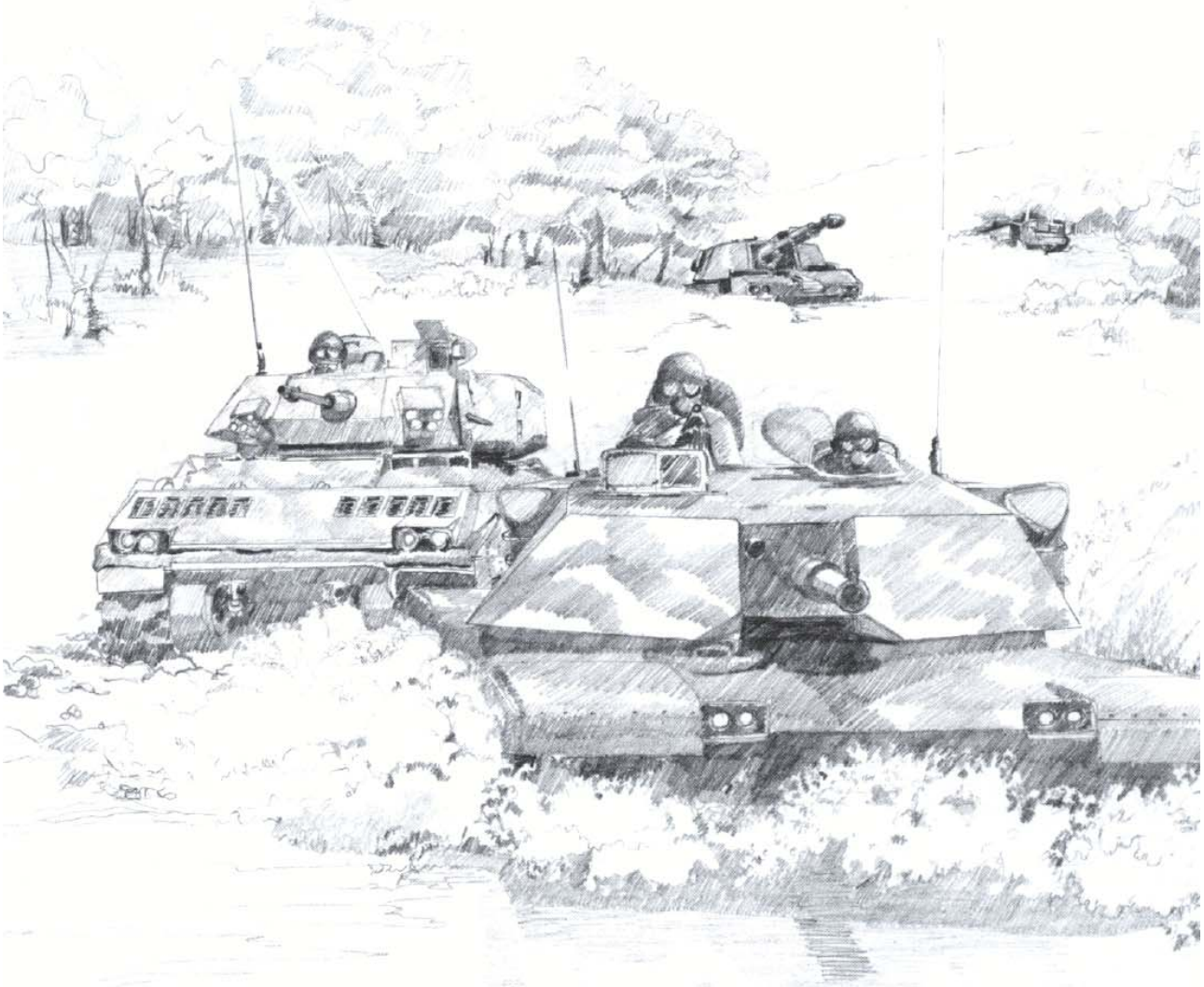
Field Artillery Journal

January-February 1986



DEEP BATTLE

Field Artillery Journal

Volume 54 January-February 1986 Number 1

ARTICLES

FEATURES

The drawing on the front cover depicts members of the combined arms team.

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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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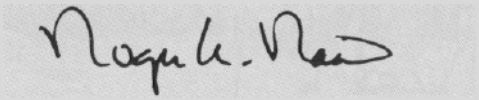
Why Deep Battle?

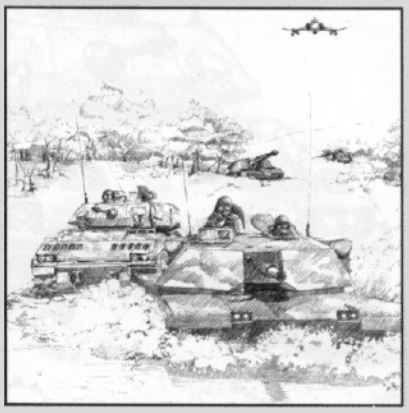
Today's American soldier confronts an unprecedented diversity of threats to his nation's interest. The Soviet Union alone boasts 199 active divisions arrayed as a remarkably well-tailored offensive force focused on Western Europe. Scores of regional conflicts dot the globe and serve as a constant magnet for superpower attention or involvement.

To deal with this tremendous range of possible hostilities, America's senior leaders have looked to the lessons of history, their own experiences, and the forecasts of elaborate war-fighting simulations. One of the results of this eclectic analysis is the doctrinal imperative to fight and win in-depth.

This issue of every Redleg's professional magazine faces the hard questions surrounding fire support *in-depth*. It explores how armies have supported the deep battle in the past, how American artillerymen are doing it today, and how they may strike deep in the future. This issue of your *Field Artillery Journal* challenges you to join the professional dialogue regarding one of the most controversial topics in the American Army today — fire support for the deep battle.



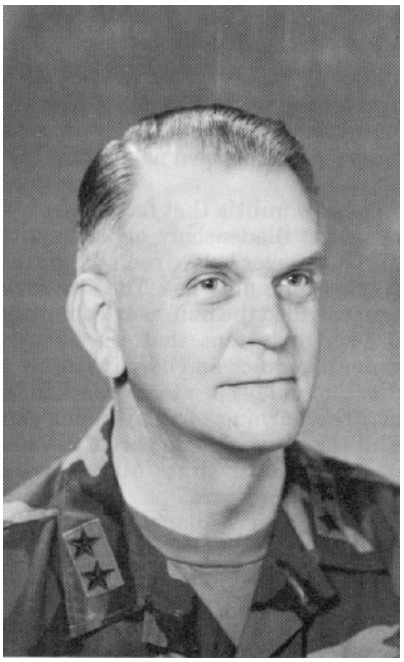
EDITOR



On the Move

Deep Battle: Right Place at the Right Time

MG EUGENE S. KORPAL



"It is firepower, and firepower alone that arrives at the right time and place, that counts in modern war."

B. H. Liddell Hart

Achieving depth in terms of time, distance, and resources is a key precept of AirLand Battle doctrine. Today's field artillerymen must become masters of providing integrated, synchronized fire support over the full depth of the battlefield. Specifically, present day Redlegs confront two challenges:

• First, they must understand our branch's formidable capability to support contemporary operations in depth.

• Second, they must work hard to improve that capability as time and resources allow.

The necessity for achieving depth is a practical rather than a theoretical concern. History makes the necessity of fighting in-depth abundantly clear. Since the early part of this century, the Soviets have practiced a remarkably successful "deep battle' doctrine. What's more, they have emphasized the role of fire support in the deep attack. One need only look to the later campaigns of the Great Patriotic War to see how Soviet fire support has become the linchpin in their echeloned tactical and operational plans.

Of course, the role of field artillery in the deep battle has not been lost on Americans. During World War II, gunners played a significant role in deep exploitations and pursuits designed to disrupt supplies, delay reinforcements, and destroy enemy formations. This reliance on fire support was no accident. Then, as now, the requirement to deliver fire in depth, to support deep strikes by maneuver formation, and to synchronize both of these efforts challenged American Redleg leaders and their organizations.

Against this historical backdrop and in the context of today's troubled world, the writers of AirLand Battle doctrine have done well to underscore the critical challenges we face in fighting present and future battles in-depth.

Today's commanders in the field in concert with the doctrine writers of the Training and Doctrine Command (TRADOC) Community must continue to develop the tactics and techniques necessary to strike the right deep targets at the right time with the right munitions. Redlegs in the field must then implement this doctrine. Of course, the key to implementation is training to *disciplined standards.*

This issue of the *Journal* contains much good evidence that artillery units are continuing to achieve standards of excellence in this area. The work done by several European-based organizations and the continuing efforts at the Warrior Preparation Center are but two examples. Fire supporters in these units are facing and solving tough problems. By their unflagging attention to detail they are making the Fire Support Community the important team player it must be in the deep battle.

At the same time that we train for today's deep battle we must plan for the future. We must seek long-term gains in deep battle capabilities which capitalize on conceptual and technological advances.

One of the most significant long-term developments in the area of deep operations has been the publication of FC 100-15-1, *Corps Deep Operations*. Along with FM 100-5 and TRADOC's 525-series pamphlets on the Joint Second Echelon Attack (JSAK) and the Joint Suppression of Enemy Air Defenses (JSEAD), this circular provides a solid foundation for the use of fire support. It calls for us to *decide* what we want to attack, *detect* its location, and then *deliver* the appropriate munitions.

Field artillery doctrine writers are building on the circular's strong foundation by:

• Revising our 6-series field manuals and circulars.

• Designing organizations which enhance the corps' operational capabilities — corps artillery headquarters and headquarters battery, Lance and multiple launch rocket system battalions, and effective battlefield coordination elements.

• Engaging in ambitious material development programs such as the Army tactical missile system (Army-TACMS), the joint surveillance and target attack radar system (JSTARS), and the remotely piloted vehicle (RPV).

• Contributing to the development of futuristic concepts such as Army 21.

B. H. Liddell Hart, once noted that "It is firepower, and firepower alone that arrives at the right time and place, that counts in modern war." Today's Redlegs must take this quotation to heart in the context of AirLand Battle doctrine. They must plan and train to execute deep battle with the resources now available, and they must build for tomorrow by creating the doctrine, the organizations, and the weapon systems necessary to win future battles in-depth.

Incoming

LETTERS TO THE EDITOR

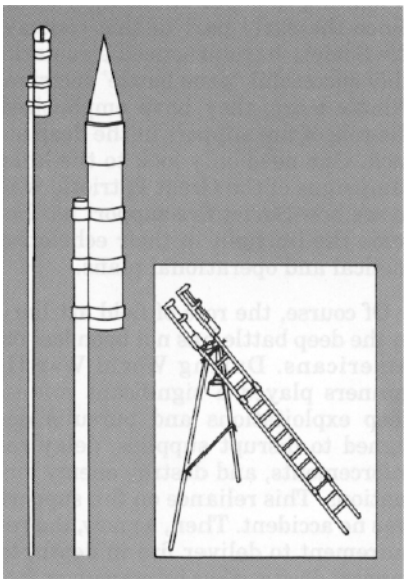
Rockets and Things

And the Rocket's Red Glare . . .

Surprising as it may seem, today's big military threat — the rocket — nearly cost the United States its independence over 170 year ago. And it was used as a field artillery weapon.

When most people hear "and the rocket's red glare" from the "Star Spangled Banner" they think of nothing more than a composer's dream or at best a vivid picture of fiery signal rockets bursting over Fort McHenry in Baltimore Harbor. That was only part of it.

At the time, the rockets of 1814 were the latest in military hardware. Invented by Sir William Congreve at the Woolrich Arsenal in England, these metal cylinders contained 32 pounds of propellants and explosive charges. Their flight was punctuated by an 18-foot wooden tail whipping along behind. The warhead could be either high explosive or incendiary, and it possessed a range of up to 2 miles. Although its accuracy was more myth than fact, it did prove a frightening experience for unseasoned troops in the target area.



Congreve rockets and launcher.

In the summer of 1814, during the heat of this nation's second clash with Great Britain, a British expeditionary force landed in Maryland bent on capturing Washington, D.C. It was equipped with its own field rocket brigade.

The raw militia that faced this new menace at Bladensburg on 24 August 1814 had never before seen these crazily careening missiles. The awesome sight terrified the half-hearted militia to such an extent that the British achieved a quick and decisive victory. The Capitol lay open to occupation. In fact, the burning of the Capitol and White House were only part of the logical aftermath that followed the "Bladensburg Races."

Although Sir William Congreve saw his rockets as the weapon of the future, it took until the twentieth century to recapture the knowledge of the nineteenth. The very crude Congreve rocket was the predecessor of such modern day weapons as the multiple launch rocket system.

Reed C. Hildreth
Cottage, Grove, MN

Amplifying On A Winner

Captain Richard M. Bishop's article "Multiple Launch Rocket System Tactics" (May-June 1985 *Field Artillery Journal)* provides a quick overview of the capabilities, limitations, and employment options regarding the multiple launch rocket system (MLRS). Soldiers around the world need a synopsis like this piece to familiarize them with the newest addition to the field artillery's arsenal.

Captain Bishop's article does, however, raise several points that warrant further comment.

• First, although the MLRS is primarily a counterfire weapon, it is not exclusively so. "Fire supporters" must not forget that there are other high payoff MLRS targets; especially those that cover a large area, have a large target location error, and require a high percentage of damage.

• Second, organizing the MLRS for combat has several interesting twists.

Step One: The first step is, of course, to ensure the MLRS is in the appropriate organization by establishing a command relationship. The Department of the Army (DA) has made an MLRS battery organic to heavy divisions and the 2d Infantry Division under the J-series table of organization and equipment for a composite 203-mm and MLRS battalion. DA has also assigned an MLRS battalion to each corps. The corps commander has three options for employing the MLRS battalion. He can retain command and control of the battalion through the corps artillery or field artillery brigade commander; relinquish command and control by attaching individual MLRS batteries or the MLRS battalion to a subordinate division, armored cavalry regiment, or separate maneuver brigade; or a combination of these two options. What he retains or relinquishes should be based on the factors of mission, enemy, terrain, troops available, and time (METT-T) as well as the advice of the corps fire support coordinator. The division commander has the same basic options with his organic MLRS battery. He can retain command and control through the division artillery commander or he can attach the battery to a maneuver brigade.

Step Two: The second step is to give the MLRS unit a standard or nonstandard mission. The MLRS gives the force commander a weapon with which he can rapidly and decisively influence the battle; therefore, he will probably centralize control over the system. At corps level, the commander can give a mission to the battalion as a whole, the battalion as part of a brigade, or to the individual batteries. At division level, the commander can give a mission to the battery. The usual missions will be

general support (GS) or a nonstandard general support reinforcing (GSR) mission. A nonstandard GSR mission must be given because the equipment and personnel structure of the MLRS battery and battalions does not allow the establishment of liaison. Moreover, communications must be identified as digital or FM.

• Third, special attention needs to be given to the actual employment of MLRS. As with all field artillery weapons, MLRS should be positioned well forward to exploit its range. Commanders should also employ the MLRS in depth to avoid untimely moves. Captain Bishop mentions that when the MLRS is 15 kilometers behind the forward line of own troops it can do certain things. I believe 15 kilometers is too far back. The MLRS is ideally suited for deep counterfire, suppression of enemy air defense, and interdiction. But to optimize its designed 30 + kilometer range capabilities, it must not be positioned in the rear.

• Fourth, Captain Bishop's discussion of covering force operations needs some clarification. The MLRS may well have to be positioned forward of the main battle area in the covering force area. If given a nonstandard mission that provides first priority calls for fire to the covering force artillery headquarters, it may also have to occupy forward supplementary positions. In either case the forward deployed units will be vulnerable to ground attack. The commander who has command and control of the MLRS unit must therefore provide security for the MLRS unit. After all, each self-propelled launcher loader (SPLL) has a crew of only three personnel.

Overall, Captain Bishop's article is very informative and fills a void that has existed for some time. His piece also raises a number of issues, especially in the area of logistics, that need to be resolved. As more units reach the field and more exercises challenge MLRS field artillerymen, we will be better able to employ our newest weapon system.

Kenny W. Hendrix
MAJ, FA
Fort Sill, OK

New Capabilities — Old Problems

Captain Richard M. Bishop's article (May-June 1985 *Field Artillery Journal)* "Multiple Launch Rocket System Tactics" sounded too good to believe when in the last sentence of the introduction he stated, "The MLRS meets all of the pressing requirements" from countering massed artillery to the engagement of dense formations of mechanized forces.

My experience with the 2d Rocket Battery in Korea and as the commander of the 1st Battalion, 31st Field Artillery (Honest John) left me with a lasting respect for both the strengths and weaknesses of rockets. Captain Bishop identified the bright side: I will bring out a bit of the practical side for balance.

Consider the example cited in the article of 12 rockets from one launcher saturating a 60,000 square meter area with close to 8,000 bomblets. Can one select a target area that is 250 meters by 250 meters (62,500 square meters) and saturate it with one launcher load from the MLRS? With a system circular error probable of 10 mills and the authors' positioning some 15 kilometers behind the forward line of own troops, half of the rockets would not land in the box. Also, because each rocket is an independent entity the probability of uniform coverage of the target is very low. This questions the validity of the term "saturation."

Time is a critical event in the attack of real targets. There is a payoff for using time-on-target (TOT) battalion volleys. Personnel will react to the first volley and change their protective postures so that subsequent volleys are far less effective. For a comparison between cannon and MLRS, consider the following: A battery volley of eight 155-mm howitzers firing dual purpose ammunition delivers more bomblets than a single MLRS rocket (644). A 12-rocket ripple provides many more bomblets, but the individual rockets come in one-at-a-time, a few seconds apart. In contrast, a 155-mm battalion TOT can land the equivalent of 3 rockets with a time spread of 2 to 3 seconds with more uniform distribution and most of the bomblets in the target area. Which yields the greatest practical effect?

There are other tactical issues to be dealt with when using long range rockets. One has to do with the single trajectory for a given quadrant elevation (QE). In rough terrain, site masking can result in a very large HOB (dispersal point) for targets at a range near that at which the maximum ordinate occurs. This will contribute to both delivery error and added time for the target to respond.

The rough terrain of Korea, for example, frequently resulted in large areas of dead space in which units could not effectively attack using Honest John rockets. Moreover, night operations and bad weather can make calculating *site to mask* a problem if firing points have not been reconnoitered when visibility was acceptable. Using map data for this purpose has significant shortcomings that could put a load of rockets into an unsuspecting ridgeline. The automatic mode, described as a 3-minute operation by the author, appears to have overlooked this consideration.

There are a number of other tactical issues that commanders must address in any realistic scenario. I will close with one problem I call *real estate control*. The rationale for move-shoot-move tactics is the high probability that counterfire will follow a launch. Avoiding damaging neighboring units by this counterfire will require some tough real estate control in the positioning of MLRS.

The capability of new hardware is often oversold. Critical evaluations under battlefield conditions against a responsive threat should continue to identify the strengths and weaknesses of rocket systems. Only then will the combined arms team be balanced against the spectrum of challenges of the modern battlefield. MLRS brings both new capabilities and old problems. The integration of this system into the combined arms team is obviously not yet complete.

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Doctrine and Development

An Important Message

Lieutenant Colonel Peter Morosoff's article "Doctrine — Credo or Counsel?" (September-October 1985 *Field Artillery Journal*) provides tremendous insight into the arena of military terms and definitions and their effect on the decision-making of military leaders. Today's services provide their men at arms large amounts of printed materials on how to perform many facets of their profession. Numerous agencies and experts have developed volumes and volumes of literature based on past performances, present capabilities, and future predictions. As leaders in the armed services, we *must* have a basic understanding of how this information has been developed and how it can be used to assist us in future combat situations.

Some confusion seems to exist on the roles of the various manuals available today. How are these manuals and documents supposed to be interpreted and employed on the AirLand Battlefield? Are they general guidelines, specific directives, or a combination of both? In his article, Lieutenant Colonel Morosoff attacks the basic issues facing leaders — how to use the wide variety of literature available.

Morosoff contends, and I agree, that in order to exploit these manuals and documents one must understand their purpose and intent. As explained in the article, "doctrine" is not a step-by-step guide on what must be done to be a successful combat leader. Anyone who tries to do everything by the book will eventually fail as will someone who lacks a basic understanding of our doctrine. Manuals and documents do, however, contain a variety of information that when used properly can do much to ensure success. This information includes not only doctrinal precepts but also administrative and organizational information, tactics, techniques, and procedures. When employed properly this diverse information will provide wise, experienced leaders with a definite advantage in the performance of their duties.

Morosoff gets right down to the basics in one particularly confusing area: What is doctrine? His discussion of the elements of doctrine and how they provide a basic overall frame of reference for decision-making in combat is very compelling. All too often soldiers refer to manuals and other documents as *doctrine* when in fact these publications are not. Actually, very little of what is written is doctrine. Rather, most printed matter constitutes expressions of tactics, techniques, and procedures.

The ability to use the information available in manuals and documents to meet the needs of the specific tactical situation is the major underlying theme of the article. In order to use the literature effectively we must not only understand the five types of material manuals contain but also be able to integrate it into our operations. Lieutenant Colonel Morosoff's article is thought-provoking and provides sensible guidelines for two very important groups of people — those who rely on the literature available to increase and enhance their combat potential, and those responsible for developing and producing our doctrinal publications in the future. It's hard to find a soldier today who doesn't fall in one of these groups. Lieutenant Colonel Morosoff does indeed have an important message for us all.

Robert Longino
CPT, FA
Fort Sill, OK

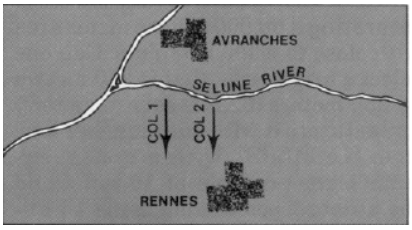
A Mobile Pursuit

I read with much interest Major Jerry D. Morelock's recent article on field artillery organization, equipment, and doctrine in World War II ("Rolling Caissons — A Legacy of Doctrine, Organization, and Materiel," September-October 1985 *Field Artillery Journal*) and thought it was a fine presentation of the conventional use of artillery with basically an infantry force. As a former commander of an armored combat command in the battles for France and Germany of 1944-45, I would like to expand on that article by telling you how I used my field artillery battalion in the *pursuit.*

The infantry division in the pursuit invariably attacked resistance by a head-on attack after an artillery preparation, much as Major Morelock has described in his article. With the mobility and flexibility of an armored division, however, I was able to use other methods.

Combat Command A, 4th Armored Division, spearheaded the breakout from the Normandy beachhead on 31 July 1944 by seizing Avranches and driving on across the Selune River. The next morning at 4 a.m., I was ordered to report to Major General Troy H. Middleton's VIII Corps Headquarters along with my division commander, Major General John S. "P" Wood, a former field artillery officer. Middleton directed our division to continue the advance toward the next major objective — Rennes. With German resistance weakening after our forces cracked through the stubborn defenses of the hedgerows, this meant that the 4th Armored Division was being committed to what was essentially a *pursuit.*

I had given a lot of thought to the pursuit — how to *organize* for it and how to *do* it. Recall that the basic composition of a World War II armored division consisted of two combat commands — Combat Command A (CCA) and Combat Command B (CCB) — and a Reserve command (CCR) all of flexible makeup allowing the division commander to tailor his unit for each combat operation. I organized the combat command into two equally-weighted columns which permitted us to maximize mobility while retaining the flexibility necessary to react to any pocket of stiffening German resistance. The situation was as depicted in this sketch:



My two columns advanced toward Rennes, one commanded by Lieutenant Colonel Creighton Abrams, the commander of the 37th Tank Battalion, the other led by the commander of the 10th Armored Infantry Battalion. In each column, I placed tanks, infantry, a platoon of combat engineers,

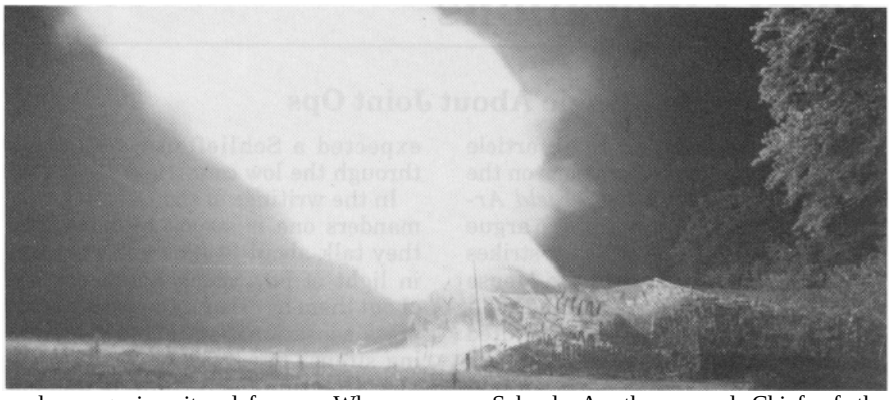
and one or more self-propelled field artillery batteries of Colonel Alexander Graham's division artillery. If either column encountered stiff resistance, which it could not quickly roll over, the other would rapidly and immediately maneuver behind the German position to neutralize it. This procedure allowed Combat Command A to seize Rennes, seal off the Brittany peninsula, and prepare to wheel left and dash across France before German resistance could be consolidated — the classic pursuit operation.

Within each of these columns, a field artillery battery was usually the third element. A tank company acted as the spearhead. It was followed by an armored infantry company with a combat engineer platoon. The artillery batteries were prepared to provide immediate fire at a moment's notice and to have white phosphorus (WP) rounds broken out to fire first. The combat command headquarters along with the remainder of the command's elements followed in order. I spent much of my time flying over and ahead of the advance columns in an L-4 light observation plane borrowed from the field artillery battalion headquarters. This enabled me to observe the routes for 2 to 3 miles ahead of the rapidly moving columns.

When I detected a potentially dangerous area, I would contact the nearest column's field artillery battery and mark the position with a WP round. From this initial round, I would rapidly adjust fire onto the target and quickly discover what was there, if anything. Subsequent fires would then neutralize the target. I repeated this procedure at each suspect area along the route of march. We referred to this technique as "reconnaissance by fire." The battery habitually fired these missions *from column* on the road and became very expert and prompt.

Throughout our dash across France, leading Patton's Third Army to the Seine and beyond, these procedures worked extremely well. By avoiding the main French highways where the Germans erected their roadblocks, we were able to reduce points of resistance from the rear. Additionally, I told my artillery and other battalion commanders early on *not* to fire into a French town without permission. As a former engineer officer, I did not wish to return to France after the war to rebuild French villages.

Our pursuit across France was successful because we refused to give the German army a chance to consolidate



and reorganize its defenses. When our overextended supply lines and miserable weather combined to allow the Germans to put together an effective defense, the going was much tougher and slower.

My experience with the employment of field artillery subsequent to this pursuit was generally in its conventional role as described in Major Morelock's article; but during the active and flexible defense of St. Vith during the Battle of the Bulge, my artillery units had to be prepared at all times to displace as we fell back slowly thwarting the main German effort.

I have served with several prominent field artillery officers during the World War II era in addition to "P" Wood of the 4th Armored Division. After the close of World War II, I was fortunate to come under the influence of General Jacob J. Devers, a great artilleryman, while serving as G3 and Assistant Commandant of the Armored School. As the second Chief of the Armored Force, his innovations included increasing the number of guns in an armored field artillery battery from four to six (1941), changing the rank of the division artillery commander from brigadier general to colonel, and combining the two artilleries into one branch. My commander in the 7th Armored Division during the Battle of the Bulge was a fine field artilleryman, Major General Robert W. Hasbrouck.

My association with the field artillery dates to the World War I era when in 1921 I was appointed to the United States Military Academy while serving as corporal of a 155-mm howitzer battalion in the New York National Guard. Once a gunner, always a gunner.

Bruce C. Clarke
GEN (Ret), USA
McLean, VA

Microchip Nostalgia

The July-August 1985 issue of the *Field Artillery Journal* was a double dose of nostalgia.

Good ol' FADAC dead! Why, it seems like just yesterday that I hurried from the C Battery orderly room to the 2d Howitzer Battalion's S4 shop to see the *first* field artillery digital automatic computer (FADAC). There it sat, in its coffin-like case, unopened on orders from higher up that it be hand-receipted to the Gunnery Department for use in the Field Artillery School. I had to wait 5 years, until 1965, to see this modern marvel in action, enshrined in a tent filled with folding chairs as if for an old-time revival meeting.

