the second question first because its answer appears more obvious. The bedrock of our doctrine has remained fundamentally sound over a period of major

technological change spanning some 70 years. This implies it will weather the next wave of technological change as well. To be sure, we can't afford to be complacent and merely assume current fire support principles will remain valid forever.

But it appears that these principles rest on very solid ground, indeed—the sort that only a truly profound change can disturb. If, for example, technological advances someday make indirect fire weapons as effective as direct fire weapons, then we may confront the sort of profound change that would force us to review all aspects of how we fight. Until then, our current set of principles remain sound.

But how does one explain this continuity? A light artillery battalion of World War I equipped with 75-mm guns on horse-drawn carriages bears little resemblance to a modern battalion of M109A6 howitzers. The range, lethality and mobility of the latter vastly exceeds that of the former. Modern communications and data processing equipment make the modern battalion far more agile. Yet the principles for employing masses of light, horse-drawn artillery are the same ones we use for masses of armored, computerized artillery.

I would suggest two simple explanations. First, the basic role of indirect fire artillery hasn't changed substantially from what it was in 1918. The artillery still supports the maneuver arms by destroying, neutralizing and suppressing the enemy.

Second, fire support principles have remained unchanged because they have consistently proven effective against many different enemies in a variety of situations. That, after all, is what makes them principles. Unlike tactics, techniques and procedures that must be constantly updated to fit changing situations, principles retain their validity in virtually all circumstances and provide the basis for developing new tactics, techniques and procedures.

The basis for any doctrine, its principles, must transcend technological and situational change. A doctrine based solely on a particular threat array or technology would have to be thrown out as soon as a new threat or technology displaced the old.

Developing Doctrine. The way to develop doctrine resembles the way natural scientists develop theory. Scientists observe nature and infer theories to explain how nature works. Likewise, military theorists examine history and develop theories on the general nature of warfare. When these theories receive official sanction and expression, they become doctrine. Doctrine, like scientific theory, is properly based on real-world experience. Doctrinal principles, like scientific theory, are not so much invented as discovered.

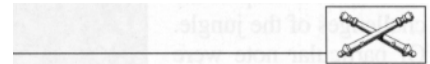
Our current AirLand Battle Doctrine reflects this approach. It is not an original body of thought, but rather a concise expression of ideas from a host of military thinkers. It's based on time-honored principles and theories, including the work of Clausewitz, Jomini, J.F.C. Fuller and Sun-Tzu. It uses historical examples from the Civil War, the Korean War and Operations Just Cause and Desert Storm to illustrate the validity of principles and demonstrate their transcendent nature. Best of all, because of its sound basis in recognized principles, AirLand Battle Doctrine was not tossed out when the threat array changed. The authors of the 1993 edition of *FM 100-5* updated some aspects of the doctrine to reflect changes in the world situation, but these revisions were relatively minor.

Conclusion. The principles of fire support demonstrate this same continuity. Years of combat experience on the Western Front during World War I taught leaders effective methods for organizing and employing masses of artillery. The fundamental aspects of organizing and employing artillery have remained valid throughout subsequent wars, in spite of changes in technology and geography.

Although specific tactics and techniques

have changed dramatically, the basic principles for employing artillery have not changed. The evolution of our doctrinal principles has not been characterized so much by changes in method as by improvements in our ability to recognize and articulate those principles. Today, our understanding has advanced to the point where we can express our doctrine's fundamental elements on a few pages of text.

New technologies will undoubtedly continue to prompt changes in tactics and techniques. The principles of fire support, however, will remain valid well into the future. As we visualize the role of fire support in future conflicts, we can stand confidently on our current doctrine because it rests solidly on the foundation of past experience. The key to the future, at least in part, lies rooted in the lessons of the past.



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Notes:

1. *Field Manual 6-20 Fire Support in the Airland Battle* (Washington: Headquarters, Department of the Army, 1988), v.
2. *Field Manual 100-5 Operations* (Washington: Headquarters, Department of the Army, 1993), 2-4.
3. *FM 6-20*, 1-3, 1-5, 3-5.
4. W.E. Shepherd, Jr., "The Employment of the Artillery—Fifth Army Corps Argonne—Meuse Operations," *Field Artillery Journal* 9 (April-June 1919), 153.
5. War Department, *Order of Battle of the United States Land Forces in the World War, American Expeditionary Forces, Divisions*, (Washington: Army War College, 1931), 272-273, 285.

6. War Department, "1st Division HQS War Diary Entry for 6 Nov 1918." *World War Records, 1st Division, A.E.F. (Regular): War Diary, Headquarters, 1st Division (Vol XVI)*. (Washington: Office of the Adjutant General, 1919).
7. Edward F. McGlachlin, "Army Artillery in Meuse-Argonne," *Infantry Journal* 23 (November 1923), 547.
8. Shepherd, 168.
9. *Ibid.*, 151.
10. War Department, "Report of Operations, Nov 1st to Nov 11th, HQS, 2d FA Brigade," *World War Records, 2d Division, A.E.F. (Regular): Operations Reports, 2d FA Brigade (Vol VI)*, (Washington: Office of the Adjutant General, 1919).

As Dr. Edward Drea notes in his study of operations on New Guinea during World War II, "the jungle [is] not just wooded terrain writ large."¹ The jungle environment has unique implications for all types of units, and *FM 90-5 Jungle Operations* identifies several factors that affect the use of artillery. These include the facts that heavy vegetation degrades the effects of all types of munitions, ground observation is limited, and an all-around defense is often required.

In the Pacific Theater during World War II, American artillerymen recognized these considerations and developed techniques to adapt to the challenges of the jungle. Of particular note were the actions of the artillery supporting the 1st Cavalry Division on the Admiralty Islands: the 37th and 43d Infantry Divisions on New Georgia and the 112th Cavalry and 126th Infantry Regiments on New Guinea.

Nearly all units had to learn the hard way that artillery fires failed to penetrate heavy jungle vegetation the way they did lesser types of foliage. For the 1st Squadron, 5th Cavalry Regiment, 1st Cavalry Division, this experience was gained in tough jungle fighting from 14 to 24 March 1944, around Hill 260 on Los Negros Island, part of the Admiralty chain.

Fuzes and Firepower

The 1st Cavalry Division Artillery consisted of two 75-mm pack howitzer battalions and two 105-mm howitzer battalions. On 21 March, a patrol from C Troop, 5th Cavalry encountered an enemy strongpoint in a cane patch 700 yards west of Hill 260. The patrol pulled back and called for a 75-mm artillery mission on the target. Once the artillery lifted, the patrol moved forward but was quickly halted by machinegun and rifle fire.



WWII: Artillery in a Jungle Environment

by Captain Kevin J. Dougherty, IN



Major Fred Irby, who served as the squadron S2/S3, noted that "The thick cane served as excellent overhead protection for the Japanese foxholes" and that "without a direct hit, the light caliber 75-mm howitzers had no effect on the well-protected enemy."²

To help alleviate this common jungle condition, FM 90-5 suggests that "alternative fuze action is normally required to achieve effective results." The manual specifies that "delay fuzes give better effects in heavy vegetation." These fuzes will penetrate the thick canopies, triggering in the treetops but detonating the round in the air at a lower level.³

Irby supports this claim stating, "The artillery fired delay fuze so that the projectiles would penetrate heavy overhead foliage and burst closer to the ground."⁴

In some cases, however, even delay fuzes were not enough to make up for the 75-mm's lack of punch. On 23 March 1944, the 1st Squadron, 8th Cavalry Regiment, 1st Cavalry Division attacked the Japanese positions around Old Rossus on Manus Island, just west of Los Negros Island. Although delay fuzes reduced tree bursts to just 10 percent, the 75-mm shells "did not have a sufficient penetrating effect to reach the entrenched bunkers through the heavy jungle growth." When the cavalymen attacked, the "Japanese came out of their holes, quickly set up their automatic weapons with supporting snipers

and poured fire upon our troops."⁵

Recognizing this reality, FM 90-5 states that in some cases, heavy jungle growth will simply require "more firepower."⁶ Irby's observations support this conclusion; he "believed that the heavier 105-mm will produce much better results in the jungle and with fewer rounds [than the 75-mms]."⁷ Others agreed, and in October 1944, the 82d Field Artillery Battalion received 105-mm howitzers to replace its 75-mms.⁸

In some situations, however, more firepower was not an option. Herculean transportation efforts had resulted in just one 105-mm howitzer, six Australian 25-pounders and three Australian 3.7-inch howitzers being available as the 126th

Infantry Regiment prepared to seize Buna Village on the Papuan Peninsula of New Guinea on 6 December 1942.⁹ Like the 1st Cavalry, the 126th Infantry's experience was that "artillery and mortar concentrations preceding earlier attacks had not succeeded in knocking out the Japanese defenses."¹⁰ Because the firepower condition could not be changed, new tactics were required.

Jungle Tactics

In this regard, the 126th Infantry made two adjustments. First, extra care was taken to ensure the accuracy of what little fires were available, and second, attack plans were based on realistic capabilities and limitations of indirect fire in the jungle.

On the first count, the 126th Infantry learned to use its low caliber systems, such as mortars, against only those targets identified as accurately as possible.¹⁰ The 126th Infantry had learned that the thick jungle, reinforced by especially strong Japanese bunkers, made broad area fires ineffective.

On the second count, instead of conducting a general assault after the preparation, the 126th Infantry began sending



out patrols. The 126th Infantry no longer expected to encounter a neutralized enemy and began to realize that, in the jungle, artillery would not have uniform effects across the entire front. The patrols would locate enemy weaknesses caused by the preparation, and then the 126th Infantry would advance by infiltration through those weaknesses.¹⁰

These new tactics were successful because they recognized the effect the jungle has on indirect fire. The Papuan Campaign proved that, using the new tactics, "the artillery could go into the jungle with the infantry and, what was more, could be used effectively in jungle terrain."¹¹

Smoke and Sound

But the jungle's thick vegetation not only degrades the effects of fires, it also greatly limits ground observation. In August 1943, the 37th Infantry Division was one of the XIV Corps units trying to seize Munda Point on the island of New Georgia. The dense foliage made it difficult to determine the locations of friendly units,



A 105-mm howitzer, part of the 135th Field Artillery Battalion.



Redlegs of the 152d Field Artillery Battalion on New Georgia prepare to fire their howitzer.

and there were many complaints of fires landing across unit boundaries. The situation became so bad that several artillery preparations had to be canceled because of uncertainty about the 148th Infantry Regiment's location.

Major General Oscar Griswald, the New Georgia Occupation Force commander, had done his best to improve the situation. He ordered frontline battalions to mark their flanks each day with white panels measuring 25 feet long by six feet wide. The plan was to photograph these markers from the air. The problem was that the jungle was so thick there simply were no clearings large enough to permit the panels to be spread out.

With the failure of this large-scale measure to identify friendly locations, units developed means of addressing the problem on a more local basis. Flares, smoke pots and even flame throwers were used to mark flanks, but these could be seen only by those soldiers in the immediate vicinity.¹² The 43d Infantry Division did make some limited inroads into solving the problem by using smoke and sound to adjust fires.

Generally, unit locations were so inexactly plotted that many times infantry units were actually located by artillery fire. The procedure was for a round of smoke to be called for in front of the

estimated position. All observers, both artillery and infantry, were to watch for it. Following each sensing of smoke, subsequent rounds were fired progressively closer to friendly lines. The location of the front was determined by the plot of the last round.

If the smoke rounds could not be observed but were determined to be in a safe location, batteries frequently fired a volley of high-explosive rounds that were sensed by sound. Observers found this procedure to be particularly difficult as the sound reverberated in the jungle and seemed to come from false directions and distances. The sounds differed with the conditions: day and night, rainy and clear weather and ground or air burst. These factors often made infantry commanders feel that fires were landing much closer to them than they actually were.¹³

FM-90-5 recognizes that "Jungle foliage will often require that artillery marking rounds be sensed by sound,"¹⁴ but, because of the difficulties just discussed, it suggests limiting this technique for use "in severe cases" only.¹⁵

OP Tree

As the Allied island hopping continued to Bougainville, forward observers (FOs) were becoming increasingly innovative in dealing with the observation limitations. One such example can be found on Hill 260, an hourglass-shaped feature with two rises, North Knob and South Knob, at each end. The key point on South Knob was a 150-foot high tree, nicknamed observation post, or "OP Tree," in which the Americans had built an observation platform. From this vantage point, artillery and mortar observers could see the Torokina River, the East-West Trail that crossed it and Hills 250 and 600 to the northeast. If the Japanese gained control of South Knob and OP Tree, they could observe Hills 608 and 309 in the Americal Division's sector and the corps rear area between them.¹⁶

The importance of this observation post is demonstrated by the heavy fighting to control it. The Americans occupied Hill 260 with about 80 men, including FOs and a reinforced platoon from G Company, 182d Infantry. On 10 March, the position came under attack from Japanese mortars, machineguns and rifles.¹⁷ After three days of fighting, the Japanese won control of Hill 260.

Although counterattacks failed, the Americans were not about to let the valuable



L-3s used on the Admiralties to direct artillery fire. Here they're shown behind protective embankments on the Momote air strip.

position remain in Japanese hands. The 182d Infantry's Cannon Company even put its 75-mm pack howitzers on Hill 309 and tried to knock down OP Tree with direct fire. As a result of such efforts, OP Tree fell on 17 March at 1900. More than 10,000 105-mm rounds were fired on South Knob. The Americans counted 560 enemy dead and suffered 98 killed, 24 missing, and 581 wounded themselves.¹⁸ Such monumental effort for a single tree surely demonstrates the value of observation in the jungle.

Unfortunately, tree platforms only solve the observation problems in static conditions. What was needed was a means of achieving height without losing mobility. The answer was aerial observation. Thus, FM 90-5 states that "all available air assets proficient in observed fire procedures, to include USAF, should be used when priorities and level of risk/advantage are favorable."¹⁹

Observation from the Air

Again Major Irby found this statement to be true at Los Negros. On 14 March 1944, the 1st Squadron, 5th Cavalry began an attack to clear the Japanese from around Hill 260. The attack was supported by the 82d Field Artillery Battalion. The 82d's commander, Major Harry Lambert, flew in a Cub plane to act as the aerial observer. The vegetation was so thick that even from the air Lambert could not see the friendly troops.

To correct this condition, the units marked their positions with red flares. Seeing the pyrotechnics, Lambert instructed the battery to fire a marking round well to the front. Subsequent missions

brought the fire back toward the ground observer until he could determine the point of burst and make the necessary corrections.²⁰

The 43d Infantry Division had used similar procedures on New Guinea—evidence of the validity of FM 90-5's statement that in the jungle, "adjustment is frequently conducted using creeping techniques."²¹ Using this sequence, Lambert and the FOs brought accurate fires to within 50 yards of the advancing companies.²²

All-Around Defense

Such heroics, however, are moot if the artillery cannot defend itself long enough to fire. Excellent cover and concealment make attack possible from any direction in the jungle. Therefore, FM 90-5 states units "must be prepared for all-around defense."²³ This usually equates to some sort of perimeter defense, and, for the artillery, FM 90-5 recommends a star formation.²⁴

The 181st Field Artillery Battalion was very sensitive to these considerations around Aitape on New Guinea in April and May of 1944. To obtain all-around security, the artillerymen positioned their batteries in diamond shaped formations. All howitzers were dug in, and protective cover was added for both ammunition and crews.²⁵ In this way, the 181st constructed a survivable and mutually supporting defense.

Summary

The Pacific jungles presented a formidable challenge to American artillerymen in World War II. They responded to the

thick vegetation's degrading effects on their fires by adjusting munitions, fuzes and tactics. They overcame limited observation by elevating themselves to where they could see. Sometimes this meant climbing a tree; other times it meant boarding an airplane. If these options were unavailable, battle-wise veterans resorted to the old stand-bys of creeping fires and sensing by sound. Finally, ever mindful of the all-around threat, the artillerymen prepared defenses with the security and thoroughness that the jungle demanded. Such measures made the artillery a valuable member of the combined arms team in the Pacific.

Since World War II, American artillerymen have found themselves in the



jungles of Vietnam and Panama. With significant portions of Latin America, Africa and Southeast Asia covered by jungle, it's likely they'll be called upon to serve in this challenging environment again. To prepare for such an eventuality, today's artillerymen would be well-advised to study the lessons learned by their World War II predecessors in the Pacific.



