

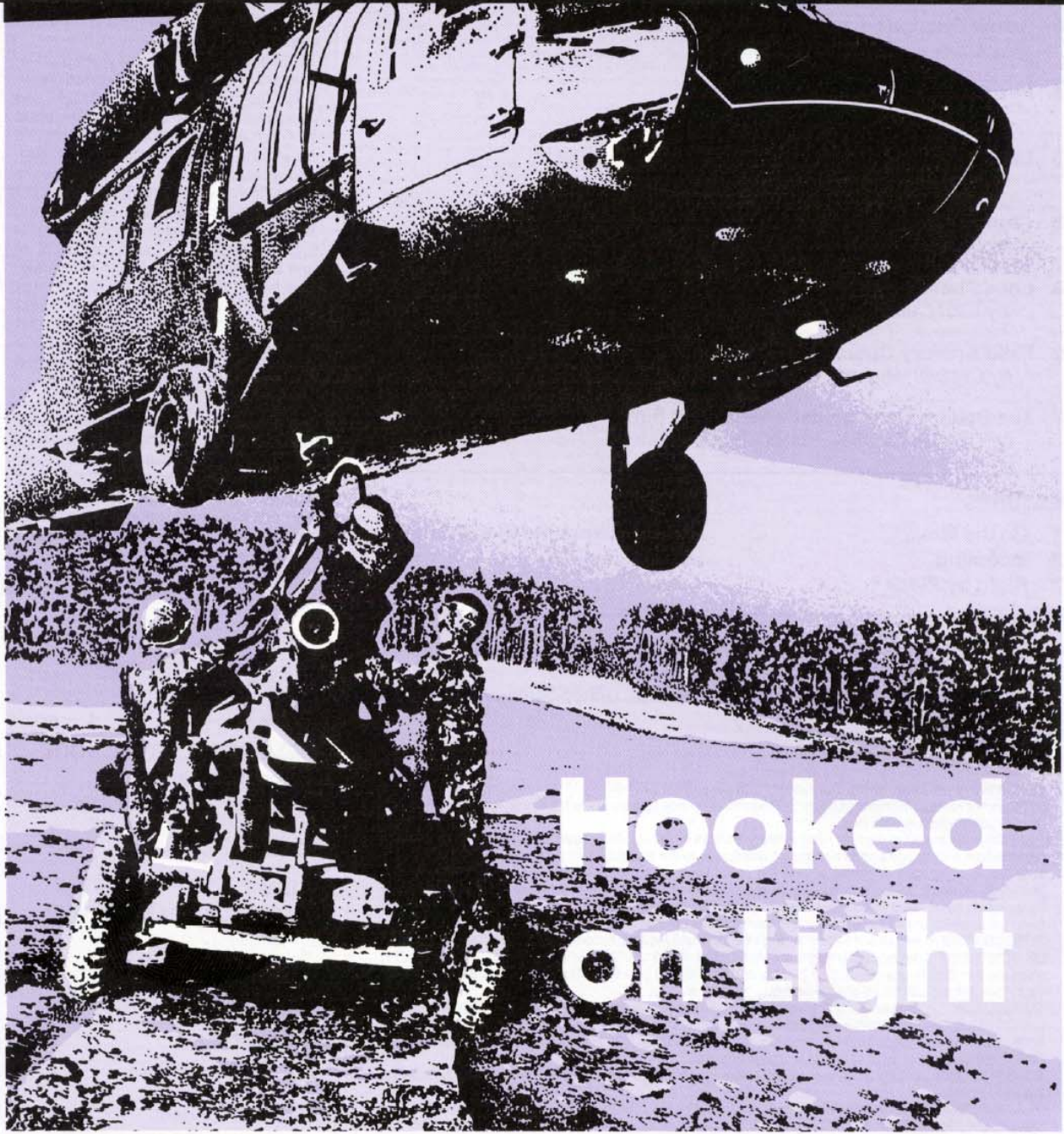


Field Artillery

A Professional Bulletin for Redlegs

October 1987

PB 6-87-5 (Test)



Hooked on Light



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By Order of the Secretary of the Army: CARL E. VUONO, General, United States Army, Chief of Staff.

Official: R. L. DILWORTH, Brigadier General, United States Army, The Adjutant General.

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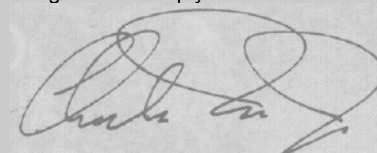
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Give Me A Light!

Through the years, most Redlegs at the company-grade level have sought advice from their superiors as to the best course to take in balancing their career assignments among cannon or missile units and line and staff organizations. They have had to sort out not only the kind of organization but also the specific type of job that would best prepare them for future responsibilities. Somewhere along the line, most of them recognized that all jobs in all units are not equal. There is no careerism in looking at the options with an eye toward matching one's own abilities and aspirations with the job. Each of us has a discrete set of talents and should try to maximize them.

Today's Redlegs have an even thornier problem. The load has not been "lightened," so to speak. How should light unit assignments fit into the plan? This issue of *Field Artillery* makes no attempt to answer the question. However, it will provide a broad range of views of light units in action, along with overviews of strategic and tactical concept development. Two historical pieces reveal the bitter lessons learned about the employment of light artillery in combat. With the certain knowledge that the likelihood of war increases at the lower end of the "spectrum of conflict," the place of the light unit is assured. Your FA staff hopes this issue illuminates the character and importance of these lean-and-mean organizations.

NOTE: I am extremely pleased to have been given the opportunity to serve as your editor. This publication belongs to us and is the only forum for the free exchange of ideas within the Field Artillery community. I encourage you to support our efforts with your letters and articles. You have the knowledge. Let us help you share it.



EDITOR

FIELD ARTILLERY SCHOOL

Commandant:

MG Raphael J. Hallada

STAFF

Editor:

MAJ Charles W. Pope, Jr.

Associate Editor:

CPT Suzann W. Voigt

Art Director:

Donna Jeanne Covert

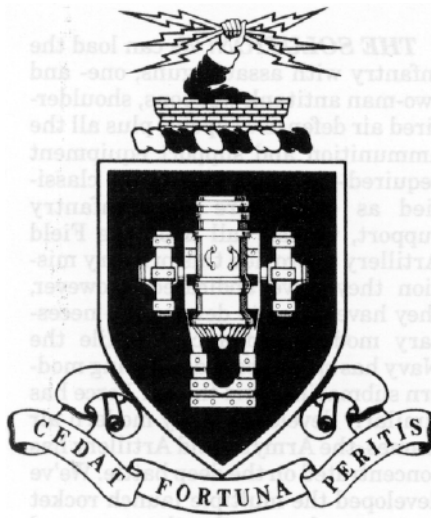
Assistant Editor:

Joanne Brown

Field Artillery

On the Move

MG RAPHAEL J. HALLADA



Masked attack, baited attack, urban storm attack, seamless web and urban web defense (Archipelago)," among others, are terms we use to describe light division engagements with the enemy. The language may be new, but our mission is unchanged: win the battle by crushing the enemy and destroying his will to resist.

Whether we talk fire support for light or heavy maneuver divisions, the fire support coordinator's (FSCOORD) challenge, tasks and responsibilities haven't changed. This issue of *Field Artillery* focuses on fire support initiatives for our light fighters.

Leaders at the Field Artillery Center and School haven't neglected the light forces. Initiatives in doctrine and training development force structuring and materiel acquisition are progressing well.

Doctrine. The School produced FM 6-20-50, *Fire Support for Brigade Operations (Light)*, in a coordinating draft and distributed it to active and reserve component units in August. The FM is a "how to" manual for FSCOORDs. We wrote it for fire support officers and sergeants in light, airborne and air assault units at brigade level and below. Let us hear from you and give us your recommendations. We want it better

to serve you in the field. If it's not on track, let us know.

Training. Soldiers scheduled for assignment to light units now receive training in the tactics, techniques and procedures employed in light firing batteries and fire support teams. Officers graduating from the advanced course receive a follow-on light cannon system qualification course. The Artillery Center also trains the cadre for COHORT units here at Fort Sill, as well as at the unit's home station. A number of light units already have taken advantage of this program with outstanding results.

Organization. To add to the lasing and observation capability of the division artillery, we've submitted a proposal to add six combat observation and lasing teams (COLTs). Three are earmarked for division artillery headquarters battery. The others, one each, will go to the direct support battalions. A three-man fire support section (one officer and two enlisted) also will be added to the light division's reconnaissance squadron to remedy the current shortfall.


Materiel. Foremost in the effort to modernize the 105-mm weapon system is the acquisition and fielding of the British lightweight howitzer. Army planners signed a production contract for the M119 howitzer in July 1987 for an initial buy of 27 howitzers. The Army may buy an additional 81 weapons by April 1989. The first unit equipped (FUE) will be in FY 89. We are upgrading ammunition for the 105-mm howitzer, and developers have begun working on a 105-mm dual-purpose improved conventional munition. This much-needed projectile improves the capability of light forces to engage light armor or motorized forces at ranges of about 14 kilometers.

We also have begun full-scale development on a new high-explosive, rocket-assisted (HERA) projectile. When coupled with the M200 propelling charge in the M119, it travels to about 20 kilometers. Production schedules suggest we will have enough of this round in FY 88 for fielding with the M119 howitzer.

We are aggressively pursuing a near-term solution for an automated fire support system for light divisions. A test by the Field Artillery Board at Fort Ord, California, evaluated the capabilities of

the fire support team digital message device (FIST DMD) at the battalion fire direction center, division artillery fire control element, and at the fire support elements from division to battalion level. The Board evaluated the digital communication terminal (DCT) at the company fire support team headquarters and with platoon forward observers. Although the test uncovered some shortcomings, the FIST DMD and DCT will provide selected fire support command, control, and communication (C³) functions. They can transmit digital target and enemy fire mission data, observer locations, and plaintext information rapidly throughout the division area. The FIST DMD and DCT provides a digital link with the mortar ballistic computer (MBC 23) and the battery computer system (BCS). The FIST DMD also provides a digital link with Q36 radars. The Army plans to begin fielding the FIRST DMD in January 1989.

An improved M1069, 9,400 pound, high mobility multi-purpose wheeled vehicle also is being developed as a "muscle up" prime mover for the M119 howitzers. Current fielding schedules call for FUE in October 1988. We also are looking into a new lightweight laser rangefinder that observers can carry. New positioning systems, such as the modular azimuth positioning system (MAPS), will meet the needs of towed artillery since they can be used on the HMMWV. A smaller artillery meteorological system for light units is a must. We have recognized its need for some time. The light artillery meteorological system (LAMS) will provide this capability. Fielding could start as early as FY 89.

These programs will assure light artillery provides the best possible fire support for its comrades-in-arms. My promise to Redlegs everywhere is that we, at the Field Artillery Center and School, will continue to provide the best possible support to the field in doctrine, training, organization and materiel. You have my total commitment to the task at hand—to keep the Field Artillery in its rightful place as King of Battle. 

Incoming

LETTERS TO THE EDITOR



Shot, Over!

THE PROBLEM: "In a nutshell, after six years of effort, strong initial Congressional support, and millions of research and development dollars spent, the Army has yet to sell a coherent plan for modernizing its light maneuver forces with adequate levels of firepower." (*Armed Forces Journal* May '86)

THE CULPRIT: An overproliferation of agencies, panels, review boards; plus an abdication of its primary mission by the Army's Field Artillery leadership.

HISTORY: The primary mission of our Field Artillery has always been close support of the Infantry. In World War I the Infantry called for suppression of enemy artillery and infantry fire (machine guns, rifles and mortars). Tanks and air attacks were not a major problem. The rolling barrages of our French 75-pound guns provided excellent close support. Our attempts to amplify this with accompanying guns weren't very successful. In World War II, the enemy added tanks and tactical air to the firepower. Our new 105-mm and 155-mm howitzers provided excellent general and direct support for our infantry divisions. Our Air Force neutralized enemy air with some help from a small number of air defense units. Specific antitank defense by our limited number of "tank destroyers" battalions was mediocre.

Since World War II our potential enemies have added the element of helicopter attacks, increased numbers of armored vehicles, and added firepower—including tactical missiles.

Our worldwide commitments have pointed to the need for mobile light divisions for use not only in Third World areas but also interspersed with our heavy divisions in dense urban areas. The firepower we allot to these divisions consists of three battalions of 105-mm howitzers, a 155-mm howitzer battery, plus 90 Stinger shoulder-fired air defense missiles. The Infantry must consider this assignment of World War II-type firepower inadequate! The former US Army Chief of Staff, however, called for an assault gun "essential to support the operational concept of the light divisions." The Chief of Infantry's "number one requirement is a good man-portable medium antitank missile."



THE SOLUTION: We can load the infantry with assault guns, one- and two-man antitank weapons, shoulder-fired air defense weapons, plus all the ammunition and support equipment required—or since this is all classified as direct fire close infantry support, we can call upon the Field Artillery to provide this primary mission they have abdicated. However, they have failed to develop the necessary modern ordnance! While the Navy has spent years developing modern submarines and the Air Force has similarly developed many modern air frames, the Army's Field Artillery has concentrated on the deep battle. We've developed the multiple launch rocket system and recently the approved Army tactical missile system. For close infantry support Redleg leaders have been content to approve the British 105-mm towed howitzer and develop Copperhead antitank ammunition. The 105-mm howitzer is a World War II weapon and we should relegate it to the museum as such.

The 155-mm howitzer has no place in a light division! We have the talent and facilities to produce a truly modern artillery field piece as we old-timers term it. First of all, it must possess multi-purpose capability. This means close infantry support, and antitank as well as low-altitude air defense ability. Further vital specifications are:

- Self-propelled
- Lightly armored
- Air-droppable
- Amphibious
- Weight limit: 15 tons
- Calibre - 75-mm
- High velocity
- 360° traverse
- Autoloading
- Special air defense antitank ammunition

Each light division must have three battalions. Massed fires would be provided by a battalion of the equivalent of the Israeli LAR 160-mm multiple rocket launcher, on an M113 chassis. The existing MLRS is too heavy for the light division.

SUMMARY: Hold the Field Artillery to the performance of its present-day primary mission. Don't overload the infantry. The many cries for mobile, protected assault guns will cease!

R. P. Shugg
Brigadier General, Retired
Oakland, CA

Shot, Out!

Thank you, General Shugg, for your provocative letter. You certainly have touched on one of the Field Artillery's greatest challenges—providing effective fire support to our Army's light divisions.

Although the popular press' emphasis on deep maneuver operations and fires may suggest that the Field Artillery has lost its "close" support focus, I want to assure you that nothing could be farther from the truth. In fact, the entire combined arms community is grappling with that very issue. Here at Fort Sill, we are dedicated to delivering the most responsive and effective fires possible. Let me mention just a few specific examples of our ongoing efforts.

Although our fire support doctrine has changed over the years, the mission of the Field Artillery—to support maneuver and to add depth to combat—has not. Nevertheless, the advent of the light division with its 500-sortie deployment constraint presents us with quite a few challenges. I believe we have responded in a logical, realistic, and prudent fashion.

- First, we designed a complete fire support organization that employed the best *available* helicopter-transportable weapon—the M102.

- Second, we quickly began to test other weapons that would yield far greater range, reliability, and lethality. The end result was the adoption of the M119, the British Light Gun, which can attain 20 kilometers in range and deliver rocket-assisted projectiles and dual-purpose improved conventional munitions.



- Third, we challenged the Research and Development Community to produce a light 155-mm howitzer capable of firing all current and projected armor-killing munitions.

Today we're continuing this rapid evolutionary process by scrutinizing systems ranging from lightweight cannons to a variety of rockets and missiles. The 75-mm assault gun you proposed offers a case-in-point. During our exploratory efforts, we did consider such a high-velocity weapon. But our studies clearly established that such a small caliber piece would have little munitions versatility and be much less useful than a 105-mm howitzer as an indirect fire system. What's more, the weight and size of a self-propelled gun simply would not meet the light division's deployability requirements.

Our studies also demonstrated the clear need for the division to have at least a battery of 155-mm howitzers. The M198 howitzer is an effective system and has several advantages over the current generation of multiple launch rocket

systems (MLRS). Although it cannot deliver a tremendous volume of fire, the M198 is more accurate and, therefore, allows for closer employment to friendly units. What's more, it accommodates a very versatile suite of munitions, including the Copperhead antiarmor round as well as chemical and nuclear projectiles. Such capabilities are crucial factors today. Many "Third World" nations—Soviet surrogates and others—have the capability to produce nuclear weapons and employ chemical munitions. The 155-mm system affords our rapidly deployable light forces a realistic deterrent in both these arenas.

We have not limited our light fire support initiatives to just cannons. At present the Field Artillery is working hard on many light forces initiatives. They range from downsizing counter-battery radars to the production of advanced command and control systems and antiarmor projectiles. Simultaneously, other members of the combined arms team have been exploring heliborne and ground-fired antiarmor systems. The HELLFIRE, the fiber-optical guide (FOG-M), and the advanced antitank weapon system-medium (AAWS-M) missiles are just three examples.

The bottom line is clear. The Field Artillery has not abdicated its responsibilities. Our branch is working hard and producing results. In fact, as the 7th Infantry Division certification clearly suggests, our flexible fire support system may not be perfect, but it does provide the close fires our light fighters will need in a low-intensity conflict. When reinforced with appropriate larger weapons, the light infantry division artillery also can prove effective when suitably employed in mid-to-high intensity combat.

Thank you again for your insights. We here at Fort Sill value your views. It is only through open professional discussion that Redlegs will continue to grow. I look forward to sharing your experiences and profiting by your perspectives.

David L. Benton III
Colonel, FA
Fort Sill, OK

Response to "On the Move"

I have problems with some parts of the Commandant's message and the quote from the Chief of Staff in the "On the Move" column in the March-April issue.

All commanders recognize the importance of safety in training, and certainly none want to hurt their troops or blow up their equipment. In my judgment it would be a mistake to let safety become the dominant factor in conducting training. Safety is an integral part of all Field Artillery activity—always.

We cannot train to fight unless we have realistic combined arms live-fire exercises, and we cannot conduct these exercises without taking risks. Mistakes will happen because of the failure of humans and machines. A wise commander always plans to minimize those risks but even the best commander can't eliminate them. It would cost more lives to send troops to combat without the benefit of realistic combined arms live-fire training than to send them into the fray after sanitized training. For the most part, we can have it both ways; we can have both realistic training and safety. But we in the Field Artillery are reluctant to shoot near the maneuver troops in training. And articles like this just encourage the more squeamish artillery commanders to avoid the



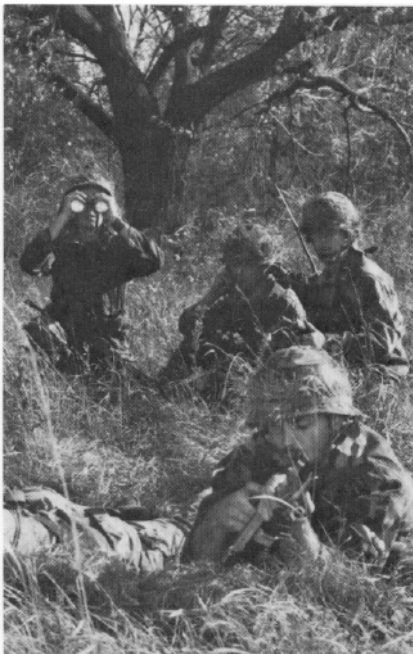
responsibility and eliminate the possibility of an accident. The result is to have an untrained combined arms team.

I don't think it's "simplistic" or "cynical" to say soldiering is dangerous business. It certainly *is* a dangerous business—it always has been and it always will be. How else can you characterize jumping out of airplanes, shooting live ammunition over the heads of soldiers, firing rifles and machine guns with real bullets, throwing hand grenades, maneuvering 65-ton vehicles at night, rappelling

out of helicopters, and on and on. Let's stop this tendency toward a self-serving, self-patronizing Army and remember why we are on the taxpayers' payroll.

I just worry that if the senior leadership wants an Army that won't take risks to do realistic training—they are apt to create an Army that can't hack it in the total hell, trauma, confusion, and miseries of combat.

Vernon B. Lewis, Jr.
Major General (Retired)
Alexandria, VA



Intelligent Fire Support Planning

While I agree completely with Major Windham's view that Intelligence Preparation of the Battlefield (IPB) is important to fire support planning (*Field Artillery Journal*, March-April 1987), he failed to consider just how important it is that fire support planning is "intelligent." He failed to bring out how IPB can aid target acquisition and target damage assessment, as well as fire planning. Incredibly, he also failed to grasp the important links between IPB and target value analysis (TVA).

TVA allows Redlegs to identify the high-payoff targets (HPT) in the enemy force but doesn't help you discover their location. Supporting intelligence units will have to determine the location of the target because Field Artillery target acquisition capabilities

are so limited. Consider the example of a howitzer battalion. Field Artillery target acquisition units can locate howitzers when they fire—and not before. The location of the battalion fire direction center (FDC), observers, and support elements remain a mystery. While the howitzers are an important target, they are not the high-payoff target, nor are they easy to defeat. The battalion FDC would obviously be more important than the howitzers, but Major Windham's description of the process has not yet made it possible to locate the FDC.

An *intelligent* fire support planner will take the HPT identified through the TVA process and coordinate with the intelligence officer to see if we can actually locate them. Since TVA also provides a physical description of the HPT, the intelligence officer can determine if he can detect any characteristics, how accurately he can locate

the target, and how long it will take to collect and process the data. If you can't detect the target, how can you plan to attack it? If you can't locate the target accurately, how much ammunition do you expend on it? Finally, if the target moves *before* you initiate a fire mission, how will you attack it? You must resolve problems *before* the battle.

Once TVA identifies HPT, the intelligence officer indicates which ones he can detect. Redlegs can use the situation and event templates to predict where we can find the target on the battlefield. The terrain limitations identified through the combined obstacles overlay then help in positioning the collection assets, as well as delimiting the possible size of the target. The event analysis matrix then makes it possible to develop initial cueing guidance for both intelligence and target acquisition systems. Once the battle begins and as the planners complete the event analysis matrix, they can refine that cueing guidance and predict the

target's arrival times.

This also shows that another use of the event analysis matrix is in conducting target damage assessment. If Redlegs use ammunition to attack a target, they should cause some damage. The target either dies and you don't see it again, or you disrupt its planned activities and slow it down. By recording actual times of arrival on the event analysis matrix and then comparing them with the predicted times, you can judge the interdiction effects of the attacks.

The intelligence officer can help determine how long a target may stay in position based on the activities it has to accomplish. Using these data, the fire support planner can determine how responsive the intelligence data must be to engage the target effectively. All of this is done as the team develops the decision support template.

An *intelligent* fire support planner uses TVA and IPB in an extremely effective manner. TVA identifies which targets artillery should attack

and their signatures and helps determine how quickly Redlegs must target them. The intelligence officer identifies which targets he can detect, how quickly, and to what accuracy. Together, these planners position their acquisition assets for best effect. With the development of the IPB process, they also can determine when and where the targets will appear, what degree of damage is required, and the effect it will have on the accomplishment of the *enemy's* mission. As the battle develops, these same planners update the event analysis matrix and the decision support matrix so fire support recommendations are flexible, responsive and appropriate to a changing battlefield situation. This *must* happen if fire support is to achieve the required results in combined arms operations.

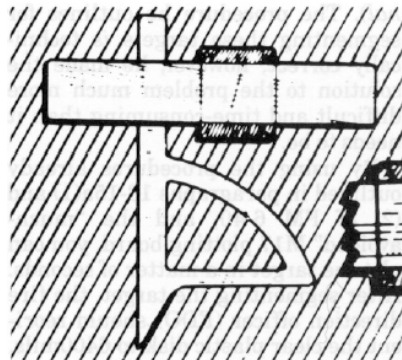
George T. Norris
Charlottesville, VA

Irregularly Shaped Targets

After reading Captain Kirchen's letter in the May-June issue, I was very disappointed in the method he used to attack this type of target. Though Captain Kirchen has demonstrated the procedure properly, he should have studied FM 6-40 in more detail to find an easier and more efficient way of attacking a target of this type. The method described in the article is great for the classroom environment, but when a maneuver commander asks the artillery liaison "Where *is* the artillery, son?"—the artillery has failed.

Whether the irregularly shaped target is preplanned or is a target of opportunity, the battalion and battery fire direction officers (FDOs) have to react quickly and plot the target area accurately. Pulling out a lap chart at this moment is unsatisfactory, and having two to four, or even worse, eight FDOs—you may have someone reinforcing you—pulling out lap charts increases the probability of error.

To keep the fire planning quick and easy and to reduce the probability of error in the system, refer to the FM 6-40 (or the FC) under "Attacking Large



Targets." Pay particular attention to the faster and more accurate template method.

As the battalion or brigade FDO you should have incorporated templates in your standing operating procedures for fire direction. You should also make up enough templates to give to your batteries, plus extra copies to support a reinforcing unit (part of the package in your brief to the liaison officer).

Here are a few tips that may come in handy in making templates:

- The target grid ("whiz wheel") makes an excellent template. It provides a built-in accurate attitude.
- Use two different sets of templates: 1:25,000 & 1:50,000.

- Before making templates, ensure you know your area of coverage for the shell or fuze combination used. Here you must enter the JMEMS. Remember: *effects and area covered change according to range and method of fire.*

- After making the originals, burn copies on a facsimile machine for a transparent template. Ensure the templates are labeled, i.e., DPICM, 1:50,000, RG 10,000, sheaf BCS SPECIAL, DPICM TEMPLATE #1.

