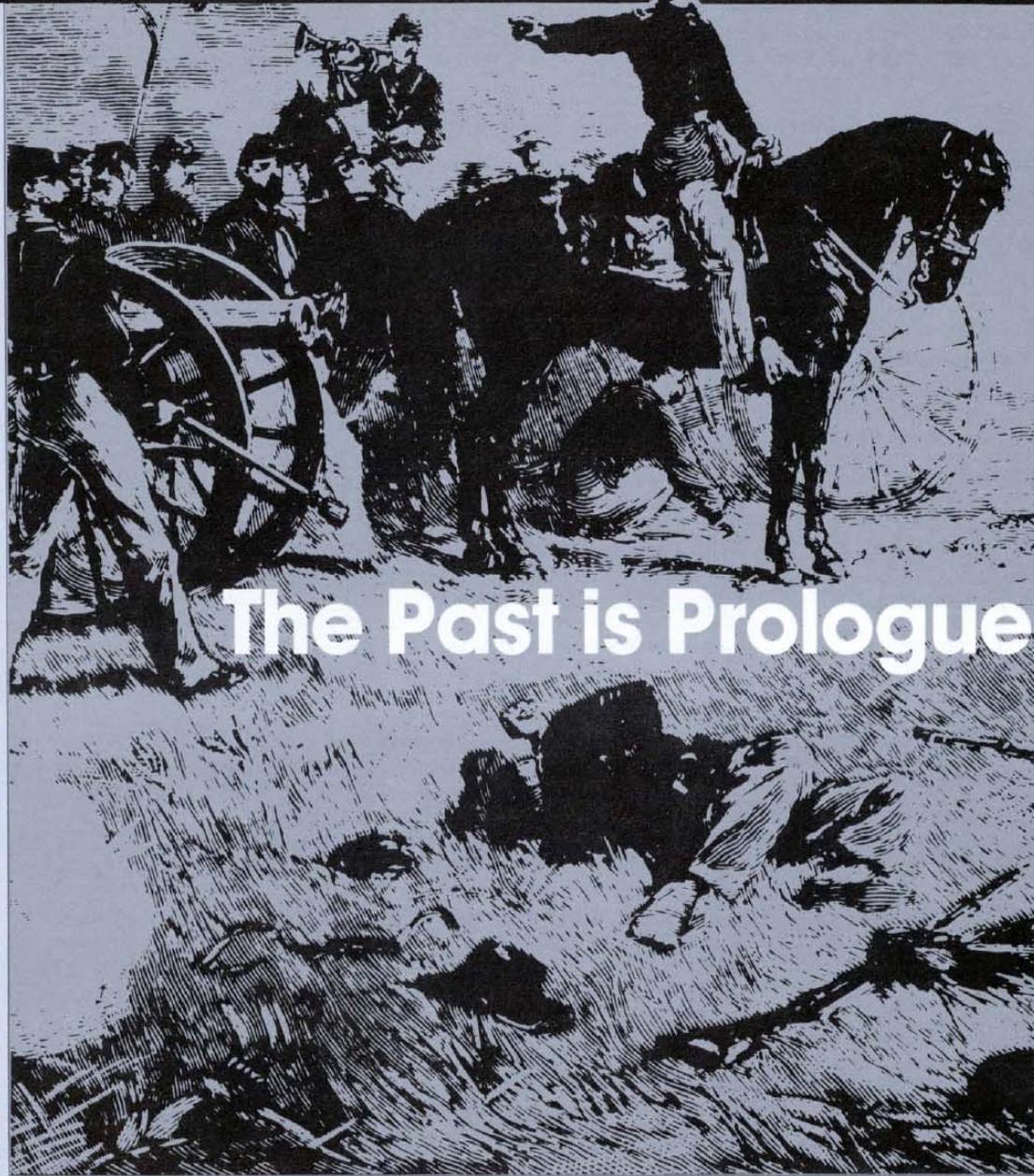




# Field Artillery

A Professional Bulletin for Redlegs

October 1989



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October 1989

HQDA PB6-89-5

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- Unit Training Hotline—AV 639-5004 or (405) 351-5004: ARTEP, AMTP, SQT, MQS, TEC and ACCP.
- Redleg Hotline—AV 639-5020 or (405) 351-4020: NTC, JRTC and Other Artillery Subjects.

## Correction:

In the August 1989 *Field Artillery*, some information on Page 29 of the article "Field Artillery Devices, Software and Special Texts" is incorrect. For "Nuclear Weapons Projectiles," soldiers should *not ram* the training projectiles in howitzers. In addition, the extractor listed is incorrect. Soldiers should use the H4196 extractor for 155-mm and the H4172 or H4272 for 8-inch *war reserve* nuclear projectiles.

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

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

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**CARL E. VUONO**  
General, United States Army  
Chief of Staff

Official:  
**William J. Meehan II**  
Brigadier General, United States Army  
The Adjutant General

**RAPHAEL J. HALLADA**  
Major General, United States Army  
Field Artillery School Commandant

## Staff

**Editor:**  
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*To be a successful soldier, you must know history....What you must know is how man reacts. Weapons change but man who uses them changes not at all.*

General George S. Patton, Jr.  
Letter to West Point Cadet George S. Patton IV  
June 6, 1944

## An Army Without Warriors?

The provocative title I've chosen for this editorial is, I must confess, stolen from an *Army Times* cover story that appeared in July 1989. It speaks of a subject for which members of my year-group (1973) have a great deal of sensitivity. We'll produce the first crop of battalion commanders who have had **no** chance to experience the friction of war in extended combat. And some of us will take the guidon within the next year.

Veterans who speak of the friction of war are talking about a human dimension of combat that we simply can't fully replicate in peacetime. It has to do with stress, apprehension, horror and feelings of isolation counterbalanced against loyalty to fellow soldiers and an attempt to put on the face of courage. Of course, the term friction includes the chaos and uncertainty of the battlefield the "fog" of war.

We have at least three ways to offset this lack of combat experience. Tough, realistic training at our combat training centers and in local training areas is certainly the best way, though current and projected funding is, unfortunately, forcing us to rely more on training simulation and less on field training. Taking advantage of the combat experience of our more senior officers in the classroom and during professional development counseling is another. The third, and most cogent to this edition's Field Artillery History theme, is the closer study of historical campaigns with an eye toward that illusive human dimension

and the friction of war.

In the article "Using History in Military Decision Making" that appeared in the June 1989 edition of *Military Review*, Captain F. Freeman Marvin analyzes four uses of military history to improve decision making. He says that by applying disciplined methods to drawing analogies, placing situations in context, assessing people and organizations and examining assumptions that a commander can improve his estimate of current and future situations. This kind of training starts with a wide reading of worthwhile examples of decision making in military operations.

Thanks to the US Field Artillery Association's continued sponsorship of our annual History Writing Contest, we again can analyze the very best manuscripts submitted by our excellent authors. Our distinguished panel of judges, to whom we owe a special thank you, made their tough decisions using the following criteria:

- Relevance to Field Artillery Tactics
- Usefulness to Today's Redlegs
- Historical Accuracy
- Writing Effectiveness
- Originality

Our Contest will continue to support a history edition of *Field Artillery* each year for our soldiers to use as a professional development tool. We hope this issue helps Redlegs understand **how man reacts** when faced with the friction and fog of ever-more-violent warfare without the "benefit" of

combat experience. To learn these lessons the hard way is *simply unacceptable*.

**Editor**

### US Field Artillery Association's 1989 History Writing Contest Winners

- First Place** "Danger Close: A Historical Perspective on Today's Close Support" by Major Thomas G. Waller, Jr.
- Second Place** "Kasserine, the Bulge and AirLand Battle — Changes in the Tactical Role of Corps Artillery" by Lieutenant Colonel Joseph R. Cerami
- Third Place** "Braxton Bragg and AirLand Battle" by Major Timothy J. Kiggins

### History Contest Judges

• **Lieutenant General Dave R. Palmer**, Superintendent of the US Military Academy at West Point. He holds a master's degree in history from Duke University, taught history at West Point, is the author of three books on military history and has published several historical and professional articles.

• **Brigadier General William A. Stofft**, Chief of Military History and Commander, US Army Center of Military History, Washington, D.C. He holds a master's degree in history from New York University, taught history at West Point and is the author of a book on military history and several historical articles.

• **Major David T. Zabecki**, a Field Artilleryman with the USAR Military Intelligence Group, West Germany. A frequent contributor of historical articles to *Field Artillery*, he also has written articles for six other magazines and is Contributing Editor for *Military History* and *World War II* magazines. Major Zabecki is the Editor of the *Encyclopedia of World War II in Europe*, in preparation for publication.

# On the Move

MAJOR GENERAL RAPHAEL J. HALLADA

## Understanding the Past — Our Future Depends On It

*...historical sense involves a perception, not only of the pastness of the past, but also of its presence.*

T.S. Eliot

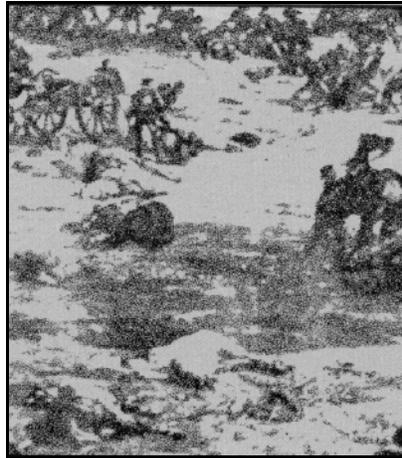
Perhaps more than any other profession, the military must have the "historical sense" to which Eliot refers — the sense that the present is the culmination of our past. What we do with our present decides the future. As General Carl E. Vuono stated in 1987 at his swearing-in as Army Chief of Staff, "We build on the past, we're responsible for the present and we shape the future."

To understand where we are today and to enable us to best meet the challenges of tomorrow, we must develop that historical sense. In our profession where the chance to actually ply our trade is thankfully rare and training exercises and simulations (regardless of how elaborate) can't begin to approach the reality of war, we must seek the wisdom that only an understanding of history can provide.

### Building on Our Past

Some believe the study of history is of little practical use in our rapidly-changing world. Indeed, a rigid perception of history and an attempt to forcibly overstamp its "lessons" on the present can be useless and even detrimental. One can easily point out examples of defeat resulting from dogmatic adherence to traditions, refusal to accept the advent of new tactics and technology and the unfortunate tendency to "fight the last war." Pickett's Charge and the French debacle in the Blitzkrieg onslaught come quickly to mind.

Taken to the opposite extreme, to dismiss the lessons of history as having been overcome by technology and change (thus having no application to the present and future) is to



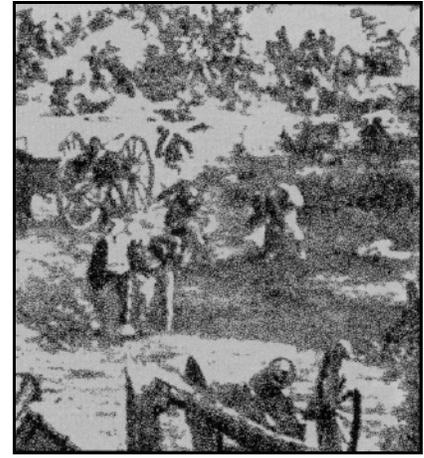
deny some very elemental truths. Many of us are easily mesmerized by new technology and lose sight of the basics. From such has stemmed the notion that the defense of our nation could rest solely on a well-stocked strategic nuclear arsenal or that we could win the war in Southeast Asia "from the air."

With proper judgment, however, an understanding of history provides us the "high ground" from which to observe and assess not only our past, but also the present and possibilities for the future.

### Responding to the Present

Collectively, we of the military now have good historical sense. We appropriately emphasize joint and combined operations and training and realize that no one service or branch can win the war alone. Our Army has experienced a resurgence in its true role as a strategic force and now maintains a variety of forces with the flexibility to meet threats of all levels anywhere in the world, from terrorism to full-scale armored operations.

The Field Artillery, too, is enjoying renewed emphasis as a key player on the combined-arms team. History has shown the tremendous effectiveness and vital importance of artillery in every war our nation has fought. These lessons, unfortunately, have often faded during times of peace.



### Shaping Our Future

The AirLand Battle and AirLand Battle-Future concepts have again reaffirmed the importance of fire support in providing a major portion of the firepower-maneuver equation that has won wars since before Napoleon. We are also making great doctrinal and materiel advancements and improving our ability to provide quality fire support in all of our roles (close support, counterfire and attack at depth).

The cannon, recently believed by many to be an anachronism made obsolete by rocket and missile technology, is gaining newfound respect as work progresses on the howitzer improvement program (HIP) and our plans for an advanced Field Artillery system, cannon (AFAS-C). With these advances, the cannon will remain our mainstay for accurate, 24-hour-a-day, all-weather fire support for the foreseeable future.

### Maintaining the Heritage

History is present and can give wisdom for today and tomorrow. It has proved the Artillery to be the King of Battle, and the King still reigns today. Our past has given us a heritage to be proud of, and we're building on it — the future does, indeed, belong to the Field Artillery!



# Incoming

## LETTERS TO THE EDITOR

### Thinking Ahead: It's Everyone's Business



MAJ Charles W. Pope, Jr.

*The Field Artillery is now caught between two diametrically opposed tendencies...the need to engage more targets, with a greater volume of fire, at ever greater ranges and more accurately than before...and the need to disperse more widely, shoot more rapidly and move more frequently to avoid the increasingly lethal, fast and accurate fires of counterbattery weapons.* (Daniel Malone, *International Defense Review*, No. 11, 1984).

#### New Tactics

Although the 3x8 concept is a radical change in tactics for the gunline, this pales in comparison to the changes that will occur when HIP deployment begins in FY 91. Adding two guns, another FDC and splitting into two platoons is a relatively simple task when compared to throwing away aiming circles and displacing your guns 1,000 meters apart. That far apart they may not only be out-of-sight, but also out of control.

As a commander of a 155-mm self-propelled direct-support battery in Europe, the most frustrating and continual challenge for me was trying to disperse my guns while maintaining reliable communications. Limitations caused by necessary line-of-sight with the aiming circle and secure landline communications were a never-ending struggle.

Even though 3x8 helps us disperse and adds flexibility, the survivability issue is still of concern. Why must we find a way to disperse more? Well, for years we have worried about Soviet intentions to annihilate entire grid squares while trying to destroy our nuclear capacity. According to *FM 100-2-1 The Soviet Army Operations and Tactics*, the Soviet Army intends to place 270 152-mm rounds in our firing positions. This threat has prompted such theories as "shoot and scoot" and so on. Fortunately, the M109 HIP will go a long way in frustrating this Soviet goal.

The HIP will provide us automatic lay-of-the-piece, allow for on-board gunnery

computations and position-location determination and give us digital radio communications. In reality, the M109 howitzer will become the proverbial "one-man band." This translates into greater gun dispersion, which means greater survivability, fewer displacements and — the bottom line — more sustainable firepower available to the force commander at the culminating point in the battle.

With the HIP, we'll soon be able to disperse our guns far enough apart that the Soviets will not only have to find them individually, but also they'll have to engage them that way as well. However, before we go off beating our chest to the maneuver guys about how great we're going to become, we should look at the considerable challenges that lie ahead.

#### Get Involved

Since the law of physics "for every action there is an equal and opposite reaction" generally applies to other walks of life as well, we must look at how we're going to cope with the problems the HIP deployment will present. History shows us the success of any weapon system depends in great part on how it's deployed. This requires maximizing capabilities and minimizing vulnerabilities. Developing these concepts requires considerable thought and discussion.

The point I'm trying to make is we need to start thinking about these changes *now*, not once we've deployed the system. Every professional Redleg should get involved, not just the few working on the system's development. Having said all that, what negatives *do* we face?

**Less Control.** By far, the major disadvantage of greater dispersion is less centralized control, which means a shift in the leadership burden to the section chief. In theory, the HIP offers a battalion the ability to have 24 separate firing units on the battlefield. Therefore, the dilemma becomes how to achieve the proper mix between displacement and control. If we simply choose to continue the traditional "firing line" concept, we'll waste the

As I was reading the February 1989 issue of *Field Artillery*, I was elated to see how professionally the Pathfinder Division has adapted to the 3x8 concept ["3x8 Matures for Pathfinder's Power" by Colonel John M. Pickler and Major Mark P. Gay]. As a former battery commander in the 8th Infantry Division Artillery, I remember routinely conducting non-standard, BCS [battery computer syssem]-controlled split-battery operations with only one fire direction center (FDC). Now that each platoon has its own FDC, split-battery operations are a matter of SOP [standing operating procedures].

Although I found the discussion of the various 3x8 employment concepts in this issue interesting, I was concerned that we continue to debate tactics only after we field a new piece of equipment or change tables of organization and equipment (TOEs). Since most of the recent changes have required only minor adjustments in tactics, this kind of "posterior" thinking has been sufficient. However, in the not-so-distant future, we're going to face a radical alteration in the way we do business, for the fielding of the M109 howitzer improvement program (HIP) is just around the corner.

major advantage the M109 HIP offers — *flexibility*. On the other hand, if we adopt the radical "roving gun" or MLRS [multiple launch rocket system] concept, it would likely lead to chaos in the "real estate" management section at division G3.

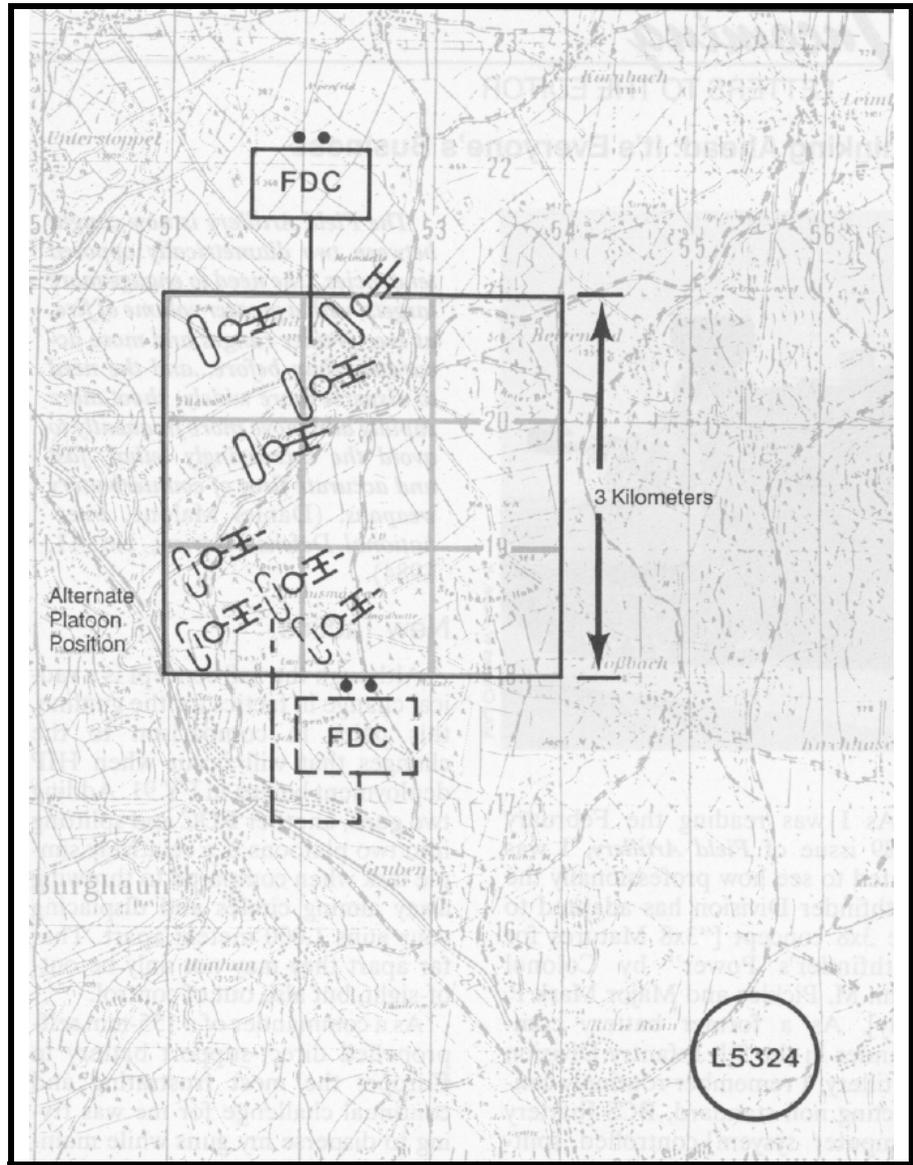
In the direct-support business, the urgency of the mission requires us to find the correct balance that maximizes the HIP's impressive capabilities while meeting the "responsiveness needs" of the force commander. By responsiveness needs, I mean we must efficiently control logistics, movement and security missions so the maximum number of guns is ready and responsive when called on.

**Increased Responsibilities.** In looking for a solution, we must try to imagine how HIP deployment will affect operations and personnel. I believe the greatest revolution will occur at the gun-chief level. The HIP gun chief will not only have to comprehend a sophisticated on-board computer, but also will face the additional challenge of increased tactical responsibilities (e.g., selection of firing positions, independent navigation and "piece" security). This will require us to retain the smart and energetic new troops we're getting now.

We also can expect greater challenges for future platoon leaders and battery commanders. Coordinating security, resupply and movements will require sound SOPs, good training and innovative thinking, which is the area I think we need to work on.

**Changed Emplacement.** If we continue to look for tree lines perpendicular to the azimuth of fire as logical gun emplacements, we'll never succeed at maximizing the HIP's potential. We should be looking at courtyards, gorges, secluded areas, etc., that provide improved protection from indirect fires, facilitate mobility and enhance logistical operations.

In the European scenario, the small town becomes the ideal platoon location. Urban terrain provides security and protection, as well as much-needed shelter and logistical support (e.g., fresh water, personal facilities, etc.). We need to visualize more than just howitzers on



The 3x3-Kilometer Method for Employing HIP Platoons

line. We need to picture the battlefield as it really is — villages and fields mixed with soldiers and weapons. By viewing the battlefield in this light, we can begin to look for ways to improve the way we do business.

**Greater Dispersion.** As previously stated, the key to successful HIP employment is to find a proper mix between dispersion and control. One possible option would be a 3x3-kilometer method. Using this method, a platoon is given a 3x3-kilometer position area. Within the area, the platoon leader selects a position about the size of a square kilometer and places a section in the vicinity of each corner and also selects another square as

an alternate position. The section chief would occupy his designated "corner," then select an alternate firing position independently. For security, the FDC could be located in the "early warning" perimeter formed by the square or randomly collocated near a firing section.

The size of the square, of course, would be tempered by the tempo of current operations, logistical and terrain limitations, threat considerations, etc. The flexible square formation places each piece at approximately equal distances apart, providing equally rapid response by all pieces to ground threats. Resupply could be done within the perimeter or through a "hot load" during

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displacements. Overall the concept works to maximize the HIP's ability to disperse, while maintaining some semblance of command and control.

## Conclusion

Although this is only a rough sketch of a deployment technique we could use, it represents the kind of innovative thinking we must do if we're to harness our future and provide the ground-gaining arms the quality of fire

support they have come to expect.

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***When armies begin to separate their thinkers from their fighters, they will have their thinking done by cowards and their fighting done by fools.***

Alexander the Great

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We must begin to discuss how we'll do hip-shoots, displacements, operations in LIC [low-intensity conflict], rear

operations, etc., all with this new technology in mind. The one reality we must face is the technological revolution has only just begun. Using these innovations to the greatest advantage will be the litmus test for us, as well as for future Redleg leaders everywhere. Let it not be said the Redleg corps wasn't ready. Let's start thinking together **now!**

CPT Brett E. Morris, FA  
*School of the Americas  
Fort Benning, GA*

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## USS Iowa Disaster

The tragic explosion aboard the Battleship USS *Iowa* reminds all cannoners of the danger in our profession. The time is now for the Navy to remove some of that danger and take a quantum leap into the future!

Conversion of the main armament of the Iowa-class battleships to liquid propellant will create a safer, more reliable system. The solid propellants in

current use are 1900-era technology, which led to the tragedy and the inaccurate fire experienced in Lebanon. Although the exact cause of the ignition of the propellant bags may never be known, the disaster fosters outcries for the retirement and scrapping of the Battleship.

The fire support community must stand behind the Navy in support of these necessary bombardment platforms. We

also must urge the Navy to take the step into the future and explore liquid propellants with us. Conversion of the Battleship's main armament to liquid propellants will truly achieve a "New Era of the Battleship."

CPT Patrick Calhoun, FA  
*Opns Off, HQ, WESTCOM  
Fort Shafter, HI*

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## Response to "USS Iowa Disaster"

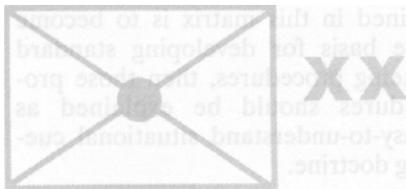
Congress has **mandated** that all systems fielded after 1993 be equipped with insensitive munitions. These munitions will reduce the possibilities of future tragedies, such as the one that occurred on the USS *Iowa*. The Field Artillery School is evaluating insensitive propellants for all future cannon, including liquid,

unicharge and electrothermal propellants. The School anticipates a decision on which insensitive propellant it will use in late FY 91.

E. Paul Gross  
*TSM-Cannon  
Field Artillery School*

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## Why We Formed Division Artilleries



Down through the years, there's been a raging argument going on. Many people believe division artilleries should be done away with and the artillery battalions assigned directly to brigades to control. I've always felt the division-artillery system worked the

best. Its flexibility negated any argument opposing it. But until now, I had no historical evidence. I found it in *Siegfried Line Campaign*, part of the "European Theatre of Operations" series of *History of the US Army in World War II*.

***The short-barreled 105-mm howitzer of the regimental cannon company also had contributed little in its normal role as artillery directly under control of the infantry regimental commander. Probably because the smooth-working relationship***

***between the infantry regiment and divisional artillery made the presence of the cannon company within the regiment unnecessary, many divisions shifted the company to the direct control of the divisional artillery to supplement its fires.***

I hope this will enlighten those who need it. This isn't some theory or opinion. It's what really happened.

CPT Stanley Lynn Grzybala, USAR  
*Vancouver, WA*

## The BOC and Scout Section Good — Add a UAV

Captain Thomas [J.] O'Donnell's article "3x8 Strategy: A Product Improvement" (February 1989) discusses improvements to battery operations at the 1st Armored Division Artillery. It appears the 3x8 reorganization is forcing innovative command concepts to emerge.

The artillery battery leadership is going through an evolution of control similar to business operations in the commercial sector. Peter Drucker, an eminent management expert, is coming out with a new book describing today's management environment and updating the management principles described in his book written some 40 years ago. In both cases, because of information technology, the control and directing functions are no longer bound by span of control (i.e., each supervisor in control of five to seven subordinates).

Today's leadership and management has expanded to a "span of communication" (i.e., how efficiently you communicate). Management is

looking for the most efficient way to conduct operations, and these concepts of operations usually evolve as a result of technological expansion.

Captain O'Donnell's battery operations center (BOC) has captured this trend in the artillery batteries of AirLand Battle. Commanders, because they're required to make quick survivability decisions that don't sacrifice the battery's fire support capability or jeopardize the commander's intent, can best accomplish this in tomorrow's wider battlefield with the BOC. Likewise, to assist the battery in its required reconnaissance, the scout section has furthered battery flexibility and efficiency.

To continue this trend, one could suggest the scout section look at employing small unmanned aerial vehicles (UAVs), probably the hovering type, to survey the forward routes and positions remotely. The UAVs could allow the battery leadership to conduct

remote route reconnaissance (R<sup>3</sup>) from their "drivers' seats." Acquired video from the R<sup>3</sup> could be dispersed to platoons to help them move to future sites. Insertion of an R<sup>3</sup> UAV into battery operations may improve the 3x8 strategy greatly, but the BOC has to be established first.

The R<sup>3</sup> is an example of process innovation that bridges the transition from span of control to span of communication. Under the span-of-communication concept, the organizations that can effectively and efficiently manage their information will be the survivors on today's global economic and military battlefields. Captain O'Donnell should be commended for his efforts to transform the artillery into a force of the future.

Dr. Jeffrey D. Cerny  
*Corporate Director*

*General Dynamics Defense Initiatives  
Arlington, VA*

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## Response to "Foxy Firefinder"

A very important aspect of the vulnerability of Firefinder was not addressed in Lieutenant Colonel Daniel A. Jurchenko's decision matrix in the article "Foxy Firefinder" (April 1989).



The first question in the matrix covers the threat's being from a ground or airborne system; however, it states "Airborne Threat situation not covered by this chart." There's a close relationship (both tactical and technical) between electronic detection and the airborne threat.