Yes, I remember FADAC in its dotage too, memory units failing inexorably, holding on to give its successor time to prove its maturity. I remember the day Fort Sill requested acquisition of 4,700 TI-59s to fill the need temporarily, and how the hide-bound conservatives resisted this military adaptation of a commercial item. But in less than a year they were bought with custom software; and the *Journal* blossomed with articles from innovative users in the field. That was 1980.

Now, in only 6 years, the TI-59 passes to obsolescence and the HP-71b takes to the field as the back-up computer system with expanded capabilities.

Congratulations for staying up with the leading edge of technology, but . . . I suddenly feel as old as an abacus.

Robert C. H. Schmidt
LTC (Ret), FA
Minnetonka, MN

Joint Operations

There's Nothing Magic About Joint Ops

Captain John Gordon, in his article "A Fatal First: Joint Operations on the Meuse" (March-April 1985 *Field Artillery Journal),* is quite right to argue the importance of Luftwaffe air strikes to the German crossing of the Meuse on 13 May 1940. General Guderian himself stated that they "contributed markedly to our success." But the thrust of the article goes too far in suggesting that it was "jointness" which sealed the fate of France. Guderian attributed his success to three factors: the organization and employment of tanks, the French adherence to a doctrine of positional warfare rather than maneuver, and the disastrous deployment of French and British forces who expected a Schlieffen-type attack through the low countries.

In the writings of the German commanders one is struck by how little they talk about Stukas and Dorniers in light of how much has been said about them by others. I suspect a little press sensationalism about "screaming sirens" has spilled over into history. One thing is certain: it was not a "joint force" possessing "ability, depth, and synchronization" which allowed the Germans to "seize and retain the initiative." Command, control, and communications systems of that day did not allow much agility or synchronization of air-ground operations. In fact, on 12 May Kleist ordered the Luftwaffe plan changed to the short, massive preparation that Captain Gordon mentions; but the airmen executed Guderian's plan anyway because they were not flexible enough to change their plans with only 1 day's notice. Guderian makes it plain that the initiative was won because of his fast-moving Panzer divisions.

Ironically, the idea underlying Captain Gordon's article is correct, and we would all do well to remember it: There is nothing new about AirLand Battle. I would also add that there is nothing magic about joint operations.

Thomas G. Waller, Jr.
MAJ, FA
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The Primary Link

Major Bob Ashey's article "J-SEAD: Doing It Together" (March-April 1985 *Field Artillery Journal)* provided a concise and accurate discussion of the Joint Service Agreement. From the article and the original document, we can easily realize why suppression of enemy air defense (SEAD) is a topic coming to the forefront. In the face of the enemy's formidable integrated air defense system, the Army and Air Force must make a coordinated effort to provide a relative degree of protection to friendly aircraft over the battlefield.

While some may see this effort as simply protecting the pilot and a very expensive airframe, we in the Fire Support Community should have a rather selfish interest in SEAD. The fewer of our aircraft which are lost to enemy ground fire, the greater number of close air support (CAS) and battlefield air interdiction (BAI) sorties can be flown to support the maneuver commander and influence the battle.

Suppression of enemy air defense is definitely a matter of high priority. However, in our zeal to provide SEAD we cannot afford to become extravagant and wasteful with our fire support assets. As Major Ashey points out, SEAD fires are directed against known enemy air defense artillery assets. Today, in far too many instances, SEAD fires are planned and executed in the total absence of any hard target information. The all too predictable result is that fires are dumped into an area on the slightest possibility that the enemy may have air defense artillery assets there. More often than not these attempts have no real effect on SEAD and waste a weapon system and invaluable ammunition to attack terrain. We must establish and exercise a system for identifying, locating, and sharing SEAD target information.

The most readily available link exists in the current fire support element and tactical air control party relationship. By using this already established system, SEAD target information can be rapidly disseminated to action agencies. Because the field artillery is recognized as the Army proponent for SEAD, we must take immediate steps to increase our knowledge and capabilities in performing this important duty. Several ways of doing so are:

- Training our fire support team personnel in enemy air defense artillery system identification.
- Establishing highly mobile enemy air defense artillery systems as high priority targets for immediate engagement.
- Working with electronic warfare personnel to identify those nonlethal options for inclusion in SEAD.
- Developing and using doctrinal templates to help in the SEAD targeting efforts.
- Realistically exercising the SEAD target information network and the fire support exercise in command post exercises and field training exercises.

The field artillery must be prepared to employ all the available lethal and nonlethal fire support means in support of SEAD operations. We must also be prepared to support deep attack maneuver operations whose primary objective may be the destruction or neutralization of the enemy's air defense system. As fire support coordinators, we are the primary link in "Doing It Together."

Vincent R. Bielinski
TCAD, USAFAS
Fort Sill, OK

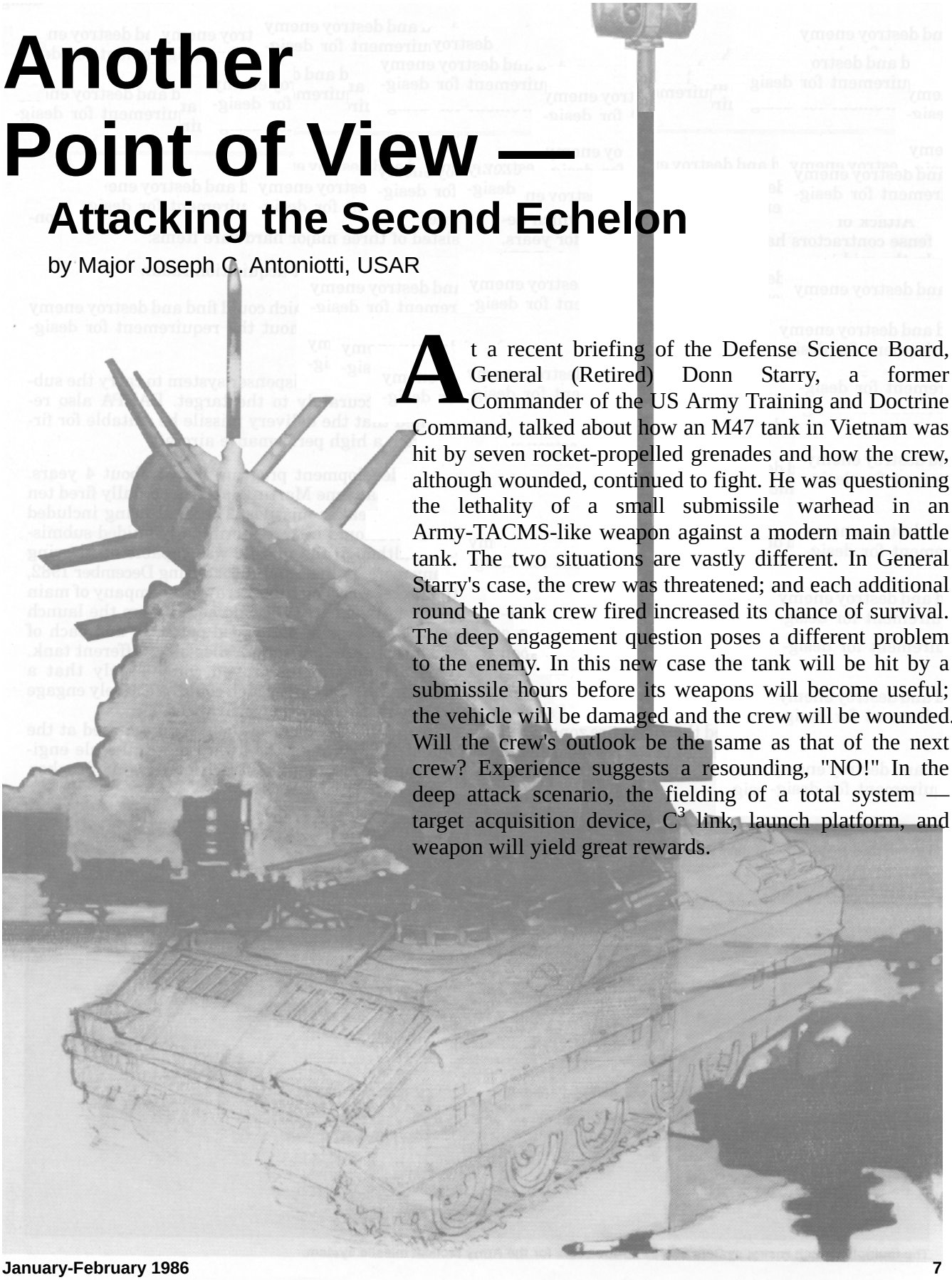
Speak Out

The *Journal* welcomes and encouraged letters from our readers. Of particular interest are opinions, ideas, and innovations pertinent to the betterment of the Field Artillery and the total force. Also welcomed are thoughts on how to improve the magazine.—*Ed.*

Another Point of View —

Attacking the Second Echelon

by Major Joseph C. Antoniotti, USAR



At a recent briefing of the Defense Science Board, General (Retired) Donn Starry, a former Commander of the US Army Training and Doctrine Command, talked about how an M47 tank in Vietnam was hit by seven rocket-propelled grenades and how the crew, although wounded, continued to fight. He was questioning the lethality of a small submissile warhead in an Army-TACMS-like weapon against a modern main battle tank. The two situations are vastly different. In General Starry's case, the crew was threatened; and each additional round the tank crew fired increased its chance of survival. The deep engagement question poses a different problem to the enemy. In this new case the tank will be hit by a submissile hours before its weapons will become useful; the vehicle will be damaged and the crew will be wounded. Will the crew's outlook be the same as that of the next crew? Experience suggests a resounding, "NO!" In the deep attack scenario, the fielding of a total system — target acquisition device, C^3 link, launch platform, and weapon will yield great rewards.

Attack of the second echelon is a topic which defense contractors have been investigating for years. In the mid-1970s the Defense Science Board (DSB) advised the Secretary of Defense and the service staffs that it was feasible to develop a weapon which could effectively engage threat forces at ranges of more than 100 kilometers across the forward line of own troops (FLOT).

The members of the Science Board believe that North Atlantic Treaty Organization (NATO) forces must have an effective long-range nonnuclear weapon which would deter the Soviets from employing their second echelon. Once NATO could make use of such conventional means to reduce the threat of a massive armored breakthrough, the defense of the entire alliance would be strengthened while the reliance on nuclear weapons waned.

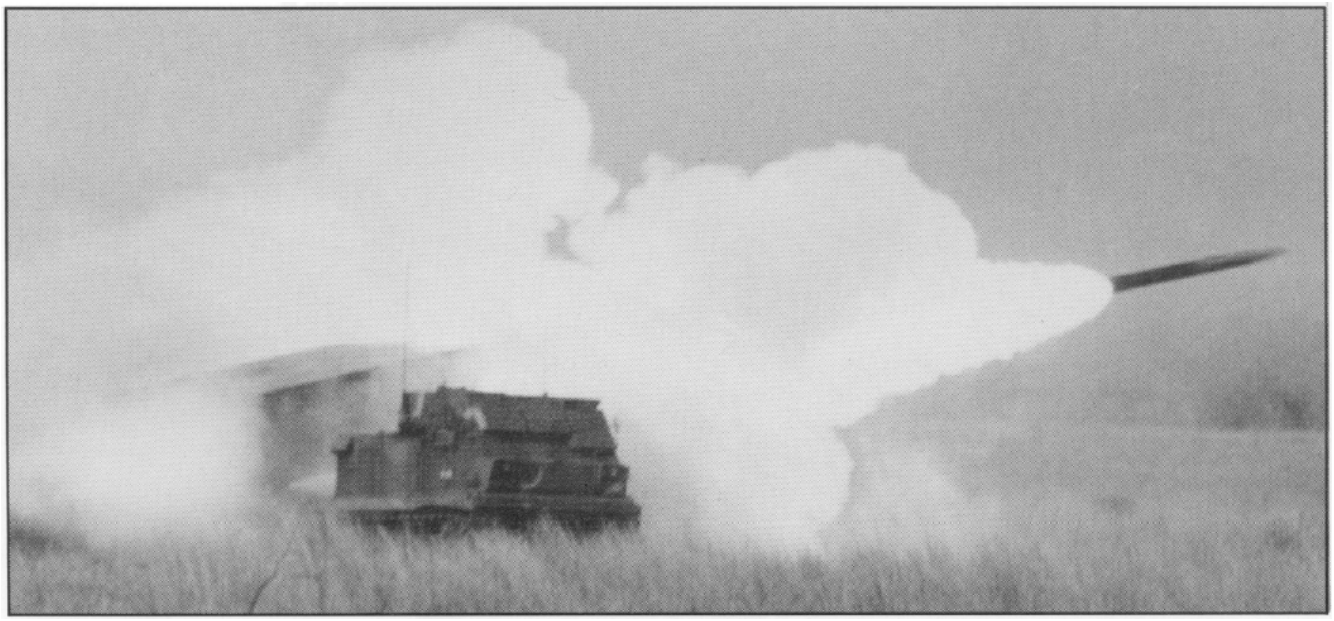
In 1977 the Defense Advanced Research Projects Agency (DARPA) issued the first request to industry for the concept definition of a deep interdiction weapon. The following year the Department of Defense awarded contracts for the development of a demonstration version of an interdiction weapon called Assault Breaker.

The purpose of Assault Breaker was to destroy or neutralize large combat formations in the second echelon before they reached the direct fire zone. Such a system would disrupt the flow of the second echelon force and delay its arrival in the main battle area. The Assault Breaker demonstration program consisted of three major hardware items:

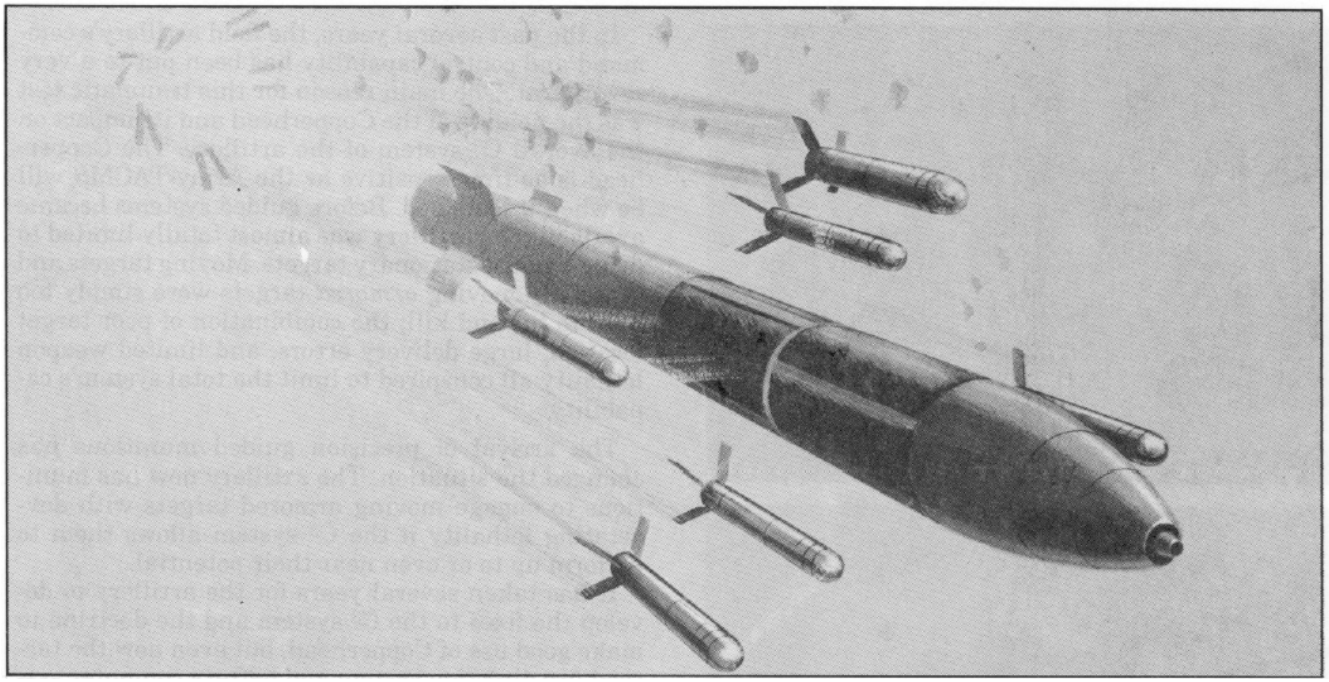
- An aerial target acquisition radar.
- A submissile which could find and destroy enemy armor vehicles without the requirement for designation.
- A missile and dispenser system to carry the submissiles accurately to the target. DARPA also requested that the delivery missile be suitable for firing from a high performance aircraft.

The development program lasted about 4 years. During that time Martin Marietta actually fired ten Assault Breaker missiles. The final firing included five operational infrared terminally guided submissiles, although the missile was capable of carrying many more. In that final shoot during December 1982, the target was a circular array of a company of main battle tanks nearly 100 kilometers from the launch point. The system performed perfectly and each of the five operational submissiles hit a different tank. This demonstration proved conclusively that a weapon could be built which could effectively engage armored formations at long ranges.

In spite of the success, the program lapsed at the end of 1982 without the award of a full-scale engineering development contract for Assault Breaker.



The multiple launch rocket system serves as the basis for the Army tactical missile system.



Small submissiles designed for the deep attack mission will destroy or neutralize large combat formations in the second echelon before they reach the direct fire zone.

Since then the deep attack concept has been revived several times under different names — corps support weapon system (CSWS), close support weapon (CSW), joint tactical missile system (JTACMS), and most recently as the Army-tactical missile system (Army-TACMS).

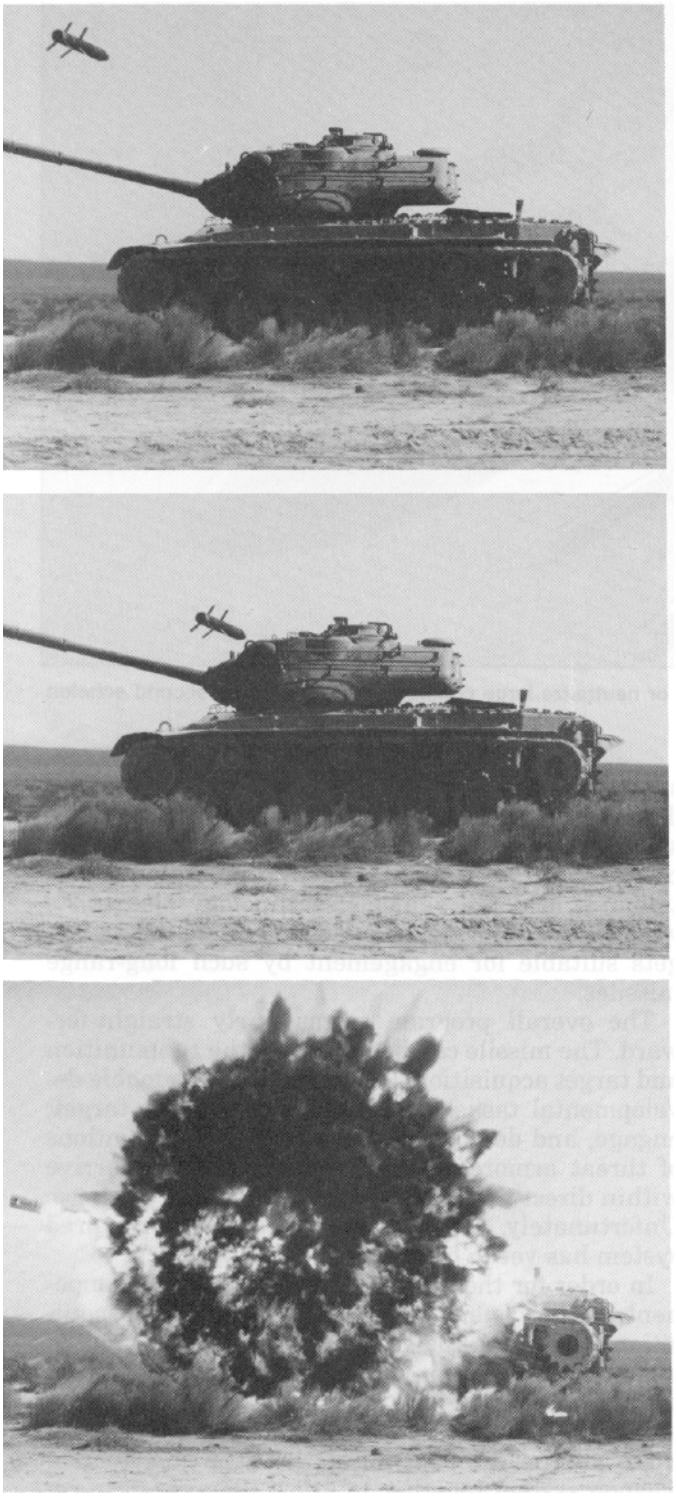
In June 1985, the Army asked qualified companies to bid for the development of a second echelon attack missile. The guidance given to prospective contractors, at that time, was to design a system for the deep attack mission which could make use of a modified multiple launch rocket system (MLRS) launcher with the candidate missile totally contained within a standard size MLRS launch pod.

The initial weapons would be produced without antiarmor smart submissiles; instead they would have warheads loaded with a large number of improved conventional munitions. A second phase of the development would result in the production of a guided fire-and-forget submunition and a dispenser mechanism to replace the initial improved capabilities missile (ICM) warhead.

The basic concept of the weapon is sound. Technology exists today which will allow a missile that can fit into an MLRS pod to deliver a significant payload to a range of 100 or more kilometers. The technology also exists which will enable a small submissile to be dispensed, oriented, and, without further designation, seek, engage, and destroy a target. Essentially, one of these missiles delivered over an appropriate target could destroy a company or a battalion of armored vehicles. Technology also exists which allows a target acquisition system to find targets suitable for engagement by such long-range missiles.

The overall program seems fairly straight-forward. The missile can be built; and the submunition and target acquisition device are also reasonable developmental tasks. It should be possible to target, engage, and destroy or neutralize large formations of threat armored targets long before they arrive within direct fire range of our own defensive forces. Unfortunately, a significant aspect of the required system has yet to be perfected.

In order for the system to be complete all components of the system — the weapon, the target acquisition device, the fusion center, the decision maker, and the fire direction center — must be linked together efficiently by an effective command, control, and communications (C^3) system. Such a C^3 system links all the components of the deep interdiction weapon system together to allow the system to respond to fire requests with acceptable rapidity and effectiveness.



A Copperhead round impacts with devastating lethality on an armored target.

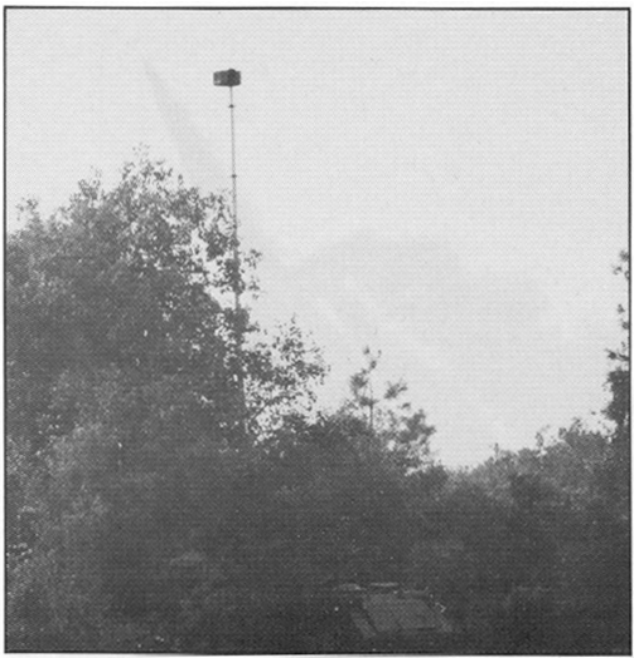
In the past several years, the field artillery's command and control capability has been put to a very severe test. The main reason for this traumatic test was the fielding of the Copperhead and its impact on the overall C^3 system of the artillery. The Copperhead is as time sensitive as the Army-TACMS will be when it is fielded. Before guided systems became available, the artillery was almost totally limited to firing against stationary targets. Moving targets and especially moving *armored* targets were simply too hard to hit and kill; the combination of poor target location, large delivery errors, and limited weapon lethality all conspired to limit the total system's capability.

The arrival of precision guided munitions has changed the situation. The artillery now has munitions to engage moving armored targets with devastating lethality if the C^3 system allows them to perform up to or even near their potential.

It has taken several years for the artillery to develop the fixes to the C^3 system and the doctrine to make good use of Copperhead, but even now the tactical fire direction system and battery computer system fixes have yet to be completed. When Army-TACMS is fielded it will be a very capable and cost effective weapon, but it will be very expensive. It follows that the doctrine and the C^3 system necessary to operate Army-TACMS most effectively should be in place and tested before the system reaches troops. In this way the overall system problems experienced on Copperhead will not be repeated.

Once the entire system is put together and all the components are linked by an effective C^3 network, the artillery will have a very lethal, new capability. The combination of Army-TACMS, MLRS-terminally guided warheads, and cannon-launched weapons will allow the artillery to engage an attacking force continuously from a depth of about 100 kilometers all the way to the beginning of the direct fire zone and, in the case of laser Copperhead, even *into* the direct fire zone.

From the point of view of the developer, however, killing the target is a component of a larger process. The Army specified the maximum size and weight of the missile and the ranges which it must achieve. The Army also specified the size of each of the individual submissiles which would be dispensed from the carrier missile and the minimum number which must be carried. From this point onward, the design of the proposed system is in the hands of the engineers, technicians, and analysts who work for the developer.



Photos and illustrations courtesy of Martin Marietta

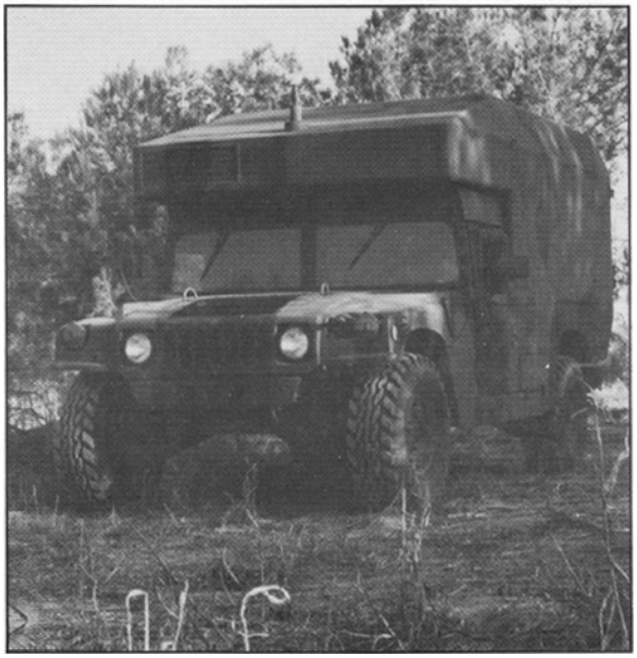


Photo courtesy of Motorola, Inc.

A wide variety of research and development activities support the deep battle initiative. The target acquisition and designation on a pole (TADPOLE) and the downsized ground station module (DGSM) mounted in a high-mobility multipurpose wheeled vehicle are two examples.

Before the first weapon finally reaches the hands of a field artillery unit many hundreds of blueprints will have been created, changed, and drawn again as the form of the weapon progresses from the engineers' and designers' concepts to a mature weapon. At each step in the design process many hours of computer simulation will shorten the total time required to evaluate different design concepts and select the best alternative.

While the weapon is being designed, another team will be evaluating the projected performance of the weapon on the battlefield. This analytical team will use other computer simulations to determine how best to use the weapon — what targets it should energize and what organizational and operational concept best suits its employment. The analytical team will also spend a great deal of time with the Army user to evaluate exactly how the new weapon should fit into the artillery command and control system and if changes to the overall fire support system must occur to allow the new weapon to work.

The end result of this cooperative effort between the Army and the developer should be an exceptionally capable weapon. If the promise of the Assault Breaker missile holds true, by the early 1990s the Army should have the capability to look deep into the Threat's second echelon, identify and target his advancing armored columns and their supporting artillery, and target and destroy these units long before their weapons can range our forces. Conceivably, a single battery of Army-TACMS could destroy the equivalent of a maneuver regiment with a single load of missiles from each launcher.