- Sheaf size should be standard (BCS or BUCS SPECIAL) unless specified in the fire order. Compute circular targets for special sheafs: ATTITUDES are not needed except for LINEAR TARGETS.

The fire order will vary according to separate unit standing operating procedures. The firing units will pick their grid(s) to fire from the aimpoint(s) on the template and then compute their firing data. The template also may be used in attacking large targets and linear targets as FM 6-40 states.

With a template, your fire order is sent quickly. This is much better than waiting for someone to compute aimpoints. Here are a few examples that may be useful:

IRREG TGT

BN, FFE, GRID 34745342 (ORIENTING POINT), ATTITUDE 6400 (ORIENT THE TGT GRID)*, SHELL DPICM, SPECIAL INSTRUCTIONS - DPICM TEMPLATE #1, "A" BTRY-4C; "B" BTRY-4D; "C" BTRY-2D.

*In unit SOPs, the attitude for orienting the TGT GRID may be standardized to 6400 mils, thus dropping it out of the fire order for IRREG and LRG TGTS.

LARGE TGT

BN, FFE, GRID 64539781, SHELL DPICM, SPECIAL INSTRUCTIONS - DPICM TEMPLATE #1, "A" BTRY - 3C, 3D; "B" BTRY - 4C, 4D; "C" BTRY - 5C, 5D.

LINEAR TGTS

BN, FFE, GRID 55737902, ATTITUDE

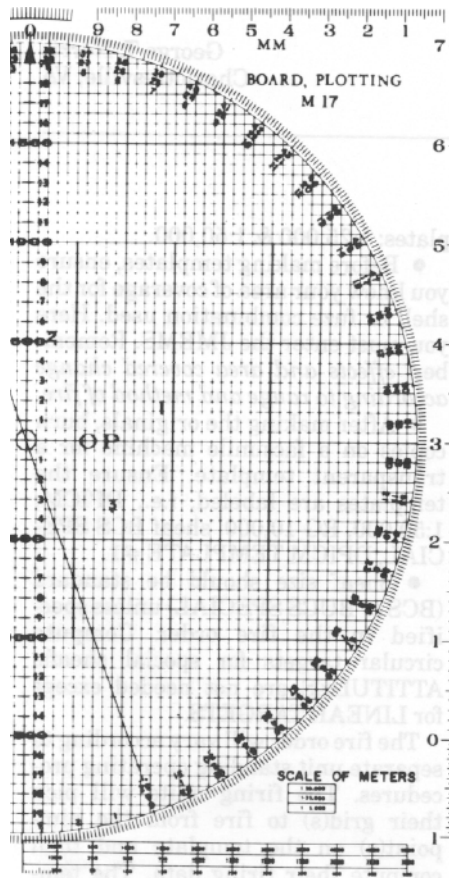
5000, SHELL DPICM, SPECIAL INSTRUCTIONS-DPICM TEMPLATE #1, "A" BTRY - 3C, "B" BTRY-4C, "C" BTRY-2C.

By having templates made up prior to any exercise or any real world situation, you will be ready to *ACT* upon this type of mission—NOT REACT!

Those of you who work with the tactical fire direction system (TACFIRE) should look at the possibility of incorporating templates into its program. You may be able to attack large, irregular, or linear targets by just "pushing a few buttons."

D. W. Haerter
CAPT, USMC

Twenty Nine Palms, CA



KISS Irregularly Shaped Targets-Part I

I applaud Captain Kirchen for recognizing there is a problem with the way some fire direction centers (FDC) attack irregularly shaped targets, (May-June 1987 *Field Artillery Journal*). The procedure he outlines for segmenting these targets is technically correct; however, he made the solution to the problem much more difficult and time-consuming than it needs to be.

By using the procedures already outlined in paragraphs 13-15a(1) and (2) of FM 6-40, and the "much-avoided" M17 plotting board, you can plot the target in a matter of seconds. After segmenting the target, the fire direction officer (FDO) should reorient the clear plastic disk to 6400mils. He can read the center coordinates for each segment *directly* from the base of the M17.

The FDO also can use the M17 with great speed and accuracy when segmenting targets described by a series of grid coordinates. He should plot the announced coordinates directly onto the plastic disk with the disk oriented to 6400mils??. To determine the attitude of each segment, he connects the dots and

rotates the disk counter-clockwise (the attitude must be between 0-3200m) until each segment is parallel to any of the vertical lines on the base. He reads the attitude from the outer black scale under the red index arrow on the gridded base. At the same time he reads the segment length to scale from the base.

Regardless of the method of target location and segmenting used, the "bottom line" when attacking any target must be the effectiveness of the fires. This is especially important with irregularly shaped targets. Before he can issue his fire order, the FDO must consider the effective bursting radius of his weapon system and ensure commanders assign a sufficient number of weapons (i.e., aimpoints) to each segment of the target.

To amend Captain Kirchen's closing statement: We can process irregularly shaped targets with the speed, accuracy, and effectiveness Redlegs are known for—if we use the best procedures and we make the required considerations.

James B. Williams
CPT, FA
US Army Readiness Group,
Los Angeles, CA

Response to "Sound Doctrine"

Many commanders in the field have been asking questions lately about

seemingly changing doctrine, new equipment, and where the Field Artillery seems to be placing its priorities. If one keeps in mind that the role of the Field Artillery is to provide

fire support to the maneuver commander, it becomes clear that the changes which at the surface seem so drastic, really do not change our role but give us more flexibility to fulfill that role.

Since the battery computer system (BCS), back up computer system (BUCS), and all future automated fire direction systems compute individual piece to aimpoint solutions for the engagement of a target, the artillery maintains its ability to mass fires regardless of distance between guns. The new howitzer improvement program (HIP) howitzer has onboard survey and fire direction capability. This gives the Field Artillery unprecedented roving gun capability. However, the decision to deploy in this manner will depend on the maneuver commander's assessment of the tactical situation. If the ground threat exceeds the indirect fire threat, certainly the commander will want to group the artillery together for protection. If the opposite exists, the survivability of the artillery is greatly enhanced by the ability to deploy roving guns.

The computers that by now are familiar to most of us still leave questions about reliability and survivability and "what do we do when the computers go down." In a nuclear environment, the tactical fire direction system (TACFIRE) computer can withstand high altitude electromagnetic pulse (HAEMP) when personnel will die from the radiation effects of the nuclear blast. The radios will not survive EMP at this distance, but microwave communications will not be affected. The artillery, then, can continue to operate by using the

microwave equipment at division artillery or brigade. Outside of the nuclear environment, the BCS and BUCS have proved to be extremely reliable. Reports from the field indicate that the computers themselves rarely break down and, if they do, are fixed quickly.

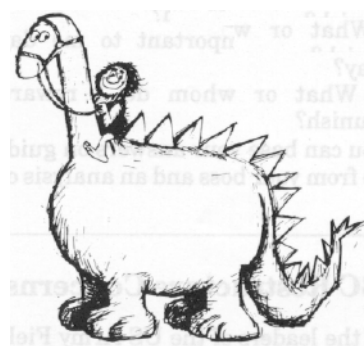
When everything fails, we still maintain the ability to operate under emergency situations. While we understand that manual gunnery may be slower and less accurate than automated, the Gunnery Department continues to teach manual methods to students at the Field Artillery School. Enlisted soldiers receive about 30 percent instruction in emergency techniques, lieutenants in the basic course receive 23 percent, and captains in the officers advanced course receive about 10 percent. It is a question of priority. Based on input from the field, the Field Artillery School tailors the curriculum to the needs of the field balanced with the doctrinal ways of conducting business. And, the school determined that computers are our primary source of data. Therefore, we spend most of our time teaching automated systems.

Finally, the artillery units fire those rounds and missions that the maneuver commander deems important to the overall mission. If the artillery is firing suppression of enemy air defense (SEAD), it is not because we are devoted to the Air Force, it is because

the maneuver commander needs air support and the protection thereof for his current operation. We fire Copperhead at enemy armored vehicles not because we support Armor, but because the maneuver commander has determined the enemy tanks pose a threat to his operation.

New rounds, new howitzers, new computers, and new ways of doing business are not hurting the artillery. They give the artillery more flexibility to support the maneuver commander. In short, they allow the Field Artillery the agility the maneuver forces have enjoyed for years. The artillery has a reputation for leading the way with automated operations and state-of-the-art equipment. Let's not lose that reputation by holding on to dinosaurs unnecessarily.

Thomas G. Hughes
CPT, FA
Fort Sill, OK



Leadership

Winning in Command

In the Pentagon they call it the Wailing Wall...a place off the 7th corridor where the Army's phantom posts the promotion, schools, and command lists. Those selected experience a moment of great joy and self-satisfaction. But those "considered but not selected," know disappointment, resignation, or hope for next year. All over our Army, leaders play out this scene as the various selection boards transform the leadership potential into a strong national defense.

While all selection and promotion boards are important, none have a greater impact on the Army's readiness

than selection for battalion or brigade command. Not only will these officers replenish the leadership pool, but it is they who have the day-to-day responsibility to train, maintain, lead, and care for soldiers and their families.

What is the key to being an outstanding commander, successfully caring for soldiers and coaching junior leaders? I am convinced the answer doesn't lie in our selection process or in the similarities of the commanders. The answer is that successful commanders have a well-developed vision of what they want their units to be like when they reach their own change of command. As a result, they focus their energy and their unit's training to make

it happen.

Now the key is to outline your vision to avoid wasting subordinates' time trying to "discover" your goals.

First, before you assume command, you must develop and write down your command philosophy so you can communicate it to your subordinates. It helps if you base it on values, so others can understand what you are trying to do. Some of the key ingredients should be:

- These are my values...courage, candor, commitment, competence are a good start.
- This is how I plan to exercise command, and this is your role in the chain of command or NCO support chain.

- These are the objectives that are important to me for training, maintaining, leading, and caring.

- This is how and what I will evaluate (evaluate only those intermediate objectives that contribute to readiness or mission accomplishment).

- This is how or what I will reward or punish.

Second, there are some questions you should be able to answer on the day you assume command:

- What do I want this unit to look like two years from now?

- How am I going to make it happen?

- How will I know how I'm progressing?

- How will I know if my subordinates understand what my vision is?

- How will I know if my subordinates understand my strategies for getting there and how each fits into the whole?

- What are my priorities for the year and the long term?

- What is important to me day to day?

- What or whom do I reward or punish?

You can base your answers on guidance from your boss and an analysis

of your unit. As you spend more time in command you may get additional information to refine your answers and may even find some surprises that will cause some changes. Answer these questions before you "grasp the colors" because they are essential to your next step.

Third, distribute to your subordinates your written command philosophy, a draft of your officer support form, your answers to the questions discussed above and milestones of objectives that lead the unit to your vision.

Finally, evaluate your progress toward your vision and fine tune as you go by using the DA Form 67-8-1 as the basis for your subordinates' periodic counseling sessions. This will allow you to allocate resources, change timelines and add or delete objectives so you are leading your unit to your vision.

Successful command tours aren't easy, but when commanders are winners, our soldiers, our units and our Army are winners. This approach helps make more commanders winners and it reduces the large number of commanders whose impression of their command experience is summarized:

"Command to me was like being in a mail sack hanging on a railroad pickup post—the train came by, snatched me up and threw me into the mail car. Two years later I found myself hanging from another post, don't know where the train went in the meantime, only that I was on it."

Not only does a winning approach to command make sense, it is an organizational imperative.

A WINNING APPROACH TO COMMAND

- Write out your command philosophy.

- Develop a vision.

- Communicate them both.

- Use 67-8-1 as a command tool.

- Develop a feedback system.

- Be flexible and understand units have a life of their own.

- Have fun and develop your replacements.

- Command will be over before you know it. Do it now.

Michael T. Plummer
Colonel, IN
Fort Benning, GA

OBC Restructure Concerns

If the leaders of the US Army Field Artillery School aim to teach fire support, then the strategy of specialization in cannons, rockets, or missiles for follow-on assignment doesn't follow this training philosophy. Teaching all artillery officers to be fire support specialists, or teaching officers according to their next duty assignments are two completely different and incompatible training philosophies. The School plans to teach lieutenants just what they need for their first assignment. Under the guise of saving student training time and preparing officers for their initial assignment, we could be undermining our primary goal of developing fire support officers.

Every Redleg officer should have a solid foundation in cannon artillery doctrine, tactics, employment, and fire direction. All this becomes the foundation for future development as a battalion or brigade fire support officer (FSO). Although the actual number of

FSO positions for artillery captains and majors may not be as large as for other staff or command positions, the current command climate emphasizes thorough knowledge of fire support principles. Those officers who go to assignments other than cannon have always had and should continue to have specialized training. The current trend in specialization might yield a better Lance officer to the field more quickly than our current system, but this would cost us trained fire support officers.

I submit that any initial savings in the officer basic course (OBC) could create a major training deficiency later in an officer's career. Specifically, those officers with no OBC cannon training going to a cannon assignment after their advanced course would require extensive training before assuming the cannon assignment. They may have to attend some cannon refresher training such as the cannon weapon qualification course in addition to the present tactical fire direction system (TACFIRE) follow-on course.

Whatever savings might be gained at lieutenant level training is lost at captain level.

The Gunnery Department currently recognizes the need to bring non-cannon officers up to speed in cannon techniques. However, under a current trend to eliminate any training from professional development courses that appears to retrain lower level tasks, this training has come under close scrutiny. If the School changes its training strategy to train officers for their next assignment, the little "familiarization" training might be eliminated because it does not fit in a generic course.

In conclusion, the School's intent to train officers by specialty not only limits our fire support potential, it limits the field commander's flexibility in determining positions and duties for his captains.

Richard L. Stevens, Jr.
MAJ, FA
Fort Sill, OK

Stalingrad:

Artillery in Support of MOUT

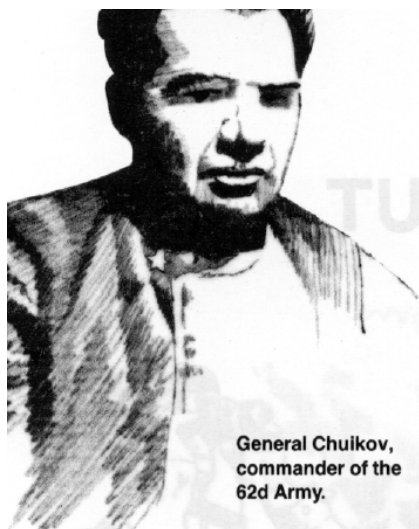
by Captain Robert D. Lewis



In the Central Army Group's (CENTAG) area of operations the rolling terrain is broken by large tracts of urban sprawl. The artilleryman fighting in this area must know intimately the techniques he can use to defend these urban areas against the assault of a modern armored or

mechanized force. The Red Army's resistance in Stalingrad shows how to conduct such a defense. During this prolonged defense (June 1942-November 1943), the Soviets managed to halt the German offensive, force a stalemate within the city, and eventually return to the offensive. Some scholars consider the defense of Stalingrad the turning point of the Allied war effort in World War II. Indeed, from this point to the end of the war, the Red Army never surrendered the initiative. During operations at Stalingrad, the Commander of the Sixty-second Army, General Chuikov, described the Soviet fire support system as the most powerful weapon in the fight against the Germans.

This article will discuss operations at Stalingrad and will analyze the fire support tactics the Soviets used conducting military operations in urban terrain (MOUT). Finally, this article will illustrate the lessons from Stalingrad that are relevant to the American artilleryman in CENTAG.



After the 2d and 4th Panzer Armies isolated the Soviet forces at Stalingrad, the 6th Army advanced deeply into the positions of the 62d Army and reached the Don River.

Background

By the spring of 1942, the German high command had developed its plan for the summer offensive. The German armies were not used in the same formations that had been initiated in Operation Barbarossa. They no longer had enough strength to carry out offensives along the entire front. Instead the high command selected two targets for the upcoming operations: the Volga River Basin including Stalingrad and the Caucasus Mountains.

The German high command chose the Sixth Army supported by elements of the Second Army and the Fourth Panzer Army to attack a concentration of 250,000 men, 740 tanks, 7,500 mortars and artillery pieces, and 1,200 aircraft. The Soviet forces opposing the Germans at Stalingrad consisted of the Sixty-second and Sixty-fourth Armies. These forces had 258,633 men, 5,579 mortars and artillery pieces, 621 tanks, and 867 aircraft.

After the Second and Fourth Panzer Armies isolated the forces at Stalingrad, the Sixth Army advanced deeply into the positions of the Sixty-second Army and reached the Don River. The Fourth Panzer continued to drive south of Stalingrad, hoping to turn north to encircle both the city and Sixty-fourth Army. Luftwaffe close air support (CAS) and bombing supported these attacks. These bombing operations culminated in a raid on 23 August, causing significant casualties (40,000 men, women, and children) and forcing the Soviets to evacuate 300,000 civilians from Stalingrad. During the month of

September, the fighting between the Sixty-second and Sixth Armies began in earnest. Initially the Red Army yielded most of the city to the Germans, including the tactically vital railroad station and Mamai Hill (the highest point in the city). Once the Germans pushed the Soviets against the Volga River, the Sixty-second Army began its counterattack. This operation pushed the Soviet front several hundred yards from the Volga. At this point, the Soviets and Germans engaged in fierce hand to hand fighting, and the railroad station changed hands 13 times.

In the fall of 1942, the Soviet high command planned a counter-offensive at Stalingrad. This plan called for the encirclement of Sixth Army and a portion of the Fourth Panzer Army, intended not only to liberate Stalingrad, but also to cut off the German penetration of the Caucasus. In response to this Soviet offensive, German Army leaders created Army Group Don hoping to penetrate the Soviet defenses at Stalingrad. By early December, the Germans had failed and the Red Army had counterattacked. The Germans were forced to react, forfeiting their opportunity to free the Sixth Army.

Within Stalingrad, the Soviets brought two fronts against the Sixth Army. During their attacks the Soviets subjected the Germans to continuous CAS and artillery fires.

In the decisive offensive, the Red Army was able to split the Sixth Army in two. By the end of January, the Red Army had defeated these components, and the Germans surrendered.

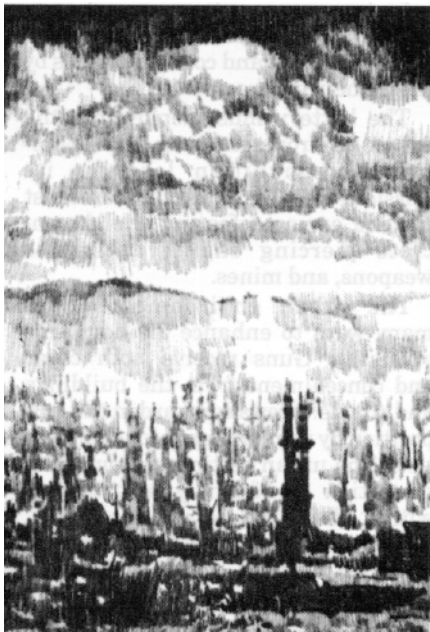
Fire Support Tactics and Techniques at Stalingrad

What role did the fire support system of the Red Army play at Stalingrad? The answer to this question requires a discussion of the tactics of the German Army at Stalingrad and the Soviet fire support system countermeasures. This discussion will separate the battle of Stalingrad into three sections: mobile warfare, defensive MOUT and offensive MOUT.

The German operations involving large maneuver forces around the city of Stalingrad used the concepts of mobile warfare. Within the scope of this warfare, the Germans used blitzkrieg tactics. The Soviet command at Stalingrad noted five phases in German attacks:

- Movement into attack positions.
- Air attack.
- Artillery and mortar preparation.
- Infantry attack.
- Armor exploitation.

Large-scale movements of infantry and armored units into attack positions during the night typified the pre-attack phase. Soviet patrols detected these movements easily. At first light, the Luftwaffe commenced its air strikes in support of the day's attack. Upon completion of the air strikes, the Germans began their artillery and mortar fires. These indirect fires had two purposes: to soften the positions of the defending infantry and to preclude reinforcement of the threatened Soviet sector. After the fires had been lifted, the German infantry conducted its deliberate attack on the Soviet positions. If the infantry identified any weakness or breach in the Soviet lines, the German armored forces quickly attacked. This attack exploited the gap and attempted to move forces into the Soviet rear area.



At first light, the Luftwaffe commenced its air strikes in support of the day's attack.

The Red Army commander at Stalingrad made three key observations and based Soviet fire support countermeasures on them. First, the Germans were extremely uncomfortable with night operations, especially offensive exercises. Second, the German lines were vulnerable to patrols seeking intelligence because they secured their positions poorly during periods of limited visibility. Finally, the Germans religiously followed their attack pattern.

Given these observations, the Soviet fire support system provided several countermeasures. During the night, the Soviets became experts at infiltrating forward observers through the German lines. The Germans compromised most of their attack troop concentrations because of their poor noise and light discipline. These concentrations became targets for Red Army artillery.

Although there was little the Soviet artillery could do to counter German air power, the Sixty-second Army discovered that any break in the pattern of the German attack would often postpone the attack. Typically, the Luftwaffe would complete its morning air strikes and the Soviet artillery would fire a massive counterstrike at the troop concentrations acquired during the night. These fires stalled the advance of German infantry and effectively suspended operations. The Katyuski multiple rocket launchers (MRLs) capably performed this counterstrike role.

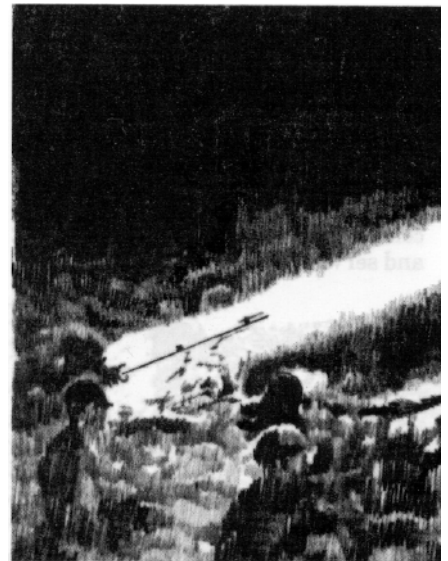
The Soviet artillerymen also learned to select the proper targets. Experience taught them that indirect fire had little effect against German tanks, so the Soviet artillery concentrated on finding soft targets. The Stalingrad defenders quickly learned that destroying infantry, not tanks, stopped German attacks.

The Soviet fire support system was important in defensive MOUT. The "strongpoint" was the basic component of these fire support operations. Field Artillerymen commanded strongpoints created from destroyed buildings within the city. The German attack pattern within the city determined the placement of these strongpoints.

The German pattern of offensive MOUT varied slightly from their pattern of mobile operations. The compartmentalization of urban terrain forced the Germans to scale down their combined arms teams to battalion task forces. The air strikes within the city created obstacles to German advances and were generally ineffective. Therefore, the Germans conducted air strikes on a much more limited scale. However, the Germans still followed the same five phases of operation, so the Soviets could exploit their efficiency.

Based on this pattern, the Soviet strongpoint commander would select and prepare a position only if it met the following criteria:

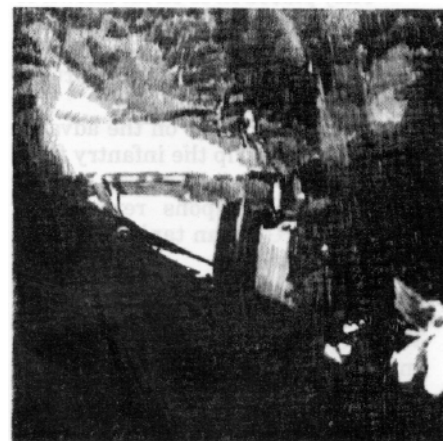
- Dominate several hundred meters of street to include any large intersections.



The Soviets would use the Katyuski multiple rocket launcher to fire massive counterstrikes against the German troop concentrations acquired during the night.

- Provide good observation and fields of fire for both direct and indirect fire weapons.
- Provide for mutual support between all arms assigned to the strongpoint (infantry, armor, artillery, and engineers).
- Allow integration with all natural obstacles in the area (primarily buildings and rubble).

The first countermeasure the Soviet fire support system employed was the extensive use of patrols and observation posts to detect targets. They placed these OPs to observe all avenues of approach. OP parties remained concealed within the rubble of the buildings to maintain observation. The Soviet observers became masters of the art of camouflage.



The Soviets became experts at infiltrating forward observers through German lines, and these observers became masters at the art of camouflage.

The Soviets also used the buildings to conceal weapons from observation by German aircraft. Further, by using both buildings and rubble, the Soviets hardened their artillery positions against both air and artillery fires. Buildings were especially important for protecting softer targets such as command posts, ammunition dumps, and service units.



Soviet Redlegs used buildings to conceal weapons from observation by the German Luftwaffe.

Once the air strikes ended, the Soviet fire support system performed five tasks to counter the German attack:

- They placed fires on all known or suspected German observation posts.
- They placed fires on all known or suspected German artillery, antitank, and armored positions.
- They placed fires to support all obstacles.
- They placed fires on the advancing soldiers to strip the infantry from the armor.
- Artillery weapons reverted to direct fire if German tanks closed on the strongpoint.

The Soviets conducted offensive MOUT against an enemy under siege. The Germans had developed well-entrenched positions but enjoyed little prospect of liberation. As a result, the Germans fought hard for each position. Soviet fire support conducted three major tasks within Stalingrad: attack preparations, close supporting fires

and harassment and interdiction fires.