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Artillery Association's History Writing Contest with this article. He has placed in the past three History Writing Contests, to include winning it in 1993. Currently, he's Chief of the Special Tactics Branch of the Doctrine Division at the Infantry School, Fort Benning, Georgia, where his previous assignment was as a Small Group Instructor for the Infantry Officer Advanced Course. Other assignments include Rifle Platoon and Scout Platoon Observer/Controller at the Joint Readiness Training Center, Fort Chaffee, Arkansas, and Commander of B Company, 5th Battalion, 502d Infantry in the Berlin Brigade, Germany. Captain Dougherty has been published in *Field Artillery*, *Infantry*, *Army Trainer* and *RD&A* magazines.

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1. Dr. Edward Drea, "Defending the Driniumor: Covering Force Operations in New Guinea, 1944" (Fort Leavenworth: Combat Studies Institute; Command and General Staff College, February 1984), 137.
2. Major Fred Irby, "The Operations of the 1st Squadron, 5th Cavalry (1st Cavalry Division, Dismounted), in the vicinity of Hill 260, Los Negros Island, the Admiralty Islands, 14-24 March 1944" (Fort Benning: Academic Department, the Infantry School, AIOC No. 1, n.d.), 17.
3. *FM 90-5 Jungle Operations* (Washington, DC: Headquarters, Department of the Army, 16 August 1982), 6-16.
4. Irby, 13.
5. *The Admiralties: Operations of the 1st Cavalry Division (29 February-18 May 1944)* (Washington, DC: War Department, Historical Division, 1945), 111.
6. *FM 90-5*, 6-16.
7. Irby, 20-21.
8. Colonel Rex Chandler, "First Cavalry Division Artillery Combat Operations," *The 1st Cavalry Division in World War II* (Tokyo: Toppan Printing Co LTD, 1947), 200.
9. *Papuan Campaign: the Buna-Sananda Operation (16 November 1942-23 January 1943)* (Washington, DC: War Department, Historical Division, 1945), 32.
10. *Papuan Campaign*, 42.
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12. Miller, 161-163.
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14. *FM 90-5*, B-3.
15. *Ibid.*, 6-17.
16. Miller, 364-365.
17. *Ibid.*, 365-366.
18. *Ibid.*, 372.
19. *FM 90-5*, 6-17.
20. Irby, 20.
21. *FM 90-5*, 6-16.
22. Irby, 11.
23. *FM 90-5*, 5-18.
24. *Ibid.*, 6-18.
25. Drea, 37.

NCO Development: New DA Pamphlet 600-25

In the past, too many Field Artillery NCOs have played a "guessing game" on how to succeed and get the promotion they deserve. No longer. The Training and Doctrine Command (TRADOC) has completed the revision of the DA Pam on NCO professional development, and it includes a chapter on Redleg NCOs. To be fielded in late summer, the revised *DA Pam 600-25 The US Army NCO Professional Development Guide*, for the first time, has chapters devoted to each career management field (CMF). Chapter 9 has the Field Artillery branch information and replaces the *US Army Field Artillery Center and Fort Sill (USAFACFS) Field Artillery NCO Professional Development Pamphlet* dated July 1989.

Format and Design. DA Pam 600-25 has 40 chapters devoted to the different CMFs and the NCO corps. The pamphlet mirrors *DA Pam 600-3 Officer Professional Development Guide* in its structure and format. Chapter 1 talks about the philosophy and management of the NCO corps. Chapter 2 discusses the leader development process and includes institutional training, operational

assignments, self-development, career development models, the self-development test (SDT) and civilian education.

Chapter 3 is about the enlisted personnel management system (EPMS), discussing the different facets of soldier career development, enlisted qualification phases, the assignment process and other considerations. Chapter 4 deals with the promotion system, to include semi-centralized and centralized promotions. Chapter 5 outlines the evaluation system and gives broad guidance for the use of this system.

Chapter 6 is the Reserve Component (RC) section and includes Army Reserves and Army National Guard procedures on classification, reclassification, assignments, promotions and evaluations. Chapters 7 to 40 cover CMF guidelines. The appendices contain the reference publications.

Chapter 9 for Redleg NCOs. This chapter describes the duties an FA NCO is expected to fulfill and the development and standards at each skill level for the NCO to remain competitive for promotions and retention in CMF 13. The chapter also includes

guidelines for FA RC NCOs and the career development model that stresses the need for RC Redlegs to continue education and include the career development model in all quarterly counseling.

Chapter 9 puts an end to the FA NCO's guessing game and sets the standards for promotion boards to apply in their selection process. Although meeting the standards is no guarantee of promotion, it's a start. The manner in which an NCO performs is the truest measure of his potential for promotion and continued service in CMF 13.

Conclusion. The US Army Center for Army Leadership (CAL) at Fort Leavenworth, Kansas, was TRADOC's executive agent for the development and publication of *DA Pam 600-25*. But several FA NCOs had major input on the development of Chapter 9: Sergeant Major (now Retired) Charles L. Sweatt and Master Sergeant David Rodriguez, both of the FA Proponency Office in the Field Artillery School, and Command Sergeant Major James C. McKinney, CSM of the FA and Fort Sill.

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LNOing United Nations Style

by Major Timothy M. Knigge

With from 24 to 27 different countries participating in United Nations Operations in Somalia II (UNOSOM II) during a four-and-one-half-month period, the success of coalition operations was directly attributable to the US liaison officer (LNO) teams deployed with the various coalition forces. The period described in this article was the time the 1st Brigade, 10th Mountain Division (Light Infantry), Fort Drum, New York, was deployed to Somalia.

Although LNO teams were key to the success of several coalition operations against Aideed militia forces, they also had problems that, on occasion, degraded operations. The purpose of this article is not to describe the military success of the LNO teams, but to address problems encountered in satisfying LNO requirements.

LNOing in Somalia

Initially, the brigade had to provide UNOSOM II Headquarters in Mogadishu a senior NCO (master sergeant promotable) and the Belgian Brigade in Kismayu a three-man LNO team: an infantry officer (captain), an aviation officer (first lieutenant) and an infantry enlisted soldier (private first class).

The first problem the team faced was the language barrier. Many coalition officers and soldiers were picked to work on the UNOSOM II staff because they spoke English. However, outside the UNOSOM II staff, English-speaking coalition soldiers were, for the most part, a scarce commodity.

On 5 June 1993, Pakistani forces conducting a routine patrol in Mogadishu were ambushed by pro-Aideed forces.

The Pakistanis had 24 soldiers killed with another 80 wounded. The casualties would have been significantly higher if it had not been for the US LNO team with the Pakistani force. The team maintained an interface between the Pakistanis and the US Quick Reaction Force (QRF), serving as forward air controllers (FACs) calling in US scout weapons teams and helicopters to help the Pakistanis. The 5 June ambush not only dramatically altered the tactics of subsequent coalition military operations, but also set the stage for US LNO teams to support future coalition missions.

The brigade found itself calling upon various combinations of officers, NCOs and enlisted soldiers to fulfill all the LNO

requirements that surfaced. At best, these were ad hoc teams formed on a moment's notice to support a particular coalition force during an operation.

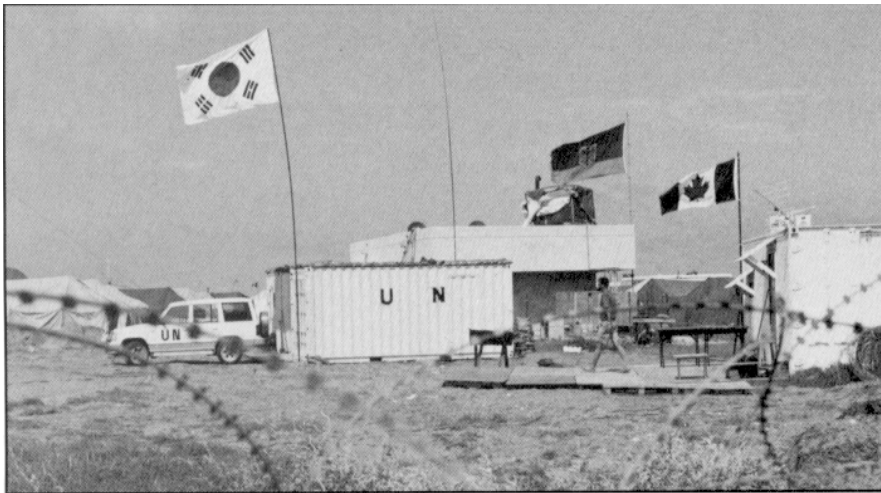
One such mission that stressed the brigade's LNO support capacity was conducted on 17 June 1993. This coalition military mission also illustrates the problems encountered while LNOing in a UN environment.

Initially, three US LNO teams were identified to support the UN mission. The LNO team to support the Moroccans had an artillery officer (major), an infantry senior NCO (sergeant first class) and an infantry enlisted soldier (private first class). A second LNO team for the Italians had an engineer officer (first lieutenant), an engineer NCO (sergeant) and an infantry enlisted soldier (specialist). Supporting the Pakistanis, the third LNO team consisted of an aviation officer (first lieutenant), an infantry NCO (master sergeant) and an infantry enlisted soldier (specialist). This was the same LNO team that had supported the Pakistanis on many occasions in the past, including the 5 June mission. Each team had a high-mobility multipurpose wheeled vehicle (HMMWV) with two radios to talk with the brigade headquarters and call in US Army Cobra and Blackhawk helicopters, as necessary.

This triad of LNO teams had a twofold mission. First, their mission was to form a 2,800-meter cordon around a 16-block pro-Aideed area in Mogadishu with the Moroccans responsible for a 2,100-meter cordon on the east, west and north and the Italians responsible for the remaining 700-meter



Aerial view of the northeast corner of Mogadishu cordoned off by the Moroccans. The author and a US special forces team were pinned down in this area for three hours of a nine-hour battle.



The Korean, German and Canadian LNO locations on the US Embassy compound in Mogadishu, which also has the UNOSOM II Headquarters.

cordon on the south. The second part of the mission was for the Pakistanis to conduct search and attack missions against specific Aideed enclaves within the 16-block area.

The cordon mission was to "Prevent large crowds and militia forces from entering or escaping the Pakistani search and attack area." Sub-missions included: "Deny crowds of people and militia access to the 16-block area of operations," "Prevent hostile forces from moving against Pakistani forces" and "Control access routes into and out of the 16-block search and attack area."

The cordoning/search mission called for more LNO assets. The Moroccans received an additional four-man US special operations forces (SOF) team, a Pakistani LNO (captain) and an Italian LNO (second lieutenant). During the nine-hour battle that ensued, the brigade scrambled a fourth LNO team for the French: an infantry officer (captain), an infantry NCO (staff sergeant), an artillery enlisted soldier (specialist) and an infantry enlisted soldier (private first class). This team's mission was to support the French Task Force assembled, initially, to clear and secure the Somalia Military Academy and one of Mogadishu's main roads and, then later, conduct a relief-in-place mission with the Moroccan Task Force that had sustained heavy casualties in both men and equipment. The LNO teams' duties during that 17 June battle are listed in the figure.

Lessons Learned

Though there were many aspects of US LNO teams supporting UN coalition task forces that made the teams invaluable to military operations, the teams also encountered

some significant problems, many of which can be solved by planning now to accommodate operations in some other part of the world.

MTOEs and LNO Team Manning.

The first lesson the brigade learned was its modification table of organization and equipment (MTOE) didn't allow enough manpower to support the additional LNO teams. This lesson immediately was passed on to the 10th Division aviation brigade that would replace the 1st Brigade in mid-August 1993.

The 10th Division Artillery gave the aviation brigade artillerymen to support the two additional LNO teams. One team included a first lieutenant, a staff sergeant and a fire support specialist while the second team had a first lieutenant and two enlisted fire support specialists. When the aviation brigade took over from the 1st Brigade, it also occasionally called upon its own S5/fire support officer, an artillery staff sergeant and a fire support specialist

- Assist and advise the coalition force commander.
- Maintain radio contact with 1st Brigade Headquarters.
- Serve as forward air controllers (FACs) for US Army aviation assets in the air and mark the targets with M203 40-mm smoke grenades.
- Engage hostile targets with M203 40-mm high-explosive (HE) grenades and small arms.
- Direct Cobra 20-mm cannon and tube-launched, optically tracked, wire-guided missile (TOW) fires onto the targets and direct Blackhawk M60 machinegun fires onto hostile targets.

Duties of the US LNO teams for coalition forces for the nine-hour battle in Mogadishu on 17 June 1993.

to support coalition operations as an LNO team.

Artillerymen on the Teams. Why did the 10th Division Artillery give the aviation brigade the additional LNO teams? The second lesson learned by 1st Brigade's trial and error was that the primary purpose of the LNO teams was to identify and mark targets and then call upon scout weapons teams to engage them.

The teams also needed to be prepared to employ US and coalition force 60-mm, 81-mm, 82-mm and 120-mm mortars on a moment's notice. To do so required more communications equipment and ground mobility than the aviation brigade had—or even the infantry units under its command and control. Thus, the division artillery supplied the additional LNO teams.

Translators. 1st Brigade quickly learned that redundant translation capabilities were of the utmost importance. None of the seven US personnel providing LNO assistance to the Moroccans on 17 June spoke French or Arabic, and only three of the 308 Moroccans in the task force spoke enough English to interface with US personnel. It's important to note that all three of the English-speaking Moroccans became casualties during that day's operation, undermining any future communications attempts between US and Moroccan forces. Additionally, none of the LNO team members with the Italians and Pakistanis could communicate with their supported forces, other than in English. Only one of the four LNOs with the French could speak French, placing the onus on the French to communicate with the US LNO team in English.

Commo. The compatibility and capabilities of radio communications equipment were shortfalls. The US and Moroccan radios were incompatible. Thus, the only means of communication was person-to-person or through hand-and-arm signals. In a nine-hour battle with personnel separated as they were, some form of communications other than person-to-person or hand-and-arm signals is necessary.

Additionally, the SOF team couldn't communicate with the US LNO team supporting the Moroccans. Although the radio equipment was compatible, the SOF and LNO teams monitored separate nets—again, forcing communications to be person-to-person or by hand-and-arm signals. Without an external speaker for the PRC-77 radios, LNO teams had to dedicate personnel to monitor those radios, using personnel normally devoted to the aviation net, the teams' lifeline.

Ammo. LNO team members need to deploy with lots of ammunition for both

small arms and crew-served weapons. At a minimum, basic loads for LNO teams need to be doubled as was done for LNO missions after 17 June.

One and one-half hours into the nine-hour battle, the SOF team had expended all 400 of its automatic grenade launcher grenades. Five hours into the fight, all four SOF team members had expended their small arms ammunition. Attempts to resupply were futile.

After the battle, only 200 M16 and 24 9-mm pistol rounds remained between the three LNO team members for the Moroccans. All 40 HE and 40 smoke grenades were expended during the nine-hour battle.

The French LNO team expended 600 M16 and 150 M60 machinegun rounds, engaging hostile Somali militia before relieving the Moroccans. This left the French LNO team with less than 30 percent of its initial basic load to conduct the relief-in-place with the Moroccans. Eventually, the French LNO team returned to the US Embassy compound with less than 100 rounds of ammunition.

Retaining the Initiative. Initially, the Moroccans took the initiative by cordoning off an their area. However, as the situation developed, the Moroccans adhered too inflexibly to their original cordon plan, becoming reactive to Somali militia actions instead of remaining proactive. This, coupled with the Moroccan's blind adherence to the UN rules of engagement (ROE), contributed to the number of Moroccan casualties: five killed, including the Moroccan Task Force Commander and one of his company commanders, and 43 wounded, including the task force executive officer. Additionally, 29 of the 68 Moroccan vehicles used in the cordon operation were either damaged or destroyed. The Moroccan centralized decision-making process was so centralized at the task force commander's level that the soldiers on the forward edge of the fighting couldn't change their fire or maneuver to retain or take back the battle initiative.

Recon. If time permits, our forces need to conduct a ground and (or) aerial reconnaissance of the area of operations. If the Moroccans had conducted either, their cordon plan would probably have been different.

Mass Fires. Our forces need to mass the fires of multiple weapon systems onto a target to engage and destroy it. During the battle, targets were so plentiful that a target was often engaged by only one asset when additional assets were available.



The destruction along the infamous "Green Line" in downtown Mogadishu.

Instead of "chasing" individual targets on the battlefield, massing fires would have eliminated many more.

Riot Control Equipment. The US LNOs deployed with chlorobenzalmononitrile, called CS, in riot control grenades. In accordance with the ROE, the deputy commander of the UNOSOM II forces could authorize the employment of CS grenades, and at the request of the Moroccan LNO, he did. The CS grenades were effective in controlling the growing crowds of Somalis.