Also, the author says he "challenged" the two-minute radiation time and feels secure that the "worst possible scenario" could never occur. I challenge the author to explain under what conditions the worst possible scenario is not considered when planning and training for war. It's my understanding that combined training areas like the National Training Center, (NTC) Fort Irwin, California, and the Combat Maneuver Training Center at Hohenfels, West Germany, were designed specifically to train our forces under the conditions of the worst

possible scenario. The author contends that the proposed decision matrix is "applicable along the entire spectrum of combat" but has left out considerations of the airborne threat and the worst scenario — two important aspects of survivability.

Lastly, although logical deduction and flow charting are useful methods in some decision-making processes, I contend the proposed matrix is too "busy" and would result in the typical soldier or planner's ignoring its information. If the information contained in this matrix is to become the basis for developing standard cueing procedures, then those procedures should be explained as easy-to-understand situational cueing doctrine.

CW3(Ret.) Thomas Curran  
*Lawton, OK*

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## Response to "A Counterfire Concept for Light Divisions"

I read Major [Thomas J.] Costello's article ["A Counterfire Concept for Light Divisions," April 1989] with interest as I'm the tables of organization

and equipment (TOE) developer in the Field Artillery School for light units. I'd like to correct a minor error in his article and mention steps the School has

taken to alleviate some of the difficulties he encountered.

His Figure 3 outlining the personnel authorizations for the light division

**Field Artillery**

artillery (Div Arty) tactical operations center [Page 26] incorrectly lists the specialty of the intelligence officer as 74B, which is a chemical officer. The correct specialty is 35D Tactical Intelligence.

As a result of the light infantry division (LID) certification process and updated doctrine, the School revised the Div Arty TOE. The revised TOE is currently at Headquarters, Department of the Army, waiting approval. We expect these changes to be approved in early FY 90.

We increased the required number of FM radios in the tactical operations center (TOC) from four to eight to make the communications net structure of all divisions the same — light or heavy, tactical fire direction system (TACFIRE) or non-TACFIRE.

This gives the LIDs three operations/fire nets and the Div Arty command a net for internal communications. Two of the remaining four radios belong to the Div Arty S3. The others are on two external nets: division command and division intelligence. The new radio requirement is matched by changes in the personnel requirement of the TOC (see the chart).

The TOE revisions were staffed with the light infantry Div Artys in May 1988 and were briefed to Div Arty commanders or their representatives at Fort Sill in November 1988.

Title	Grade	MOS	Required
These positions are from Para 01, Command Section, of the TOE.			
S3	05	13A00	1
S2	04	35D00	1
These positions are in Para 04, Tactical Operations Center, of the TOE.			
Assistant S3	04	13A00	1
Operations Officer	04	13A00	2
Counterfire Officer	03	13D00	1
Chemical Officer	03	74B00	1
Operations Sergeant	E9	13Z50	1
Intelligence Sergeant	E8	13Z50	1
Fire Control NCO	E7	13C40	1
NBC Staff NCO	E7	54B40	1
Intelligence Sergeant	E6	96B30	1
Senior Fire Direction Specialist	E5	13E20	1
Intelligence Analyst	E5	96B20	1
Fire Direction Specialist	E4	13E10	2
Clerk Typist	E4	71L10	1
Intelligence Analyst	E4	96B10	1
Fire Direction Specialist	E3	13E10	2
Radio Team Chief*	E5	31C20	1
Single-Channel Radio Operator*	E4	31C10	1
Single-Channel Radio Operator*	E3	31C10	1
*These three positions are eliminated when the AN/GRC-193 is fielded, replacing the AN/GRC-106 radio.			

These personnel requirements for the light Div Arty TOCs match the new radio requirements for these Div Artys.

The School incorporated many of the same changes in the TOEs for the Air Assault and Airborne Div Artys. The revised TOEs for these Div Artys have been approved by Headquarters, Training and Doctrine Command; they still must be approved by Headquarters, Department of the Army. The Army structure also provides each of these divisions a target acquisition detachment

identical to those allocated to the light divisions.

The radio and personnel changes incorporated in all these TOE revisions are requirements, not authorizations. Authorizations may vary by unit and will be found in the unit's modified tables of organization and equipment (MTOE).

CPT Paul V. Kohl, IN  
*Directorate of Combat Developments  
 Field Artillery School*

## Another Response to "A Counterfire Concept for Light Divisions"

The article written by Major Costello, titled "A Counterfire Concept for Light Divisions," provides a well-written and forthright discussion about the design and fielding of a target acquisition detachment (TAD) to enhance the artillery capability of the light infantry division.

Unfortunately, the major challenge facing the light artilleryman

today is not his ability to accurately locate the threat or achieve the range to engage the threat, but rather his inability to place lethal munitions on the threat target area.

A recent Department of the Army decision to terminate the XM915/XM916 dual-purpose improved conventional munition (DPICM) programs will severely dilute the

force effectiveness of the light infantry divisions. Assuming we can accurately acquire the threat and achieve the prerequisite range to engage him, the bottom line is today's light artilleryman lacks the "punch" to effectively neutralize an enemy force.

Albert E. Smith  
*Senior Operations Research Analyst  
 Ground-Warfare Division  
 US Army Materiel Systems Analysis  
 Activity  
 Aberdeen Proving Ground, MD*

## Fire Support in the Light Infantry Division

In the February *Field Artillery*, I addressed the need to organize mortars

October 1989

into mortar units under the control of Field Artillery commanders ["Mortars

— A Field Artillery Weapon," Incoming]. I want to reinforce

this concept, using the example of a light division.

Previous articles in *Field Artillery* have addressed the question of fire support for the light division. Most concluded fire support is inadequate and advocated additional assets. These ranged from increasing the number of howitzers to acquiring 75-mm field guns. The answer to increasing fire support for light divisions lies not in increased quantities of weapons, but in changes in organization and doctrine.

First, consider a scenario of a light division infantry battalion airlifted by helicopter 35 kilometers into the enemy's rear area to seize a key installation. The remainder of the division is in corps reserve. The division artillery [Div Arty] has a reinforcing mission for a corps covering force artillery battalion. How can the commander increase the fire support available to the maneuver battalion with the Div Arty committed and without costly increases in weapons systems such as field guns?

## The Light Division

To answer this question we must first look at the light infantry division or LID. The division is an extremely flexible fighting force designed to operate either as a part of a larger force (usually a corps) or independently for up to 48 hours without augmentation. According to *FC 71-101 Light Infantry Division Operations*, dated 31 July 1984, it "is organized, equipped and trained to capitalize on its dismounted infantry capabilities."

**Design.** An austere organization gives the LID flexibility and the ability to respond to a variety of contingencies, both strategic and tactical. This same austerity, however, limits the LID. One of the most critical limitations is in the area of fire support. The light division doesn't have enough fire support and isn't organized to provide maximum fire support with available assets.

Currently, the fire support assets for the LID include a Div Arty consisting of three 105-mm howitzer battalions that provide direct support for each maneuver brigade and a 155-mm howitzer battery that provides general support for the division. According to

the Command and General Staff College's *Student Text 101-1 Organizational and Tactical Reference Data for the Army in the Field*, a "lack of medium fire support" is an organic limitation of the division. In addition to Field Artillery, each maneuver battalion in the LID has organic mortar assets.

Why is the question of the type and amount of fire support in the light division important? The first reason is based on the lightness of the maneuver elements of the division and their capability to conduct "standard operations." According to FC 71-101, to conduct offensive operations such as penetrations, maneuver units *must be task organized to provide maximum combat power at the point of penetration*. The current organization and concept of fire support of the LID precludes such task organization. The second reason is found in the specialized missions of the LID and the close terrain on which it is best suited to fight.

**Missions.** The LID is designed to conduct all types of offensive and defensive operations, but its light nature and foot and airmobile capability lend themselves to unique missions such as raid and infiltration missions, usually conducted by company-, battalion- and occasionally brigade-sized elements. The division also can establish temporary forward operating bases (TFOB) from which to launch ambushes and delay operations for up to 72 hours.

These same characteristics enable the light division to conduct operations in close terrain, such as mountains and built-up areas. Rear area operations are also a suitable mission for the LID when Level III threats are likely.

**Unique Fire Support.** The point is the LID has unique capabilities (and limitations) that require unique fire support. The fire support must be light and easily transportable by foot, vehicle or helicopter and must provide a high volume of firepower in difficult terrain. It must help the division meet one of the tenets of AirLand Battle operations, i.e., "*Superior combat power must be generated in critical areas*" [emphasis added] (FC 71-101).

Can the division's organic fire support

assets meet the needs of such a variety of missions, terrain and special operating conditions? Can these assets be task organized to provide superior combat power at critical points? The answer is they can't as currently organized.

## Organizational Alternatives

How can fire support be improved without degrading the unique capabilities that give the LID its strategic and tactical flexibility? There are several alternatives. First, of course, is the augmentation of the division's fire support by additional Field Artillery assets, either by TOE [tables of organization and equipment] or by external assets in the form of a Field Artillery brigade from corps. Increases in TOE assets are expensive. During a battle, artillery augmentation is not assured and, in any case, would increase significantly the number of C141 aircraft sorties above the 500 limitation to deploy the division. This would decrease the division's ability to react unilaterally in a contingency situation. The option of additional Field Artillery also fails to meet the need for light, easily transportable fire support that could accompany light infantry battalions on raids, infiltrations and TFOB operations.

A more viable alternative is reorganizing the mortars organic to the LID into mortar batteries in the Div Arty.

**Company Mortar Platoons.** To begin with, each rifle company should retain organic mortar platoons. There are times when a company will be operating in autonomous situations, conducting ambushes, raids and infiltrations. The 60-mm mortar is an excellent choice for this role because it's lightweight, has a good range and is destructive. The remaining mortars should be consolidated under the Div Arty in the form of a mortar battalion.

**The Div Arty Mortar Battalion.** Consolidation would have two benefits. First, it would enable the Div Arty commander to task organize **all** fire support assets to meet the tactical situation, something he can't do currently because of the rigid organization

of the LID fire support assets. The current Light Div Arty has just enough battalions to provide a unit in direct support of each brigade. The organic mortars are "locked in" to their respective maneuver units, providing no flexibility. Under the current system, LID operations are tailored to the factors of METT-T [mission, enemy, terrain, troops and time available], yet there's no way to address these factors using organic mortar units.

Task organization, coupled with the transportability of mortars, would enable the commander to concentrate needed indirect fire support at crucial points on the battlefield. He could create force multipliers and maintain flexibility to shift mortar units as necessary.

More importantly, consolidation will allow mortars to be available for fire support at all times. As stated in my previous letter, under the current system when a maneuver unit (the remainder of the division in our scenario) is in reserve for any reason, its organic mortars are in reserve also. This results in valuable firepower's being lost, a situation that the light division can't tolerate because of its already marginal fire support assets.

Consolidation would preclude such a situation. When a brigade, for instance, went into reserve, the mortars wouldn't because they would be a Div Arty asset. They would be available to the commander to task organize based on METT-T to provide much needed fire support to his committed forces.

Consolidation is more desirable than increases in cannon artillery for other reasons. It would increase fire support capabilities without requiring additional assets. Thus, the LID could maintain its strategic deployment capability in 500 C141 sorties. It also would result in increased fire support for raids, infiltrations and other small unit operations because mortars are more transportable by foot, vehicle or helicopter than artillery. Additionally, mortars with their high angle of fire are better suited than artillery for the close terrain in which light divisions may operate.

One may question the limitations of the mortar. The range of the improved 81-mm mortar is 5,600 meters and for the 107-mm mortar, 5,650 meters. But given the mobility limitations of the units they are to support, mortars can provide adequate coverage of fires and, because of their transportability, can

displace with the units they support. Task organization will enhance this capability further by allowing mortar units to provide reinforcing fires for one another as units displace. In addition, new explosive charges in mortar projectiles produce a bursting radius closely approximating the 105-mm howitzer currently in the Div Arty's. Mortars' extremely high rate of fire enables them to put as much "steel on the target" as slower-firing conventional artillery.

## Conclusion

So the answer lies not in adding numbers of artillery weapons to the LID to improve its fire support posture, but rather in reorganizing the existing organic fire support assets. In this scenario, the Div Arty commander has but to task organize his mortars into a package that will provide the much needed fire support to accompany the chosen battalion. The result will be a more flexible system providing increased firepower for the ground force commander.

MAJ James O. Harrison III, FA  
*Off. C/S, USFK/EUSA*  
*South Korea*

## 1990 History Writing Contest

The United States Field Artillery Association is having its fifth annual History Writing Contest with the winners to be published in the August edition of *Field Artillery*.

Send us your original, unpublished manuscript on the theme **Fire Support for the Maneuver Commander** by 2 January 1990 to compete. The Association will award cash prizes for the best manuscripts: First Place — \$300; Second Place — \$150; and Third Place — \$50. A manuscript can be designated Honorable Mention and be published in *Field Artillery* or the Association's "Forward Observer" newsletter.

Military or civilian, Association member or not — anyone with an interest in the history of the King of Battle can compete. By 2 January, send (1) a double-spaced typed manuscript of no more than 2,500 words, not including your



bibliography, (2) your biography and (3) graphics to support your article (maps, charts, crests, black and white or color slides or photographs, etc.) to:

**The United States  
 Field Artillery Association  
 ATTN: History Contest  
 Post Office Box 33027  
 Fort Sill, OK 73503-0027**

A panel of three expert historians will judge the manuscripts. The panel will use the following criteria:

- Relevance to Fire Support for the Maneuver Commander (20%)
- Usefulness to Today's Redlegs (30%)
- Historical Accuracy (20%)
- Originality (10%)
- Writing Effectiveness — Organization, Construction and Style (20%)

You can write your historical article on any aspect of the theme you wish; however, your thesis must include lessons learned that apply today.

# ***Danger Close: A Historical Perspective on Today's Close Support***



by Major Thomas G. Waller, Jr.



**W**e artillerymen are tempted to go a step beyond "greatest killer" and think "decisive arm," but we must not take the same theoretical detour as did the Allied air forces of World War II. No one arm will ever decide the outcome of battle. As *FM 100-5 Operations* states, today's and tomorrow's

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All artillerymen relish the historic, even poetic mystique of the volley and thunder of the guns. "Great battles are won by artillery," said Napoleon, and even though the Emperor may have been biased (he was a Redleg), there's no doubt the artillery is the greatest killer on the battlefield. With Copperhead, the Army tactical missile system (Army TACMS), sense and destroy armor (SADARM) and a host of other technological developments at hand, the Field Artillery is more deadly than ever.

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battles will be combined-arms battles, just as they have always been. AirLand Battle doctrine also maintains that despite advances in deep-attack capabilities, close operations will still decide success or failure.

An important question, then, is how well can we, the artillery, support the maneuver arms once the close battle is joined? This article suggests that when we lash historical perspectives of close support to current Field Artillery tactical doctrine and capabilities, we can't answer

that question with confidence that we can support them well enough.

## **The Environment of Close Support**

Both US and Soviet analysts agree that the next war will be unprecedented in its scope, lethality, complexity and swiftness. With today's longer-range weapons systems and new capabilities for long-range intelligence and target acquisition, FM 100-5 portrays a battlefield of much

greater breadth and depth than ever before.

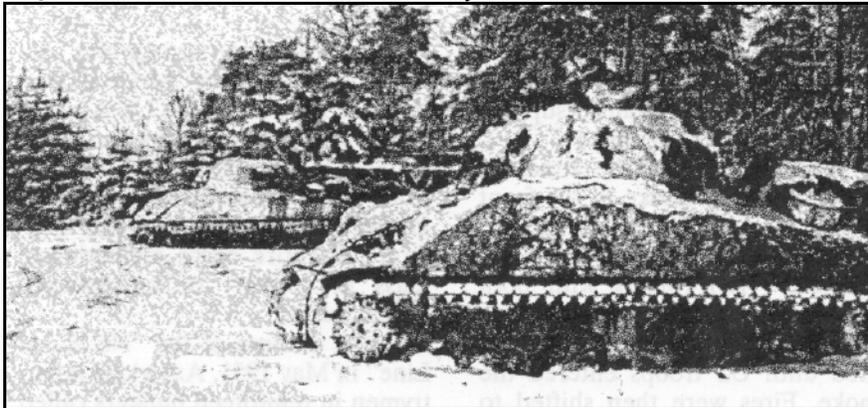
## The Threat

With a mission to defend approximately 60 kilometers of the inter-German border, US divisions in Europe will face an enemy three to five times their number. According to P.H. Vigor, author of *Soviet Blitzkrieg Theory* (1983), the Soviets not only will mass enormous amounts of combat power at points of their choosing, but also will emphasize speed and tempo in all operations, believing that "...one minute decides the success of battle, one hour the success of a campaign, and one day the fate of the war."

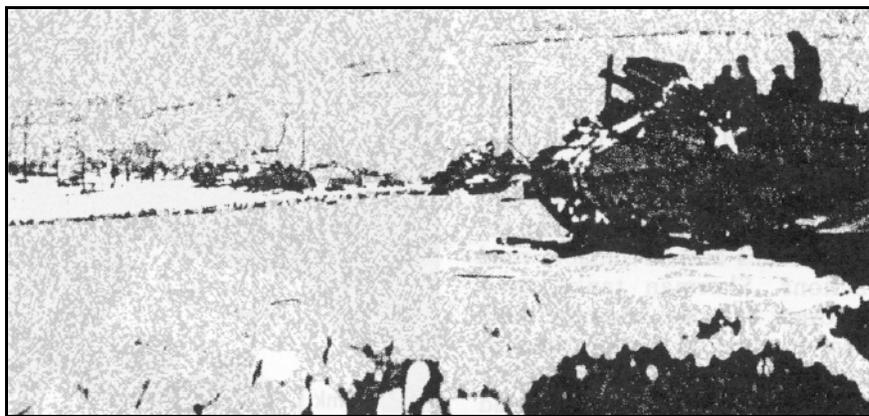
Our division commanders hope corps and division deep operations will delay and disrupt second-echelon divisions and regiments, allowing brigades to deal with first-echelon regiments in close operations. At best and if all goes according to plan, US brigades still will be outnumbered two or three to one in maneuver and outgunned to a greater degree in artillery.

## The Terrain and Weather

The terrain of Europe won't help us engage the enemy at the maximum effective ranges of our weapons. Huge urban sprawls in northern Germany make combat in built-up areas on a large scale unavoidable. Much of the non-urbanized terrain to the south is the mountainous, forested areas such as the Hohe Rhon, Spessarts or the Vosges. Such terrain will limit the line of sight of our weapons and the operating ranges of our radios.



Tanks of the 7th Armored Division are in a temporary position at St. Vith.



The M7 105-mm self-propelled howitzers in action in the Battle of the Bulge. The artillery provided danger-close fires to stop German tanks, allowing maneuver elements to finish them off.

The normal weather patterns of Europe, likewise, will allow the enemy to close with our main brigade positions. As former Commander of US Army, Europe, General Frederick Kroesen said:

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***We cannot hit what we cannot see, and the 14 hours of darkness in midwinter, snow, rain, and the many days throughout the year when fog lasts until noon or even all day are limitations that today's weaponry cannot readily overcome. The same is true of our opponent's weapons. Those realities and the availability of tactical smoke-generating devices in abundance lead me to believe that the next war will be won or lost at the 300 meter range, just as in the past.***

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Thus when the close battle is joined, it will be characterized by non-linear, highly fluid, extremely violent operations across the full range of brigade and division areas. By that time, the division commander

will have shifted the priority of his fire support to units in contact. What will he expect his Field Artillery to accomplish?

## History of Close-Support Tasks

Since the advent of AirLand Battle, artillery doctrine and weapons capabilities have been enticed "over the hill" to deep attack. While we faithfully acknowledge our duty to provide close support to our maneuver forces, years of peace have caused us to forget the sophisticated nature of close support — how close is "close," how fast is "timely" and just what is it we are trying to accomplish with our devastating fires? Historical experience in World War II, Korea, Vietnam and the Middle East suggests that "close" is far closer in time and distance than we currently think of and prepare or train for.

## World War II

"Danger close" today means something out of the ordinary, calling for unusual procedures. In World War II, such fires were routine.

**The Battle of the Bulge.** The performance of the 7th Armored Division Artillery at St. Vith during the Battle of the Bulge offers a useful example of danger-close support. In the Battle, the Germans massed elements of three Panzer armies against VIII Corps (US), much as the Soviets would do in a breakthrough sector in Europe today.

Massing large numbers of tanks and motorized infantry and supported by large numbers of assault guns and heavy artillery, the Germans attacked St. Vith from three sides. The infantry of Brigadier General Bruce Palmer's Combat Command B, 7th Armored Division, set up kill zones around suitable road junctions. Sherman tanks, tank destroyers, bazookas and other tank killers oriented on the kill zones at close ranges, while division artillery units planned targets on the road junctions. As stated by Gregory Fontenot in his Fort Leavenworth monograph "The Lucky Seventh in the Bulge" (1985), the idea was to "suck in enemy armor, stop it with massed artillery, then KO Jerry tanks at close range with our Shermans."

The maximum effective range of a Sherman tank was 1,500 meters, but "close range" was much closer. Battalion Commander Lieutenant Colonel Frank W. Norris wrote in his *Field Artillery Journal* article titled "In France with the Mediums" (March 1945):

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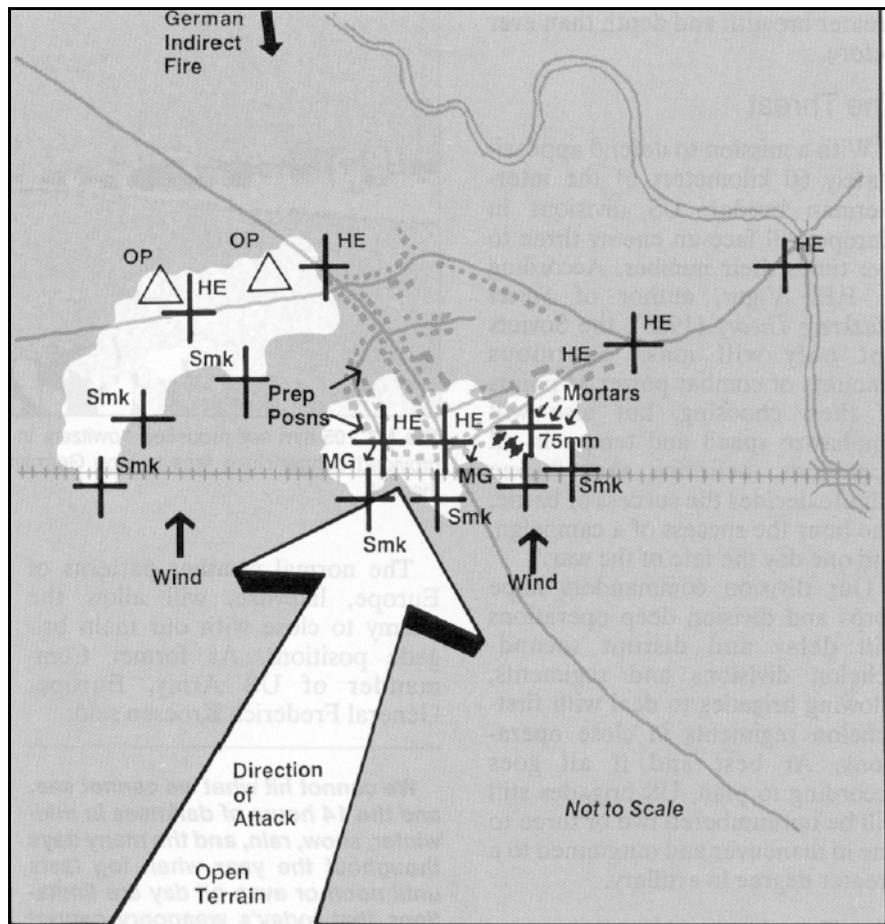
***Each unit should be prepared for a drastic revision of its ideas concerning how artillery fire may be placed to its supported troops. They must be prepared to adjust on tanks within 75 yards of OPs [observation points], to fire battery volleys within 125 yards of infantry and battalion volleys within 200 yards.***

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Considering the effects of weather and terrain in Europe and the fact that Warsaw Pact vehicles are much faster and more maneuverable than World War II tanks, Colonel Norris' estimate seems more than valid today.

Instructive is the fact that the 7th Division Artillery fired no counter-fire, "counterflak" or harassing and interdiction fires. In one day, three artillery battalions fired 185 missions, more than 4,000 rounds, on purely close support. They had time for nothing else, and nothing was more important.

**Kaltenhouse.** Offensive operations always have depended on precisely timing the integration of maneuver and fire support. Another World War II example demonstrates how danger-close fire support can



Kaltenhouse. The integration of danger-close artillery firing smoke (Smk) and HE enabled the 1st Battalion, 315th Infantry, to seize a town defended by 150 Germans and suffer only four wounded.

pave the way to success. The 1st Battalion, 315th Infantry, faced a formidable objective in the town of Kaltenhouse, Germany, in December 1944.

Approximately 100-150 Germans were dug-in or positioned in buildings with excellent fields of fire across an open meadow. The Germans were supported by indirect-fire artillery, 80-mm mortars and 75-mm assault guns. The only route the 1st Battalion could take was across 1,000 meters of open terrain. (See the map of the fire plan to support the attack on Kaltenhouse.)

The artillery began the attack by laying screening smoke to the front of the town, which blew across and into the enemy positions. The high-explosive (HE) rounds with both time and delay fuzes were fired to keep the enemy down and were not lifted until US troops entered the smoke. Fires were then shifted to blocking targets, which prevented

reinforcement or escape. The Battalion was able to cross the open terrain, attack and seize this tough objective, capturing 28 prisoners in the process while suffering only four friendly casualties. This could not have been done without danger-close fire support's suppressing the enemy positions until US troops were on top of them.

## Korea

The dispersed strongpoint defense envisioned by AirLand Battle was forced upon the US Army in Korea by the massive invasion of the Chinese in December 1950. We take pride in the accomplishments of the artillery in Korea where it was common for entire corps artilleries to mass in support of beleaguered infantry units.

In the defense of the "No Name Line" in May 1951, American infantrymen in reinforced bunkers called in tons of artillery around and on

their own positions. One artillery battalion fired more than 11,000 close-support rounds in just six hours.

General Almond, X Corps Commander, explained later how infantry battalions were sometimes extracted from encirclements using the "box barrage." Artillery would fire on all four sides of the withdrawing unit and would lift one side at precisely the right moment for the breakout. Artillery indeed dominated the battlefield in Korea, but it did so at extremely close range, often within 50 meters of friendly positions.

## Vietnam

Tactical dispersal became even more necessary in Vietnam than in Korea due to the nature of the enemy's guerrilla warfare. Units often were widely dispersed and isolated from mutual support.

Additionally, Vietnam demonstrated a new degree of fluidity that begins to approach the present-day battlefield in the large-scale use of airmobile forces. An example is the Battle for Landing Zone (LZ) X-Ray in which the 1st Squadron, 7th Cavalry, air assaulted into the middle of a North Vietnamese regiment. Two batteries of artillery had been flown in earlier and had taken up positions about eight kilometers away to provide close-support fires.

Suffering determined attacks from all sides, 7th Cavalry observers called for artillery and air support. Throughout the night, the two batteries fired more than 4,000 rounds so close that the "troops felt hot shell fragments whistle over their heads," according to Colonel Robert H. Scales, Jr., in his unpublished paper



Israeli General Adan talks with one of his brigade commanders. His Division paid a heavy price for attacking a prepared Egyptian defense without adequate suppressive fire support.

from the National War College "Firepower in Small Wars" (1985). Air Force aircraft orbited on station for more than 40 hours, attacking a close target every 15 minutes.

Colonel Scales concluded that the ultimate survival of the 7th Cavalry can be attributed to the close support it received. This example illustrates the special fire support requirements of dispersed and fluid operations, which we routinely can expect in the next war.

## The Middle East

We saw how suppressive fires contributed to the success of an offensive operation in World War II. Suppression is even more vital to the success of offensive operations in the extremely lethal environment created by today's precision-guided direct- and indirect-fire weapons.

General Bren Adan of the Israeli Army got a taste of this lethality and discovered the importance of close support in 1973.