During its offensive, Soviet artillery discovered two techniques of preparation: standard preparation and surprise preparation. In the former, they fired on targets to enhance the movement of maneuver forces. These fires neutralized known enemy positions, isolated and weakened the objective area, and prevented the reinforcement of the objective. The Soviets used the latter in concert with a surprise attack. After troops had occupied an attack position just short of the objective, Soviet Redlegs would place initial fires on the objective itself to neutralize resistance. Then they would shift fires to seal the objective from reinforcements. After the artillery shifted fires, Soviet maneuver forces attacked the objective itself.

The Soviets' close support consisted of indirect and direct fires. During the planning phase of a Soviet attack, leaders determined targets and created a fire support plan. As the maneuver forces advanced they were accompanied by direct fire assault units. These assault units ranged in size from a single gun to a battalion. As these gun units accompanied the Soviet infantry, their fires were under the direct control of the maneuver commander who directed them against hard targets (i.e. bunkers, gun emplacements, and tanks).

The Soviets also used large-scale harassment and interdiction fires at Stalingrad. Questioning of German prisoners led the Soviets to conclude these fires accomplished three tasks — they discouraged German movement during the night, they produced casualties amid the hard-pressed German defenders and they contributed to a feeling of hopelessness in the 6th Army.

Lessons for American Artillery

Soviet operations in Stalingrad provide numerous insights for the American artillerymen in the United States Army, Europe (USAREUR). These lessons fall into three areas: MOUT applications, survivability, and fire planning.

The Stalingrad experience demonstrated that the artillery could provide valuable contributions to both defensive and offensive operations by concentrating on MOUT principles. Today's fire support team (FIST) members must recognize the importance of the reconnaissance patrol. The FIST must know every street, building, and obstacle within its assigned sector of the

city. Further, given the compartmentalization of urban terrain, the FIST should deploy in numerous small elements to assure complete coverage of its sector. The FIST must have both navigation and observation skills during periods of limited visibility.

The gun section must develop expertise in close combat skills. Each section should learn how to achieve a high percentage of first-round, direct fire hits against moving targets at very short engagement ranges. The gun section also needs to train as a rifle squad. On many occasions, gun sections at Stalingrad had to deploy as patrols, infantry squads and tank killer teams to respond to German penetrations.

The battery leadership must serve as both fire support element and strongpoint commander. As a result, the commander must develop the skills of the artilleryman, infantryman and engineer. He must choose gun positions that allow his weapons to perform both direct and indirect fire mission. He must also emplace his infantry, armor, antiarmor and engineer assets to assure the survival of his strongpoint and counterattacks by his maneuver forces.

The battery must deploy into the urban environment with the appropriate ammunition load for its mission. This ammunition load must include armor defeating shells, concrete piercing shells, antiarmor weapons, and mines.

The urban environment offers many ways to enhance artillery survivability. Guns receive both cover and concealment from the buildings and rubble. Crews can harden the gun position by reinforcing natural protection. The urban setting also provides protection for friendly soft targets within the strongpoint. Basements, warehouses, and barns can house fire direction centers, support elements and ammunition. The urban setting also provides many natural obstacles that prevent the enemy's rapid approach. Should the strongpoint become untenable, obstacles can slow the advance of the enemy. Egress should be accomplished only on routes that are covered by fire from other strongpoints. Stalingrad showed that pipes and culverts can provide protection for the strongpoint's wire communication. In the USAREUR scenario, the artilleryman must be prepared to use civilian phone lines for backup communication as long as such lines remain viable.


Stalingrad demonstrated that the compartmentalization of urban terrain prevents the use of massed fires.

Therefore, commanders must decentralize fire support planning to the strongpoint level. The strongpoint can provide most of its own fire support. Fire support planners must observe the enemy for patterns and then analyze them for weaknesses.

Stalingrad demonstrated that soft targets are more vulnerable than armored formations, and foot infantry is the softest target. Infantry should be engaged whenever possible. The Soviet fire support planners acquired targets extensively at night. Simply by moving carefully through its sector, the FIST can obtain many targets with night observation devices (NODs).

Conclusion

The battle of Stalingrad proved one of the turning points in the Second World War. The Soviets won this battle through the tremendous sacrifice of their troops. The adaptability and effectiveness of the Soviet's fire support

system were key in this battle. Given the large stretches of urban terrain found in the Central Region, all leaders and units in NATO need to become expert in all aspects of war in the city. The artillery must lead the way in such training. 

Captain Robert D. Lewis was commissioned from the Reserve Officer Training Program at the University of California, Davis. He is a graduate of the Field Artillery officer basic and advanced courses at Fort Sill, Oklahoma. He has served in both command and staff positions in the 17th Field Artillery Brigade in VII Corps culminating in commands of both Batteries B and Service, 1st Battalion, 36th Field Artillery. He has served as a commander in the 10th Special Forces Group (Airborne). He is currently assigned to 2d Battalion, 10th Special Forces Group (Airborne), Fort Devens, Massachusetts.

Right by Piece

NOTES FROM UNITS

Exercise Ardent Ground

There were blue skies and little wind as the American paratroopers descended onto Everleigh Drop Zone at Salisbury Plains, England, to start the Ardent Ground annual Allied Command Europe (ACE) Mobile Force (AMF) artillery exercise.

The exercise involved artillery and mortar troops from England, Belgium, Italy, Germany and the United States.

Lieutenant Colonel Mike Smythe, the force artillery commander, said he was particularly impressed when the Americans parachuted in only one minute behind schedule after flying all the way from Italy. *"It's an amazing achievement,"* he noted.

Battery D, 319th Artillery (Abn), and the 81-mm mortar platoon of Combat Support Company of the 3d Battalion, 325th Infantry Regiment, Airborne Battalion Combat Team from Vicenza, Italy, participated in the two-week, multi-national artillery exercise.

The Battery's First Sergeant, Timothy D. Riley, described the aim of the exercise as *"overcoming equipment and language barriers."* Riley added *"Through Ardent Ground, NATO can train together."*

Italian Major General Franco Angioni, the AMF commander, said these troops from different nations work so well together because they are on the same



level of professionalism. He added, *"What we don't want to do is change the traditions and customs of each country."*

Ardent Ground concluded with a jump into Juliett Drop Zone in Italy.

The AMF is a small and highly mobile force consisting of about 5,000 men. It can defend itself from aggression, and its mission covers the Northern and Southern borders of Allied Command Europe. Since most of these areas are defended only by forces of the countries in which they are located, the ACE Mobile Force is ready to deploy at the first sign of trouble.

Australian Visits Field Artillery

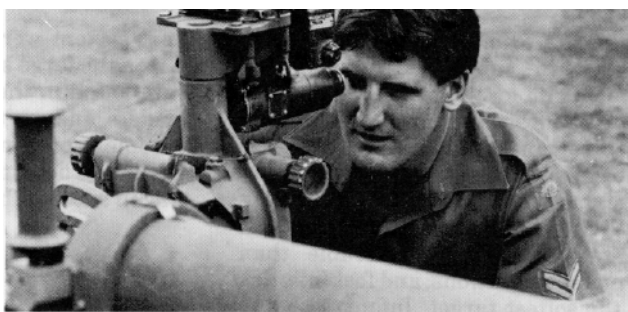
Traveling to foreign lands is an almost routine part of the job for many soldiers of the 25th Infantry Division (Light), at Schofield Barracks, Hawaii. But for many troops in other countries the opportunity to travel abroad comes along rarely, if at all.

"I was probably the happiest bloke in my unit before I left," said Bombardier Grant Boyce, of the 108th Battery, 4th Field Regiment, Royal Australian Artillery.

Boyce spent six weeks on Oahu working and living with the soldiers of Battery A, 7th Battalion, 8th Field Artillery, as part of the Pacific Armies Look Exchange. Joining Boyce in the exchange were 13 of his fellow countrymen and three Papua New Guinean soldiers.

"We deploy all around Australia," Boyce explained, *"but we just can't afford to send thousands of people to Japan and Korea."*

Boyce, who is the only artilleryman among the visiting Australians, remarked on some of the differences between the two units.



"The 105 millimeter howitzers we use are much smaller than the ones you've got here," he said. *"Their range is a bit less, but they're very air portable. And they can be stripped down into parts that can be carried by four men."*

Boyce said he was impressed by the size and technology of the US Army *"I always thought my post in Australia was fairly big, but compared to Schofield, it's quite small."*

"Your technology is more modern than ours. The communications equipment in this battery is a bit more technical than ours."

Oklahoma National Guard Makes History

The Oklahoma Army National Guard made history on 10 July when it became the first reserve component to receive the new generation of advanced rocket artillery.

In a ceremony at Camden, Arkansas, the first NG launcher for the multiple launch rocket system (MLRS) rolled out of the LTV Aerospace and Defense Corporation factory and into the Oklahoma Guard's 1st Battalion, 158th Field Artillery.

The organization will receive a full battalion of 29 new launchers, each packing the firepower of an entire battalion of conventional artillery.

The 1st Battalion, 158th Field Artillery, commanded by Lieutenant Colonel Jim Swafford of Cushing, fired its final 8-inch artillery round during annual training at Fort Carson, Colorado on 23 June.

To accomplish its new mission, National Guard leaders reorganized the battalion. Its headquarters will remain in Lawton, along with Headquarters and Service Batteries and Battery A. Battery B (minus Det 1) will form in Duncan with Detachment 1 in Walters; and Battery C (minus Det 1) will locate in Chickasha with Detachment 1 in Marlow.

"It is only fitting that the 158th Field Artillery was selected for this honor," said Major General Ansel M. Stroud, Jr., President, National Guard Association of the United States. *"The combat history of this organization, as well as the peacetime accomplishments of this battalion as an 8-inch self-propelled unit, make it the only logical choice,"* he said.

Major General Donald F. Ferrell, the Adjutant General of Oklahoma, said, *"This is a great day for Oklahoma and especially for the personnel of the 1st Battalion, 158th Field Artillery. The battalion's past accomplishments in*

training and maintenance, as well as its constantly being at authorized strength are reflected here today at this historic occasion."

Colonel Rosindo E. Caldarone, Jr., Chief, Logistics Division, Army National Guard, cited the Oklahoma National Guard's maintenance program as one of the reasons Oklahoma was selected to field the new system. *"Nationwide the mission-capable rate for maintenance of equipment is 90 percent, and that's acceptable; but Oklahoma consistently rates at 94-96 percent,"* he said.

National Guard leaders expect a dramatic increase in Oklahoma National Guard artillery power and unit effectiveness. The system is so easy to operate that even a single soldier can perform a complete firing mission, including rocket-pod reloading. However, the standard crew is three persons.

The US Army fielded the first MLRS battery in early 1983, and as new warheads and system variants are developed, MLRS will keep America's total force the unquestionable leader in advanced artillery capabilities.



Soviet Наршение упрабленил



by Major Jeffrey D. McCausland

The Soviet military is very honest in presenting its doctrine in the various military journals published in the Union of Soviet Socialist Republics (USSR). As noted by former Soviet Defense Minister Andrei Grechko, "We have never concealed, and do not conceal, the ...tenets of our military doctrine."

Doctrine is much more important in the Soviet military system than in most Western ones. According to Marshal N. V. Ogarkov, former head of the Soviet General Staff:

Doctrine is a system of guiding principles and scientifically substantiated views of the Communist Party of the Soviet Union (CPSU) and Soviet government on the essence, character, and modes of fighting a war ...as well as the military developments, training, and preparing the Armed Forces and the nation to crush an aggressor.

However absorbed a Commander may be in the elaboration of his own thoughts, it is necessary sometimes to take the enemy into considerations.

Sir Winston Churchill

If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself, but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle.

Sun Tzu, The Art of War



Soviet command and control disruption is defined as:

...a complex of measures aimed at disruption or disorganization of the command and control of enemy troops, weapons, and combat equipment to eliminate or reduce effective enemy weapons employment and to disrupt the coordination of his troop operations. Command and control disruption is achieved mainly by the destruction and suppression of enemy command and control systems and electronic equipment.

Doctrine is a goal that planners and developers use in designing units and equipment. The existence of the Soviet general staff provides a closer integration of doctrine across the various military services of the Soviet Union. Consequently, the Soviets consider their military doctrine to be one of their greatest assets. They attempt to distill military wisdom and experience, and amend and improve it by experiment exercise, and reevaluation. In this process, Soviet planners consider the impact of modern technology to be a very important variable. When forced to face a technical problem in design, the Soviets do not necessarily expect to solve it by a technological development. Instead they rely on a more clever use of existing technology, an alteration in the deployment of forces, an increase in quantity or a combination of all these points.

Soviet doctrinal writers have always shown a great interest in the destruction and disruption of enemy command and control as key to victory. The advent of tactical nuclear weapons and the revolution in command and control technology in the West have made attacking enemy command and control centers a vital topic in Soviet military publications. The wartime effectiveness of friendly Field Artillery, conventional as well as nuclear, will depend to a considerable degree on our appreciation of Soviet command and control countermeasures.

Command and Control Disruption

In achieving disruption of command and control, time is of critical importance. As one Soviet expert observed:

In military affairs, time is a most important factor in a combat situation. The experience of military history demonstrates that the advantage in war lies with the side that uses time in the most rational manner.

Another Soviet military scholar noted that during modern combat the loss of troop control, even for a short time, might lead to "...fatal consequences and ultimately to the failure of the combat mission." Thus we must remember that to achieve the command and control disruption outlined in Soviet doctrine, it isn't necessary to destroy something. They may achieve overall success simply by lengthening an adversary's decision cycle and thus precluding his quick reaction to changes in the combat situation.

The Soviet definition of command and control disruption encompasses many different active and passive measures. In this article I will confine my discussion to two—electronic warfare and Soviet special operations forces (known as Spetznaz). I have selected these because of the wholesale improvement the Soviets have made in both areas in quantity and quality of equipment and troops during the last decade.

In Soviet military doctrine electronic warfare is defined as:

The set of measures performed for reconnaissance of the electronic material and systems of the enemy and their subsequent electronic neutralization, as well as the measures performed for the electronic protection of friendly electronic material and systems. Radioelectronic combat measures are carried out in conjunction with the destruction of electronic material, primarily by weapons that home in on emissions.

Electronic Warfare. (Radioelectronic Combat)

The Soviets have a standard doctrine controlling radioelectronic combat (REC) for all branches of their armed forces. The Soviets divide radioelectronic combat into the following areas:

- Interference
- Deception
- Protection
- Destruction
- Reconnaissance

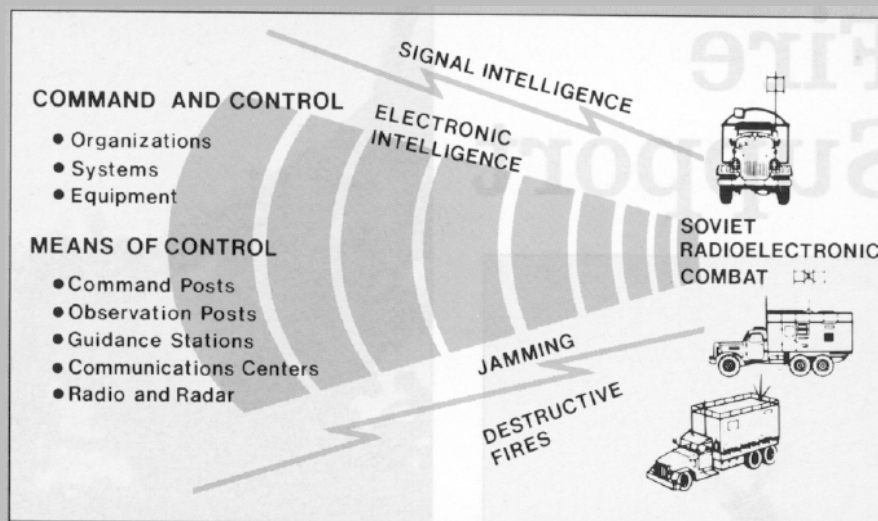
For the purposes of this discussion, I will concentrate on interference and destruction of command and control.

Soviet military literature considers REC one of the three major postwar developments—along with automation and airmobility. Their doctrine emphasizes the integration, timeliness, purposefulness, and mass at all levels. The principles of REC permeate Soviet doctrine from weapon system design and development to its actual employment in battle.

For example, a cursory examination of force structure reveals the integration of REC in the Soviet order of battle. Each Soviet combined arms or tank army has a radio and radar intercept battalion as well as a radio intercept battalion. Currently, 19 electronic reconnaissance battalions are in operation at full capacity as part of the Group of Soviet Forces, Germany. These battalions will allow the Soviets to engage command and control targets successfully with indirect fire weapons or aircraft. While there may be a low probability of destroying the target (because of location accuracies at extended ranges due to hardening, etc.), one must remember destruction of the target is not necessary for success in command and control disruption. Partial destruction or damage to command and control modes or forced displacements will degrade any headquarters' ability to analyze the situation, formulate plans, and dispense combat orders.

The integration of radio direction finding equipment and indirect fire weapons is demonstrated by the organization of artillery units. Each artillery regiment has a direction finding capability and with ideal conditions, can engage a target within 120 seconds after being acquired. During the Yom Kippur War (1973), the Arabs used Soviet direction finding equipment and doctrine with great success by a combination of electronic signature, maps, and known Israeli tactical doctrine.

Jamming is a second major way that the Soviets conduct radio electronic



Electronic warfare is one way the Soviet Armies disrupt command and control.

combat. Due in part to their lack of sophisticated technology (by Western standards), the Soviets use a large number of high-powered jammers. This is an example of the concept of "mass" as a principle in Soviet doctrine. It also shows their efforts to seek solutions which do not rely on technological breakthroughs.

The Group of Soviet Forces, Germany (GSFG) has hundreds of land-based, airborne, and helicopter-based jammers. An awesome array of equipment allows the GSFG to interrupt a significant portion of allied communications in time of war. Once again, it is not necessary for the Soviets to deny Allied use of the radio electronic spectrum to be successful. Their ability to jam completely certain key transmitters or to slow the transmission of orders may be all that is necessary in disrupting NATO command and control. Some Western experts believe the Soviets will attempt to disrupt at least 50 percent of an adversary's command and control assets by the use of jamming.

Soviet "Spetznaz" Forces

A second way the Soviets attempt command and control disruption is by use of special operations forces (SOF). Soviet use of special operations forces is consistent with both their doctrinal concept of enemy command and control destruction and their ability to seek solutions without relying on advances in technology.

The use of Spetznaz units is common in Soviet military doctrine even prior to World War II. Joseph Stalin wrote in 1937, two years prior to the beginning of World War II:

To win an engagement in time of war, it is necessary to have several corps of Red Army men. But to pluck the victory on the front, several spies somewhere on the army staff, or even division staff, capable of stealing the operational plans and giving it to the opponent is all that is necessary. To construct a great railroad bridge, thousands of men are needed, but to blow it up, several people are sufficient.

During World War II, Soviet special operations forces:

- Wrecked 20,000 trains.
- Destroyed 12,000 highway and railroad bridges.
- Disabled 4,000 tanks.
- Killed or wounded 1,000,000 "Fascists."
- Tied down 24 German divisions.

Scholars also credit the Spetznaz with a large part of the Soviet success in the Manchurian Campaign against the Japanese, and in Operation Concerto (the Russian assault across the Dnieper River).

The expansion and improvement in Spetznaz forces and NATO's vulnerability to SOF attack was clearly illustrated in the past five to 10 years. The number of units (each containing 25-50 men) in the Warsaw Pact has grown to approximately 800. During Wintex 1983, a simulated Soviet Spetznaz team arrived at Gatwick Airport outside London before Allied forces intercepted it. In his book *Inside the Soviet Army*, Viktor Suvorov, a Soviet defector, notes that a Soviet general frequently remarked, "Supposing we repeat Concerto, not against bridges and roads but rather against NATO command and control systems?" It is also important to remember such forces might begin

their operations even before the beginning of the actual hostilities.

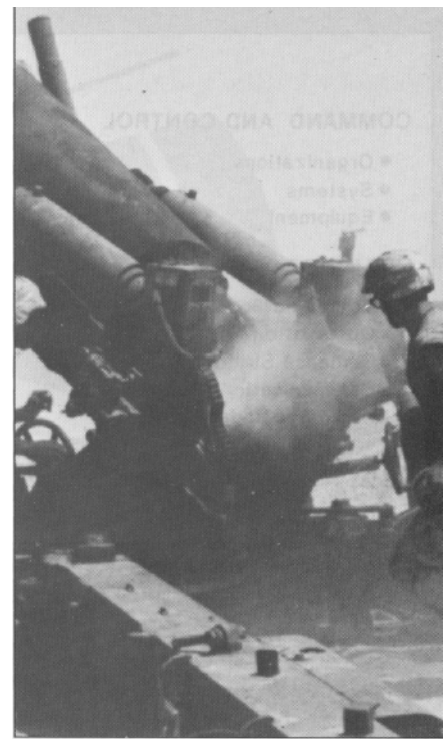
Conclusions

This has been a biased presentation of what the Soviets "would like to achieve" in any conflict. Therefore, it is a goal and not necessarily a reality. But we must consider the Soviet doctrinal process and the critical command and control disruption plays in current Soviet military thinking when we develop and evaluate the US Army's command and control systems. Such a review is vital to the Field Artillery community in light of our unique command and control requirements and the high priority the Soviets have given to the destruction or neutralization of nuclear-capable units and fire support assets. Advanced communication technology (such as burst transmission, frequency hopping, directional antennas, etc.) offers increased protection from jamming and radio direction-finding. New artillery tactics, such as dispersed battery positions and frequent relocations, will reduce our vulnerability to counterbattery fire. However, these latter changes in tactics have associated operational costs in logistical resupply, unit sustainability, and battery self-defense that leaders must consider carefully. Time is a critical variable and is a crucial aspect of any review process. For even if Soviet REC capability is unable to destroy our systems or preclude friendly use of the electromagnetic spectrum, their ability to degrade our command and control and lengthen our "decision cycle" could be of critical importance in any future conflict.



Major Jeffrey D. McCausland received his commission from the US Military Academy at West Point, and is a graduate of the Field Artillery officer basic and advanced courses and the Command and General Staff College. He earned a master's and a doctorate in International Relations from Tufts University in Massachusetts. He served as the S-3 and the executive officer for 2-28 Field Artillery in VII Corps after serving as a battery commander at the 24th Infantry Division Artillery at Fort Stewart, GA. Major McCausland earned a John M. Olin Fellowship to study Western European Defense Policy at the Center for International Affairs at Harvard University.

Fire Support



for the Light Division

by Lieutenant Colonel Heinz A. Schiemann

Many of the United States' interests face daily threats. The reality exists that the US Armed Forces may see combat. Although general war is least likely in the spectrum of conflict, it poses the gravest consequences. However, it is more probable for the armed forces to become enmeshed in regional conflicts in Latin America, Southwest Asia or the Middle East. At a time when smaller

budgets and diverse interests constrain our resources, the United States still must meet the threat. This requires carefully and efficiently built forces that can meet the challenges of a changing world.

The deployment of heavy forces to outlying geographical areas might well be inappropriate, if not impossible, given the limited strategic lift resources in times of crisis. The US

Army needed a new type of infantry division that could deploy rapidly on contingency operations without committing the strategic reserve of the Army using about 500 C141B aircraft sorties. The Army created the light infantry division. But while it is strategically responsive, flexible, and easily sustainable, it has less firepower and mobility than a heavy division. From its inception, leaders have questioned whether this division could fight at all levels of conflict, against either a light or heavy foe. This article will examine the issues dealing with the adequacy of fire support for light infantry divisions. Is there sufficient organic fire support available for contingency missions? What total fire support is available for the low-to high-intensity levels of conflict?



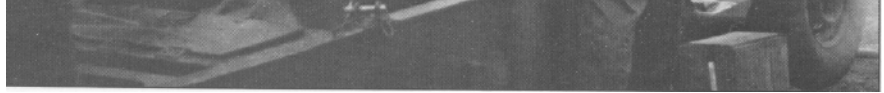
Background

The light division design posed special dilemmas for early planners. Initially the division had a dual mission: deploying to regions worldwide and reinforcing forwardly deployed NATO forces. With these missions, the division would face enemy forces that would vary from light infantry to tank formations. This meant the division should have antiarmor weapons, be tactically mobile, and possess excellent targeting and fire support resources. Yet it had to be air-transportable with a minimum of strategic lift.

To meet these requirements, we needed a robust force. In the first design of the division in 1980, the planners opted for a division force structure that definitely did not take into account the limited strategic airlift.

The artillery community recommended a division artillery (Div Arty) comprised of three direct support battalions with three batteries of eight M198 155-mm towed howitzers and the multiple launch rocket system (MLRS). The infantry, combat support, and combat service support asked for similarly robust force structures. These requests were adequate to meet the threat but too heavy to satisfy the requirement for a strategic, flexible and light force that could react in contingency situations.

Leaders realized they had to modify the operational concept of division



employment to gain this flexible, lean, and light force capable of deploying in about 500 C141B sorties.

The Light Division

A new division concept modified the offensive and defensive roles of the light division. To support forwardly deployed forces such as NATO in the offense, the division would attack only infantry. Against motorized forces, the division would attack only on terrain favorable to the division or against a weakened enemy. In defense the division would be most effective against similar infantry forces, but it could also defend against motorized forces on restrictive terrain. The division no longer could defend in place against heavy enemy armored forces on mixed or open terrain. The current division has the following strengths:

- It is strategically deployable with 500 C141B aircraft sorties. It can reinforce any theater rapidly.