However, once it came to the attention of the US LNO that the Moroccans didn't have masks to protect them from the CS, the use of grenades was terminated. Likewise, the Pakistanis didn't have protective masks for this operation, but they got US masks for later operations. All coalition forces should have protective masks, so their LNOs can employ CS and make the most of this non-violent control measure.

Never Underestimate the Enemy. Aideed militia forces had established a defense in depth with clearly established fields of fire and kill zones in which the Moroccans quickly found themselves entangled. The US LNO team, along with its sister SOF team, was pinned down for more three hours in the streets of Mogadishu during the 17 June battle. The LNO called on all the assets listed in the figure and marked targets for the Cobras and Blackhawks to help Moroccan forces during the nine-hour battle.

The French were forced to fight a Somali militia organized defense at the Somali Military Academy in Mogadishu. This delayed them from conducting their relief-in-place mission with the Moroccans for more than two hours.

All of the enemy activity was contrary to the intelligence reports about the will and determination of the Aideed militia that was passed on to the Moroccans. It's clear our coalition forces need to be very careful about the intelligence reports they receive and never underestimate the enemy.



The author (center) visits a Moroccan bakery with two officers of the Moroccan Task Force.

LNOing, especially in support of UN operations, has inherent problems. But with all the problems, the vital link to many nations working harmoniously and effectively in such operations is the LNO team. We need to work to resolve the problems, anticipate others we could encounter in different scenarios and be prepared for coalition operations anywhere, anytime.



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USMC Fire Support Conference 1994

by Major Daniel J. Conn, USMC



Returning to the mecca of fire support, Marine artillerymen gathered at Fort Sill, Oklahoma, for three days in April to discuss the future of Marine Corps artillery and fire support. All four artillery regimental commanders and one incoming commander attended this year's conference, providing a quorum for serious decision making.

The stage was set for an earnest discussion on where Marine artillery is now and where it's envisioned to be in the 21st century. The result: 19 issues and recommendations were taken for further action by various offices at Headquarters Marine Corps (HQMC), Washington, DC; Marine Corps Combat Development Center (MCCDC) at Quantico, Virginia; and Marine Detachment at Fort Sill.

The following outlines some of the issues discussed at the conference and the results of those discussions.

Advanced Towed Cannon Artillery System (ATCAS). Major Larry Lane, a liaison officer for the Marine Corps Systems Command (MARCORSYSCOM) in Quantico, Virginia, briefed the status of the Marine-Army project to develop a lightweight 155-mm howitzer, now called ATCAS. The draft joint operational requirements document (JORD) set the Army and Marine Corps requirement for a 155-mm howitzer capable of achieving

a 30-kilometer range with a weight of 9,000 pounds or less.

Some conferees argued that threat artillery systems continue to outrange US capabilities—hence, we must seek a 40-kilometer range for any future howitzer. Others stated that 40 kilometers is not achievable, given the weight restriction, and that any increase in range would be offset by an increase in weight. It was noted that current ammunition also limits range, a factor that can only be overcome by using a higher caliber cannon tube that requires greater weight in the tube, recoil system and carriage.

The outcome of this exchange was a recommendation to state clearly in the mission needs statement (MNS) and JORD that the Marine Corps requires a cannon capable of transport by medium-lift aviation with a range in the vicinity of 30 kilometers *unassisted*.

In the interim until ATCAS is fielded in 2004, the M198 howitzer will undergo a product improvement program (PIP) to ensure that its service life reaches the proposed replacement date of 2004. Among other improvements, the PIP will add an automated hydraulics system to assist in the emplacement and displacement of the M198. (See Figure 1 for a list of Marine artillery systems under development and their scheduled fielding dates.)

M101A1 Howitzer Museum Candidate.

The Army will declare the World War II-era M101A1 howitzer a "museum piece" in FY 95, which will require the Marine Corps to become the primary inventory control authority. Colonel Jerry C. McAbee, Commander of the 11th Marine Regiment at the time of the conference, noted that I Marine Expeditionary Force (MEF) had already reduced its inventory to 12 M101A1s, and Colonel Walter B.

Ford, Commander of the 12th Marines, thought III MEF would follow suit. The conference adopted a position recommending that the M101A1 inventory be reduced to the minimal number of systems necessary for ceremonial salutes and to support specific training requirements peculiar to each MEF.

Marine Corps Fire Support System

(MCFSS). Lieutenant Colonel Dave Penman, MARCORSSYSCOM, enlightened the group about the corps' latest steps toward digitized fire support. MCFSS is a system of systems that incorporates the following: the battlefield computer terminal (BCT); the lightweight computer unit (LCU) with either the initial fire support automated system (IFSAS) software or fire direction software; the digital communications terminal (DCT), which will be replaced by the digital automated communications terminal (DACT); the muzzle velocity system (MVS); the meteorological measuring set (MMS); and the AN/TPQ-36 Firefinder radar Version 7 software. The fielding dates of these systems are noted in Figure 1.

IFSAS is the same in both the Army and Marine Corps, but in the Marine context, it represents only a part of MCFSS. It's the first step toward a totally integrated system that will be the advanced Field Artillery tactical data system (AFATDS).

MCFSS fielding begins this fall with the introduction of IFSAS and Version 10 fire direction software to II MEF. The initial phase of MCFSS systems fielding will be completed in the summer of 1995 with the total MCFSS system in place in FY 98.

The fielding plan fostered some discussion with regard to future sustainment training of operators and leaders as well as the prioritization within the fielding plan.

Fire Support Programs	Fielding Dates
Initial Fire Support Automated System (IFSAS)	FY 95 to FY 96
M198 Product Improvement (PIP)	FY 95 to FY 96
Global Positioning System-Survey (GPS-S)	FY 95 to FY 96
Meteorological Measuring System (MMS)	FY 96 to FY 98
Muzzle Velocity System (MVS)	FY 96 to FY 97
Digital Automated Communications Terminal (DACT)	FY 97 to FY 98
AN/TPQ-36 Firefinder Radar Version 7 Software	FY 97 to FY 98
Gun Laying and Positioning System (GLPS)	FY 98 to FY 99
Advanced Towed Cannon Artillery System (ATACS)	FY 99 to FY 2004
Laser Locator Designator Rangefinder (LLDR)	FY 2004

Figure 1: Marine Corps Systems Under Development and Projected Fielding Dates.

While some initial training will take place at Fort Sill, there's currently no plan for qualifying new operators in the fleet. It was proposed that the expeditionary warfare training centers (EWTCs) be the primary sites for such training. Representatives from both EWTCs were at the conference and thought the option was viable. Funding, personnel and course curriculums for the training must be delineated.

The conference recommended the Marine Detachment at Fort Sill coordinate with Training and Education (T&E), Standards Branch, MCCDC, and the EWTCs to develop the training plan. This should relieve the regiments from having to expend critically short personnel and materiel resources to beef up their in-house artillery training schools.

Fielding Priorities. As for fielding priorities, discussions regarding MCFSS high lighted a recurrent problem that's probably as old as the corps itself: the criteria for determining the order in which units receive new equipment. Perceptions are that MARCORSSYSCOM generally establishes a fielding plan in numerical order or some similar variation. This usually means that the 14th Marine Regiment is fielded after the last active regiments and the maritime pre-positioning force (MPF) sometime after that.

The conferees posed the question: Why not field systems based on theater requirements and threat probabilities? In other words, if III MEF is the most likely candidate to go to war tomorrow, then it should receive the most capable equipment first. In addition, it stands to reason that any Reserve units linked to III MEF contingencies should be fielded at the same time to integrate the total force package.

One integration problem has occurred with the single-channel ground and airborne radio system (SINGARS). The fielding schedule is I, II and III MEF with the Reserves and MPF scheduled for fielding much later. What would happen if a fly-in-echelon (FIE) married up with an MPF off-load? None of the vehicle mounts in the MPF set would be capable of accepting SINGARS.

What would happen if the Reserves "flesh out" the active unit? SINGARS capabilities would be reduced and incompatibilities could arise in digital systems, such as MCFSS.

The Requirements Division, MCCDC, took this conference recommendation for action. The recommendation states that SINGARS (and other systems) be fielded

to a MEF, its associated MPF squadron and designated Reserve organizations as a *contingency package*.

General Support (GS) Artillery Study. Colonel E.A. Smyth, Director of Studies and Analysis Division at MCCDC, briefed the GS Artillery Study underway. The study, as tasked by the Secretary of Defense, is looking at the long-term Marine Corps GS artillery requirements in lieu of the Commandant of the Marine Corps' decision to forego acquisition of the multiple-launch rocket system (MLRS).

The term "general support" artillery initially caused consternation because the Marine Corps has adopted the direct support (DS) structure for all artillery battalions, making them capable of both GS and DS missions. However, it was recognized that the warfighting MEF is limited in fire support assets.

Naval surface fires, aviation and artillery systems are shrinking in number. Artillery systems are especially limited as the same units dedicated to providing DS to the Marine division would have to be used by the MEF commander.

Currently, this gap in artillery support is to be filled partially by Army MLRS, as provided for by a memorandum of agreement (MOA). However for the long-term, discussions indicated that this may not be a viable solution for either the Army or Marine Corps under the national strategy that specifies the military be able to fight and win two major regional contingencies nearly simultaneously. In addition, naval surface fire support (NSFS) is very limited and will remain so until systems under study are fielded in 10 to 15 years, at the earliest.

Mission Area Analysis 24 (Fire Support) Study (MAA-24). The conferees questioned how the GS artillery study related to the MAA-24 study and whether or not it could expand into a more comprehensive fire support study, incorporating offensive air support, assault support, NSFS, electronic warfare, space systems, target acquisition, mortars and artillery. It was noted that no such comprehensive analysis has been done since Legal Mix V (that prompted 3x8 structure) and Legal Mix VII. With the scope of changes that have occurred in strategy, doctrine, equipment and structure since the last study, it was felt that it's time to take a serious look at fire support for the 21st century.

The conference recommended that

MAA-24 be expanded to include an assessment of the MEF warfighting concept and its impact on total future requirements through the year 2015 and the definition of the relationship between the artillery used by the MEF and the MEF force fires coordinator. Colonel Smyth took these recommendations back to Quantico for further study.

Army MLRS Support. The conferees were very interested in the progress of the MOA on Army MLRS support to the Marine Corps. Exercises have been conducted at Twentynine Palms, California, involving MLRS from III Corps Artillery from Fort Sill and the 11th Marines at Camp Pendleton, California. The exercises incorporated MLRS through the use of a digital quick-fire channel to the unmanned aerial vehicle (UAV) ground station monitor with great success.

UAVs have been used for years as target locating platforms in many situations where artillery or NSFS could immediately attack targets. Joint training with MLRS further validated this technique. But the low-density UAV are tasked heavily as intelligence-gathering platforms.

In joint operations and exercises where Army MLRS is in support of the Marine Corps, decisions will have to be made on the best method of acquiring targets and passing those targets to the MLRS unit. Marine Corps AN/TPQ-36 Firefinder radars could be used, but they may limit the effectiveness of the MLRS fires due to the radar's range.

As a result of these discussions, the conferees recommended that the Fleet Marine Force (FMF) have the opportunity to review and provide formal comments and recommendations to the draft MOA throughout its developmental process. Further, the corps should explore the possibility of acquiring the AN/TPQ-37 Firefinder radar that has longer range or getting Q-37 support from the Army along with MLRS.

Doctrine Development. Major Jeff Seng of the Doctrine Division, MCCDC, briefed the group on the progress in updating fire support doctrine (Figure 2). A highlight was the inclusion of the Army's FM 6-20 Fire Support series of manuals as FMF reference publications (FMFRPs), such as FMFRP 6-6-20, etc., and the dual designation of familiar tomes, such as FM 6-40 as the *FMFM [FMF Manual] 6-6-40 Manual Gunnery*, titled FMFM 6-22, now being revised.

Command Post (CP) Shelters. The 1993 Conference resulted in a fleet operational

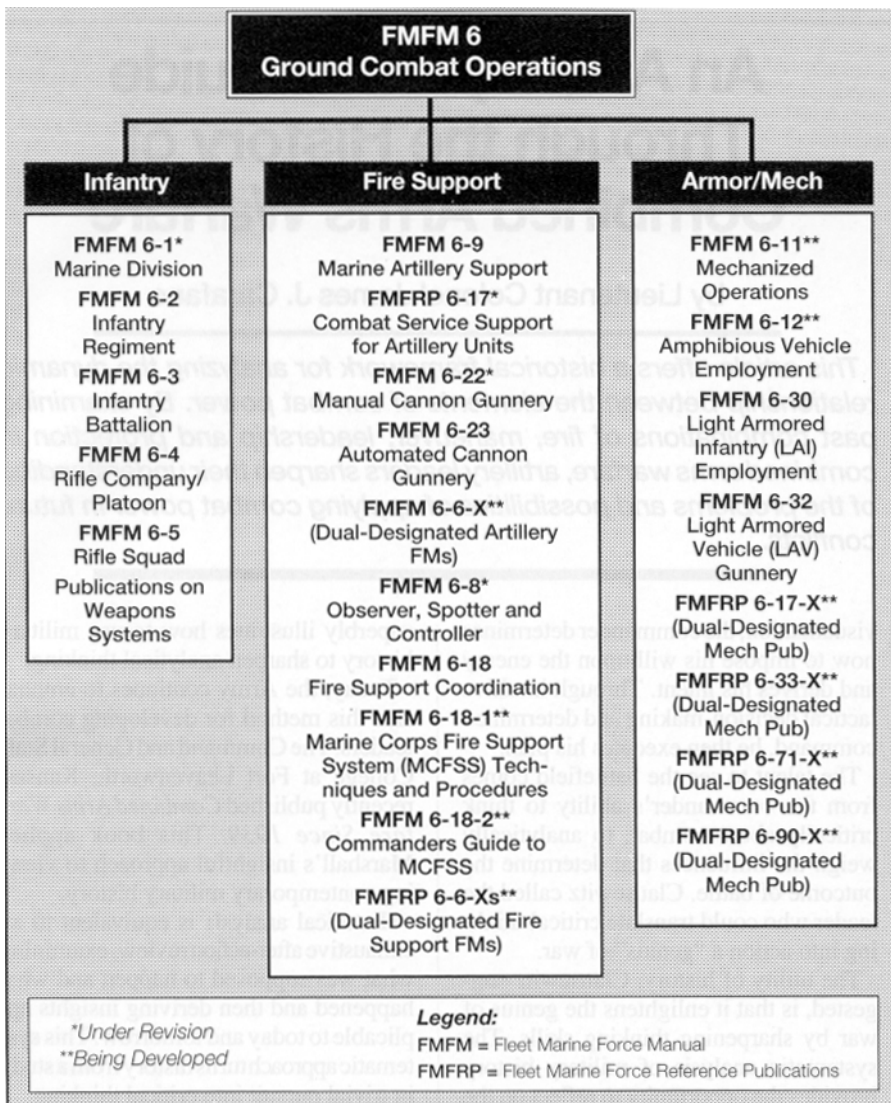


Figure 2: Hierarchy of Publications for Marine Corps Ground Doctrine

needs statement (FONS) that validated the use of the standard integrated command post system (SICPS) as the de facto CP shelter for the Marine Corps. Each MEF, division and regiment has purchased these shelters from unit funds, but because the SICPS is not a table of equipment (T/E) item, there are no maintenance funds. SICPS is an approved shelter available in the Army supply system but not through Marine Corps channels.

MARCORSYSCOM consolidated the FONS with others to study options for a single replacement to our World War I-vintage canvas. Conference attendees recommended, again, that the SICPS be adopted and added to unit T/Es down to the battery level.

Skill Progression Training for 0811 (Cannoneer) and 0861 (Forward Observer). Neither military occupational

specialty (MOS) attends formal skill training after its initial stint at Fort Sill. In each case, the tasks required of staff NCOs (SNCOs) in these MOS bare little resemblance to the tasks for which they were trained. On-the-job training (OJT) will no longer suffice.

The conference decided that 0811s and 0861s should receive follow-on training before promotion to the SNCO ranks as is the case with a 0844 (Fire Direction Controlman) stepping up to 0848 (Chief Fire Direction). The Marine Detachment at Fort Sill will work this issue through HQMC in an attempt to change the MOS manual and develop the courses necessary to fill the void.

One item that may help with both skill progression and Reserve training is a system known as telecommunications network training (TNET). As part of the Field Artillery School information briefing

near the end of the three-day conference, TNET was presented as a revolutionary mode of nonresident training.

Much like a video teleconference via satellite, this system features two-way communications with video and much more. The instructor can see and speak directly to his students in several remote locations and respond immediately to their questions. The full-duplex satellite system is well on its way to fruition in both the Army and Air Force.