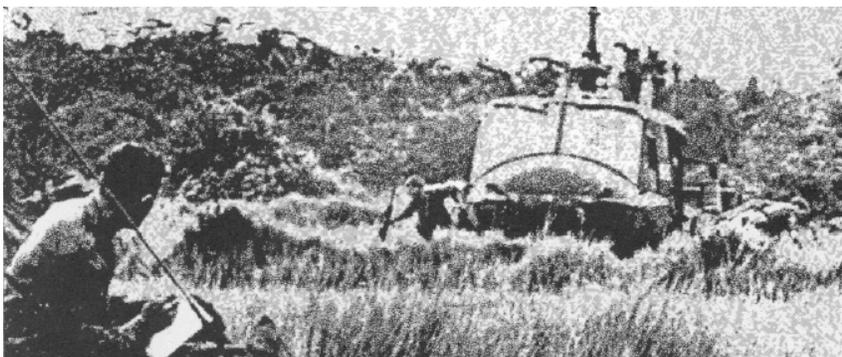
After the Egyptians conducted a brilliant, surprise crossing of the Suez Canal to open the Yom Kippur War, the Israelis launched their only available division, commanded by General Adan, to counterattack the bridgehead. In the interwar years since 1967, Israel had come to rely too heavily on the idea that tanks kill tanks and had neglected the synergistic effect created by combined arms. While the Israeli Air Force fought the air-to-air battle, the Adan Division attacked with virtually no fire support. Only two batteries of artillery supported a two-brigade assault.

The Egyptians, dug-in and equipped with wire-guided Sagger anti-tank missiles, killed 18 of 25 tanks in one brigade and 15 of 25 in the other. Of 100 Israeli tanks eventually committed, 70 were hit.

The Adan Division ended up 8 October withdrawing and fighting off counterattacks. As this example shows, without close, suppressive fire support, offensive operations are destined for failure.

## Today's Close-Support Tasks

Today's and tomorrow's battles will see the US Army's fighting the numbers that the 7th Armored Division



Units in Vietnam were often widely dispersed because of the nature of the enemy's guerrilla warfare.

fought in December 1944, and the X Corps fought in Korea in 1951. It will have to deal with the fluidity and dispersal seen in Vietnam. The US Army will face an even more lethal environment than that faced by the Adan Division in October 1973.

While deep operations are essential, we must see them as a shaper of the decisive close battle. If the artillery focuses too much of its effort in doctrine, weapons development and training on killing tanks deep, then we have "signed up" for a battle of attrition. Against the Soviets, *we will lose*.

As Colonel W.F. Millice wrote in his article "If Ordered to the Armored Force," *Field Artillery Journal* (May 1943), "tankers cannot dig foxholes — when they need help, they need it now and in volume, not next week in small quantities."

When supported maneuver calls for close support, they'll mean anywhere from 50 to 300 meters. When they want "timely" fires, they'll mean now and with devastating volume. The artillery routinely will have to bring fires within a hairsbreadth of friendly troops, protecting them and shaping their battle.

We must do this with finesse as a key player in a combined-arms team. Our soul-searching question, then, remains — can we meet these demands?

## Demands on Field Artillery

Space doesn't permit a rigorous analysis of this question. Adopting the grand jury approach, however, is there enough evidence that we need a more in-depth investigation or at least to instill concern and action among Field Artillerymen? Let us look briefly at today's structure for close support — our organization, tools and doctrine.

### Organization

In World War II, corps artilleries usually conducted counterfire and interdiction missions, while division artilleries concentrated on close support. To accomplish these special missions, a corps artillery retained some of its units, usually the heavier guns, and attached or assigned reinforcing missions to the other battalions

to support division artilleries. The battalions that supported divisions almost always reinforced direct-support battalions with close support fires.

The important point is that significant elements of corps artillery were involved in providing close support while the remainder conducted counterfire, interdiction and other special missions. Division artilleries focused primarily and almost exclusively on direct, close-support fire, supplemented from corps.

After the Korean War, corps artillery units were organized into Field Artillery groups, which then could be assigned missions supporting divisions or retained under corps control. These groups evolved into the current Field Artillery brigades, but their roles remain essentially the same.

Field Artillery brigades can perform some of the special missions, but today they neither train for, nor are they equipped to provide close-support fires. If a Field Artillery brigade supports a division, it receives its mission from the division artillery commander who, under current doctrine, is now responsible not only for close support, but also for counter-fire and tactical interdiction. In other words, the division artillery isn't free to focus its attention on close support as it was in World War II and Korea. Further, corps artillery is fast losing the means to supplement the close-support effort.

### Tools

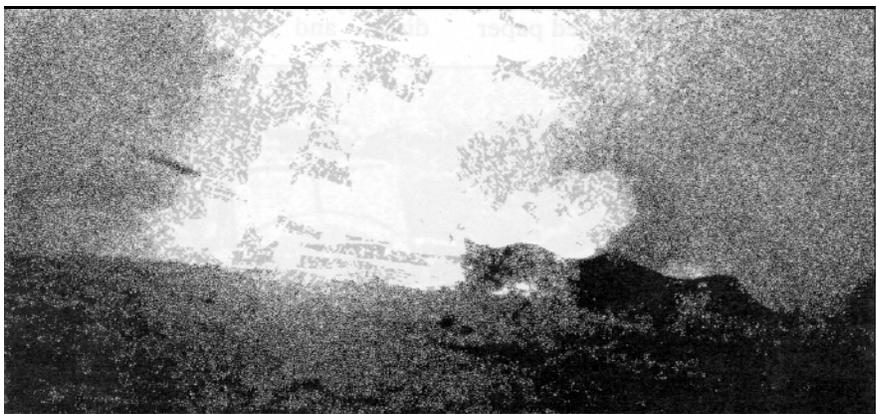
Command and control architecture looks to centralize control of artillery. The fundamental idea of

massing all available fires on the most critical targets is made possible by the tactical fire direction system (TACFIRE) and in the future to an even greater extent by the advanced Field Artillery tactical data system (AFATDS). Taken to its logical conclusion, this concept offers the spectre of an inanimate, complex network designed to kill the most things in the most efficient way.

According to Lieutenant Colonel Robert Zawilski in his article "A Redleg Potpourri," *Field Artillery Journal* (September-October 1985), TACFIRE can't accurately and efficiently discriminate between high-priority missions when targets are dense. Unfortunately, the close battle envisioned by FM 100-5 will be an environment rich with high-priority targets. Sorting through to the right target choices is complex. And as Clausewitz stated, "in war, even the easy things become difficult."

Such a system is attrition-based and isn't flexible or agile enough for the close-support demands of maneuver warfare. We could conceivably fire tremendous counterfire and devastating interdiction and still lose the war because the crucial battles are being fought at the 300-meter line.

Our weapons exacerbate the problem. The multiple launch rocket system (MLRS) has already replaced 8-inch howitzer units in divisions and ultimately will replace them all. As already noted, in past wars all division artillery units and many corps artillery battalions fired danger-close support. MLRS simply can't do that. *FM 6-60 MLRS Operations* states categorically that MLRS



The MLRS units are replacing our 8-inch units, yet MLRS lacks the precision necessary for close support.

fires lack the precision necessary for close support.

Further, even the cannon battalions in our division artilleries are stocking a preponderance of improved conventional munitions (ICM) over HE rounds. The ICM can't be fired with the 75- to 300-meter precision required of close-support fires. Our direct-support units also carry a number of interdiction-type rounds — Copperhead, rocket-assisted projectiles (RAP) and family of scatterable mines (FASCAM) rounds, all of which displace the close-support round of choice, HE. And all of these support an attrition-based doctrine.

### Doctrine

The doctrinal trend emanating from the Training and Doctrine Command (TRADOC) is a product of the now famous Fire Support Mission Area Analysis, which states that our relative edge in technology gives

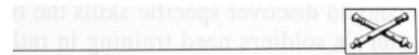
us an edge in the "over-the-hill" battle. Deep attack (now an outdated term) attracted long-range thinking like a lightning rod. We now know our technological edge is fading, and we never knew if we could accomplish the degree of attrition required to force the enemy to do our will. If we think we can win today's and tomorrow's battles over the hill, then we do so at our peril.

### Conclusion

Certainly we must continue to develop our capabilities to attack the enemy in depth. But we should make our real challenge (the focus of our minds and hearts as well as our resources) dominating the area a stone's throw in front of Private Jones' foxhole. That's the heritage of the gunners of St. Vith, No-Name Ridge and LZ X-Ray.

Our maneuver brothers will have to look the enemy in the eye and

defeat him. We in the artillery must help make that happen.



**Major (P) Thomas G. Waller, Jr., is the S3 of the 72d Field Artillery Brigade in West Germany. He won the 1989 US Field Artillery Association's History Writing Contest with this article. Major Waller holds a Master's of Arts in Asian Studies from the University of Michigan and a Master's of Military Arts and Science from the Command and General Staff College, Fort Leavenworth, Kansas. He's a graduate of the School of Advanced Military Studies, Fort Leavenworth, and taught history at the US Military Academy at West Point. Major Waller has held several Field Artillery positions, including as the S3 of the 2d Battalion, 319th Airborne Field Artillery Regiment, 82d Airborne Division Artillery, Fort Bragg, North Carolina, and as a battery commander in the 1st Battalion, 3d Field Artillery, 2d Armored Division (Forward), West Germany.**

# Redleg News

## ITEMS OF GENERAL INTEREST

### Drill Sergeants Needed

The US Total Army Personnel Command (PERSCOM) Field Artillery Enlisted Branch is looking for qualified soldiers to become drill sergeants. Currently, PERSCOM needs soldiers in military occupational specialty (MOS) 13B Cannon Crewman to volunteer for drill sergeant duty.

However, permanent-change-of-station (PCS) constraints have given priority selection to MOS 13B soldiers in the grades of staff sergeant and sergeant first class stationed

overseas. Overseas volunteers should submit their applications 10 months before their date of estimated return from overseas (DEROS).

The eligibility criteria and general policies for drill sergeant applications are in Army Regulation 614-200 Selection of Enlisted Soldiers for Training and Assignment.

Soldiers who are interested in volunteering for drill sergeant duty should contact their local personnel service center (PSC) or the PERSCOM Field Artillery Enlisted Branch at AUTOVON 221-0304.

### Transfer Article 15

Any Field Artillery soldier with an Article 15 in the performance fiche of his official military personnel file (OMPF) may request it be transferred to the restricted file. Army Regulation 27-10 Uniform Code of Military Justice allows a soldier, staff sergeant and above, to provide evidence the intended purpose of the punishment has been served and the transfer is in the best interests of the Army. The soldier should send a memorandum directly to the President, Department of the Army Suitability Evaluation Board, Headquarters, Department of the Army (DAPC-MPCPE); Washington, D.C. 20310.

If the request is approved, the Article 15 will be transferred to the restricted file and removed from the military personnel

records jacket (MPRJ). If the request is denied, the soldier may then petition the Army Board for Correction of Military Records (ABCMR). For more information about this action, soldiers should contact their local PSCs or the PERSCOM Field Artillery Enlisted Branch at AUTOVON 221-0304.

#### Criteria for Transfer of Article 15

- At least one year since the Article 15 was administered.
- At least one NCO or senior enlisted evaluation report since the Article 15.
- Severity of offense.
- Effect the Article 15 has on the soldier's career.
- Recommendation of the soldier's chain of command.
- Quality of the soldier's evidence and argument for Article 15 transfer.

# *Kasserine, the Bulge and AirLand Battle — Changes in the Tactical Role of Corps Artillery*

by Lieutenant Colonel Joseph R. Cerami

Although the 1976 version of FM 100-5 may have represented what Robert A. Doughty (in his Leavenworth Paper "The Evolution of US Army Tactical Doctrine 1946-1976," August 1979) calls the "zenith of emphasis on firepower during the three decades since World War II," its active defense doctrine was a major setback for the corps artillery. The active defense's emphasis on the division as the major war-fighting headquarters led to significant changes in the corps artillery.

**Corps plan and conduct major operations and battles. They synchronize tactical activities, including the maneuver of their divisions, the fires of their artillery units and supporting aerial forces, and the actions of their combat support and combat service support units.**

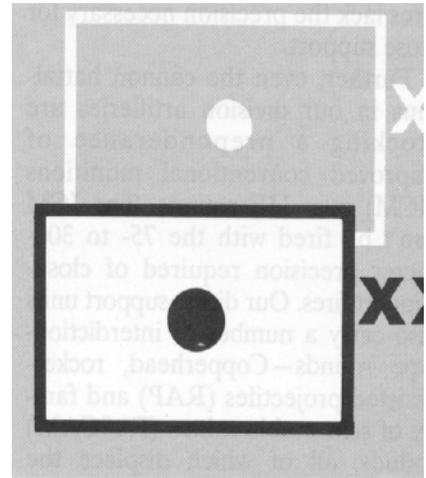
*FM 100-5 Operations*



In 1976, the counterfire mission was moved from the corps to the division level. Then in 1977, the corps artillery headquarters and headquarters battery was reduced to a fire support section. The corps artillery's World War II role as a tactical command and control headquarters declined, and under the active defense it became primarily an allocator of resources. This was to change 10 years later with the reestablishment of the headquarters battery and the re-emphasis on the importance of the tactical role of the corps and the corps artillery in AirLand Battle.

Fully understanding the significance of the role of the corps artillery in AirLand Battle requires historical perspective. Looking at World War II, the American Army's last major conflict involving the extensive use of corps artilleries in large-scale maneuver warfare, provides insights for evaluating the corps artillery's current capability to meet the challenges of the AirLand battlefield.

This article examines changes in the tactical role of the corps artillery in World War II by comparing the use of artillery in two battles —



Kasserine Pass, North Africa, and the Bulge, Western Europe. Studying the development of the corps artillery during World War II also provides insights into the role of combat experience as an agent of change.

***We won the War and it was largely won by the artillery. I think it is very important that you now record on paper what you did (not what you think you did), so that the artillery in the next war can start off where you stopped.***

*General George S. Patton, Jr.  
30 May 1945*

Kasserine is one of the American Army's well-known, chaotic first battles. The Bulge includes the heroic episode of the relief of Bastogne and shows the Army at the high point of its fighting skills in World War II.

The comparison is one of marked contrasts. Kasserine was essentially a defensive operation while III Corps operations in the Bulge were offensive. Kasserine is an example of an army that lacked combat experience. The Bulge shows an army hardened by several years of combat in North Africa, Italy and Western Europe. Finally, Kasserine shows an army unable to synchronize its actions while the Bulge demonstrates the payoffs of synchronized operations.

## **Battle of Kasserine Pass**

The Battle of Kasserine Pass in February 1943 included eight engagements.

There were examples of both grave failures and significant successes. The three dimensions of synchronization — space, time and unity of purpose — provide a framework for exploring both the failures and successes during the engagements and the use of artillery in the Battle.

Early in the Battle, the Germans provided an example of synchronized operations. They demonstrated the effectiveness of a deep attack well-coordinated with a close battle.

**As a consequence of the Battle of Kasserine Pass, the US Army instituted many changes. Officers worked to improve fire-direction control, to obtain better battlefield intelligence and to gain more effective air support.**

Martin Blumenson  
"Kasserine Pass"  
America's First Battles,  
1776-1965 (1986)

### Engagement Failures

A planned American counterattack by Combat Command C of the 1st Armored Division was hit with long-range German field artillery and a coordinated air attack "at just the critical moment when the [US] units were massed for attack" (David W. Hazen's master's thesis "The Role of Field Artillery in the Battle of Kasserine Pass," Command and General Staff College or CGSC, 1973). The result was that the planned dawn counterattack was disrupted and delayed with the US force unable to cross the line of departure until after noon. Then German infantry, tanks, air and artillery succeeded in knocking out 50 US tanks. The American tank battalion commander was captured, and 15 officers and 298 enlisted men were reported missing.

**Space.** Initially for US forces, it was a question of learning from their mistakes. For example, the engagement at Sidi bou Zid, Tunisia, is the story of an overall failure to synchronize forces. In terms of space-time relationships, the artillery was often at the wrong place at the wrong time.

One corps medium artillery battalion was overrun during the fight. "As if forgotten," it remained east of Sidi bou Zid during an American withdrawal to the west and was overrun, losing all 18 of its howitzers (Hazen). The shortage of artillery also contributed to the rout. In addition, the artillery often was positioned where it could not support the battle.

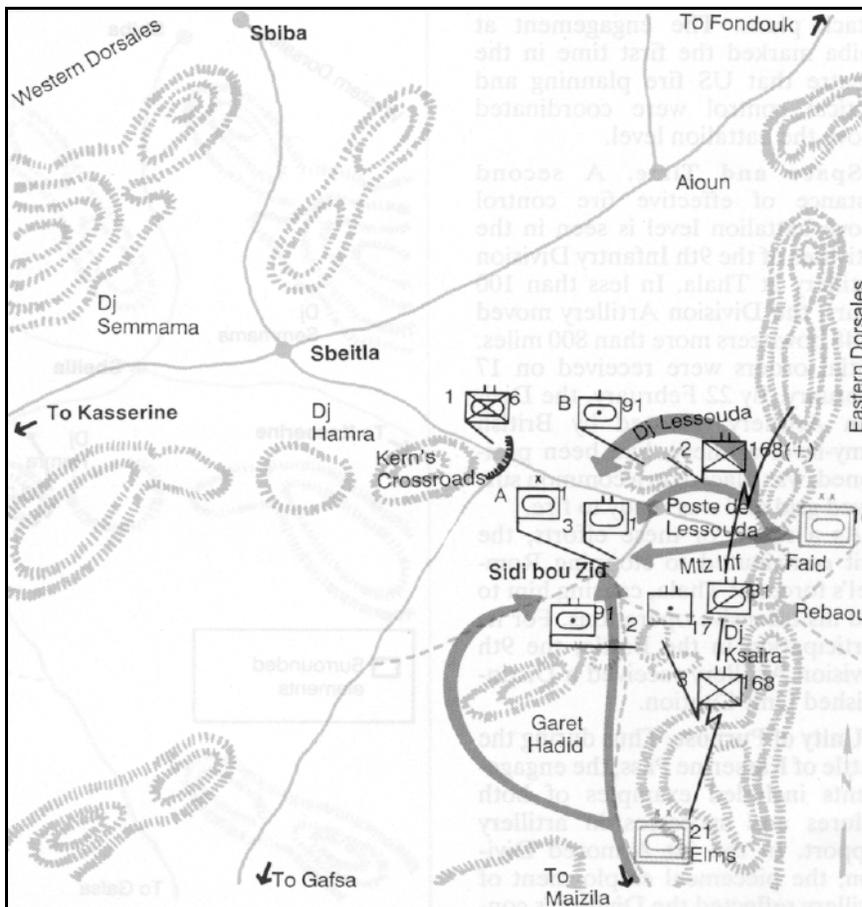
**Time.** The factor of time also worked against the US forces' planning and execution at Sidi bou Zid. One example is the case of three forward observer parties' joining Combat Command C just before the engagement, unaware of the maneuver unit's plans, formations or even radio net procedures. The overrun battalion east of Sidi bou Zid was also a victim of poor timing. It wasn't ordered to move until it was too late.

**Unity of Purpose.** Overall, the lack of unity of purpose accounts for a great deal of the confusion at Kasserine. The problems of Major General

Lloyd Fredendall, the II Corps Commander, have been reviewed in several writings. As the situation developed and Fredendall lost control of his own forces, the problem worsened. As Hazen wrote, "In lieu of a single commander's providing unity, in the Kasserine area alone there were more than nine major commanders with their fingers in the command pie."

The lack of effective unity of purpose, especially at the corps level, led to inefficient planning and coordination and "bore heavily on the artillery's ability to support" (Hazen). In part, this accounts for the observation that at Sidi bou Zid "artillery support was practically nonexistent" (Hazen). The fire support problems were aggravated by the fact that throughout the Battle of Kasserine Pass, there was no artillery commander at II Corps.

It wasn't until after the Battle on 6 March 1943 that the 13th Field Artillery Brigade finally joined II Corps



The Germans attack Sidi bou Zid from Faid Pass on 14 February 1943.

as its corps artillery. The lack of a controlling corps artillery headquarters accounts, in part, for the misuse of artillery assets and the loss of effective fire support.

### Engagement Successes

During the Battle of Kasserine Pass in the engagements after Sidi bou Zid when artillery was much more effective, it was the unity of purpose of well-led and well-trained division artilleries that made a difference. At Sbiba, the 34th Infantry Division Artillery maintained its unit integrity, deploying under the effective command and control of the division artillery commander.

The engagement at Sbiba is an example of a well-synchronized operation by US forces. One hundred artillery concentrations were planned on and around minefields covered by an American infantry division in prepared defensive positions. The strong defense enhanced by the accurate and high volume of artillery fires led Rommel to alter his attack plans. The engagement at Sbiba marked the first time in the theatre that US fire planning and tactical control were coordinated above the battalion level.

**Space and Time.** A second instance of effective fire control above battalion level is seen in the activities of the 9th Infantry Division Artillery at Thala. In less than 100 hours, the Division Artillery moved its 48 howitzers more than 800 miles. Initial orders were received on 17 February. By 22 February, the Division Artillery, assisted by British army-level artillery, had been positioned, was placed on a common surveyed grid and was ready to fire.

As a result of these efforts, the unit contributed to stopping Rommel's forces at Thala, causing him to end his offensive operations. For its participation in the Battle, the 9th Division Artillery received a Distinguished Unit Citation.

**Unity of Purpose.** Thus during the Battle of Kasserine Pass, the engagements included examples of both failures and successes in artillery support. In the 1st Armored Division, the piecemeal employment of artillery reflected the Division's confusion concerning the appropriate

role of artillery in mechanized warfare. One participant noted the Division's treatment of artillerymen as "another bunch of tankers and, at that, ones who could not keep up" (Hazen). In contrast, the 9th Division Artillery "functioned as a unit in textbook fashion" (Hazen).

The American artillery doctrine at the time recognized the importance of unit integrity and maintaining centralized control for massing fires. It was a lesson learned from the French in World War I. "By the end of the last war [World War I], great masses of artillery were directly controlled by the corps artillery commander, a major general on the staff of the corps commander" (John A. Crane, "What makes an Army," *Military Review*, September 1944).

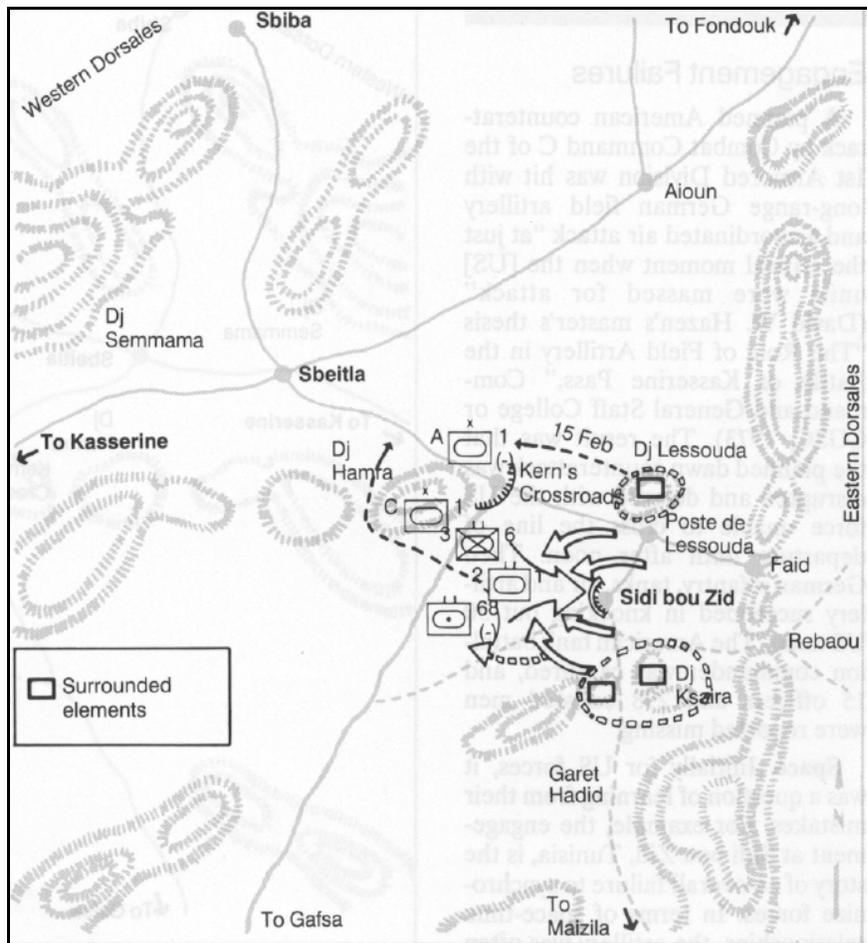
### Organization and Control Failures

In part, the artillery failures at

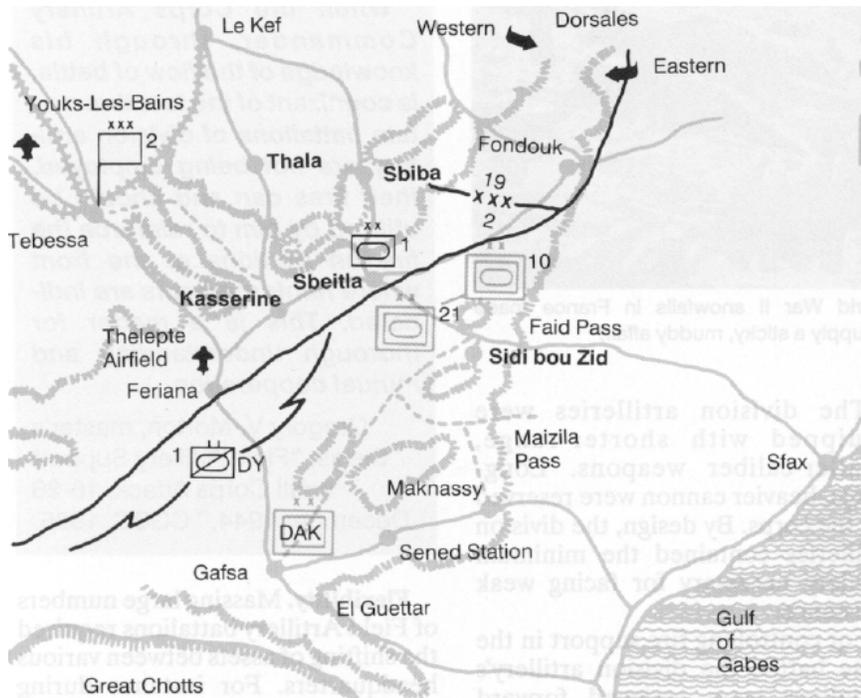
Kasserine Pass were due to organizational problems at the division and corps levels. There were two major causes of failure. First, the Allied commanders failed to employ US formations as integral units, with corps and divisions "split into small parcels and physically separated" (Blumenson). This wasn't in accordance with established American doctrine. Compounding the problem was the fact that artillery commands had been designed to function at the corps and division levels.

Second, there was a failure to achieve centralized control of Field Artillery, which also was in the doctrine of the time. Corps artillery battalions and some divisional Field Artillery battalions were either attached to maneuver units or placed in supporting roles without the control of a higher artillery headquarters.

Artillery doctrine also called for having heavy, long-range weapons



US II Corps units counterattack at Sidi bou Zid on 15 February 1943.



The US II Corps' defensive line on 16 February 1943 after the engagement at Sidi bou Zid.

for counterbattery, reinforcing and general support fires available for the division and corps commanders. A 1944 article by D.S. Sommerville, an instructor in the Field Artillery School, titled "Corps Artillery Fires in Combat" and published in *Military Review*, explained the role of the corps artillery in combat:

**Corps artillery executes two general types of fires:**

1. Fires in support of the corps as a whole. These include counterbattery, long-range interdiction, etc. Targets are obtained by long-range observation, higher echelons of intelligence, map study, etc., or may be prescribed by the force commander.
2. Fires reinforcing the division artillery. These are against targets reported by division artillery observers and are usually fired on call, although fires requested by the division are also included in prearranged schedules. Reinforcing fires constitute the majority of missions executed by the corps artillery.

The purpose of long-range artillery was (and still is) to add depth to the battlefield, give weight to the critical sector and permit the higher-level commanders to influence the action. At Kasserine, there were no

heavy or long-range weapons assigned to II Corps. It wasn't until the end of 1943 that new heavy and long-range howitzers and guns were added to the corps artillery. For the remainder of the War, however, greater proportions of the heavier weapons were assigned in support of major formations.