- It can perform decentralized mobile operations in restrictive terrain.

- It requires only modest logistical support.

- It can perform operations during reduced visibility.

- It is particularly well-suited to low-intensity conflict (LIC) employment.

The division's weaknesses are:

- It has poor tactical mobility in open terrain when opposed by motorized forces.

- It has limited protection against artillery, nuclear and chemical fires.

- It has no truly effective light or medium antitank systems for dismounted infantry.

- It needs air superiority for mobility.

The organic artillery fire support consists of three 18-gun 105-mm towed artillery direct support (DS) battalions. Currently, these are M102 howitzers with a range of 11,500 meters. But these will change to the



The British M119 light howitzer offers our Redlegs extended ranges and more munitions options.

M119, with a 17,500 meter range using rocket-assisted projectiles (RAP). There is one eight-gun M198 towed 155-mm battery with a range of 30,000 meters with RAP. To acquire counterbattery targets, each DS battalion has the capable Q36 radar. The fire support teams (FIST) don't have lasers, but there are three combat observation lasing teams (COLT) in headquarters, division artillery, and one in each DS battalion that provide the lasing capability.



The inclusion of M198 towed 155-mm howitzers gives maneuver commanders more fire support assets.

By equipping the DS battalions with the 105-mm howitzer in lieu of the 155-mm howitzer, the light infantry division gains an advantage in strategic lift at the expense of a more capable weapons system. Although the 105-mm gun is a great antipersonnel weapon with a rapid fire capability, it has limited range and unfortunately lags behind in development of improved ammunition. It has no family of scatterable mines, no antitank capability except in a direct fire role and no antimateriel rounds. The other means of indirect fire support are two 60-mm mortars at the rifle company level and four 81-mm mortars in the light infantry battalions.

The attack helicopter battalion and the reconnaissance squadron of the combat aviation brigade provide the division's main antiarmor defense. The fire planner should know the



The M102 towed 105-mm howitzer is the backbone of fire support for the light infantry division.

light infantry engineers have no mechanical mine-laying capability, no dump trucks and little or no terrain reinforcement potential. This creates an additional challenge to fire planners who assist in the construction of the barrier plan with scatterable mines.

Threat

In the review of the table of organization and equipment (TOE) it becomes obvious the division is light but has the capability to react to the most likely deployment scenarios worldwide. The questions now are: can the division sustain itself and does it have the fire support available for the initial battle? The threat is formidable. It is folly to believe that the division's enemy is not well armed and heavily mechanized. The heavy threat is great even in areas we consider infantry country. For example, one-third of the Nicaraguan Army is mechanized. According to the latest edition of *Soviet Military Power*, US Armed Forces may encounter the following Soviet-delivered equipment in the most likely contingency areas:

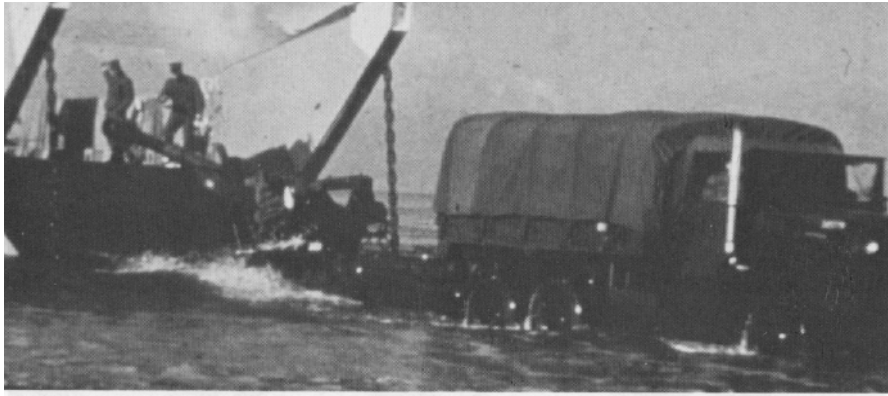
	NEAR EAST SOUTH ASIA	SUB-SAHARAN AFRICA	LATIN AMERICA	EAST ASIA
Tanks or self-propelled guns	3,600	630	505	280
Light armor	6,565	1,000	280	250
Artillery	3,810	2,050	895	390
Surface-Air missiles	10,400	1,890	1,300	430

Soviet equipment around the world, according to *Soviet Military Power*.

Employment

When the light division deploys, it must be ready to fight from the outset even if it has a deterrence mission. The days when a superpower's fighting force remained unchallenged are gone. The nuclear mantle cloaking a superpower from attack has disappeared as a deterrent because smaller nations realize superpowers won't use their full arsenal of weapons. Weaker nations have called the US' bluff in Vietnam and Lebanon. The Soviet Union is discovering this now in its war with Afghanistan.

To fight from the outset, the division not only must consider deployment, but also survivability. Proper task organization and phasing of assault and follow-on echelons for contingency operations will be very important. In the deployment phase, the division—which does not have a forced entry capability—will arrive by air or sea in a landing zone secured by an advanced US force or by friendly forces of the country involved. Their assault force will have to secure the immediate area while follow-on elements arrive.



Redlegs can provide timely and accurate fires—whether they're Marine artillerymen landing with the M198 in Lebanon (top) or air transporting the M102 in Vietnam.

The operation will continue until the soldiers secure the lodgement area for the division. The operation is most vulnerable in the initial phase when the force may experience enemy counterattacks. A pure infantry force without sufficient artillery, air or naval gunfire support would indeed do poorly against a threat. The light division in particular must rely on all available fire support assets since it does not have the antitank companies of the airborne divisions nor the sufficient 155-mm artillery the air assault division has. A division commander cannot rely on only one means of fire support and expect to win in combat. The Israelis in the Yom Kippur war of 1973 paid dearly to learn this lesson.

The Lesson of the Yom Kippur War

After the 1967 War, the Israeli Air Force became armor's main support arm because of their total air supremacy. Many believed tanks and aircraft could win any war. Accustomed to continuous support from the air, the Israelis neglected other fire support means. When the Israeli Air Force could not accompany the armor into battle during the 1973 war because of the air defense threat, the Israeli armor forces lost dearly. The Egyptians had learned a lesson from the 1967 war. Realizing they could not match the Israelis in the air, the Egyptians instead set up an effective air defense system consisting of layers and layers of surface-to-air missiles and the deadly 23-mm ZSU 23:4 anti-aircraft guns. This formidable air defense system shut down the air force over the battlefield, except for critical operations when Israeli air support was needed and used but at considerable expense. Without the usual air support, ground forces had to learn to rely once again on their own indirect fire support systems. But until they learned to use their artillery to suppress the Sagger antitank gunners and enemy artillery positions, the Israelis paid dearly with their tanks.

The Falkland Campaign Experience

On the other hand, the British Army provided a good example of proper employment of forces fighting as a combined arms team. Although they fought 8,000 miles from home, British leaders knew the terrain well. They deployed their forces on terrain favoring infantry. There were no roads, the ground was marshy bog, and they could move only by marching or by helicopter. The two brigade-sized task forces used their limited fire support assets with maximum effect.

For example, in the victory at Goose Bay that signalled British dominance in the Falklands campaign, a British battalion supported by only three 105-mm howitzers with 1,000 rounds of ammunition and two 81-mm mortars defeated a reinforced, dug-in Argentine battalion that was supported by artillery. The British fire support proved to be accurate and broke the resiliency of the Argentine defense, while the Argentines failed to take advantage of their artillery. The British had planned to use the 4.5-inch gun of the frigate HMS Arrow, but because of a mechanical failure in its single gun, this support was not available.

In the subsequent march across East Falkland to Port Stanley, artillery remained one of the few means of proven fire support available. The British Army used most of the lift sorties of the helicopter transport to move the guns and ammunition. Ground forces used naval gunfire primarily to launch harassment and interdiction campaigns against the Argentines at Port Stanley. The British limited close air support because they used the available Harriers to defend the fleet against fanatical Argentine air force attacks. They were able to integrate these other means of fire support because both air liaison officers and naval gunfire spotters operated closely with the task force. Furthermore, there was complete integration of maneuver and fire support practiced as "infantrymen would not move from their perimeter unless they had gunner support," as reported by Major Gerald R. Akhurst in the March-April 1984 issue of the *Field Artillery Journal*.

The Lessons of Urgent Fury

In contrast to the British experience in the Falkland Islands, the American experience in Grenada was more frustrating on the subject of fire support. Possibly because of the short preplanning phase and brevity of the campaign, American soldiers did not always orchestrate fire support. This did not detract from the overall success of the exercise, but it did provide valuable lessons for future operations. All types of fire support were available to the 82d Airborne Division task force commander and to the Ranger task force commander. These included mortars, 105-mm artillery, US Air Force AC130 gunships, US Navy A7 ground-support aircraft, and naval gunfire.

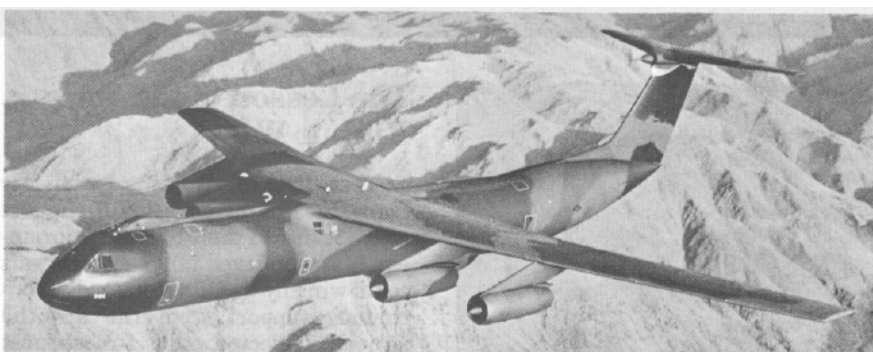
Unfortunately, the key fire support advisers to the task force commander failed to deploy with the assault element of the 82d Airborne Division. Both the air naval gun liaison company (ANGLICO) team and the habitually supporting tactical air control party (TACP) failed to be in that critical first assault element, owing to the short alert time. Because of the secrecy of the operation, leaders did no real predeployment planning or the integration of fire support.

Once the task force was on the ground, they still couldn't resolve the problem with naval gunfire because they lacked communications codes and did not adhere to joint doctrine. Although two destroyers were on station to provide initial support to the ranger battalions and then the 82d Airborne Division, "they did not deliver a single round of naval gunfire in support..." reported Major Scott R. McMichael in the March-April 1985 issue of the *Journal*. However, the A7s and the AC130 gunship did provide excellent support. During the raid at Grand Anse to rescue American medical students, the fighters coordinated fires from A7 aircraft, artillery, mortars and marine attack helicopters in a flawless manner. The overall conclusion from this experience has been that joint forces should work together before deploying to a combat zone.

Fire Support for the Assault Echelon

Having examined these historical examples of a light force in combat, there are some conclusions we can draw benefiting the task force commander of the assaulting element. Each force deployed as a task force had fire support as part of the assault element. Sometimes commanders included it at the expense of maneuver forces. US forces need more than one means of fire support in case one is neutralized—like the Israeli loss of close air support and the British loss of naval gunfire. To fight as a combined arms team, representatives from all fire support elements must be present at the outset and advise the commander of the capabilities.

Having said this, what forces should make up the assault echelon of a light division? The task force commander will face a tremendous sortie constraint. He may only have 30 sorties or less of C141B aircraft for fire support. Certainly, in peacetime the value of fire support isn't obvious. There may be a tendency to fill all aircraft with infantrymen who can storm out of the aircraft and secure the airhead. But



The US Air Force's C130 (top) and C141B provide the sorties for our highly mobile light artillery units.

when anticipating combat, the commander should include his organic mortars and at least his slice of organic 105-mm howitzers. But will he include a portion of the 155-mm howitzer battery? Probably not, although a strong case exists for the inclusion of 155-mm howitzers. As demoralizing as artillery and mortar fires were in the Falklands campaign, "the peat fields literally absorbed the steel splinters from exploding shells." Rounds of 105-mm guns literally burst within a few meters of Argentine soldiers without



The O36 Firefinder radar acquires targets in the enemy assault echelon.

killing them. The 105-mm howitzer is a great weapon for suppression and for antipersonnel targets, but it fires a light projectile and is inadequate against a mechanized force. Although the light forces are getting the British lightweight gun with improved range and performance, the ammunition is still not as capable as that of the 155-mm howitzer system.

To illustrate, the M198 howitzer has a RAP range of 30 kilometers. With the help of a Q36 counterbattery radar to acquire the target, the howitzer can engage any enemy battery that attacks the assault echelon. The 155-mm howitzer can fire an antipersonnel-antimateriel round that kills personnel with fragments and destroys armored personnel carriers with shaped charges capable of penetrating up to 2.75 inches of homogeneous armor plate. Redleg leaders have made significant advances with the development and fielding of the cannon launched guided projectile (CLGP), or Copperhead. Finally, the artillery has a projectile that can destroy both moving and stationary armor to a range of 16,000 meters. The round has a laser seeker and guidance package that steers the projectile into the target lased by an observation team equipped with a laser designator and tracker. This projectile gives the task force commander the flexibility to destroy armor across a wide front in close support and in depth.



Redleg leaders have made significant advances with the development and fielding of systems like the Copperhead round (top) and the ground-vehicular laser-locator-designator. (G-VLLD).

The 155-mm artillery system also owns a family of scatterable mines (FASCAM) munition. There are two types of either antipersonnel or antitank mines, both of which have a short (less than 24 hours) or long (more than 24 hours) self-destruct mode. With an effective range of 18,000 meters, the task force commander can emplace "minefields deep behind enemy lines with no distinctive signature to alert the enemy that mines have been laid." The Field Artillery can deliver these minefields extremely rapidly in response to the needs of the battle. As such, artillery scatterable mines can serve as point minefields to disorganize the enemy,

canalize him, and prevent his use of high-speed avenues of approach. An artillery unit can provide a sizable antitank minefield of 250 by 300 meters by firing as few as 10 rounds of antitank ammunition. For a target of opportunity, artillery can lay a minefield 400 by 400 meters by firing as few as 24 antitank scatterable mine (SM) projectiles and 6 antipersonnel SM projectiles. While none of these munitions are currently available for 105-mm howitzers, they can complement the 105-mm when fired from the 155-mm system.

Commanders can divide these artillery systems to accomplish the direct support mission. Although it's not a

good idea to have composite batteries without proper support over a prolonged period, it is precisely suited for a temporary assault echelon. The 105-mm battery, or slice thereof, can provide suppressive and neutralizing fires with its conventional ammunition, while the 155-mm howitzers with the improved and smart ammunition would attack targets beyond the capabilities of the 105-mm howitzers.

Given the scarcity of strategic lift, but considering the threat which may face the assault echelon, a minimum of two howitzer sections with fire direction capability need to deploy early with the assault echelon. If they deploy in a C141B, the aircraft loader can plan for a howitzer with prime mover along with another smaller vehicle or 463L pallet. The unit would need a second aircraft for the second howitzer and prime mover. A third aircraft could carry six pallets each configured to carry approximately 56 complete rounds of ammunition of the types described above. If the unit deploys in C130 aircraft, it would need twice the number of aircraft.

Some may argue that deploying a two-gun platoon of 155-mm howitzers with the assault echelon is too little to be effective, costs too much to lift, or is too heavy a gun system for the assault echelon. However, the experience of the XVIII Corps Artillery (provisional) in providing support to the 82d Airborne Division during exercises since URGENT FURY proves the concept of augmenting organic 105-mm battery support with 155-mm howitzer sections does work. Units have tested this concept routinely during emergency deployment readiness exercises (EDREs) and during the first light task force rotation at the National Training Center in September 1985. The support provided varied from two gun platoons to four gun batteries or more.

As to the argument that one platoon can't provide the fire support needed, artillerymen need to stop judging effectiveness only by massive delivery of conventional high explosive rounds. Improved munitions make single or platoon fires effective. The area coverage and effectiveness of cluster ammunition such as dual purpose improved conventional munitions (DPICM) are comparable to battery fire of high explosive projectiles. The emplacement of minefields with scatterable mines (FASCAM) is not necessarily a timed mission and one gun can fire them. And depending on the method of engagement, one gun can fire the Copperhead projectile to destroy a tank.



Two-gun platoons of M198 howitzers with improved munitions can compensate for the limitations of the organic direct support battalions' 105-mm howitzers.

Admittedly, three C141B aircraft may be a considerable amount of lift for one two-gun platoon package, but commanders can do it with less if necessary. No artilleryman enjoys deploying a towed howitzer without its own prime mover, but that may be an option. When the 3d Battalion, 8th Field Artillery sent a platoon in February 1986 to Avon Park, Florida, in support of a battalion task force of the 82d Airborne Division, it had to rely on a 2½-ton truck instead of the usual 5-ton to shuttle the guns from the airfield to a nearby firing point. Obviously, this is not an ideal situation, but it demonstrates the flexibility a unit must have to accommodate mission constraints.

Field Artillery certainly will not be the only fire support available to the assault echelon. Both close air support and naval gunfire may assist the task force to secure the lodgement area. The fire support elements will need to coordinate this support at all levels with the advice of members of the tactical air control party (TACP) and the air naval gunfire liaison company (ANGLICO). These representatives are essential to the successful employment of these fire support means. URGENT FURY clearly demonstrated what can go wrong when circumstances exclude these members from the planning process or initial deployment.

Only through rigorous training and thorough evaluations could units develop procedures that ensured units were ready to deploy in a timely manner. Similarly, light divisions must develop procedures to ensure their ready battalions train with all their attachments and that they will deploy with them on time in the assault echelon. If naval gunfire or naval air is

considered a primary fire support means, then the ANGLICO that would habitually provide support must station a team with the assault unit to ensure they make the load times. In this unpredictable world when light divisions must deploy on a moment's notice, the readiness of the assault attachments must equal that of the supported force.

Commanders can organize the follow-on echelons of the light division similarly, depending on the situation. Certainly, the elements of the organic combat aviation brigade significantly enhance the antitank capability and tactical mobility of the division.

Fire Support in a Mid-to-High Intensity Conflict

Commanders would allocate the fire support for a division in a mid-to-high intensity conflict depending on the unit's employment. Normally, the division would operate as part of a corps or joint task force. It would not operate on terrain or in a situation for which it was not structured. It would have combat missions in rear and urban areas or any other close terrain. The division could also perform high risk operations such as stay-behind operations where elements of the division would let the first echelon bypass and then interdict that echelon's lines of communications and attack its command posts and logistical facilities.

Since the division would need more than the organic fire support, it would receive its slice of the corps' air support and additional artillery. The corps commander could either attach or make a Field Artillery brigade or battalion responsive to the division

commander. Additionally, other combat, combat service or service support could go to the division to make it more robust.

Conclusion

Light infantry is the dominant arm in low-intensity conflicts where rapid movement to the conflict area will depend on its strategic deployability. Leaders and planners have made a tradeoff between fighting power and strategic deployability, but the light division can still fight and win. Having said this, it can only accomplish its mission by fighting as a combined arms team. This is particularly critical in the assault phase of the operation. Commanders must use all fire support means, and they must deploy with the assault echelon. Two-gun platoons of 155-mm howitzers with improved munitions can compensate for the limitations of the organic direct support battalion's 105-mm howitzers.

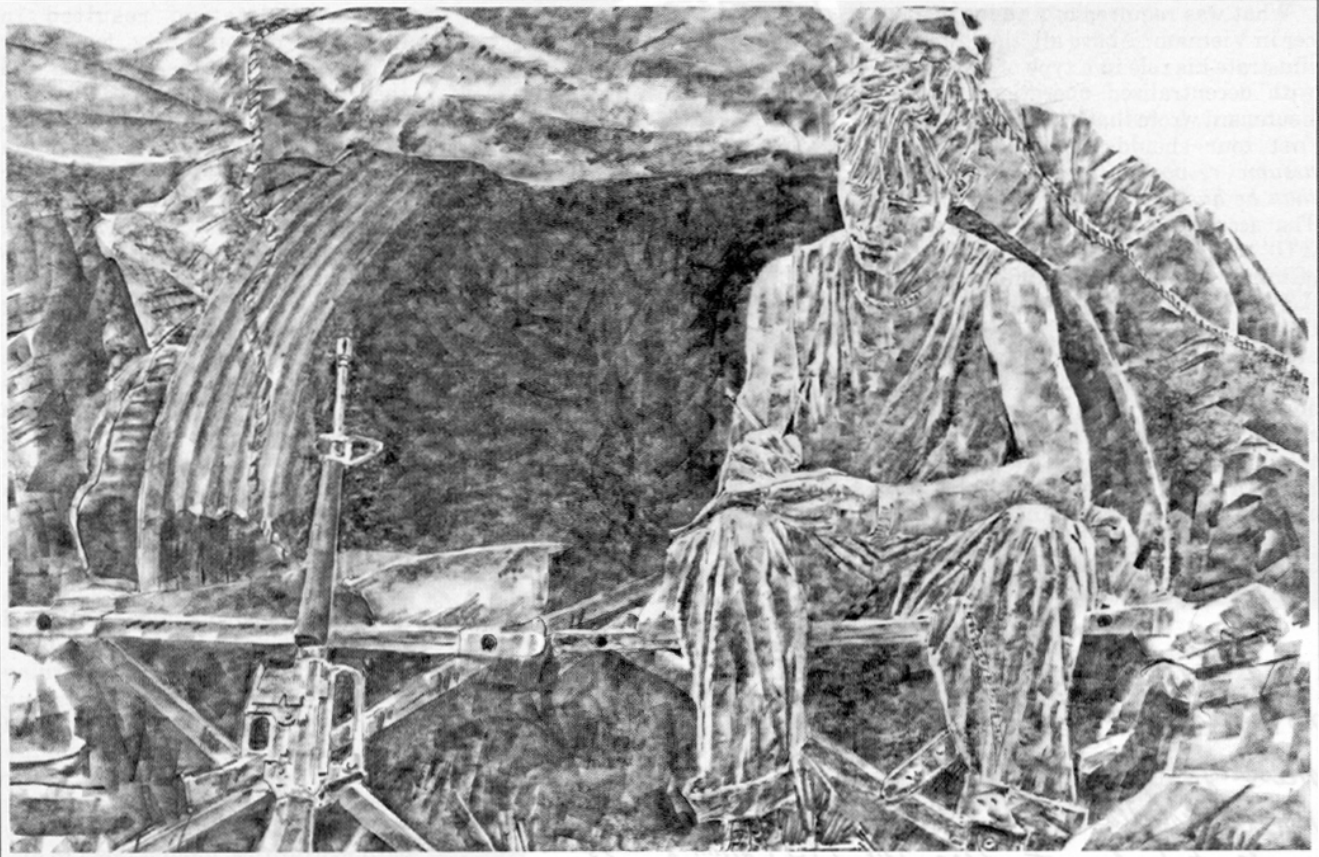
Recommendation

The corollary "to train as you would fight" is to train with whom you would fight. Light task forces must train with all their attachments, to include the TACP and the ANGLICO party down to battalion level. Attached elements to the task force must exercise the same degree of readiness as the assault force. Units must develop procedures to accomplish this; they must upload equipment and palletize ammunition to ensure timely departure with the assault echelon. EDREs should exercise not only the ready battalion but all of the attachments, particularly those from other units or services. The goal of the light task force is the same as that of other US combined arms teams: to fight and to win!



Lieutenant Colonel Heinz A. Schiemann commanded the 3d Battalion (towed 155s), 8th Field Artillery, and served as S-3 for the 18th Field Artillery Brigade. He received his bachelor's degree in history from Cameron University and received his commission from Field Artillery officer candidate school. He graduated from the Field Artillery officer basic and advanced courses, the Armed Forces Staff College and the Army War College. Colonel Schiemann received his MA in public administration from Shippensburg College in Pennsylvania and now serves at the Field Artillery School.

Field Artillery



Letters from Vietnam

by Captain James Jay Carafano

During the Vietnam War the Military Art and Engineering Department at the United States Military Academy at West Point solicited letters from officers on their experiences in Southeast Asia. The Academy posted the letters for cadets to read, and some instructors discussed them in the classroom. Today these firsthand and spontaneous remembrances of the war provide a unique source for studying the role of the junior officer in low- to mid-intensity conflicts.

Figuring prominently in the collection are comments on the Field Artillery. Since the Army is revitalizing its capability to fight a low-intensity war with the creation of the light infantry divisions, it is a particularly fruitful time to assess the issues of tactical employment of artillery in Vietnam. This article surveys leadership challenges to remind today's Field Artillery lieutenants and captains of the problems and considerations they may confront in future conflicts.

For the young military professional who did not serve in Vietnam, my advice is to learn all you can about the war and try to understand it.

General Bruce Palmer author of *The 25-Year War, America's Military Role in Vietnam.*

What was required of a young officer in Vietnam? Above all, the letters illustrate his role in a type of warfare with decentralized operations. One lieutenant wrote that an officer on his first tour should be prepared "to assume responsibilities far greater than he has ever experienced before." The account of a forward observer (FO) serving as perimeter defense officer for a battalion landing zone (LZ) provides a good example. He describes the duties artillery lieutenants performed in crisis and often without guidance. During an attack on the LZ, the tactical operations center (TOC) that would have coordinated the position's defense was knocked out in the first few moments of the battle. The lieutenant recalled:



I had my radio with me at the TOC and proceeded to put it on my back and relay messages to the 105 mm howitzer battery. I coordinated with the air observer and instructed him to fire the 175 (mm gun), 8" and 155 (mm howitzers) defensive targets. Then I began to adjust Blue Max (Cobra gunships). I had to relay messages continuously for both the infantry and artillery, plus coordinate the insertion and air cover for the medevacs. After approximately 400 rounds of enemy artillery landed on us contact was broken. I continued to adjust Blue Max on likely avenues of withdrawal and insured that the air observer knew what the ground situation was. As the medevacs came in, the infantry would open up with a small arms mad minutes to prevent the NVA (North Vietnamese Army) from downing any of the choppers.