Marines in the Operations and Training section of the Marine Detachment at Fort Sill will work closely with representatives from T&E at MCCDC and the Directorate of Training and Evaluation (DTE) at the Field Artillery School to explore the potential for widespread Marine Corps application of TNET, particularly as it applies to 4th Marine Division (Reserve) forces.

In the meantime, conferees were told that units can request time on the system at local Army and Air Force installations. Fort Sill is on line teaching several Field Artillery classes and will broadcast many more this fall to Army National Guard and Army Reserve units nationwide.

This summary of discussions that occurred during the three-day Marine Corps Artillery Fire Support Conference is by no means exhaustive—just some highlights. The 1994 conference, like its predecessors, was a great success for Marine Artillery and Marine Corps fire support in general.



Major Daniel J. Conn, US Marine Corps, is Chief of the Officer Instruction Branch of the Gunnery Department at the Field Artillery School, Fort Sill, Oklahoma. His previous assignment was as the Fire Support Officer for the 15th Marine Expeditionary Unit at Camp Pendleton, California. Among other assignments, he has served two tours with the 11th Marines at Camp Pendleton, filling all battery billets, including three battery commands. A graduate of the Advanced Communications Officers Course at Quantico, Virginia, he served as the Communications Officer for 1st Battalion, 11th Marines, Camp Pendleton. He has been an Assistant S3 twice and served a tour in III Marine Expeditionary Force on the 3d Marine Division staff in Okinawa, Japan.

An Artilleryman's Guide Through the History of Combined Arms Warfare

by Lieutenant Colonel James J. Carafano

This article offers a historical framework for analyzing the dynamic relationship between the elements of combat power. By examining past combinations of fire, maneuver, leadership and protection in combined arms warfare, artillery leaders sharpen their understanding of the problems and possibilities of applying combat power in future conflicts.

The topics discussed focus on battles illustrating the challenges of employing combat power at significant turning points in the history of Western warfare. Each topic includes a bibliography to use for self-study. Such a systematic study of past battles builds a critical perspective for analyzing the problems of today and tomorrow.

The books listed are available in libraries, book stores or through the military publications system or the Government Printing Office. The suggested companion reading list for this study is listed in the "Overview Bibliography."

Topic 1:

How to Study Battle

Studying war requires a systematic approach to selecting, reading and analyzing historical material. Carl von Clausewitz, the 19th century military theorist, offered an approach to battle study that remains sound for the American Army today. "Everything in war is simple," Clausewitz wrote, "but even the simple is very difficult."

This philosophy can be applied to the fundamentals of combat, which are straightforward and have remained relatively unchanged for two centuries. Commanders fight battles and engagements for one purpose: to impose their will upon the enemy. They accomplish this feat of arms by being stronger at the decisive point—a "simple" concept. But the key to having relative maximum combat power at the decisive point is the synchronized application of combat power. It's the challenge of synchronization that makes such a "simple" concept "very difficult."

Synchronization begins in the mind of the commander. He must "see" the battlefield, visualize the factors and forces that determine victory or defeat. From this

visualization, the commander determines how to impose his will upon the enemy and derives his intent. Through intuitive tactical decision-making and determined command, he then executes his plan.

The talent to see the battlefield comes from the commander's ability to think critically about combat, to analytically weigh the influences that determine the outcome of battle. Clausewitz called the leader who could translate critical thinking into action a "genius" of war.

The utility of history, Clausewitz suggested, is that it enlightens the genius of war by sharpening thinking skills. The systematic analysis of military history provides the opportunity to reflect on the dynamic nature of warfare and illuminates the battlefield for the commander.

Using military history to build critical thinking skills requires more than a casual read. When George C. Marshall commanded the Infantry School at Fort Benning, Georgia, he argued that military history must set a problem that forces students to analyze decisions made "in the battle." To illustrate this process, Marshall ordered his staff to prepare a book of essays on small unit combat in World War I. The result was *Infantry in Battle*. This book

superbly illustrates how to use military history to sharpen analytical thinking.

Today, the Army continues to emphasize this method for developing combat leaders. The Command and General Staff College at Fort Leavenworth, Kansas, recently published *Combined Arms Warfare Since 1939*. This book applies Marshall's insightful approach to viewing contemporary military history.

Historical analysis is equivalent to an exhaustive after-action review, examining what was supposed to happen and what happened and then deriving insights applicable to today and tomorrow. This systematic approach turns history from a study in trivial pursuit into critical thinking.

Topic 2:

Napoleonic Warfare—Crucible of Fire and Maneuver

The age of Napoleon introduced the concept of synchronizing fire and maneuver. Previously when commanders considered employing firepower, they faced a Hobson's choice. If they chose heavy artillery, it provided potentially decisive fires but wasn't sufficiently mobile to be shifted rapidly around the battlefield. If they chose light artillery and infantry fire, their fires were far more agile but less decisive. The lack of a suitable combination of overwhelming fire and agile maneuver made synchronizing at the decisive point an elusive goal.

In the late 18th century, advances in technology allowed the production of light, mobile and powerful Field Artillery that

Overview Bibliography

Dupuy, R. Ernest and Trevor N. Dupuy. *The Encyclopedia of Military History*. New York: Harper & Row, 2d revised edition, 1986. The encyclopedia concisely summarizes the engagements and battles presented for study by this article.

Dastrup, Boyd L. *The Field Artillery: History and Source Book*. Westport, CT: Greenwood Press, 1994. This new book is an invaluable reference and has an excellent bibliography for tracing the artillery's role on the combined arms team.

FM 100-5 Army Operations. Washington, DC: Headquarters, Department of the Army, June 1993. The field manual is a guide for analyzing battles; it outlines current doctrine, which is a valid framework of tactical concepts for evaluating past conflicts.

Topic 1: How to Study Battle Bibliography

Clausewitz, Carl von. *On War*. Eds. and trans. Michael Howard and Peter Paret. Princeton: Princeton University Press, 1984. Pages 75 to 112 and 170 to 176 contain Clausewitz's views on military genius and military history.

Paret, Peter. "Clausewitz." *Makers of Modern Strategy*. Ed. Peter Paret. Princeton: Princeton University Press, 1986. Pages 123 to 142 introduce Clausewitz's philosophy.

Infantry in Battle. Reprinted in 1993 by the Center of Military Leadership, Fort Leavenworth, Kansas. Each of the short chapters studies a tactical concept.

Spiller, Roger, eds. *Combined Arms in Battle Since 1939*. Fort Leavenworth, KS: US Army Command and General Staff College Press, 1992. This excellent book provides case studies on tactical combat from World War II to Operation Just Cause.

Topic 2: Napoleonic Warfare Bibliography

Wood, W. J. *Leaders and Battles: The Art of Military Leadership*. Novato, CA: Presidio Press, 1984. Pages 59 to 87 examine Davout's tactical skill during the battle.

Rothenberg, Gunther E. *The Art of Warfare in the Age of Napoleon*. Bloomington: Indiana University Press, 1980. Pages 95 to 205 concisely summarize the tactics and weapons systems employed in Napoleonic warfare.

Petre, F. L. *Napoleon's Conquest of Prussia*. London: Greenhill, 1992. This book provides a definitive history of the campaign.

Topic 3: Civil War Bibliography

Robertson, Glen T. "First Bull Run." *America's First Battles*. Eds. Charles E. Heller and William A. Stoff. Lawrence, KS: University Press of Kansas, 1986. Pages 81 to 108 provide an overview of the battle.

Griffith, Paddy. *Battle Tactics of the Civil War*. New Haven, CT: Yale University Press, 1987. The book presents a controversial, but interesting, survey of Civil War combat tactics and weapons.

Weigley, Russell F. "American Strategy from Its Beginnings through the First World War." *Makers of Modern Strategy*. Pages 413 to 443 cogently introduce the American approach to conflict and the influence of Napoleonic ideas.

offered commanders the potential to harmonize fire and maneuver with decisive results. The battle of Auerstadt during Napoleon's campaign of 1806 illustrated how skilled commanders could synchronize powerful, mobile artillery with cavalry and infantry.

Marshall Louis Nicolas Davout commanded the French forces at Auerstadt. Ordered by Napoleon to cut off the remnants of a defeated Prussian army retreating toward Berlin, Davout instead encountered the bulk of the enemy conducting an organized withdrawal. By securing good ground, arresting the enemy with artillery and rifle fire and then exploiting its effects with cavalry and infantry, he quickly seized the initiative.

Davout's tactical decisions reflected his outstanding leadership skills. He demonstrated that by skillfully synchronizing fire and maneuver, a commander could overwhelm a vastly larger enemy force.

Topic 3:

The Civil War—Death of Maneuver and Triumph of Fire

In the opening battles of the American Civil War, commanders copied Napoleonic warfare. At the First Battle of Bull Run, the Union attempted to synchronize fire and maneuver in much the same manner as Marshall Davout at Auerstadt. When Union commanders moved up their artillery to fire on the enemy lines and clear a path for the infantry, they found the face of battle had changed significantly since the days of Napoleon.

The introduction of rifled muskets gave infantry soldiers the ability to engage artillerymen at long range with deadly, accurate fire. When commanders ordered the guns to race to the decisive point, they

Topic 4: The Indian Wars Bibliography

Hoig, Stan. *The Battle of the Washita*. Garden City, NY: Doubleday, 1976. This book gives a definitive history of the campaign.

Utley, Robert. *Cavalier in Buckskin*. Norman, OK: University of Oklahoma, 1988. This book includes an excellent study of Custer's tactical skill.

Custer, George A. *My Life on the Plains*. Ed. Milo Milton. University of Nebraska Press, 1992. Custer's very biased, but interesting, account of the battle is on Pages 305 to 352.



found the exposed artillery crews vulnerable to enemy infantry fire. Infantry firepower imposed new limits on maneuver and increased the requirement to protect forces from the devastating effects of direct fire weapons.

The Union generals at Bull Run found that a Napoleonic-style rush of artillery and infantry assaults resulted in high casualties and infrequent success. The generals failed because they had not adequately accounted for shifts in the dynamic relationship between the elements of combat power.

Topic 4:

Another Kind of Combat—The Indian Wars

After the Civil War, the Army of the frontier faced a different kind of battle. Although it occasionally was called out to campaign against native-American tribes, most of its duties involved activities that ranged from providing security to supporting domestic civil authorities. Today, we characterize these as operations other than war (OOTW).

When soldiers went to war in the West, they found that the essential elements of combat had not changed. What they frequently failed to recognize, however, was that the "rules of engagement" that guided action on the frontier were different than the ones applied in the Civil War.

Combat during OOTW must consider the restraint and legitimacy of combat firepower to a greater degree than in conventional military campaigns. Because these operations place military forces more frequently in contact with civilian populations, commanders are constrained in ways not experienced in more traditional military operations.

Lieutenant Colonel George Armstrong Custer's assault on a native-American encampment at the Battle of the Washita illustrates the tragedy of employing conventional tactics in unconventional situations. Custer planned the raid on Black Kettle's village as retribution for recent Indian attacks. In planning and execution, the attack lacked both legitimacy and restraint, resulting in unnecessary casualties in women and children. Custer's inappropriate use of force offers a sobering



case study on the unjust application of fire and maneuver in operations other than war.

Topic 5:

World War I—Fire in Search of Maneuver

At the dawn of the 20th century, the development of quick-firing artillery, breach-loading guns with recoil systems firing smokeless powder and exploding munitions appeared to offer the potential to restore the Napoleonic standard of employing fire and maneuver in equal measure. Commanders could maneuver their indirect fires without placing the guns under the sights of enemy infantry weapons.

In practice, however, the precise maneuvering of indirect fire in close coordination with combat forces proved impractical. World War I battles looked like the charges of the Civil war writ large. Protection from fire was only achieved by the extensive use of field fortifications. These fortifications also became insurmountable obstacles. As the war ground on, it appeared as though no amount of firepower could break the stalemate and permit maneuver on trench-laced battlefields.

In 1918, the Germans demonstrated that synchronization of fire and maneuver depended more on doctrine and decisions than the promise or limitations of new technology. Based on the results of lessons learned, they revised their offensive tactics. At the battle of Amiens, the Germans employed carefully trained, rehearsed and closely coordinated artillery-infantry teams to penetrate enemy trenches on a narrow front. The German tactical successes late in the war (albeit overwhelmed by the nation's strategic exhaustion) demonstrated that even in an age of new weapons, leadership and critical thinking remained the key to synchronizing combat power.

Topic 5: World War I Bibliography

Paschall, Rod. *The Defeat of Imperial Germany, 1917-1918*. Chapel Hill, NC: Algonquin Books, 1989. Pages 128 to 162 discuss the German campaign of 1918.
Lupfor, Timothy T. *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War*. Fort Leavenworth, KS: US Army Command and General Staff College, 1981. Pages 37 to 54 cover the development of German tactics and the battle.
Gundmundsson, Bruce I. *On Artillery*. Westport, CT: Praeger, 1993. This book surveys the development of French and German fire support during World War I. See Pages 87 to 106 for the artillery tactics of 1918.

Topic 6:

World War II—Combat Power on Purple Battlefields

World War II saw many of World War I's new technologies develop into dramatically powerful war-making capabilities. For example, thanks to the development of the fire direction center (FDC) and improved coordination and target acquisition systems, indirect fire systems could mass accurate and lethal fires that were readily synchronized with the other elements of the combined arms team.

These developments, however, didn't minimize the commander's requirement to see the battlefield to synchronize effectively. In fact, new capabilities made synchronization more difficult than ever before.

The complexity of synchronization was nowhere more evident than in the ability of forces to combine land, sea and air power. Borrowing the color of the stripe on the uniform of the German general staff, today we describe many of the operations of World War II as "purple"—joint operations involving forces of one or more of the armed services.

Although the American participation in the amphibious assault on Sicily in 1943 was successful, the US air drop portion of the assault devastatingly illustrates the pitfall of unsynchronized combat power. The invasion called for the cooperation of naval, air and land forces. The land forces included an array of combat power from conventional armor and infantry divisions to special forces and airborne units. On the 11th of July, the Americans scheduled an air drop by the 506th Parachute Regiment

to support amphibious landings. Plans for inserting the regiment shifted at the last minute.

As a result of inadequate coordination, Army and Navy units fired on the airborne column as it came into the drop zone, resulting in devastating friendly casualties. The tragedy of Drop Zone Sicily remains a cautionary tale on the challenges of synchronizing fire and maneuver while protecting the force on the purple battlefield.

Topic 7:

Korea—Contingency Warfare

While the Second World War revealed the complexities of synchronizing fire and maneuver in modern combat, the Korean War demonstrated the cost of learning synchronization skills in battle. The first battles conducted by the United States Army and the Marine Corps in Korea offer powerful lessons on the training and mental preparation required to wield combat power in war.

Task Force Smith, the first American Army unit to meet the North Korean charge, was ill-prepared and inadequately outfitted for the task. Its crushing defeat was in sharp contrast to the first Marine units to engage in battle.

From the outset, Marine operations in the Marine Provisional Brigade reflected the skilled coordination of maneuver and firepower. The Marines achieved one of the first clear victories of the war and helped stem the North Korean advance toward Pusan.

The stark difference in performance resulted, in large part, from the pre-combat training conducted by the Marines. The first elements of the Marine Provisional Brigade deployed to Korea emphasized tough realistic combined arms training. This preparation enabled them to perform well under the most demanding combat conditions.

Commanders can't predict with certainty the nature of the next conflict. The Korean War demonstrated that seeing the battlefield—critical

Topic 6: World War II Bibliography

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Topic 7: Korean War Bibliography

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- Thompson, Julian. *The Lifeblood of War: Logistics in Armed Conflict*. London: Brassey, 1991. This survey of military history examines the critical element of sustaining combat power. Pages 105 to 131 discuss the Korean War.

Topic 8: South America to Vietnam Bibliography

- Yates, Lawrence A. *Power Pack, US Intervention in the Dominican Republic, 1965-66*. Fort Leavenworth, KS: Combat Studies Institute, 1988. This is an excellent case study on employing the US Army in peacekeeping operations.
- Herring, George C. "The 1st Cavalry and the Ia Drang Valley, 18 October-24 November 1965." *America's First Battles*. Pages 300 to 326 include the battle of Landing Zone Albany.
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thinking—requires the mental agility to adapt to a range of contingencies. Tough, demanding, realistic training proved to be a key element in developing agile, versatile units.

Topic 8:

From South America to Vietnam—Versatility at War

In 1965, technology again appeared to alter the balance of combat power. Units at Fort Benning experimented with helicopter warfare. Examination of American airmobile operations in the 1960s offers an excellent study in the versatility required to employ fire and maneuver effectively on modern battlefields.