**Organization Changes**

In sum, Kasserine demonstrated the importance of massed fire at the division artillery level and revealed the weaknesses in organizational structure, combined-arms training and equipment at the corps level. After Kasserine, the Commander of Army Ground Forces Lieutenant General Leslie J. McNair, a Redleg, reorganized the corps to achieve greater mobility and flexibility and established a unified doctrine for

**General McNairs' Changes to Field Artillery Force Structure (Hazen)**

- Brigade and regimental headquarters were replaced by a corps artillery headquarters.
- Group headquarters would be attached to corps artilleries to control varying numbers of assigned battalions.
- The corps artillery commander became the chief of the artillery staff at corps.
- The ratio of Field Artillery to armor in the armored divisions was increased.
- The battalion was established as the lowest-level, self-sustaining Field Artillery unit [instead of the regiment].

organizing and employing corps artillery. The changes established the corps artillery headquarters as a major tactical headquarters. The order authorizing these changes was published in July of 1943, and "every one of the organizational changes dealt with areas in which problems were encountered at Kasserine" (Hazen).

**Combat Experience and Control**

While McNair's reorganization was leaning in the direction of adding flexibility to the corps artillery as a tactical headquarters, it was combat experience that proved to be the decisive change agent. The experience at Kasserine established the importance of the corps artillery headquarters in World War II. As recorded by Blumenson:

***The Americans made many mistakes in this first large-scale engagement of the war in Europe, but they learned from their errors and made adjustments that enabled them to go on to victory in Tunisia and beyond. The defeat at Kasserine showed the Army what troops had to learn and to do.***

And, changes were not long in coming. During operations in the Tunisian Campaign after Kasserine, artillerymen demonstrated the effectiveness of the centralized control of artillery by the newly formed II Corps Artillery at the Battles of El Guettar and Mateur. At El Guettar, "the artillery preps fired by 11 battalions under centralized control made a real believer out of General George Patton, the new II Corps Commander" (Hazen).

## The Battle of the Ardennes

The second historical case study for examining the role of the corps artillery in combat is in the Battle of the Bulge during the III Corps offensive in December 1944. Significant changes had occurred since the time of Kasserine. The corps artillery had matured, and it played a significant role in this Battle. The Field Artillery group — a tactical headquarters without organic, assigned, subordinate battalions — demonstrated its important synchronizing role. Most of all, this Battle shows the flexibility of Field Artillery, which could be task organized for combat in various ways and still be massed quickly to provide indirect fire support at the time and place of the maneuver commander's choosing.

### Space

In terms of space, the battlefield was divided into the close and deep battles. The division artilleries were responsible for the close battle, while the corps artilleries handled long-range fires. The artillery's equipment, organization and tactics reflected this division of responsibilities.

***Of the principal arms which could be brought to bear directly upon the enemy, infantry, armor and air were seriously handicapped by weather and terrain. Through all, however — day and night, good weather and bad — the flexibility and power of our modern artillery was applied unceasingly...A lesson, then, from the Battle of the Bulge — artillery constitutes a most formidable striking power continuously available to any commander of combined arms for application wide and deep over the battle area.***

General Courtney H. Hodges' accompany remarks for Joseph R. Reeves' article "Artillery in the Ardennes," *Field Artillery Journal* March 1946.



World War II snowfalls in France made resupply a sticky, muddy affair.

The division artilleries were equipped with shorter-range, smaller-caliber weapons. Long-range, heavier cannon were reserved for the corps. By design, the division artilleries contained the minimum artillery necessary for facing weak resistance.

For controlling fire support in the close battle, the division artillery's battalions were assigned forward observers and liaison officers responsible for coordinating close support for the maneuver force. Observation battalions at corps level had the longer range target acquisition assets, including sound and flash equipment and aerial observers with piper cubs.

### Time

While the battlefield was divided, the close battle was considered most important, and the corps Field Artillery groups were used to weight the main effort in critical sectors. The importance of multiple-battalion massed fires, for which the American artillery won high praises, was largely due to the flexibility in the coordination and organization of the corps and divisional artilleries. The corps artillery commander didn't formally command or control the divisions' organic artillery, but he could coordinate the use of direct-support artillery.

### Unity of Purpose

Thorough understanding and mutual cooperation developed from a unity of purpose that existed among artillerymen during the War. This was no accident. Two of the causes for achieving this teamwork were a flexible doctrine concerning organization for combat and standardized tactical training.

***When the Corps Artillery Commander, through his knowledge of the flow of battle, is cognizant of the fact that certain battalions of division artillery are not being employed, their fires can and should be utilized by him to reinforce the fire on portions of the front where reinforcements are indicated. This is a matter for thorough understanding and mutual cooperation.***

Gregory V. Morton, master's thesis, "Field Artillery Support for III Corps Attack, 18-26 December 1944," CGSC, 1985.

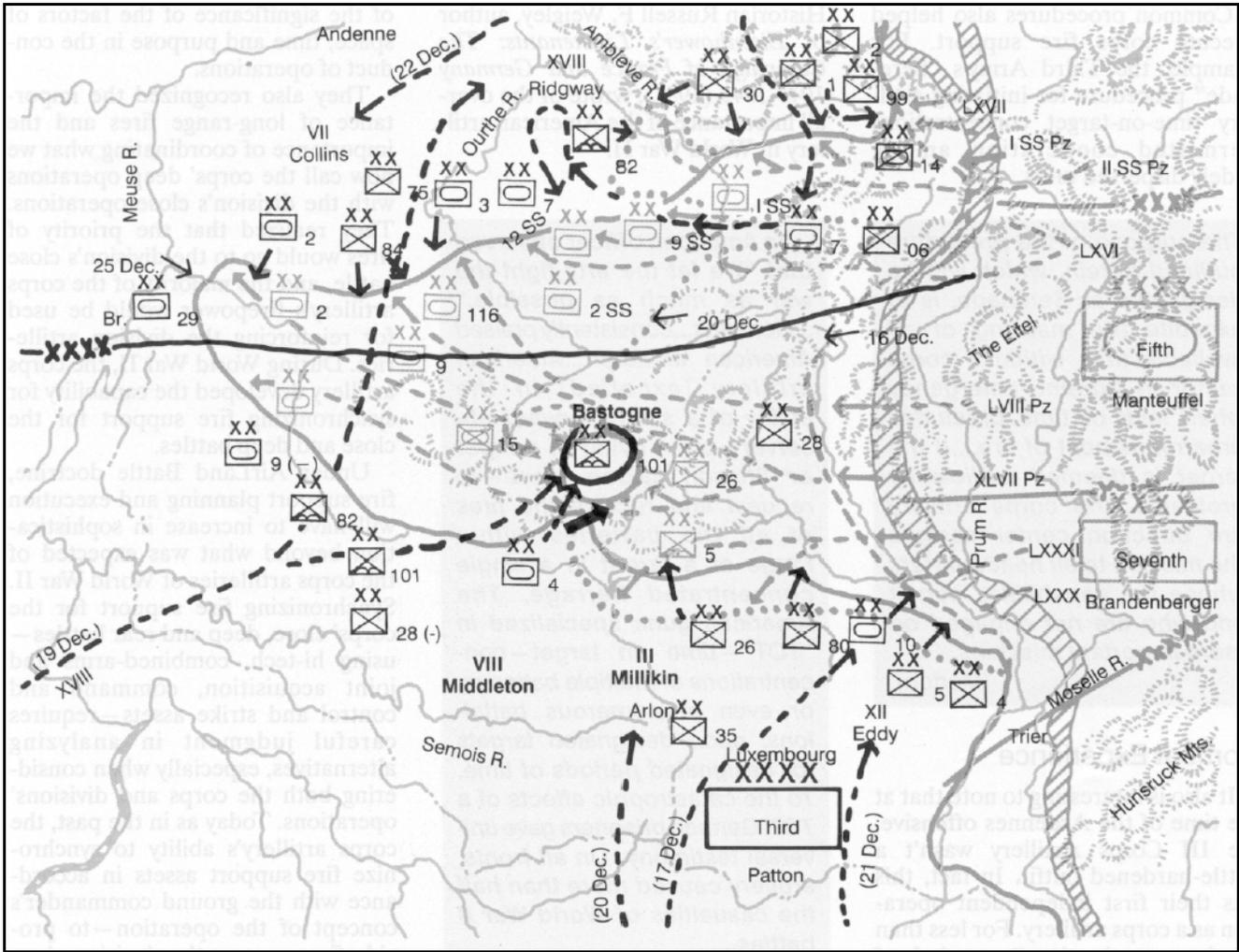
**Flexibility.** Massing large numbers of Field Artillery battalions required the shifting of assets between various headquarters. For instance during the time of the III Corps offensive in the Ardennes from 18-26 December 1944, the Corps was able to control and employ 25 different artillery battalions in the relief of Bastogne. Only two of those units were assigned to III Corps; the rest had been attached for the operation.

One analysis of artillery during World War II records this flexibility in assigning tactical missions for supporting various headquarters. In a one-year period, one corps artillery battalion was assigned to seven different groups in three different corps. In another example during a four-month period, one group controlled the fires of nine different battalions in two different corps.

The ability to make numerous shifts in artillery support relationships was due in part to the uniformity of training and testing conducted by Army Ground Forces before certifying Field Artillery groups and battalions "combat ready" (Morton). In addition, the flexibility inherent in the four standard tactical missions of Field Artillery organization for combat — direct support, general support, reinforcing and general support reinforcing — also contributed to the success in massing multiple battalions.

In preparation for the counterattack into the Ardennes, the III Corps Artillery received nine artillery battalions from the other corps.

***Field Artillery***



The Ardennes Campaign, 16-25 December 1944

Four groups were formed with strengths varying from two to four battalions each. A group was assigned to each of the corps' three divisions. One four-battalion group, including an observation battalion, was retained in general support of the corps.

Just hours before the attack, VIII Corps Artillery attached four of its battalions to III Corps. One battalion was assigned to the 4th Armored Division, and three were retained by III Corps Artillery for general support.

Overall during this period of offensive action, the Corps allocated the majority of its assets to reinforcing the divisions and retained five of the 25 battalions in general support. Thus, the system permitted the decentralization of control in offensive operations where there were wide zones of action, rapid movement, inherent communications

difficulties and combat-team-level action.

Later in the operation when the situation stabilized after the bulk of the Corps' movement was completed, the III Corps Artillery was able to regain more centralized control of its artillery assets. However even when control was decentralized, the ability to mass wasn't lost. The controlling headquarters just moved one echelon lower to the division artillery or group headquarters fire direction center.

Divisions within the III Corps also had flexibility in the way they organized their artillery for combat. During the III Corps offensive, artillery task organization varied from complete decentralization in the 4th Armored Division to centralization in the 26th Infantry Division. Yet, by using the standard artillery tactical missions, the

corps and divisions were careful not to violate artillery doctrine while task organizing their assets in accordance with their situation, mission and preferences.

**Training.** The factors of common training, standardized testing and adherence to tactical doctrine made up for the fact that there were no long-term or habitual support relationships in III Corps at the time. The various corps artillery units had not previously worked with the maneuver units or the other Field Artillery units involved.

The synchronization factor of time was also important in this operation. The III Corps after-action report notes there wasn't time for lengthy planning and that "time was the all-important factor" (Morton). Using standardized missions saved coordination time.

Common procedures also helped execute corps fire support. For example, the Third Army's "Serenade" procedure for initiating artillery time-on-target concentrations permitted cooperation among widely dispersed units.

**The purpose of the procedure outlined herein, which will be designated as Serenade, is to expedite the massing of all available fires within a corps sector in extreme emergency when lack of time precludes prearrangement of fire....If the target is deemed sufficiently profitable, the corps artillery fire direction center assigns the mission to all headquarters whose fire capabilities permit and who are not engaged on more important missions.**

(Morton)

## Combat Experience

It also is interesting to note that at the time of the Ardennes offensive, the III Corps Artillery wasn't a battle-hardened outfit. In fact, this was their first independent operation as a corps artillery. For less than 50 days previously — "a period of tutelage" — they had been attached to the XX Corps Artillery in operations around Metz (Morton). During this break-in period, the III Corps Artillery "gained valuable experience in the lessons of combat" (Morton).

The value of this short exposure to combat alongside a veteran unit served as an important confidence-building measure. Under XX Corps, the III Corps Artillery "experimented with the way to organize the Field Artillery for combat and how to control it. They were comfortable with the operating procedures they developed" (Morton).

The Battle of the Ardennes is an excellent example illustrating the growth in the importance of the corps artillery in the conduct of battle during World War II. Since Kasserine, American artillery doctrine, procedures and equipment had matured to the point that even a "green" unit could become combat effective in a short period of time. Historian Russell F.

Weigley, author of *Eisenhower's Lieutenants: The Campaign of France and Germany 1944-1945* (1981), wrote of the overall importance of the American artillery in World War II:

**...an American officer observed that "We let the arty fight the war as much as possible." ...Germans...consistently praised American artillery ...American artillery [excelled] in the ability of a single forward observer — often flying in a Piper or Stinson liaison plane — to request and receive the fires of all the batteries within range of a target in a single concentrated barrage. The American guns specialized in "TOT" — time on target — concentrations of multiple batteries, or even of numerous battalions, upon designated targets for designated periods of time. To the catastrophic effects of a TOT, German prisoners gave universal testimony. On all fronts, artillery caused more than half the casualties of World War II battles....**

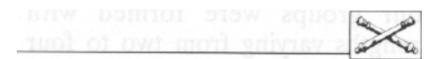
## AirLand Battle

The organizational changes of adding the corps artillery and group headquarters were the result of General McNair's restructuring of the corps. At the same time during the Tunisian Campaign, artillery leaders began implementing the changes necessary to overcome the deficiencies found at Kasserine. While procedures and organizational structures were far from standard in the Italian Campaign, by 1944, tactical doctrine, organization, training and experience came together in the artillery that proved so effective in Western Europe.

The combat experiences of World War II demonstrated the importance of the corps artillery in large-scale, mechanized maneuver warfare. Although the tenet of synchronization was not in the doctrine of World War II, artillerymen were well aware of the significance of the factors of space, time and purpose in the conduct of operations. They also recognized the

importance of long-range fires and the importance of coordinating what we now call the corps' deep operations with the division's close operations. They realized that the priority of fires would go to the division's close battle, and the majority of the corps artillery's firepower would be used for reinforcing the division artilleries. During World War II, the corps artillery developed the capability for synchronizing fire support for the close and deep battles.

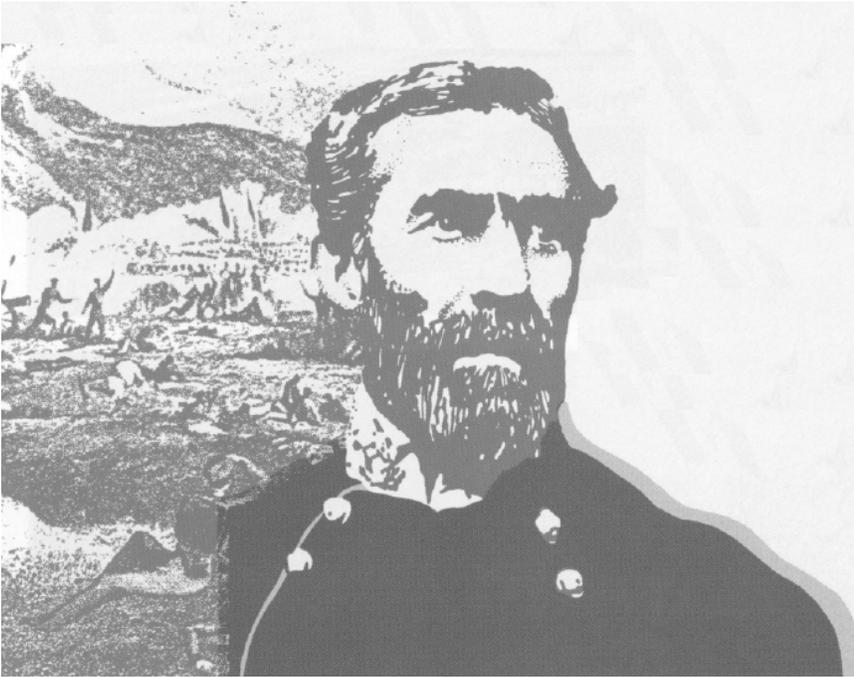
Under AirLand Battle doctrine, fire support planning and execution will have to increase in sophistication beyond what was expected of the corps artilleries of World War II. Synchronizing fire support for the corps' close, deep and rear battles — using hi-tech, combined-arms and joint acquisition, command and control and strike assets — requires careful judgment in analyzing alternatives, especially when considering both the corps and divisions' operations. Today as in the past, the corps artillery's ability to synchronize fire support assets in accordance with the ground commander's concept of the operation — to provide firepower at the decisive place and time — remains one of the key ingredients for victory.



**Lieutenant Colonel Joseph R. Cerami is the Deputy Chief of Plans and Exercises with the C3 of the Combined Field Army (ROK/US) in South Korea. He won second place in the 1989 Field Artillery Association's History Writing Contest with this article. Lieutenant Colonel Cerami is a graduate of the Command and General Staff College and the School of Advanced Military Studies, both at Fort Leavenworth, Kansas, and holds a Master's of Arts Degree in International Relations from the University of Texas at Austin. He also was an Assistant Professor in the Department of Social Sciences at the US Military Academy at West Point. He has served with the 82d Airborne Division, Fort Bragg, North Carolina; 3d Armored Division, West Germany; and the Field Artillery Training Center, Fort Sill, Oklahoma.**

*Field Artillery*

# Braxton Bragg and AirLand Battle



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*With two thousand years of examples behind us, we have no excuse when fighting, for not fighting well.*

T.E. Lawrence, 1888-1935

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by Major Timothy J. Kiggins

**S**oldiering well requires a sense of history. Soldiers often have heard that knowledge of military history is important, and excellent historical summaries abound. At the same time, we haven't been shown how to apply the experiences of past soldiers with the same degree of emphasis.

One obvious use for military history is to illuminate a bit of the past in the hope we won't repeat a serious error in tactics or judgment. This is a common focus in historical pieces. But there's another angle from which to view the subject of military history.

History can give meaning to current doctrine. When a soldier wants to know the meaning of today's doctrine, a close examination of the past can give practical insights into even the most complex and forward-thinking doctrine. After all, sound doctrine is rooted in historical example. Witness the case of Braxton Bragg in the Battle of Buena Vista, which gives us insights into AirLand Battle.

## AirLand Battle

We developed AirLand Battle doctrine in response to a sophisticated threat force's fighting a sophisticated battle on multiple levels. New doctrinal publications begin with a description of the doctrine and a discussion of the four tenets of the AirLand Battle: agility, depth, initiative and synchronization.

The components of this doctrine are easy enough to understand, but there's a gap between understanding and implementing them at the lowest level. What does AirLand Battle mean to a firing battery platoon leader or section chief? How can we translate the raw combat firepower of a howitzer section into synchronization? Does agility simply mean the ability to displace quickly from a firing position? How can a lone gun or a four-gun platoon achieve depth? If a section chief uses a very effective way to organize the section for 24-hour-a-day operations, is that initiative? Although our manuals give excellent descriptions of the doctrine,



they fall short of giving us implementation techniques.

What is the solution to bridging the gap between the meaning of doctrine and the implementation of AirLand Battle concepts? The answer: study history. It can mean the difference between hollow doctrinal tenets and rich, meaningful concepts.

## Buena Vista Environment

In 1847, the United States engaged in a war on foreign soil over a tremendously



extended line of support. In comparison to the War of 1812, there had been many technological improvements that made the Mexican War a new ball game. The only military actions we had been involved in since the War of 1812 had been a series of small insurgency operations against American Indians in Florida and on the Western frontiers. In many ways, the situation was similar to the state our Army would be in if we were to go to war tomorrow.

### American Attitudes

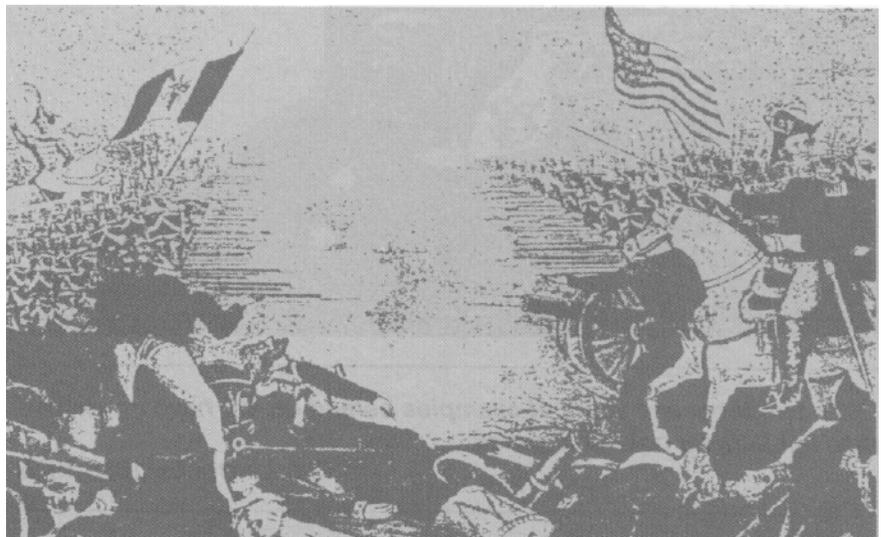
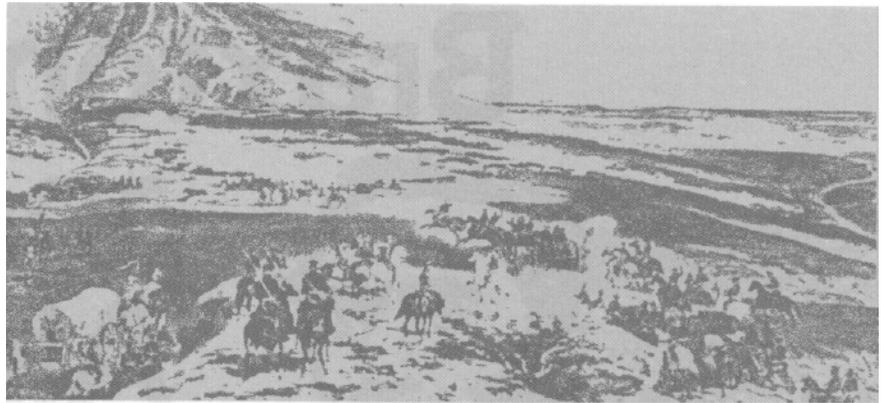
Zachary Taylor needed a victory desperately. Tension between him and President Polk in Washington and competition with Winfield Scott for command of the American forces were constant burdens to "Old Rough and Ready." In fact, his latest encounter with General Scott had depleted his unit to a dangerously low strength to fuel Scott's march on Mexico City.

He moved what was left of his army deep into Mexico looking for a fight. Suddenly, he stumbled onto the entire Mexican Army. Greatly outnumbered, he pulled back into the only defensive position available — a small hacienda named Buena Vista.

A chorus of "Remember Washington" rolled back through the American soldiers as they marched to their initial fighting positions. It was Washington's Birthday, 23 February 1847. The soldiers could afford to feel good because there was obvious strength in their position.

### Buena Vista Terrain

With mountains and a stream on its right and mountains to its left, Zachary Taylor's force of about 5,400 men could concentrate on the two avenues of approach into its position.



Artists' Renditions of the Battle of Buena Vista — Top is by Nebel and Bottom by Baillie.

To its front was the road from San Luis Potosi in the south to Saltillo in its rear.

The first avenue of advance directly approached the right side of the position and was easily defended. The stream to the right of the road and the steep slopes of the mountains made an effective wall for channelling the enemy. Santa Anna and his army of 20,000 could not flank the Americans from that side. East of the road was a steep bluff that gradually rose to meet more mountains further to the east. A few well-placed guns on the bluff would dominate the road.

Before the mountains in the east, there were several open flats between deep ravines. This broken ground was the other avenue of approach, and the defenders again had the advantage. The ground allowed for about a mile of maneuvering, and the deep ravines would break the momentum of any attack

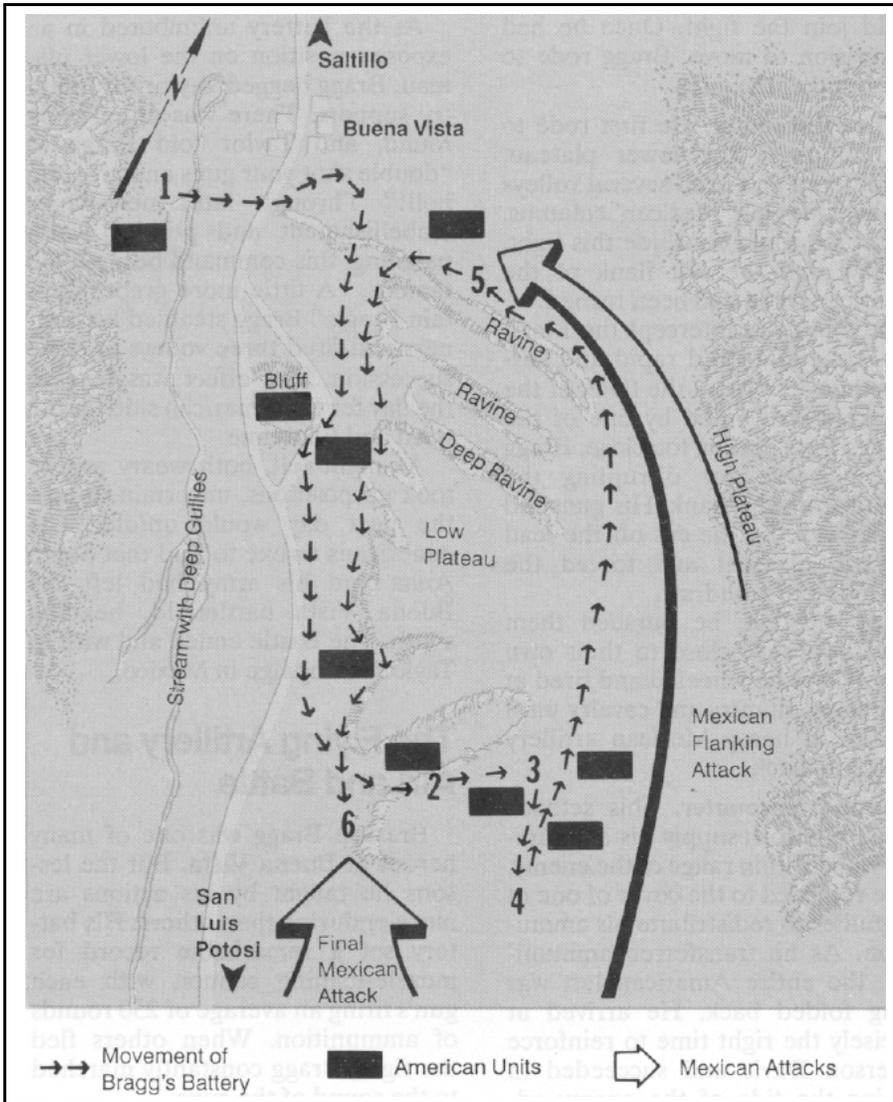
launched by Santa Anna.

The mountains on either side drew together behind the American position to form a mountain pass on the road. The hacienda of Buena Vista was at the top of this pass. It guarded the road to Taylor's supply trains at Saltillo, about five miles to the north.

Although he could defend this position easily, the fact remained that Zachary Taylor had been stripped of many soldiers to support Winfield Scott's campaign on Mexico City. Taylor's greatest disadvantage was that most of his regulars went to Scott, leaving him only about 500 seasoned troops. And in spite of the strength of his position, he faced Santa Anna who had an army hungry for victory.

### The Battle of Buena Vista

General Antonio Lopez de Santa Anna lead the Mexican Army across



Battle of Buena Vista, 23 February 1847

200 miles of desert to get into the War. His cavalry located the American Army at Agua Nueva and reported it was very much under-strength. In spite of the exhausted state of his Army, Santa Anna pressed ahead for 35 more miles to catch Taylor's depleted force.

The motivator for his soldiers was the imminent capture of the American stores, supplies they desperately needed. At Agua Nueva, the Mexican Army found that Taylor had apparently departed in haste. Continuing to press, Santa Anna met the Americans on the road south of Buena Vista.

### Santa Anna's Strategy

Sizing up the American position did not take long. Santa Anna quickly saw the strength of the

American's right. To attack the American center head-on would be foolish because his infantry would be exposed throughout the advance across the lower plateau. But Santa Anna did see an opportunity on the American's left.

At the foot of the eastern mountains was a high plateau that allowed some room to maneuver. More important, it was not heavily defended. If Santa Anna could get troops on this plateau in enough numbers, he could turn the American left. After careful deliberation, he launched a feint to the American's right and sent General Ampudia's infantry to the east seeking exactly that result. It didn't take long before Santa Anna's plan began to work.