The impact of this capability on the Threat will be staggering. Think of the effect of the destruction of an enemy's tank and motorized rifle companies many hours before they reach the FLOT. In fact, the same units could be engaged several times by Army-TACMS, MLRS-terminally guided warheads, Copperhead, and close support aircraft before they can fire a single round against our AirLand Forces.

Major Joseph C. Antoniotti, USAR, received his Field Artillery commission through the ROTC at St. Peter's College, Jersey City, New Jersey. He commanded four battery-sized units in Vietnam. After attending the Field Artillery Officer Advanced Course, he served as a member of the Legal Mix V study team as an operations research analyst. He is currently employed by Martin Marietta Aerospace as an operations research engineer and specializes in analyses of precision-guided munitions and command and control systems. He also serves as the movement plans officer for the 143d Transportation Brigade in Orlando, Florida.

The Point of Lance

by Captain Gary M. Bowman

A 1976 *Field Artillery Journal* article entitled "The Time Has Come . . .," describes Lance as a nuclear delivery system which should be the exclusive property of the corps commander. The article characterizes Lance as the ideal weapon to reverse seriously deteriorating tactical situations. AirLand Battle doctrine, however, has changed the role of Lance. Even though the missile's nuclear role is still important, the role of nonnuclear Lance in the deep attack has attained greater importance. Today the corps commander must perceive Lance as their primary tool for operational interdiction.

". . . the Lance system is made to order for operational level employment by the corps commander."

Lance and Doctrine

According to US Army Training and Doctrine Command Pamphlet 525-5, *AirLand Battle and Corps Operations*, interdiction and deep attack are fundamental aspects of the Airland Battle doctrine.

> *Interdiction allows the defender to focus his attacks on the enemy targets which, when delayed, disrupted, or destroyed, will create an opportunity for positive action. The enemy's momentum can be altered by attacking high-value second-echelon targets, reducing his ability to mass and build momentum. Interdiction is the method whereby the defender achieves the leverage necessary to slow down the attacker, stop him from achieving his objective, and gain the initiative.*

Lance is the most significant artillery interdiction system in the contemporary Army arsenal. With the exception of special operations forces, Lance is the only all-weather, violent means of interdiction available to the operational commander, short of resorting to nuclear weapons.

Moreover, the Lance battalion has utility in terms of all four AirLand Battle principles — initiative, depth, agility, and synchronization.

• *Initiative* — the ability to set the terms of battle by action — is a great advantage in war. To gain the initiative, subordinate commanders must understand the overall commander's objectives and be able to act independently to achieve those objectives when electronic warfare, the destruction of friendly forces and headquarters, or the confusion of battle disrupt command, control, and communications. Lance firing batteries help commanders maintain the initiative regardless of the other conditions on the battlefield. Communicating directly with the battalion liaison officer at the corps fire support element, such firing batteries can deliver interdicting fires without assistance from the parent battalion's tactical operations center and can function effectively on the nonlinear battlefield, even when isolated by enemy maneuver units.

• Lance adds *depth* to the AirLand battlefield in both time and space. The long range of the Lance system allows the attack of follow-on forces deep in the enemy's rear lines. Through interdiction, Lance can prevent the reinforcement of enemy frontline forces, thereby gaining time for friendly forces to initiate counterattacks and seize the initiative. The ability of Lance to provide massive nuclear fires also gives the commander the means to terminate the battle quickly or generate future operational opportunities.

• *Agility* means acting faster than the enemy to exploit his weaknesses and frustrate his plans. A Lance firing platoon can move quickly over the battlefield to deliver interdicting fires. Such rapid movements minimize the enemy's chances of acquiring firing platoon locations through electronic, sound, heat, or light signatures. Moreover, the Lance lightweight launcher can be airlifted to almost anywhere on the nonlinear battlefield where a helicopter can go.

• The *synchronization* of fire support is a particularly impressive capability of a Lance unit. In fact, the maneuver commander at the corps level orchestrates the timely use of Lance. Unlike his limited control of air interdiction assets, the ground component commander has complete discretion regarding the use of nonnuclear Lance fires. He can quickly shift Lance fires as the battle progresses and as the campaign matures. The extended range of the system allows the use of both nuclear and nonnuclear weapons which can interdict deep yet not interrupt operations at the forward line of own troops (FLOT). Lance's nuclear capability also gives the corps commander the ability to hold the enemy at risk throughout the former's entire area of influence.

Thus, the Lance missile system is made to order for operational level employment by the corps commander. The operational level of war — the bridge between tactics and strategy — includes the marshalling of forces and logistical support, providing direction to ground and air maneuver, applying conventional and nuclear fires in depth, and engaging in unconventional and psychological warfare. Operational interdiction is certainly a major aspect of the operational level of war.

An Operational Scenario

The following scenario drawn from TRADOC Pamphlet 525-5, illustrates how commanders may use Lance to support the AirLand Battle at the corps level. The scenario, like most planning at the corps level, uses time and space criteria to divide the battle into phases. The employment of Lance interdicting fires is different in each phase.

The initial phase of the AirLand Battle involves divisions and brigades engaging the enemy's attacking first echelon while the corps commander focuses his attention on the enemy forces located within 72 hours of the close-in battle. The corps commander's goal is to interrupt the entry of follow-on echelons into the close-in battle and to create opportunities to seize the initiative. Lance is particularly effective during this phase. Along with air strikes, it provides a means of disrupting, delaying, and destroying the approaching force at long range. The payoff of attacking such targets as logistical and command control elements with nonnuclear Lance at this point in the battle may be great because these critical targets are very vulnerable.

Commanders can conserve Air Force attack assets to strike hard targets such as bridges, while they use Lance to hit softer targets. However, Lance may well be the only means of interdiction available during the early stages of combat. Bad weather, local enemy air superiority, or effective enemy air defense may prevent the use of air interdiction. When the Air Force is neutralized, Lance becomes even more critical as the tool of operational interdiction and might be launched against hard, critical targets.

As enemy follow-on echelons approach, within 60 hours of the frontline battle, the enemy commander's intentions should become apparent. Deep nuclear strikes with Lance or airpower should be very effective during this period. Targets are now more vulnerable to nuclear attack, but they are still beyond the danger radius for friendly forces. The time until contact at the FLOT is sufficiently long to allow the release of nuclear weapons and execution of nuclear missions.

The wide range of alternative courses of action still existing at this phase of the battle requires the corps commander to maintain a strong conventional firepower option, particularly in the absence of a nuclear release. His most important task

In the movement to contact, launcher platoons in the Lance battalion should be moved over or very close to firing points, boresighted, and laid in the general direction of preplanned and probable targets.

remains to hold the enemy follow-on echelon out of the close-in battle long enough for the frontline divisions to have sufficient time and space to accomplish their current missions and prepare to meet the next echelon.

When the follow-on echelon enters the division's area of influence, the importance of real-time target acquisition soars. Once they detect the commitment of a follow-on force on specific avenues of approach, the defenders can prepare definite fire plans. Lance fires may be particularly critical at this point in the battle. As pointed out earlier, bad weather or enemy air defense may preclude battlefield air interdiction and make Lance the primary means of interdiction. Furthermore, Lance will also be an important supplement to air interdiction because of its superior responsiveness in delivering nuclear fires. In rapidly changing situations in which the nuclear planning and release process has matured, Lance may well be the only system capable of changing from a conventional to a nuclear posture quickly enough to accomplish the commander's objectives.

As the follow-on echelons enter the close-in battle, they become the immediate concern of the maneuver brigade commander. Artillery rather than airpower dominates. During this stage of the battle, commanders will use Lance as long-range artillery destroying the command, control, and logistical facilities located at the tail of the engaged echelon. However, if substantial interdiction has been accomplished in the earlier phases of the battle, many enemy assault forces will have been destroyed; freedom of maneuver will have been attained; and the initiative will be with the defenders.

Employment Considerations in the Offensive

During exercises such as REFORGER, WINTEX, and ABLE ARCHER, Lance has yet to realize its full potential as a tool of operational interdiction. Corps fire support agencies and the Lance battalions have simply not matched the requirements for deep attack with the characteristics of the Lance weapon system. Lance can and must be used to support both offensive and defensive operations. But before they employ Lance, planners must consider certain employment factors for each type of combat. They must understand the nature of the particular operation, the limitations of the Lance battalion, and the unique capabilities of Lance equipment.

In the movement to contact, launcher platoons in the Lance battalion should be moved over or very close to firing points, boresighted, and laid in the general direction of preplanned and probable targets. These actions will facilitate the delivery of responsive fires. The system's on-carriage traverse limits — 285 mils for the nuclear warhead and 400 mils for the nonnuclear warhead — need to be considered.

Lance firing platoons may also be airlifted forward to firing points in proximity to or beyond the FLOT in support of maneuver units, but increased security risks and a lack of logistical support preclude sustained operations near the FLOT. Under no circumstances should entire batteries be moved across the FLOT. Support of movements to contact can best be accomplished by giving the Lance battalion the mission of general support reinforcing or reinforcing to a division artillery. Although Lance fires may be important in creating opportunities that individual maneuver brigades may exploit during offensive operations, control of a Lance battalion should not be passed to echelons below division level.

During the maneuver force's main attack following a movement to contact, nonnuclear Lance can be used to suppress enemy air defense and artillery; disrupt command and control elements; and destroy logistics stockpiles. Firing positions must be selected well before the attack in order to guarantee timely support of the main attack and any subsequent breakthrough. Because preplanned targets fired in a systematic program optimize the utility of Lance, the field artillery support plan should include a target list and a schedule of Lance fires. Lance commanders can use this target list as they select firing points.

The fire support coordinator can also use Lance to weight the main effort by massing fires at decisive targets, but his targeting must be performed carefully. The circular-error-probable of Lance may endanger friendly forces. Lance, therefore, should not be used to engage targets near the FLOT. The fire support coordinator must also enforce targeting discipline. The requirements for massive fire support may be great, but the scarcity of Lance ammunition requires strict adherence to proper targeting procedures.

The best targets for Lance during exploitation and pursuit are enemy units that are slowed at choke points such as river crossings and road junctions. However, because every Lance firing point must be surveyed, it may be that even under ideal conditions and even with the position and azimuth determining system (PADS), the survey process will still not allow the Lance battalion to keep pace with the supported maneuver forces. Therefore, Lance commanders must aggressively seek forward positions; and surveyors must continuously prepare new firing points. Coordination between the battalion and the division in whose area the battalion is operating must

occur. The survey information center of the division artillery can aid the battalion in locating and establishing survey control, and the division headquarters can assist the battalion in clearing position areas in the forward areas of the division sector.

The long range of the Lance missile should be used to keep fire support available to the advancing maneuver units, but planners should never forget that firing platoons may also be airlifted forward to conduct operations. Here again there is a probability of expending large amounts of ammunition. Given the necessity of conserving ammunition, the mission of general support reinforcing or reinforcing is best suited to Lance during the attack; the exploitation; and the pursuit. Lance should never be controlled by any headquarters lower than division artillery or the field artillery brigade level. Even when Lance is under the control of a division, the corps commander should establish a constrained supply rate on Lance ammunition.

Employment Considerations in the Defensive

During all defensive operations, Lance should be retained under the corps commander's control with the mission of general support. The uncertainty of the defensive situation requires that the corps commander retain sufficient fire support to counter the enemy's main thrust wherever it may occur. Lance firing elements should, therefore, be positioned out of counterfire artillery range. Under exceptional circumstances, they may be airlifted forward to engage deep targets. The fire support coordinator must anticipate the enemy's use of deception, and in the interest of conserving scarce ammunition he must wait until the enemy's intentions and potentially valuable targets become apparent. The requirements of the AirLand Battle predominate in the defense — the follow-on echelons must be attacked systematically.

There are other special factors which the fire support coordinator must consider when deciding to use Lance. The first is the inherent trade-off between responsiveness and survivability. Lance is a scarce asset; there are relatively few Lance launcher, of course, degrades the corps' firepower; and planners should carefully weigh the risk of using Lance before they decide to shoot.

Lance units can support defensive operations more effectively and avoid detection better by limiting displacement and by using good camouflage techniques.

Even though the Lance battalion possesses excellent mobility, commanders must realize that continuous unit displacement increases vulnerability to enemy attack and degrades overall responsiveness. Lance units can support defensive operations more effectively and avoid detection better by limiting displacement and by using good camouflage techniques. Rather than unit displacement, commanders should take advantage of the system's ability to evacuate a firing point rapidly after a round has been fired and move to another point — the "shoot and scoot" technique. A well-trained firing crew can perform post-firing checks and march order in a matter of minutes after firing. The firing unit can then rendezvous with a loader-transporter, reload, and move to a subsequent firing position in preparation for another fire mission. Unit commanders must select many external firing points at distances from the battery's position. Such tactics will prevent enemy detection of the battery and still maintain a high level of unit responsiveness.

The speed with which the Lance battalion can respond to calls for fire can be increased if the force fire support element plans the weapons mix which the Lance battalion will maintain. The term "weapons mix" means the ratio of nuclear to nonnuclear warheads that will be transported by the Lance battalion as part of its basic load. Weapons mix also describes the ratio of nuclear to nonnuclear missiles available in the ammunition supply system to replace the missile ammunition expended.

Response time can also be increased by effective use of the force reponse posture described in FM 6-42, *The Field Artillery Battalion, Lance*. The corps commander may assign different response postures to individual batteries within a battalion. For example, one battery within the battalion may be in response posture IV (maximum nuclear response). Such posture IV units could stay well hidden,

while the other two batteries might adopt response posture I (maximum nonnuclear response); response posture II (increased nuclear response); or response posture III (immediate nuclear response). The same arrangement could apply to battalions at the corps level where one Lance battalion may be hidden in response posture IV, while the other two battalions might be in a nonnuclear response posture. Planners should never forget that the process of changing response postures slows responsiveness to calls for fires; therefore, the fire support coordinator must coordinate judiciously.

The availability of survey certainly affects the responsiveness of Lance. The Lance firing platoon requires surveyed firing points, and the firing platoon must fire only once from each firing point to avoid counterfire. Of course, Lance can only shoot as fast as the battery surveyors can put in new firing points.

Since the battalion must range particular targets, positioning also may degrade the responsiveness of Lance fires. The fire support element can handle this problem by giving the battalion a no-greater-than range as positioning guidance. The no-greater-than range will serve as notice to the battalion that only those firing points at a range to the target less than the no-greater-than range will be used to fire the mission.

A last factor to consider in the employment of Lance for operational interdiction is the role of the Lance battalion's liaison officer at the force fire support elements. The liaison officer's primary responsibility is to provide timely tactical information to the battalion and to represent the battalion commander at the fire support element on all Lance employment matters. The liaison officer accomplishes a number of specific tasks.

- He maintains a primary and alternate communications link from the fire support element to the battalion.
- He provides Lance technical expertise to the fire support element.
- He provides information on the capabilities of Lance units to the force commander.
- He transmits unit status information from the battalion S3 to the force commander.
- He transmits fire missions from the fire support element to the battalion fire direction center.
- He collects and transmits any useful data from the fire support element and the force G3 operations section to his battalion.

The liaison officer, in effect, is the Lance staff officer at the fire support element. He should maintain a Lance situation map and be prepared to brief the fire support coordinator on Lance employment and battalion operations. When the fire support element displaces, the liaison officer should move to the alternate fire support element to ensure that communication is never lost between the battalion commander and the controlling fire support element. The tactical fire direction system (TACFIRE) has dramatically improved the quantity and speed of information flowing from the fire support element to the Lance battalion, but the liaison officer is still necessary to make sense of the increased volume of information at the fire support element.

Conclusion

Lance artillery, employed as a tool of operational interdiction, is ideally suited to support the AirLand Battle; but nonnuclear Lance in this role has yet to be exercised fully and hence its value has not been fully realized. Corps commanders must learn how to apply Lance nonnuclear fires to support maneuver forces. When integrated into the AirLand Battle model, Lance can make deep attack feasible today.

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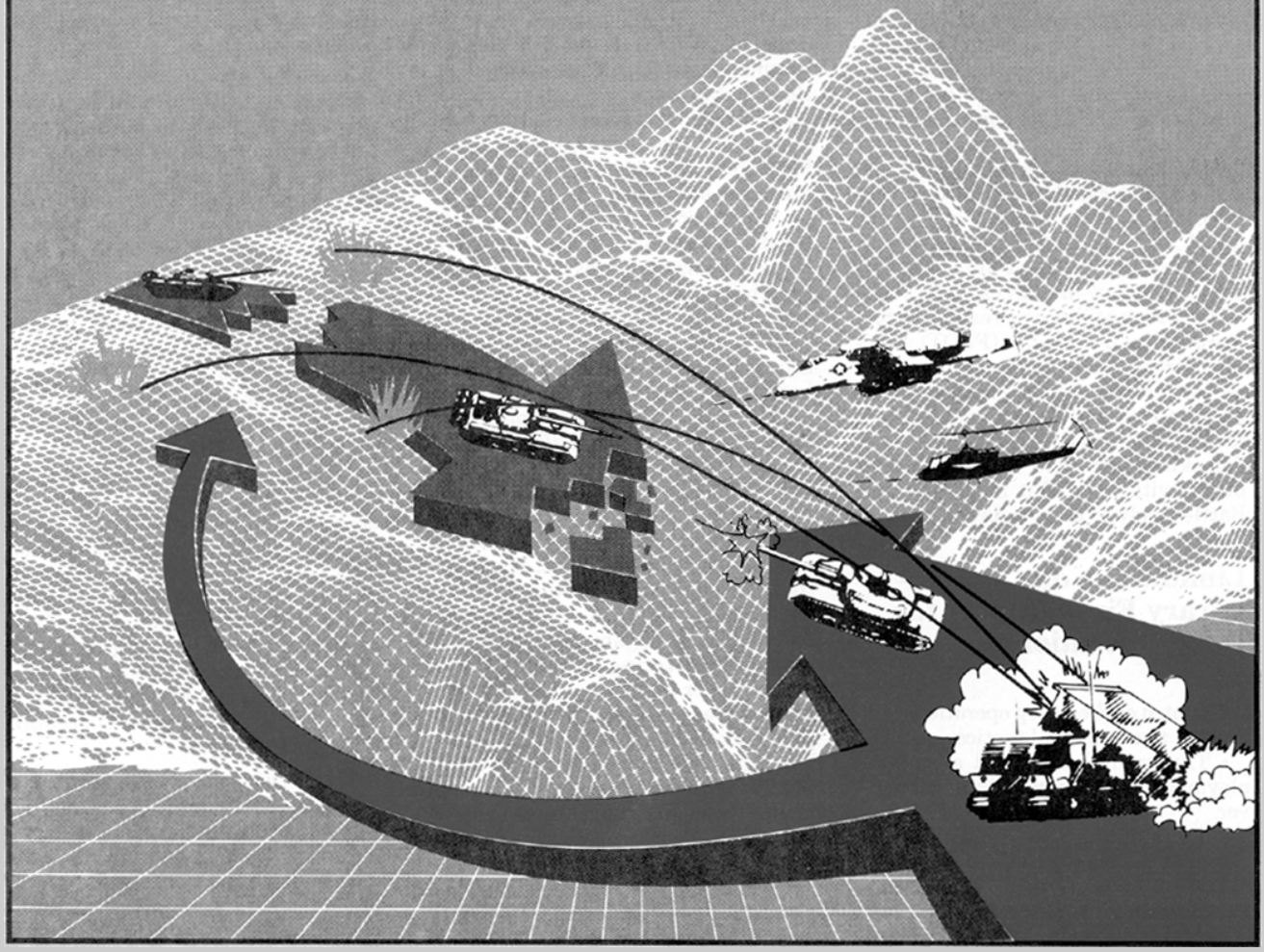
It's Deeper Than You Think



Artillery Doctrine and Concepts

by Mr. Bill Rittenhouse

"The Army's operational *concept* is called AirLand Battle *doctrine*." This interesting combination of terms taken from the 1982 edition of FM 100-5, *Operations*, appears to be a contradiction. Most knowledgeable soldiers view concepts and doctrine as distinct entities. So the question arises: "Does FM 100-5 contain a play on words, or is this simply a mistake?"

Ironically, the manual speaks of AirLand Battle as doctrine and concept because that is exactly what AirLand Battle is. As a concept, it describes how the US Army may fight on future battlefields. In that sense, it is the basis for developing future Army doctrine, organizations, training, and materiel. But in another sense, it is doctrine — the way we will fight on today's battlefield.

The purpose of this article is to provide insights regarding possible courses of action to exploit our present capabilities and enhance our future abilities. Specifically, this piece focuses on one facet of operational concepts and doctrine — fire support for deep operations. In addressing this important topic, the article also examines some pressing conceptual issues and briefly describes the method the Army uses to transform concepts into approved doctrinal, organizational, materiel, and training programs.

Doctrinal Tenets of Deep Operations

Field Circular 100-15-1, *Corps Deep Operations*, contains today's deep operations doctrine. This publication provides the "rhyme and reason" for conducting operations in depth, and it presents a compelling argument for why we should fight in depth. In doing so, it describes deep operations in

terms of the operational level of war — warfare that seeks to gain positional leverage on the enemy by conducting large unit campaigns. The circular also makes it perfectly clear that planners should visualize fire support for the deep operations in operational-level terms.

In addressing the context of deep attacks, FC 100-15-1 lays out a description of the Soviet operational capabilities. It explains not only the Soviet practice of echeloning forces but also their tremendous capabilities to mass troops, penetrate forward defenses, and conduct rapid exploitations. The circular points out that a major premise of AirLand Battle is that to win American forces must interdict the enemy's follow-on forces before the latter's formations can reach our forward line of own troops (FLOT). Such interdiction operations would involve the use of fires and maneuver to attack, destroy, and disrupt enemy forces in depth. Obviously, in any such undertakings the field artillery would play a vital role. But is the King of Battle ready to do so today?

Limitations on Contemporary Fire Support for Deep Operations

As noted earlier, deep operations will involve two principal tactics.

• The normal combined arms employment of fire support and maneuver.

• The singular use of deep fires to interdict the enemy's follow-on forces.

Both of these methods will require the planning and delivery of fires on a gargantuan scale. Today's field artillerymen do a good job in providing indirect fire support and in integrating the application of various fire support means during close-in operations. But they will experience distinct qualitative and quantitative limiting factors that will undoubtedly handicap the branch's participation in the tremendously larger operations envisioned by deep operational theorists. To meet these larger challenges, Redlegs must come to grips with the following limitations.

• *Fire Support at the Operational Level.* We must improve the corps commander's capability to command and control the fire support assets necessary to win deep offensive action. Specifically, we must increase the range and lethality of field artillery attack systems out to a depth of approximately 150 kilometers. It follows that we must also extend our target acquisition capability beyond that extended depth.

• *Targeting Philosophies.* We must move toward a better approach in the business of targeting. In the past, we tended to become inundated with targets. Basically we reacted to targets. The result was befuddlement as operations officers wrestled with the question of which specific targets should be attacked. To make deep battle doctrine work, we must *decide* in advance which targets are important, then *detect* their whereabouts on the battlefield, and finally *deliver* the appropriate ordnance.

• *Joint Fire Support.* AirLand Battle places a premium on our capability to synchronize the fires of all services, especially the Air Force. The use of battlefield air interdiction (BAI) is, and will remain, a primary means of deep attack. Fortunately, we are steadily improving techniques for executing joint attacks. Such documents as TRADOC Pamphlet 525-45, *Joint Second Echelon Attack (JSAK),* and USREDCOM Pamphlet 525-3, *Joint Suppression of Enemy Air Defenses (JSEAD),* provide good examples of such synchronizing efforts. Moreover, the battlefield coordination element (BCE) has become in many theaters an invaluable organization for planning and delivering joint fires. There are, however, questions which remain unanswered concerning the fire support link between the Tactical Air Force and the echelons above corps (EAC) via the battle coordination element. These questions are as basic as "How should fire support function at EAC?"

• *Allocation of Fires.* The crux of the problem facing the corps and higher level commanders is how to conserve and pool fire support resources in order to attack deep at the point of decision. This is a perplexing problem in light of the inevitable heavy demands for support of the close and rear area battles. Our future fire support systems will require better methods to facilitate anticipated operations than the routine assignment of on-order missions or the articulation of priorities of fires. Such methods become particularly controversial when they involve the creation of *fire support reserves* — formations that would violate the *current* injunctions against placing field artillery units in reserve.

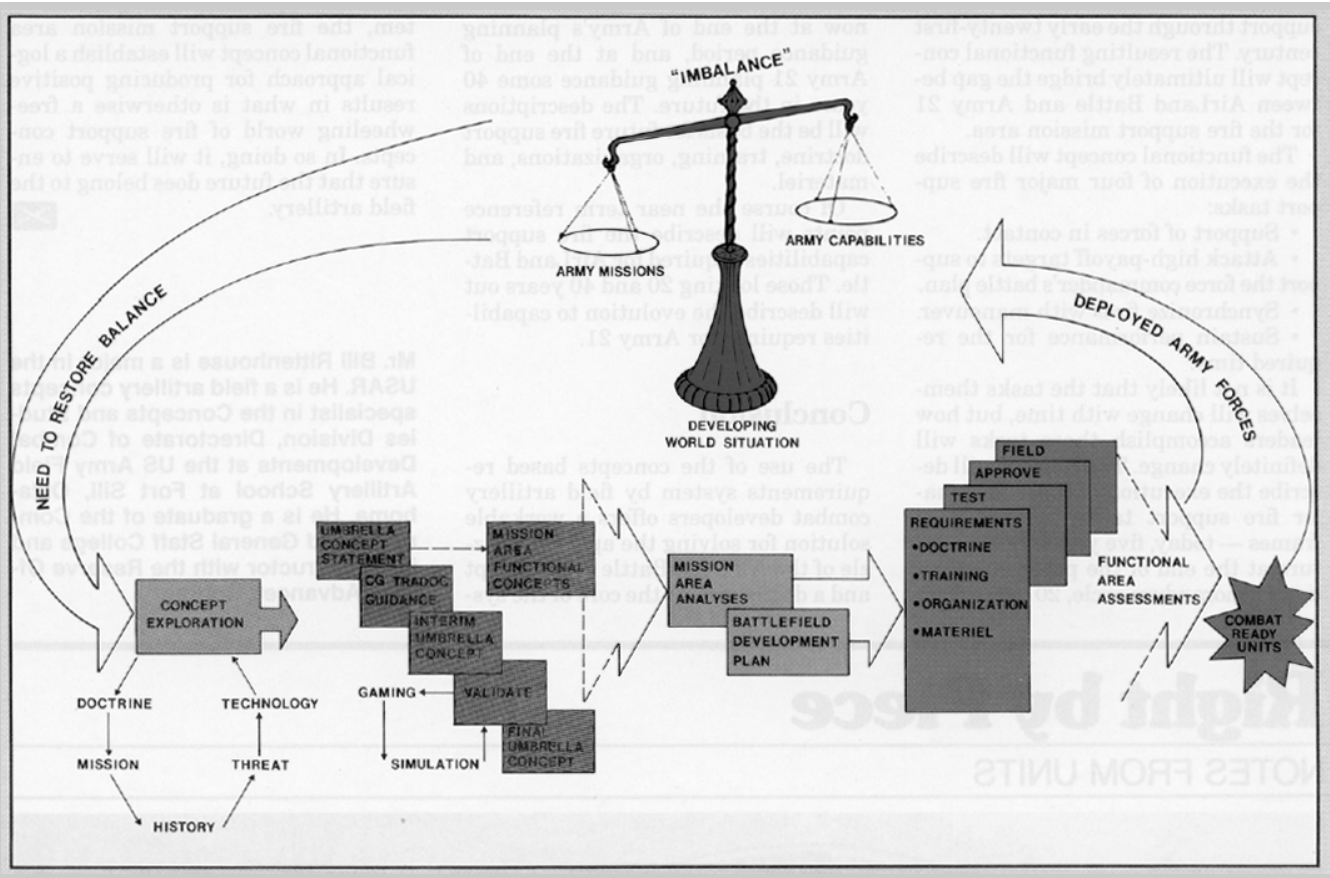
A Partial Solution

The problems described above dramatically limit our ability to execute AirLand Battle as doctrine. Fortunately, the Army has a mechanism to transform concepts into realities. That tool is the concepts based requirements system (CBRS). As the name implies, CBRS uses concepts to generate requirements for future Army doctrine, training, organization, and materiel. The following figure outlines many of the steps involved in this complex process.