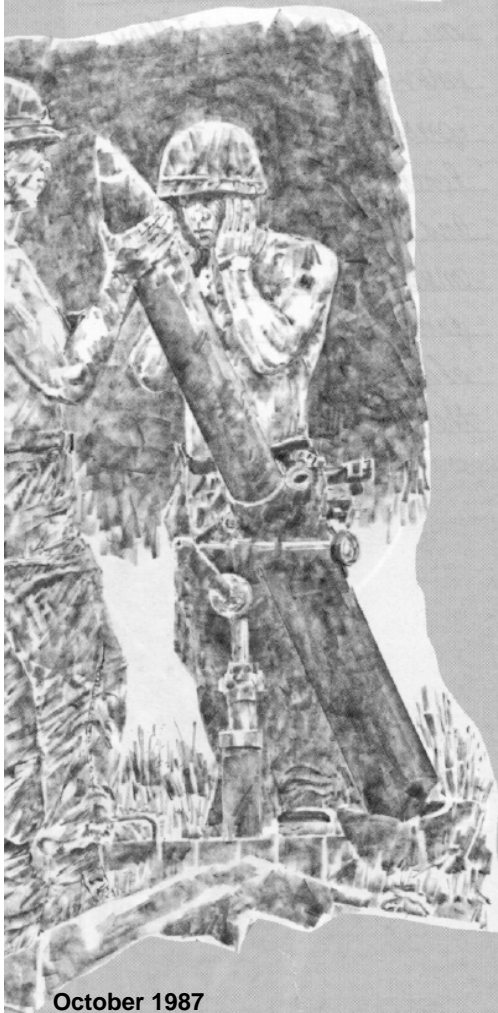
Decentralization resulted in increased responsibility for junior officers. Although the helicopter and the radio could connect a division commander to an individual platoon, in the heat of contact these links often broke down. The fire support officer with a maneuver company and the battery commander at a remote fire base became fire planners, coordinators and decision-makers who often played the decisive role in directing tactical operations.

A junior officer's personal courage and his decision-making abilities sometimes served him better than classroom training. In November of 1966, Battery B, 1st Battalion, 19th Field Artillery, and Battery C, 6th Battalion, 16th Field Artillery, occupied LZ Bird in the Kim Son Valley. Shortly after 0100 hours the enemy attacked. An FO serving with the infantry company assigned to defend the perimeter recalled, "I was awakened at 0105 hours in the morning by .50 caliber bullets whizzing through our ponchos. It just didn't seem possible, but within five minutes they had penetrated 50 meters inside perimeters." The enemy immediately hit the fire direction centers (FDC) with mortar fire, forcing them to displace. They also disabled the radios. For the entire battle, soldiers at LZ Bird couldn't coordinate the support of nearby units. With the perimeter breached, enemy soldiers quickly overran Battery C. The Battery B executive officer, Lieutenant John Piper, took command of an unoccupied gun. He assembled a crew and fired two Beehive rounds "through half his battery directly into the entire length of Battery C." Witnesses claimed this action turned the tide of the battle quickly. Piper provided the courageous leadership required to galvanize disorganized resistance into an effective defense of the firebase.

The letters give the overwhelming impression young officers saw themselves assuming great responsibilities that they tried to execute as professionally as possible. This led many of them to discuss their own training and preparation as combat leaders. How do you prepare an artillery lieutenant to fight this kind of war? In his "Vietnam Notebook" S.L.A. Marshall wrote that junior commanders making decisions in combat, "became more conditioned by the habits of a particular war than by prior education." Letters that commented on training generally agreed with Marshall's conclusion. Young officers felt inadequately prepared for duty in Vietnam. There was a great deal of on-the-job

training. A forward observer shared his thoughts after a firefight:

We were fighting our way in a ditch when the company commander was seriously wounded and I took charge of the company. It went through my mind what Tom Woolsey had told me before I left (in Vietnam). He had an article where the artillery forward observer had to take charge of an infantry company and I had better study up on infantry tactics. Well I never thought it would happen to me but it did.



October 1987

The need for young officers to be both flexible and well trained is an almost universal recommendation in the letters. They are replete with examples of lieutenants performing duties above and beyond their training. An artillery lieutenant wrote about all the "infantry stuff" he did, leading patrols and setting up ambushes. Nor was artillery strictly a Redleg business. An infantry company commander recounts the story of how he had to take over for his forward observer after the observer had been wounded. A signal lieutenant remembered when he took over the perimeter defense and also coordinated all fire support. He wrote, "I found myself wishing I had stayed alert in class. Just because I wore crossed flags didn't mean I would be working strictly in communication."

The letters illustrate that in wartime the formal training augmenting branch introductions is not always satisfactory. For example, General David Ott points out in his monograph, *Vietnam Studies: Field Artillery, 1954-1973*, the US Army Field Artillery School at Fort Sill expended great effort to develop instruction applicable to the war. But many field commanders felt this training was insufficient. Redleg leaders attempted to supplement service schools with in-country schools on forward observer and fire direction center procedures. The quality of these courses varied, and several officers complained that their preparation was inadequate. An artillery lieutenant wrote when he arrived at his unit:

The battalion S-3 knew the forward observer schooling during OCS (Officer Candidate School) or OBC (Officer Basic Course) was not sufficient training for a forward observer in Vietnam and sent me through the next battalion forward observer school. Regrettably, it seemed like a review of OBC because the instructors had never been forward observers.

Lieutenants found the most effective training took place in a fire base or on patrol with an infantry platoon.

One officer blamed part of the training shortfall on the differences between preparing at Fort Sill and fighting in Vietnam:

In training we would shoot possibly 50 rounds for a few hours in one area, then hit the pack. But in Vietnam (we fire up to) 2,000 rounds. We shoot in all directions instead of into one impact area and the clincher is (we conduct) 24 hour day operations.

In addition, artillerymen rarely practiced one of the artillery's most critical missions, shooting danger-close. Leaders frequently used artillery fire with friendly forces in contact to blunt an enemy assault. In his book General Ott estimated gunners fired 50 percent of all fire missions close to friendly positions. One forward observer remembered how he called in artillery so close he showered the platoon with fragments of bamboo, thankful at least that it wasn't shrapnel. This type of war experience isn't duplicated in a training environment.

A lieutenant bitterly wrote, "I found in almost all situations the school solution was lacking." The ultimate preparation for these officers would be at a training range simulating the operations of low-intensity warfare. This training should permit analysis of the tactics as is done at the new Joint Readiness Training Center. Just as importantly, an officer needed to develop the "imagination and resourcefulness needed in combat conditions rather than to rely on book solutions." The Vietnam letters are filled with examples. One lieutenant arrived in Vietnam only to discover he

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had to find his unit himself. "I knew that as a young lieutenant I would have to take command of situations," he wrote, "but I didn't expect that within my first few days in a war zone I would be hitchhiking and finding my assignment by myself." Training should teach officers to be flexible, self-reliant and creative in dealing with tactical problems and not expect "school solutions" to provide all the answers.

Whether they learned their skills at Fort Sill or in the A Shau Valley, these letters underscored the need for well-trained artillery officers. These Redlegs linked the maneuver unit to the most powerful asset on the battlefield—firepower. One Lieutenant Colonel wrote, "I have burned up my ammunition supply rate (ASR) plus somebody else's, but I believe in massive response. I'd use a nuc if they'd let me." Another officer added, "...by letting the artillery and the air do it, we are making use of tactical advantages that the Viet Cong [don't] have." Letters written by both maneuver and combat support officers support this conclusion. In fact, the whole collection emphasizes the importance of fire support in tactical operations.

The employment of firepower in low-intensity conflicts is one of the most important issues for today's junior officers to understand. In a low-intensity conflict, he is the only one to decide when and where to call in fire support. One of the harshest criticisms of American tactical operations in Vietnam is that we tended to rely too heavily on firepower to the exclusion of maneuver. General Dave Palmer wrote in *Summons of the Trumpet*, that the traditional tactics of "...fire and maneuver had switched over to one of maneuver and fire" and "the utter dependence on firepower represented a failure of the US system in fighting in Vietnam."

The use of firepower in Vietnam will no doubt remain a controversial issue. In his book, *War Without Fronts*, George Thayer said 70 percent of the artillery was fired during periods of light or inactive combat intensity. There is no question that in some instances the use of firepower appeared abusive. Take the example of a battalion commander who received some ground fire while on an air reconnaissance. He immediately called in suppressive fire. In his letter he wrote, "Would you believe 100 rounds of 81-mm mortar, 300 rounds 105-mm howitzer, two flights of gun ships, and six F100s in retaliation for a burst of AK [AK47 assault rifle]?"

Although there is not enough information in this particular letter to draw a firm conclusion, it seems such an expenditure of firepower was excessive and unproductive.

However, there are other instances where massive firepower wasn't enough. One new infantry company commander was very critical of his performance in his first major contact with the enemy. The operation began by bombarding "the objective area, an abandoned village, with four air strikes, artillery and naval gunfire." When the company moved on the objective they were pinned down immediately by fire from a trench line and bunker complex. After the battle the captain wrote:

This was a rude way for me to break in. As I sit here and look at the silver star I received for that day I wonder if there was something I should or could have done to prevent our casualties. I'd probably never really but I know now never to underestimate the enemy because he is an expert at fighting from well prepared and concealed positions.

In this case it was apparent an inexperienced officer used massive fire support, but to little advantage. It is naive to expect firepower alone can do the job. On the other hand, another officer related a story of how fire support was used effectively by an experienced battalion commander to support the operations of maneuver units.

The VC (Viet Cong) now found themselves pinned down in the trenches, and by this time they were cut off from retreat or reinforcement by artillery falling to their rear. Both companies (US) remained in place for approximately two hours as air strikes began at a distance of five hundred meters to our front and worked into a distance of one hundred meters. As the air strikes and artillery moved in the VC were pressed in closer to our lines to avoid the air and artillery. D company moved through the pinned down VC eliminating them as they moved forward.



Field Artillery

While the debate over how best to employ firepower will certainly continue, we must remember the effective use of firepower is essentially a product of sound leadership, realistic training and the combat experience.

The importance of physical courage and decisive leadership in junior officers inevitably raised the question of how they reacted in combat situations. The letters have surprisingly little to say on this, although one captain did offer his personal conclusion. Of his first experience under fire he remembered:

I found that the responsibility of leading men under fire consumed all my thought and energy. I actually was very calm and had little fear for my personal safety. I attribute this directly to the competitive training I received as a result of participating in athletics when I was required to think and act rationally under physical and mental stress.

In assessing the effectiveness of firepower, we have to consider the enemy's response. Both the Viet Cong and the North Vietnamese Army adopted tactics to counter the overwhelming combat support available to American forces. For example, one officer described how the Viet Cong tried to entice his unit into terrain where the US unit couldn't use heavy artillery. The Viet Cong also restricted firepower by retaining the initiative. They would initiate contact and control their own attrition. In the case of a deliberate attack, the enemy attempted to close quickly with US

forces. This caused the Americans to withhold fire support, or call in fires on themselves. The enemy also hardened positions and in some areas developed extensive tunnel networks to conceal activities and offset the effects of indirect weapons. In a protracted conflict against a determined foe, we must constantly revise and refine our tactics. Those actions that now constitute accepted tactics of low-intensity conflict were only expedient solutions proposed by officers in the fields of Vietnam.

The war in Vietnam raised other issues in addition to the ones discussed above. For example, in a war without fronts, the enemy and the civilian population often intermingled in one area. As a result, fire control and coordination became an especially difficult task. Not all officers were happy with the restrictions. One officer wrote, "clearance to fire artillery always was a problem, and slowed the fire missions consistently." Another wrote, "I don't mind telling you I've mixed opinions about this war—maybe because I'm so far down the chain and some of the rules are hard to play by."

A related issue to the problem of command and control of artillery support was the possibility of receiving friendly fire. Although only a few letters relate instances of friendly fire, when it did happen, its effects far exceeded immediate casualties. In one letter, an officer relates the unsettling effect an incoming round had on the unit until they realized they had been hit only by an enemy mortar and not American artillery. It illustrates how friendly fire can depress the entire unit's morale, decreasing combat effectiveness. A war without fronts demands exacting standards from the young artillery officer who must develop techniques and standards to bring in fire support without endangering friendly forces or civilian populations.

A low-intensity conflict may prompt young officers to reevaluate the principles of fire support they learned in the officer advanced and basic courses. Officers raised on a diet of AirLand Battle doctrine will feel uncomfortable with the tactics employed in Vietnam. Batteries in Vietnam provided fire support to units committed over a large area. Commanders tended to decentralize fire support rather than to mass artillery fires. "Most fire missions processed in Vietnam by our battalion," one battalion executive officer wrote, "were initiated directly at the battery level with the target acquisition



element sending the call for fire support [directly] to the batteries." Today's junior officer must realize that what they learn in formal schools is only the foundation on which they will build the techniques to be employed in battle.

However, one principle is unchangeable—the maneuver commander shapes combat support. In Vietnam the intimate relationship between fire support and maneuver elements meant artillery batteries had to be as mobile and responsive as the supported units, and commanders offered the fire base as the mobility solution. They permitted the artillery to follow maneuver almost anywhere in the theater of operations. General Ott, in his study of artillery in Vietnam, concluded that, "the fire base proved its worth in Vietnam." Although this may have been true, the fire base also introduced the young artillery officer to a new set of problems ranging from logistics to battery defense.

For example, a new emphasis on security was the salient characteristic of fighting from a firebase. In a war without fronts, artillery units had the same considerations for security and self-defense as infantry units. Artillery units often had to develop security plans without sufficient equipment or personnel. Redlegs adopted several techniques, attempting to exploit their

superior firepower. They used "killer junior" or "killer senior" rounds (155-mm or 8-inch high explosive round with a mechanical fuze set with a time-of-flight corresponding to a range of less than 100 meters and resulting in a deadly low air burst). Some argued this method could be more effective than the vaunted beehive because it could penetrate into defilade positions and dense foliage. Another technique they tried was "red splash," an artillery mad minute of mortar and direct artillery fire scheduled at predesignated times along the perimeter to discourage Viet Cong infiltration. However, the most important techniques proved to be standard infantry defense—observation and listening posts, integrated fields of fire, hardening of positions, and adequate battlefield intelligence. Artillery officers need to know these tactics of small unit defense.

But if the enemy chooses to take on a fire base, a relatively infrequent occurrence in Vietnam, the encounter proved to be intense and violent. As one officer concluded in recounting the battle of LZ Becky:



This kind of warfare was a rare experience for American Field Artillerymen. But it is the kind of conflict we can expect to fight in low-intensity conflicts.

Although the actions of officers in battle was potentially significant, the letters indicate there was little actual combat time. Fighting the enemy was the exception rather than the daily routine. However, Vietnam also demanded another kind of courage from junior leaders as they strove to maintain their integrity in an increasingly controversial war. Already exposed to the debate over the war at home, the American soldier had many legitimate questions and concerns. Providing straight answers to these tough questions required honesty, clear thinking and exceptional professionalism from junior officers. It was not an easy job. For example, one lieutenant wrote about a meeting he had with his men as they deployed to Vietnam in 1967.

The artillerymen must man their guns to provide direct fire and the mortar men must fire their HE and illumination rounds, so these men are exposed. As a result the 155 (mm howitzer) contingent on LZ Becky suffered 75% casualties including the death of the battery commander. The next day we found one wounded (North Vietnamese Army soldier) outside the wire on the north east. The prisoner later said that his battalion had been assigned to hit the LZ, but as they approached they had been discovered and our direct fire artillery and mortars hurt them badly. The prisoner stated that in his sixty man company there were only ten or so who were not killed or severely wounded when it came time to attack.


THE MEN STARTED INTO THE PHILOSOPHY OF WAR IN SOUTHEAST ASIA. WHY IS THE U.S. INVOLVED? WHAT DO THEY HOPE TO GAIN? HOW IS PATRIOTISM AND FREEDOM INVOLVED IN A WAR WHEN THE VIETNAMESE THEMSELVES DON'T EVEN LIKE US? IT SEEMS LIKE THE PEOPLE AT HOME ARE AGAINST THE WAR. WHY IS THE WAR LIMITED? WHY DOES POLITICS ENTER INTO THE PICTURE? WHY ARE WE LOSING SO MANY MEN AND PLACES? I TRIED MY BEST TO ANSWER THEIR POINTED QUESTIONS. A WELL INFORMED SOLDIER IS A BETTER MAN AND YOU JUST DON'T TELL YOUR MEN "YOURS IS NOT TO REASON WHY....."

It is unlikely this lieutenant resolved for his men all the controversies surrounding the war. The debate over the war added a new and demanding facet to the leadership challenge for junior officers in Vietnam.

Still, a leader could earn the respect and confidence of his men by addressing their concerns with candor and conviction.

In many respects the artilleryman's experiences in Vietnam represent a unique chapter in the American way of war. It provides an excellent opportunity to examine the employment of firepower in low-intensity conflicts. The tactics leaders developed for the war in Southeast Asia exploited superior American firepower. The letters from Vietnam illustrate the impact these tactics had on junior leaders. For artillery officers, the low-intensity

conflict brought new considerations in leadership, integrity, training, command and control, and the appropriate use of firepower and battery defense. Unfortunately, the letters do not address every issue that concerns soldiers. For example, there is little information on the relationship between officers and enlisted men. There is no mention of the impact of 12-month combat tours on unit cohesion and performance. Still, the letters provide valuable insights into understanding the Redleg experience in Vietnam and in suggesting issues of concern for junior officers in evaluating

artillery doctrine for low-intensity conflict. 

Captain (P) James J. Carafano graduated from the US Army Military Academy at West Point, and the Field Artillery officer basic and advanced courses. He served as a Special Weapons Detachment team leader in Korea, a staff officer in 214th Brigade, as a fire direction officer, and assistant S-3, and battery commander in Lance Battalions at Fort Sill. He received an MA in History from Georgetown University and is now an assistant professor at USMA.

View from the Blockhouse

FROM THE SCHOOL

Bulletin Notes

The Field Artillery bulletin staff welcomes Major Charles W. Pope, Jr. as our new editor. Major Pope received his commission from the United States Military Academy. His Field Artillery tours include assignments as Pershing platoon leader, battalion adjutant, battery commander, S3, and USMA admissions media

officer. He has an M.A. degree from the University of Georgia, and an M.S. degree from Long Island University. Major Pope is a graduate of the US Army Command and General Staff College. Before his assignment to Fort Sill, he served as battalion executive officer with the 1st Battalion, 15th Field Artillery, Camp Stanley, Korea.

Although his arrival wasn't "On Time," his guidance and direction are very much "On Target!"

The CALL Corner

The Center for Artillery Lessons Learned (CALL) received the following issues from Field Artillery units after visits to the National Training Center and major exercises. The CALL office researched or staffed the responses through the US Army Field Artillery School.

Send your comments and questions to the Commandant, United States Army Field Artillery School, ATTN: ATSF-OA, Fort Sill, Oklahoma 73505-5600.

Some field units question the doctrinal employment of the 60-mm mortar. Representatives of the Infantry Schools' mortar platoon officer's course said they teach direct-lay and line-of-sight firing for the 60-mm mortar. Some Redlegs feel this method does not work because it takes too long for the average soldier to adjust fire on a target at 60-mm range.

The Infantry School instructors emphasize the preferred use of the 60-mm mortar in the conventional bi-pod-mounted mode. Using the forward observer and fire direction center (FDC) procedures, this mount allows the mortar to fire from a concealed position while remaining protected from line of sight weapons in the target area. It also allows a significant increase in range. The Infantry mortar platoon



course teaches both conventional and hand-held methods of employment to give the commander the option to employ either one. The average infantry soldier can deliver accurate mortar fires from a 60-mm mortar in the hand-held mode more quickly than from any other indirect fire weapon currently fielded.

Other unit leaders maintain that soldiers in MOS 13F and company fire support officers (FSO) need to know more about using mortars. Mortars are a very significant part of the fire support for the maneuver commander—and this asset is maximized when the forward observers understand their capabilities.

The Field Artillery School currently teaches mortars to the Field Artillery officers basic course, the cannon qualification course, and the 13F advanced noncommissioned officer course. Advanced course students now receive two periods of instruction. In addition to these blocks of instruction on mortars, instructors continually remind students of the capabilities of mortars during practical exercises and group discussions. Field Artillerymen and the maneuver commander must develop a good understanding that allows mortar and artillerymen to train together. This will give FSOs and 13Fs a better understanding of mortar capabilities. Starting with FAOAC 1-88, the Fire Support and Combined Arms Operations Division will start an integrated program of instruction that will have artillery and maneuver instructors stressing *FIRE SUPPORT!*

A current fire support issue is the ineffective use of battalion and company mortars. Many times this happens because:

- The FSO doesn't integrate the mortars into the fire support plan.
- The FSO doesn't use the mortars to their full capability.
- The Mortar platoon leaders use poor positioning and movement techniques.

Successful units at the National Training Center have one thing in common: good home-station training. Interviews with maneuver commanders, their FSOs, and mortar platoon leaders reveal a sound training strategy based on the following principles:

1. Maneuver commanders take a personal interest in their mortars and ensure:

- Mortar platoon leaders go to the mortar platoon officer course at Fort Benning, Georgia.
- Everyone understands the capabilities and limitations of the mortars.
- Staff training includes the combined arms team—that means the mortar platoon leader, too.
- They clearly establish priorities of fire and command-support relationships.

2. FSOs and fire support team personnel are committed to use mortars in the battle. Home station training routinely includes training with the mortar platoons. The FSO and the fire support team are proficient in the tactical employment of mortars, and assist the mortar platoon with survey.

3. Mortar platoon leaders make sure their mortar crew understands and can execute the basics. They aggressively seek opportunities to improve gunnery, movement, and survivability techniques and to develop contingency plans for communications.

MOUT Fuze Delays Explosion Inside Urban Building

BLOSSOM POINT, MD—A 120-mm projectile armed with a M734 multi-option fuze was used in a demonstration of its ability to penetrate the roof of an urban building and explode after a set delay during a recent firing test here. Harry Diamond Laboratories conducted the test of the fuze's usefulness in military operations against urban terrain (MOUT).

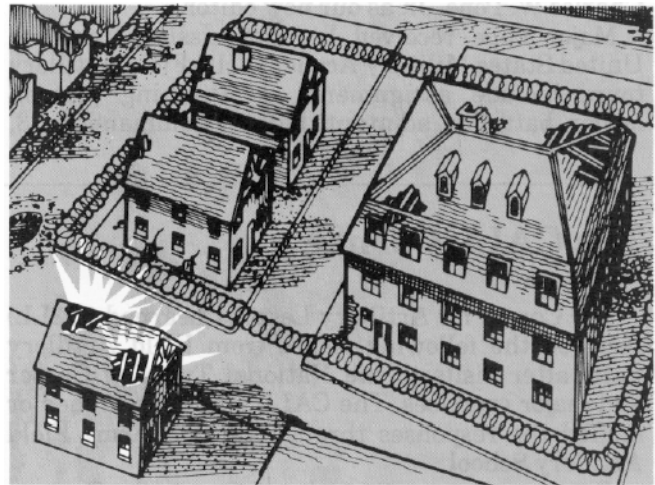
Spokesmen said crews fired a total of eight rounds. Each round contained an M734 multi-option fuze set to detonate 50 to 100 milli-seconds after impact. The delay mode is one of four alternate modes of the M734 fuze that troops can preselect before firing the round. The other three modes or options are proximity, near-surface burst, and impact.

Test coordinator Jonathan Fine said the rounds impacted against the wall of a building that simulated a roof. The simulated roof had a layer of slate followed by a layer of 3/4-inch plywood. The plywood was backed by two-by-10 foot rafters with 16-inch spacing between centers and contained thermal insulation enclosed by plaster board.

Fine said these materials are similar to the types used in urban dwellings and buildings in Europe that could be occupied by snipers.

During the late-November tests, crews also fired a modified version of the M734 fuze—a digital, electronic time (ET) fuze—using the German-made Diehl mechanical time fuze as a control.

"The electronic time fuze proved both easier to set and much more accurate than the Diehl fuze," Fine



said. The electronic time fuze requires no special tool while the Diehl fuze requires two men using a special wrench. Moreover, a single person can set the ET fuze by rotating thumb-wheel switches which not only display the set time but also produce "clicks" that can be both felt and heard.

In battle, mortar ammunition is used to destroy, illuminate, or obscure targets. For the ET tests, Harry Diamond Laboratories armed 29 81-mm mortar rounds with fuzes set to burst in the air at predetermined times. These times ranged from 8.1 to 32.8 seconds.

HDL is one of seven Army research laboratories nationwide that report to the US Army Laboratory Command (LABCOM), the newest major subordinate command of the Army Materiel Command (AMC).

TOE Versus MTOE

A great deal of confusion exists in the Field Artillery community about what a table of organization and equipment (TOE) does or does not do. Clearly, there is a need to explain the purpose, the development cycle, and the transition of the requirements document—the TOE—into an authorization document—the modified table of organization and equipment (MTOE). First, some terms require definition.