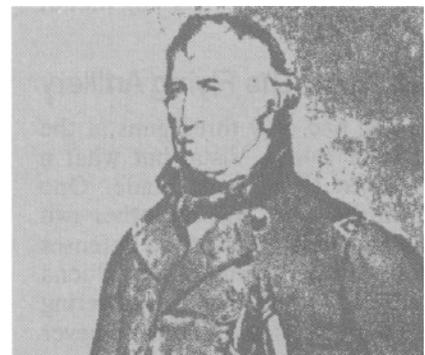
**The Feint.** The feint drew Taylor's

attention to the west but didn't mask the advance of General Ampudia. By late afternoon, Taylor was forced to both notice Ampudia's steady advance and to take action against him. Both sides fought to get to the commanding eastern high ground first, and the Mexicans won the race. Darkness fell as both sides settled down to restless sleep in a cold rain.

Before their rest, the Mexicans had redeployed forces to launch another diversionary attack in the morning. This time, they brought up guns to threaten Captain Washington's battery on the bluff overlooking the road. Santa Anna was more determined than before to turn the American's left, and this diversion would mask the 6,000 soldiers forming in the deep gullies under Generals Ampudia, Pacheco and Lombardini.

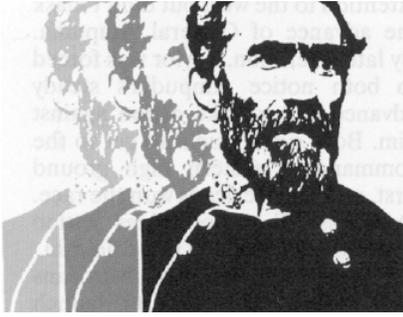
These soldiers would be going against the 2d Indiana Regiment on the American's left. The Indiana volunteers were untested in battle and were jittery enough without having the full weight of the Mexican attack in their sector.

When the diversion began, Washington's battery on the bluff held, but the Mexicans poured out of the ravine far to the east. The inexperienced and confused Americans fell back. General Don Manuel Lombardini turned his advancing division to the left and enfiladed the Americans. Suddenly the high plateau was wide open.



General Zachary Taylor

**American Reaction.** At this critical instant, Zachary Taylor returned from checking his supplies at Saltillo. He assessed the situation and threw Jefferson Davis with his Mississippi Rifles into the fight on the high plateau. Taylor also stripped his center to reinforce the left.



Davis had Taylor's only regiment of volunteers with combat experience, and these legendary men revitalized the defense and held their positions temporarily. The temporary defense was so effective that the tired Mexicans backed up to regroup. When this happened, part of the American force pursued them.

**Mexican Desperation.** At this moment, one of the most controversial actions of this battle occurred. A white flag went up from the Mexican lines. General Wool advanced to find out the nature of the truce, but the Mexicans continued to fire their artillery and rifles. Wool hastily returned to the American lines, but the pause had been enough to allow Santa Anna to regroup.

There followed an intense charge from the Mexican line against the American center. Santa Anna even committed his reserves to this last attack. He might have been successful except for the performance of the American artillery, including that of Braxton Bragg.

## Bragg and The Flying Artillery

Bragg had only three guns at the Battle of Buena Vista, but what a difference these guns made. One was in the rear, and the other two were posted to support the defenses south of the hacienda at Buena Vista. His fourth gun was covering the supply point at Saltillo and never participated in the main action.

Assigned to hold the extreme right, he asked permission to move forward when he saw the disposition of the opposing force. Since Taylor was inspecting the rear, Bragg had to find another source of authority to approve this move. He found the chief engineer on the field, Major Joseph Mansfield, and secured permission to move to the east so he could join the fight. Once he

had permission to move, Bragg rode to the sound of the guns.

**First Encounter.** He first rode to the center of the lower plateau, unlimbered and fired several volleys at the charging Mexican columns. Before he could conclude this fight, he saw that the left flank of the American force had been turned.

He moved to intercept the Mexican Army and fired rapid and sustained direct fire on the flank of the attackers. Prevented by one of the ravines from getting too close, Bragg had to settle for disrupting the assault from the flank. His guns did this so well that he cut off the lead Mexican element and forced the remainder to withdraw.

Not satisfied, he pursued them until they were close to their own lines. There he wheeled and fired at the enemy infantry and cavalry until the fire of heavy Mexican artillery drove him back.

**Second Encounter.** This setback forced him to resupply his ammunition while within range of the enemy, so he returned to the cover of one of the gullies to redistribute his ammunition. As he transferred ammunition, the entire American left was being folded back. He arrived at precisely the right time to reinforce Jefferson Davis and succeeded in turning the tide of the enemy advance for a second time.

This was the time of the questionable flag of truce, and Bragg was not to get a rest yet. The brief lull in the action soon ended, and he heard a great volume of fire to the south again. This was the evidence of Santa Anna's fresh reserves' joining the fight for the last push.

**Third Encounter.** Bragg urged his beaten horses on, whipping and spurring the exhausted animals to respond. Along the way, he was forced to drop his heaviest caisson to lighten the load for the horses.

He made it to the center of the lower plateau just as Lieutenant John Paul Jones O'Brien was forced to abandon his guns. Bragg joined the most critical part of the fight for the third time that day. He now was able to bring all three of his guns into the fight because Taylor had ordered the third from the rear to help in the main action.

As the battery unlimbered in an

exposed position on the lower plateau, Bragg begged Taylor for infantry support. There was none to be found, and Taylor told Bragg to "double shot your guns and give 'em hell!" Through later newspaper embellishment and political campaigning, this command became the famous, "A little more grape, Captain Bragg." Bragg steadied his gunners and fired three volleys in rapid succession. The effect was to save the day for the American side for the third and final time.

As night fell, both weary armies took up positions, uncertain of how the next day would unfold. The Americans awoke to find that Santa Anna and his army had left the Buena Vista battlefield, heading south. The Battle ended and with it, Taylor's campaign in Mexico.

## The Flying Artillery and AirLand Battle

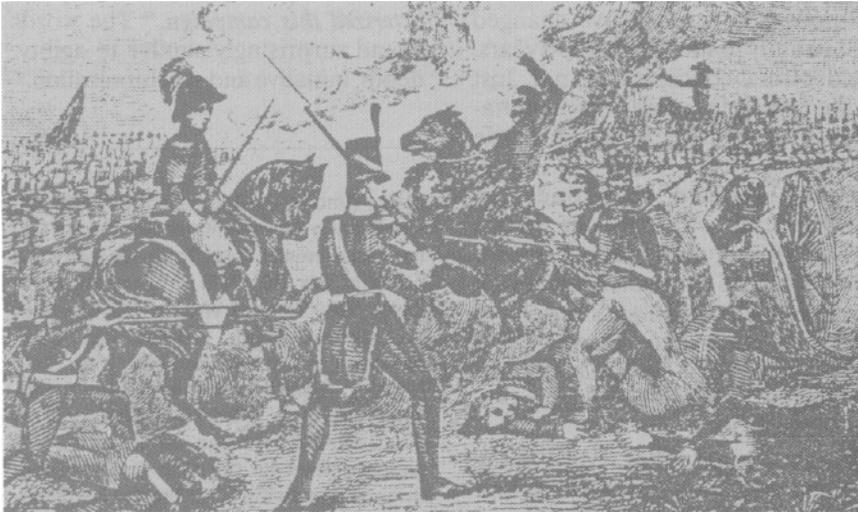
Braxton Bragg was one of many heroes at Buena Vista. But the lessons he taught by his actions are more enduring than others. His battery set a remarkable record for muzzle-loading cannon with each gun's firing an average of 250 rounds of ammunition. When others fled the fight, Bragg constantly marched to the sound of the guns.

Bragg instilled confidence in his men through rigorous training long before the Battle. His cannoneers were able to unlimber, fire and limber again with greater speed and adeptness than other crews in the fight. They were worthy of being called "The Flying Artillery." Perhaps it's more than coincidence that The Flying Artillery can provide keen insights into AirLand Battle.

## Agility

Bragg moved constantly on the battlefield. Not being saddled with specific orders, he constantly rode to the action. In spite of terrain that would discourage normal artilleryists, Bragg's battery flew with the uneven landscape. His movements were practiced and precise, and his battery achieved its exceptional responsiveness through training.

When he ran short of ammunition as cannons are likely to do, he



Braxton Bragg helped Taylor, who was greatly outnumbered, defeat Santa Anna at Buena Vista by applying the tenets of agility, depth, initiative and synchronization.

planned for resupply that meshed with the flow of battle. Bragg didn't have to take his guns out of the fight during a critical period or for a long time to redistribute his ammunition. When the situation demanded his presence at the front, Bragg cut loose his heaviest caisson to get there as quickly as possible.

It was typical in this Battle that Santa Anna allowed Taylor to reinforce the front at each of the Mexican advances. While Santa Anna's error may appear to have been decisive, it can't take away from Bragg's accomplishment. What he did at Buena Vista more than anything else was to exercise agility. A study of this battle is a short course in the AirLand Battle tenet of agility executed to perfection at the small-unit level.

## Depth

Bragg initially achieved depth by having his battery split. With one gun in the rear and two forward, he was able to cover the entire range of the Battle at Buena Vista. But there's much more to learn about depth than positioning weapons.

Bragg achieved depth through anticipation and reaction. A look at the schematic of his movements make this clear: he was everywhere! Bragg also added to this fight exactly what artillery was meant to add: multiplication of combat power — not addition, but multiplication. His rapid movements, unsupported stands and hasty emplacements delivered mortal blows to the enemy and bought precious time for the Americans.

Jefferson Davis' Mississippi Rifles and Lieutenant O'Brien's gun crew would probably swear to the value of The Flying Artillery as a combat multiplier. After all, many of them owed their lives to Bragg's application of depth on the Buena Vista battlefield.

## Initiative

Braxton Bragg presents the clearest example of personal initiative of all the players in this Battle. From the beginning when he determined he might miss the main thrust of the Battle, he made decisions and executed them flawlessly until the Battle ended.

His leadership was a great factor in his success because his troops probably wouldn't have performed so well without the example of their chief. Bragg was always with the guns and exposed himself to the same perils his gunners faced. To help protect them, he sought infantry to support both his men and his guns. When the protection didn't materialize, his gunners carried on unsupported, encouraged by his example.

When he found an exposed flank or an unsupported enemy attack, Bragg ruthlessly pursued the enemy to bring his firepower to bear on them. At least twice while he was pursuing the enemy, he advanced ahead of his infantry support. His penchant for pursuing the enemy and for seeking out lucrative targets was largely responsible for the great volume of fire Bragg's battery delivered during this Battle.

But he also was concerned with providing basic, steady fire support to Taylor's besieged army. Without Bragg's initiative, the outcome of this Battle may well have been different.

## Synchronization

In today's parlance, synchronization usually implies some measure of joint operations among the services. In Bragg's time, it meant making sure all the parts worked together.

Bragg worked on synchronization long before Buena Vista. In fact, he began before hostilities commenced. In camp, Bragg drilled his men for hours each day. As Grady McWhiney described in his book *Braxton Bragg and the Confederate Defeat* (1969), Bragg trained his troops to wheel "from column to line formation, change direction at top speed, limber and unlimber."

When the Battle of Buena Vista was in full tilt, Bragg's attention to crew drill paid great dividends. This training kept his troops from folding as did some of the other units.

During the Battle, Bragg wanted and needed infantry support. He chose circuitous routes around the plateau to coincide with the presence of infantry. Bragg knew artillery was devastating to the enemy, but enemy troops this close to the guns were equally devastating to friendly forces.

Bragg also discovered a different angle on the synchronization of forces. He used artillery as a rallying point for infantry. The sound of his six pounders' cracking at the enemy encouraged many soldiers to return to the fight or to at least feel better about being in the middle of the Battle.

## Parallels to Today

At Buena Vista, the terrain favored the defender just as much of it does in Europe today. It had been a long time since the Americans had fought a war, and Zachary Taylor had few battle-tested soldiers riding with him. Added to that, Taylor lacked a coherently trained force at the outbreak of hostilities. When he assembled at Fort Brown in Texas, it could just as easily have been today's Rhein Main Air Force Base in the Federal Republic of Germany. Taylor also faced overwhelming odds in



his outing with Santa Anna, a situation that also now exists for the United States Army in Europe.

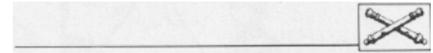
Although we call AirLand Battle the doctrine of the 1980s and 1990s, Braxton Bragg won at Buena Vista using the same tenets. While the

weapons and ranges have changed significantly in the ensuing 150 years, the doctrinal concepts have not. Just as the principles of war are immutable, so are these AirLand Battle tenets.

Bragg showed that one can achieve depth with only one or two guns. Can a multiple launch rocket system (MLRS) platoon leader learn about agility from Bragg's actions at Buena Vista? The answer is a resounding "Yes." We can learn similar lessons about initiative and synchronization.

Bragg's biographer McWhiney summed up the actions of Bragg and the others at Buena Vista: "*Boldness, bravery and independent action characterized*

*this campaign.*" The words sound surprisingly similar to agility, depth, initiative and synchronization.



**Major Timothy J. Kiggins is the Field Artillery Branch Representative for the US Military Academy at West Point. He won third place in the US Field Artillery Association's 1989 History Writing Contest with this article. Major Kiggins has been assigned to the 1st Battalion, 37th Field Artillery, Alaska, and commanded A Battery, 2d Battalion, 2d Field Artillery, Fort Sill, Oklahoma. He also served as the Brigade Adjutant for the 17th Field Artillery Brigade and as the S3 of the 1st Battalion, 18th Field Artillery, 17th Field Artillery Brigade, in West Germany.**

## Famous Redlegs Puzzle

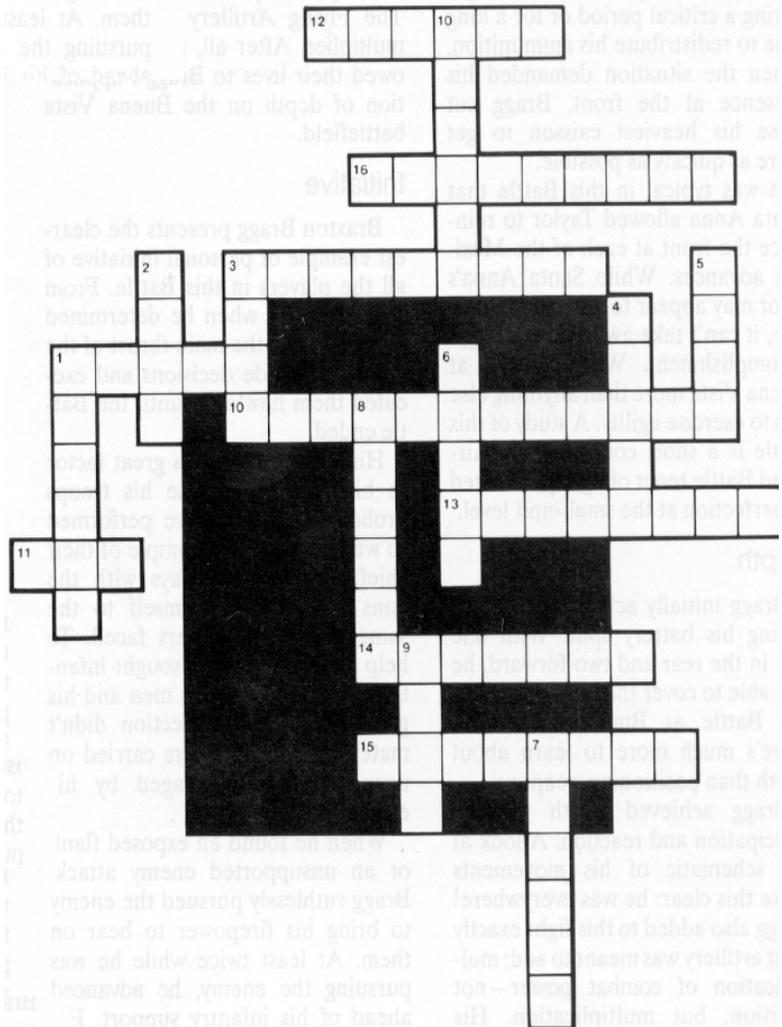
Fill in the puzzle with famous Redlegs' last names.

### ACROSS

1. Current Chief of Staff of the Army.
3. His platoon opened the gates of Peking, 1900, in 7 down's battery; Weapons Department Building.
10. XO, 9th Div Arty, WWII; MACV Commander, 1964-1968.
11. Observed British fire in 1814 and set BDA to verse.
12. Commander of D Battery, 129th FA, in WWI; used ultimate "FS" on 6 August 1945.
13. Commanded Flying Batteries in Mexican War.
14. Georgians have never erected a statue to this Union general.
15. Fort Sumter commander in 1861.
16. "Nuts."

### DOWN

1. Awarded a battlefield commission in Italy in 1944; former JCS Chairman.
2. Father of American Field Artillery.
3. FA Chief after WWI; FA School is currently housed in a building named in his honor.
4. Helped Mexicans acquire a taste for grape; NC post named for him.
5. CG, 4th Armored Division in WWII; "Tiger Jack"; other nickname — "Professor."
6. Commandant of first FA School at Fort Sill in 1911.
7. His battery in the 5th Artillery opened the gates of Peking in the Boxer Rebellion in 1900; KIA.
8. The Rock of Chickamauga.
9. Commander of Meade's Artillery at Gettysburg in 1863.
10. CG, Army Ground Forces in WWII; killed at St. Lo in 1944; Fort Sill's Headquarters Building.



For the answers to this puzzle, turn to Page 48.



# The Lost Art of Tactical Fire Direction

by Captain John F. Petrik, Photos by Author

Artillery battalions face a clear choice in tactical fire direction. Since its requirements don't change with the method employed, they must decide whether to do it manually or automatically. These two methods are each quite rigorous; both are decision procedures intended to solve the same problem.

A battalion fire direction center's (FDC's) most common mistake is to take the easy parts of both methods and think it has an adequate system. What it really has is a fire direction officer's (FDO's) guess masquerading as a fire order.

Careless fire orders not only reduce the effectiveness of a battalion's support, but also jeopardize the safety of friendly troops. This article offers some suggestions on how to avoid common fire control errors.

## Problems with Automated Fire Direction

The tactical fire direction system (TACFIRE) is a hostile, cumbersome system whose unforgiving software discourages battalions from attempting automated tactical fire direction. This is unfortunate because the system's capabilities offer real benefits to those willing to work through its limitations.

The most common complaints are that the system doesn't process fire missions in accordance with any discernible priorities beyond first-come-first-served and that its tactical solutions are always inappropriate and often impossible to execute. The usual solution — and it's not a good one — is to send a FDO's guess to the batteries by plain-text

message (PTM). This isn't using TACFIRE. This isn't automation. It's only frequency modulation (FM) teletype.

## Problems with Manual Tactical Fire Direction

Old manual battalion FDCs maintained situation maps, firing charts, an appropriate set of graphical and tabular firing tables, range-deflection protractors, joint munitions-effectiveness manual, graphical munitions-effects tables and the other tools of fire direction. I mention these not to advocate a return to that system, but as a healthy reminder of its complexity. In contrast, the new "manual" FDC — as in "we plan digitally but execute manually" — usually has nothing more than a casually maintained situation map.

What's wrong with this? The old system was designed to enable a FDC to accomplish both tactical and technical fire direction, hence the maintenance of charts nowadays found only in batteries (if even there). But it also kept the requirements of tactical fire direction constantly in front of the FDO.

## Elements of Tactical Fire Direction

Tactical fire direction is the process that results in a fire order, and everyone is supposed to know what went into a fire order (see Figure 1). *FM 6-40 Field Artillery Cannon Gunnery* offers this definition: "A fire order is the fire direction officer's decision on how the target will be attacked." We have largely forgotten this.

1. Location of Target. Is it safe to fire? Is it within range? Are there intervening crests? Can the target be attacked?
2. Nature of Target. How large is it? What is its degree of protection?
3. Ammunition Available. What do the batteries have on hand to fire?
4. Fire Units Available. Who is in range and ready to fire?
5. Commander's Guidance/SOP. What do we want to do to the target?
6. Request for Fire. What did the observer ask for? Can we give it to him? Should we give it to him?
7. Munitions Effects. Given the ammunition available, nature of the target and commander's guidance, how should we attack the target?
8. Tactical situation. When should we fire? Do we need special instructions?

Figure 1: Development of a Fire Order



While a good FDO will have reduced most of the 11 elements of a fire order to a standard that need not be announced every time (see Figure 2), the process isn't a simple one and clearly involves more than merely relaying calls for fire to batteries. Whether he's using TACFIRE and modifying its solution to fit his judgment of how to attack the target or really "going manual," he must be able to run through the tactical fire direction process and issue a sound fire order.

1. Unit to Fire, Unit(s) to Follow the Mission and Unit to Fire for Effect
2. Adjusting Element/Method of Fire of Adjusting Element (If Applicable)
3. Basis for Corrections
4. Distribution
5. Projectile
6. Ammunition Lot and Charge
7. Fuze
8. Number of Rounds
9. Range Spread, Lateral Spread, Sweep and Zone and High Angle
10. Time of Opening Fire
11. Target Number

Figure 2: Elements of a Fire Order

### Making Automated Fire Direction Work

For you to exploit TACFIRE, think of it as a device that will give you a fire order. It's best if observers use their digital message devices (DMDs), but you can increase speed and accuracy even if only the battery computer systems (BCSs) are on-line.

If you transmit an FM;FC to the batteries, the FDOs need only check it. They aren't copying and entering PTMs or voice messages; if the solution is safe, they need only execute it. This makes it well worthwhile to compose an FM;RFAF at the artillery control console (ACC) from a voice call for fire.

When the ACC operator has practiced this, he'll find it's no slower than typing a PTM, the battalion FDO will find the system has done most of the checks for him and the fire unit FDCs will find they save key strokes on the BCS. For this to work, the following files must be current and accurate.

- **Support Geometry.** Set the geometry up so it's complete down to task-force level. Airspace coordination areas (ACAs) and air corridors should be included. No-fire areas (NFAs) and free fire areas (FFAs) must be kept current — delete them when they're no longer effective. Coordinated fire lines (CFLs) are an important permissive measure and must be included in the file. The operations and intelligence section should help the FDC with these if the fire support elements (FSEs) fail to provide the geometry.

- **Ammunition and Fire Unit.** Keep after the batteries to maintain their ammunition and fire unit (AFU) data. The operations and intelligence section should take the lead in this. Fire unit locations, weapon strength and ammunition counts are critical; a report of READY:X or OUTIL is relatively less important. (The operations and intelligence section can enter these based on voice reports. Don't sit around waiting for a unit to transmit READY:X when you know perfectly well they're ready. Enter it yourself.)

- **Commander's Criteria.** The commander's criteria are established in two files: the FM;MOD and the FM;ATTACK. Neither of these should be fixed by standing operating procedures (SOP); rather, they should change with each operation. Maneuver commanders won't establish these for their artillery. The Field Artillery battalion must analyze the planning guidance they get and develop appropriate entries. The PZONE field captures (roughly) priority of fires. The PTYPE captures high-payoff targets. The PSHEL captures high-priority munitions (examples: illumination for a night defense and white phosphorus for a movement to contact).

These won't be the same in all phases of the same engagement, let alone in every operation. Raise the ECOF if you want to tend to mass on effects-type targets, those with TACFIRE'S joint munitions effectiveness manuals (JMEMs) database attack solutions. Lower the ECOF if you don't. Set the attack guidance target type by target type, and base it on what the commander told you



FDOs and FSOs share responsibility for firing safety.

he wanted to achieve. Remember that suppression lasts as long as the rounds are landing, neutralization is 10 percent effects and destruction is 30 percent. Many targets have to be treated as volley targets — those that use manually generated attack solutions. Some commanders may express their attack guidance for all targets in terms of volleys. If you need to reserve certain types of ammunition or certain fire units, exclude them from consideration.

Most battalions recognize that the first two files should be complete and accurate. They drop them largely because FSEs neglect to enter geometry and batteries forget to keep the AFU data current. An aggressive operations and intelligence section that checks and manages these data will correct these oversights. It's a matter of training and supervisory emphasis.

The third area, however, is not generally well-understood, and it's in this area battalions can realize the fastest payoff. The data in all three files must change as the battle changes or TACFIRE won't work for you.

### Maintaining a Manual Backup

The backup to TACFIRE is manual fire direction. But a battalion TACFIRE shelter is not designed to accommodate a manual FDC, and the battalion FDC no longer has its own M577 command post carrier. So a full-blown manual FDC is not physically possible — there's no room for it. If the battalion FDC elects to go manual, it will have to set up for it carefully and well in advance (see Figure 3).

- A Current Fire Order Standard. When you issue a voice fire order, issue it correctly; you'll minimize errors.
- Written Attack Guidance. The JMEds and graphical munitions-effects tables (GMETs) tend to be too cumbersome to be useful.
- An Ammunition Count for the Fire Units. This includes projectiles, propellants and fuzes.
- A Current Situation Map. It must have at least the following information clearly and accurately displayed (a sloppy SITMAP in a FDC is dangerous):
  - Boundaries
  - Fire Unit Locations
  - Fire Support Coordination Measures.
  - FLOT
  - Observer Locations
- Range Fans or Graphical Training Aid (GTA) 6-5-1 Range Deflection Protractor for a Fast Check on Range.

Figure 3: A battalion FDC can return to manual operations more easily if it keeps these tools on hand.



A TACFIRE-Equipped Battalion FDC

## Tactical Safety

This paragraph heading is misleading if taken to imply a separate set of safety procedures for combat and training. It's wrong to split combat procedures from those used in training. But if we think about safety as a tactical issue, we may come to understand better how a battalion fires safely without safety-Ts, impact areas and range regulations. This can only improve the effectiveness of a battalion's training.

The single most common cause of artillery firing incidents during NTC live-fire exercises has been failure to perform grid-location checks. This is also the usual cause of fratricides during force-on-force training. (Too often all concern for firing safety evaporates after a battalion moves south of Granite Pass.) The FDOs and FSOs share responsibility for firing safety.

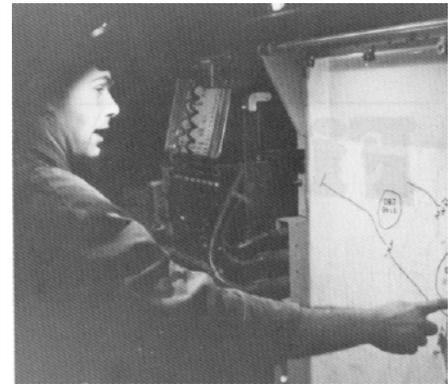
The brigade boundaries define an impact area, plus any permissive fire support coordination measures and less any restrictive measures. Consider regular impact areas found in training areas — why do they have 1,000-meter buffer zones? They are there to prevent the effects of fires from leaving the impact area.

"Effects of fires" isn't a well-defined concept. AR 385-63 Regulations for Firing Ammunition for Training, Target Practice and Combat (which remains advisory for combat) indicates that it equals the fragmentation radius, which is surface danger area Alpha. For 155-mm high-explosive rounds, this is 725 meters. Use this as a guideline in the FDC for clearing fires. If an FSO doesn't want this restrictive an interpretation of boundaries and NFAs, he should coordinate a closer distance (e.g., fires are permitted to within 50 meters of the NFAs, or fires are permitted up to the boundaries) and inform the battalion FDC. The FDO must consider standard restrictions and stated exceptions when he performs grid-location checks.

What else can the brigade FSO contribute to firing safety? He has already designed the impact area, and if he knows his business, he has used fire support coordination measures to supplement boundaries and protect friendly troops. Can he monitor and clear all calls for fire? Probably not, especially if his subordinate FSOs and FOs are using their DMDs; he has no digital device once he leaves his FSE.

The fire support team (FIST) DMD is supposed to solve this problem. We'll know after units receive them and gain field experience. However well the FIST DMD performs, I doubt it will change the fundamentals of fire control.

If the FSO is smart, he won't have his people turn off their DMDs. He'll concentrate instead on designing coordination measures to make his intervention unnecessary, and



An S3 reviews a Field Artillery support plan.

he'll ensure that his subordinate FSOs and FSEs continually report the location of the maneuver units they support.

The FM;OBCOs, remember, are only an approximate forward line of own troops (FLOT) — better than nothing, but not adequate in themselves. The FSEs are a good backup to reporting by company FSOs and FOs. Their FLOTs will depend on the spot-reports received at the maneuver command post, and they'll have to have someone walk over and look at their S3's situation map (SITMAP). But FSEs are chronically underemployed during engagements and certainly have the time to do at least this much.

## Summary

Tactical fire direction is a problem a FDO can solve only if he understands its elements and attacks it systematically with the help of FSOs and FSEs. The TACFIRE and manual methods are both tools for tactical fire direction: they are ways of arriving at a cogent fire order. Too many Field Artillery battalion FDCs have forgotten this.