Essentially, the CBRS methodology starts when the Army's senior leaders perceive that evolving military trends are likely to create a gap between Army's missions and its capabilities. Based upon projections of the future threat, planners visualize how the Army of the future must fight and then define what capabilities it must acquire to close the gap between what we have and what we need. In doing so, they use five basic building blocks — current doctrine, current and future missions, historical approaches to solving similar problems, technological trends, and the projected threat — as the tools during the visualization step. As their vision matures, they document it in a brief narrative outline known as a concept statement. This outline eventually gives way to an even more mature visualization called an operational concept. When validated through war-gaming and simulations, this overarching operational concept provides the impetus for altering doctrine, training, organizations, and materiel.

TRADOC Pamphlet 525-5, *The AirLand Battle and Corps 86,* provides a good example of an overarching concept which prompted a significant doctrinal change — the production in the August 1982 edition of FM 100-5, *Operations.* It was also the genesis of the Army 86 force structure designs and many major materiel initiatives such as the Army tactical missile systems (Army-TACMS) and the joint surveillance and target acquisition radar system (JSTARS).

Once the Army accepts an operational concept and incorporates it into doctrinal manuals, the Army's senior leadership normally rescinds the original concept. For example, they rescinded TRADOC Pamphlet 525-5 with publication of the August 1982 revision of FM 100-5. Although incorporated into Army doctrine at that point, AirLand Battle had not produced all the developmental work necessary for its full implementation. Much war-gaming as well as force structure, training, and materiel change remained to be accomplished. Thus, FM 100-5 was at once an operational concept as well as a doctrine.



The concepts based requirements system uses concepts to generate requirements for future Army doctrine, training, organization, and materiel. Based upon projections of the future threat, planners visualize how the Army of the future must fight and then define what capabilities it must acquire to close the gap between what we have and what we need.

Normally broad, overarching concepts do not provide enough detail for the Army's lower echelons to use as the basis for future change. FM 100-5, for example, does not provide sufficient details to allow a company or battery commander to fight and win in a deep battle. The concept requires further amplification. Specifically, it requires a heirarchy of supporting operational concepts. The TRADOC 525-series pamphlets provide such subordinate concepts. At present there are more than 40 operational concepts published in 525-series.

Neither AirLand Battle nor most of the supporting operational concepts have been fully integrated into proponent or branch doctrinal manuals. As a result, combat leaders in the field must consult FM 100-5, the entire series of TRADOC 525-series pamphlets, and all or part of *each* branch's doctrinal publications to understand the details of the combined arms battle.

Obviously, our Army will remain in a continuous state of transition for as far into the future as we can see. Therefore, it would be advantageous for planners, programmers, and trainers alike to have some idea of what changes to doctrine, training, organization, and materiel will likely occur at various points during the transition. Such a key would allow leaders to measure progress and synchronize doctrinal, training, organizational, and materiel changes.

A Reasonably Complete Cure

The Army has developed such a framework. The resulting "key" will permit planners to understand various combat and support mission requirements in the context of the Army's total needs. The framework is functional in character. That is, it deals with what the Army *does* rather than what the Army *is*. It concentrates on the Army's ability to execute wartime missions and views the battlefield in terms of 12 mission areas. Each mission area is the province of a proponent school or center. For instance, the Field Artillery School is proponent for the fire support mission area, the Armor School is proponent for the close combat heavy mission area, and the Combined Arms Center is proponent for the command and control mission area. Within the context of this broad framework, the solution to the doctrinal dilemma is development of a mission area functional concept which provides:

- A detailed description of the branch's role in implementing the overarching operational concept.
- The evolution of the branch's specific doctrine, training, organization, and materiel.

The mission area functional concept acts not only as a bridge between a single, overarching concept such as AirLand Battle and the branch's doctrine, but also as a bridge between diverse umbrella concepts like AirLand Battle and Army 21. Thus, the mission area functional concept describes the role and capabilities required by a branch to execute AirLand Battle including its deep operational aspects. It also describes the subsequent evolution required to implement Army 21.

Field Artillery School action officers are now in the initial stages of developing a functional concept for the fire support mission area. Their purpose is to write a foundation document that will guide the evolution of fire

support through the early twenty-first century. The resulting functional concept will ultimately bridge the gap between AirLand Battle and Army 21 for the fire support mission area.

The functional concept will describe the execution of four major fire support tasks:

- Support of forces in contact.
- Attack high-payoff targets to support the force commander's battle plan.
- Synchronize fires with maneuver.
- Sustain performance for the required time.

It is not likely that the tasks themselves will change with time, but how leaders accomplish these tasks will definitely change. The concept will describe the execution of these four major fire support tasks in four time frames — today, five years into the future at the end of the program objective memorandum cycle, 20 years from now at the end of Army's planning guidance period, and at the end of Army 21 planning guidance some 40 years in the future. The descriptions will be the basis for future fire support doctrine, training, organizations, and materiel.

Of course the near term reference points will describe the fire support capabilities required for AirLand Battle. Those looking 20 and 40 years out will describe the evolution to capabilities required for Army 21.

Conclusion

The use of the concepts based requirements system by field artillery combat developers offers a workable solution for solving the apparent puzzle of the AirLand Battle as a concept and a doctrinne. At the core of the system, the fire support mission area functional concept will establish a logical approach for producing positive results in what is otherwise a freewheeling world of fire support concepts. In so doing, it will serve to ensure that the future does belong to the field artillery.

Mr. Bill Rittenhouse is a major in the USAR. He is a field artillery concepts specialist in the Concepts and Studies Division, Directorate of Combat Developments at the US Army Field Artillery School at Fort Sill, Oklahoma. He is a graduate of the Command and General Staff College and is an instructor with the Reserve Officer Advanced Course.

Right by Piece

NOTES FROM UNITS

Bravo Bulls Take a Bath

FORT CAMPBELL, KY — The "Bravo Bulls" of Battery B, 1st Battalion, 321st Field Artillery, recently capped a week of training with a decontamination exercise. During the exercise, the battery relied heavily on the expertise of the members of the 2d Platoon, 63d Chemical Company.

Battery B soldiers who were contaminated during a mock attack took their personal gear and equipment including 105-mm howitzers to a field decontamination site to neutralize the chemical agents. There the 10-man battery decontamination team worked with chemical corps soldiers to clean up men and materiel. First Lieutenant David McElroy noted, "The 63d Chemical Company doesn't have the manpower to decontaminate all our personnel and equipment, so it's up to our own soldiers to be trained."

"As for the training we're getting out of this, you can't beat it," said Captain John Churchill, Battery B commander, as he watched the Bravo Bulls scrub down jeeps, gamma goats, and howitzers.

The artillerymen's equipment went through three stations to clean away chemical agents. "The first station is a water wash," said Private First Class Daniel Helfrich, 2d Platoon, 63d Chemical Company. "The idea is to get most of the mud off the vehicle,

especially the undercarriage. Most agents are picked up off the ground, and after the first wash, most are removed."

At the second station, soldiers applied liquid DS-2, a highly concentrated decontaminant, to the vehicles. "This decontaminant can neutralize almost any known chemical agent in 30 seconds," said Staff Sergeant Gloria Booker, 2d Platoon, 63d Chemical Company. "We only use it on the metal vehicles because of its strength."

The third station was yet another wash. "You need to wash the vehicle off again because of the DS-2," Booker said. "If you leave it on without rinsing, it will eat through the metal."

Batteries A, B, and C all went through the chemical decontamination training. "We've had about 180 soldiers and all the equipment including 18 howitzers go through the site," McElroy said. It was a bath the Bravo Bulls and their compatriots will not soon forget.

Have Guns — Will Travel!

BAUMHOLDER, GERMANY — "We took the seemingly impossible and made it look like a cake walk," was the comment from Captain Brett Morris, Battery C, 4th Battalion, 29th Field Artillery, about the unit's recent road march from Grafenwoehr.

Over 500 kilometers clicked off the odometers of 31 vehicles on the trip back to Baumholder. "Every vehicle made it back under its own power; none were towed in." Of the 31 vehicles, 14 were tracked.

According to First Sergeant Richard Ward, this is the first time a local unit has ever attempted to drive this distance — especially with tracked vehicles. "One reason it's never been done is units just don't want to see their equipment falling out and laying all over the autobahn from Grafenwoehr to Baumholder," he said.

When the battalion left for Grafenwoehr, Morris had requested his unit road-march back to Baumholder instead of moving by train.

Were there doubts? Certainly, the unit realized how long and tiring the road march would be on themselves and their equipment, but they had the confidence to prove they could do it.

One track mechanic, Specialist 4 Paul Redden, said the idea seemed a little crazy when the first sergeant mentioned the road march, "I guess everyone was expecting failure, but nothing was deadlined. Most of the problems on the march were just fuel related, nothing major."

Along with Battery C, the battalion's Service Battery provided 26 soldiers and a few vehicles to keep the unit rolling for the 500 kilometers. Morris said without their help the road march wouldn't have been such a success.

"The guys who made it happen were the operators and mechanics," Morris explained. "I'm proud to say we came back injury free with no major problems." (Story and photo by Pam Rhodes)

This horse, a 25-ton howitzer, threw some shoes during a 500-kilometer road march from Grafenwoehr. PV2 Tommie Benjamin, Battery C, 4-29th Field Artillery, is replacing one of the 980 pads needed for the 14 tracked vehicles which road-marched back.

Showing How It's Done

GRAFENWOEHR, GERMANY — More than 250 North Atlantic Treaty Organization (NATO) general officers assembled to see US Army and Air Force units conduct a Joint Combined Arms Exercise and to witness the first firing of the highly accurate Copperhead artillery round in Europe.

The exercise was conducted on a 7th Army Training Command's combined arms live fire facility to show how the ground and air forces intend to fight together if called upon to defend NATO on European soil. The generals also saw how effective the Copperhead round is against laser designated targets. Every target fired on with Copperhead was totally destroyed.

Four prominent NATO observers at the Joint Combined Arms Exercise at Grafenwoehr Training Area, West Germany are (left to right): LTG Maurice-Jean L. Gysemberg, Chief of the Belgian Joint General Staff; GEN Bernard Rogers, Supreme Allied Commander, Europe; GEN Richard L. Lawson, Deputy Commander, US European Command; and GEN Glenn K. Otis, Commander in Chief, US Army, Europe.

Stressing that the scenario was a defense designed to stop enemy aggression, General Glenn K. Otis, Commander of the US Army in Europe, welcomed guest observers including General Bernard Rogers, Supreme Allied Commander, Europe, and many other key NATO leaders.

Participating units included the Army's 11th Armored Cavalry Regiment, Fulda, Germany; and the 2d Battalion, 75th Field Artillery, Hanau, Germany. An Air Force 81st Tactical Fighter Wing A-10 Thunderbolt unit from the 510th Tactical Fighter Squadron, Bentwaters, England; and an F-16 Fighting Falcon element from the 10th Tactical Fighter Squadron, Hahn Air Base, Germany, provided close air support during the exercise. The A-10s fired their 30-mm, seven-barreled chain cannons, and the F-16s dropped 500-pound "snake eye" general purpose bombs.

Army hardware used included: M1 Abrams main battle tank; M3 Bradley cavalry fighting vehicle; M109 self-propelled howitzer; AH-IS Cobra attack helicopter; OH-58 scout helicopter; M113 fire support team vehicle; and various command, control, and communications vehicles.

Soldiers from the 11th Armored Cavalry Regiment's 58th Engineer Company provided demolitions support, simulating incoming enemy artillery and other special effects with 20,000 pounds of explosives placed throughout the multimillion-dollar range complex. The explosives were used to demonstrate the effects of an attacking force — the lethal assault a NATO ground commander would face while trying to direct combined arms action against an enemy within his sector of the battlefield.

Speaking about the conduct of the exercise, General Otis said, "First, the weapons you see have been brought together . . . by a captain on the battlefield. That's the fellow in charge. Second, there is no single dominant weapon system, but air and ground [forces] working together as a synergistic whole."

"We will," Otis added, "demonstrate how a joint air attack team (JAAT) operates with artillery, A-10s, Cobra helicopters, and the ground fighters." A JAAT is a cooperative effort between the Army and the Air Force, and it is controlled by an air battle captain who — when available and called into action by the ground commander — works to thwart the enemy's advance. Friendly artillery and airplanes work in concert to hinder enemy air defense assets and disrupt the first committed motorized rifle battalion so F-16s or other high-performance aircraft can strike

A live Copperhead artillery round gets unpacked for firing by two soldiers from 2d Battalion, 75th Field Artillery, a 155-mm self-propelled howitzer unit from Hanau, West Germany. After being cannon launched and reaching a specific point in its trajectory, the Copperhead deploys guidance fins and glides to a target marked by reflected laser energy.

A field artillery soldier stands guard while other members of his 155-mm self-propelled crew prepare for a Copperhead fire mission at Grafenwoehr Training Area, West Germany. The gun crew are members of the 2d Battalion, 75th Field Artillery, 41st Field Artillery Brigade, V Corps Artillery.

deep against the main force — the armored battalions in the rear of the enemy's lead regiment.

The exercise at the training area demonstrated defensive actions that would occur all along the East-West battle front. Properly executed, the joint combined arms team can stop an enemy attack cold.

The exercise consisted of three phases: an orientation on a large map board; an animated, scale-model joint air attack team demonstration complete with moving tanks, hovering remote-controlled helicopters, "flying" A-10s, and simulated artillery; and a narrated, 45-minute-long live fire operation. The three-phase approach was used to clarify exactly how the joint combined arms concept is employed by US Forces in Europe.

Most of the weapon systems in the exercise incorporated the latest technology. The field artillery, for example, now has the capability to destroy pinpoint targets thanks to Copperhead and the ground laser locater designator (GLLD). The GLLD is a laser-emitting device that literally marks the spot where the Copperhead impacts. Copperhead targets can be designated by a number of other ground and airborne lasers as well.

Because of its high-tech, force-integrated approach to war fighting doctrine, NATO — including the US Forces in the Alliance — have the capability to halt a conventional, numerically superior Threat attack into the West. According to many of the soldiers and airmen involved, the exercise shows why the US Army and Air Force are a viable deterrent to aggression in Europe. If deterrence fails, however, the US Forces and their NATO Allies are ready to stand against and stop the Threat. (Story and photos by SSG Frank Cox)

MUNCIE, IN — In its continuing efforts to recognize professionals in the Corps of Field Artillery, the US Field Artillery Association recently presented this award to 2LT Robert J. Rice of Ball State University. Rice is one of the top five ROTC graduates from the Class of 1985. COL David L. Benton presents the award at the Ball State commissioning ceremony.

The stand-off target acquisition radar system (SOTAS) is mounted as a rotating "plank" below the main cabin of a Bell UH-1H helicopter.

Since the late 1960s the Army has recognized the need for some means to provide a deep target acquisition and attack capability as well as intelligence concerning enemy activities well beyond the forward line of own troops (FLOT). The nature of Warsaw Pact forces, which represent the most dangerous threat likely to be encountered by the Army, place a premium on such "deep seeing" capabilities. Moreover, the Warsaw Pact has long enjoyed numercial superiority over the combined forces of the North Atlantic Treaty Organization, and this margin of deficiency will continue to increase into the next decade. The bottom line is clear: Today's Redlegs require systems to locate and engage opposing forces before these enemy units can influence the close-in battle.

In the 1970s, this need led to the development of a helicopter-borne radar which could acquire targets and provide intelligence regarding second echelon forces. Initial testing of this concept involved four Bell UH-1H aircraft converted to carry the stand-off target acquisition system (SOTAS). Each of these helicopters had a moving target indicator (MTI) radar mounted in a rotating "plank" below the main cabin, new autopilot and navigation systems, retractable landing skids, and a data link. The ground equipment for SOTAS consisted of a control center mounted in a semitrailer, a device for determining the helicopter's position, and associated support equipment.

In the fall of 1973, the Undersecretary of Defense for Research and Engineering (USDRE) signed a memorandum directing the Army and the Air Force to produce proposals for systems that could detect, locate, and attack enemy armor at ranges well beyond the FLOT. As a result, the Army and Air Force conducted joint feasibility demonstrations from November 1974 through December 1975 using the Army's SOTAS for moving target tracking and the Air Force's advanced location strike system for guided weapons delivery.

In 1975, SOTAS helicopters were evaluated during field testing in West Germany, where the systems were permanently assigned after 1979. In 1982, when the Department of the Army turned down additional research and development funds, the SOTAS program ended.

From 1974 through 1978, the Air Force and the Defense Advanced Research Project Agency (DARPA) supported several other programs to develop advanced radar technology for moving target detection. In response to urgings from the Defense Science Board and the Scientific Advisory Board, DARPA began to develop a concept for the neutralization of follow-on echelons. The Secretary of Defense accepted this concept proposal in 1977.

As a result, USDRE gave DARPA the lead in the development of a fiscal year 1981 "proof of concept" demonstration. This demonstration, known as Assault Breaker, was a series of technological expositions conducted at White Sands Missile Range with Army and Air Force participation. The overall purpose was to show the technical feasibility of an improved systems approach to detect, track, and attack Warsaw Pact second echelon armor forces. Assault Breaker proved that near-real-time target acquisition as well as guidance of aircraft and missiles were possible.

In May of 1982, USDRE directed the development of the joint surveillance and target attack radar system (JSTARS). At first, efforts in joint development focused on obtaining two radars with some commonality. The Air Force intended to mount its radar on either the TR-1 or the C-18 (a militarized 707). The Army planned to use the OV-1D Mohawk for its platform. Developments continued along this track until the Army and Air Force Chiefs of Staff signed a joint memorandum of agreement (MOA). This agreement committed the services to develop the C-18 as a joint

The ground station module is a tactical data processing and evaluation center that links the JSTARS radar to Army command, control, and communications, and intelligence nodes at the corps and division levels. The modules will help commanders perform both battle management and targeting.

platform to satisfy the operational requirements of both services. In turn, the Commandant of the US Army Intelligence Center and School and the Deputy Chief of Staff of the Tactical Air Command signed a joint agreement providing direction to the developer. This document articulated the joint requirements.

The main points of the requirements were to develop and field a fully-capable JSTARS, wide-area surveillance radar for use on the C-18 aircraft. According to the requirement, the final JSTARS should have the following capabilities: moving target indication, fixed target indication, and weapons guidance for direct attack by aircraft and missiles.

Milestones for the JSTARS project are still under development, but to date the Army has contracted Motorola for the construction of eight full-scale development ground station modules which will be representative of the Army's future processing center at division artillery, division, corps artillery, and Army tactical missile systems' tactical operations centers. The ground station module is a tactical data processing and evaluation center that links reports from the JSTARS radar to Army command, control, communications, and intelligence nodes at the corps and division levels. The modules will help commanders perform both battle management and targeting. The Army will also help man the C-18 aircraft with two to five personnel.

The 3d Infantry Division Artillery tested a prototype of the ground station module during REFORGER in the fall of 1984. This first test used the existing SOTAS radar system to test moving target identification by a division artillery tactical operations center. During a second test by the V Corps Headquarters, OV-ID side-looking airborne radar (SLAR) data was fed to the ground station at the corps tactical operation center. Both of the demonstrations proved that the new concepts as well as the ground station module would work.

The Air Force now has the lead in the development of the radar itself. Recently, the Air Force awarded a contract to the Grumman Corporation to develop the airborne system. Over the next five years, Grumman will design, build, and test two full-scale systems. Boeing will furnish the aircraft, and the Norden Systems Division of United Technologies will build the radar. Initially, the C-18 aircraft will carry the radars. Subsequent buys may place the radar aboard a more advanced, survivable platform. If the program stays on schedule, the first JSTARS aircraft could be flying in 3 years, and demonstrations in the US and Europe could occur shortly thereafter. Without a doubt, the joint surveillance target attack radar system will be one of the most valuable tools available to Redlegs at all levels.

Captain Tim Northrup, FA, is a project officer in New Systems Division of the Target Acquisition Department of the US Army Field Artillery School at Fort Sill, Oklahoma. He received his commission through ROTC at the New Mexico Military Institute and is a graduate of the Field Artillery Officer Basic and Advanced Courses and the Target Acquisition and Survey Officer Course. Past assignments include sound and flash platoon leader, radar platoon leader, and executive officer of a target acquisition battery in Europe.

Jockeying with JTACMS

by Dr. Glenn W. Goodman, Jr.

The Army recently issued a long-awaited full-scale development contract for its own version of the joint tactical missile system (JTACMS), to be called the Army tactical missile system (Army-TACMS). This event comes 3 years after the (JTACMS) program was initiated to develop a common Army-Air Force conventional warhead missile for "deep strike" interdiction of enemy targets. Army-TACMS will be a ground-launched ballistic missile with a range in excess of the current Lance conventional warhead and could be initially fielded in the next decade. The warhead will consist of unguided area submunitions already in the inventory to be fired against enemy personnel and light material. The missile will be designed to use the existing multiple launch rocket system (MLRS) launcher and support equipment.

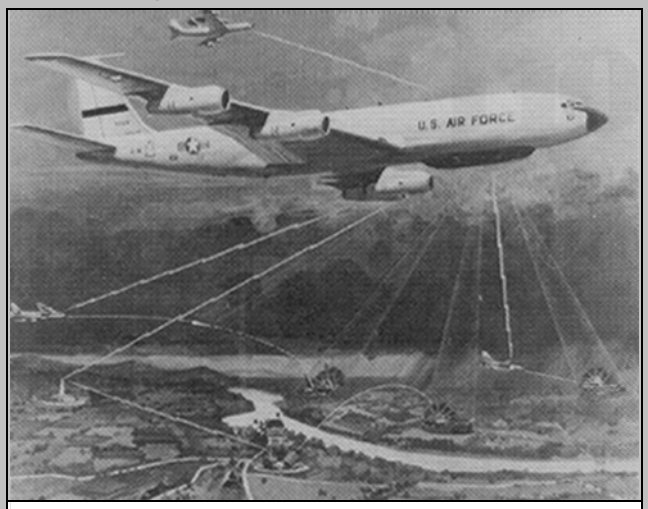
In addition, the Air Force and Army are concurrently pursuing a longer-term JTACMS concept involving a deep strike missile with the Air Force as the lead service. That program, which retains the name JTACMS, is highly classified with no details available. JTACMS, overall, is described as a "family of complementary weapons developed by the Army and the Air Force to . . . engage enemy targets in the deep battle area." These weapons will share a joint operational concept and joint procedures for employment. They will also be integrated with deep strike target sensors such as the joint surveillance and target attack system (JSTARS).

Background

The JTACMS program was the result of a Department of Defense-directed merger in August 1982 of the Army corps support weapon system and Air Force conventional standoff weapon programs. The Army program was intended to develop a replacement for the conventional capability of the deployed, ground-launched Lance missile system. Such a replacement system would enable the corps commander to attack enemy combat forces, particularly reinforcement armor columns, beyond the range of available cannon and rocket systems. The Air Force was interested in a longer range, air-launched conventional standoff missile for suppression of air defense sites and interdiction of high value, fixed targets in enemy rear areas. Following the merger of the two programs, months of delays occurred as the Army and Air Force were unable to reconcile their divergent requirements for a common missile. The Army needed a larger missile with sufficient propulsion for ground launch while the Air Force's air launch concept dictated missile size and weight constraints.

The initial Army preference, later pushed by Congress and the Department of Defense, was for both services to adapt either the Martin Marietta T-16 derivative of the Patriot air defense missile or the Vought-LTV T-22 improved Lance missile derivative. Both missiles demonstrated deep strike technologies during the Defense Research Projects Agency (DARPA) Assault Breaker test program in 1981-82. The Air Force, however, concerned with the weight and length of even scaled down T-16 and T-22 missiles, resisted a ballistic missile solution to its JTACMS requirements. The two services ultimately agreed in May 1984 to pursue separate JTACMS development programs while ensuring that their respective systems were fully complementary. At that time the services also agreed to divide up their battlefield responsibilities. The Army would develop a shorter range, ground-launched missile to strike at targets up to a range of 70 kilometers, while the Air Force would cover deeper targets with an air-launched standoff missile as well as direct aircraft strikes. The Army, following the May 1984 agreement, shifted away from the Assault Breaker approach and leaned toward an extended range MLRS as its JTACMS solution. This change of perspective resulted largely from the division of battlefield responsibilities with the Air Force as well as cost considerations.

The Air Force settled on a cruise missile as best meeting its requirements to attack longer-range fixed targets with precision accuracy. The Army subsequently shifted back to the longer range ballistic missile approach for its deep strike system which it decided to mate with existing MLRS launchers. It will integrate whatever missile is finally selected with existing MLRS launchers and support equipment already in the field. Such an approach should reduce program development and life cycle costs. The proposed system was called JTACMS-Army for a time before taking the current name — Army-TACMS. The Army also later joined the Air Force deep strike cruise missile program which retains the original title JTACMS.



The JTACMS program combines efforts by the Army and the Air Force to provide a new dimension in fire support. It is being developed to deliver a common Army-Air Force conventional warhead missile for "deep strike" interdiction of enemy targets.

Current Army-TACMS Program

In June 1985, the US Army Missile Command (MICOM) issued a request for proposal for full scale development of the Army-TACMS missile and launch pod containers. Proposals have been submitted by the team of Vought-LTV and Martin Marietta-Orlando, who joined forces for the competition, and also by Boeing. All three companies had performed JTACMS concept definition studies in the fall of 1983. Vought, as developer of the MLRS, has also been issued a sole source solicitation for the Army-TACMS system integration, test, and training.

The existing MLRS tracked, self-propelled loader launcher has two pods, each with six 11-inch diameter tubes for MLRS rockets. The Army-TACMS will feature one or two missiles per pod in place of six multiple launch rockets in light of the larger size of the missiles. For its warhead (of 1,000 pounds or more) Army-TACMS will be able to draw on a number of "smart," terminally guided submunitions under development in other Army and Air Force programs, particularly antiarmor submunitions with infrared sensors and self-forging fragment kill mechanisms. Submunitions of this kind are being developed under the Army sense and destroy armor (SADARM) program for artillery projectiles launched from 155-mm and 8-inch howitzers. Another candidate is a terminally guided warhead (TGW) being developed for the MLRS by a multinational joint venture that includes a West German, a British, and a French company teamed with Martin-Marietta. The terminally guided warhead would release millimeter wave seeker-guided antiarmor submunitions on horizontal trajectories. Armed with a payload of smart submunitions, Army-TACMS could be used effectively in an antiarmor role as well as in an antitactical missile role against enemy surface-to-surface missile units which are high priority targets for the Army.

Early versions of the Army-TACMS will carry unguided area submunitions already in the inventory such as M-74 antipersonnel, antimateriel bomblets. Another option would be the M-77 (modified M-42) unguided submunition, which combines a shaped charge with fragmentation. The Army-TACMS missile will use an advanced inertial guidance system that will be capable of providing terminal accuracy sufficient for submunition effectiveness against moving enemy armor formations.

After having traveled a rocky road for several years, Army-TACMS now appears to be in for smooth sailing. That should be good news for the future commanders who will have to make the "deep attack" concept work.

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Allen Bloemendaal

Fire Support for the Rear Battle

by Lieutenant Colonel Paul Treolo, Jr.

"Corps G3, this is the rear battle commander. We're under attack in the northeastern sector of the corps' rear area. It appears to be at least a battalion of airborne troops. I need help — now!

I need a tactical combat force with fire support assets. If I can get some help immediately, we may be able to contain all or part of the attack before too much damage is done. Without help, my defense force folks won't be able to delay for long.

If we don't stop them soon, my support capabilities from that area will cease. Remember, the majority of our artillery ammunition stocks including a special ammunition supply point are in that sector."

Do you think this conversation could really happen? The experts certainly do. In fact, this scenario is so real that it is frightening. Today, our Army has good reason to be frightened; it is not currently training to fight and win the rear battle.

What is our rear battle (RB) doctrine? Who fights the rear battle? How long will the rear battle commander in the example have to wait for the requested tactical combat force (TCF) and fire support assistance to arrive? Where, and how, are rear battle fire support assets generally employed? Can the field artillery provide an effective fire support system for the rear battle?