- **TOE**—A TOE is a table which describes the normal wartime mission, organizational structure as well as the personnel and equipment requirements for a type unit. It is the basis for the MTOE, an authorization document. Headquarters, US Army Training and Doctrine Command (TRADOC), is the proponent for the development, revision, and maintenance of all TOEs. The US Army Field Artillery Center and Fort Sill is the subproponent for all Field Artillery TOEs. Headquarters, TRADOC, cannot change, modify, or otherwise alter any MTOE.

- **MTOE**—The MTOE prescribes the modifications to a base TOE necessary to ensure that a unit can perform its assigned mission in a specific geographical or operational environment. It is the document which allows units to requisition personnel and equipment. Most Field Artillery units are organized under an MTOE, and the remainder normally fall under a table of distribution and allowances (TDA). Each major Army command (MACOM), the National Guard Bureau (NGB), and the Office of the Chief, Army Reserve (OCAR), has the responsibility for the development, revision, and maintenance of the MTOEs for the units within their areas of responsibility. The MACOMs, NGB, and OCAR cannot change, modify, or otherwise alter any TOE.

- **TDA**—The TDA is a document which prescribes the organizational structure, personnel, and the equipment authorizations and requirements of a military unit designed to perform a specific mission for which there is not an appropriate TOE. TDA units are normally nondeployable and are uniquely developed to perform a specific support mission. The US Army Field Artillery School (USAFAS) provides a perfect example.

Figure 1 lays out a simplified developmental cycle of a TOE. Normally, a TOE evolves as the result of a study process such as Division 86 or, more recently, the Army of Excellence (AOE) initiatives. For example, the AOE effort resulted in a complete redesign of not only the Army's light divisions but also of the heavy division artillery structure. TOEs for these new designs are complete. In general these new TOEs call for a division artillery of three 155-mm self-propelled direct support battalions and a one by nine multiple launch rocket system (MLRS) battery.

The TOE for unique divisions—airborne and air assault—plus other Field Artillery units also went through redesign and documentation. In support of these studies, the Directorate of Combat Developments, USAFAS, prepares automated unit reference sheets (AURS) for the Field

Artillery elements of the divisions. The AURS (which is similar to the TOE but lacks detail) reflects personnel requirements established by doctrinal manning levels, standard position requirements, and manpower requirements criteria (MARC). The appropriate field or technical manuals drive the identification of doctrinal manning levels. Standard position requirements—determined through tests, maneuvers, and experience—come from the number and types of units and personnel supported. These positions have administrative, legal, and logistics clerks, supply specialists, aides, cooks, and drivers. The annual maintenance man-hours (AMMH) required to maintain that unit's required equipment determine MARC positions. Detailed analysis of the unit's combat mission reveals the equipment requirements.

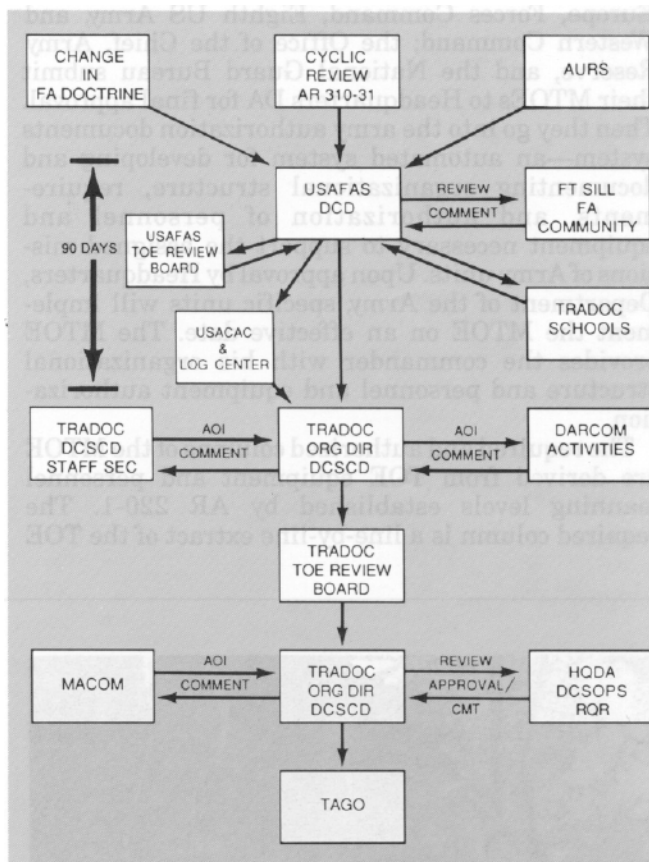


Figure 1. TOE development.

After the study is approved, the AURS is transformed into a draft TOE featuring the three strength and equipment levels prescribed by AR 310-31. Each of these levels yields a balanced organizational structure. Level 1 represents full requirements for sustained combat; Levels 2 (90 percent) and 3 (80 percent) provide balanced organizational structures which reflect a unit's reduced capabilities in terms of staying power in combat or its ability to perform at given work loads. A unit organized at reduced levels will be able to execute its mission effectively, but it will require build-up to Level 1 to sustain combat effectiveness.

After staffing within the Field Artillery School and among other TRADOC schools, the draft TOE goes to Headquarters, TRADOC, with attached mission and capability statements, limitation and dependency statements, personnel and equipment justifications, loading plans, MARC computations for maintenance personnel, and communications diagrams. After review at TRADOC, the draft TOE goes to the major Army commands for an "area of interest" review and subsequently to Department of the Army for final staffing and approval. Although incorporation of comments and TRADOC priorities may lengthen this period to a year or longer, the entire process normally takes seven months. Upon DA approval, the major Army commands begin preparing the authorization document based on the TOE.

The major Army commands including US Army Europe, Forces Command, Eighth US Army, and Western Command; the Office of the Chief, Army Reserve, and the National Guard Bureau submit their MTOEs to Headquarters DA for final approval. Then they go into the army authorization documents system—an automated system for developing and documenting organizational structure, requirements, and authorization of personnel and equipment necessary to support the assigned missions of Army units. Upon approval by Headquarters, Department of the Army, specific units will implement the MTOE on an effective date. The MTOE provides the commander with his organizational structure and personnel and equipment authorization.

The required and authorized columns of the MTOE are derived from TOE equipment and personnel manning levels established by AR 220-1. The required column is a line-by-line extract of the TOE Level 1— or 100 percent of

the required strength. The authorized column is based on the unit's established authorized level of organization (ALD). Normally a level of organization of 2— or 90 percent of the required strength— is designated. At this level, a unit should be able to operate and maintain all of the major equipment items authorized at the 100-percent level. Normally, they will have 100 percent of combat mission essential equipment when organized at the 90-percent personnel level. To provide for rapid fill to 100 percent when maximum readiness is required, the personnel reductions to ALO 2 normally affect only those positions with relatively low skill levels. Equipment fill is based on a myriad of variables such as budgetary constraints, distribution priorities, production limitations and shortfalls, and a lack of an established logistical base. Therefore, Field Artillery units normally experience a disparity of equipment fill from unit to unit, and many units receive substitute items. In an era of budgetary consciousness, this situation will continue to exist.

This brief explanation of a relatively complex subject can supplement the more detailed explanation of the Army authorization documents system (TAADS) in AR 310-49.

The former Vice Chief of Staff of the Army directed that the existing organizational documentation process be modernized to allow for discreet applications of new systems. The objective of this new approval, often referred to as the Living TOE (LTOE), will present a more accurate picture of a unit's organizational status. The Field Artillery School developed a prototype Living TOE using the M109 direct support battalion as the test case. At this writing, TRADOC schools are transforming TOEs into the LTOE format. The effort is nearly complete.



New Governor Sets Speed Limits

The Troop Support Command's Research, Development, and Engineering Center have refitted the Army's 15KW, 30KW and 60KW generators with a new governor.

This commercially-designed electronic governor is more

reliable, easier to maintain, less expensive, and lighter than the electro-hydraulic system the Army used previously.

Under the retrofit program, mechanics replaced the control unit, actuator, hydraulic pump, fluid tank, cooler (60kw), filter, oil fittings and hoses, and the electric cable harness of the electro-hydraulic system with a simpler electronic system consisting of a control unit, actuator, speed sensing device and electric cable harness.

Tests showed the new governor will run an average of 8,592 hours between failures compared to 3,887 for the electro-hydraulic unit. In addition, the electro-hydraulic unit was more difficult to adjust, required external equipment and demanded a higher degree of skill to maintain. The weight of the system varies with the model of generator, but the new governor weighs 83 percent less than the old design. Finally, Center engineers estimate the new governor will save the Army nearly \$1 million over the next five years because it costs about half as much as the electro-hydraulic unit.



Countermine Operations

by Captain G. C. Tillery and Captain R. M. Bankey

Imagine yourself as the commander of a 155mm howitzer battalion—call sign W5M12—reinforcing the fires of another Field Artillery battalion in direct support of an armored brigade. The brigade is executing an attack to the flanks of a threat salient. Suddenly, a battery stumbles into a minefield protecting the enemy flank. You receive a call from your lead battery. **"M12 this is Z12, over."** **"Z12 this is M12, over."** **"M12 this is Z12.** My W15 element (1st platoon) stumbled into a scatterable minefield. His lead howitzer hit a mine and was destroyed. The other vehicles in his element, thinking they were under direct fire, dispersed into the minefield and are all out of action—break." **"I don't think we can bypass. I think the entire W5M element will have to go out of zone to get around this obstacle, over."**

While the enemy managed to block your advance with this minefield, the bulk of the armored brigade and the Field Artillery battalion you are reinforcing continue the attack. Suddenly, your fire direction

officer (FDO) breaks in. **"M12 this is M75, over."** **"M75 this is M12, over."** **"This is M75. We have lost contact with X6A** (the battalion you are supporting). **Request instructions, over."** **What do you do?**

Now imagine yourself a battery commander (call sign K2L12). It is 2400 hours. Your battery is conducting a fire mission. Suddenly, the sky over your position is illuminated by multiple explosions, and then goes dark. Anticipating counterbattery fires, you order your battery to displace by echelon. You soon receive a call from your lead platoon. **"L12 this is A15, over."** **"A15 this is L12, over."** **"This is A15. We've been stopped in place by a scatterable minefield. It's all around us. I've just lost three men to antipersonnel mines and one howitzer to an antiarmor mine. Request instructions, over."** Just then you hear artillery detonations from the direction of your lead platoon. What do you do?

These are only two examples of how mine warfare, a sadly neglected subject since the close of the Vietnam era, threatens the ability of the artillery to provide close, continuous support to maneuver. The Army has begun to address this threat only recently. Specifically, in the spring of 1986 General Richardson, then commander of the Training and Doctrine Command (TRADOC), initiated the Army countermine effort.

The purpose of this article is to rekindle awareness and stimulate thought among Field Artillerymen on the threat of mine warfare. We don't intend to offer any definitive solutions. What we propose is to define the requirements for Field Artillery units to conduct countermine operations, assess their capability to conduct these required operations, and finally propose some solutions to correct shortcomings between artillery countermine requirements and capabilities.

Further, we won't attempt to address Field Artillery employment in support of combined arms countermine operations; but rather we will limit ourselves to addressing specific requirements for Field Artillery units to conduct countermine operations.

In doing this we have made several assumptions. First, the United States Army will continue to use mines throughout the AirLand Battle at all levels of conflict. Second, our most dangerous threat is a conflict in Central Europe against the forces of the Warsaw Pact—and that Warsaw Pact doctrine for mine employment and target attack priorities will not change significantly. Additionally, the Soviet Union will continue to maintain technological parity with the United States in mine technology, and will continue its proliferation of sophisticated mines to surrogate forces in the Third World. Finally, the doctrinal requirements for Field Artillery units to conduct countermine operations will not change.

Despite the reality of the mine threat, the Field Artillery, as well as the Army as a whole, is unprepared to conduct countermine operations efficiently. Our countermine requirements exceed our current capabilities.

The real mine threat to artillery units will not be massive barrier minefields, but rather random point minefields. They will vary from simple traps emplaced by insurgent forces in low intensity conflicts to sophisticated, remotely-emplaced scatterable mines in mid- to high-intensity conflicts. Because of their mobility, self-propelled cannon systems and the multiple launch rocket system (MLRS) may be able to find a bypass once the minefield is detected. But wheeled missiles, towed cannon systems, and logistical support units might not.

Mine Clearing Concept

The Troop Support Command's Belvoir Research Development and Engineering Center awarded a \$2,185,000 production contract for the Army's new Cleared Lane Marking System (CLAMS) to BMY Corporation of York, Pennsylvania.

CLAMS will help vehicle drivers follow safe paths cleared through minefields. Mounted on the rear of the lead minefield breaching vehicle, it dispenses markers fitted with colored flags for soldiers to spot easily during the day. A device attached to the vehicle's odometer controls the dispenser and drops the markers at constant intervals. The system also has chemoluminescent lightsticks for night operations.

To operate effectively in the AirLand Battle, artillery units must be able to neutralize this mine threat. They must detect and avoid mines, and be able to conduct limited clearing operations when bypass is not possible. However, Field Artillery units are not capable of executing these countermine operations effectively.

One way of looking at countermine capabilities is in terms of doctrine, training, organization, and materiel. If we address our required capabilities in those terms, we find doctrine and organization are generally adequate, but training and materiel are lacking.

Doctrine

With two exceptions, artillery countermine doctrine is sound. Field Artillery units are required only to detect, mark, bypass, and, in some instances, to conduct limited clearing. Doctrinal deficiencies exist in the areas of mine clearance along lines of communication and extraction from scatterable minefields.

While the responsibility for maintaining lines of communication is shared by the engineers, the military police, and the ordnance corps, their

failure in this mission could adversely affect our ability to sustain the fire support effort. Consequently, the uncertainty of countermine doctrine in this area is a serious matter. Doctrine tells us who will maintain lines of communication, but is very vague on how to maintain them.

Finally, no one has come to grips fully with scatterable mine doctrine. How do you extract a unit from a scatterable minefield that enemy artillery has placed on top of that unit's position—a threat to both Field Artillery delivery and service support systems. Field Manuals 5-101 *Mobility* and 20-32 *Mine/Countermine Operations*, address how to breach, clear, and mark a minefield that a unit stumbles into. It does not address what to do when a unit is surrounded by a scatterable minefield.

Training

Countermine training is a major shortcoming, primarily because of resource and time constraints. Despite the doctrinal requirements in soldiers manuals and Army training and evaluation programs (ARTEPS) to conduct countermine operations, neither the US Army Field Artillery



Belvoir RD&E Center Evaluates New Version of Old Mine Clearing Concept.

Belvoir's RD&E Center is also evaluating a new version of an old mine clearing concept. The US Army Armor and Engineer Board at Fort Knox, Kentucky, will test a vehicle designed by the Aardvark Mine Ltd. of Aberdeenshire, Scotland. They plan to get data that may result in a tank-width vehicle mine clearing system for combat engineers.

Mine clearing flails are not a new idea. Armies meeting in North African deserts in World War II had the first mine flail tank. It used rows of weighted chains to beat the ground and dig up or explode mines. Although it cleared a safer path than other methods at the time, the system fell out of favor because it was so heavy and powerful that the cleared areas were impassable to most vehicles. However, Great Britain and several other countries went on to develop and improve the concept.

After reviewing reports of past designs, Aardvark developed a flail that weighs less, costs less, requires less power, lasts longer and provides a better beat pattern than previous systems.

The Aardvark design requires less power to drive its flails than the Churchill flail tank, which went out of use in the 1960s. Though the new design uses eight chains for every foot of rotor, it uses less power than the earlier model that had only five chains. Aardvark also matched the tip weight with the flailing speed to produce an optimum pattern of contact with the ground. During trials, one Aardvark flail cleared charges of up to 3.6 kg of explosive with virtually no damage.

The design the Center is evaluating weighs 13-1/2 tons, 10 tons for prime mover and 3-1/2 tons for the flail unit. Mounted at the rear of a custom-built half-track vehicle, the flail unit has a 10-foot wide rotor and 72 to 79 chains with disc-shaped striker tips. Other features include automatic contouring and depth control, retractable sidearms for air transport, an armored cab and an optional rotor with 60 heavy chain tips for use against buried antitank mines.

If the Fort Knox tests are successful, the Army will use these data to design a flail system as wide as its prime mover.

School nor the US Army Field Artillery Training Center are conducting countermine instruction. The same resource and time constraints

plague countermine training in the field, and it is in the field that units must conduct the bulk of countermine training.

Organization

Unit organization is not really a concern. Because of the flexibility of task organization, most Field Artillery units can organize to conduct countermine operations and do not need a dedicated countermine capability. The two possible exceptions to this are Pershing II missile and towed cannon units because both lack tactical mobility.

Materiel

Field Artillery units experience their greatest shortcomings between required and current countermine capabilities in the area of materiel developments. Let's examine these materiel shortcomings in terms of mine clearing, marking and detecting operations, and system survivability.

While clearing and marking capabilities are generally adequate (C4 for clearing and CTA lane marking kits or locally fabricated mine caps for marking), Field Artillery detection capabilities are limited. The only organic means of mine detection currently available are observation, probing, hand-held metallic mine detectors which are not wholly effective, and misadventure. There is no organic standoff detection capability in artillery units. These slow and painstaking detection means are totally at odds with the rapidity and agility required by AirLand Battle doctrine.

Now that we've identified the Field Artillery's greatest shortcomings in countermine warfare, we'll offer some proposals for solutions in the same format: doctrine, training, organization, and materiel.

We want to preface our proposals by saying that while our greatest shortcomings may be in materiel, this is also the most difficult area to fix



given our constrained resources. Consequently, it is with doctrine and training that we can obtain the greatest benefit.

There are two key things leaders can do to improve doctrine. First, the Field Artillery must continue to stress the development of adequate doctrine for mine clearance in the rear of the Field Artillery battalion combat trains, particularly along the lines of communication. Second, we must develop doctrine for extraction of Field Artillery systems from scatterable minefields.

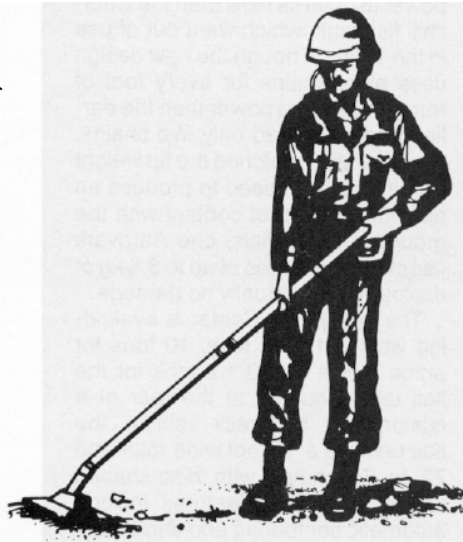
Because of competition for training time and resources, the first step in developing a countermine training program is to determine the critical tasks. The next step should be to assess their comparative worth to each other and to other training tasks; and then to restructure training as appropriate.

In addition, units should tailor training to the role of the target audience in countermine operations. Countermine training should begin at the US Army Field Artillery School and Training Center. Students in the US Army Field Artillery Training Center and the Field Artillery officer basic course (OBC) should learn where to expect threat mines; how to identify them; and their characteristics. OBC and officer advanced course (OAC) students must learn to plan and execute countermine operations. Instructors should focus on how to neutralize the mine threat. Advanced noncommissioned officer course (ANCOC) students should conduct detection, marking, and clearing operations. Precommand Course (PCC) students, on the other hand, only require an update on mine warfare and the mine threat their prospective units may face.

Additionally, leaders must integrate countermine training with the units' individual and collective training programs. The focus should be on that unit's primary threat based on its operational contingencies. Consequently, units must include countermine operations in ARTEPs. Leaders need to teach soldiers about this threat and the steps they can take to minimize it.

On the organizational side, we find only the towed cannon units' requirement for a dedicated countermine capability needs to be examined. While Pershing units will face a mine threat, the degree of the threat probably does not justify the resources required to give them a dedicated countermine capability.


In the area of materiel we need to focus our efforts on mine detection and system protection. Optimally, as many Field Artillery systems as possible should have an onboard mine detection capability. They should be able to neutralize, or at a minimum, reduce, the effects of mine detonations. Some possible design initiatives worth exploring are applique belly



armor (reactive or conventional), hull design or compartmentalization, and selective hardening. Our materiel requirements documents must address these capabilities. As an interim or alternate solution, we should examine the potential for a mobile mine detection capability organic to artillery units. Systems such as the minefield reconnaissance and detector system (MIRADOR) evaluated by the Engineer School may fulfill our needs.

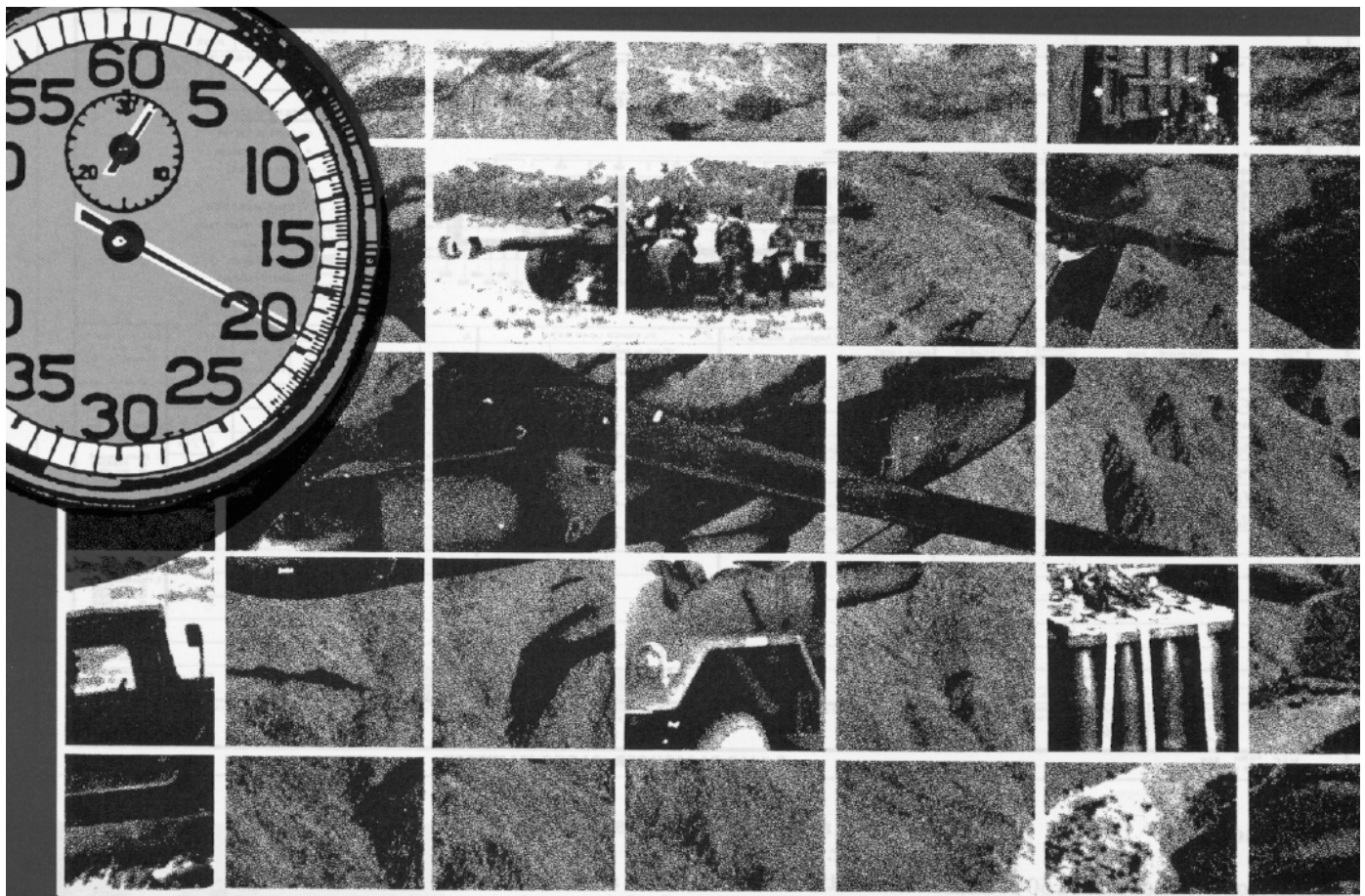
Additionally, we must learn to make better use of all of our mine detection assets, to include the intelligence community. If we employ them correctly, they can be very effective. This is particularly true in low intensity conflicts where the threat can't emplace mines remotely, so they must emplace them prior to contact with friendly forces.

Summary

As we promised at the beginning, we have not attempted to provide any concrete solutions to the Field Artillery's countermine shortcomings. What we hope we have done, however, is to rekindle an awareness of the countermine threat, and to provoke thought and discussion on this subject. If we have accomplished this, then we have accomplished our objective. 

Captain George C. Tillery, AR graduated from the US Military Academy at West Point in 1977. He has served as a platoon leader, executive officer, staff officer, and company commander. He is a graduate of the Armor officer basic and advanced courses, and the Combined Arms Staff and Service School. He is now assigned to the Concepts Branch of the US Army Field Artillery School's Directorate of Combat Developments.

Captain Robert M. Bankey, FA, graduated from the US Military Academy at West Point in 1977. He has served as an executive officer, fire direction officer, FIST chief, and as a battery commander in the US Army, Europe (USAREUR). He is a graduate of the Field Artillery officer basic and advanced courses, and the Combined Arms Staff and Service School. He is now assigned to the Concepts Branch of the US Army Field Artillery School's Directorate of Combat Developments.