Trained to conduct war on some future atomic battleground, airmobile units at Fort Benning were initially deployed to the Dominican Republic to assist in peacekeeping operations. Less than a year later, they were in Vietnam as part of the newly

reorganized 1st Cavalry Division (Airmobile) and fighting a very different kind of war. Helicopter warfare was designed to increase the tempo of battle by shuttling forces and firepower across the battlefield with unprecedented speed.

One of the first battles between the American airmobile forces and North Vietnamese Army (NVA) occurred at Landing Zone Albany. A surprise encounter with the enemy illustrated that airmobile tactics alone were ill-suited to seizing the initiative from the NVA. With the freedom to choose the time and place of battle, the NVA more frequently determined the tempo of combat and prevented Americans from synchronizing fire and maneuver at the decisive point.

The American airmobile experience of the 1960s demonstrated the need for versatile forces. Versatility requires units be able to adapt to a range of tasks and missions. This requirement emphasizes the importance of the commander's ability to see the battlefield and critically consider the strength and limitations of both friend's and foe's capabilities.



Topic 9:

Combat Power and Future War

Operations Just Cause and Desert Storm both illustrate the problems and possibilities of modern warfare. Each operation called for an unprecedented simultaneous application of combat power at depth throughout the area of operations. These campaigns employed the range of joint capabilities from stealth fighters to special forces. In addition to complex combat operations, American forces faced a range of challenging civil-military tasks during the post-conflict phases of the campaigns.

Just Cause and Desert Storm reflected a common theme in the study of the history of combined arms. The key to synchronization lies in the commander who's skilled at seeing the battlefield. Though modern technology and materiel may offer commanders unprecedented capabilities, commanders still must achieve the maximum relative combat power at the decisive point—a simple concept that's very difficult to achieve.

The study of military history can be a powerful tool for developing leaders' skills to see future battlefields. Our leaders can make history the battle lab of the mind, using the past as an experiment for understanding the future. The skills and abilities they develop could win future battles and save lives.

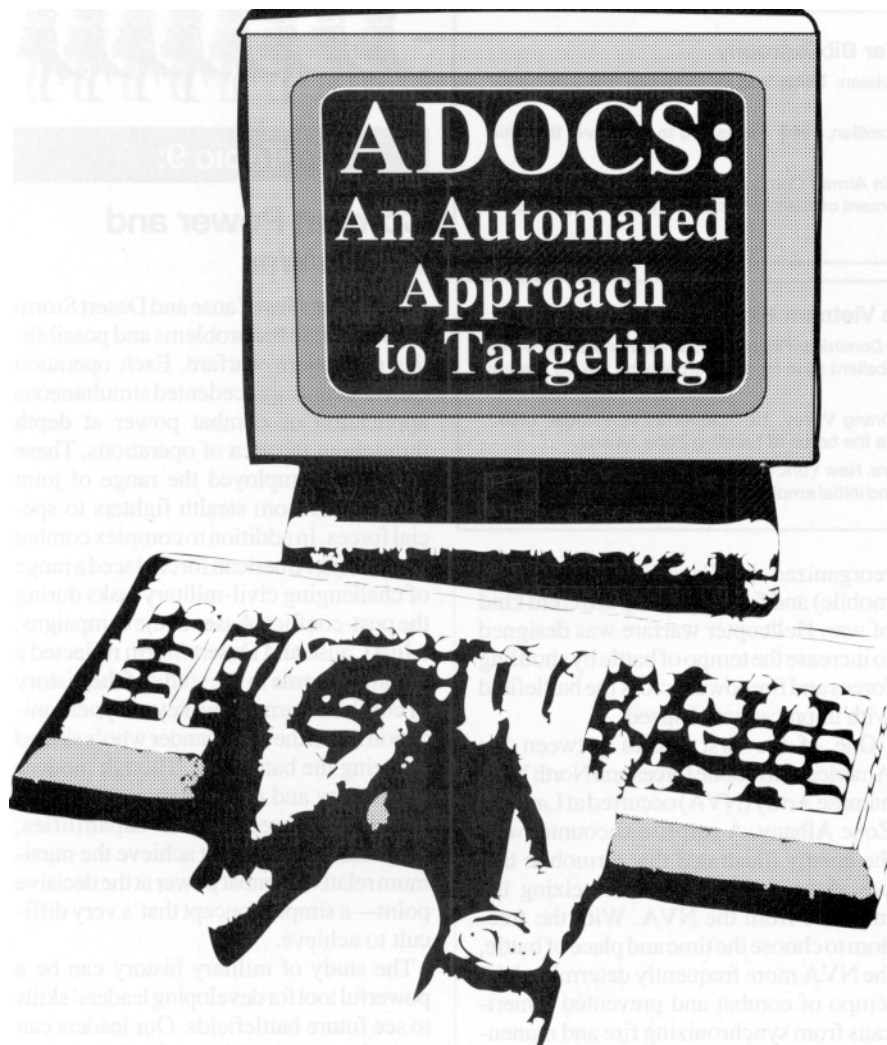


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- Romjue, John L. *The Army of Excellence: The Development of the 1980's Army*. Fort Monroe, VA: Training and Doctrine Command, 1993. This book analyzes the development of the forces that fought in Just Cause and Desert Storm.
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- Reitz, John W. "A Fire Supporter's Guide to FM 100-5." *Field Artillery*, December 1993. Pages 10 to 15. This think-piece article offers a platform for comparing the past to possible futures.

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FIELD ARTILLERY



by Major James L. Davis and
First Lieutenant Stephen D. Cifrulak

It long has been a goal of the Fire Support community to increase the efficiency of the targeting process through the use of automated systems. The tactical fire direction system (TACFIRE), initial fire support automated system (IFSAS) and the future advanced Field Artillery tactical data system (AFATDS) all will contribute greatly to this goal by allowing the corps artillery headquarters to send information digitally to the lowest level—the firing platform.

Until recently, however, one major area of target processing was left untouched by advances in computer automation: processing targets horizontally within the corps fire support cell (FSC). The manual system is outdated and cumbersome—crucial man-hours for planning and coordination are lost in the bureaucratic clearance process, producing excessive paperwork and fracturing functions among the different members of the Deep Operations Cell.

V Corps' answer to these inefficiencies was to adopt the automated deep operations

coordination system (ADOCS) to process targets horizontally—the idea being that ADOCS would restore battle-focus to the corps targeting effort. In the short time the system has been in place, it has been overwhelmingly successful. ADOCS has revolutionized and greatly simplified planning, coordination and execution within the corps' Deep Operations Cell.

ADOCS also gives the FSC an edge over the manual system by communicating digitally with TACFIRE. This link provides deep operations team members the ability to quickly access and pass information

to the firing elements. In fact, live-fire exercises in August 1993 demonstrated V Corps Artillery's ability to accurately and rapidly acquire, process and engage targets three times faster than the manual system.

Perhaps as important an indicator of system's success is the praise users have for ADOCS. Across the board, users laud the relative ease with which they learned and can operate ADOCS.

ADOCS Capabilities

Originally developed within V Corps in 1990 as a joint product of the Advanced Research Projects Agency (ARPA) and the Defense Intelligence Agency (DIA), both in Washington, DC, ADOCS (originally named FULCRUM, then changed to TIARA) has come a long way since its early prototype days. Current advancements are due in large part to innovative ideas proposed by the V Corps Artillery leadership and users coupled with extensive software modifications made by Dr. Steve Levin of the Interactive Television Company of Arlington, Virginia.

But even with these modifications, the basic mechanics of ADOCS has remained the same. It's still a system that uses existing computer hardware configured in a local area network (LAN) of computer subscribers. In V Corps, this network includes a file server and eight workstations in the sections of the Deep Operations Cell: the attack aviation regiment in the Aviation Operations section, Field Artillery division artillery and brigade liaison officers (LNOs), Army Airspace Command and Control (A²C²), Deep Operations Targeting (two workstations), Current Operations and Corps G2 Targeting (see Figure 1). Each workstation includes a 486 central processing unit, a graphics display monitor, a data processing monitor, a laser disk player, a keyboard and mouse as well as the software for target processing. In addition, each workstation is linked to others in the FSC and to the TACFIRE computer via the ADOCS file server.

It's through this network that the majority of information is passed and coordination among team members is conducted. Long gone are the days when the halls of the Deep Operations Cell were continuously crowded with runners passing notes and shouting for immediate fires. Instead, ADOCS puts power in the hands of its subscribers, allowing them to process targets efficiently, internally and quietly.

ADOCS gives each subscriber the ability to perform the following tasks:

- Display Defense Mapping Agency maps input from a laser disk. Scales range from 1:25,000 to 1:1,000,000.
- Draw boundaries, phase lines, engagement areas, air corridors and a variety of other control or coordination symbols on the graphics display monitor. This information is simultaneously shared with other ADOCS workstations in the system.
- Produce a variety of overlays (i.e., maneuver

- graphics, target overlays, flight routes, etc.) and display them in conjunction with other overlays produced in the system.
- Receive targeting information electronically from the Corps G2 Targeting section and selectively display it on the graphics monitor.
 - Process pre-planned and immediate targets for Army tactical missile system (ATACMS) or multiple-launch rocket system

- (MLRS) fires and coordinate airspace clearance with the corps A²C² element for such fires.
- Associate targets with a plan name and request ATACMS or MLRS fires and airspace clearance for plans in support of corps operations.

ADOCS Responsibilities

The ability to perform these ADOCS tasks would mean little if each member of the Deep Operations Cell didn't have a clearly defined area of responsibility. Although the specific duties of each section may vary (depending on the individual mission), the process of clearing a nominated target generally follows a pattern.

It's important to note, however, that because ADOCS shares all of its information equally and simultaneously with its subscribers, there's no standard sequence of events. In other words, the actions in ADOCS can occur one after another or at the same time. Sequence then, depends on individual reaction times and on whether or not a particular action is linked to another (i.e., A²C² waiting for LNOs to determine the unit to fire). Generally, however, the process is conducted by executing responsibilities in the following order:

1. Corps G2 Targeting, manned by the Field Artillery intelligence officer, has the primary responsibility for developing and nominating targets for engagement, although other target nominations can come from the all-source analysis system-warrior (ASAS-W), special operations forces (SOF) long-range surveillance units (LRSU) or subordinate Field Artillery division artilleries or brigades. These nominations are sent digitally to ADOCS or by voice to the Deep Operations Targeting section.

2. The targeting officer evaluates each target as it appears on ADOCS and is primarily responsible for initiating targets to the other sections for action by either approving or denying a target for execution. If approved, the targeting officer, for example, inputs the number of ATACMS to be fired on the ADOCS target nomination sheet—thus, action is initiated. The Deep Operations Targeting section then sends a broadcast message through ADOCS to alert subscribers of a pending mission.

3. Current Operations then reviews the approved ATACMS target nominations for fire support coordination measures (FSCM) violations and the availability of firing units and ammunition and indicates

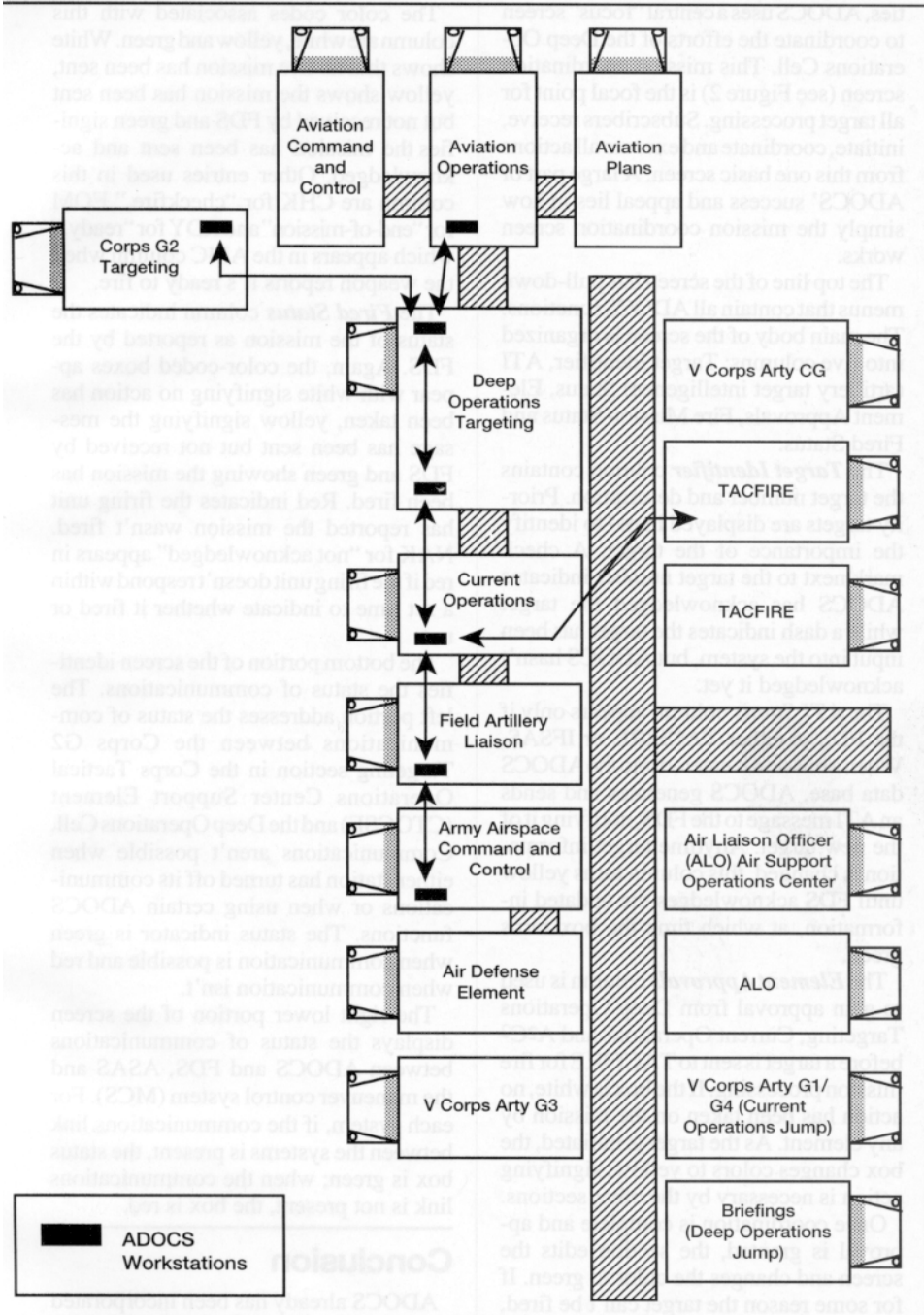


Figure 1: The V Corps Artillery Fire Support Cell ADOCS Architecture. Each ADOCS workstation is linked via the fire server with all other ADOCS workstations and the TACFIRE computer.

the nominations' approval or disapproval on ADOCS. If the nominations are approved, Current Operations also selects the Field Artillery brigade to execute the mission. (Current Operations has the primary duty of clearing fires within the corps' boundaries, coordinating for fires outside the corps' boundaries and transmitting "cleared" target nominations to TACFIRE, the latter as seen in Step 6.)

4. The LNO selected by Current Operations to receive the approved target nomination then coordinates with his respective organization—be it a corps, division artillery, Field Artillery brigade or some other joint or allied element—to assign a unit to fire for effect (UFFE). This process is simplified by the LNO's ability to track his own unit locations and ammunition status by ADOCS.

5. The A²C² section has sole responsibility for deconflicting the airspace for that mission. In addition, the section ensures any "hot" MLRS platoons don't endanger current or future air operations. If the airspace is clear for the target nomination, the A²C² section indicates its approval on ADOCS.

6. Current Operations again reviews the target nomination and ensures it has been cleared by all the appropriate agencies. If no mistakes have been made and if the target nomination proves to be in order, Current Operations then prepares an ADOCS request for fire and immediately transmits that request to TACFIRE.

7. TACFIRE processes the request for fire and transmits the request to the executing Field Artillery headquarters. After the mission is completed, the headquarters then transmits a mission fired report digitally back to the FSC's TACFIRE so both TACFIRE and ADOCS data bases are current.

Army aviation assets (as well as the Air Force) can be involved in the target nomination process if air operations are ordered (i.e., suppression of enemy air defenses, or SEAD). In this case, however, the clearance process begins by direct coordination between the aviation regiment and the targeting officer through ADOCS. The aviation regiment initiates coordination by using ADOCS to produce an aviation route overlay, which is scrutinized by the targeting NCO for enemy air defense artillery coverage. The targeting officer, in turn, initiates appropriate target nominations as indicated in the numbered steps.