How many of these questions can you answer? I think most of us will admit we are largely ignorant about rear battle doctrine and tactics. We can handle questions about the deep and close-in battles, but we lack sufficient expertise to discuss — or more importantly, to practice — rear battle techniques and procedures. This systemic

ignorance results from a lack of emphasis and from the absence of opportunities to develop and refine rear battle tactical procedures.

Almost all our training is oriented toward exercising tactical fighting units in the deep and close-in battles; and we usually focus only on the support (or technical) chain in the rear areas. The tactical (or fighting) elements operating in this massive area are deemphasized during our training exercises to allow the combat support and combat service support systems to function adequately and not interfere with training the deep and close-in fighting forces.

Certainly there is no doubt that we will fight the AirLand Battle throughout the entire depth of the battlefield. To be successful we must plan for and begin attrition of the enemy deep in his rear areas. We then must have the trained fighting forces necessary to win decisively in the main battle area. Our ultimate success in these two integrated battles depends to a large degree on our ability to defend the massive support capability positioned throughout the corps rear area.

Keeping the situation map in the operations center up to date is vital to deep battle planning. Movement of units is constantly monitored and posted to determine their vulnerability and possible need for protection.

Flawed Doctrine and Training

During the past few years North Atlantic Treaty Organization (NATO) planners have come to realize the importance of beginning to engage the enemy hours — and sometimes days — prior to his arrival in the main battle area. To this end the planners have developed follow-on forces attack plans and reoriented Allied doctrine and training. Of course, the enemy is also doing some deep battle thinking and planning. A very important part of his plan focuses on our rear areas.

Field Circular 100-15, *Corps Operations,* states that the commander of the corps support command should receive the mission of conducting the corps rear battle (although the deputy commanding general has this job in most corps today) and that he will use a tactical chain of command including a rear area operations center (RAOC) to fight the rear battle. The concept is deceptively simple:

• Service support forces in the rear area will fight the agents, saboteurs, and terrorists found in a Level I threat.

• With the assistance of the military police these same service support units must also deal with enemy combat forces smaller than battalion-sized characteristic of Level II.

• A corps reserve force will have an on-order mission to counter battalion or larger sized Level III threats.

Our combat support and combat service support units are trained to defend themselves, and they work hard at developing and executing rear area defensive plans. However, their main focus must remain on their primary mission — supporting the fighting forces. The sustainment of the close-in and deep battles will be degraded in proportion to the extent that our support units are actively engaged in defending themselves and not performing their primary mission. Moreover, reliance on a mobile reserve force from the main battle area to deal with Level III threats appears suspect when one considers the distances in the corps rear area and the fact that the unit might have to be committed in the main battle area or beyond.

Fire support for the rear area has been particularly neglected. Theoretically it has been provided through on-order missions assigned to a general support or general support reinforcing field artillery unit. There has been some work at division and corps levels on calls-for-fire and fire control measures for the rear area, but nothing more than placing a division artillery liaison officer with the division support command operations center or a skeleton artillery crew in the rear area operations center at the corps support command warrants mention.

In fact, very little actual planning or training has been done toward the monumental task of actually providing effective fire support in our rear areas. Moreover, the problems of limited assets for a large area, rapid movement over congested roads, untrained observers, and fire control measures for extremely crowded rear areas have never been adequately addressed.

Even the theory that artillery tubes could be immediately reversed to provide rear area supporting fires is highly suspect. How well do most batteries do on such missions during field training exercises? If range becomes a problem, we are resigned to call for attack helicopter strikes, airmobile operations, or overland displacement of artillery units. Unfortunately, little realistic thought and even less training has been given to the practical aspects of this approach.

Could committed artillery or attack helicopters always be spared for the rear battle? Considering the likely distances involved, can we really move artillery units quickly enough to provide timely rear area fires? If light aircraft and towed artillery aren't available, can we reposition our self-propelled units overland, during daylight or darkness, in time to have an effect on fleeting Levels I or II targets before they combine to become Level III threats? What about movement in the rear areas? Is it feasible to expect artillery or maneuver units to reposition

quickly against the flow of all other traffic in the area?

But the most critical question yet concerns fire support teams. Where do they come from? Who provides these essential elements of the fire support system? Who communicates the call for fires? The answer has always been "from individuals who need the fires." Anyone who has ever evaluated an untrained observer mission on an artillery Army Training and Evaluation Program (ARTEP) will agree that this is not the solution. A well-trained fire support team is essential to placing timely, effective fires on target.

Now is the time to take a hard look at this critical area. If we are to be successful in the close-in battle area or in our deep attack efforts, we must have a reasonable degree of control and freedom of movement in the corps rear. Our combat units can become ineffective very quickly without the command and control, communications, and logistics provided by units located throughout this area. The authors of FM 90-14, *Rear Battle*, are absolutely right when they say, "the AirLand Battle cannot be won solely by fighting the rear battle; but it could well be lost in the rear." Ironically, that document and FM 6-20-J, *Fire Support in Combined Arms Operations*, devote a scant 1-½ pages each to how fire support will be provided for the rear battle. This is obviously insufficient. The following argument recommends a concept for correcting that flawed and inadequate thinking. It proposes a concept that with adequate training to standard just might work.

A Concept for Rear Area Fire Support

The proposed concept is to provide the rear battle commander a direct support 105-mm artillery battalion. This battalion would plan, train, and deploy with rear battle units and have essentially the same habitual relationship that direct support artillery battalions have with supported infantry brigades. The M102, 105-mm howitzer is an ideally suited weapon for this mission. It is light, nonnuclear, and it can be moved quickly.

The concept provides a number of advantages.

• The rear battle commander will have immediate access to indirect fires to counter Levels I and II threats — no disengagement or reorientation of main battle area units need be involved. The 105-mm battalion would also be available to provide fires for initial engagement of Level III threats allowing additional time for repositioning of other security or reserve forces, if required.

• The dedicated artillery battalion could focus exclusively on planning and executing fire support for the corps' rear battle. Because of the distances involved this unit could be attached to the corps support command and controlled through the rear area operations center.

• The artillery battalion could develop a comprehensive field artillery support plan to support the rear battle plan. Personnel in the artillery battalion tactical operation center and the RAOC fire support element would become intimately familiar with fire control measures for the rear area, trafficability of its congested areas, and general rear area operational procedures that are, by nature, much different from those employed in the main battle area and beyond.

• Fire support team personnel would be in place to call for fire. In fact, habitual relationships could be maintained as they are with maneuver battalions. These fire support teams would be invaluable if the threat exceeded Level II and additional artillery support is committed. Remember, the general support and general support reinforcing units normally pulled out to strike the Level III threat lack observers in their structures.

• In conjunction with the RAOC fire support element, the rear area direct support battalion could coordinate logistical support and plan possible positions for additional artillery. The battalion would also provide a nucleus of artillery command and control if the threat exceeded Level II and additional friendly forces were committed by the corps commander.

• Trained personnel would be available to plan, coordinate, and direct air strikes, attack helicopters, or naval gunfire as required.

• This unit might also respond to calls for fire from division rear areas.

This concept would certainly not provide the rear battle commander with 100 percent artillery coverage of the corps' rear area. However, intelligent application and positioning would provide adequate and timely fires for the most critical bases or base clusters. This proposal also provides direct access and proper control of other fire support assets that may be available. Moreover, the rear battle commander will have a fire support coordinator for detailed fire planning and "expert" fire support assistance if the threat involves Level III attacks.

Opponents of this concept say that this proposal places artillery in reserve. Nothing could be further from the truth. The direct support artillery battalion for the rear battle is not reserve artillery. It is a *committed* artillery force and will have a viable mission from the outset of any major conflict. Above all, even a cursory examination of modern Soviet tactics shows that they plan to place special emphasis on attacking our rear areas from the developing stages to the height of the fight. We can expect well-trained Spetznaz and other tactical units to be employed simultaneously at all three threat levels. Friendly forces must neutralize or contain such incursions swiftly and effectively before they have the opportunity to achieve their objectives and adversely affect our close-in and deep battle efforts.

Some Thoughts on Employing the Rear Area Fire Support Force

One of the foremost advantages of this proposal is that it will provide a much needed focus to procedural and training developments. It takes very little research to conclude that "smart folks" and "how-to" manuals regarding rear battle fire support do not exist. An artillery unit that could plan, train, and exercise fire support for the corps rear would prove invaluable in providing necessary operational concepts and tactical procedures for this critical element of the corps rear battle plan.

FM 90-14 calls upon commands to plan and fight the rear battle using the principles of centralized planning and decentralized execution. The concept assigns all units in the rear area to a base, a unit, or multi-unit position with a definite perimeter. The senior officer or base commander establishes a base defense operation center and plans, prepares, and supervises the *internal* defense of the base. When the threat exceeds his defensive capabilities, the base commander requests assistance through the rear area operations center.

If bases are close enough to provide mutual support, the RAOC clusters them, and the senior officer in each cluster becomes the cluster commander. The cluster commander integrates the separate base defense plans into a cluster defense plan and forwards it to the RAOC with requests for additional support or defensive augmentation, if needed.

Members of the RAOC staff review the base and base cluster defense plans. They then integrate these plans into the overall rear battle plan for approval by the rear battle commander. In addition to the defense plans submitted by base and base clusters, the RAOC also uses the commander's base assessment when developing the rear battle plan. Prepared by the G3 and corps support command commander, this assessment lists in priority the critical facilities or supplies the corps commander determines to be essential to his concept of operations. The RAOC uses this assessment to allocate rear area defensive forces.

Under the proposed concept, the RAOC leaders, military police commander, and the rear battle artillery commander would then deploy defensive forces appropriately throughout the rear area using base and cluster defense plans, the commander's base assessment, and available defense forces as the basis for allocation. Current rear battle doctrine calls for bases and clusters to defend themselves against Level I threats. The military police constitute the primary combat force for a Level II threat. If the threat reaches Level III or beyond, then these base and military police forces delay and disrupt until the corps G3 commits a tactical combat force or redefines the battlefield.

Of course, the proposed rear area artillery commander would also consider guidance contained in the corps fire support plan including the availablity of attack helicopters, the corps field artillery support plan, available target lists, and information from the RAOC fire support element when conducting his fire planning and positioning his artillery units. Under the new concept, artillery units would occupy positions from which they could provide support for as many of the high priority bases and facilities as possible. The artillery commander would also coordinate primary, alternate, and supplementary positions as well as the routes to these positions with the RAOC which functions as the rear area terrain manager.

The criteria for selection of rear area artillery positions may be different from standard positioning considerations. The necessity to provide some fire support to cover the many critical assets located throughout this large area may outweigh the time-honored requirement to mass the fires of all battalion tubes. Battery-level operations and decentralized control may become the norm. This makes good sense when one considers the type of threat activity expected in the rear area.

A look at the composition of forces employed in a Level I or II threat suggests that these organizations will produce targets of a size and nature that should be attacked by an artillery battery or platoon. Of course, a Level III threat may warrant centralized artillery operations. The commander faced with larger enemy formations may require his batteries to reposition to allow for massing of fires. If aviation lift assets are available for the rear battle, the wise rear area artillery commander might well consider positioning a battery in close proximity to supporting aviation units thereby facilitating rapid airmobile operations.

In the development of targeting information the RAOC fire support element and direct support battalion commander should coordinate closely with the RAOC intelligence officer who is the rear battle commander's contact with the intelligence system. Coordination with this individual should yield intelligence on the enemy's probable courses of actions and intentions. Moreover, the intelligence officer should also have access to detailed terrain analysis which will assist in identifying possible enemy airborne or airmobile landing zones and other high value rear area targets. Fires should be planned on and around *probable* landing zones as well as on routes of egress from those areas.

If there is a reserve force with an on-order mission to protect the corps rear, the rear area field artillery commander should establish liasion with it. He must make the ground force commander fully aware of the expected enemy threat, the rear area battle situation, fire support means available, fire support planning already conducted, and rear area artillery positions. If the corps G3 commits the tactical combat forces to the rear battle, the rear area direct support artillery battalion commander positions his unit to support the ground unit's maneuver plan.

Three Employment Options

There are three major options that come to mind when considering how a rear battle direct support artillery battalion could be employed.

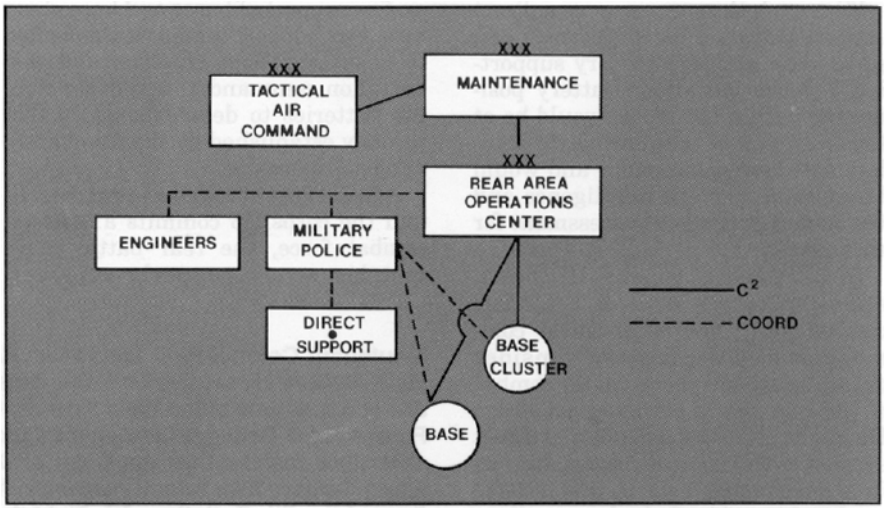
- Direct support to the military police brigade.
- Direct support to the RAOC.
- Direct support to the tactical combat force.

Although not an exhaustive list, these concepts provide "food for thought" and are a point of departure for establishing an effective fire support system for the rear battle.

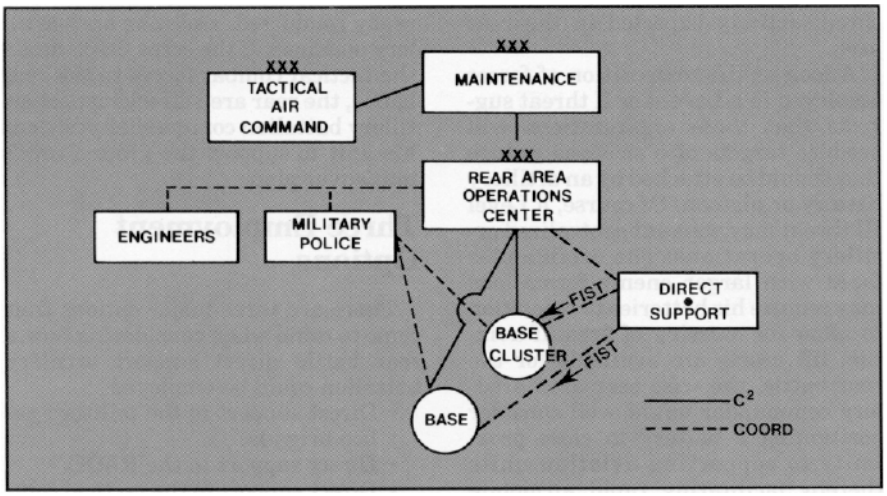
Option 1 —

FM 90-14 states that the military police are the primary combat force for the rear battle through a Level II threat. Under circumstances where the likely threat was primarily at that level, logic dictates that the rear battle artillery battalion should be employed in direct support to the military police brigade. Carrying this theory a bit farther, and considering how the military police brigade deploys for operations in the corps rear, one can begin to visualize how a military police-artillery force would fight the rear battle.

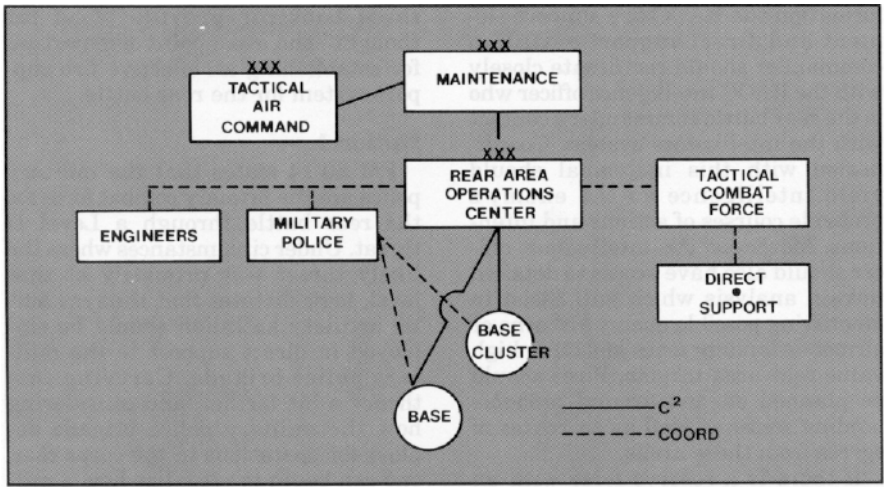
The military police brigade normally subdivides the entire corp rear area into battalion sectors of responsibility for all police functions including defense. The military police commander subdivides these battalion



Option 1. Direct support to the military police brigade.



Option 2. Direct support to the rear area operations center.



Option 3. Direct support to the tactical combat force.

sectors into company, platoon, and squad sectors of responsibility. If an artillery battalion were in direct support to the police brigade, then the artillery would reasonably position itself in much the same way as a direct support battalion for an infantry brigade — an artillery battery supporting a police battalion. Battery positioning within the sector would be at the discretion of the rear battle artillery battalion commander and would be based on current intelligence and the commander's base assessment for each sector.

In the event of a Level III threat, and upon employment of a tactical combat force, the rear battle commander would properly consider changing the organization for combat of the rear battle artillery battalion. He might place the battalion in direct support to the tactical combat force or in a reinforcing role if the tactical combat force already had an artillery force.

Option 2 —

The second option places the rear battle artillery battalion in direct support of the rear area operations center. In this case, the artillery unit focuses on fire support of bases and base clusters. Fire support teams would deploy to bases and base clusters, and the battalion commander would position his batteries to defend bases in the priority established by the commander's base assessment.

Again, if the threat exceeds Level II and the corps G3 commits a tactical combat force, the rear battle commander would properly consider changing the organization for combat to support the tactical combat force commander's plan of attack.

Option 3 —

Under the final option, the corps commander has the forces available to provide a tactical combat force for the rear battle prior to experiencing a Level III threat. In this situation, the rear battle artillery battalion might be placed in direct support to the tactical combat force and employed based upon the commander's defense plan.

Conclusion

The proposed concept and employment schemes are alien to most artillerymen, but the rear battle is alien as well. When all is said and done, a 105-mm direct support battalion may not prove the optimum answer to fire support for the rear battle. But it is a reasonable suggestion to solve a weighty problem.

Our current force structure does not provide for a rear battle artillery battalion in each corps, and most of our units already have multiple missions that require exhaustive training. Fortunately, the resulting shortfall can be solved. Army leaders can provide adequate fire support for the rear battle. If the Active Component does not have the forces available for the rear battle mission, then we may once again have to call upon the Redlegs of the Reserve Component. In either case, we must address the rear battle problem *now*. We cannot continue to overlook and ignore the importance of the rear battle and its fire support.

Success in the rear battle is necessary to maintain the flow of the lifeblood of the AirLand Battle. The field artillery has led the way in the development of doctrine and tactical procedures for the deep and close-in fight. We must now continue this momentum and assist the maneuver forces in structuring a winning rear battle tactical team. Unless we have a fighting structure and supporting doctrine which will guarantee rear area control and freedom of movement, then all our training and preparation of deep and close-in forces may prove a monumental waste.

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THEN AND NOW-

Fighting It Out at Operational Depths

by Major Mark P. Gay

The ability of the field artillery to provide timely fire support for deep offensive maneuvers has long been a concern of commanders and their staffs. Although he remained skeptical of the artillery's mobility, even Clausewitz advocated the use of combined arms — infantry, cavalry, and artillery — to "expedite the decision" when pursuing an enemy or cutting off his routes of escape. Several more contemporary military writers have shared Clausewitz's view. They responded with alarm to senior leaders talking of carrying the battle deep into the enemy's rear without accompanying artillery. In fact, B. H. Liddell Hart regularly harangued his fellow advocate of rapid tactical and operational maneuver, J. F. C. Fuller, about the latter's penchant for employing tank-only forces in deep offensive missions. One need only review the events of the 1973 Mideast War to find modern evidence that such parochial arguments still find receptive audiences. There, the Israelis found their armored drive into the Sinai seriously threatened by overreliance on close air support to the exclusion of field artillery.

Concern about support of the deep offensive continues unabated, and the issues involved remain complex. The problems of such artillery support are not limited to the planning staffs of foreign armies. Despite a record of proud accomplishments in supporting exploitation and pursuit during previous wars, American field artillery faces the sizeable challenge of adapting to the anticipated demands of modern battle. The growing emphasis on offensive operations borne of AirLand Battle doctrine elicits well-founded concerns. The tenets of initiative, depth, agility, and synchronization focus the attention of artillerymen on the need for rapid execution

Sam Orr

and, if necessary, spirited thrusts well beyond the forward line of own troops (FLOT). Specifically, the responsibility for campaign planning which abides with commands above the division level gives pause to artillerymen who now must seek to disrupt the enemy's follow-on echelons at distances up to 150 kilometers from friendly forward positions. These issues and others like them shape the question of how best to provide fire support for exploitation and pursuit in modern warfare.

"When not racing forward to engage the enemy ahead of lead Soviet tanks, self-propelled artillery units offered mobile group commanders the flexibility of constituting a substantial rear-guard ambush force whenever terrain permitted."

The Soviet Experience

History offers some important considerations and alternatives concerning fire support during deep attacks. The Soviets' employment of phased "artillery offensives" at the point of intended breakthrough provides one particularly poignant example. These offensives involved centralized planning at the highest organizational levels. That approach provided much needed unity of effort in achieving mass, surprise, and efficient allocation of logistical support. Consisting of preparations, schedules, rolling barrages ahead of assaulting formations, and fires in support of the tactical breakthrough, artillery offensives sought to immobilize the enemy's forces throughout the depths of his positions. For the Soviet artilleryman, then, support of deep offensive missions is not an opportunistic tasking. Rather, such support is deliberately planned and orchestrated carefully throughout the chain of command.

As Stalin's forces demonstrated so convincingly during the massive combined-arms offensives of Belorussia (June-July 1944), Jassy-Kishinev (August 1944), Vistula-Oder (January 1945), and Manchuria (August 1945), the rapid shifting of extensive artillery reserves from *front* and Supreme Command Reserves (RVGK) added decisive weight to the main effort of subordinate units. Those shifts, conducted with utmost secrecy, frequently began as soon as the outcome along one main axis appeared no longer in doubt. Tactical road marches exceeding 100 kilometers per day were the norm. Despite austere transportation assets and limited fuel supplies, resourceful and persistent commanders moved artillery units, known as *chasti*, both laterally and forward to initial and subsequent firing positions.

Soviet logistical planners performed laborious calculations to ensure that accompanying artillery received sufficient resupply for both the tactical march and for subsequent combat operations. Priority for replenishment went to *chasti* assigned to the forward detachments; self-propelled artillery with those formations carried extra fuel tanks and 1.2 to 2.5 units of ammunition. Such forward detachment artillery units were self-sustaining for the first few days of fighting — provided they could remain "silent" during actual breakthrough operations.

Task organization of the reinforcing artillery units into groups specially tailored for the nature of the terrain and the enemy plan of defense simplified command arrangements. The practice of allowing commanders to form artillery groups at each organizational level above battalion made extended, albeit decentralized, control possible for units operating at great depths behind enemy lines. With the twin advantages of quantitatively and qualitatively superior weaponry at the close of the war, Soviet commanders at various levels acquired operational flexibility through physical massing at the critical point. Their fire planning efforts attempted to minimize firing by the artillery of the mobile groups during the preparation and assault phases. This technique permitted them to enter the breakthrough gap virtually undetected, unscathed, and fully stocked with ammunition.

Collocation of command and observation posts, supplemented with extensive air and ground reconnaissance, usually provided targeting information that proved extremely accurate well beyond the forward line of own troops. Ironically, the centralized nature of Soviet fire planning made it probable that such information was used by higher level artillery staffs to calculate norms for guns and ammunition for conduct of the artillery offensive — not to give artillerymen at the lower organizational levels authority to divert preplanned fires to targets of opportunity. The forward observer's role remained the shifting of preplanned fire or the signalling to lift barrages in coordination with the movement of forward troops.

Finally, the determination of both accompanying and supporting artillery to maintain forward momentum placed a premium on reconnaissance, mobility, and innovation. Whether supporting river crossing operations, destroying bypassed pockets of enemy resistance, or engaging in direct fire against enemy tank formations, exploiting artillery proved responsive and reliable. When not racing forward to engage the enemy ahead of lead Soviet tanks, self-propelled artillery units offered mobile group commanders the flexibility of constituting a substantial rear-guard ambush force whenever terrain permitted. In fact, the acceptance in some instances of artillerymen as commanders of exploiting forward detachments attests to the Soviet appreciation for artillery as an integral component of maneuver.

The American Experience

Although the American artillery inventory during World War II numbered far more cannons than at any other time in the nation's history, US artillerymen never benefited from quantities of artillery tubes and ammunition stocks enjoyed by their Soviet counterparts. Moreover, American leaders were plagued by logistical shortfalls, and competition for relatively scarce resources aggravated the recurring organizational problems of employing large-scale forces. Army commanders usually designated main efforts by "chopping" maneuver divisions — not artillery — from one corps to the next. Army group commanders gave little consideration to shifting large artillery formations across army boundaries during exploitations and pursuits. Furthermore, the political constraints inherent in a coalition environment would have stifled similar shifts of artillery across army group boundaries.

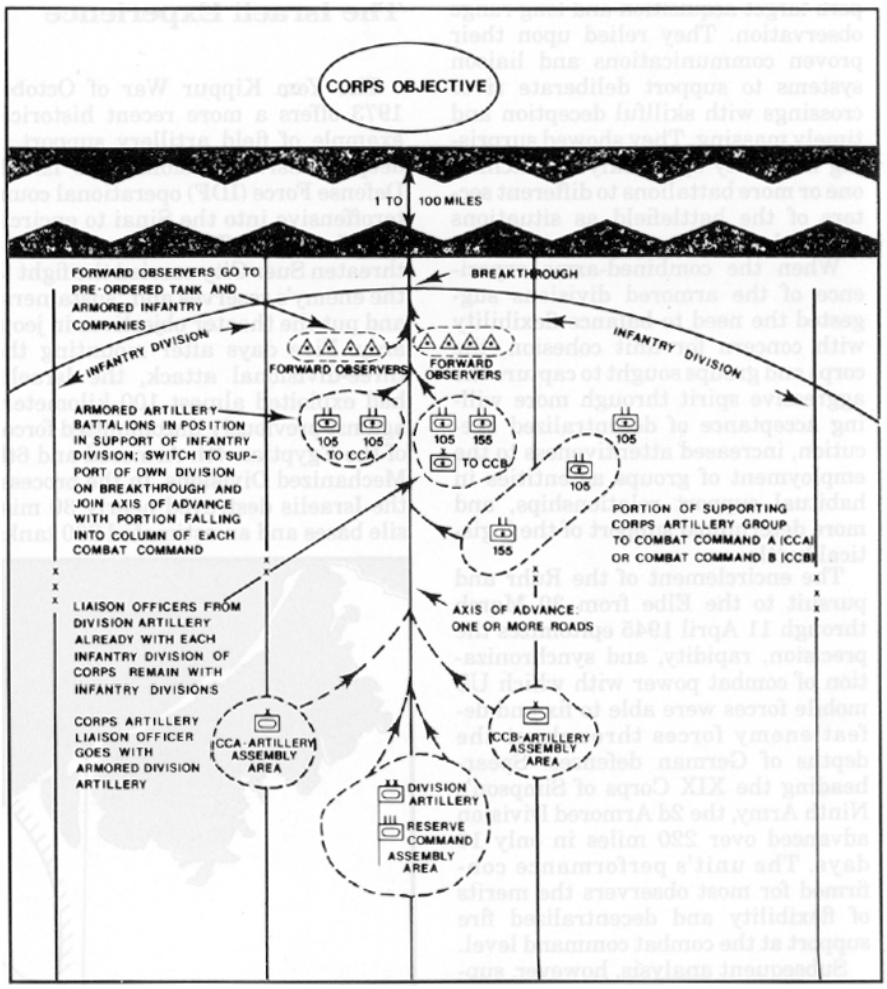
The Americans continued to allocate near-equitable amounts of artillery to each army and corps and to rely upon exceptional communications and liaison systems to mass fires. As a result, neither the Americans nor any other Ally except the Soviets could achieve the physical massing artillery made possible by the rapid transfers of RVGK and *front* artillery. In fact, initial attempts to achieve breakthrough such as the push across the Cotentin Peninsula following the Normandy

invasion were sputtering in comparison to phased Soviet offensives. Fires from field artillery and close air support were often redundant, and they failed to achieve the overwhelming shock effect offered by complementary targeting and mission analysis. As one senior field artilleryman, Major General John A. Crane, observed:

> *The keynote of all battle experience reports on artillery employment during the time has been flexibility. As a matter of choice, flexibility is a desirable asset; as a necessity it smacks of instability or at least lack of organization.*

To be certain, Americans did learn several important artillery lessons on the battlefields of Western Europe. As their collective perspective gradually broadened beyond the "3 yards and a cloud of dust" orientation of hedgerow fighting, the Americans adopted an offensive style that sought to apply superior combat power along several axes simultaneously. The artillery sections at army and army group levels steadily acquired increasing prominence in the overall fire support effort. Lacking command authority, these sections ably resolved fire support coordination and logistical problems of operational importance, attenuated much of the friction inherent in air-ground coordination, and furnished valuable feedback to artillery headquarters at lower levels. Insistence upon a modicum of heavy artillery and observation support at army level forced artillerymen to consider the advantages of shifting large artillery formations to assist in achieving penetration. Although the lack of mobility among heavy battalions limited their contributions to the exploitation and pursuit at operational depths, those units constituted a sizable fire support resource which at least caused leaders to consider whether the tactical battle to their immediate front was the only conflict of concern.