Load Planning Puzzle

by First Lieutenant James Lenschau

The puzzle is a mind bender. Given the following:

Equipment: A C141B aircraft, an M925 prime mover (5 ton), an M198 howitzer, and a high mobility, multipurpose wheeled vehicle (HMMWV).

Requirements: Upload in 20 minutes at the aerial port of embarkation (APOE) and download vehicles in three minutes at the aerial port of debarkation (APOD).

M925 Prime Mover (NOTE: the M925 includes a front winch):	M198 Howitzer	HMMWV	Ammunition Basic Load (Including powder)
<ul style="list-style-type: none"> ● Empty axle weights, from front to rear: 11,000, 5,700, and 5,700 pounds respectively. ● Loaded axle weights from front to rear: 11,400, 10,600, and 10,600 pounds respectively. ● Length: 327 inches. 	<ul style="list-style-type: none"> ● Towed position: axle weight of 14,400, pintle weight of 1,200, length 486 inches. ● Stowed position: axle weight of 11,600, pintle weight of 4,000, length 293 inches. 	<ul style="list-style-type: none"> ● Length: 120 inches. ● Empty axle weights: 2,000 pounds each. 	<ul style="list-style-type: none"> ● Cubic measurement: 164,506 cubic inches. ● Minimum floor space required; 5,292 square inches. ● Total weight: 7,600 pounds.

Characteristics of equipment

1. UNIT BEING AIRLIFTED (Name or Number)		2. UNIT IDENTIFICATION CODE		3. TYPE MOVEMENT PLAN		4. MOVEMENT DATE		5. UNIT AIRCRAFT LOAD NUMBER		PAGE OF PAGES				
6. MISSION NUMBER			7. ACFT SERIAL NO. (Last Five)			8. CONFIGURATION			9. DEPARTURE AIRFIELD/EYD			10. DESTINATION AIRFIELD/ETA		
11. ACTUAL LOADOUT														
SCALE - 1/4" = 3 FEET														
LOAD SEQUENCE	ITEM MODEL AND NOMENCLATURE/DESCRIPTION	VEHICLE PACKAGE NUMBER	SERIAL INCREMENT NUMBER	E. REMARKS (Special handling, shoring, etc.)		F. PLANNED LOAD DATA (Total in inches)			G. ACTUAL LOAD DATA			REMARKS CODES (For use in Column "4c")		
				HAZE CODE (From Column 1)	OTHER	LENGTH	WIDTH	HEIGHT	WEIGHT (Total Pounds)	HEIGHT (Total Inches)	CUBE		WEIGHT (Total Pounds)	CENTER OF BALANCE
1	FLOOR LOADED RUCKS											366	1. Optimal (A, RIGHT OR LEFT)	
2	M198 HAMMUV			1A		190	95	69	7,100			508	2. Center line load area required both sides	
3	M198 HOW			3A	STWB POS	293	100	84	11,601			690	3. Shoring required (A, PARKING OR BOLLING; B, SLEEPER; C, BRICKS)	
4	M925 ST TRK					327	98	87	27,800			1116	4. Must be driven into aircraft in direction of service	
5	463L PWOR/SEC EQ					108	88	76	3,700			1352	5. Sequence pallets (AK actual weight)	
6	463L AMMO					108	88	76	5,600			1472	6. UTD Form 13072 required	
7	PAX (13)								2,600			248	7. Maximum Fuel: (A) 1/2 TANK; (B) 1/2 TANK; (C) 1/2 TANK	
12. PASSENGER SEATS						TOTAL						REMARKS CODES (For use in Column "4c")		
13. DATE APPROVED						14. TYPED OR PRINTED NAME, GRADE AND ORGANIZATION OF PLANNING OFFICIAL			15. SIGNATURE OF PLANNING OFFICIAL			957		

Limitations:

- The load cannot exceed 50 pounds per square inch (psi) anywhere on the floor of the aircraft.
- The front axles must weigh less than 11,630 pounds, except in the high-density area of the aircraft, where they must be below 20,000 pounds. Intermediate and rear axles must weigh less than 10,000 pounds.
- The high-density area is 320 inches long (from stations 678 to 998, the middle 16.5 feet of cargo area).
- The total floor-loaded cargo area is 1,221 inches long.
- The total cargo weight allowed is 70,000 pounds.

As the Army goes to the new 900-series 5-ton truck, more and more M198 units will discover that the new truck is too heavy for conventional methods of strategic movement. At both Forts Bragg and Campbell, the M198 is loaded on C141Bs with the 900-series 5-ton truck. The axle weights on the 800-series truck (9,000, 5,000, and 5,000 pounds, front to rear) do not present the same challenge

Note: the 7th Infantry Division (Light) solution presented here for 900-trucks also will work for 800-trucks, with some small modifications to weight distribution in the cargo bed.

as the heavier 900-series prime mover.

Celtic Cross IV, the annual 7th Infantry Division (Light) exercise, provided the opportunity for one unit to face and conquer this new challenge. The general support (GS) battery, B-15th Field Artillery, was told to be prepared to fly 10 days before start of the exercise (startex). The light division should be able to move primarily by C141 aircraft, augmented with some C5As. The movement officer prayed C5As would be available to move the M925-M198 combination, but his prayers were not answered. The GS battery would fly in C141s.

The traditional solution for loading the M198 howitzer is to push it into position on the aircraft using a 2-1/2 ton or 4,000 pound forklift with a front-mounted pintle. This solution is adequate, but it has some drawbacks. For instance, the same pusher vehicle must be at the APOE and APOD.

Another drawback is that crews need more time to unhook the howitzer at APOE and hook up the howitzer at APOD. It is very difficult to unhook a howitzer with 4,000 pound lunette weight in the tight confines of a C141B aircraft. The traditional solution has been to use shoring and two 5-ton jacks to lift and lower the lunette, and some units use the lunette traveling jacks to lift and lower the lunette.



An Air Force loadmaster briefs PFC Dennis Statler, 7th Infantry Division (Light), prior to loading the M925 truck and M198 howitzer onto the C141 aircraft.

If the lunette rests anywhere other than the towing pintle of a prime mover, then loaders have exceeded the 50 PSI limitation on the C141 flooring, and they must use shoring to distribute the load. For the C141B this means a support pyramid with a 92-square inch base.

The time required to push the vehicle on, stack the shoring, unhook the howitzer at APOE (or time required to hook up howitzer at APOD), and pull the combination off is excessive for Air Force loading standards.

The pusher vehicle must have a reinforced bumper and pintle to handle the 15,000-pound M198.

The pusher vehicle usually is not an organic asset, and the whole movement schedule at APOE and APOD depends on the coordination effort for a vehicle pusher.

The pusher vehicle solution is easier than trying to back the howitzer onto the aircraft with the prime mover. But the final solution to the puzzle required specific answers to these three problems:

Problem #1. How to upload the gear quickly at the APOE and download the gear at the APOD.

Problem #2. How to load the prime mover without exceeding 10,000 pounds on any axle.

Problem #3. How to transport gear not loaded on the prime mover.

The solution to problem #1: Use the 6,500-pound winch on the forward bulkhead of the C141B aircraft to pull the howitzer and prime mover into position. The driver should point the truck aft, ready for driving off the aircraft at the APOD. The slow, steady pull of the winch allows the vehicle driver to direct all his attention to the loadmaster who guides the howitzer into the aircraft. This allows for quick upload at the APOE. We were able to load and tie down a howitzer and truck in 12 minutes. Keeping the howitzer hooked to the prime mover was quick, and it eliminated the shoring requirements. Because we did not use a pusher vehicle, there were no requirements for external coordination, there was no need for a vehicle at the APOD, and we didn't spend time hooking up the howitzer and pulling it off the aircraft. At the APOD we dropped the tie-down cables and were off the aircraft within three minutes of the aircraft's halt. (Ammo pallets on the aft end of an aircraft will slow this time somewhat.)

Points to remember:

- The winch cable is about two inches above the floor of the C141. Because the cable runs under a HMMWV or a pallet, we can use the front third of the cargo area with the howitzer and truck pulled into position.

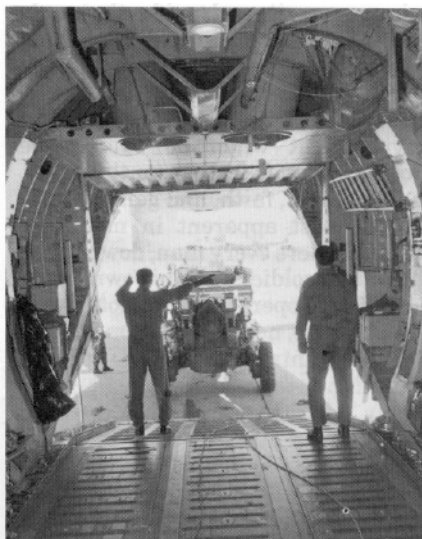
- Coordinate with Air Force personnel before you arrive to ensure the C141 winch is working. We didn't see any deadlined winches and the Air Force loadmaster had never experienced one. Although it is rare, they do break and it is better to be safe than sorry.

- To connect the winch to the howitzer, run a heavy-duty chain through

the eyelets on the lower carriage of the howitzer and connect the winch to this chain.

We solved problem #2 with the solution to the first problem. Once the M198 axle is placed in the high-density area of the aircraft, the length of the howitzer precludes placing the axles of the prime mover in the high-density area as well. The key to solving problem #2 is this: when hooked to the truck, the lunette's 4,000 pounds is great enough to move the center of balance aft, which lowers the weight on the front axle. However, it does not bring the weight below the 10,000-pound limit. By carefully managing what crews load in the cargo bed and where they load it, the loadmaster ensures the axle bears less than 10,000 pounds. Then the crew can load the M925 prime mover without regard to the high-density area of the aircraft. By keeping the howitzer connected to the prime mover during upload of the aircraft and during flight, the crews eliminate the need for shoring, meet the 10,000 pound axle weight requirement, and enhance combat downloading at the APOD. Now the only shoring requirement is to place parking shoring (24"×3"×80") under each M198 tire.

The solution to problem #3 means the crew must palletize the section gear and ammunition not loaded on the cargo bed of the M925 and load it on the C141B. We had the space shown at diagram A. This allows for quick upload at the APOE and download at the APOD. You can see the final load plan below (see diagram). It meets all Air Force specifications and allows for




The loadmaster guides the M925-M198 combination into the C141.



An Air Force loadmaster attaches the C141 winch cable to the chain on the lower carriage of the M198 howitzer to help load the equipment.

total loading of a gun section and HMMWV with their unit basic load of ammunition on one C141B.

The solution to the M198, M925, C141B puzzle hinges on the winch of the C141. Though the solution is simple, the process of getting there was long and exhausting. Our unit spent at least 100 man-hours sitting on scales, redistributing loads, redrawing load plans, talking with loadmasters, and coordinating directly with Travis Air Force Base before we found the solution. The men of 1st Platoon, Battery B, 15th Field Artillery, spent those hours and developed a solution that all M198 units can use to deploy their howitzers aboard C141Bs. Many thanks to the outstanding professional NCOs at Fort Ord and Travis Air Force Base who made the movement and the solution to our problem possible. 

First Lieutenant James G. M. Lenschau received his commission through ROTC at the University of California (Davis). He is a graduate of Field Artillery officer basic and advanced courses, airborne, air assault, ranger, and jungle operations courses. He has served as fire support officer, fire direction officer, and executive officer at the 7th Infantry Division (Light) at Fort Ord, California. Lieutenant Lenschau graduated from the Air Force's Airload Planner Course at Travis Air Force Base. He is now serving as the division artillery assistant S1.

Field Artillery Operations in the Arctic

by Colonel Wayne P. Kubasko



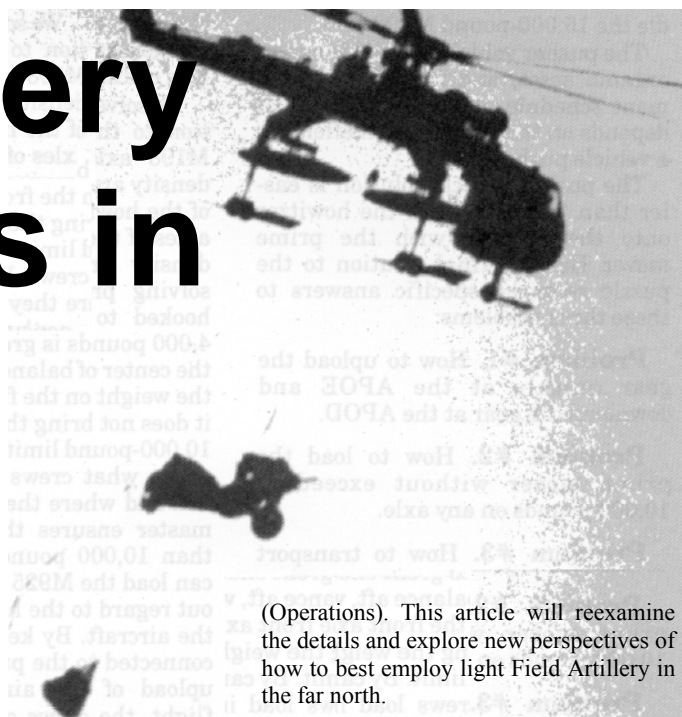
When Clausewitz wrote, "If no one had the right to give his views on military operations, except when he is frozen or faint from heat and thirst or depressed from privation and fatigue, objective and accurate views would be even rarer than they are," he was reflecting on a lifetime of warfare in Europe. But he could have been talking about Alaska. Only the arctic soldier knows the bone-aching chill of airlifting a firing battery at -40°F or the exhaustion of making an occupation in four feet of snow. Only he can appreciate

the reality of what is important, what works, and how to make it work.

It is in the panorama of mountains, tundra, rivers and glaciers of Alaska that the US Army stationed its newly-activated 6th Infantry Division (Light). Alaska is an expanse of 365 million acres of terrain and islands that dwarfs nations. It is a land of diversity. The climate varies from extreme cold in the north during the winter months to pleasantly mild further south during the summer.

This environment develops a unique soldier able to operate under the harshest circumstances and maintain an esprit and pride that only comes from succeeding in the face of adversity. The Arctic soldier in many ways is on his own. Clausewitz recognized the effect of such a challenging environment when he said, "The troop's national feeling (enthusiasm, fanatical zeal, faith, and general temper) is most apparent in mountain warfare where every man, down to the individual soldier, is on his own."

Northern operations are not new to the US Army, nor are they confined to the 6th Infantry Division (Light). The 10th Mountain Division at Fort Drum, New York also is becoming expert in the art of winter fighting. The US Army has formalized its doctrine for northern operations in a series of field manuals: FM 31-70 (Basic Cold Weather); FM 31-71 (Northern Operations); FM 90-6 (Mountain Operations); and FM 100-5,



(Operations). This article will reexamine the details and explore new perspectives of how to best employ light Field Artillery in the far north.

Artillery Tactics and Mobility

The Arctic is not an area for the set-piece land battle of divisional standoffs. The terrain and weather are inherent barriers to heavy land forces. Today, a battle in the Aleutians would be confined largely to the air and sea, with some probability of low intensity ground combat. The vast geography, weather, and nature of the threat in Alaska dictates a task organization that emphasizes the combined arms task force. In fact, FM 31-71 (Northern Operations) recognizes this requirement and states, "Normally a light, towed artillery battalion will be attached to an infantry brigade employed as a task force." A full brigade-sized task force shouldn't expect to deploy in defense of a critical oil site or strategic military base threatened by a Soviet "spetznaz" or special operations team. More than likely, commanders will employ battalion and company task forces.

The dedicated battery concept is used routinely in the Arctic. Field Artillery commanders must have the flexibility and the breadth of understanding to allow their firing batteries to deploy in task force organizations. Likewise, maneuver commanders must recognize the tremendous increase in firepower that comes with a howitzer battery. Infantry commanders also must have a solid understanding of combined arms

tactics to capitalize on "their" firing battery. In some instances, Redleg commanders do not want to hand over a battery, and infantry commanders may not want the burden of an additional unit. Yet there is no more formidable and mobile land force in the Arctic than the infantry battalion augmented with Field Artillery, engineers, signal and aviation.

Tactical maneuvers by the infantry in the Arctic pose a special challenge to the Field Artillery. The maneuver forces may use skis or snowshoes. They may break down into small units which move by stealth through difficult terrain and are able to make maximum use of cover and concealment. They camouflage well with the snow, in their white over-garments.

What about the artillery?

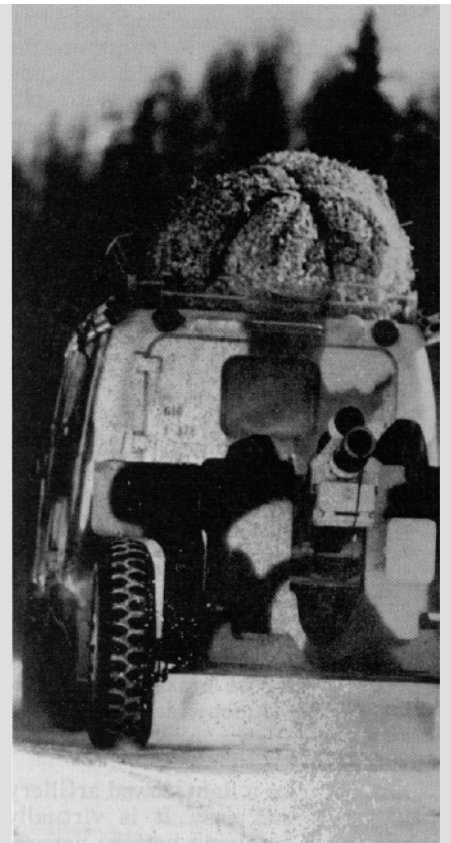
Cross-country mobility is a key to effective tactical operations in the mountains and across the tundra. The Army's small unit support vehicle (SUSV) and helicopters can move artillery pieces, but the M101A1 howitzer doesn't have skis, and helicopters can't do airmobile operations in extreme weather.

The SUSV is a light, non-armored, tracked vehicle capable of traversing deep snow while towing a 105-mm howitzer and carrying its crew. Both the infantry and the Field Artillery in the arctic now have the SUSV as their prime mover. In fact, the infantry goes to war in the SUSV, either riding or skijoring (skiers towed behind the SUSV). Normally, the infantry will dismount the SUSV and move through mountains by snowshoes.

Unfortunately, sometimes the howitzers fall behind the battle and this is the challenge to the Field Artillery commander. The SUSV can tow the M101A1 without skis, but this means that the howitzer is dragged through the snow. It sounds crude and is slow, but it's worked better in Alaska than a variety of fabricated skis and skids.

Some options include the British light howitzer (M119), which has proved effective in arctic tests, and has a ski package that could solve the mobility problem. Or, we could take a lesson from the light mountain batteries of the Italian Alpini forces that still operate effectively on the French border with their model 56 105-mm howitzers and mules. They maneuver a four-gun battery in the mountains by breaking down the pieces and using 48 mules as prime movers.

Rivers pose a formidable barrier to land travel in Alaska. They are sometimes fast and treacherous, and may not be stable enough for ice bridging until after January. Airmobile operations often become a key to move both the artillery and the infantry. However, moving a battery by CH47 or CH54 at -40°F presents special challenges. Foremost is the need for independent, disciplined leaders in the firing battery who are prepared to operate alone under the harshest conditions. Leaders must plan loads to maintain crew and weapon integrity, and to ensure complete survival packages and rations go in with each crew. They must spread firing capability and ammunition from the beginning to the end of the displacement. Because the weather may halt the deployment at any moment, a unit



The Army's small unit support vehicle (SUSV) can cross deep snow while towing a 105-mm howitzer and carrying its crew.

may be stranded in the mountains on its own for days. Moreover, navigation is critical: helicopter pilots can't drop loads and depart without knowing they have put the crew and its weapon in the correct location. And finally, because of the winter's short days, many airmobile operations occur at night. Nevertheless, movement by helicopter is a viable option as long as leaders follow these principles and use common sense. A few mature leaders who have already been seasoned by the north can make it happen: the Arctic is not a place where youth and zeal will win out over experience and judgment.

Camouflage is critical also for the Field Artillery battery because a towed battery displaces slowly in deep snow. It is vulnerable once detected by the enemy. White camouflage nets are required for winter operations, and units should use them to conceal further a good position. Firing units provide the best support when they can sneak along with the infantry, quietly occupying hidden positions in natural cover. The fire support officer, artillery commander and maneuver commander must study the route in detail and find probable positions for howitzer units.



Moving a battery by CH47 helicopter at temperatures -40 degrees F presents a special challenge to Redlegs in the Arctic.

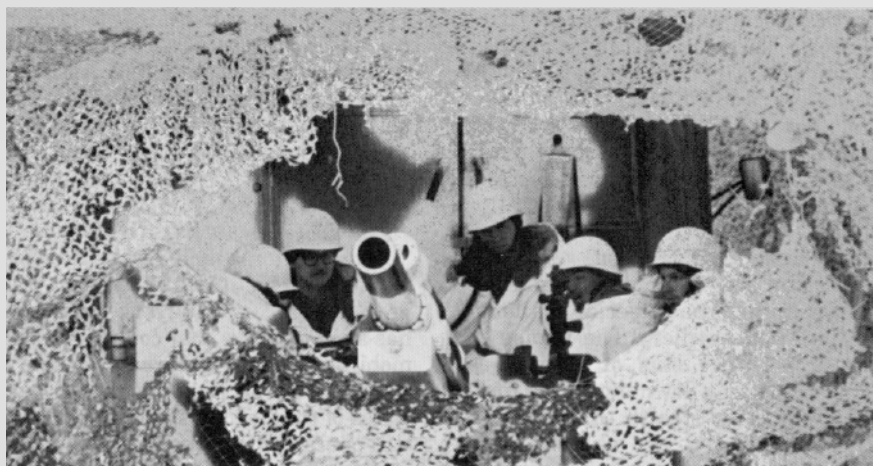
The best employment of Field Artillery in Alaska is to maintain the integrity of the firing battery and avoid a further breakdown into split battery operations or raids. The new table of organization and equipment for the light division further reduces the capability of the towed battery for split operations. This conservative approach may contradict popular doctrine and does not offer more diverse employment; however, it recognizes that dividing a battery in the harsh Arctic conditions results in a tremendous reduction in effective fire support. The two-gun raid is colorful, but not very practical in terms of firepower, and organic mortars may be better suited for the raid. Furthermore, splitting a light towed battery seriously thins the structure of leadership so essential to success, and logistical support becomes a nightmare. Furthermore, the infantry leaders may begin to believe artillery batteries can be broken down routinely into independent elements resembling their own sections of crew-served weapons.

Security for a light, towed artillery battery is not easy. It is virtually impossible for firing battery personnel to provide their own security in the face of a significant threat. Gunners either can shoot for the infantry or shoot for themselves but they cannot do both at the same time effectively. The wise task force commander studies carefully the counterfire threat and is not reluctant to provide a security infantry force when the situation dictates. An artillery battery is a potential bastion of firepower, but when Redlegs stay awake all night to defend the perimeter, answering every probe and sapper threat, the infantry commander has given up timely and accurate fire support for his companies.

Training

Effective training for artillery units in the arctic means focusing on physical training, gunnery skills maintenance and cold weather training.

Gunnery training must be a high priority in a howitzer battalion's training program. The best guide, of course, is the Army training and evaluation program (ARTEP). It gives artillery commanders a collective training program that sets standards, identifies strengths and weaknesses, and measures firing performance. These battery tests give commanders the opportunity to demonstrate their battery can complete at least 80 percent



Arctic artillery battalions should take their ARTEP during the winter rather than the summer months.

of the tasks to standard. An external evaluation of the battalion provides a "super bowl" setting so essential in driving the yearly training program.

Arctic artillery battalions should take their ARTEP during the winter rather than the summer months to evaluate units under the worst conditions they may have to face.

Maintenance operations in extreme cold are a special challenge. They require knowledgeable leaders, operators and mechanics. Vehicles and equipment not properly serviced in accordance with specifications for extreme cold weather quickly fail. Adequate motor pool facilities in garrison and a maintenance tent with heater in the field allow operators and mechanics to conduct quality maintenance. Battery-level mechanics can conduct maintenance on the move without a heater, but more extensive work will require protection from the weather.

Effective maintenance training also requires operators and supervisors to learn how to conduct operator maintenance prescribed in the - 10 series of manuals. They must know what special lubricants are required for cold weather procedures for warming engines with swing-fire heaters, and winterization requirements. Everyone has to get a little dirty in the process, not just the young enlisted soldier.

Driver training is an important part of the maintenance program. The chain of command must plan and conduct a training program that qualifies drivers to operate vehicles in all weather, with emphasis on winter conditions. Installation-level licensing programs are not sufficient. The battery commander must direct a continuing schedule of training at the

unit level. Convoys pose special problems in heavy snow and ice, especially for artillery units whose prime movers are towing guns, radars, and trailers that jackknife easily on steep slopes. Leaders must exercise iron-tough discipline to maintain the established interval between vehicles or rear-end collisions are a certainty.

Road-testing vehicles in garrison can be a high-risk operation during winter months when roads and trails are hazardous. There is a tremendous temptation to hit the throttle when an inexperienced soldier drives out of the motor pool for a "spin" in a newly repaired SUSV or high mobility multi-purpose wheeled vehicle (HMMWV). He must have an experienced driver in the vehicle.