Target nominations, however, are not

limited to single requests. Like other timesaving features of ADOCS, the system can transmit and nominate entire fire plans at once for approval.

Mission Coordination Screen

As implied in the listing of responsibilities, ADOCS uses a central "focus" screen to coordinate the efforts of the Deep Operations Cell. This mission coordination screen (see Figure 2) is the focal point for all target processing. Subscribers receive, initiate, coordinate and execute all actions from this one basic screen. A large part of ADOCS' success and appeal lies in how simply the mission coordination screen works.

The top line of the screen has pull-down menus that contain all ADOCS functions. The main body of the screen is organized into five columns: Target Identifier, ATI (artillery target intelligence) Status, Element Approvals, Fire Mission Status and Fired Status.

The *Target Identifier* column contains the target number and description. Priority targets are displayed in red to identify the importance of the target. A check mark next to the target number indicates ADOCS has acknowledged the target while a dash indicates the target has been input into the system, but ADOCS hasn't acknowledged it yet.

The *ATI Status* column appears only if the FDS is either TACFIRE or IFSAS. When a mission is entered into the ADOCS data base, ADOCS generates and sends an ATI message to the FDS, notifying it of the new target. Anytime target information is changed, this column turns yellow until FDS acknowledges the updated information, at which time the box turns green.

The *Element Approvals* column is used to gain approval from Deep Operations Targeting, Current Operations and A²C² before a target is sent to TACFIRE for fire mission processing. If the box is white, no action has been taken on the mission by any element. As the target is initiated, the box changes colors to yellow, signifying action is necessary by the other sections.

Once coordination is complete and approval is granted, the section edits the screen and changes the color to green. If for some reason the target can't be fired, the section changes the box color to red, signifying denial of that particular mission. The "U???" status appears only in the AIR column and means the mission

hasn't been assigned a UFFE. For A²C² to coordinate the airspace above a "hot" platoon, the LNO section must specify a UFFE.

The *Fire Mission Status* column traces the type of fire command sent to the firing element. The mission can be sent as "on-call" (ONC), "at-my-command" (AMC) or "when-ready" (WRD) missions.

The color codes associated with this column are white, yellow and green. White shows that no fire mission has been sent, yellow shows the mission has been sent but not received by FDS and green signifies the mission has been sent and acknowledged. Other entries used in this column are CHK for "checkfire," EOM for "end-of-mission" and RDY for "ready," which appears in the AMC column when the weapon reports it's ready to fire.

The *Fired Status* column indicates the status of the mission as reported by the FDS. Again, the color-coded boxes appear with white signifying no action has been taken, yellow signifying the message has been sent but not received by FDS and green showing the mission has been fired. Red indicates the firing unit has reported the mission wasn't fired. NAK for "not acknowledged" appears in red if the firing unit doesn't respond within a set time to indicate whether it fired or not.

The bottom portion of the screen identifies the status of communications. The left portion addresses the status of communications between the Corps G2 Targeting section in the Corps Tactical Operations Center Support Element (CTOCSE) and the Deep Operations Cell. Communications aren't possible when either station has turned off its communications or when using certain ADOCS functions. The status indicator is green when communication is possible and red when communication isn't.

The right lower portion of the screen displays the status of communications between ADOCS and FDS, ASAS and the maneuver control system (MCS). For each system, if the communications link between the systems is present, the status box is green; when the communications link is not present, the box is red.

Conclusion

ADOCS already has been incorporated into the Deep Operations Annex of the V Corps Field Standing Operating Procedures. This FSOP is proving to be a solid, innovative precursor for future Army deep

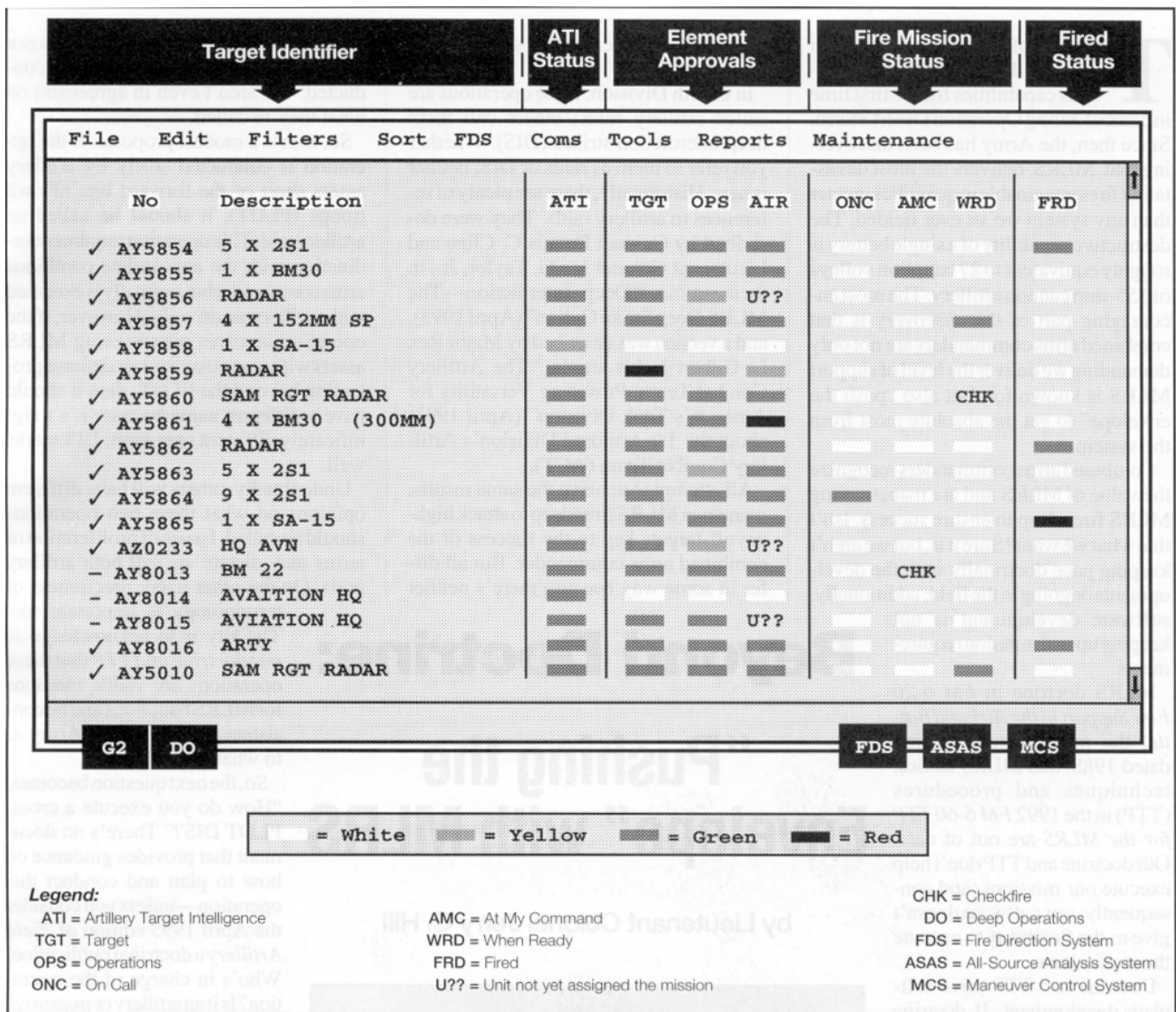


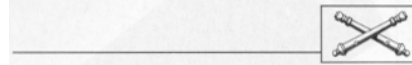
Figure 2: ADOCS Mission Coordination Screen. Subscribers receive, initiate, coordinate and execute all actions from this one basic screen. Colors indicate the status of targets in the various columns—for example in the "Target Identifier" column, red indicates the target is priority. The top of the screen has a pull-down menu that contains all the ADOCS functions.

operations-related field manuals and tactics, techniques and procedures. More importantly, however, ADOCS is being incorporated into deep operations targeting at III Corps Artillery at Fort Sill, Oklahoma, and the XVIII Airborne Corps Artillery at Fort Bragg, North Carolina, as well as the Depth and Simultaneous Attack Battle Lab at Fort Sill.

For V Corps, ADOCS has more than fulfilled its charter to facilitate the fire support mission to "provide accurate and timely fires." ADOCS gives the fire support community an automated system to expedite target processing among the members of the Deep Operations Cell.

But more capabilities are yet to come. With future technology and lessons

learned from its users. ADOCS will grow and improve in the coming years. Armed with ADOCS, the Deep Operations Cell steps to the digital forefront in shaping and defining the modern battlefield.



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The multiple-launch rocket system (MLRS) demonstrated its tremendous capabilities for the first time in combat during Operation Desert Storm. Since then, the Army has been discovering that MLRS delivers the most devastating fires imaginable in quantities greater than any system we've ever fielded. The destructive capability of a single battery is roughly equivalent to 27 battalion volleys of 155-mm cannon artillery. The most encouraging part of this *discovery* is that combined arms commanders are not only demanding we deliver the level of support MLRS is known for, but also "push the envelope" to get the absolute most from the system.

Combined arms commanders recognize the value of MLRS and are maneuvering MLRS fires deep to ensure success. Isn't that what we want? Sure it is, but we aren't keeping pace doctrinally with the developments ongoing in the field; additionally, software development is not keeping up with mission requirements.

MLRS doctrine in *FM 6-20 Fire Support in the AirLand Battle*, the most current version dated 1988, and MLRS tactics, techniques and procedures (TTP) in the 1992 *FM 6-60 TTP for the MLRS* are out of date. Our doctrine and TTP don't help execute our missions, and consequently, our software doesn't give us the flexibility to execute those missions.

Doctrine and TTP drive software development. If doctrine or TTP says a system must do a certain task, then the software must be developed to support the requirement. So, until we get the doctrine and TTP right, software will never catch up.

So, the question is, "What's missing—what must the MLRS battalion do that's not covered in doctrine, and where are the software shortfalls?"

Striking Deep

There have been many articles in *Field Artillery* describing forms of maneuvering fires deep. During the 4th Infantry Division (Mechanized) Warfighter in April, the 17th Field Artillery Brigade, part of

III Corps Artillery at Fort Sill, Oklahoma, and its 1st Battalion, 12th Field Artillery (MLRS), executed several deep missions.

In the 4th Division, these operations are called artillery raids; others call them deep interdiction strikes (DIS). Whether you refer to them as raids or DIS, neither is new. Historically, there are plenty of references to artillery raids. They were described by Colonel Dennis C. Cline and Lieutenant Colonel Joe G. Taylor, Jr., in their article, "Deep Interdiction—The MLRS Deep Strike Option" (April 1993), and a version was described by Major Rex L. Gilbert in his article, "The Artillery Combat Team: Providing Versatility for America's Tank Division" (April 1993) about the 1st Armored Division's Artillery Combat Team (ACT).

All attempt to achieve the same results: maneuver MLRS fires deep to attack high-payoff targets key to the success of the combined arms commander. But all differ in some way because there's neither

clear doctrine to guide the operations nor TTP to describe how they should be conducted. We aren't even in agreement on what they're called.

So, here's a modest proposal. If the operation is conducted solely by artillery assets short of the forward line of own troops (FLOT), it should be called an artillery raid. This operation requires coordination with the appropriate combined arms commander but normally is executed with artillery assets only. However, if the operation involves maneuvering MLRS assets with maneuver and air defense protection beyond the FLOT, then it should have a different name because it's a significantly different operation; DIS works well.

Undoubtedly, others will have different opinions on what these two operations should be called. Issues of proliferation of terms may dictate we call both artillery raids. On the other hand, preciseness of terminology is important too. The key is to

acknowledge *in our doctrine and TTP* that these operations are viable missions for MLRS battalions and be consistent throughout the Army as to what we call them.

So, the next question becomes, "How do you execute a cross-FLOT DIS?" There's no document that provides guidance on how to plan and conduct this operation—unless you consider the April 1993 edition of *Field Artillery* a doctrinal publication. Who's in charge of the operation? Is it an artillery or maneuver operation? What are the planning considerations for executing a DIS? The figure lists the considerations 1st Battalion, 12th Field Artillery used to plan DIS.

Establishing "ownership" by the brigade commander in whose sector the operation is executed is very important, particularly if it's a cross-FLOT operation. No ownership might equate to no support or not enough support. However, if the division commander gives operational control of (OPCON) all assets to a maneuver brigade commander, provides accurate target locations and then gives him the mission to "destroy the 11th DAG [division artillery group]," it leaves no question about ownership. And you can bet the overall mission, including adequate

Beyond Doctrine: "Pushing the Envelope" with MLRS

by Lieutenant Colonel Jerry C. Hill



DIS Scenario: *The division commander has two enemy division artillery groups (DAGs) to destroy to ensure the success of his operation and has planned to attack one DAG with attack helicopters and one with MLRS. Both DAGs are beyond the range of MLRS from behind the FLOT. He has given the mission to destroy one of the DAGs to the aviation brigade commander and the other to the 3d Brigade commander. He has directed his deep attack planning cell to provide accurate target locations to the 3d Brigade commander and has provided an MLRS battalion OPCON for the mission. To range the targets, the MLRS battalion must maneuver launchers five kilometers beyond the FLOT.*

What must an MLRS battalion consider while planning a DIS mission? The following are the questions the MLRS battalion staff asks in the planning process:

- | | |
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| <ul style="list-style-type: none"> ■ Have we established liaison/coordination with the supporting force—sent a liaison officer to the brigade tactical operations center (TOC)? ■ Because the targets drive the number of launchers required, how many targets are there and what are their target descriptions? ■ What is the commander's intent for effects on target? Destroy, neutralize or suppress? ■ How much ammunition must be brought forward? ■ If required, where will the launchers reload? ■ Have we developed a survey plan? ■ How many launchers are required to execute the mission and ensure adequate redundancy? | <ul style="list-style-type: none"> ■ Based on the number of launchers going forward, which command and control structure (platoon, battery or battalion level) do we need to use? ■ What protection has been provided, including maneuver elements, air defense artillery (ADA), electronic warfare (EW) assets and other fire support for MLRS disengagement and protection or reactive counterbattery fires? ■ Have the maneuver elements cleared the route to firing positions? Are they providing appropriate security? ■ What's the follow-on mission? ■ What's the abort criteria established by the division commander? ■ How many turns will be required to engage all targets, and how long will the element be forward of the FLOT? What's the risk? |
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The 1-12 FA (MLRS) Deep Interdiction Strike Planning Considerations

protection of MLRS assets, will be accomplished as an integral part of that brigade commander's plan. It's no longer a fire support mission but a combined arms mission that requires maneuvering fires and synchronizing them with the rest of the plan.

of this success can be attributed to the MLRS SEAD.

The 17th Field Artillery Brigade fired SEAD in support of 4th Brigade during this *simulation* exercise, engaging in excess of 80 enemy air defense artillery (ADA) targets on both the ingress and

egress routes. This was a very successful operation *within* the simulation. However, the issue is how to execute this operation with a real battalion on the ground and have the flexibility needed to be successful.

What we discovered in 1st Battalion, 12th Field Artillery is our software doesn't provide the flexibility to execute SEAD in support of Apaches in the deep attack mission. Specifically, in the case of the 4th Brigade, though the line of departure time was planned and normally wasn't significantly altered, the egress times for the Apaches changed quite often. In many cases, the Apaches would begin their egress either earlier or later than planned, usually on short notice, depending on what they encountered in the engagement area.

This caused the MLRS battalion to complete the fire plan by shooting the SEAD targets On-Call—an operation fairly easy to do during Warfighter simulations but very difficult with an actual battalion. The MLRS battalion is limited by software and communications.

Software doesn't provide enough flexibility to allow significant changes to a fire plan at the last minute. For example, when an egress time changes, the lightweight computer unit (LCU) operator must edit the firing time of each target and send the targets to the battery one at a time—five steps per target, a very cumbersome process. If you don't have time to reschedule and re-send each target, you must make the changes by voice from the battalion through the battery fire direction center (FDC) to each launcher. The voice

Suppression of Enemy Air Defenses (SEAD)

Perhaps the greatest success during recent Warfighter exercises and one of the most potent combinations on the battlefield is the Apache deep attack-MLRS SEAD combination. When it comes to killing tanks and destroying artillery formations, there are few options more potent.