American corps and group artillery organizations in general support or reinforcing roles often fired suppressive missions that allowed divisional artilleries to focus upon the close support of maneuver forces during the penetration and river crossing operations. But their ability to provide centralized control of fire direction and organization for combat at extended depths frequently was overpowered by the clamor of division commanders who sought all available self-propelled artillery. Corps and group artillery headquarters compensated for the resulting lack of mobile artillery by superb



Deployment of armored division artillery for breakthrough.

US Army Signal Corps Photo

During World War II, division commanders sought to acquire self-propelled howitzers like this M-7 to give mobility and flexibility to their attacking columns.

target acquisition and long-range observation. They relied upon their proven communications and liaison systems to support deliberate river crossings with skillful deception and timely massing. They showed surprising flexibility by quickly dispatching one or more battalions to different sectors of the battlefield as situations changed.

When the combined-arms experience of the armored divisions suggested the need to balance flexibility with concern for unit cohesion, the corps and groups sought to capture the aggressive spirit through more willing acceptance of decentralized execution, increased attentiveness to the employment of groups as entities in habitual support relationships, and more determined support of the logistical battle.

The encirclement of the Ruhr and pursuit to the Elbe from 30 March through 11 April 1945 epitomizes the precision, rapidity, and synchronization of combat power with which US mobile forces were able to fix and defeat enemy forces throughout the depths of German defenses. Spearheading the XIX Corps of Simpson's Ninth Army, the 2d Armored Division advanced over 220 miles in only 19 days. The unit's performance confirmed for most observers the merits of flexibility and decentralized fire support at the combat command level.

Subsequent analysis, however, supports two conclusions which may herald the nature of future deep offensive missions by American forces.

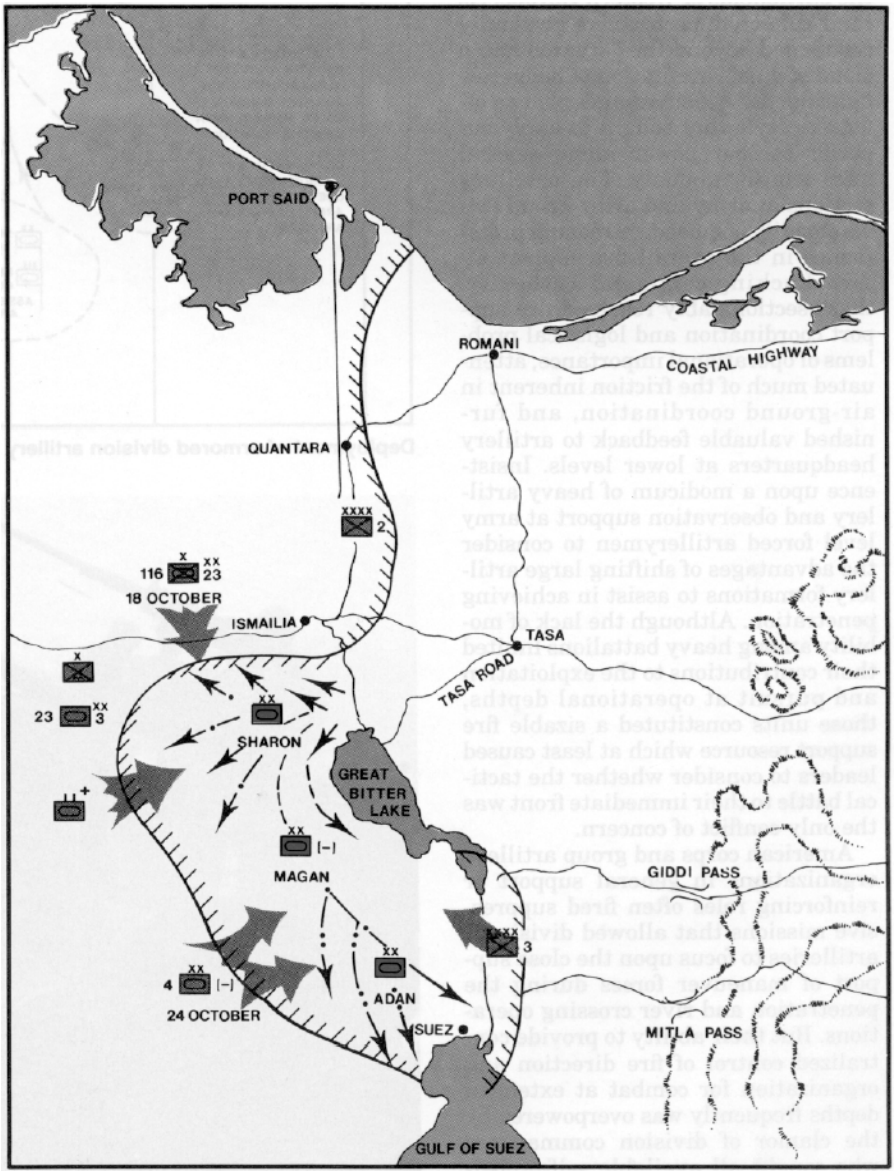
• First, as the Soviets found with their larger mobile formations, US efforts to commit the 2d Armored through a gap opened by other maneuver forces helped preserve the unit's fighting strength and ammunition stockages. Consequently, the division was able to bring its full combat power against withdrawing forces and reserves at the decisive moment.

• Second, the analysts who performed the study became convinced that the 2d Armored's encirclement and pursuit would have failed against a more determined adversary with adequate logistical support. In their judgment, under such circumstances the mission would have required at least an armored corps reinforced by massed self-propelled artillery fire. They asserted that to conclude from the 2d Armored Division's success that US combat forces were appropriately organized for deep offensive missions against a well-armed opponent, would be "a dangerous concept based on erroneous assumption." The point is that American Redlegs cannot rest on their laurels.

The Israeli Experience

The Yom Kippur War of October 1973 offers a more recent historical example of field artillery support of deep offensive missions. The Israeli Defense Force (IDF) operational counteroffensive into the Sinai to encircle the Egyptian Third Army and to threaten Suez City carried the fight to the enemy's reserves and "sustainers" and put the theater objectives in jeopardy. Five days after mounting the three-divisional attack, the Israelis had exploited almost 100 kilometers against previously uncommitted forces of the Egyptian 4th Armored and 6th Mechanized Divisions. In the process, the Israelis destroyed nearly 30 missile bases and an estimated 200 tanks and armored personnel carriers. The preponderance of Third Army forces — 20,000 men and 300 tanks — languished on the east bank of the Suez with logistical support adequate for a week at best.

How were the Israelis able to adapt so quickly in the face of near-catastrophic defeat of its armor-pure "strike" divisions only a few days earlier? At least part of the answer rests with the leaders' decisions to alter radically the plan for artillery fire support. Israeli Defense Force armored attack formations on the Southern Front began as early as the 12th of October to assimilate both infantry and artillery into combined-arms teams. Though still not fully integrated into the armored formations, a brigade of self-propelled artillery accompanied



The Israeli leaders' decision to alter radically the plan for artillery fire support called for attack formations on the Southern Front to assimilate both infantry and artillery into combined-arms teams.

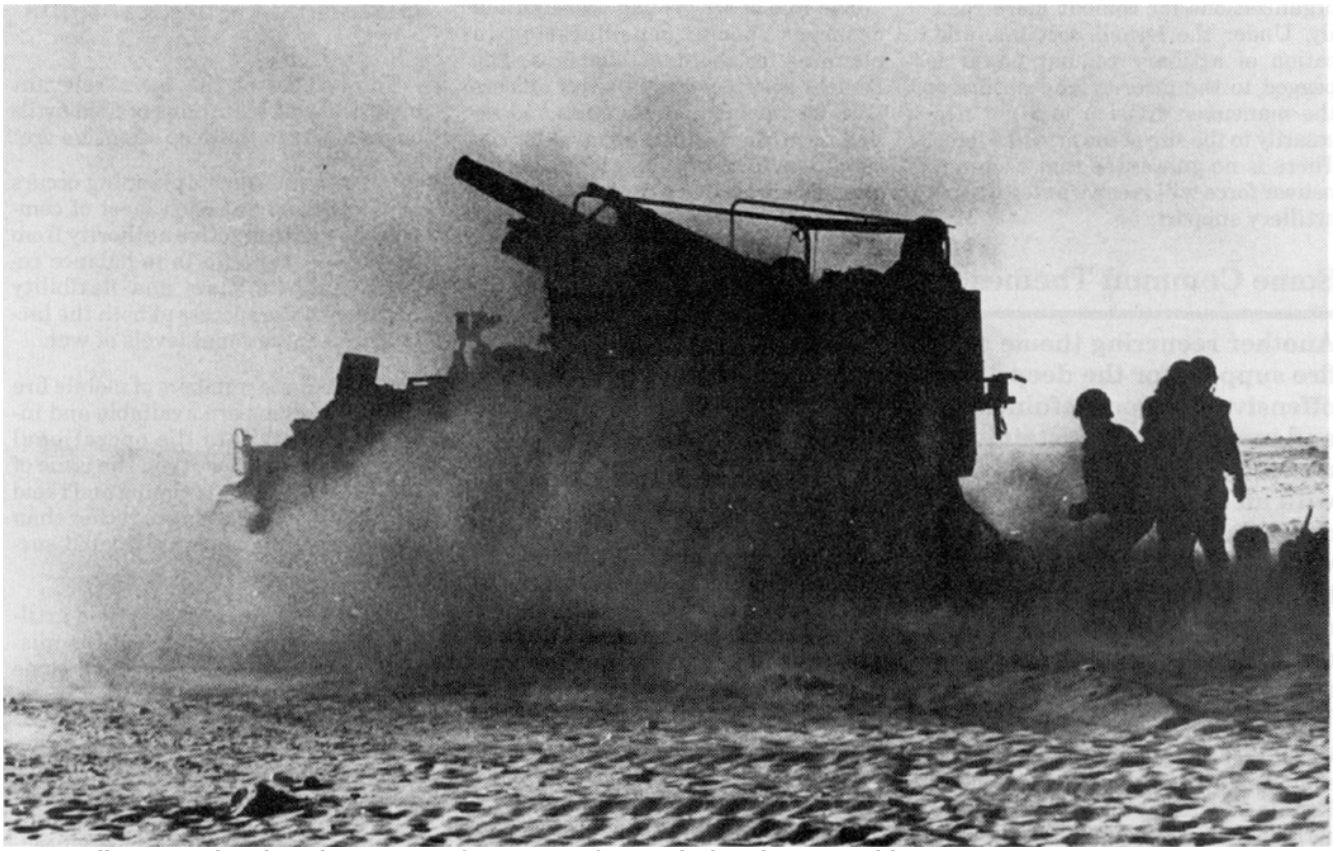


Photo courtesy of the Israeli Embassy

An Israeli 155-mm howitzer in support of maneuver forces during the 1973 Mideast War.

each of the three divisions in the push to the west. Each field artillery brigade had the principal mission of neutralizing antitank missiles and gun positions in close support of advancing friendly armor.

As the lead maneuver brigades attacked through the narrow bridgehead north of Great Bitter Lake, they received artillery fire support not from the self-propelled battalions moving with them, but from the remaining battalions of their artillery brigade awaiting their turns in the movement column. Meanwhile, artillery remaining at front level provided supression of enemy air defenses and reinforcing fires to the divisional artillery.

Israeli Defense Force artillery support of operations on the West Bank complied with requirements for both mobility and mass. Still, leaders were slow to appreciate the contributions of accompanying artillery support. Buoyed with optimism from the success of General Adan's lead division, they fell prey to overconfidence and faulty intelligence in consolidating their gains. The Israelis had completed their encirclement of the Third Army by the 23d of October. However, as the Israeli columns advanced into Suez City, Adan's divisional artillery did not have time to displace forward and occupy direct-fire positions against suspected antitank sites. Nor did they plan a preparation. Thus, the lead brigades were virtually without support when they were ambushed by an undetected Egyptian brigade still occupying the built-up area. Forced to order a retreat and to extricate the remnants of his lead tanks and paratroopers under cover of darkness, Adan was reminded of the inherent dangers of attempting "last-minute snatches" in exploitation without integrated combined arms support.

Following the cease-fire, Israeli forces pursued both qualitative and quantitative improvements to enhance the combined arms team concept. Israeli leaders have, for example, recognized the need for functional groups of artillery in support of deep offensive missions. Corps artillery headquarters are now authorized for each front. They give the front artillery an intermediate headquarters to control the fires of multiple nondivisional 175-mm (self-propelled), towed, and rocket battalions. Allocated to reinforce the fires of the division artilleries along a designated axes of advance, those corps artillery battalions offer the same operational flexibility through rapid shifts of concentrated firepower as that furnished in 1973 by the field artillery brigades. At the same time, the 120-mm and 160-mm mortars became organic to maneuver units to balance the requirements for spontaneous close support.

The organizational changes of Israeli artillery reflect a doctrine for exploitation and pursuit that is somewhat different from that of either the Soviets or the Americans during World War II. Israeli Defense Force concerns for air defense and antitank suppression during deep offensive missions call for field artillery support which is synchronized with the attacks of tactical aircraft. Israeli fire support planning now tends to be more centralized than that of the American armored divisions in the spring of 1945. Yet the planning is far more responsive initially to the forward maneuver commanders than permitted by the deliberate phasing of World War II Soviet offensives.

Paradoxically, Israeli leaders are still not convinced of the need for artillery in exploiting combined arms formations. Their reluctance to integrate supporting artillery completely into armored-infantry columns stems partially from concerns over the mobility of self-propelled artillery as well as from the belief that coordinated artillery support from closely following divisional artillery affords flexibility to mass and reconfigure field artillery

organizations for combat more readily. Under the Israeli doctrine, allocation of artillery combat power is pegged to the priority and nature of the maneuver division and not necessarily to the size of the armored force. There is no guarantee that each maneuver force will receive at least some artillery support.

Some Common Themes

Another recurring theme of fire support for the deep offensive is resourcefulness and innovation in sustaining mobility and support. Even with an appreciation for operational theory prior to war, the Soviets found themselves looking to field expedients to meet the unanticipated demands of exploitation and pursuit.

Like the Soviets and Americans of World War II, the Israelis place great emphasis upon direct fire capability. Training exercises underscore the importance of that particular mission as cannon units practice firing from exposed forward slopes then pulling back quickly to covered positions. Of course, the direct fire mission also implies the need to provide a larger allocation of antipersonnel rounds to artillery basic loads.

Another recurring theme of fire support for the deep offensive is resourcefulness and innovation in sustaining mobility and support. Even with an appreciation for operational theory prior to war, the Soviets found themselves looking to field expedients to meet the unanticipated demands of exploitation and pursuit. Similarly, the American and Israeli Defense Force artillerymen discovered that continuous, offensive operations called for unusual solutions. Israeli efforts to retube 175-mm howitzers with 8-inch cannons while the battle continued were certainly a difficult undertaking, as were the improvisations of Red Army artillerymen to maintain the tempo of fire support of river crossings. Again, US artillery sections at echelons above corps helped evaluate those actions taken to ensure continuous support to the offensive, and they made sure that solutions which worked reached all subordinate artillery arganizations. Of course, no amount of resourcefulness and innovation could substitute wholly for the mobility and flexibility offered by additional quantities of self-propelled artillery.

The role of air-ground coordination deserves special consideration in planning for the deep offensive. The Soviets positioned air liaison officers with forward maneuver units and relied upon the tactical air arm for observation, target acquisition, and preplanned airstrikes in concert with field artillery preparations. As coordination improved during the course of the Great Patriotic War, Soviet air forces assisted mobile groups during the breakthrough gap and helped leaders hold accompanying artillery in a well-supplied, silent status.

Americans placed great stock in air force "carpet" bombing immediately following the Normandy invasion. In fact, they attempted to use airstrikes as the principal means of fire support during the penetration phase of Operation COBRA. Field artillery reinforced rather than complemented the air effort. The results were less than satisfactory. There was no readily available fire support held in reserve. Nor were either field artillery or close air support assigned specific missions for supporting exploiting columns once breakthrough occurred.

Although initial results proved disappointing, leaders wisely continued to refine air-ground coordination procedures as the offensive pushed across the European continent. Field artillery fires controlled by high-speed tactical aircraft, as well as the reconnaissance and observation efforts of the slower Piper Cubs organic to armored field artillery battalions were especially effective. Integration of tactical air strikes with the artillery fire support plan normally was a responsibility of corps and echelons above corps staffs. Occasionally, division artillery assumed responsibility for such coordination during exploitation.

Tactical fighters likewise failed as a panacea for the Israelis during the first days of combat in 1973. Formidable Egyptian air defenses forced Israeli flyers to take the time to develop evasive countermeasures. In the interim, landpower leaders pursued other solutions by increasing the number of available artillery tubes and the stock of artillery ammunition. Realizing that under the circumstances neither arm provided satisfactory firepower accompaniment for the armored strike divisons, Israeli leaders finally assigned complementary fire support tasks to each. The improved coordination between the air and artillery arms made each a much more capable participant in rapidly moving offensive situations.

Historical Considerations

Thus, some of the more relevant historical considerations of field artillery support to the deep offensive are:

• If combined arms planning occurs simultaneously at each level of command — with directive authority from the top — then efforts to balance requirements for mass and flexibility will have more success at both the tactical and operational levels of war.

• If adequate numbers of mobile fire support systems are available and integrated fully into the operational scheme of maneuver, then the issue of agility becomes one of timing and rapid shifting of artillery forces rather than one of reacting to unanticipated success.

• If close air support and field artillery are used to *complement* the missions assigned each other, then some fire support can be maintained in reserve to support the deep offensive.

• If exploitation and pursuit are aggressively prosecuted at every level, then the risks to the flanks and front of advancing forces can be reduced. Furthermore, continuous tempo can partially offset inadequate planning and experience.

Obviously, none of the four considerations can stand alone. Rather, most are interdependent and revolve about the central issues of numbers, types, and distribution of weapon systems as well as the availability of logistical support.

Relevance Today

Examining the more obvious facets of field artillery support to deep offensive missions in a strictly historical sense is of little value if one makes no attempt to assess their relevance on the modern battlefield. Studies of doctrinal literature and force structure ranging from the current "Army of Excellence" initiatives to the boldly imaginative *Army 21* proposals reveal an increasing focus upon the operational counteroffensive as the decisive parry to a large-scale Warsaw Pact attack in Central Europe. Assessed collectively, American doctrinal documents appear to capture several of the historical tenets of field artillery support in exploitations and pursuits. For

instance, the integrated fire support planning envisaged under the auspices of an AirLand Force Commander could furnish the unity of artillery effort characteristic of Soviet offensives during World War II.

In the future, technological sophistication and vastly improved target acquisition means may well obviate the need for physical massing of large artillery formations along narrow frontages. Similarly, the extended ranges of cannon and missile systems together with the stand-alone fire support of individual artillery pieces promise to revamp traditional artillary organizations. The issue of centralization versus responsiveness may be resolved through innovative command and control systems and more refined fire support coordination. Finally, fuel and ammunition resupply while remaining prevalent among the concerns of artillery commanders will perhaps be accomplished increasingly through prepositioning.

While history offers useful guideposts for the conduct of deep offensive missions on future battlefields, the application of those doctrinal and organizational considerations needs to be tempered with judgment and an appreciation for the technologically altered field artillery systems of tomorrow. As doctrinal writers ponder amendments to current doctrine in an effort to focus on *how* field artillerymen conceive, plan, and execute deep offensive missions; they should refrain from urging adoption of Soviet doctrine and artillery force structures. The scale of operational campaigns fought on the Russian steppes and in Manchuria, where hundreds of divisions conducted simultaneous offensive missions, left the Soviets with an historical appreciation for centralized planning and allocation. The same cannot be said of Americans, who in many ways remain wedded to historical roots of their own. Political and military influence over the industrial base probably will allow the Soviets to continue the accumulation of artillery pieces and organizations that seem staggering to most American planners. Rather than seeking to duplicate an adversary's system, US leaders should attempt to glean doctrinal and organizational principles that can be applied to the foundation of existing — and projected — American operational concepts for fire support.

One factor that should not escape the doctrine writer is tacit recognition that, all other things being equal, *numbers count*. Reserve fire support allocated by the army or army group for conducting exploitation and pursuit should afford corps commanders the capability to hold some of their organic artillery initially in reserve. Admittedly, constitution of a reserve assumes that the corps would be authorized additional field artillery brigades for conventional fire support. Still, by committing fresh fire support assets from the army group to the intended breakthrough sector, leaders can ensure the tempo of suppressive and long-range fires as exploiting columns advance into the gap. Meanwhile, previously silent cannon and rocket launcher battalions from corps can relocate from dispersed assembly areas to join the ranks of the maneuver force conducting the exploitation. Artillery battalions supporting committed brigades, when reconstituted, will be available in the event prolonged exploitation requires rotation of the accompanying field artillery formations.

The artillery entrusted to the corps commander must, in the absence of formidable maneuver reserves tantamount to an army-level operational maneuver group, be organized for the attack of objectives at operational depth whenever possible. Whether the artillery commander retains one or more mixed-caliber brigades in general support or places constraints upon the employment of long-range smart munitions in his fire plan, the net effect must be to husband conventional firepower in anticipation of fighting the deep offensive battle. Ideally, one or more brigades should be trained specifically for exploitation and pursuit missions. Furthermore, historical experience indicates that the corps commander has a critical role to play in directing the brigades toward functional fire support taskings during the penetration and assault phases and in determining the composition of forward regrouping and the accompanying field artillery support for the exploitation.

Operational doctrine should also highlight the need for logistical build-up prior to offensive operations. The purpose of build-up is twofold:

- First, to ensure the continuous tempo of fire support during the critical phase of breaching the gap and widening the shoulders of the penetration.
- Second, to assist in the attainment of surprise and deception.
- The success of Soviet, American, and Israeli armies in capitalizing upon surprise by applying overwhelming mass along the main offensive zone hinges upon the forward movement of logistical support. Once friendly forces are through the gap, exploitation will require the massing of tractor-trailer assets within the army. Establishment of forward ammunition transfer points should receive mission priority second only to that of combat forces. Even then, artillery munitions will have to be self-contained to avoid the time-consuming, shell-fuze-powder match-ups. Air delivery of containerized munitions should supplement ground resupply efforts. Where possible, doctrine should also impress upon artillerymen the importance of using captured enemy supplies.

Conclusions

Fire support for the deep offensive scheme of maneuver will thus have several main tasks.

- The fire support apparatus will have to *guarantee the maneuver crossing* at the point of breakthrough and to *sustain* that guarantee until enemy forces have lost their will to resist.
- Exploiting artillery must either be moving or shooting. Optimally, each maneuver battalion task force will have an artillery battalion in accompaniment.
- Timely shifting of massed fires in brigade-size concentrations will ensure continuous tempo and security.

Artillery movement with the combined-arms formations, coordinated by fire support officers working with the infantry and armor battalions and brigades, should leave little room for fellow members of the combat arms to doubt the willingness of field artillerymen to "fight it out" at operational depths.

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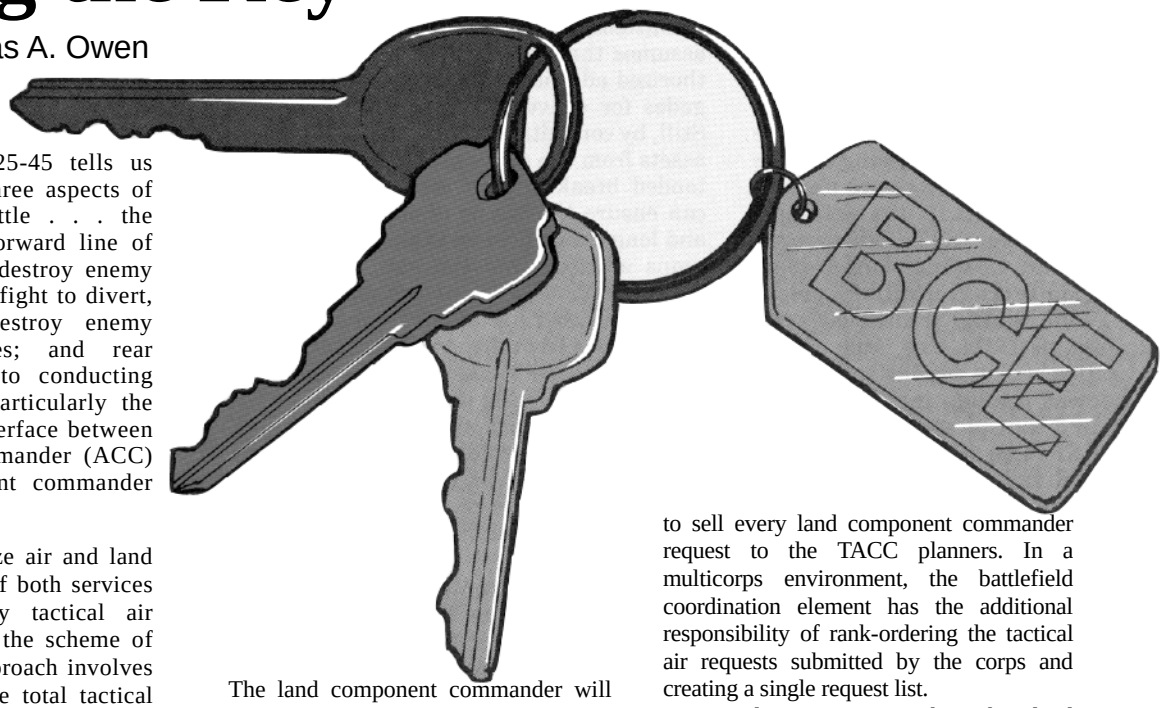
Finding the Key

by Captain Thomas A. Owen



TRADOC Pam 525-45 tells us that there are "three aspects of the AirLand Battle . . . the close-in flight at the forward line of own troops (FLOT) to destroy enemy assault forces; the deep fight to divert, disrupt, delay, and destroy enemy second echelon forces; and rear operations." One key to conducting each of these fights, particularly the deep one, lies in the interface between the air component commander (ACC) and the land component commander (LCC).

In order to synchronize air and land operations, the leaders of both services must plan and employ tactical air support in concert with the scheme of maneuver. This joint approach involves the apportionment of the total tactical air effort as well as the allocation and distribution of air sorties in support of land forces. The land component commander uses his battlefield coordination element (BCE) to present his plans and needs at the numbered Air Force Tactical Air Control Center (TACC). The BCE is a part of the land component commander's staff. It processes land force requests for tactical air support, monitors and interprets the land battle situation for the TACC staff, and provides the necessary interface for the exchange of current intelligence and operational data. First, and perhaps foremost, the BCE "sells" the land component commander's requests for air support to TACC planners and controllers.