Successful FDCs support well because they remember the point of the whole system: not to keep a teletype running and not to relay calls for fire, but to **decide how to attack targets**.



This article and the next, also by the same author, comprise Part III of the NTC Series. The author's biography is with the second article.



# Fire Support Rehearsals

by Captain John F. Petrik



Working as part of a heavy combined-arms team swiftly teaches the ease with which even well-conceived plans fall apart from the friction of misunderstanding, incomplete coordination and overlooked details. An observer can't see the obstacle in front of his company, so the enemy breaches it undisturbed by indirect fires. The brigade fire support officer (FSO) can't communicate with the direct-support battalion, and a counterattack fails because priority of fires isn't shifted. Joint air attack teams (JAATs) are aborted at the initial point when no artillery is available to suppress enemy air defenses.

The agility and synchronization we all talk about are, in fact, very difficult to achieve precisely because they demand clear communication of intent and the rare kind of attention to detail that frees subordinates instead of restricting them. We don't do either of these well, and the Field Artillery is at a particular disadvantage because we must integrate a variety of systems into a brigade fight.

Rehearsals are a means of reducing some of the friction in brigade operations. Field Artillery manuals don't address them well, and maneuver organizations generally rehearse better than we do. But artillery battalions training at the National Training Center (NTC), Fort Irwin, California, continue to learn the value of rehearsals. Although they have come to see the rehearsal as an essential skill, most organizations still struggle with it.

Agility and initiative are tenets of our doctrine that seem to make the very idea of a rehearsal obsolete. Aren't rehearsals a sure way of ossifying a plan into a rigid, brittle structure that will shatter on contact with the enemy? Don't they require excessive amounts of preparation time? Not at all. In fact, rehearsals properly understood are

invaluable aids to fighting in accordance with just these tenets of our doctrine. This article offers some observations from a direct-support battalion S3's perspective that show the uses of properly conducted rehearsals.

## Staff Synchronization

Rehearsals are commonly misunderstood as having value only in set-piece operations with long preparation times. This is incorrect, but a natural mistake. Few staffs organize themselves to attack their operational problems in a synchronized way because most leaders don't understand the meaning of synchronization. Consider these examples:

*"This is all wrong," an FSO says. "You can't begin planning until the commander has given you his guidance" (or concept, or intent, or plan, or scheme, or whatever the latest word is).*

*"The way to synchronize fire support is to have the commander tell you what his fire plan is, and then you've got to see what the brigade S3 has laid out for you in the synchronization matrix."*

*"Wait until the plan is complete, then rehearse."*

There are two mistakes here. The first is reluctance or inability to analyze the mission and anticipate the commander's requirements. Artillerymen have become so sensitive to the fact that they support maneuver — "it's really the maneuver commander's fire plan, not mine" — that they have largely abdicated their responsibility to advise their maneuver counterparts.

A maneuver commander has a lot of things on his mind, and a fire support coordinator (FSCOORD) at any level who expects that commander to state where fire units should be positioned, what every



NTC Observation Division

Execution in MOPP 4 gear can strain plans to a breaking point. Artillery must rehearse in MOPP4 to ensure we can achieve our objectives successfully.

piece of commander's criteria will be or how every target should be attacked isn't doing his job. The FSCOORD must be able to tell the maneuver commander what fire support he needs and how he's going to get it. He may rest assured that the maneuver commander will tell him if he disagrees, but disapproval of a well-conceived fire support plan is rare.

The second error (usually the artillery battalion S3's) is to fail to break the plan into subplans his subordinates can work out.



CPT John Petrik

Battery participation in rehearsals is important.



NTC Observation Division

A company FSO with part of his supported unit must know where his targets are and when to call for them.

## Understanding Doctrine

Synchronization depends on a common understanding of doctrine. In our case, this understanding begins with *FM 6-20-1 The Field Artillery Cannon Battalion*, Chapters 2 and 8, and *FM 6-20-40 Fire Support in Brigade Operations (Heavy)*, Chapter 3 and Appendices B and O. It moves from these to other maneuver and fire support manuals.

Each type of operation has characteristic requirements and problems. Once the S3 knows the area and the general nature of the operation, he can assign portions of the plan to members of his staff. The S2's intelligence preparation of the battlefield (IPB) should be continuous; if it is, he can quickly develop a decision support

template and a reconnaissance and surveillance plan. The assistant S3 might get the task of planning the battalion's positioning. The reconnaissance and survey officer (RSO) or survey chief plans survey support. The signal officer designs a signal plan to support the operation. The fire direction officer (FDO) is concerned with the development of the fire plan. The executive officer's combat service support staff works out logistical support.

These problems are solved concurrently under the supervision of the S3. If the staff knows its job, the plans it comes up with will mesh well, but only through a common understanding of the requirements of the operation.

If, for example, the battalion is supporting an attack whose first phase is a movement to contact, the assistant S3 will know he must keep fire units moving close behind the brigade's advance guard while others maintain a continuous firing capability. He'll know he must have as many units as possible in position to support at crucial points in the operation — crossing the line of departure, assaults on objectives, etc. And he'll use his knowledge of the friendly situation and the S2's decision support template to come up with clear trigger points. The FDO will know he can't count on having all units available to fire at all times and will recognize the same critical points the assistant S3 does.

The signal officer will understand he must provide for retransmission as the FSOs advance and the batteries move; he'll look for terrain that balances line of sight between the tactical operations center (TOC) and his retransmission stations. He'll get the FDOs and FSOs to assign observers battery computer system (BCS) relay addresses. The RSO knows he'll have to bring control forward as the batteries advance; he'll plan backup means of extending common control.

None of this is mysterious. When seen as a set of plans that must meet a small set of common requirements rather than as a single big plan that must be briefed to all in detail before they can take independent action, the

Field Artillery support plan immediately becomes more tractable.

## Dividing the Work

With the first step a common understanding of doctrine, the second is a clear division of labor within the staff. This step comes with the recognition that the battalion staff has a "shadow" staff in the batteries.

Each staff section can identify its counterpart in the batteries. The signal officer's shadow is the battery communications chief. The RSO's shadow is probably the gunnery sergeant. The battalion FDO has the battery or platoon FDOs. The assistant S3 can work with the executive officer or a platoon leader.

As they complete their plan, they should rehearse it with their shadows or at least have their shadows give them a quick backbriefing. This ensures the subplans are cogent and understood and that they're formed in time to be effective.



NTC Observation Division

Had a platoon leader reconnoitered his route and rehearsed his passage, he might not have ditched in this friendly obstacle.



NTC Observation Division

Engineers try to reduce an obstacle without fire support, a gap a unit rehearsal would have revealed.

## Rehearsals

A dictionary defines "rehearsal" as a session of exercise, drill or practice, usually private, in preparation for a public performance. It's a run-through of the operation. It should both practice and test the plan. At

the end of a solid rehearsal, everyone should know his responsibilities, and the commander should know if his plan is adequate.

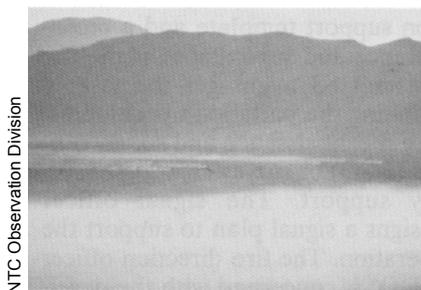
A successful rehearsal is easy to describe in a brief outline. Consider the example of the Field Artillery support plan, the most comprehensive an artillery battalion produces.

The S2 and FSO structure the rehearsal in accordance with the enemy's most likely course of action and the friendly scheme of maneuver. Where alternative friendly courses of action hinge on enemy actions (and time permits), the alternatives may be rehearsed. The S2 should take advantage of his role in the rehearsal to check his reconnaissance and surveillance plan by having collectors report on their assigned named areas of interest (NAIs).

At the appropriate time, each participant executes his part of the plan. The FSOs execute their assigned targets, place fire support coordination measures (FSCMs) into effect and render the reports the battalion depends on for its combat information. The forward observers (FOs) do the same. They ensure their assigned missions, especially high-priority ones such as final protective fires, are loaded in the buffers of their digital message devices (DMDs) and ready for transmission. The air liaison officers (ALOs) monitor airspace coordination areas (ACAs), clear aircraft in from the initial point (IP) and call for marking rounds and suppression of enemy air defense (SEAD).

The direct-support battalion TOC monitors all this: its operations and intelligence section pays particular attention to displacements, and its fire direction center (FDC) issues fire orders and passes messages to observers. If there's a mutual support unit, the two FDCs exercise transfer of control. Attached radars work both situational and scheduled cues with the S2. Fire unit FDCs compute fire commands, acknowledge FSCMs and ensure they can fire their assigned missions.

Any rehearsal will generally resemble this outline. Note its important features. It presupposes a completed



NTC Observation Division

Enemy rapid movement behind smoke calls for well-conceived and rehearsed plans by the Blue Force.

plan — not necessarily a final plan and certainly not a perfect plan, but a plan complete enough to execute. This distinguishes a rehearsal from a war-gaming session: the latter is an aid to decisions, the former takes place after the decisions have been made.

A rehearsal is designed to show whether everyone knows his responsibilities (for executing a target, moving a battery, switching frequencies and observing an NAI) and the cues for his action. It provides an opportunity to check whether the plan will work (observers confirm they can see their targets, platoons that they know assigned routes of march and FDCs that they have a ballistic solution to their target). Finally, the rehearsal as a whole is clearly under someone's direction.

## Ways of Rehearsing

Rehearsals may be conducted face-to-face, by wire or by radio. The first two have the advantage of greater security; the last two test communications in the course of the rehearsal.

Face-to-face rehearsals tend to be time-consuming and concentrate leaders in one place, but they are often the most secure and usually the least ambiguous. Wire rehearsals generally limit the number of agencies that can rehearse; they also don't test the radio communications on which execution usually depends. Radio rehearsals are usually the most comprehensive and the easiest to conduct on short notice, but they present the greatest risk of compromise and frequently confuse participants — "Is this fire mission real or a rehearsal?"

Whatever the technique, a successful rehearsal will be as close to



NTC Observation Division

This artillery suppression of an enemy's defensive position "came together" during a fast FSO-FDC rehearsal an hour before departure.



CPT John Petrik

This M198 crew had to shift trails three times in an engagement because its azimuth didn't coincide with the fire plan's requirement.

the way you want to execute as possible. Try to use the people who'll execute the plan; limit stand-ins to a minimum, especially when the battalion is new to rehearsals or unused to continuous operations. When a problem emerges during the rehearsal, fix it right there. Too many rehearsals waste time when the participants gloss over errors, flaws and misunderstandings just to get it over with.

## When to Rehearse

Many rehearsals can be concurrent. A common mistake is to wait until a plan is complete before rehearsing it — the temptation is to do nothing until everything is perfect. Not only will this encourage staff officers to refine their plans beyond reason and usefulness, but it also will make whatever rehearsal is actually conducted too late, too complicated and too time-consuming to do much good.

A look at the short list of plans (Figure 1) and who should rehearse them (Figure 2) reveals most of the plans have clear proponents who

**Field Artillery**

plan in relative independence (not isolation). Such plans can be rehearsed at the same time, and they need not all be rehearsed in the same way.

## When Not to Rehearse

When time is limited, you won't have a chance to rehearse everything. You must "triage" your plans. Some will be beyond help, others probably will be in good shape as they stand, but some could improve with a short run-through.

Pro forma rehearsals are pointless. Pick out the plans that need attention and can be checked and fixed in the time available. An obvious condition of being able to select a plan for rehearsal is having organized your staff work into coherent subplans.

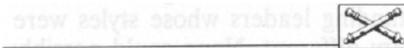


CPT John Petrik

Battery rehearsals help determine how much of what type of ammunition it needs for a schedule of fires.

## Conclusion

Rehearsals are both an aid to and a sign of organized staff work. If properly conducted, they encourage initiative and foster agility. They promote synchronization and coordination without shackling fire support to a rigid, set-piece operational style.



**Captain John F. Petrik is an Instructor in the Department of English at the US Military Academy at West Point. Until recently, he was an S3 Trainer in the Operation's Group Fire Support Trainers at the National Training Center (NTC), Fort Irwin, California. In nearly three years at the NTC, he has taken part in 40 rotations. Captain Petrik commanded B Battery and served as Battalion S3 in the 1st Battalion, 32d Field Artillery, West Germany. He holds a Master's of Arts in Philosophy from the University of Chicago.**

October 1989

1. Fire Plan, This is more than a target list and schedule of fires. It includes these, but it also includes responsibility for calling for targets, schedules and FSCMs. Close air support (CAS) and mortars also are part of the fire plan.
2. Field Artillery Support Plan. This concerns, ultimately, the fire units' movement and ability to meet support requirements. The FSCMs, especially boundaries and ACAs, are important and frequently overlooked. The Field Artillery support plan commonly includes such subplans as a survey plan and a nuclear, biological and chemical (NBC) defense plan.
3. Target Acquisition Plan. This involves radars, observers and the division artillery or Field Artillery brigade collection and analysis assets.
4. Reconnaissance and Surveillance Plan. Similar to a collection plan, it is perhaps meshed with the target acquisition plan. In the artillery battalion, this should be designed to answer the S3's priority intelligence requirements (PIR). The PIRs usually will involve security and displacement; they also may address gaps in the fire plan.
5. Communications-Electronics Plan. Are wire circuits in? Will data lines carry digital signals? Are the frequencies assigned to data nets separated enough to prevent local interference? Can all stations communicate with their net control stations? Are BCS relay addresses set? Does retransmission function? Do all stations understand electronic counter-countermeasures, particularly how to switch frequencies in the event of jamming? This is perhaps the most difficult plan to rehearse. It also exacts the greatest operation security (OPSEC) penalty.
6. Special Situations. These are operations or conditions that are unusual or essential to success. Some common examples are passages of lines, degraded mode operations — the tactical fire direction system (TACFIRE) unserviceable, only one BCS available for two firing platoons — linked observers, JAAT, etc.

Figure 1: An artillery battalion should consider rehearsing these kinds of plans.

1. Fire Plan: FSOs, FDCs, ALOs, Aviation Commander (Avn Cdr) or Air Battle Captain, Mortar Platoon Leader.
2. Field Artillery Support Plan: All listed in the other categories.
3. Target Acquisition Plan: FSOs, FOs, Direct-Support Field Artillery Battalion S2, Radar Personnel, Combat Observation Lasing Teams (COLTs).
4. Reconnaissance and Surveillance Plan: As in Numbers 1 and 3, Plus Batteries and Maneuver S2s.
5. Communications-Electronics Plan: Signal Officer, Fire Support Elements (FSEs), FDCs, TOC, Battery Operations Centers (BOCs).

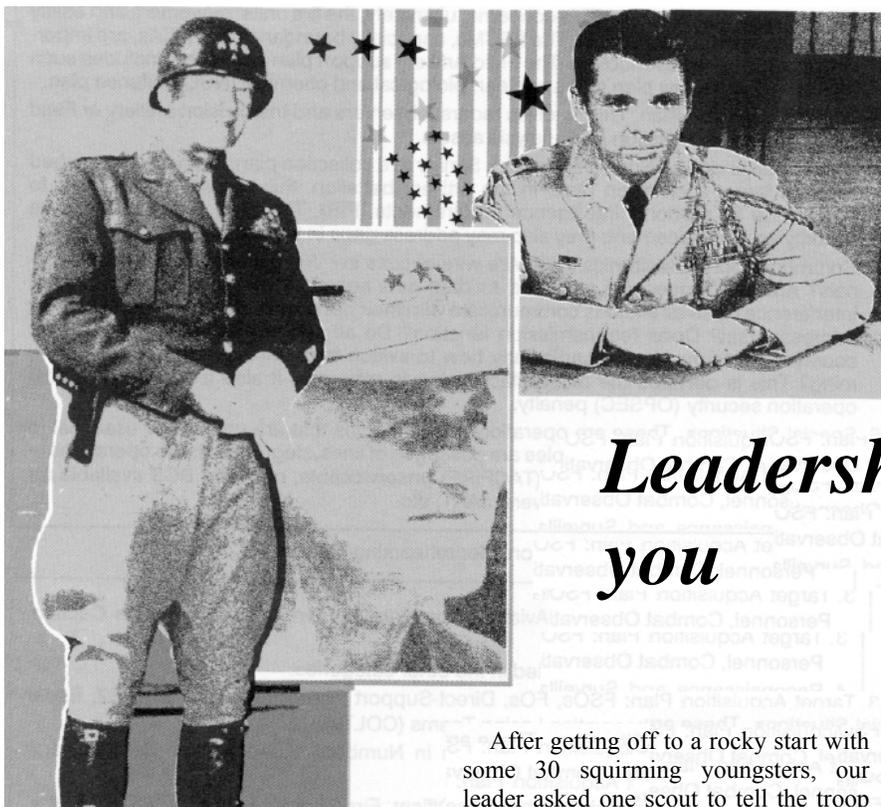
Figure 2: Who should rehearse obviously depends on the plan and the availability of key personnel.

- In a good rehearsal, leaders —**
- Use players, not stand-ins, especially in organizations with little experience in continuous operations.
  - Stop and correct problems as they arise.
  - Have built-in checks. The S2 participates, and those responsible for execution report back. These checks anchor the rehearsal in the enemy situation, the terrain and the details of the plan.
  - Parallel the way the plan will be executed; the sequence and the execution cues are the same.
- In a bad rehearsal, leaders —**
- Wait until all plans are complete, and they never are.
  - Wait until the last minute, leaving no time to correct problems.
  - Hold a "dog-and-pony" show, running a rehearsal without any serious intent of using it. This is the most common error artillery battalions make when rehearsing at the NTC.
  - Fail to monitor and supervise the rehearsal. No one accepts responsibility for directing the rehearsal, and it rambles unfocused and uncorrected.
  - Fail to rehearse concurrently at several levels.
  - Leave out crucial players.
  - Assume a plan has been checked when it hasn't.
  - Don't rehearse the plan they intend to execute. Some staffs think there are inherent benefits in rehearsing any plan at all, even one that's superceded or overcome by events. There are, but they are the general benefits of any command post exercise (CPX). They have little payoff in the next engagement.
  - Don't distinguish between rehearsal and execution. Batteries occasionally fire the missions they receive during a rehearsal.

Characteristics of Good and Bad Rehearsals

# Fire for Effect

SENIOR LEADERS SPEAK OUT



This excellent article by General Kerwin kicks off our new feature, Fire for Effect. We'll regularly include this feature in *Field Artillery*, allowing senior leaders Armywide to speak out on leadership, philosophy or other non-technical subjects.  
Editor

## Leadership to Fit you

By General (Retired)  
Walter T. Kerwin, Jr.

How many times have you seen leadership described in different ways? Some describe it with long essays while others confine themselves to a definition or a short description. But then, how many experts are there? Many, because each leader is his own expert. Despite the variances, everyone recognizes leadership when he sees it, and every time he sees it, it's in a different form. That's what makes leadership so intriguing.

Many years ago when I was an assistant Boy Scout leader, we held our rainy night meetings in the basement of the local church. The scoutmaster had a list of subjects to use for such rainy contingencies — his choice this night was leadership.

After getting off to a rocky start with some 30 squirming youngsters, our leader asked one scout to tell the troop his definition of leadership. The pithy answer was, "It's when you get somebody to do something he doesn't want to do without his complaining."

Now this is not a very sophisticated definition, but it has all the elements necessary to get the job done. It has stuck with me for more than 55 years.

### Leadership Versus Management

There's also a wealth of discussion about the difference between leadership and management. Some in the military say we are predominately involved with leadership and less with management. Others say that as you progress upward through the ranks, leadership dwindles and management is predominant. Certainly, leadership at the top is more complicated and, at times, cumbersome, with less direct contact. Some try to simplify the comparison by saying leadership is people and management is things.

All of these approaches are wrong. People include things and things include people. To manage things, you must involve people, and this requires leadership. Leadership and management are inextricably intertwined.

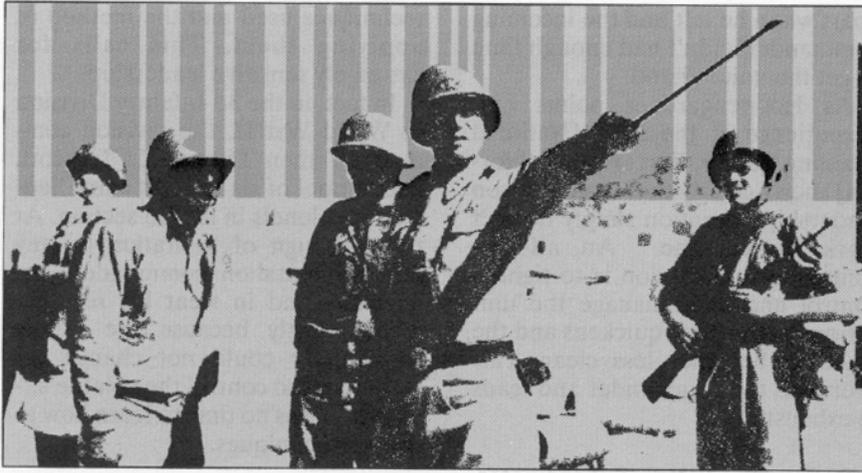
### Three Different Styles

Previously, I said you can recognize leadership when you see it, even though it comes in many different forms. Let's look at Generals George S. Patton, Jr., and Creighton W. Abrams, Jr., and Lieutenant Audie Murphy. All are recognized as outstanding leaders whose styles were very different. None could possibly have used the techniques of the others, yet all were tremendously successful.

### Patton, The Masterful Actor

How did Patton lead? Among other things, he was a superb actor. But underpinning this technique were two other approaches. First, he had assembled a team that was among the best of the operational planning staffs in the European Theater. It knew how to fight and win

*Field Artillery*



General George S. Patton, Jr.

using detailed plans and imaginative, aggressive execution.

Second, Patton symbolized professionalism with his boots, breeches, pearl-handled revolvers and five sets of four-star insignia on his uniform. His Third Army was highly successful, and he was its symbol. His mannerisms and strikingly immaculate appearance amidst the smoke and carnage of the battlefield were his signature.

Once his operation began, he was out among the troops "to see and be seen." He was recognized everywhere immediately. He exuded confidence.

The results? When you ask a World War II veteran who was in Europe what he did in the War, the inevitable answer is, "I was in Patton's Army." Everybody couldn't have been in Patton's Army, but they all wanted to be. Why? Because he was a leader whose hallmark was his *visible*, masterful acting, supported by superb staff work.

### Abe, The "Bear"

On the other side of the leadership coin was "Abe." General Abrams was a key to our success in the Battle of the Bulge at Bastogne. He was deputy commander and, subsequently, commander of all forces in Vietnam and the Chief of Staff of the Army before his untimely death.

Abe came on as a gruff "old bear" with his ever-present cigar and unpressed fatigues. He wore no pistols, carried no riding crop and sported only two pairs of subdued four-star insignia — no shiny jeep with a siren and four-star flags.

His style was one of warmth and informality. He was a father figure — his signature. He listened, he empathized, he was everywhere. He barked and demanded but no matter, everyone was as comfortable with him as with an old pair of shoes.

He was also a storyteller — each story had a lesson that spread by word-of-mouth thousands of times in a few days. Everyone knew what he wanted. He was unflappable and down-to-earth, one who loved the field and combat and detested bureaucracy. His *different* sort of acting in leadership was also successful.



General Creighton W. Abrams, Jr.

### Murphy, the Leader's Leader

Then at the bottom of the command ladder, both in rank and age, was that fantastic, gung-ho character known as Lieutenant Audie Murphy. I had the pleasure of being associated with him in the 3d Infantry Division in World War II. He was the Army's most decorated soldier.

In many respects, he was a wild man in combat. He believed anything could be done, and everyone believed he could do it. He carried this same signature out of combat into rear areas and elsewhere — sometimes much to the concern of his superiors.

He was an actor with a hallmark of his own — *be out in front*. I suppose if you are looking for the difference between leadership and management in its purist form, Audie's example was all leadership and no management.

### The Common Threads

The differences among these three heroes are dramatic. No one could have emulated one of the others without seeming to be ridiculous. Probably no style used by one could be as effective if used by another. Yet there are common threads of leadership woven among the three.

**Be Yourself.** The first and most important is to be yourself. Each one used a style that suited his personality — from flamboyance to self effacement to "gung-ho." All are markedly effective, but only if applied within the context of the individual personality.

At the so-called "Charm School," which is conducted by the Army Chief of Staff for colonels about to be promoted to brigadier general, the question inevitably arises, "What do I need to do to be general officer?" The question presupposes there are certain techniques and changes in the leadership style that occur as one crosses that line into general officer status and that they can be applied universally. The Chief's reply is usually, "You were selected because you have already demonstrated your leadership with your own techniques. Don't change them, but be acutely aware you must alter these techniques as the situation demands. Trying to emulate someone can only be disastrous."

**See and Be Seen.** An old adage says that no one knows whether a violinist is a virtuoso if he plays to an empty hall. Conversely, the violinist will never know how to apply his musical techniques unless he plays to a full house and constantly gauges the audience. The full house for the military leader is his unit, be it a corps or a platoon, and the only way he can play to his full house is to see and be seen constantly. In this way he hones his techniques as he gauges his unit. No one hones his techniques while confined to his command post or through periodic walks outside to "smell the flowers" under ideal conditions.

Old Blood-and-Guts and Abe did it by constantly seeing and being seen, each in a different way. Audie did it by being at the forefront of his unit in combat and stirring activity in the rear.

Mind you, by being there you'll soon learn how effective your techniques are and whether or not *you are a leader*. Everybody will be marking your scorecard subconsciously. Your subordinates will let you know in all sorts of subtle direct and indirect ways what your score is.

**Delegate Authority.** The third is aptly put in an article by Major Hoopengardner, a leadership staff officer in Forces Command. He stresses "power down," i.e., delegate authority. I agree.

It's undoubtedly the most difficult technique to implement. Why? Because there's a widely held notion that "if you want it done right, do it yourself." There's no greater strain on your leadership style than to keep your hands off your subordinates as they do their jobs. How many times have you muttered to yourself, "I can do it better"?

The point was made not long ago in a round-table discussion with others who had been division commanders that we were sometimes amazed by what *appeared* to be outstanding battalions — great training, fine maintenance, etc. The same battalions would turn out to be mediocre three or four months after the battalion commanders changed. Why? Usually, it was because a former commander tended to do everything himself and delegate little. What happened? The unit came apart when he left and the incoming commander hadn't had

enough time to get the unit in hand.

As Hoopengardner points out, "experience at the NTC [National Training Center, Fort Irwin, California] shows clearly that a one-person leadership operation simply doesn't work in wartime." An all-too-commonplace reaction is to tighten control and micromanage the unit actions as the pace quickens and the situation becomes less clear. This overtaxes the commander and leads to exhaustion.

**Be Sensitive to Your Subordinates.** In peacetime, commanders at all levels tend to forget that personnel in units are constantly changing — sometimes at an alarming rate. One thing is certain, the leader can rest assured that his unit is not the same unit he took command of last year or even last month. At the end of a two-year command tour, it's a brand new outfit.

For instance, a new commander may find his entire staff leaves within six months. Conversely, the commanders and subordinate staffs may be fairly stable for more than a year. In any event, the arrivals and departures are continual, and this severely affects the "texture" of the unit.

It means the commander must be sensitive in using his leadership techniques. This sensitivity considers that the changing maturity and experience of his subordinate commanders and their staffs will no doubt call for differing training, counseling and team-building techniques.

In combat, the pace is frantic. The continual changeovers are such that the senior may have little or no opportunity to know his subordinates. Moreover, the daily stresses will vary tremendously on the commander himself and on his subordinates. One will have been subjected to taxing enemy pressures while the other, much less so. One is clearheaded, the other fuzzy-headed. All are too soon exhausted, tempers are shortened and comprehension is diminished. The reactions of these soldiers will reflect their attitude and physical condition.

All in all, the principles of leadership will remain the same. What will get the job done depends on the techniques used and the method of applying them. This calls for extremely sensitive leadership.

In fact, in the 3d Infantry Division in World War II, the division commander, then Lucian K. Truscott, kept a pool of six to eight extra lieutenant colonels in his G3 section. At the first sign of hesitation by any infantry battalion commander, out he came and in went his replacement, mostly because the failing commander could not change his techniques to control the volatile situation. It was no time to learn how to change techniques.