During the 4th Division Warfighter, the 4th Brigade (Aviation) conducted Apache deep attack operations virtually every night, usually three attacks per night. Planning was conducted at the division level, drawing from the 4th Brigade, division fire support element (FSE) and G2. The division enjoyed great success and lost very few aircraft, considering the number of times the attacks crossed the FLOT and the depth of these attacks. While recognizing the Apache can "self-SEAD," much



The 1-12 FA (MLRS) "Strike Deep" battalion did just that at Dona Ana Range in New Mexico during this night artillery raid.

option is faster than rescheduling/resending individual targets digitally but still time-consuming.

For a battalion with the AN/VRC-47 radio set in its launchers, the same one originally fielded with the system in 1982, executing a SEAD mission by voice is a difficult operation, to say the least, but not impossible. The AN/VRC-47 consists of one radio/transmitter and one auxiliary receiver. To "go voice" requires coming off the digital net. Switching back and forth between voice and digital nets makes coordination and execution of fire plans, such as SEADs where the egress is On-Call, very difficult.

To execute properly, the battalion FDC needs to be able to make significant changes to the plan at the last minute and rely on the LCU software to update the plan in a timely manner and the launcher software to accept the changes. Current software doesn't allow that.

Having two single-channel ground airborne radio systems (SINCGARS) in each launcher would correct the communications problem. The two SINCGARS radios would give the crew the capability to operate on both voice and digital nets simultaneously. This radio configuration can accomplish the coordination necessary when a SEAD plan changes.

Many MLRS battalions already have SINCGARS; but many do not—do not even have them listed on their updated modified tables of organization and equipment (MTOEs). It's imperative the Army field SINCGARS in the other battalions—now.

If you don't think we've pushed the envelope yet, consider shooting a DIS SEAD. This occurred during the 4th Infantry Division Warfighter. The division commander needed to send Apaches deep against high-payoff targets that were out of his MLRS' range. The mission was critical enough to warrant sending MLRS assets forward of the FLOT to provide SEAD fires in support of the aviation brigade.

The risks associated with this operation are high. The MLRS element firing this mission may be in position for an extended time, depending on the number of launchers taken forward and the number of targets to be fired in the SEAD plan. Time between missions for each launcher may not allow for repositioning, requiring the launcher to shoot more than one mission from the same location. Additionally, if the egress time changes,

launchers will have to move to a firing location, lay on their targets and await the command to fire.

Planners must consider what acquisition means are available to the enemy and how fast he can bring counterfire on the shooters. How long will the MLRS unit be in position? If the enemy doesn't have electronic acquisition means, such as in a Korean scenario, then the maneuver protection element must prevent the enemy from getting *eyes* on the shooters—not an easy task.

Most, if not all, of the considerations listed in the figure as applying to DIS also apply to the DIS SEAD mission. Certainly, there are others. However, the most important issue is whether or not the mission is critical enough to justify accepting a risk that high.

MLRS Mobility

With the exception of Paladin, which is currently in low-rate production, MLRS is the only fire support system that can match the mobility of the Abrams tank and Bradley fighting vehicle. So, how are we expanding our MLRS doctrine and TTP to take full advantage of this mobility? In what innovative ways can we employ MLRS to maneuver fires in synchronization with other battlefield operating systems (BOS)?

In his article, "It's Time for FA to Maneuver" (April 1994), Lieutenant Colonel John M. House discusses some of the issues and possible solutions to this problem. In his conclusion, he wrote, "Our doctrine has served us well, but today's

fast-paced armored operations and potential nonlinear battlefield demand new approaches." I couldn't agree more.

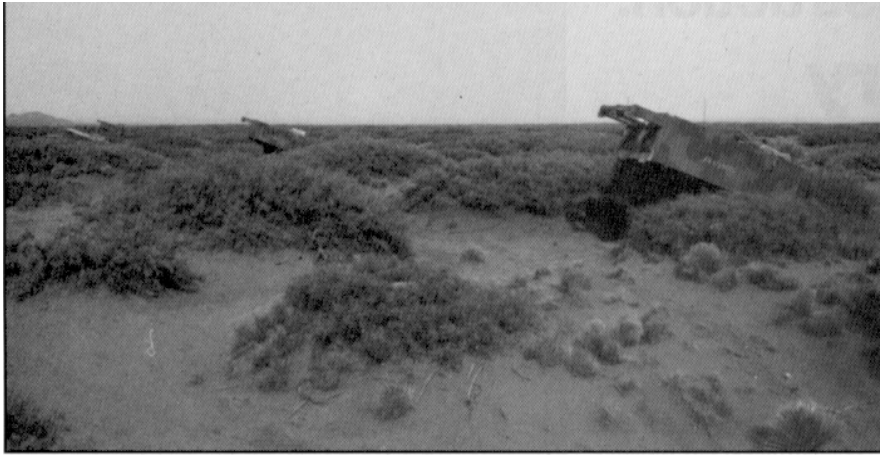
FM 6-60 describes movement operations in exactly the same manner originally developed in the first MLRS Organizational and Operational (O & O) Concept written by the Field Artillery School's Directorate of Combat Developments (DCD) in the early 1980s to support the operational testing and fielding of the first battery. Very little in the manual has changed—but the world has changed drastically. For example, the movement techniques of MLRS units during 1991's Operation Desert Storm deviated significantly from the original TTP, yet those techniques aren't reflected in the 1992 FM 6-60 with Change 1 dated 1993.

We need innovative thinking to make the most of MLRS—no idea is too farfetched for consideration. For example, we could develop a mode of employment that links MLRS platoons with maneuver companies for movement, protection and logistical support—taking full advantage of the mobility of MLRS platoons, providing inherent protection and putting MLRS assets as far forward on the battlefield as possible. The command relationship would obviously be nonstandard, perhaps a variation of "attached less OPCON" comes the closest to describing it. Although it may sound ridiculous at first, the more you think about it, the more feasible it becomes.

In that unique arrangement, we could maintain our current MLRS fire direction command and control (C²) structure. By



A 1-12 FA MLRS launcher moves across the Dona Ana Range.



1-12 FA prepares to live-fire during lane training in New Mexico.

integrating some logistics support into the maneuver support structure, those seemingly unsolvable problems probably also could be solved. The only real hurdle left to overcome would be the political implications of relinquishing some control of fire support assets, and that, I expect, would be hotly debated. Regardless of the outcome of the argument, it would be a bold and aggressive move, taking full advantage of the unique capabilities of the system. The point is, we must be *imaginative* and develop doctrine that fully supports the operations we're expected to execute.

MLRS in Direct Support (DS)

FM 6-60 with Change 1 says an MLRS unit can assume the DS mission with some personnel and equipment augmentation. This is a significant departure from previous doctrine. However, the discussion in this TTP manual isn't detailed and doesn't describe how to accomplish this mission—I'm not sure it's ever been attempted.

In the recent past, an armored cavalry regiment (ACR) deployed in combat could expect to get a Field Artillery brigade in direct support. But what about the drawdown—what effect does that have on the equation? There may not be enough assets to give the ACR an FA brigade. What's the next best thing? An MLRS battalion.

An MLRS battalion is uniquely suited to perform the DS mission for an ACR. The howitzer batteries are organic to the regiment and so is the fire support structure. To provide tactical and technical fire control for the howitzer batteries, an MLRS battalion need only add an additional LCU

to its FDC and the cannon software and fire direction personnel to operate it.

The MLRS battalion tactical operations center (TOC) could collocate with the ACR TOC. (The MLRS TOC is only two tracked vehicles so it's small enough to add to another TOC.) Collocating both TOCs would allow the MLRS battalion to incorporate the regimental fire support officer (RFSO) and his FSE. This would provide the fire support expertise needed to plan and coordinate fires.

MLRS has the same mobility as the ACR and provides significant firepower. Subordinating the howitzer batteries under the MLRS battalion's control would allow one artillery headquarters to control both close supporting and long-range fires.

Let me take it a step further. Imagine an ACR with a Paladin (M109A6) howitzer battery, an ACR that also has an MLRS battalion DS. What a *tremendous* fire support structure that could be—all in a relatively small package with the same mobility as the ACR.

Performing the same mission for a divisional maneuver brigade would be more difficult. This mission would require adding the fire support structure, if not already in place, and addressing the lack of a close support weapons system. MLRS can't provide most of the close supporting fires usually required, such as smoke and family of scatterable mines (FASCAM). Additionally, shooting MLRS within close proximity to friendly troops (closer than three kilometers) risks fratricide, given that it's an area weapon system with a large footprint.

Either option, DS to an ACR or DS to a maneuver brigade, would require significant training with the supported force to get it right. But it's obvious the easiest DS mission to assume is to the ACR.

The Doctrinal Void

There are many issues facing MLRS commanders that have never been addressed in doctrinal publications, and I know I haven't addressed them all. It seems that every time we conduct a Warfighter exercise, more issues surface. We're behind the doctrinal "power curve," and catching up will take significant effort.

However, I know one group who would benefit greatly from such a "catch up" and be more than appreciative—new battalion commanders who have not had significant *recent* experience with MLRS. They inevitably get thrown into the fray of a Warfighter exercise or a Combat Training Center (CTC) rotation with very little preparation.

The shortage of doctrinal guidance and TTP is also an issue for war planners. They normally have little experience with MLRS, so where do they go to find out how the system operates and what its capabilities and limitations are? If they go to our MLRS doctrinal manuals, they'll have only scratched the surface.

Given the capabilities MLRS has demonstrated and the confidence our combined arms commanders show in the system, we ought to be investing at least as much energy in developing TTP for MLRS as we have for cannon artillery.

MLRS is a winning system—in more ways than one. It's imperative we correct our doctrinal and software deficiencies if we expect to accomplish the missions our combined arms commanders give us.



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The Myth of Destruction: Artillery in the Great War

by Lieutenant Colonel Robert W. Madden

The Battle of the Somme was initiated with a seven-day bombardment of the German trench line. Infantrymen huddled in their trenches and bunkers and endured the horror of the explosions and "steel rain," wondering if the next incoming round would end their war. In all, the Allies massed the fires of more than 2,000 artillery pieces expending well over 1,500,000 rounds to soften up defenses before the attack.¹

Remarkably, and to the Allies' astonishment, once the attack commenced, German resistance proved formidable. The graphic reality of the German trenches immediately following a bombardment was captured in Erich Maria Remarque's classic novel, *All Quiet on the Western Front*:

Suddenly the nearer explosions cease. The shelling continues, but it has lifted

and falls behind us; our trench is free. We seize the hand grenades, pitch them out in front of the dug-out and jump after them. The bombardment has stopped and a heavy barrage now falls behind us. The attack has come.

No one would believe that in this howling waste there could still be men, but steel helmets now appear on all sides out of a trench and 50 yards from us a machinegun is already in position and barking.²

The Battle of the Somme was just one example of many proving that tactically employing artillery for destruction wasn't feasible. This is not to



Battle of the Somme

say that artillery wasn't effective. It's estimated that artillery accounted for 65 to 75 percent of the casualties during World War I. The totals were staggering: the Allies lost 22,089,709 while the Central Powers lost 15,404,477 to the fires of artillery.³

However, artillery alone could not win World War I battles or retain terrain. Yet today, fire supporters are asked to do the impossible, as if artillery systems were a panacea for destroying enemy forces, thereby making attacks or counterattacks unnecessary. This article explores the tactics of destruction versus neutralization of enemy forces and obstacles within the context of World War I and discusses contemporary applications.

Artillery Tactics of Destruction—Maneuver Forsaken

The Allies employed artillery tactics of destruction from early 1916 until the latter part of 1917. The purpose of employing artillery in this manner was to solve the problem of infantry mobility through the "no man's land" between trench lines. Allied leaders decided they would rather sacrifice ammunition than the thousands of lives it would take to cross the area between trench lines with soldiers caught



Battle-ravaged wood, the Somme.



Field Artillery in World War I

up in obstacles and massacred by German machineguns and artillery.

By early 1916, British leaders shared the philosophy that the effect of a massive bombardment would "crush all resistance and that it would only be necessary for the infantry to march forward and take possession."⁴ Historical evidence of Industrial-Age warfare and the lessons learned of two years at war supported the British conclusion. Historian Michael Howard points out a lesson from the Russo-Japanese War (1905): "No infantry attack could succeed unless it was not only prepared but accompanied up until the last moment by artillery attacks..."⁵ Further as Sir Douglas Haig claimed, "The defenses on our front are so carefully and so strongly made and mutual support with machineguns is so complete, that in order to demolish them, a long methodical bombardment will be necessary by heavy artillery...before the infantry is sent forward to the attack."⁶

Faced with the difficulty of creating a penetration of an entrenched enemy line, the Allies chose to mass artillery fires. However, controlling the forward movement of infantry while shifting artillery fires in the attack proved challenging to coordinate. Military historian Jonathan M. House illustrates the point by describing this scene: "The rigid movement of the artillery fire often outran the heavily laden infantryman struggling

across the shell-pocked battlefield, allowing the defender time to leave his shelter and engage the attacker after the barrage had passed over a trench."⁷ Thus, the idea of combining artillery fire with maneuver was abandoned and the Allies concentrated their efforts on achieving overwhelming destruction in the preparation fires.

The primary goal for preparation fires was the destruction of machineguns, obstacles in front of the trench lines and enemy communications used to control the battle. Essentially, artillery was used exclusively in the battle for the first trench lines.

As Remarque described, Allied intentions became predictable and the Germans learned to anticipate the attack, once the bombardment lifted. Historian Theodore Ropp offers this explanation: "The

cult of the offensive still had many followers. Many generals could not see that these tremendous artillery bombardments sacrificed mobility and surprise for mass and concentration."⁸ This method caused many artillerymen to boast, "The artillery does the whole task, and the infantry advances only when the former tells it: 'Madame is served!'"⁹ A major advantage that the attacker possessed, the element of surprise, was lost.

The Germans responded to the tactics of destruction by organizing their defenses in depth, to include positioning reserves and artillery out of range of Allied weapons systems. Once a bombardment began, the reserves and forces in the rear took cover deep in bunkers while the forward elements moved out of the targeted trenches and into nearby shell holes.

The German High Command quickly realized that massing their forces in the forward trenches was suicidal and, consequently, adopted a tactic of putting as few troops as necessary in the first two trench lines. After a bombardment lifted, the forward elements would open fire from the shell holes or trenches while the reserves and artillery immediately readied themselves to counterattack.¹⁰

Another problem encountered was the inability of artillery ammunition to effectively clear obstacles and break up wire in front of the German positions.

Shrapnel, while it was extremely effective against troops in the open, had no effect against well-prepared positions. The best artillery could do was to force the defender to stay under cover during the assault. Prewar fuzes for high-explosive rounds would not detonate the rounds when they encountered the slight resistance received when passing through wire. It wasn't until the development of the point detonating fuze in 1917 that the artillery was able to create a penetration in the wire.¹¹

This shortcoming led the Allies to develop heavier guns, such as the 6-inch and 9.2-inch howitzers, to create greater destruction. Previously, the principal caliber of weapon was the French 75-mm, which lacked both the range and the destructive punch necessary. It was determined that Field Artillery made little impression on well-entrenched infantry. Only heavy artillery used in massive concentrations would break their resistance.¹²

Unfortunately, heavier guns caused new problems. They destroyed tactical obstacles, but they created new ones. "The guns destroyed all communications in the GAP—roads, paths, even the top soil—leaving crater-pocked deserts as bad as barbed wire and trenches and making surprise impossible."¹³ Once the attacking force penetrated the first trench line, it was often too exhausted or decimated to present much of a threat. Further, exploitation was made extremely difficult in terms of moving troops, artillery and supplies across the cratered terrain.

In most cases, by the time the attacker completed his move across "no man's land," the defender had been able to bring up his reserves and set up in trench lines in front of the attacker. The defender had the advantage. He could move his reserves using rail or an intact road system over unbroken ground. The attacker had to move through the sea of mud and shell holes his artillery created.

Another problem alluded to earlier was that the artillery was so involved in the close battle that it wasn't used effectively for counterbattery or disrupting the enemy's commitment of reserves. With emphasis on destroying enemy forces and eliminating obstacles in the forward defensive area as well as staying out of the range of enemy indirect weapons systems, Allied artillery could only effectively support a penetration 2,000 to 3,000 meters deep.

However, Allied artillery could neither prevent enemy artillery from engaging the attackers once they had achieved a penetration nor prevent enemy counterattacks.

The enemy artillery batteries were free to fire with impunity upon the attackers. Therefore, the momentum of the attacking force was disrupted as the attackers were unable to retain any area achieved by the penetration. They had to withdraw at quite an additional cost in human lives. This inability to exploit offensive operations ultimately led to the stalemate along the Western Front.