The BCE organization allows the land component commander to work with each essential TACC cell. BCE personnel must be familiar with fire support principles and be able to sell Air Force planners and targeteers on the necessity of attacking specific areas or targets. Field artillerymen, with their fire support background, are often the linchpins in BCE organizations. Their experience allows them to debate the validity of land component commander nominated tactical air strikes and to handle the full range of support requests.

The land component commander will request a wide variety of air support including tactical surveillance and reconnaissance, electronic warfare, air interdiction (AI), battlefield air interdiction (BAI), close air support (CAS), airlift, and special operation missions. The battlefield coordination element is the conduit for obtaining all these. What's more, the BCE coordinates real-time changes in air support requirements.

The primary job of the BCE is processing land component commander "prioritized" close air support and battlefield air interdiction requests and recommending air interdiction targets for Air Force consideration. Because the Air Force is ultimately the final authority on which missions are flown, it is incumbent upon the BCE to sell every land component commander request to the TACC planners. In a multicorps environment, the battlefield coordination element has the additional responsibility of rank-ordering the tactical air requests submitted by the corps and creating a single request list.

In order to ensure that the land component commander receives an appropriate piece of the air support pie, the BCE must influence the air component commander's air apportionment recommendations (as shown in the figure) to the joint force commander (JFC). Specifically, the BCE must ensure that the JFC's division of available resources to counter air (CA), air interdiction, and close air support mission areas supports the overall scheme of maneuver. Although the joint force commander may subapportion battlefield air interdiction as a percentage of the air interdiction effort, he will normally leave it to the BCE to work it out with the air component commander's staff. Their aim is to establish the percentage of the air interdiction effort dedicated to support BAI nomination.

APPORTIONMENT RECOMMENDATION

Expressed As Percentage:		**Expressed As Priority:**
Counter air	40%	1st Priority — Counter air 2d
Close air support	35%	Priority — Close air support 3d
Air interdiction	25%	Priority — Air interdiction

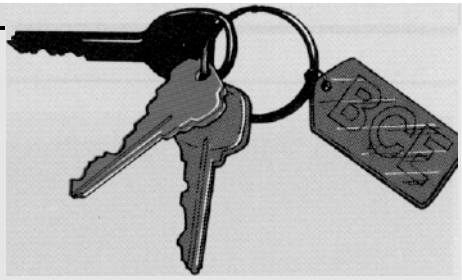
Air component commander and land component commander negotiation: Battlefield air interdiction is 50% of the air interdiction effort.

OR

Joint force commander subapportionment: Battlefield air interdiction is 50% of the air interdiction effort.

In order to be effective in the apportionment "game," the BCE chief and his staff must be knowledgeable about the air-war and aircraft capabilities. An uninformed or unprepared battlefield coordination element will be easily overwhelmed by a technically superior TACC crew. The experiences of the Ad-Hoc XVIII Airborne Corps and III Corps battlefield coordination elements during major exercises including Solid Shield, Blue Flag, and Bold Eagle suggest that a thorough understanding of Air Force operations is vital to BCE mission accomplishment. Many Air Force planners are parochial in their views about allocation of available services. The BCE must be able to "talk Air Force" and make the TACC personnel understand what the land component commander needs. Compromise and concessions are often necessary, but ultimately an efficient BCE will see that the land component commander's interests are achieved.

Fort Bragg's XVIII Airborne Corps is currently fielding the first permanent Continental United States-based battlefield coordination element. Korea and US Army Europe implemented the permanent BCE concept several years ago. In these organizations the BCE chief, senior operations officer, and most of the senior noncommissioned officers are Redlegs. These experienced artillerymen have learned that the key to ensuring that tactical air strikes support the land component commander's battle plan lies in an experienced BCE, one that has established an appropriate level of credibility with their Air Force counterparts



and is capable of articulating land component commander desires to the TACC. Today's Redlegs must strive to develop and maintain the competence necessary to ensure that our battlefield coordination elements gain that credibility.

Captain Thomas A. Owen, FA, is assigned to the Directorate of Combat Developments, US Army Field Artillery School, Fort Sill, Oklahoma. He received his commission through ROTC at Texas A&M University and is a graduate of the Field Artillery Officer Advanced Course. Captain Owen has served as an artillery detachment commander, artillery group S2, battalion S2, and battery commander.

View from the Blockhouse

FROM THE SCHOOL

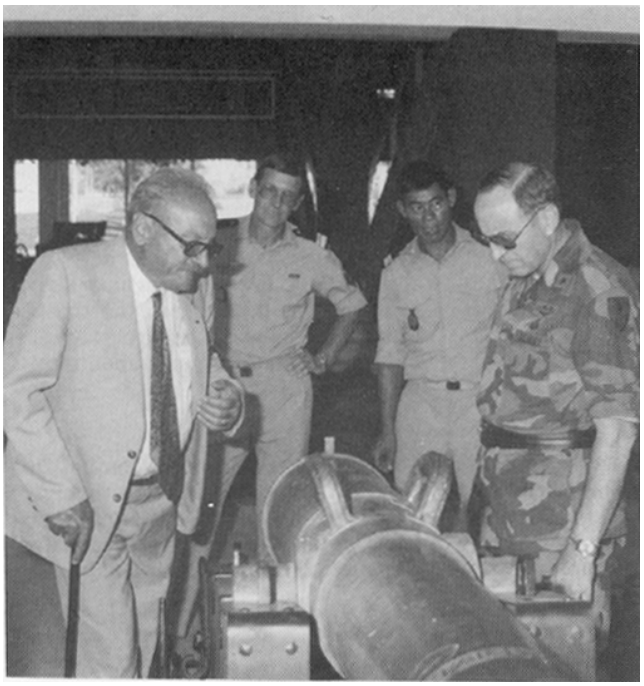
Seeing How the French Do It

When a cannoneer dreams of the artillery, he cannot help but recall Napoleon and the French 75. The proud tradition of French artillerymen and their cannon lives on today. In August, Brigadier General Raphael J. Hallada, Assistant Commandant of the US Army Field Artillery School, confronted that tradition during his visit at the French Artillery School at Draguignan, France.

During his stay at Draguignan, the Assistant Commandant learned that today's French Artillery School occupies a new facility which first opened its gates in 1976. Since 1983, it has been the home for both Field and Air Defense Artillery, one common branch in the French Army. The school graduates more than 2,500 commissioned and noncommissioned officers annually to include many officers from France's Allies. American visits to this modern facility have been infrequent but are on the increase since the stationing of an American liaison officer at Draguignan in 1981.

During his 1-day visit, the Assistant Commandant received briefings on the organization of the school and its approach to training artillerymen. He also had an opportunity to view the extensive use of simulators and simulations in the various courses. The 60th Artillery Regiment, one of three units which

BG Hallada looks over the turret simulator for the 155-mm self-propelled howitzer, Au Fl, with the chief of the Au Fl instructional department. This simulator allows the entire four-man crew of the weapon to complete all actions associated with the operation of the system. All potential faults to the automated loading system can be simulated by the section chief using a fault simulator. Each Au Fl regiment has two of these simulators.



BG Hallada tours the French Artillery School Museum in the company of COL (Ret) Giaume, Museum Curator. The museum is used by the school for instructional purposes as well as to orient visitors on the history of artillery. This two-story facility includes artifacts from the thirteenth century through today.

support the school's training mission, provided a field display of the major equipment found in a 155-mm self-propelled artillery regiment. This demonstration occurred at the Canjeurs Major Training Area — the largest in Europe — located in the foothills of the Alps, and a short 10-minute helicopter flight from the school.

The Assistant Commandant also learned that French artillery units are participating in a major modernization effort. All armored division regiments are being rearmed with the new 155-mm self-propelled cannon, the Au Fl. The ATILA system provides automated fire direction with backup provided by the much smaller CADET computer. Those regiments in infantry divisions are receiving the new 155-mm towed howitzer, the Tr Fl as well as ATILA and CADET. Observer teams will soon receive a sophisticated observer vehicle with laser rangefinder, night vision optics, onboard navigation systems as well as a digital ATILA interface.

Brigadier General Hallada also held discussions with Brigadier General Michael Sevrin, the French Commandant, concerning the direction of French Field Artillery. These conversations enabled both leaders to gain a better understanding of approaches to common problems and to identify those areas where combined initiatives might prove beneficial. Both officers agreed that there was much to be gained from a good American-French relationship and that both would like to see an exchange of officers at each other's officer advanced courses. (MAJ Randolph E. Shelton)

Regiments, Regiments

The Department of the Army has announced the final pairings for field artillery regiments. There will be a total of 38 field artillery regiments by fiscal year 1992. Currently four regiments are active — the 3d, 5th, 8th, and the 29th. Regimental activation during fiscal year 1986 will include the 2d, 9th, 11th, 35th, 77th, and the 84th. Coordination of the activation dates is ongoing. The Field Artillery School will soon announce them by proponency message.

Regiments scheduled for activation during the fiscal year 1987-92 period are as follows:

Fiscal year 1987 = 37th, 39th, 319th, 4th, 12th, 27th, and the 32d.
Fiscal year 1988 = 18th, 40th, 76th, 94th, 14th, 17th, 320th, 6th, 15th, 41st, and the 82d.
Fiscal year 1989 = 20th, 1st, and the 7th.
Fiscal year 1990 = None.
Fiscal year 1991 = 16th, 21st, 10th, 13th, and the 92d.
Fiscal year 1992 = 79th.

The 26th Field Artillery Regiment will become the target acquisition regiment as soon as a decision is made on the future structure of target acquisition units.

All enlisted soldiers and field grade officers must select a regiment for affiliation by 30 September. Company grade officers may affiliate immediately, if they desire, but they do not have to affiliate prior to achieving field grade rank. All regiments are open for selection regardless of whether the regiment is currently activated or not.

US Army Military Personnel Center teams will visit most major commands beginning in April to explain the program to soldiers.

Dealing with an M198 Sticker

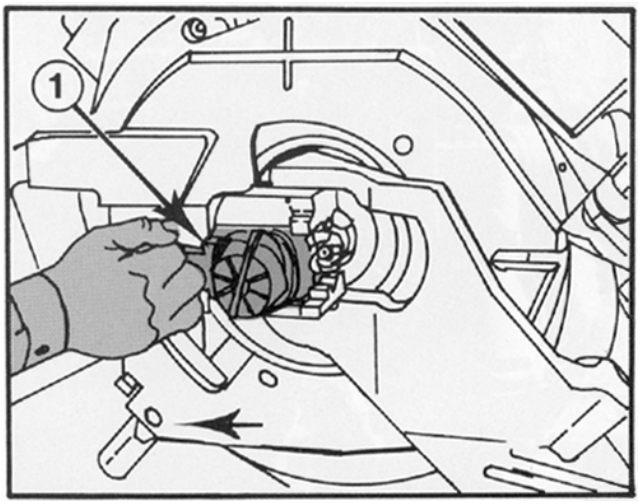
Firing charge 1 in the M198 howitzer is not authorized. You may fire charge 2 with the M100 series, M449, M485, and M804 projectiles; however, you might occasionally experience stickers with this charge.

When stickers occur, the projectile lodges in the tube trapping hot gasses under pressure in the chamber. Removing the primer in sticker situations is dangerous because the primer will shoot rearward when released. In fact, the expelled primer may cause serious injury to personnel standing in its path.

WARNING

Do not stand behind breech when removing the primer. Do not grab the firing lock assembly so that your hand is likely to be hit by the expelled primer.

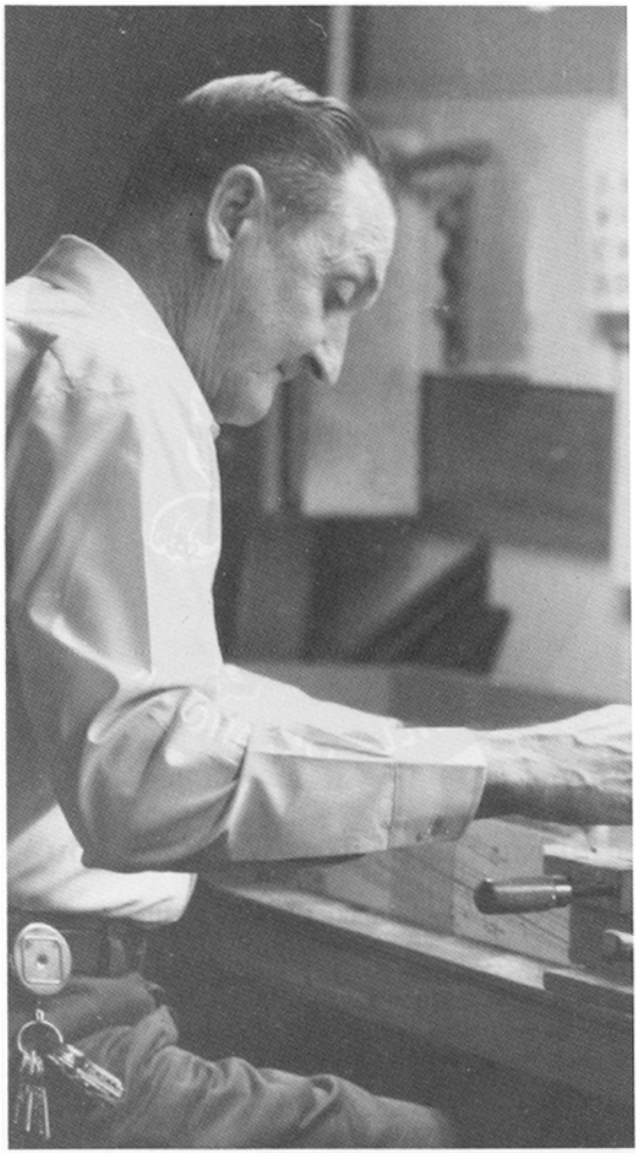
M198 howitzer section chiefs should post a copy of these instructions in their TM 9-1025-211-10 until a new change incorporating them appears. Chiefs should also know by heart the correct procedure for subsequent clearance of the weapon's tube. These instructions can be found on pages 4-42 through 4-44.1. of the technical manual.



The correct procedure for removing the primer in the event of a sticker is for cannoneer no. 1 to slide the firing mechanism block assembly to the left. The primer will fly to the rear and the pressure will vent off.

MVCT Update

Muzzle velocity correction tables (MVCT) M90-1, dated November 1979, are superseded by muzzle velocity correction tables (MVCT) M90-2, dated October 1985.



Precision counts as a dedicated craftsman puts the finishing touches on a graphical firing table.

Get Your GFT!

155-AM-2 graphical firing tables (GFT) can now be requisitioned through normal supply channels. Cite CTA 50-970, as requisitioning authority. The required part numbers and national stock numbers (NSN) are as follows:

GFT	CHARGES	PART NO	NSN
Low angle	2-4, 3,5-6,7-8	9360327	1220-01-215-3929
High angle	All	9360328	2110-01-215-3961
Illumination	2-3, 5-7	9360329	1220-01-215-3962
GST	All	9360330	1220-01-215-3930

Remember, units should only use the AM-2 graphical firing tables in conjunction with AM-2 tabular firing tables.

Making the System Work for You

There *is* a way to make the field artillery system work for you — its called BATTLEKING. The BATTLEKING program provides soldiers in the field with a way to submit suggestions about shortcomings in currently fielded equipment, doctrine, force design, and training methods.

The program streamlines the process for applying quick-fixes to existing systems and allows the branch to experiment with the latest state-of-the-art technology.

But in order to work, BATTLEKING needs your input. Your suggestions are vital to the success of this program and to the continued progress of the field artillery.

Since BATTLEKING began in 1983, project officers have completed 144 proposal evaluations. Regardless of cost or apparent significance, every suggestion has received a thorough evaluation.

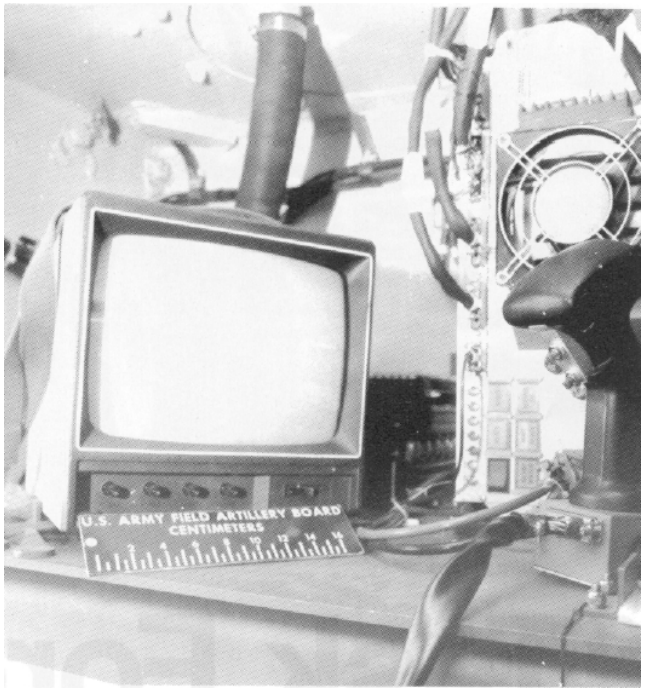
BATTLEKING cannot succeed without your support. Let us know about your ideas. BATTLEKING will share them with your fellow Redlegs. Just write down the idea and send it to: President, US Army Field Artillery Board, ATTN: ATZR-BDW (BK), Fort Sill, OK 73505. If you have any pictures or drawings please include them.

BK 5-85, Laser Designators (Source: KEI, DCD, CPT Bumgarden). Combat developers within the field artillery have identified a need for a lightweight laser target designator for use by the foot-mobile fire support team of the light infantry division. Five possible candidates to satisfy this need have been identified. The candidates include three which are presently in the inventory: the AN/TVQ-2 ground vehicular laser locator designator (G/VLLD), the AN/PAQ-1 laser target designator (LTD), and the AN/PAW-3 modular universal laser equipment (MULE). In addition, there are two prototype lasing devices currently under development through a contract with the Nightvision and Electro-Optics Laboratory, Fort Belvoir, Virginia. These devices are the lightweight target marker (LWTM), which is being developed by International Laser System (ILS), and the laser target marker 84 (LTM 84), being developed by KEI, a subsidiary of Optic-Electronic Corporation. After initial testing it appears the prototype devices may satisfy the requirements for a lightweight laser target designator. Further evaluations are being conducted which will improve the capabilities of the designator. BATTLEKING analysts have recommended the development of a tripod mount for the device selected.

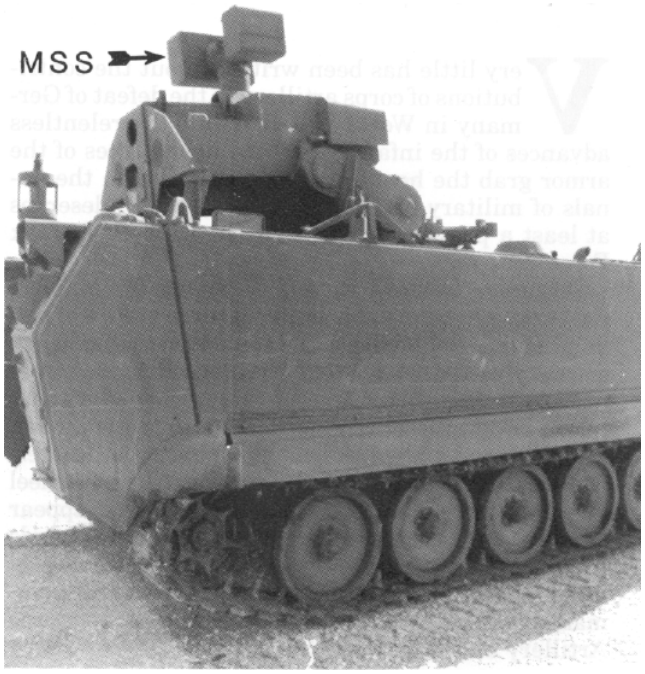
The AT/TVQ-2 ground vehicular laser locator designator (G/VLLD).

The AN/PAW-3 modular universal laser equipment (MULE).

BK 3-85, FIST V Configuration Changes (Source: Emerson Electric Corporation). Test findings during the fire support team (FIST) force development testing and experimentations (FDTE) II revealed a need for improved observation capabilities on the M981 FIST vehicle. In response to those findings, the Emerson Electric Company submitted an unsolicited proposal to the Directorate of Combat Developments, USAFAS, identifying proposed changes to reduce those FIST V limitations. The proposal requested that three items of equipment be added to the fire support vehicle system. During the evaluation, the BATTLEKING staff collected data on the operational feasibility and performance of these items. The equipment includes a mobile surveillance system, a driver's night vision device, and an external communications device. Following the initial testing, all three items are being improved upon for use in the M981.



The mobile surveillance system (MSS) internal configuration is a low-light level television which will permit the fire support team vehicle chief to view the battlefield from a buttoned-up vehicle.



"Task Force" Shugg

by Colonel (Retired) C.A. Murphy

Very little has been written about the contributions of corps artillery to the defeat of Germany in World War II. While the relentless advances of the infantry and the bold strikes of the armor grab the headlines and are hailed in the annals of military history, the field artillery deserves at least a passing mention for the actions of "Task Force" Shugg.

Brigadier General Roland P. Shugg commanded XIII Corps Artillery consisting of three groups of medium and heavy artillery and reinforced by the heavy artillery of the 34th Field Artillery Brigade. Over his years of service, General Shugg earned a reputation as a blunt, energetic, demanding commander, impatient with ineptitude. Among his subordinates, it was widely believed that he could smell a hot wheel bearing a mile away, and he always seemed to appear at the point of greatest confusion. A few choice words from the General normally resolved the problems. In large measure, the demanding character of the commander shaped the accomplishments of the Corps Artillery and Task Force Shugg.

In February of 1945, XIII Corps crossed the Roer River in Germany and attacked northeast toward Krefeld and Essen. The attack was two-pronged with the 5th Armored Division on the right and the 84th Infantry Division on the left. Conventional doctrine called for artillery to be positioned to the rear of the ground gaining arms. General Shugg, however, feared that his highly mobile artillery would become ensnarled in the huge logistical tail trailing the advance. Given a withdrawing enemy and a profusion of excellent roads throughout the zone, General Shugg recommended a rather unconventional employment for his corps artillery — *attack*! Approved by Major General Alvan C. Gillem, Jr., the Corp Commander, this approach gave birth to Task Force Shugg.

Besides its attached artillery, Task Force Shugg included an observation battalion and a signal platoon in support of its advance. Both elements played critical roles in the Corps' and the artillery's operations. By chance, the Corps Artillery also acquired two teletypes prior to departure from England. By

linking the Corps Artillery teletype with a like set at corps headquarters, General Shugg kept the Corps Commander advised of his unique Task Force's progress at the front. In fact, the timely and accurate intelligence from the field artillery observers became the Corps Commander's primary source of battlefield information.

Task Force Shugg advanced quickly through the center of the Corps zone, often as the Corps' lead element. Reconnaissance was constant and quick. Reconnaissance parties of the lead battalions, armed only with jeep-mounted .50-caliber machine guns, often found themselves at the edge of hostile villages. If a few bursts from the .50 calibers did not induce surrender, a volley or two of artillery normally proved persuasive.

The artillery battalions spearheading the advance of Task Force Shugg often found themselves accepting the surrender of a meek enemy who, awakening to the sight of heavy artillery in their midst, believed the front to be many miles beyond them.

As might be expected under these unusual circumstances, the artillery advance caused more than a few raised eyebrows from the flanking infantry and armor. On one occasion an infantry 81-mm mortar crew hastily departed from its firing position because of the arrival of a 240-mm howitzer. One of the most poignant conversations of the advance occurred between General Shugg and a general of the 5th Armored Division. The artillery had advanced 10 miles forward of the armor. As was its custom, the armored column halted and "coiled" for the evening. General Shugg, unable to suppress the irony of the moment, suggested to his armor counterpart that if his tanks could see fit to uncoil they could advance safely to the artillery's forward outpost. It was no coincidence that the 5th Armored Division became a more aggressive force thereafter.

Remarkable as it may seem, there was not a single battle casualty within Task Force Shugg from the Roer to the Rhine and few from the Rhine to the Elbe. Perhaps the resistance was focused on the two flank divisions; perhaps it was pure luck. Perhaps the luck stemmed from the dynamic and ingenious application of firepower and maneuver by General Shugg. In any event, the advance of Task Force Shugg demonstrates the versatility of the field artillery on the battlefield. It may well be that future doctrine will call for a combined infantry, armor, and field artillery task force in exploitations and pursuits. General Shugg would like that.

Colonel (Retired) C.A. Murphy is an attorney in Naples, Florida. He is a graduate of the United States Military Academy and has served in many field artillery assignments from battalion to corps artillery levels. Colonel Murphy is a graduate of both the Field Artillery Officer Basic and Advanced Courses, the Command and General Staff College, and the US Army War College. He received the Legion of Merit and the Bronze Star Medal. During World War II, Colonel Murphy served under General Shugg in the European Theater.

Fragments

FROM COMRADES IN ARMS

New Electronic Warfare Systems

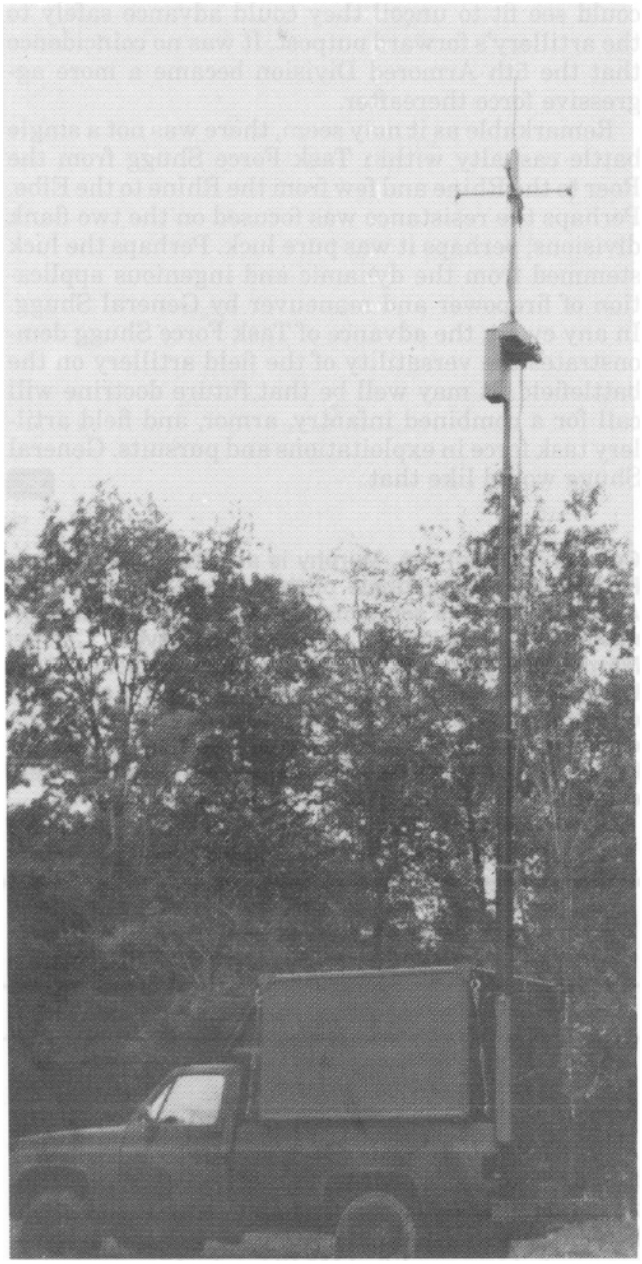
The Signals Warfare Laboratory (SWL), part of the US Army Electronics Research and Development Command, has fielded six new systems to carry out the Army's tactical intelligence and electronic warfare missions. Four of the new systems — Traffic Jam, Quick Fix, Tactical Jamming (TACJAM), and Trailblazer — are designed to support divisions, while two other systems — Teammate and Technical Control and Analysis Center (TCAC) — will support divisions and corps. The new systems are:

• Traffic Jam (AN/TLQ-17A-V-1) — A medium-power, ground-based, communications jammer. It replaces the AN/TLQ-17, is transported in jeeps, and consists of an air-cooled transmitter, a power supply, a receiver/controller, an antenna, communications equipment, and microprocessors for control.