## The "How" of Leadership

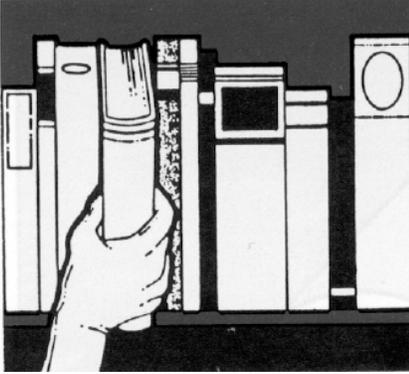
Anyone can parrot the principles of leadership in the classroom and in the ubiquitous staff meeting. They are as rock-solid as the Principles of War. It's the "how" more than the "what" that produces results.

Simply stated, the application of leadership techniques is akin to the way you choose your clothes. Your choices consider all sorts of situations. First, is it a summer or winter suit? You select it according to the conditions under which you'll wear it. Next, you choose the color or pattern. Some can wear brown clothes; others only feel comfortable in grey. But inevitably, you'll ask someone how the color looks to them before you put your money down. Their reaction is important. Finally, you choose the style — formal or casual.

Your leadership techniques are your signature, just as your clothing reflects your style. Each must fit you.



**General Walter T. Kerwin, Jr., currently a consultant, was serving as Vice Chief of Staff of the Army when he retired in 1978. He was Commanding General of Forces Command, with Headquarters at Fort McPherson, Georgia; the II Field Force, Vietnam; and the 3d Armored Division and 3d Armored Division Artillery, West Germany. He was also Chief of Staff of the Military Assistance Command, Vietnam (MACV). He served as Deputy Chief of Staff for Personnel, Headquarters, Department of the Army, and the Commander of the 56th Artillery Group, Fort Bragg, North Carolina. In World War II, General Kerwin served with the 3d Infantry Division Artillery in Africa, Sicily, Italy and France.**



# Battle Study:

## A Guide through the History of Field Artillery

by Major James Jay Carafano and Second Lieutenants John H. Nelson and Timothy P. Brereton

We often neglect the mental preparation for war — the dedicated self-study that can, in part, minimize the effects of inexperience and chance on the battlefield. This article offers a practical guide by topic for company-grade artillery soldiers to sharpen their combat leadership skills through the study of military history. It surveys the development of the artillery's role in land warfare from the 17th century to the National Training Center (NTC), Fort Irwin, California, and beyond.

**O**ur objective is to create a historical framework for analyzing the performance of artillery in battle. This approach makes the deliberate study of how others reacted to battle — in effect, a simulation — an exercise in how to deal with the unknown.

The topics guide you in the analysis of our recommended reading lists. The readings selected are readily available through libraries, bookstores and military publication channels. After completing each reading, we recommend you write a summary of the important points for discussion or further research.

As a companion book for the readings, we suggest R. Ernest Dupuy and Trevor N. Dupuy's, *The Encyclopedia of Military History* (New York: Harper & Row, 1970). This single volume contains a concise summary of all the battles and campaigns discussed. Studied in combination, these sources offer an interesting, enjoyable and professionally rewarding program that works well for individual or group study.

### Topic 1: Studying Battle

In most human endeavors, it appears that performance improves with practice.

It seems likely that this pattern would hold true in the mental preparation for war. As a result, the soldier who more deeply considers the dynamics of war through history should be more capable of dealing with them when faced with the problem of putting training into practice on some future battlefield.

### Critical Analysis

The question of how to study battle really begs the more fundamental question of how to study history. The key to the answer is the critical use of sources. History needs to be read as a detective story rather than a novel. Its purpose is to provide information for analysis, not entertain.

As you study each topic, try to strip away the romantic and self-serving to

identify controversial issues for debate and evaluate the adequacy and character of evidence provided. In other words, become a critical thinker.

### Battle Study Model

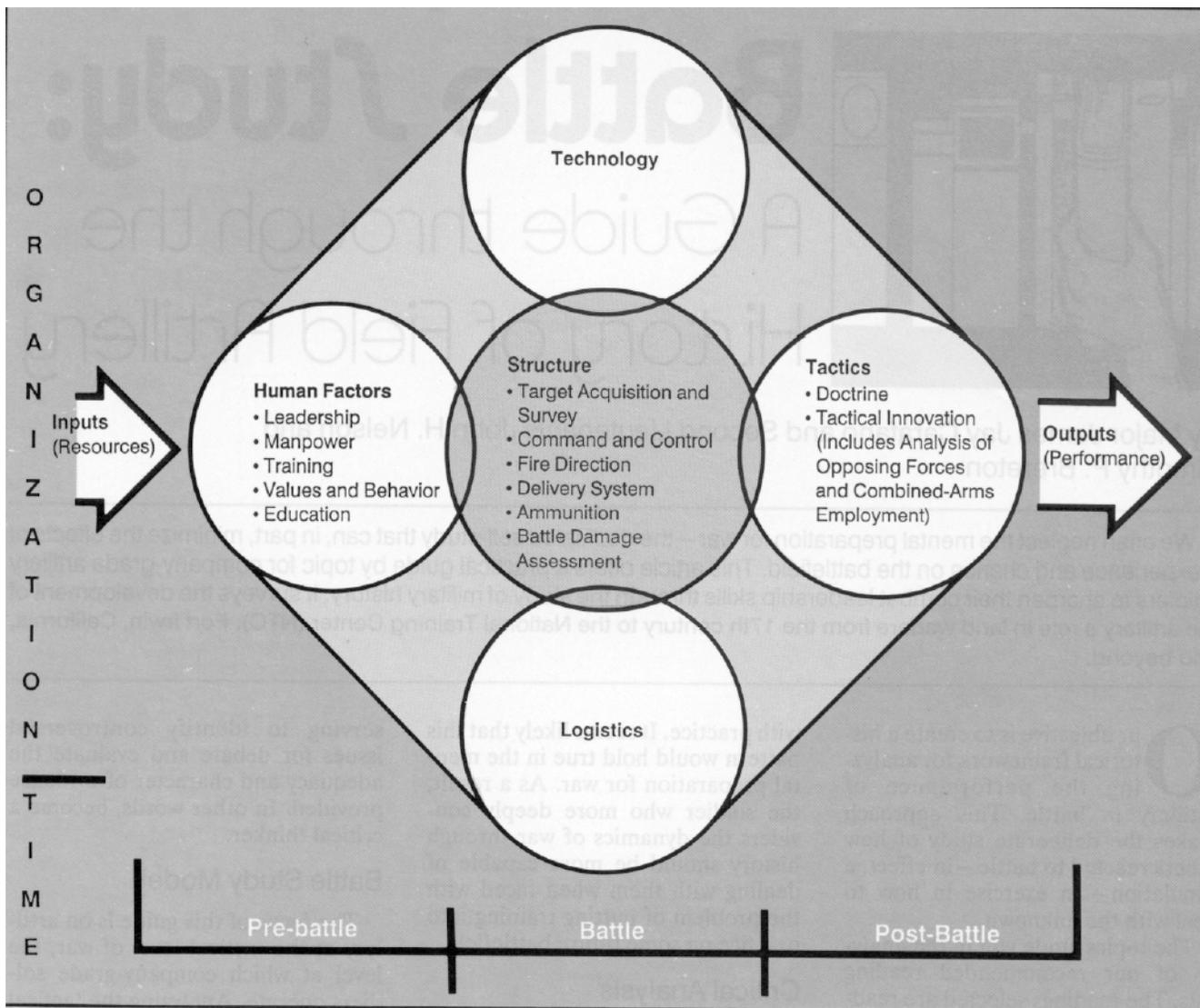
The focus of this guide is on artillery at the tactical level of war, the level at which company-grade soldiers operate. Analyzing the tactical history of fire support is a complex task. The organization and employment of artillery has always been governed by a number of factors.

To illustrate this, we constructed a battle study model. This model portrays the relationship of the elements of the artillery system. The objective of the course of study is to evaluate their effects

#### Readings for Topic 1

1. Keegan, *Face of Battle*. Doesn't specifically discuss artillery, but Chapter 1 explores issues related to studying battle history.
2. Carafano, "On Teaching War," "Forward Observer" newsletter. Makes the study of military history immediately relevant to the interests of company-grade soldiers.
3. Nye, *The Challenge of Command, Reading for Military Excellence*. Examines the role of self-study in the development of officers. See Pages vii-16 and Chapter 4.

(See the Bibliography for Field Artillery Battle Study for a complete listing; also, see Bibliographical References for Battle Study Topics for a summary by topic.)



Field Artillery Battle Study Model

on the system over time and discover how soldiers and leaders responded to the dynamics of change.

In short, you look at how various model "inputs" change (e.g., technology). Then look at how these factors affect the performance of the artillery system — "outputs" (e.g., performance in battle or changes in other aspects of the system). The model helps you move through the course of study, analyzing the material — looking for answers.

## Topic 2: Artillery Innovation and Failure in the 17th Century

The 17th century witnessed the rise of the state in Europe. Commensurate

with the increase of the political and economic power of the states' central governments, their military forces increased dramatically. The breakdown of feudalism and the medieval chivalric code made warfare more competitive and egalitarian. It was an age of opportunity for rising European states.

### Gustavus' Light Artillery

Gustavus Adolphus, the King of Sweden, proved to be one of the most innovative military commanders of the period. Sweden couldn't hope to match the economic and manpower resources of the larger European powers. Therefore, Gustavus needed to maximize his combat power to achieve

initial military victories that might preclude Sweden's involvement in a protracted war.

He was particularly interested in developing light, mobile Field Artillery that could keep up with the infantry and cavalry. He sought to create a combined-arms team capable of providing decisive tactical success. Gustavus reduced the weight of the pieces and standardized the caliber. He organized his fire support into functional units and assigned artillery to individual tactical formations. Gustavus also converted his gunners from craftsmen and hired teamsters into a regular branch of the army.

In 1631 in the Battle of Breitenfeld during the 30 Years War, Gustavus appeared to achieve his goal of

**Field Artillery**



King Gustavus Adolphus of Sweden, 1594-1632

overcoming the recognized deficiencies of the artillery system. During the Battle, Gustavus' forces outflanked his opponent, the imperial Hapsburg Army. From this flank position, Swedish gunners fired on the imperial ranks using their own as well as captured enemy artillery. When Gustavus pressed his attack, the enemy broke and fled.

Despite his spectacular success at Breitenfeld, there was no broad attempt to imitate his tactical and materiel innovations. The obvious question is why? Perhaps, it's because the Battle didn't validate Gustavus' concept. It's clear the Swedes outgunned the imperial forces; yet, artillery's role may not have been decisive.

### Lack of Implementation

Raimondo Montecucoli, a soldier and military scholar who participated in the Battle, took little note of Gustavus' innovations. In his writings, Montecucoli's recommendations on the employment of artillery focused on engaging the enemy at the maximum range and continually harassing him until the battle was joined by infantry and cavalry (extending the killing range.) He doesn't suggest that artillery be

### Readings for Topic 2

4. Roberts, *Gustavus Adolphus, A History of Sweden 1611-1632*. Analyzes definitively Gustavus' military efforts. For comments on artillery and the Battle of Breitenfeld, see Pages 171-2, 223-36 and 260-1.
5. Rothenberg, "Maurice of Nassau, Gustavus Adolphus, Montecucoli, and the Military Revolution of the Seventeenth Century," *Makers of Modern Strategy*. Evaluates contributions and ideas of 17th century military figures, including Gustavus and Montecucoli.
6. Parker, *The Military Revolution, Military Innovation and the Rise of the West 1500-1800*. Surveys military innovation during this period.

assigned to tactical units nor does Montecucoli discuss the movement of artillery during the Battle. In short, he offered nothing new.

How could such an astute observer of military operations have missed the innovations of Gustavus Adolphus? Perhaps, little effort was made to emulate Gustavus' ideas because neither Montecucoli nor others saw them as important.

### Technological and Political Limitations

A number of factors may explain the practical limitations of Gustavus' concepts. The level of technology was certainly a drawback. To obtain light artillery that could be as mobile on the battlefield as tactical units, Gustavus experimented with a number of systems designed to lighten the weight of the tube by shortening the barrel and reducing its thickness. Thinner tube walls required a lighter powder charge. The reduced charge resulted in significant decreases in accuracy and range. Gustavus' guns moved fast but did little damage.

In addition, another factor may have constrained innovation. The power of the state was on the rise; nevertheless, the European powers during the 30 Years War were strapped by social and economic dislocation, as well as the prohibitive cost of fighting a protracted war. States may have been reluctant to invest their strained resources on what they saw as unproven military concepts and marginal technologies.

### Topic 3: Napoleonic Warfare in the 18th Century

A century after Breitenfeld and generations before Napoleon, the

Prussian king Frederick the Great experimented with the organization and employment of light Field Artillery similar to the concepts laid out by Gustavus. It was, however, only in the age of Napoleon that these innovations were broadly adopted by the European powers.

### Technological and Political Changes

This was due in a large part to solving the technological dilemma of weight versus powder charge through improved gun foundry techniques. Accurate and uniform results were obtained by casting the gun as a solid piece and then boring the barrel out afterwards. The bored barrel resulted in a closer fit between the shot and tube wall. As a result, less gas escaped and a smaller powder charge was required. This allowed for thinner and lighter barrels without sacrificing range and accuracy.

By the 18th century, the power of the state caught up with technological progress. Governments exercised greater and more efficient control over society. The ability to direct a significant percentage of their resources into military spending allowed them to develop more complex and expensive fire support systems. For example in France before the French Revolution, Jean Gribeauval designed and developed the artillery system that Napoleon employed throughout his campaigns.

### Tactical Debate

Mobile, rapid-firing guns overcame many of the longstanding problems that restricted effective employment of Field Artillery. As a result, the Napoleonic period saw significant tactical innovation that



Battle of Waterloo by Dighton. Background — the smoke from 400 guns partly shrouds the battlefield; foreground — the charge of the Horse Guards.

attempted to exploit superior technology.

A century-long debate ensued on how best to employ the guns. Essentially tactics focused on answering two questions: (1) Where do we position the guns? and (2) What do we shoot at?

The requirement for tactical decisions on artillery employment during the course of a battle significantly changed the character of warfare. These combat decisions required a more sophisticated command and control network. The tactical problem of maximizing the combat power of fire support systems and maneuver units, effectively employing a combined-arms team, became apparent.

Variations in the employment of artillery by the European powers make an excellent case study in tactical innovation. These variations and the effects of artillery during the Napoleonic period are illustrated in the Battle of Waterloo in 1815. For example, the French believed in massing their guns and concentrating fire on part of the line of an opposing force to open a gap for infantry forces to break through. The British, on the other hand, spread their artillery throughout the formation to reinforce the firepower of infantry units.

In either case, the gunners were able to inflict severe casualties. The artillery could easily outrange the effective fire of infantry smooth-bore muskets. This factor — combined with the rapid rate of fire of the guns, improved aiming mechanisms and ancillary equipment and the variety of munitions available — gave the artillery a distinct firepower advantage against infantry formations.

#### Topic 4: Artillery in the 19th Century: The American Civil War

In the aftermath of Waterloo, military theorists attempted to distill the lessons of Napoleonic warfare. Preeminent among them was Antoine-Henri Jomini. A former staff officer for Napoleon, Jomini paid particular attention to the employment of artillery. He advocated using cannon as part of a combined-arms team. Jomini believed the guns equally formidable in the offense and defense.

#### Offensive Artillery

During the Mexican-American War (1846-1847), the US found light-horse

artillery was even capable of offensive action independent of other arms. "Flying batteries" fought from exposed forward positions, sometimes within range of enemy musket fire. Employing grape and canister in rapid fire and using quick displacement, artillery was able to break up attacks, protect flanks or conduct an offensive rush. As a result, artillery tactics were recognized in both theory and practice as an important element in any battle plan.

#### Restructured Artillery

The industrial revolution and the development of the professionally educated officer corps further enhanced the evolution of the artillery system. During the American Civil War, the North had a well-developed industrial base that could mass-produce standardized weapons and ammunition.

At the same time, two exceptional West Point-educated Army officers, Majors William Barry and Henry Hunt, set about building a functional fire support system. Tasked with organizing the artillery for the Army of the Potomac, they standardized battery drill, discipline, equipment and tactics and restructured logistics to support a high rate of ammunition consumption. Hunt also created an artillery reserve — a separate artillery force that could be employed throughout the battle by the artillery commander to provide massed artillery fires. In short, military professionals combined concepts of artillery tactics and organization distilled from the Napoleonic age and America's recent military experience with the war-potential of an emerging industrial state.

Despite the accomplishments of Hunt and Barry, the battle of the Blue versus Gray soon proved that technology had altered the face of battle in unanticipated ways. In particular, artillery lost its utility in the offensive role.

#### Rifled Guns

During the Civil War, the rifled musket came into common use. Rifling created a tighter fit between the projectile and tube wall. Therefore, less gas escaped and the projectile

#### Readings for Topic 3

1. Keegan, *The Face of Battle*. Chapter 3 covers the Battle of Waterloo.
7. Mercer, *Journal of the Waterloo Campaign*. Provides an eyewitness view of Napoleonic combat as Mercer commanded a horse artillery troop. See Chapters 11-15.
8. Hughes, *Open Fire, Artillery Tactics from Marlborough to Wellington*. Studies the evolution of artillery tactics.
9. Hughes, *Firepower Weapon Effectiveness on the Battlefield 1630-1850*. Provides a more detailed analysis of artillery effects.



The Blue and the Gray in the Civil War by artist Milhollen.

## Topic 5: The Age of Quick Fire and World War I — A Return to the 14th Century

The full extent to which the tactical defensive would dominate the battlefield didn't become apparent until World War I. Union victories like Malvern Hill surprised no one. That artillery could be useful in defending a well-prepared position was nothing new — artillery had been defending and knocking down fortifications since the Middle Ages.

But the idea that rifled weapons could make future wars look like a medieval siege was not seriously considered. The slug-fests of the American Civil War did not reflect the shape of modern combat anticipated by most military thinkers. As a result, they dismissed the War as an aberration.

Still the impact of rifling technology wasn't completely ignored. In the last half of the 19th century, Europeans participated in numerous small wars from the Crimea to Manchuria. These experiences witnessed some changes in tactics and technology. European armies adopted rifled infantry arms, and artillery accommodated itself to the changing battlefield by shifting from a direct to an indirect fire support system. This innovation was driven by both the difficulty in assaulting prepared positions defended by rifled weapons and the application of new technology for artillery.

### Quick-Fire Artillery

The development of quick-fire (QF) artillery employed a number of technological advances, including

was fired with superior range and power. In addition, the spin initiated by the rifling gave the round greater accuracy.

As a result, the flying batteries employed during the Mexican-American War proved ineffective. Riflemen could now outrange the effects of canister and pick off an artillery crew before it could unlimber its gun.

While the firepower of the infantry increased dramatically, the technology of smooth-bore artillery changed little in the generation from Waterloo to the Battle of Malvern Hill in 1862. Attempts were made to adopt rifling technology to artillery weapons. The Army of the Potomac, for example, employed three standard weapon systems. The Napoleon 12-pounder had a traditional smooth-bore, direct-fire gun design. But the Union also fired the 10-pounder Parrot rifle and three-inch ordnance rifle.

Employment of the rifled guns remained controversial throughout the War. Though they had greater range and accuracy, many believed that both the guns and the exploding shell they fired were unreliable. Also, the rifled guns could not fire canister (fragments would have scarred the rifling). Canister had proven to be the most effective ammunition against the Confederates' massed infantry assaults.

In addition, many doubted the worth of the extended range of rifled guns in the heavily forested and rolling terrain of the Eastern United States. The use of cannons

appeared limited.

### Tactical Defense

The Union preferred to use the tactical defense in which artillery could fight from prepared positions protected from Confederate small-arms fire. The skillful use of prepared positions and the coordinated employment of massed fire support enabled Hunt to balance the strengths and weaknesses of the Union artillery.

At Malvern Hill, the last major battle of McClellan's peninsular campaign, Hunt's cannons overwhelmed an attacking Confederate force. The rifled guns in the artillery reserve fired at long range to destroy enemy cannons and disrupt attack formations. At short range, the smooth-bore Napoleons opened up, firing canister like giant shotguns. At the day's end, 5,000 Confederate infantrymen lay dead or wounded on the slopes surrounding the Union position. Artillery made the Union the master of the tactical defense.

#### Readings for Topic 4

10. Jomini, *The Art of War*. Discusses employing artillery in Chapters 4 and 7.
11. Shy, "Jomini," *Makers of Modern Strategy*. Analyzes Jomini's life and works. See Pages 143-185.
12. McWhiney, *Attack and Die, Civil War Military Tactics and the Southern Heritage*. Provides a good summary of the employment of artillery but is a controversial book. For comments on artillery, see its index.
13. Morelock, "Wait for the Wagon! Combat Service Support for the Civil War Battery," *Field Artillery Journal*.



The French 75-mm gun, widely used in World War I.

breach-loading mechanisms, recoil systems, fast-burning smokeless powder and reliable high-explosive rounds. These innovations allowed guns in concealed positions to provide rapid and accurate long-range fires on targets.

However, these new capabilities also made new demands on the artillery. Higher rates of fire and a more complex support system increased logistical requirements. In addition, with the target out of sight of the gunner, fire direction and fire support coordination became an increasingly complex task. In short, changes in the artillery system increased firepower and survivability but at the cost of added complexity and an increased requirement for combat resources.

### Tactical Defense Remains

Despite innovation, artillery alone proved unable to break the tactical defensive's strangle hold on combat. The combination of entrenched fortifications, machineguns and defensive artillery fires exposed the frailty of the artillery system in an offensive role.

Many of the shortcomings of the system were readily apparent in the British offensive during the Battle of the Somme in 1916. The British bombarded the German trenches for seven days, firing 1,500,000 shells (about 30 shells per square yard). When the British troops went over the top, however, they found the German defenses as formidable as ever.

The British had underestimated the requirement for heavy artillery to breach prepared defenses and the ability of seasoned German troops to withstand the psychological effects of a prolonged bombardment. British losses in the campaign were 420,000 — a sad testament to the failure to fit fire support to the face of battle.

## Topic 6: World War II — The King is Crowned

America's late entry into World War I allowed little time for the development of a "yankee" artillery system. In fact, it was not uncommon for US divisions to go into battle

without American artillery in support.

The aftermath of the War was little better. The economic realities of the inter-war years allotted meager funds to develop and purchase artillery. In addition, some military thinkers argued that even this money was wasted. Airpower and armor would dominate future battlefields. The tank and the dive-bomber offered new direct-fire weapons that could restore mobility to the battlefield without fire support.

As a result, America's entry into World War II found the US outranged and outgunned. The restoration of mobility to the battlefield during World War II, rather than signaling the end of artillery, allowed guns to exploit the offensive potential of indirect fire support.

### Offensive Indirect Fire

Americans quickly discovered artillery fulfilled many requirements for combined-arms operations that airpower and armor couldn't. Unlike close air support, artillery could operate 24-hours-a-day under any weather conditions. It was also far easier to coordinate and more responsive to calls for fire from maneuver units.

Its advantage over tanks was the ability to shift and mass fires on targets beyond the line of sight. Artillery also held an inherent advantage in survivability when firing in the indirect role. In addition, Americans also found that even a "maneuver" war contained its share of static battles, such as attacks against well-defended cities like Metz and Nancy.

### Mechanization

Artillery still played its traditional roles of defending and attacking fixed fortifications, occasionally even being employed in a direct-fire role. Requirements were quickly established for mechanized light and heavy artillery pieces to perform a range of complex fire support tasks.

By the time the American Third Army broke out of the Normandy beachhead to launch the Lorraine Campaign across central France in 1944, the quantity and quality of American artillery support offered US forces a distinct battlefield

#### Readings for Topic 5

1. Keegan, *The Face of Battle*. Covers the Battle of the Somme in Chapter 4.
14. Tyndale-Briscoe, *Gunner-Subaltern*. Covers the memoirs of a British artillery officer during the Battle.
15. Bidwell, *Gunners at War, A Tactical Study of the Royal Artillery in the 20th Century*. Studies the effects of new technology and other factors on artillery operations. For World War I, see Chapters 1 and 2.

advantage. The mechanization of artillery ensured that fire support was as mobile as the maneuver force.

## Other Innovations

The capabilities of the system were further expanded by tactical and materiel innovations, including the use of radio, ground and air observers, survey, fire control equipment and new fire direction procedures. These changes created fire coordination and command and control systems that could mass and shift artillery fires, as well as provide timely and responsive fire support to maneuver units throughout the area of operation.

While the Lorraine Campaign illustrated the flexibility and effectiveness of US artillery, it also offered examples of a growing concern in the employment of fire support. As the complexity of the system grew, the danger of "amicicide" [sic] or casualties from friendly fire increased. As in the past, innovation brought not only new capabilities, but also new requirements and concerns.

## Topic 7: The Korean War — World Wars I and II Revisited

From the military point of view, Korea was really two wars. Commanders found the first phase from the outbreak of the War in June 1950 to the summer of 1951 comfortably reminiscent of American combat actions in World War II. However after a seesaw battle across the rocky peninsula, the opposing armies stalemated roughly along the original international boundary. What followed, the second phase, lasted until the armistice of July 1953.

This War more closely resembled the trench combat of World War I than the sweep and dash of the Third Army. Both sides fought from well-prepared bunker and trench positions, scrapping for bits of turf as the negotiations dragged on at Panmunjom. In short, in Korea the artillery was forced to recall the lessons of both world wars.

### Readings for Topic 6

16. MacDonald, *Three Battles: Arnaville, Altuzzo and Schmidt*. Discusses the effects and employment of artillery in combined-arms operations at the unit level. See "Breakthrough at Monte Altuzzo," Pages 103-200.
17. Cole. *The Lorraine Campaign*. Describes artillery operations at the operational level during the campaign.
18. Green, *The Ordnance Department: Planning Munitions for War*. Covers technological developments in Chapters 10-13.
19. House, *Toward Combined Arms Warfare: A Survey of 20th Century Tactics, Doctrine and Organization*. Includes the role of artillery in World War II. See Pages 105-121.
20. Shrader, *Amicide [sic]: The Problem of Friendly Fire in Modern War*. Discusses artillery fratricide in World War II. See Pages 3-14.



Reaching high ground in Korea, these soldiers dig in with a light machinegun and scan enemy terrain.



In Korea, heavy artillery, such as these 155-mm howitzers, was confined to main "highways."

### Battery Autonomy

While the Korean War saw little revolutionary development in the fire support system, the historical accounts of a few battles from this almost forgotten war provide excellent case studies for examining artillery at the unit level. Though the artillery battery as a tactical unit existed from the age of Napoleon, it only has been since World War II that the organization became truly autonomous.

It performed its own operational functions (e.g., logistics, security,

reconnaissance and survey) separate from the maneuver combat forces, while at the same time provided continuous fire support to the ground commanders. These requirements posed a severe test for organization, doctrine, logistics, combat leadership and technology.

### Security and Tactics

The defense of battery positions at Haman and Kunu-ri in 1950 and 1951 illustrates the problems of protecting the artillery system from ground attack. Artillery action at

Kunu-ri highlights the challenges of coordinating the movements of maneuver and fire support units on a crowded battlefield.

For the second phase of the War, the battles around Pork Chop Hill in 1953 underscore the use and limitations of employing artillery in static battles. In addition, the account of the Battle for Arsenal Hill demonstrates how the effectiveness of the artillery system has become dependent on the ability of the forward observer to direct fire.

## Topic 8: Vietnam — The Firepower War

Vietnam was America's first major "war without fronts." Attacks could be expected from any direction in strengths ranging from harassment by an individual sapper to attacks by conventional main-force units.

To counter this threat, US ground forces tried to defeat the enemy by exploiting the Americans' inherent advantage in mobility and firepower. This required deploying forces widely to locate the enemy. Once we "fixed" an enemy, commanders would rapidly build up a preponderance of combat power by employing helicopters, artillery and air support.

### Decentralized Control

For the artillery, the intimate relationship between fire support and maneuver elements meant batteries had to be as mobile and responsive as the supported units. The solution adopted was the fire support base. This base was essentially a small fort that could be established anywhere to deliver indirect fire support for maneuver operations and, at the same time, provide its own security.

Establishing these bases increased the independence of the artillery as a tactical unit as well as the scope of its responsibilities. Decentralization placed innovative and competent small-unit leadership at a premium as commanders faced a variety of new concerns.

The Ia Drang Campaign of 1965 produced the first major battles between the North Vietnamese Army and American forces. It tested American tactics and fire support

### Readings for Topic 7

21. Marshall, *Pork Chop Hill*. Book one discusses the Battle of Arsenal Hill.
22. Gugler, *Combat Actions in Korea*. Covers artillery operations during the first phase of the Korean War. See Chapters 3, 5 and 12.
23. Doughty, *The Evolution of US Army Tactical Doctrine*. Supplements Gugler. See Pages 1-12.
24. Marshall, "On Heavy Artillery: American Experiences in Four Wars," *Parameters*. Covers the period from after World War II through the Korean Conflict. See Pages 10-15.