Artillery Role Redefined—Courting Maneuver

Perhaps the most extreme case employing the tactics of destruction occurred during the Third Battle of Ypres in July 1917. The British began this battle with a 19-day bombardment expending more than 321 trainloads of ammunition. This was the equivalent of one year's production for 55,000 industrial workers.¹⁴ The bombardment turned "the whole battle area into a swamp in which the British Army took only 45 square miles in five months at a cost of 370,000 men or 8,222 [men] per square mile."¹⁵

Following the Third Battle of Ypres, the Allies redefined the artillery's role to that of providing preparation fires of shorter duration to create a breach through tactical obstacles, disrupting reinforcements and counterattack forces and conducting counterbattery operations. This redefinition was made possible, of course, by technological enhancements in fire control, target acquisition, mobility and ammunition. The development of the point detonating fuse allowed more effective destruction of obstacles with minimal destruction of terrain.

"Artillery's efforts were not reduced but redirected. The same mass of guns and equipment was still required..."¹⁶ The focus shifted from providing destruction fires immediately on the trench lines to sealing off the objective area so attacking infantry could maneuver freely. The element of surprise returned to the battlefield once again.

Shorter preparation fires became the norm. This point is illustrated by the second Battle of Armageddon in September 1918. "At 0430 on 19 September, the British infantry began to move forward behind a 15-minute artillery barrage. This short preparation achieved surprise and avoided tearing up the ground."¹⁷

The advent of the tank on the battlefield

reinforced this new role of the artillery, using complementary firepower to support the infantry. The tank assumed the role of providing firepower to protect advancing infantry and breach obstacles while the artillery concentrated on neutralizing German artillery and reinforcements.

This was first seen at Cambrai in November 1917, which was also the first successful use of tanks in the attack. The attack was preceded by only a 35-minute preparation that greatly enhanced surprise. The tanks were used to break through the obstacle belt and destroy the infantry in their path. Because artillery wasn't required to aid infantry mobility by destroying obstacles and machineguns, it aided mobility indirectly by neutralizing the enemy artillery, reinforcements and whatever enemy infantry firepower escaped the tanks.¹⁸

Combat Power Optimized—The Consummation of Fire and Maneuver

Our current doctrine echoes the lessons learned on a foreign battlefield more than 75 years ago. Success on the battlefield results from the effective synchronization of overwhelming combat power at the decisive time and place. Combat power measures the effect created by combining maneuver, firepower, protection and leadership.

Through maneuver, forces attempt to gain the advantage of position before battle and exploit tactical success. This advantage results in attaining surprise, seizing the initiative and momentum, achieving psychological shock and moral dominance or a combination of these elements.

Maneuver, however, is not exclusive of firepower. The two are closely related and complement one another.

Firepower is defined by our doctrine as the "destructive force; it is essential in defeating the enemy's ability and will to fight."¹⁹ Firepower facilitates maneuver by suppressing the enemy's fires and disrupting the movement of his forces. In essence, fires are used to create opportunities for maneuver, and maneuver exposes enemy forces to the concentration of fires for exploitation.

In World War I, the tactics of destruction alone could not pave the way for maneuver forces to merely mop up enemy forces, a point that holds true today. However, technological advancements in the fire support system, particularly in target acquisition and increased weapons range, combined with the employment of the tank, made it possible for the World War I artillery to set the conditions for maneuver forces to be successful. In so doing, artillery fires served as an effective combat multiplier for forces engaged in the close battle, enabling them to retain the ground they had fought so hard to gain.

Since the stalemate on the Western Front, the role of the artillery has continued to evolve. The march of technology has digitalized the call-for-fire from the observer to the gun line—Paladin or self-propelled launcher loader (SPLL). Munitions have become considerably more lethal. Weapons systems for both artillery and maneuver forces are capable beyond our forefather's wildest dreams.

Yet what hasn't changed is the enemy: he's still uncooperative and as determined to beat us as we are to defeat him. History bears numerous accounts of soldiers' adaptation to dangers, hardships and deprivations to win, such as discussed earlier in the article.



The 2d Battalion, 1st Field Artillery, moves out with the 1st Armored Division during Desert Storm.



A VII Corps MLRS rocket fires on enemy forces in Southern Iraq.

During our most recent experience in the crucible of war, the thought in the back of many of our minds was that the Iraqi Army would pull out of Kuwait before we committed ground forces. Amazingly, the Iraqi Army endured an unfathomable five-week bombardment, and coalition ground forces had to attack to seal the victory.

There's no doubt that both operational and tactical fires were decisive in the outcome of Operation Desert Storm as they set the conditions for decisive maneuver. However, operational fires in theater and tactical fires along the border, by themselves, were not enough to coerce Iraq to withdraw its forces from Kuwait.

During the ground attack, tactical fires and maneuver were employed to complement one another. Take for example, the attack of the 1st Armored Division in Desert Storm. On G+1, the division's attack had been slowed by encounters with Iraqi prisoners and a fight with the 26th Division. As the division approached the town of Al Busayyah at dusk, the division commander, Major General Ronald H. Griffith, asked the VII Corps Commander, Lieutenant General Frederick M. Franks, Jr., if the division could posture for a morning attack to destroy two Iraqi battalions defending the city. The battalions were entrenched in bunkers surrounding the city and used many of the 50 buildings as fortified fighting positions.

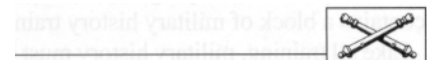
General Griffith also was concerned about the terrain south of the city. There was a network of wadis that he didn't relish negotiating in the dark. He was afraid he would lose some tanks in the final approach to the city. In Major General Griffith's words, "I'd prefer to knock the crap out of them all night long with artillery and then go in at first light."²⁰ General Franks agreed.

During the night, the artillery rained more than 300 multiple-launch rocket system (MLRS) rockets and more than 1,400 155-mm rounds on Al Busayyah before attacking at first light. By 0900 hours, the bunkers surrounding the town had been overrun, but a stubborn Iraqi

battalion still held the main street and many of the buildings.

Major General Griffith fixed the enemy with one battalion task force, while the rest of the division turned east and continued the attack. The battalion task force laid siege to the town with a 165-mm demolition gun powerful enough to flatten a house with a single round. By noon, Al Busayyah, reduced to rubble, had fallen, and the 1st Armored Division was 50 kilometers from the Kuwaiti border (50 kilometers east of Busayyah).²¹ This was classic use of fire and maneuver.

Much has changed since the doughboys fought "Over There." However, a common thread from World War I to the present is that the true destruction of an enemy force occurs when fires and maneuver are used in consonance with one another—rather than in isolation.



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5. Michael Howard, "Of Men and Fire" in *Makers of Modern Strategy*, Ed. Peter Paret (Princeton, N.J.: Princeton University Press, 1986), 518.
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8. Theodore Ropp, *War in the Modern World* (New York: Macmillan Publishing Company, 1962), 249.
9. Major A. Cert, *Swiss Army*, "Some Lessons of the War," *Infantry Journal* (March 1916), 1066.

10. House, 25-26. The German response to artillery destruction tactics is summarized from House's discussion.
11. *Ibid.*, 24. This information is paraphrased from House's discussion on the ineffectiveness of World War I artillery munitions.
12. Howard, 518.
13. Ropp, 250.
14. *Ibid.*
15. *Ibid.*
16. Bailey, 142.
17. House, 37.
18. Bailey, 142 and 151. The analysis of the Battle of Cambrai is summarized from Bailey's discussion.
19. *Field Manual 100-5 Operations* (Washington, DC: Headquarters, Department of the Army, June 1993), 2-10.
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Military History Training at the Field Artillery School:

A Vision for the Future

We stand moments away from the third millennium, poised at the beginning of a new century—ushered into an age of "violent peace" that finds more Americans deployed overseas today than at the height of the Cold War in the 1980s. We have a new national strategy that demands the Army maintain a capability to conduct military operations across the globe. One tool the Army will require to tackle this brave new world is a coherent, disciplined approach for harnessing the past to prepare us for the future.

The Field Artillery School at Fort Sill, Oklahoma, has structured military history training to encourage artillerymen to focus their thinking on how they'll lead in tomorrow's combat. We use history to teach an essential leader task—critical thinking. Future leaders must be able to analyze the past to develop the ability to think critically about fighting on future battlefields. Each of the officer and NCO programs at the Field Artillery School contains a block of military history training.

Like all training, military history must be battle-focused. Our history training stresses that the key is defining clear training objectives driven by the mission-essential task list (METL). The issues students deal with in their history analyses must be relevant and each closely tied to a critical consideration of our warfighting doctrine.

The study of military history is organized in the same manner as an after-action review (AAR). Students are forced to answer the tough questions—what was supposed to happen, and what actually happened? What were the lessons learned, and how do they provide insights relevant to the challenges we may face in the future? Three training exercises constitute the corps of the program.

Study at the Fort Sill Museum. This class, which is team-taught by military historians and the museum staff for the Officer Basic Course and NCO students, examines the relationship between leadership and technology. The museum study emphasizes the fundamental importance of sound leadership and developing the mental agility to recognize how new technology affects the employment of the combined arms team.

Battle Analysis. A battle analysis is a systematic study of a military operation to provide insight into present-day military issues. Students in all courses conduct a battle analysis.

The battles studies in the Officer Advanced Course (OAC) are particularly comprehensive. They challenge students to examine subjects such as the application of Army operations doctrine (Battle of Chancellorsville in the Civil War), the employment of light forces (Ia Drang in Vietnam), Field Artillery operations (Operation Cobra in World War II) and operations other than war (Power Pact in the Dominican Republic).

Battlefield Staff Ride. The staff ride combines a battle analysis with a detailed on-the-ground study of an actual battlefield. This exercise is the capstone battle study for OAC students. They gain practical experience in how to conduct METL-based history training in their own units.

For their staff ride, the OAC students visit Honey Springs, a small Civil War battlefield in eastern Oklahoma. Students plan and lead the exercise. They role play the commanders on the battlefield and critically analyze the decisions of leaders in battle. The small group instructors mentor and coach the students throughout the exercise.

The Honey Springs staff ride emphasizes the application of fires. The study analyzes the procedures used by the commanders for developing a scheme of fires, clearing fires and integrating the employment of fire support with other battlefield operating systems. By critically examining the application of fires in past battles, OAC students deepen their understanding of the present-day challenge of fighting with fires.

In addition to these training exercises, officers are provided self-study and resource guides they can use as the basis for leader development and self-study programs. They also have the opportunity to conduct independent research and prepare book reviews at the Fire Support Research Center in the school. Students interested in publishing their work receive assistance and guidance from the school staff.

Developing critical thinking skills is a continuing process. Commanders in the field should find that Field Artillery School graduates understand the principles of employing military history as an integral part of battle-focused training. Commanders should take advantage of this expertise and exploit the potential of history to teach an essential leader task—critical thinking.

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Military Historian
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Paladin Cadre Course Begins at Fort Sill

In the fall of 1994, the Field Artillery School, Fort Sill, Oklahoma, will begin offering the Paladin Cadre Course to soldiers being assigned to Paladin-equipped units. The three-week, three-day Paladin Cadre Course prepares leaders (sergeants, staff sergeants, sergeants first class, lieutenants and captains) for the new technologies associated with Paladin communications and the automated fire control system (AFCS). Included in the course is an intense orientation in Paladin battery and platoon tactics, techniques and procedures (TTP).

The Cadre Course contains two tracks. Track One is for sergeants and staff sergeants to study Paladin capabilities, maintenance requirements, AFCS operations, crew duties, navigation and the operations of the single-channel ground and airborne radio system (SINCGARS). Track Two is for sergeants first class, lieutenants and captains to study doctrine, TTP, platoon operation center (POC) operations, navigation and battalion operations and to become familiar with the AFCS.

Both tracks culminate with a live-fire exercise in which instructors

evaluate students on critical tasks ranging from maintenance troubleshooting to moving missions. Students also prepare platoon position areas; conduct reconnaissance, selection and occupation of positions (RSOPs); and establish resupply, rearm, refuel and survey control points (R³SPs).

To enroll in Course 2E-F165/041-F9, Track One students must be a sergeant or staff sergeant in Military Occupation Specialty (MOS) 13B in the Active Component (AC) or Reserve Component (RC); Track Two students must be sergeant first class up to captain and Field Artillerymen in the AC or RC. The

courses being offered in FY 95 are Class 1 from 7 Nov to 5 Dec 94, Class 2 from 11 Jan to 6 Feb 95 and Class 3 from 15 Feb to 13 Mar 95.

If soldiers have questions about the course, they can call the Training Development Branch, Cannon Division of the Gunnery Department, Field Artillery School at DSN 639-5803 or commercial (405) 442-5803.

CPT James Q. Webber III, FA
Team Chief, Paladin Division, Gunnery Department
Field Artillery School, Fort Sill, OK

Replace Your SIAGL with a SNSG—Beef Up Your Survey Capabilities

Now is the time for you to replace your survey instrument, azimuth gyro, lightweight (SIAGL) with the survey north-seeking gyro (SNSG). Conventional battalion survey teams or survey platoon headquarters in light divisions are authorized to order the SNSG through your property book office (PBO): LIN U69083, SNS 6675-01-391-9079.

If your unit isn't authorized a SIAGL on its modified table of organization and equipment (MTOE), you can check with your PBO for a letter from the Department of the Army authorizing you to order the SNSG while your MTOE is being revised.

The SNSG will give your Field Artillery battalion an additional

survey section capability when used in conjunction with a precision lightweight global positioning system (GPS) receiver (PLGR). The SNSG is a precise (accurate to within .2 mils) and timely (three minutes from initialization) measurement device.

If you have questions or need more information, call the Target Acquisition Division, Directorate of Combat Developments of the Field Artillery School at Fort Sill, Oklahoma, at DSN 639-3152 or 4300 or commercial (405) 442-3152 or 4300.

CPT Mark D. Luker, FA
SNSG Project Officer, DCD
Field Artillery School, Fort Sill, OK

Gun Laying and Positioning System

During a rotation at the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana, a firing battery executive officer (XO) faces flying into a firing position without accurate maps, declinated aiming circles or survey assets. His first equipment to land is two M119A1 howitzers and a Q-36 Firefinder radar; the remainder of the battery equipment and personnel arrive at 15-minute intervals.

Using hasty survey techniques, he emplaces his battery in an hour—but how accurately? To compensate for nonstandard conditions, the battery registers, wasting ammunition and possibly giving away its position. The maneuver commander executes his operations plan (OPLAN) as maneuver units hit the ground, and the battery is forced to register for each occupation until survey support arrives.

The odds of the Field Artillery in a future contingency operating in a country that has accurate survey control are slim—at best. Using the same JRTC scenario in the year 2000, the XO will have a new survey asset at his command: the gun laying and positioning system (GLPS). With GLPS, the XO will be able to emplace his battery within three minutes, using current commands and procedures.

GLPS is composed of a precision lightweight global positioning system (GPS) receiver (PLGR), a north-seeking gyroscope, an electronic theodolite and an eye-safe laser rangefinder. The system is mounted on a tripod and is battery powered. Accuracy specifications are 10 meters circular error probable (CEP), horizontal; 10 meters probable error (PE), vertical; and .4 mils PE, azimuth. If the GPS is inoperable or masked, GLPS can

self-locate via back-polar plot from a single known point. The GLPS will provide immediate precision survey support and eliminate the need for external survey support, giving the battery commander organic precision survey. One GLPS will be issued per six-gun battery or one per four-gun platoon.

Currently, survey data originates with the topographic

engineers and is transferred until it reaches the firing unit. This time-consuming process creates errors as the data is transferred. In addition, the intensity of the modern battlefield could delay survey data by several hours.

Batteries without Paladin howitzers must depend on the battalion survey section equipped with the 20-year-old position and azimuth determining system (PADS) when moving from one firing position to the next. Alternate positions are not always accurately surveyed because PADS assets in the FA battalion are limited. In the meantime, the firing unit must use hasty survey to establish its position—a technique that's less responsive and far less accurate than is required for effective fire support.

Today's survey and gun-laying equipment is old and costly to maintain. We have used the aiming circle and PADS both for more than 20 years. The savings annually on maintenance cost for PADS combined with consumables will pay for the GLPS in less than 10 years.

The Field Artillery Position and Navigation Master Plan places the GLPS in the units' hands near the year 2000. The Field Artillery School at Fort Sill, Oklahoma, is scheduled to receive a GLPS prototype this month to demonstrate the concept. GLPS is a near-term solution for our positioning and maneuver needs on an ever-increasing technological battlefield.

If units have questions about GLPS or would like additional information, call the Target Acquisition Division of the Directorate of Combat Developments (DCD), Field Artillery School, at DSN 639-3152 or 2953 or commercial (804) 442-3152 or 2953.

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