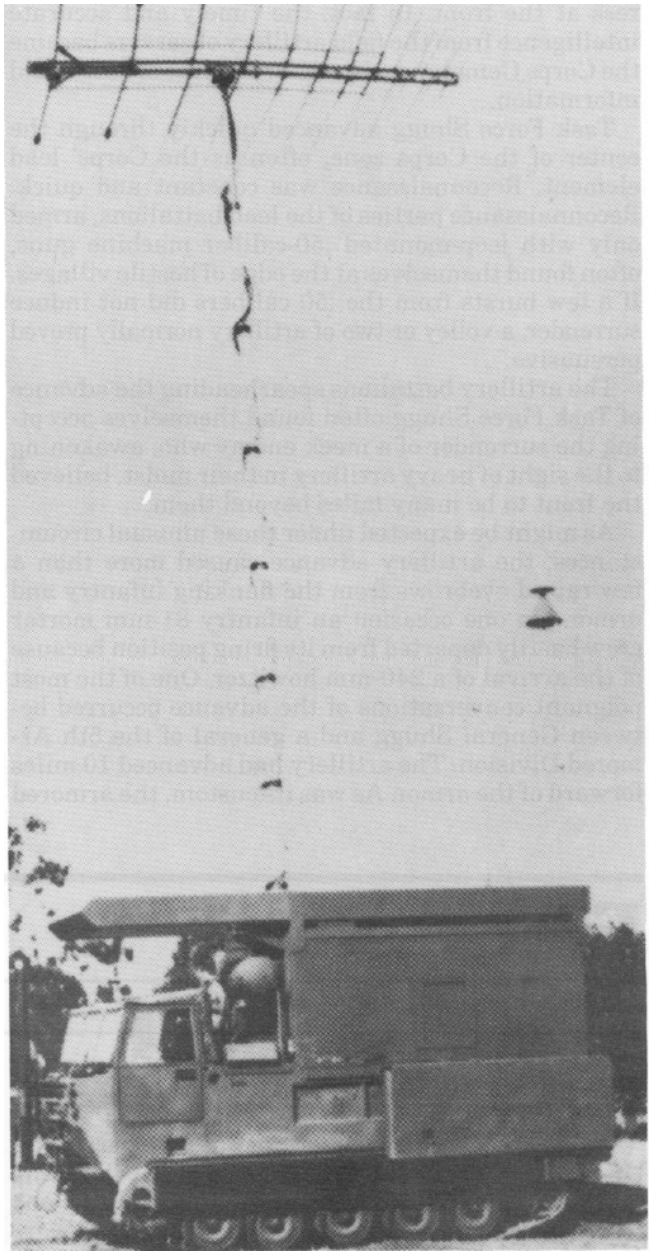
• Quick Fix 1B (EH-1H) — An airborne communications intercept and jamming system. It consists of an AN/GLR-9 intercept receiver and an AN/TLQ-17A-V-1 jammer. Both units are carried in a modified version (EH-1H) of the UH-1H Huey helicopter.

• TACJAM (AN/MLQ-34) — A high-power, ground-based, communications jammer which generates three simultaneous, independent jamming signals. It is housed in a ballistically protected shelter that is mounted on a modified M548 tracked cargo carrier, now designated the M1015 electronic warfare systems carrier. Several innovative features aid in the setup and teardown time of the system to include an onboard power generator, an automatic ground rod driver, and a 37-foot, quick-erect pneumatic antenna mast (Magic Mast). These features permit transition from cross-country travel or convoy to full operation in less than 2 minutes. Inside the shelter are three liquid-cooled transmitters, a control computer, receivers, operator interfaces, and communications equipment.

• Trailblazer (AN/TSQ-144A) — A ground-based system that provides intercept and location of communications signals. Each system consists of five stations; each station is housed in a ballistically protected shelter mounted on an M1015 vehicle that pulls



Teammate



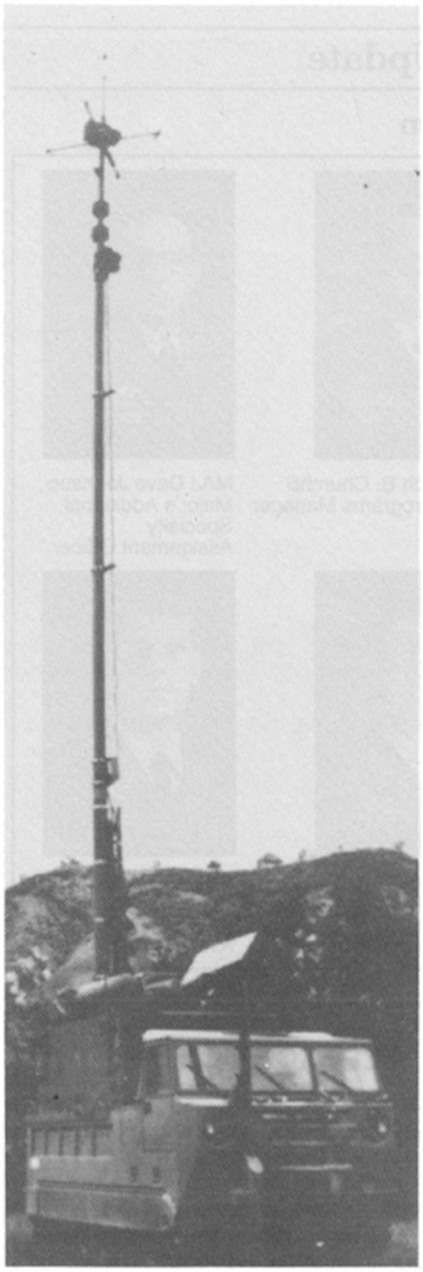
TACJAM

a 30-kilowatt generator trailer. Each station uses a 50-foot hydraulic, pneumatic quick-erect Magic Mast and modern receivers and computers. The five stations are tied together with a data link; thus, very rapid determination of communications emitter locations is possible.

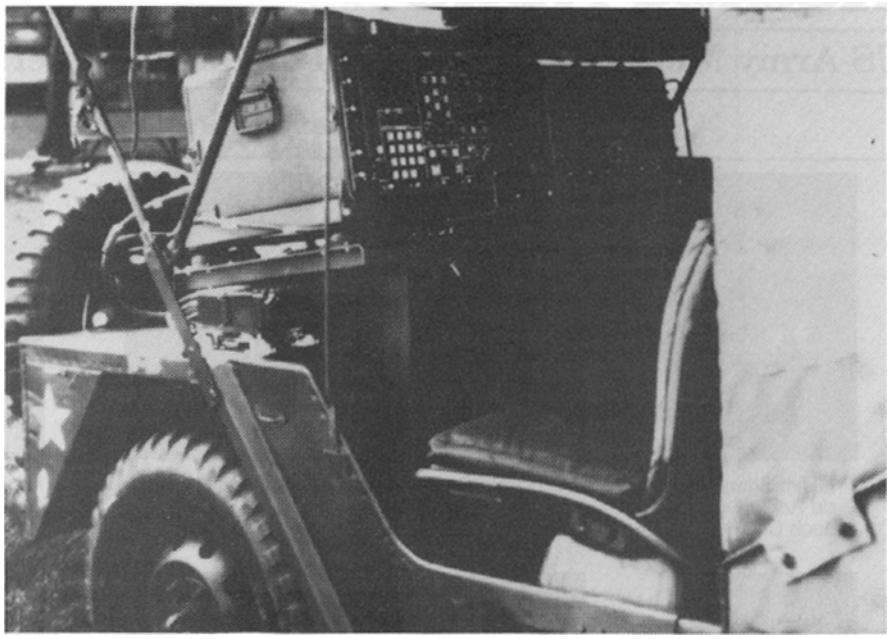
• Teammate (AN/TRQ-32-V-) — A communications intercept and location system that is shelter-mounted on an M1028A1 commercial utility cargo vehicle (CUCV). This product improvement to the previously fielded AN/TRQ-32 modernizes the system's receiving and direction-finding equipment, adds a quick-erect pneumatic 25-foot antenna mast, and includes an onboard power generator and air conditioner driven hydraulically from the CUCV — the result is a large increase in technical capability and mobility.

• Technical Control and Analysis Center (AN/TSQ-130) — A control mechanism for the new electronic warfare systems described above receives and analyzes information from them and provides intelligence information to the supported commander. Depending on its application, the system consists of either two or three shelters mounted on wheeled vehicles. The shelters contain militarized PDP-11/70 computers, analyst consoles, and radios to communicate with sensors and jammers as well as the supported commander.

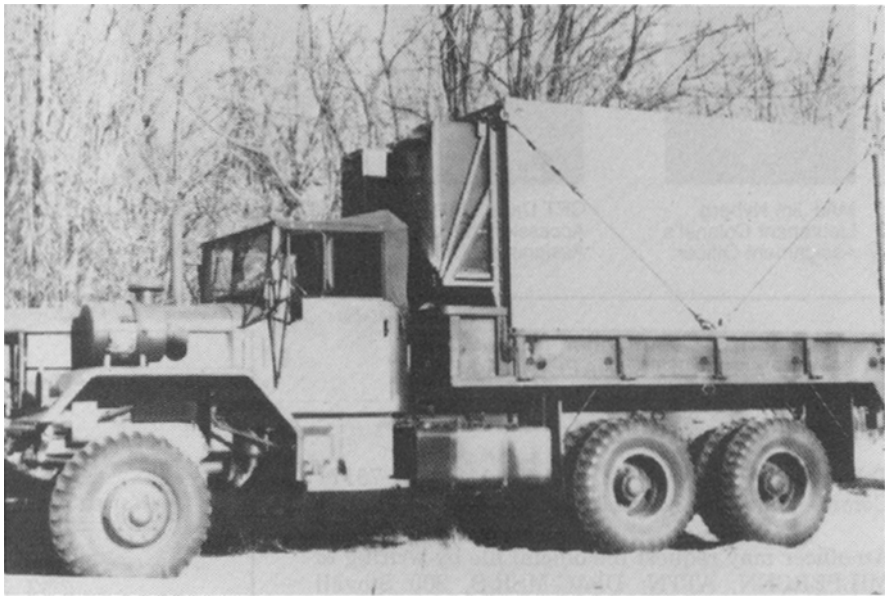
Owing to the urgent need for these systems, they were deployed with varying combinations of contractor and military logistics support.



Trailblazer



Traffic Jam



Technical Control and Analysis Center

Marine Corps Maverick

The first production model of the laser-guided Maverick missile being built by Hughes Aircraft Company for the US Marine Corps has rolled off the assembly line.

The missile, known as the AGM-65E is a follow-on system to the proven television-guided Mavericks used by the US Air Force. It is intended primarily for close air support missions. The missile's seeker guides on the reflection of a laser beam aimed by a laser designator. This precise designation allows safe employment of the Laser Maverick in close proximity to friendly troops.

Designed for use by the AV-8B Harrier II, the F/A-18, the A-6E, and the A-4M, the Laser Maverick has repeatedly proven itself in test firings. During operational tests, the weapon was successful 15 times out of 15 launches.

The Laser Maverick's 300-pound blast-fragment warhead has a selectable fuze which allows detonation on impact or after target penetration.

Hughes currently has 120 million dollars in contracts for the Laser Maverick program. In addition to support equipment and spares, the contracts call for the delivery of 275 tactical missiles by the end of May. Long-lead funding for an additional 600 missiles also is included in the total.

Redleg News

US Army Military and Reserve Personnel Centers Update

Field Artillery Officer Branch Team

LTC Jim Shane
Field Artillery
Branch Chief

LTC Gerald R. (Jay) Wilson
Colonels Division

MAJ Larry Byrd
Major's SC13
Assignment Officer

MAJ Ralph B. Churchill
Career Programs Manager

MAJ Dave Johnson
Major's Additional Specialty
Assignment Officer

MAJ Jim Nyberg
Lieutenant Colonel's
Assignment Officer

CPT Dave Cutler
Accessions/Lieutenant's
Assignment Officer

CPT Stover James
Captain's SC13
Assignment Officer

CPT Lance Moore
Military Schools/Lieutenant's
Assignment Officer

CPT Jay Yingling
Captain's Additional Specialty/Nominative
Assignment Officer

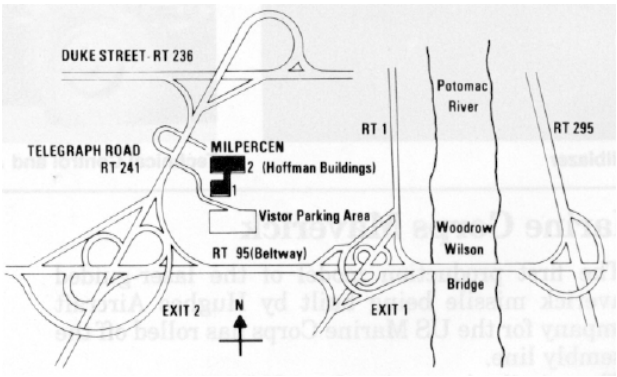
Mailing address: Commander, MILPERCEN ATTN:
DAPC-OPE-F 200 Stovall Street
Alexandria, VA 22332-0400

Telephone: AUTOVON 221-0116/01118/0187/7817
Commercial (202) 325-0116/0118/0187/7817

An officer may request his official file by writing to MILPERCEN, ATTN: DPAC-MSR-S, 200 Stovall Street, Alexandria, VA 22332-0400. Include name, rank, social security number, and mailing address.

An officer may request his performance fiche, service fiche, and officer record brief (ORB). In a recent change, the Field Artillery Branch has assumed the responsibility for official file review during a US Army Military Personnel Center (MILPERCEN) visit. An officer may now visit his assignment officer and review his official military personnel file (OMPF) in only one stop; however, he must notify the assignment officer at least 72 hours prior to the visit so that the assignment officer will have the OMPF available.

Directions to MILPERCEN Offices



Follow Interstate 95 (the Capital Beltway) toward Alexandria, Virginia; then take Exit 2 north to Telegraph Road. The Hoffman Buildings I and II are on the immediate right after exiting the Beltway and are located adjacent to the Holiday Inn. Visitors should park in visitor parking only and register privately owned vehicles with the security personnel in the lobby of Hoffman Buildings I or II.

Field Artillery and Air Defense Artillery Enlisted Branch Team

LTC Harry R.
Yarger Chief, FA/ADA
Branch

SGM Arthur Tate
Senior Professional
Development NCO
FA/ADA Branch

MSG Ronald E. Warrick
Senior Career Advisor
FA/ADA Branch

SFC Henry L. Brown
Career Advisor
FA/ADA Branch

SFC Moneshwar C. Darsan
Professional Development
NCO, FA/ADA Branch

SFC Stanley L. Davis
Career Advisor
NCO, FA/ADA Branch

SFC Samuel Powell
Professional Development NCO
FA/ADA Branch

SFC Robert A. Shelton
Professional Development
NCO FA/ADA Branch

SGT Donald W. Cameron
Career Advisor
FA/ADA Branch

Mailing address: Commander, MILPERCEN, EPMO
ATTN: FA/ADA
Branch 2461 Eisenhower Avenue
Alexandria, VA 22331-0400

Telephone: AUTOVON 221-8051/0304/0305/8038
Commercial (202) 325-8051/0304/0305/8038
Note: Reclassification questions should be directed to extension -0276.

If an enlisted field artilleryman is planning to visit MILPERCEN, he or she should call AUTOVON 221-7792 or commercial (202) 325-7792 at least 1 month in advance. Branch personnel will then arrange to have the interviewee's OMPF ready for the visit. Drop-in visitors should first go to Room 212 in Hoffman Building I. This office will call the branch to announce the visit.

US Army Reserve Components Field Artillery Officer Branch Team

LTC Jim Stumpf
Field Artillery
Branch Chief
All Lieutenant Colonels
1-800-325-4952

MAJ Mel Brown
Captains with last two
SSN digits of 50-99
1-800-235-4898

MAJ Abe Cyrus
All Majors
1-800-325-4899

CPT Tom Guerrant
Captains with last two
SSN digits of 00-49
1-800-325-4952

MAJ Gerald Lee
All Lieutenants
1-800-325-4950

Mailing address: Commander, ARPERCEN (Provisional)
ATTN: DARP-OPC-FA
9700 Page Boulevard
St. Louis, MO 63132-5260

Telephone: AUTOVON 693-7871/7873/7351.

Commercial toll-free numbers are listed below for each personnel management officer. Personnel management officers assist in obtaining assignments for individuals to a Reserve Component unit in an individual's locale. If such an assignment is not available, the personnel management officer explains Reserve Component participation options and arranges appropriate training to keep the individual active and qualified as a Reserve Component officer.

Army Reserve Personnel Center

The Army Reserve Personnel Center (ARPERCEN) provides effective and responsive management for members of the Army Reserve. The Officer Personnel Management Directorate (OPMD) of ARPERCEN maintains management files on all Army Reserve officers. Within the Combined Arms Division of OPMD, the Field Artillery Branch provides the following management services for all Reserve field artillery officers who are not on active duty and who reside in the Continental United States:

- Monitors all assigned Reserve officers throughout their careers.
- Provides a point of contact for assistance and information.
- Provides assistance to officers of the Individual Ready Reserve by arranging readiness training tours, schooling, and other training opportunities.
- Furnishes information about troop program units including assignment opportunities and other means of participation in the Army Reserve.
- Assists Reserve units in filling vacancies.
- Provides Reserve officers to other Army agencies for tours of temporary duty such as annual training site support, exercises, and schools.

All Reserve officers should contact their personnel management officer at least twice each year to advise him of their status, availability for training, address, and phone number and to obtain current information on training opportunities in the Army Reserve.

Command Update

NEW REDLEG COMMANDERS

Active Army

BG Fred F. Marty
V Corps Artillery

BG Howard C. Eggleston
VII Corps Artillery

LTC John A. Gloriod
2d Battalion, 3d Field Artillery

LTC Ralph G. Reece
3d Battalion, 3d Field Artillery

LTC Danny S. Porter
5th Battalion, 3d Field Artillery

LTC William S. Pier
3d Battalion, 5th Field Artillery

LTC Richard L. Quinn
3d Battalion, 21st Field Artillery

LTC Harvey J. Glowaski
1st Battalion, 32d Field Artillery

LTC Lamar Tooke
1st Cannon Training Battalion

In the September-October 1985 issue of the *Journal*, the Commander of the 570th Artillery Group should have been listed as LTC Peter A. *Eschrig*.

Reserve Components

Army National Guard

I Corps Artillery
BG James M. Miller
1-140 — LTC Stanley J. Gordon
1-145 — LTC Lawrence F. Phillips
2-222 — LTC John M. Esplin

26th Infantry Division Artillery
COL Joseph R. Austin, Jr.
1-101 — LTC Santo L. Bonaccorso
1-102 — LTC Able C. Leite
2-192 — LTC Robert J. Weitzel
1-211 — LTC Richard A. Barcelo

28th Infantry Division Artillery
COL Joseph F. Perugino
1-107 — LTC Raymond D. Faczan
1-108 — LTC Heinrich N. Babb
1-109 — MAJ Anthony J. Mangan (acting)
1-229 — LTC Dealvia J. Stafford

35th Infantry Division Artillery
COL Ronald D. Tincher
1-127 — LTC Dennis E. Petty
2-138 — LTC Earl L. Doyle
1-161 — LTC Anthony D. Lyons
1-168 — LTC Wesley D. Tlustos

38th Infantry Division Artillery
COL Donald D. Cox
1-119 — LTC Howard A. Becker, Jr.
3-139 — LTC David L. Huffman
2-150 — LTC James H. Lee
1-163 — LTC David M. Burgett

40th Infantry Division Artillery
COL Edgar B. Morrison
1-143 — LTC Alex F. Kennett
1-144 — LTC James P. Lowsley
2-144 — LTC Paul E. Myron
3-144 — LTC Wayne Watkins

42d Infantry Division Artillery
COL Nathaniel James
2-104 — LTC William Horvath
1-105 — LTC Donald Roberts
1-187 — LTC William P. Kiley
1-258 — LTC John T. Ruggiero, Jr.

47th Infantry Division Artillery
COL Kenneth B. Digre
2-123 — LTC Robert O. Fitch
1-151 — LTC George H. Jordan
1-175 — LTC Robert L. Bode
1-194 — LTC Jerry L. Gorden

49th Armored Division Artillery
COL Reynaldo Sanchez
2-131 — LTC John Avila, Jr.
1-133 — LTC John F. Hafner
3-133 — LTC Charles P. Flanagan III
4-133 — LTC William J. Kelly, Jr.

50th Armored Division Artillery
COL Richard S. Schneider
1-86 — LTC Harold M. Goldstein
1-112 — LTC George A. Bannon
3-112 — LTC George J. Blysak
4-112 — LTC Thomas J. Sitzler

45th Field Artillery Brigade
COL Tommy G. Alsip
1-158 — LTC Kenneth W. Bray
1-171 — LTC Bobby D. Thomasson
1-189 — LTC Robert A. Cruce

57th Field Artillery Brigade
COL Lawrence P. Kaplan
1-121 — LTC Marvin I. Strawn
1-126 — LTC James W. Holmes

103d Field Artillery Brigade
COL Richard J. Valente
1-103 — LTC James F. Ryan
2-103 — LTC Joseph E. Goddard

113th Field Artillery Brigade
COL James R. Martin
4-113 — LTC Paul W. Sexton
5-113 — LTC Forest M. Grimes

115th Field Artillery Brigade
COL Henry Castillon
1-49 — LTC Kenneth R. Schofield
3-49 — LTC Sidney A. Humberson

118th Field Artillery Brigade
COL Elton F. Hinson
1-214 — LTC Paul L. Rushing
2-214 — LTC Jordon B. Gaudry

135th Field Artillery Brigade
COL Duane M. Norman
1-128 — LTC William E. Stucker
1-129 — LTC Dempsey D. Gottschalk

138th Field Artillery Brigade
COL Julius L. Berthold
1-623 — LTC Walter R. Wood

142d Field Artillery Brigade
COL Richard L. Holt, Jr.
1-142 — LTC James R. Pennington
2-142 — LTC Bobby H. Armistead

147th Field Artillery Brigade
COL Jacob J. Krull
1-147 — LTC Ernest T. Edwards
2-147 — LTC Michael H. Hansen

151st Field Artillery Brigade
COL Edward S. Baldwin
3-178 — LTC Ralph D. Gardner
4-178 — LTC Harry B. Burchstad, Jr.

153d Field Artillery Brigade
COL Benny P. Anderson
1-180 — LTC Warren Kurtz, Jr.
2-180 — LTC Manuel Davila

169th Field Artillery Brigade
COL Joseph T. Boyersmith
1-157 — LTC William R. Suhre
2-157 — LTC Jesse T. Stacks III

196th Field Artillery Brigade
COL Carl E. Levi
1-115 — LTC James S. Pack
1-181 — LTC Jackie T. Rose

197th Field Artillery Brigade
COL Gerald F. Janelle
1-172 — LTC Alan R. Young
2-197 — LTC Norman H. Lacasse
3-197 — LTC Carl L. Nolin

209th Field Artillery Brigade
COL Joseph N. Brill
1-156 — LTC Roy R. Thomson
1-209 — LTC Austin D. Nixon

224th Field Artillery Brigade
COL Terry J. Tyler
1-111 — LTC Wiley F. Hughes
2-111 — LTC Cecil A. Broome, Jr.
1-246 — LTC Grover E. Scearce

227th Field Artillery Brigade
COL Eugene M. Bass
1-116 — LTC James R. Shoemaker
3-116 — LTC John C. Bridges

631st Field Artillery Brigade
COL James H. Powell, Jr.
1-114 — LTC James H. Lipscomb III
4-114 — LTC Sidney E. Hester

Separate Units
2-110 — LTC J. Donald Hanies
1-113 — LTC Robert A. Collins
2-114 — LTC Johnny B. McRaney
3-115 — LTC Donald F. Hawkins
2-116 — LTC Jerry L. Neff
1-117 — LTC Ira K. Jones
2-117 — LTC Joel W. Norman
3-117 — LTC Harold K. Logsdon
1-120 — LTC Ernest Woorster
2-122 — LTC Luke J. Moretti
1-125 — LTC Louis O. Bode
2-130 — LTC Jerry J. Eggleston
1-136 — LTC John T. Donnellan
1-141 — LTC Urban B. Martinez, Jr.
2-146 — LTC Michael S. Croy
1-152 — LTC Sheldon R. Lyons
1-160 — LTC Dale E. Carney
1-162 — LTC Raul O. Barreras
2-162 — LTC Ernesto A. Ramos
1-178 — LTC Harry J. Vann
1-182 — LTC Arno Rabin
1-201 — LTC Edmund F. Roleff
5-206 — LTC Roy L. Rowe
2-218 — LTC David T. Connor
1-230 — LTC Wiley M. Dewitt, Jr.
1-487 — LTC John K. Hao

United States Army Reserve

428th Field Artillery Brigade
COL Francis T. Mataranglo
4-20 — LTC William F. Motz
4-38 — LTC Stephen W. Dunkle
4-333 — LTC George E. Dunn

434th Field Artillery Brigade
COL Donald J. Mellskog
7-1 — LTC Roy J. Cimeley, Jr.
4-75 — LTC Robert F. Bracki

479th Field Artillery Brigade
COL Robert R. Armstrong
4-8 — LTC Gary M. Bentsen
4-92 — LTC Edward H. Kuhar

Separate Units
5-5 — LTC Richard S. Colt
7-9 — LTC Thomas C. Tomlinson
3-14 — LTC Michael C. Archibald
3-15 — LTC Paul D. Wharton
4-17 — LTC Joseph A. Brake
5-28 — LTC Jimmy E. France
3-42 — LTC John J. Murphy
3-75 — LTC Lee T. Cornelison
3-83 — LTC Billy W. Keyes
6-83 — LTC Wallace W. Reynolds
3-92 — LTC George A. Fromholtz

3d Brigade (Field Artillery One Station Unit Training) 84th Division
COL Gary W. Orten
1-334 — LTC David A. Wouters
2-334 — LTC Bruce W. Koopika
3-334 — LTC Robert W. Roth

Command Update US Army Reserve

402d Brigade (Field Artillery) (Training) 95th Division (Training)
COL Louis Bedoka
1-89 — LTC Barry Grabel
2-89 — LTC Ordie Jones
3-89 — LTC Gerald N. Nakashima
4-89 — LTC Gene G. Jordan
5-89 — LTC Fred R. Rowzee

Marine Corps Commanders

1st Marine Division Artillery
COL Hugh P. Pate
11th Marine Regiment
LtCol George B. Brown III
1st Battalion, 11th Marine Regiment
LtCol James M. Hayes
2d Battalion, 11th Marine Regiment
LtCol Russell E. Appleton
3d Battalion, 11th Marine Regiment
LtCol Nicholas F. Carlucci, Jr.
5th Battalion, 11th Marine Regiment

2d Marine Division Artillery
Col Christopher Catoe
10th Marine Regiment
LtCol William W. Broadaway
1st Battalion, 10th Marine Regiment
LtCol Samuel C. Decoteau
2d Battalion, 10th Marine Regiment
LtCol James M. Rapp
3d Battalion, 10th Marine Regiment
LtCol John R. Todd
4th Battalion, 10th Marine Regiment
LtCol John P. Glasgow
5th Battalion, 10th Marine Regiment

3d Marine Division Artillery
Col Regan R. Wright
12th Marine Regiment
LtCol Robert B. Newlin
1st Battalion, 12th Marine Regiment
LtCol Wayman R. Bishop III
2d Battalion, 12th Marine Regiment
LtCol James H. McKelligon
3d Battalion, 12th Marine Regiment

4th Marine Division Artillery
Col Torrence W. Rogers
14th Marine Regiment
LtCol William H. Alley
1st Battalion, 14th Marine Regiment
LtCol Thomas E. Chandler
2d Battalion, 14th Marine Regiment
LtCol Donald F. Carey
3d Battalion, 14th Marine Regiment
LtCol John B. Wilkes IV
4th Battalion, 14th Marine Regiment
LtCol Robert B. Wright
5th Battalion, 14th Marine Regiment

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