An aerial view of a fire support base in Vietnam near the Cambodian border.

procedures employed throughout the War. During this Campaign, the Battle of Landing Zone (LZ) X-Ray illustrates the techniques of employing artillery fires and provides an opportunity to evaluate their effectiveness. On the other hand, the Battle at LZ Bird in 1966 provides a detailed look at the problems of defending the artillery system in a war without fronts.

### Controversy

Employing artillery during the Vietnam War remains a controversial topic. Some critics argue that American forces relied too heavily on firepower to the exclusion of maneuver. They suggest the US squandered massive amounts of resources on a fire support system that produced little results.

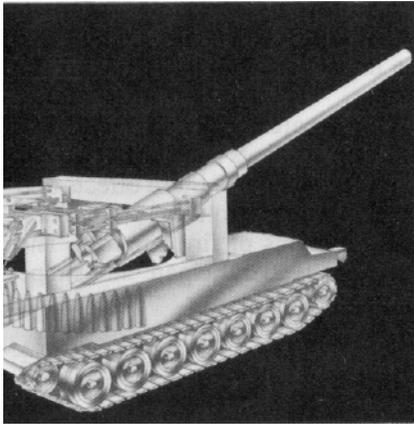
Others suggest the American experience in Vietnam is unique, not to be duplicated in future wars. Therefore, they argue Vietnam holds few lessons for the artillery. Both these conclusions require analysis and debate, particularly since the Army is revitalizing its capability to fight a low-intensity war with the creation of light infantry divisions.

## Topic 9: History and Future War

Studying military history is incomplete if a soldier doesn't apply his broadened horizons and new-found analytical skills to the study of contemporary problems. Currently, units wage combat back and forth across the sands of the NTC in a quest to capture the "face" of future battles. Though the effects of artillery are poorly simulated at the NTC, the challenges and reality of

### Readings for Topic 8

25. Marshall, *Bird: The Christmastide Battle*. Provides a complete analysis of the Battle.
26. Allbright, *Seven Firefights in Vietnam*. Covers the Ia Drang Campaign in Chapter 1.
27. Dodge, "Fire Support in an Airmobile Environment: Lessons for Everyone," "Forward Observer" newsletter. Also covers the Ia Drang Campaign.
28. Scales, *Firepower in Small Wars*. Analyzes best the employment of artillery in Vietnam. See Chapter 3.
29. Scales, "Firepower and Maneuver in the Second Indochina War," *Field Artillery*. Condenses his book *Firepower in Small Wars*.
30. Carafano, "Letters from Vietnam," *Field Artillery*.
31. Carafano, "Fortresses and Firepower in Vietnam," *Field Artillery*.



A Futuristic Robotic Howitzer for Battles Yet to Come

coordinating close fire support on the modern battlefield are readily apparent. A historical analysis of operations at the Center can increase our understanding of the dynamics of the present fire support system.

### New Threats, Missions and Technology

A study of future war, however, must also consider factors that Americans have not experienced on past battlefields or at the NTC. Artillery and missile units face new threats in the shape of advanced chemical weapons, tactical missiles, electronic warfare and nuclear weapons. In addition, they'll be targeted by special forces and air attack at a level never before experienced in previous wars. The requirement for joint coordination to employ air and ground fire support systems to fight the close, deep and rear battles adds new dimensions to battle.

Finally, we must balance these threats and missions against the enhanced technology we're employing to upgrade NATO delivery, survey, command and control and target acquisition systems. With this enhanced technology, we're trying to provide the robust fire support capability required to support AirLand Battle doctrine.

### The Forces of Change

What role does historical analysis play in understanding future battle? It increases our ability to understand the forces of change. History demonstrates

#### Readings for Topic 9

32. Scales, "Drumbeat for Maneuver Could Muffle Firepower," *Army*. Evaluates the requirements of firepower on future battlefields.
33. Bolger, *Dragons at War*. Describes experiences of a battalion at the NTC.
34. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982*. Outlines the development of AirLand Battle doctrine.

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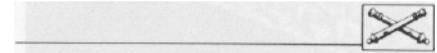
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4. Roberts, Michael. *Gustavus Adolphus, A History of Sweden 1611-1632*. Vol. 2. New York: Longmans, 1958.
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17. Cole, Hugh. *The Lorraine Campaign*. Washington, D.C.: Historical Division, 1950.
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- 30. Carafano, James Jay. "Letters from Vietnam," *Field Artillery* (October 1987): Pages 25-34.
- 31. Carafano, James Jay. "Fortresses and Firepower in Vietnam," *Field Artillery* (August 1988): Pages 37-42.
- 32. Scales, Robert H., Jr. "Drumbeat for Maneuver Could Muffle Firepower," *Army* (December 1986): Pages 24-32.
- 33. Bolger, Dan. *Dragons at War*. Novato, California: Presidio Press, 1986.
- 34. Romjue, John L. *From Active Defense to AirLand Battle: The Development of Doctrine 1973-1982*. Fort Monroe, Virginia: US Army Training and Doctrine Command, 1984.

that the "unknown" of battle is really a failure to perceive the impact of various factors on our system.

The greatest value of historical study for Redlegs is to help train our minds to recognize these effects and develop creative solutions to the tactical problems of fire support. The challenge is to anticipate and shape the face of future war.



**Major James Jay Carafano is an Assistant Fire Support Coordinator for VII Corps Artillery in West Germany. He's a frequent contributor of historical articles to *Field Artillery*. Major Carafano holds a master's degree in history from Georgetown University and, until recently, taught history at the US Military Academy at West Point. While there, he co-authored this article with Cadets John H. Nelson and Timothy P. Brereton, Class of 1988. Second Lieutenant Nelson is a Platoon Leader for A Battery, 92d Field Artillery, 2d Armored Division, Fort Hood, Texas. Second Lieutenant Brereton is a Company Fire Support Officer for the 5th Battalion, 21st Infantry, in the 6th Battalion, 8th Field Artillery, 7th Infantry Division, Fort Ord, California.**

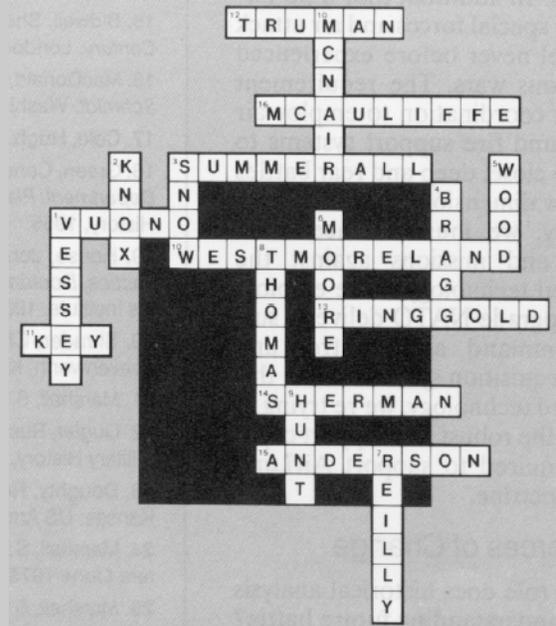
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Numbers 1, 2 and 3.
- Topic 2:** Artillery Innovation and Failure in the 17th Century  
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Numbers 10, 11, 12 and 13.

- Topic 5:** The Age of Quick Fire and World War I — A Return to the 14th Century  
Numbers 1, 14 and 15.
- Topic 6:** World War II — The King is Crowned  
Numbers 16, 17, 18, 19 and 20.
- Topic 7:** The Korean War — World Wars I and II Revisited  
Numbers 21, 22, 23 and 24.
- Topic 8:** Vietnam — The Firepower War  
Numbers 25, 26, 27, 28, 29, 30 and 31.
- Topic 9:** History and Future War  
Numbers 32, 33 and 34.

**Famous Redlegs Puzzle Answers (Page 28)**

Thanks for this crossword puzzle to Redleg Major Michael B. Kelly who, until recently, taught Military History for the Field Artillery School.



# View from the Blockhouse

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FROM THE SCHOOL

## SQT Exemptions and Deferments

The US Army Field Artillery School (USAFAS) is the skill qualification test (SQT) developer for CMF 13 and selected MOSs from CMF 29 and 31. Often USAFAS receives requests for exemptions or deferments from taking SQTs.

The Field Artillery School is *not* the approving authority for exemptions or deferments to SQT testing. If there are unusual circumstances preventing a soldier from taking the SQT, then his commander should refer to AR 350-37 Army Individual Training Evaluation Program (ITEP) and request an exemption or deferment for the soldier according to that regulation.

An exemption means the soldier isn't required to take the annual (fiscal year) SQT. An example of a situation that will lead to granting of an exemption is when a soldier is detailed to recruiting duty. In this case, the soldier would be exempted from testing from the time he departs his last duty station until the end of the fiscal year in which he completed the detail.

The granting of a deferment means a soldier is deferred from testing during the normal test period. However, he must take the current (fiscal year) SQT at a date after the normal three-month test period. Examples of situations

that may lead to the granting of a deferment are confinement, extended temporary duty (TDY) status, attending a school, emergency leave or inpatient medical status.

Specific guidance, criteria and requests for exemptions and deferments are in Paragraph 4-6 of AR 350-37. Unusual requests for exemption from testing must be forwarded for approval to the Commander, US Total Army Personnel Command, ATTN: TAPC-PDO-OP, 200 Stovall Street, Alexandria, Virginia 22332-0474. Commanders in the grade of O-6 or above can approve some exemptions and deferments in accordance with AR 350-37. Soldiers who are deferred from testing will be rescheduled by their commander and tested within 60 days after the deferment is terminated. Soldiers who miss their tests due to administrative error may have their SQTs rescheduled in accordance with Paragraph 4-6,b,(2) of AR 350-37.

The USAFAS Unit Training Hotline numbers are AUTOVON 639-5004 or commercial (405) 351-5004. It's a 24-hour-a-day number to call for answers to your questions about SQTs. Soldiers and commanders who have questions may write Commandant, USAFAS, ATTN: ATSF-DTD, Fort Sill, Oklahoma 73503-5600.

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## M992 (CATV) Conversion to an FDC Vehicle

At a senior commanders' conference held recently at Fort Sill, the Field Artillery School displayed an M992 carrier ammunition tracked vehicle (CATV) that was changed into a battery or platoon fire direction center (FDC) vehicle. The M992 is more versatile than the M577 currently used as an FDC and significantly increases unit flexibility. In addition, commanders can convert an M992 to an FDC vehicle using resources commonly available in battalions.

The converted M992 has several command and control advantages. One advantage is the converted vehicle can keep up with its howitzers and has a significant commonality of repair parts. Using the M992 as an FDC vehicle also provides a much larger work area for the FDC. Survivability is increased because more space inside reduces the need for tent extensions. Therefore, the FDC can set up and displace more quickly. In addition, the M8 chemical alarm already in the vehicle provides early warning in case of a chemical threat. The ease of conversions and the resulting advantages demonstrate the need to completely field M992s and, possibly, acquire additional M992s to serve specifically as multipurpose command and control vehicles.

### Conversion

Analysis indicated we should use as many advantages of the M992 as possible in the conversion. Toward this end, the M8 chemical-alarm system and ventilated face-piece system remain. We removed the halon automatic fire suppression system from the crew compartment but left it in the engine compartment. Also, the track commander (TC) seat and station remain for use in traveling and for defense. The design considers duty positions for the fire direction officer (FDO), chief computer, recorder and radio telephone operator (RTO). Both manual and automated gunnery techniques also are considered.

The primary source of power for the battery computer system (BCS) and radios is the vehicle's batteries. The batteries have enough power to operate the system for at least an hour without recharging. The auxillary power unit (APU) charges the batteries.

The conversion has three phases: Phase I — remove existing components of the M992; Phase II — construct new components; and Phase III — install additional components from the M577.

**Phase I.** Remove the following components from the M992 (CATV): ammunition racks, conveyor, stacker with bracketing, stacker restraint bar and halon automatic

fire suppression system in the crew compartment. Replace the halon automatic fire suppression system with portable fire extinguishers and cap the hydraulic lines coming up from the middle of the floor with brass plugs and pull them back into the subfloor.

**Phase II.** Construct the following components for the conversion:

a. A false, hinged wall to cover the vehicle air cleaners and fire extinguishing system. Hinge it to allow access to the air cleaners and other components. The distance from the wall should be about four inches, which allows you to fill hydraulic fluid and visually check the vertical hydraulic fluid gage.

b. A false metal floor. Install it from where the floor starts to slope downward all the way to the false wall and to the sides of the vehicle. It provides a more uniform walking surface, covering the hydraulic line holes and the stacker track and evening the slope. Also, the new floor allows you to weld two seats to the floor at the RTO and chief computer work stations. (The integrity of the true floor isn't violated, so the torsion bars aren't damaged.) Make the end of the floor closest to the false wall slope away from the personnel heater to allow a free flow of air to the cab. Don't cover the heater outlet.

c. A generator rack welded to the outside front right of the vehicle. Include a brush guard to protect the switches and gages from being broken by debris and branches while the vehicle is moving. Hinge the rack on the bottom to allow access to the engine compartment. Also, bolt the down leg bracket to the deck to facilitate removal.

d. Two hinged firing chart tables for use in degraded operations. Make the tables 36 inches long and 34 inches wide and the drop from the wall weld to the front 8 inches.

e. The back seat of a ¼-ton jeep welded onto the right sponson toward the front of the vehicle. It's used to transport additional crew members.

f. A wooden two-position (sloped and straight) situation map hung from the false wall.

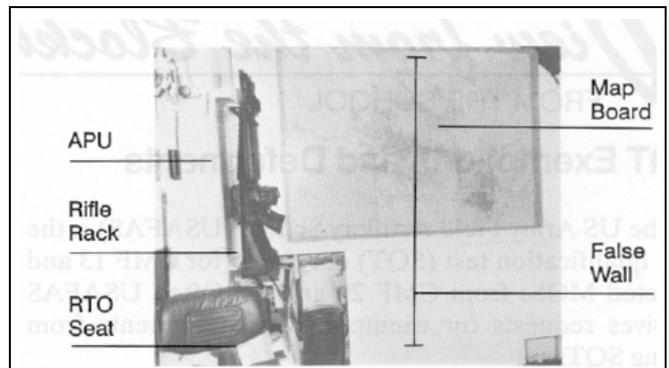
g. A rifle rack attached around the inside cover of the APU. (Remember you still must have access to this cover to change fuel filters.)

h. A bookcase installed under the APU next to the RTO's work station.

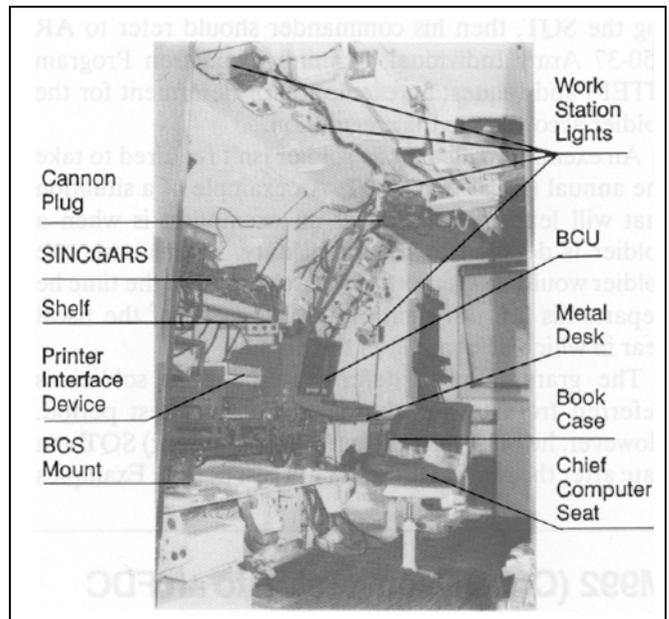
i. A hinged metal desk (28 inches wide and consisting of two segments) as a work station for the RTO. Make the section closest to the wall 10 inches deep and the one that folds down 17 inches deep.

j. A two-pronged, Y-shaped cannon plug to replace the one currently running to the 1780 vehicle intercom. The two prongs allow you to continue to operate the intercom and provide the power interface for all the computers and radios through the power distribution unit (PDU).

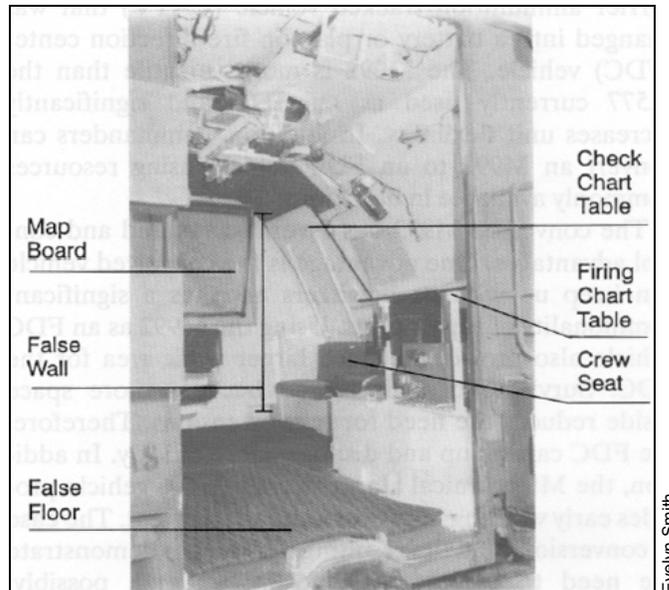
**Phase III.** Install additional components from the M577: a radio shelf; nine FDC lights; three single-channel



M992 Converted into an FDC: View from the Rear Door Forward



M992 Converted into an FDC: View from the Rear Door to the Left



M992 Converted into an FDC: View from the Rear Door to the Right

Evelyn Smith

ground and airborne radio system (SINCGARS) radios with encryption equipment and cables; an intermittent surge suppressor; and a BCS, consisting of the battery computer unit (BCU), mount and encryption equipment. Also, put a three-kilowatt generator and three fire support vehicle (FSV) antenna mounts on the vehicle. (You use the three-kilowatt generator because the power requirements come very close to exceeding the capabilities of the 1.5-kilowatt generator.)

### Reconversion

Your question now is, "If I need the M992 as an ammunition vehicle, how long will it take to reconvert?" To speed up the reconversion of the FDC M992 back to a CATV, you don't have to build many of the conversion items listed, keeping the M992 as close to its original configuration as possible. For example, you don't have to build the false wall and floor. Also, the stacker with its

brackets and support bar could remain in the M992 with little degradation of the FDC effort. The fire suppression system could remain intact, and crew seats could be metal fold-up chairs instead of the bass-boat type.

### Conclusion

Ideally, we'd field one M992 per howitzer and one to replace each M577 in a self-propelled howitzer unit. The Commandant of the Field Artillery School is attempting to solve the M992 shortage problem. The plan is to give the M577s in M109 units to non-Field Artillery units in direct exchange for M992s. This would allow the commander flexibility. He can convert the M992 into an FDC or keep it as an ammunition resupply vehicle, depending on which he needs at the time.

If units have questions, call the New Systems Division, Gunnery Department, Field Artillery School, at AUTOVON 639-5523 or commercial (405) 351-5523.

### LDF: Problems with Paper

The Communications/Electronics Department (CED) of the Field Artillery School, Fort Sill, Oklahoma, surfaced a problem with the paper used for the lightweight digital facsimile (LDF), AN/UXC-7.

The problem is the inability of the LDF to unload (eject) the onion-skin, copy-set paper used at the receiving device. The LDF's technical manual implies you can use any carbon paper. Our use indicates onion-skin carbon manifold sets tend to become damaged when unloading from the drum as they don't have the rigidity of paper designed specifically for facsimile devices.

The main advantage of the onion-skin carbon manifold sets is its cost, about .0076 cents per copy.

Similar inexpensive paper with dual usage is the tabulating machine paper, NSN 7530-00-144-9600, also used with computer systems. This paper is more rigid and only costs about .0093 cents per sheet, whereas commercial facsimile paper costs about 80 cents per sheet.

Units' using tabulating machine paper for the LDF and computers would eliminate the need for two different types of paper. It would not only save the Army money, but also make it easier on unit budgets.

If units have questions, call the Tactical Communications Branch of the Communications Division, CED, at AUTOVON 639-5107 or 5476 or commercial (405) 351-5107 or 5476.

## Field Artillery Tables of Organization and Equipment (TOEs)

### TACFIRE Chemical Equipment TOE Error

Chemical protective equipment for the tactical fire direction system (TACFIRE) shelter has been erroneously deleted from some TOEs. This equipment, LINs H10908, H48904 and J87608, should be retained. Justification for the retention of H10908 and J87608 is AR 71-13 The Department of the Army Equipment Authorization and Usage Program, Table E-1, Page 180. Justification for the retention of H48904 is Block 19, Associated Equipment, of Basis of Issue Plan (BOIP) 69-0552.

### Medical Support for 3x8 Cannon Batteries

A 3x8 cannon artillery battalion has a treatment team authorized, consisting of a doctor or physician's assistant

and three enlisted medics, an ambulance team of two medics and a combat medic section with seven medics. This allows one medic per firing platoon in the firing batteries and one medic for the service battery. Headquarters and headquarters battery receives its support from the treatment team. This structure is part of the Academy of Health Sciences modular medical concept.

### FADAC's Computer Gun Direction M18

Units with the computer gun direction M18 or the Field Artillery digital automatic computer (FADAC), LIN E76866, documented in their modified tables of organization and equipment (MTOEs) should delete it immediately. Headquarters, Department of the Army, directed major Army commands (MACOMs) to delete

FADAC from all MTOEs in 1986. Reference: Message, DTG 162133Z Jun 86, DAMO-FDE, Subject: Field Artillery Digital Automatic Computer System (FADAC).

### Band Cutters Not TOE

Band cutters are not TOE items. However, they are available on an as-needed basis through unit supply as a Class II, durable item. The cost is \$54.61 for each, Cutter,

Steel Stripping, Heavy Duty, 2-Inch Wide, Type II band cutter. The NSN is 5110-00-223-5281.

Units with questions about the information presented here or any other questions about TOEs and MTOEs should contact the Organization and Personnel Division (ATSF-COD), Directorate of Combat Developments, Field Artillery School, at AUTOVON 639-2726 or 5879 or commercial (405) 351-2726 or 5879.

## Numbering the M109 Howitzers

The Army Materiel Command (AMC) changes the number designation of the M109 howitzer system when we type classify a series of product improvement packages (PIPs) that have increased the range, reliability, maintainability and automated the fire control of the howitzer. Each time we implement a major PIP, we modify the howitzer's nomenclature. This progression begins with the type classification of the first (M109) and continues through the latest PIP, which is the howitzer improvement program (M109A6, HIP).

The evolution of the current M109 series 155-mm self-propelled howitzer began in 1952 with concept studies for a new self-propelled howitzer to support the Army's armored and mechanized forces. The M109 howitzer was type classified standard in 1963 and began service with the Army that year.

In 1973, we improved the M109 to increase its range, and it became the M109A1. In 1979, the M109A1 was further improved to increase its reliability and it became the M109A2/A3. The M109A2 was the designation given new-production howitzers, and the M109A3 was an identical howitzer created by converting the existing M109A1.

In 1980, the Division Weapon Support System (DSWS) Study was initiated to look at the options of fielding a new howitzer, using an existing or developmental foreign system or further improving the M109 howitzer to meet the needs of the Army. The DSWS

Study resulted in two programs: the howitzer improvement program (HIP), a short-term program to improve the M109A3 howitzer, and the advanced Field Artillery system, cannon (AFAS-C), a new howitzer to technologically "leap ahead" of the growing Soviet threat. The AFAS-C won't be a M109 series howitzer, although its nomenclature has yet to be determined.

During development, the HIP has been designated as the M109A3E2; upon type classification, it'll become the M109A6. Current plans call for 1,700 howitzers to be improved through the howitzer improvement program. This includes all the M109 howitzers in the active component (AC) force.

Approximately 737 howitzers, primarily in the Reserve Component (RC) forces, will receive the nuclear, biological and chemical and reliability, availability and maintainability (NBC/RAM) PIP (M109A4) along with a modified armament system (RCMAS, M109A5), which extends the M109 howitzer's range to that of the HIP.

The results of these PIPs will leave the Army with two different nomenclatures of M109s in the inventory: the M109A5 for the RC and the M109A6 (HIP) for AC and roundout (RO) forces.

If soldiers have questions about how we number our M109 howitzers, call the Training and Doctrine Command System Manager for Cannon (TSM-Cannon), Directorate of Combat Developments, Field Artillery School, at AUTOVON 639-3716/3803 or commercial (405) 351-3454/5902.

**M109 Evolution**

	M109	M109A1	M109A2/A3	M109A4 (RC Only)	M109A5 (RC Only)	M109A6-HIP (AC/RO Only)
Year Fielded	1963	1973	1979	1989	1990	1991
Max Range (Kms) (Assisted/Unassisted)	14.5	18.1	18.1/23.5	No Change	22/30	22/30
RAM Improvement	No	No	Yes	Yes	No	Yes
NBC Improvement	No	No	No	Yes	No	Yes
Survivability Improvement	No	No	No	No	No	Yes
Ammunition Payload	28	28	36	36	36	39

## Caliber versus Tube Length

The term caliber was derived from the Latin *qua libra* meaning "what pound." It was first applied to the weight of the round the cannon fired. Cannons, such as the British 25-pounder, are still sometimes designated by the weight of the projectile they fire.

But the most common meaning of the term caliber refers to the diameter of a projectile or the diameter of the bore of a gun and is usually expressed in inches or millimeters. The diameter of a projectile is measured at the widest portion of the projectile, the bourrelet. The diameter of the bore of a gun is measured at the muzzle between opposite lands. For example, the diameter of an

M110A2 howitzer projectile is eight inches, the equivalent of the diameter of its bore — 203 millimeters.

Caliber *length* indicates a gun bore length. To determine the length of a tube in calibers, divide the length of the tube by the diameter of the bore. Measure the length of the tube from the muzzle to the face of the breech recess, not including the breech or the muzzle brake. The M109A3 has a cannon tube (M185) that's 6,045 millimeters long; the diameter of the bore is 155 millimeters, so the tube has 39 caliber lengths: 6,045 millimeters divided by 155 millimeters equals 39 caliber lengths.

At one time, cannons were type classified by the caliber length of their tubes. Mortars that had a short range, low muzzle velocity and high trajectory traditionally had tubes between 10 and 20 caliber lengths. Howitzers that had a medium range, muzzle velocity and trajectory traditionally had tubes between 20 and 30 caliber lengths. Guns were built with tubes over 30 caliber lengths to achieve long range, high muzzle velocity and a flat trajectory.

Cannons are now classified by the trajectory they fire, regardless of the tube caliber length. Mortars fire high angle only, guns fire low angle and howitzers fire both high and low angle.

With the development of modern cannons, projectiles and propellants, the traditional tube lengths have changed.

To achieve the ranges required, today's Field Artillery cannons have much longer tubes. The reason is they use a greater amount of propellant to increase ranges. Tube lengths have lengthened to allow the propellant to completely burn in the tube before the round leaves the muzzle.

If soldiers have questions about cannon calibers versus tube lengths, call the Cannon Division, Gunnery Department, Field Artillery School, at AUTOVON 639-6224 or commercial (405) 351-6224.

System	Cannon	Caliber	Tube Length
M101A1	M2A2	105-mm	22.5 caliber lengths (8.45 feet)
M102	M137A1	105-mm	30 caliber lengths (10.37 feet)
M119	L20A1	105-mm	30.18 caliber lengths (10.4 feet)
M114A1/A2	M1A2	155-mm	23 caliber lengths (11.70 feet)
M198	M199	155-mm	39.34 caliber lengths (20 feet)
M109A2/A3	M185	155-mm	39.0 caliber lengths (19.84 feet)
M110A2	M201A1	203-mm	40.5 caliber lengths (26.97 feet)

The Calibers and Tube Lengths of Current Field Artillery Weapons Systems

## BATTLEKING: Track-Mounted BUCS Desk

A desk was developed for mounting the back-up computer system (BUCS) in the carrier, command post, light, tracked M577. The desk provides an effective place for the BUCS operator to input firing data in the BUCS.

Units having questions about the track-mounted desk should contact the President, TEXCOM FABD, ATTN: ATCT-FAO (BATTLEKING), Fort Sill, Oklahoma 73503-6100 or call BATTLEKING at AUTOVON 639-3717 or 4075 or commercial (405) 351-3717 or 4075.