Competent, dedicated mechanics are specialists who have a skill as valuable as any MOS in the unit. Not everyone has the magic fingers of a good mechanic, nor do they understand the inner workings of a piece of equipment. Mechanics should share their training with each other and operators during maintenance classes. The class schedule should give mechanics enough time to prepare a detailed class on one particular aspect of maintenance—such as winterization on one type of vehicle.

Soldiers and leaders need to be at a high level of physical fitness both in strength and endurance, or units will fail on extended operations. *The Armed Forces Officer* states "When troops lack the coordinated response which comes of long, varied and rigorous exercises, their combat losses will be excessive..." Conducting physical training in sub-zero weather requires certain provisions, but it also gives the unit esprit. Units can go outside for standard physical training (PT), but soldiers must wear layered clothing,

wool head and face cover, and gloves, and the PT formation should go indoors to cool down. Winter PT on cold, dark mornings builds a special kind of pride as soldiers and officers pound along, frost building heavily on their faces and shoulders. Occasionally, surface ice will cause a few troops to slip and fall but they eventually learn to balance. Foot marches on skis and snowshoes build strength and endurance quickly; however, when the temperature dips to -20°F and high winds blow, conduct daily PT indoors.

The importance of individual and unit cold weather indoctrination and refresher training cannot be overstressed. US Army publications such as FM 31-70 (Basic Cold Weather Manual) as well as unit standing operating procedures provide guidance on the subject. Nevertheless, commanders must ensure that knowledgeable and experienced instructors present the material. New arrivals just in from a post in the southern United States should be the pupils, not the teachers for this class. The instructor needs to have firsthand experience in the proper use of clothing and equipment during extreme cold. Too often, newly arrived leaders believe survival in the arctic is a matter of discipline—that if you are physically tough, you can beat the cold without the proper clothing. Beating the cold is a matter of discipline—the kind that demands you make proper use of mittens, Arctic boots, layered clothing and a 10-man tent with stove. Hands and feet freeze and drop off at the same rate among exposed soldiers regardless of how often they've been told they're tough.

Yet leaders can strike a balance between operational requirements and individual protection. They can develop this balance during crew drill and battery-level training. Leaders establish how individual protection from the cold will merge with battery operations. The requirements for the occupation of a firing position do not change because of weather. The cold cannot be an excuse for batteries that are not ready to carry out the mission. The 1941 field manual, FM 31-15 (Operations in Snow and Extreme Cold), recognized that, "It is a serious mistake to assume tactical doctrines vary with the thermometer. The doctrines that have won battles at 40° above zero will win them at 40° below."

Equipment

Artillery operations in the far north do not require a great deal of



The M101A1 howitzer is a proven asset to Arctic artillerymen.

expensive or unique equipment. The emphasis should be on light, simple items that protect the soldier and accomplish the mission in a low intensity conflict.

Clothing

Experimental clothing is continually tested in extreme cold at the Army's cold weather test center at Fort Greely, Alaska. Unfortunately, the newest items of Gortex and lightweight equipment are extremely slow in coming to the soldier. He still sleeps in a feather sleeping bag that gets cold at about -10°F, and wears an unsatisfactory outer garment made of cotton, loosely referred to as a "parka." However, some items such as the Arctic VB boot almost defy improvement. Generally, though, it is time for the Army to procure and issue cold-weather clothing comparable to that currently available to civilians off the shelf.

A classic example of the critical importance of appropriate equipment in cold weather warfare was the November 1939 battle between Finland and the Soviet Union along the Soviet-Finnish border, where one of the coldest winters on record had begun. The Finns were prepared for combat in snow and subzero temperatures; the Soviets were not. The Finnish soldiers enjoyed the simple comfort of 20-man Arctic tents heated by a simple woodburning stove, while the Russians could only huddle around campfires or dig holes in the snow for shelter. Thousands of Soviets froze to death that winter, and by the

end of the winter, frostbite cases exceeded a quarter of a million including more than 14,000 amputations.

Howitzers

A comparison of the venerable M101A1 howitzer, currently in Alaska, with the M119 British light gun shows that the M119 offers significant advantages. The test crews at Fort Greely found the M119 was far superior to the M101A1 in direct fire because of the one-man direct fire sight. The basic issue items (BII) for the M119 include a ski package that helps it to move easily in very deep snow. Additionally, the M119 is more suitable for airmobile operations because it weighs 1,000 pounds less than the M101A1. However, M119 recoil seals did not function well below -30°F, and crews had to heat the nitrogen bottle with a battery blanket to release oil pressure during test firing at -50°F.

Medium and heavy artillery have little place in the Arctic because of obvious limitations in mobility and ammunition handling. Furthermore, the tactical scenario that envisions battalion and company task force operations does not demand heavier artillery. Likewise, the initial version of the tactical fire direction system (TACFIRE), which includes a sizable compliment of trailers and auxiliary equipment, would not fare well in the snowy mountains and tundra of Alaska.

The battery computer system (BCS) has proven to be a valuable instrument in the fire direction center. Both

accuracy and timeliness have improved significantly with the BCS; however, it is essential units maintain a back-up system. To date, both the handheld calculator and manual gunnery systems have worked satisfactorily.

More than any piece of equipment in Alaska, the SUSV has boosted the capability of both the infantry and the artillery. Life in the field without the SUSV has become nearly unthinkable. Commanders have come to cherish the over-snow capability the SUSV offers as a prime mover. The SUSV carries a full howitzer section of seven men, their personal gear, a compliment of ammunition, and a 10-man tent, and tows the howitzer. It can be sling loaded, fully packed at 13,989 pounds, for airmobile operations by CH54 or CH47 helicopters. By adding a tent extension and upgrading the electrical system to 100 amps, it becomes the fire direction center for the battery computer system. At a curb weight of 9,790 pounds and a maximum towing load of 5,513 pounds, it also has demonstrated its capability as a wire laying vehicle, ambulance, fire support vehicle and ammunition carrier.

Recently fielded in Alaska, the Q36 Firefinder radar also has proven to be well suited for Arctic operations. The Q36 is a considerable improvement over the Q4 radar and has handled extreme weather conditions very well. The most important factors in the continued success of the Firefinder are the steady influx of school trained operators, and an aggressive warrant officer who will take the radar to the field for both countermortar operations with the infantry and gunnery training with the artillery battalion.

Summary

Field Artillery operations in the Arctic are both unique and standard. They must take into account severe cold and difficult terrain, but not at the expense of tactical principles and gunnery standards. Time and effect standards for the delivery of fire remain the same. The challenge to the Field Artilleryman operating in the far north is to adapt the principles to northern operations.

Warfare in the Arctic demands these leaders must perform tasks, maintain security, and protect troops and equipment from the effects of extremely low temperatures (FM 100-5). Each supervisor from section chief to commander must be capable of operating independently.

The Field Artillery can expect to fight in the mountains and tundra of



Requirements to occupy a firing position do not change because of the weather.



The SUSV's curb weight of 9,790 pounds and maximum towing load of 5,513 pounds makes it ideal as a M101A1 prime mover, ambulance, fire support vehicle, or ammunition carrier.


the north as part of a battalion or company-sized combined arms task force. Although the artillery battalion always must train to mass its fires, it likewise must train to support widely dispersed task force operations. Battery commanders should be as close to their supported maneuver commander as they are to their artillery commander.

The physical condition of troops operating in extreme cold is paramount

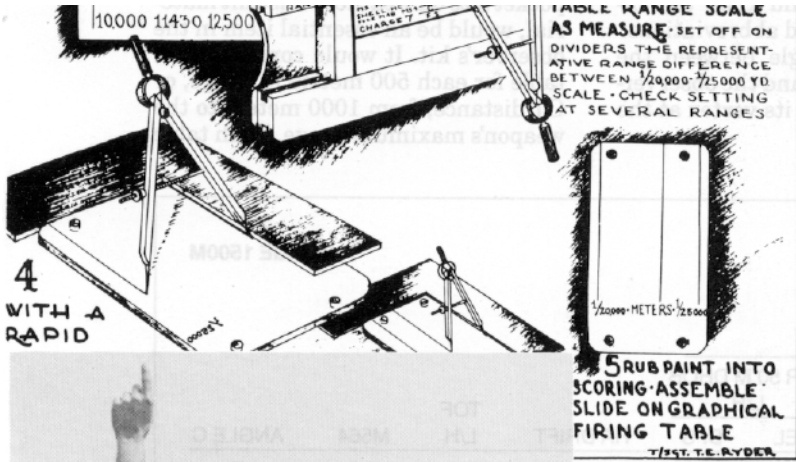
to the success of the unit. Artillerymen must have the strength to handle ammunition in deep snow and the endurance to stay with the battle. Physical training cannot be allowed to deteriorate into only indoor sports activities during winter. The war, when it comes, will not be inside a gym.

Maintenance training and operations must focus on doing those things that keep vehicles operational during the worst weather. Leaders must give special attention to winterization procedures and driving skills on snow and ice. Sub-zero temperatures place heavy demands on men and equipment.

Possession and use of individual clothing and equipment is a life and death matter for the Arctic soldier. He must have simple, proven items that are light, but give the protection needed to face combat in the most severe cold. A compromise on quality may be more costly than any defeat by the enemy.

The Arctic artilleryman is a proud, capable gunner who knows his weapon and the frontier he guards. He respects the tremendous power of the Greatland but is confident in his ability to meet the challenges of weather and terrain to deliver accurate, timely fire in support of the infantry. 

Colonel Wayne P. Kubasko graduated from the University of Montana in 1965. He has served in Field Artillery positions in the 82d Airborne Division, 101st Airborne Division, 1st Infantry Division, and most recently, as Battalion Commander, 1-37th FA in the 6th Infantry Division (Light), Alaska. Colonel Kubasko has completed the Field Artillery officer basic and advanced courses, as well as airborne and ranger schools. He is a graduate of the USMC Command and Staff College, and is currently a student at the US Army War College.



The Battery Commander's Method of Fire Direction

by Captain Frank A. Hollingshead, USMC



Before Redlegs adopted the manual fire direction center or Comanche system at the close of World War II, the forward observer, often the battery commander, would determine and send fire commands directly to his guns. This BC method of fire direction was quick and precise in the hands of an experienced observer. Though now largely forgotten, the method is worth examining as a better back-up fire direction system for the Army's light division artillery as well as Marine Corps artillery in the event of computer failure or loss.

Field manuals written before World War II reveal detailed, complicated outlines of the BC method of determining and issuing fire commands from the observation post. This article will explain a proposed simplification or updating of the BC method, which would give every company fire support officer and Marine forward observer the means of determining accurate firing data.

The need for a backup system external to the battery position should be clear. With the firefinding technology

available today, the counterfire threat is greater than ever before. Army light division and Marine direct support artillery battery fire direction centers (FDC) seem uniquely vulnerable given the mobility of their battery's weapon systems, the terrain in which they are likely to operate, and their lack of a digital backup system for technical fire control at the battalion FDC.

At the same time, we have come to rely on very "mortal," high-tech fire direction computers that are much more difficult to replace than their predecessors, the manual firing charts. Commanders also will have trouble replacing their experienced computer operators. The redundancy of dual FDCs and the backup computer system (BUCS) undoubtedly reduces the risk of losing fire direction capability at battery level, but wouldn't most commanders want another backup? The BC method could provide just that.

Before we examine the BC method in detail, what about the other, more familiar emergency systems? The

black magic system and the M17 plotting board are backups, but they have some drawbacks.

Black magic, with its best-guess data and rules of thumb has earned an appropriate nickname. But its major flaw is the built-in assumption that the observer is either on the gun-target line (unlikely) or will be able to picture it on the ground well enough to adjust rounds in relation to it (very unlikely in jungle or mountain terrain or at night).

The M17 is good for converting deviations to deflections; however, the observer would still have to carry a firing table for initial data, fuze settings and the like. The only advantage the BC method could offer here is an observers' tabular firing table (OTFT) formatted for carrying in a shirt pocket and for quick reference by the observer. Publishing and

distributing this OTFT would be the only direct cost of reintroducing the BC method.

The BC system consisted of three general methods of adjusting fire: axial, small T and large T. We only will examine the last two, termed "lateral," methods in detail. This is because the criterion for using the axial method is an angle T of less than 100 mils—that the observer is on the gun-target line. As this is an unlikely situation, and because the small T method is valid in this case, we can concentrate on two "new" systems to learn.

First, Redlegs should know the following definitions and abbreviations:

Angle T: The angle between the gun-target (GT) line and the observer-target (OT) line with its vertex at the target.

Angle S: The change in deflection necessary to keep a round on the OT line when making a range change of 100 meters.

Angle C: The change in elevation necessary for a 100 meter change in range.

Angle D: The change in deviation necessary for a 100 meter change in range.

R: Range in thousands of meters.

r: OT distance in thousands of meters.

Figure 1 contains a proposed OTFT and an explanation of how I got the listed values. Such a table, printed in pocket size on weather resistant material, would be an essential item in the observer's kit. It would consist of one table for each 500 meters of range, or OT distance, from 1000 meters to the weapon's maximum range. Each table

RANGE 1500M													
ELEVATION					ILLUM			PER 50 M DHOB		TOF			
H E					L/H		L/H						
CHG	LOW	HIGH	LOW	HIGH	FS L/H	DEL	DFS	HA DRIFT	L/H	M564	ANGLE C		
3GB	102.4	—	598.2	—	4.3	26.9	0.12	—	5.6	5.5	7		
5GB	58.9	—	551.3	—	2.7	26.6	0.08	—	4.3	4.3	4		
4WB	71.3	—	563.3	—	3.1	26.6	0.09	—	4.7	4.6	5		
7WB	25.5	—	—	—	—	—	—	—	2.8	2.8	2		

ANGLE T	ANGLE S	ANGLE D	ANGLE T	ANGLE S	ANGLE D	ANGLE T	ANGLE S	ANGLE D	ANGLE T	ANGLE S	ANGLE D
100	7	7	420	29	27	720	57	43	1020	104	56
120	8	8	440	31	28	740	59	44	1040	109	57
140	9	9	460	32	29	760	62	45	1060	114	58
160	11	10	480	34	30	780	64	46	1080	119	58
180	12	12	500	36	31	800	67	47	1100	125	59
200	13	13	520	37	33	820	69	48	1120	131	59
220	15	14	540	39	34	840	72	49	1140	137	60
240	16	16	560	41	35	860	75	50	1160	145	61
260	17	17	580	43	36	880	78	51	1180	152	61
280	19	18	600	45	37	900	81	52	1200	161	62
300	20	19	620	46	38	920	85	52	1220	170	62
320	22	21	640	48	39	940	88	53	1240	181	63
340	23	22	660	50	40	960	92	54	1260	192	63
360	25	23	680	53	41	980	96	55	1280	205	63
380	26	24	700	55	42	1000	100	55	1300	220	64
400	28	26									

NOTE: CHARGE-DEPENDENT DATA OBTAINED FROM FIRING TABLE 155-AM-2 WITH THE EXCEPTION OF ANGLE C, WHICH WAS COMPUTED: 100/DR PER 1 MIL D ELEV FROM COL. 4, TABLE F.

$$\text{ANGLE } s = \frac{100(\text{tangent } T)}{R}$$

$$\text{ANGLE } d = \frac{100(\sin T)}{r}$$

Figure 1. SAMPLE OBSERVER'S TFT

CHG	ELEVATION		ILLUM				HA DRIFT	TOF L/H	M564	ANGLE C	
	HE		PER 50 M DHOB								
	LOW	HIGH	LOW	HIGH	FS L/H	DEL					DFS
8	610.9	1003.9	692.6	962.8	56.6 75.1	5.6 -3.0	0.2 -0.36	54.5	55.1 80.9	56.2	10
ANGLE T	ANGLE S	ANGLE D	ANGLE T	ANGLE S	ANGLE D	ANGLE T	ANGLE S	ANGLE D	ANGLE T	ANGLE S	ANGLE D
100	1	1	420	3	2	720	5	4	1020	9	5
120	1	1	440	3	2	740	5	4	1040	10	5
140	1	1	460	3	3	760	5	4	1060	10	5
160	1	1	480	3	3	780	6	4	1080	10	5
180	1	1	500	3	3	800	6	4	1100	11	5
200	1	1	520	3	3	820	6	4	1120	12	5
220	1	1	540	3	3	840	6	4	1140	12	5
240	1	1	560	4	3	860	7	4	1160	13	5
260	2	2	580	4	3	880	7	4	1180	13	5
280	2	2	600	4	3	900	7	5	1200	14	5
300	2	2	620	4	3	920	8	5	1220	15	6
320	2	2	640	4	4	940	8	5	1240	16	6
340	2	2	660	4	4	960	8	5	1260	17	6
360	2	2	680	5	4	980	8	5	1280	18	6
380	2	2	700	5	4	1000	9	5	1300	19	6
400	2	2									

L, LOW = Low Angle.
 HA, H, HIGH = High Angle.
 DEL = Difference in elevation
 DFS = Difference in fuze setting
 DHOB = Difference in height of burst

Figure 1. (Continued).

would contain the entries to fire and adjust shells high explosive, white phosphorous, smoke and illumination, low and high angle, with fuzes point detonating, time, and variable time over a selected mix of green and white bag charges. Each table also would list angle C by powder charge and angles S and D by 20 mil increments of angle T.

Figure 2 is the solution of a sample small T problem illustrating the entire procedure. Figure 3 is a sample large T problem.

Determination of Initial Data

Before the observer can begin, he must have communications with the battery and have the following information: the battery location, azimuth of lay, his location and that of his target. He only has to observe the target for adjust fire missions. In addition, the observer must have a map and an OTFT. A 6H pencil, an eight-inch mil protractor, a graphical

site table and a small "credit card" calculator help increase accuracy.

The first step in both systems is to determine initial firing data following these steps:

1. Determine the azimuth of fire, scaled from the map.
2. Determine the difference between the azimuth of fire and the azimuth of lay.
3. Determine the direction, left or right, of the target from the azimuth of lay.
4. Apply the difference in step 2 to the weapon's referred deflection by the LARS (left add, right subtract) rule to obtain low angle deflection. Obtain and add drift from the OTFT for high angle.

5. Determine R and its corresponding elevation from the OTFT. Apply site, if a GST is available and vertical interval exceeds 100 meters, to obtain initial quadrant elevation.

Transmit the initial deflection and quadrant to the battery using the existing fire command format. The platoon commander checks the executive officer's

minimum quadrant elevation and other safety factors. The observer keeps track of his last commands, applies adjusting corrections and sends compute subsequent fire commands. While the first round is on its way, the observer prepares for adjustments. Spottings and adjustments are made in relation to the OT line.

The observer must next determine which system to use. This is a function of angle T, which he can scale from the map. If he doesn't have a protractor, and if R approximately equals r, then he can use the mil relation:

$$\text{Angle T} = \frac{(\text{observer-gun distance}) \times 2}{R + r}$$

with observer-gun distance scaled from the map.

If angle T is less than 300 mils, the small T method is used. If angle T is greater than 500 mils, the large T method is used. The forward observer can use either method if angle T is between 300 and 500 mils.

The Small T Method

Because range is the most difficult element to spot from a position near the GT line, the small T method uses range bracketing to facilitate adjustment.

Now the FO must determine r , scaled from the map, and angles S and C from the OTFT. He adjusts rounds following these steps:

1. Spot the first burst.
2. Bring the second round onto the OT line by multiplying the deviation by the value $(r \div R)$ and applying the product in the appropriate direction to the initial deflection.

3. Begin bracketing, if the first or second rounds are close enough to the OT line to spot the range. Either concurrent with the second round or on the third round, he establishes a range bracket by estimating the number of hundred meter intervals necessary to achieve an "over" or "short" impact. Add or subtract that number of angle C to the initial quadrant elevation and an equal number of angle S to the initial deflection. The FO always must apply the same number of angles C and S to keep the rounds on the OT line. Subsequent corrections to deflection are made by multiplying the deviation by $(r \div R)$ and applying the product to the

previous deflection.

4. Continue to narrow the bracket until splitting a range bracket of one half angle C , then firing for effect.

The Large T Method

As the observer gets farther away from the GT line, deflection becomes the more difficult element to spot. In the large T method, the FO uses deflection brackets.

Once the first round is on its way, the FO must determine: r and angles C , S and D from the OTFT. Note angle D is the only value to come from a

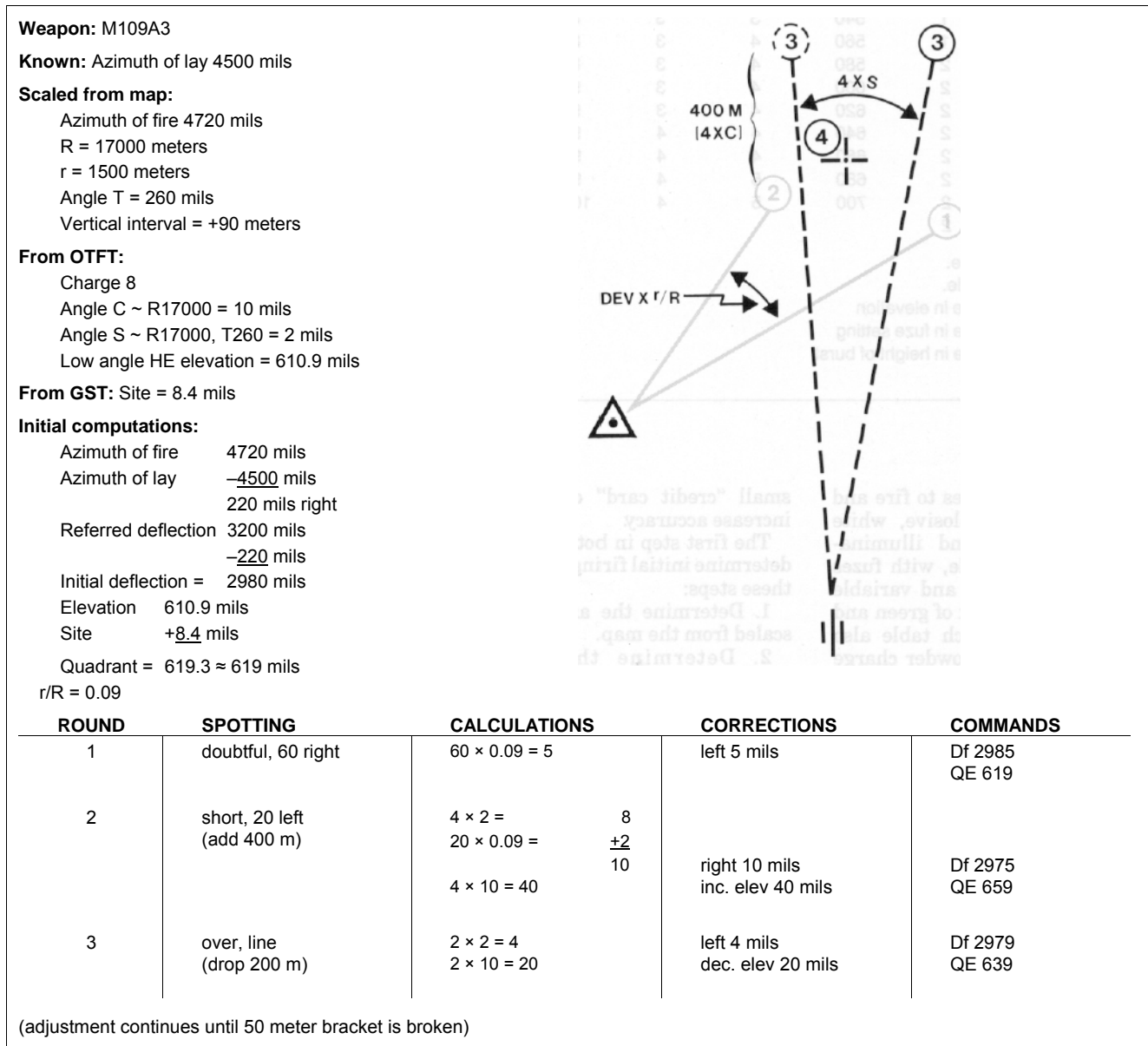



Figure 2. Small T Method

different page in the OTFT. Adjustments follow these steps:

1. Spot the first round.
2. Bring the next round onto the OT line by multiplying the deviation by the value $(C \div D)$ and applying the product to the initial quadrant elevation.
3. Get a deflection bracket by applying one angle C to the previous elevation and one angle S to the previous deflection for each 100 meters of OT distance change necessary. The FO makes subsequent range by multiplying the deviation spotting by $(C \div D)$ and applying the product to the previous elevation. He enters the fire for

effect phase once the rounds split a deflection bracket of one-half angle S.

Although the BC method obviously requires some clear thinking, it doesn't require a mathematical genius to complete. While it is most useful to the observer talking directly to his battery—as is the case in light and Marine artillery—the BC method allows the observer to share fire support coordination responsibilities. This and other considerations would have to be worked out once the Redlegs get the OTFT and they try the procedures. Nevertheless, the BC method shows powerful potential in the Field Artillery. 

Captain Frank A. Hollingshead, USMC, received his commission from the Officer Candidate School at Quantico, Virginia, after graduating from West Virginia University. He has served with the 2d Battalion, 12th Marines, 3d Marine Division in Japan, and with the 1st Battalion, 10th Marines, 2d Marine Division at Camp Lejeune, North Carolina. Captain Hollingshead is a graduate of the US Army Field Artillery School officer advanced course and is assigned to the 2d Marine Division at Camp Lejeune.

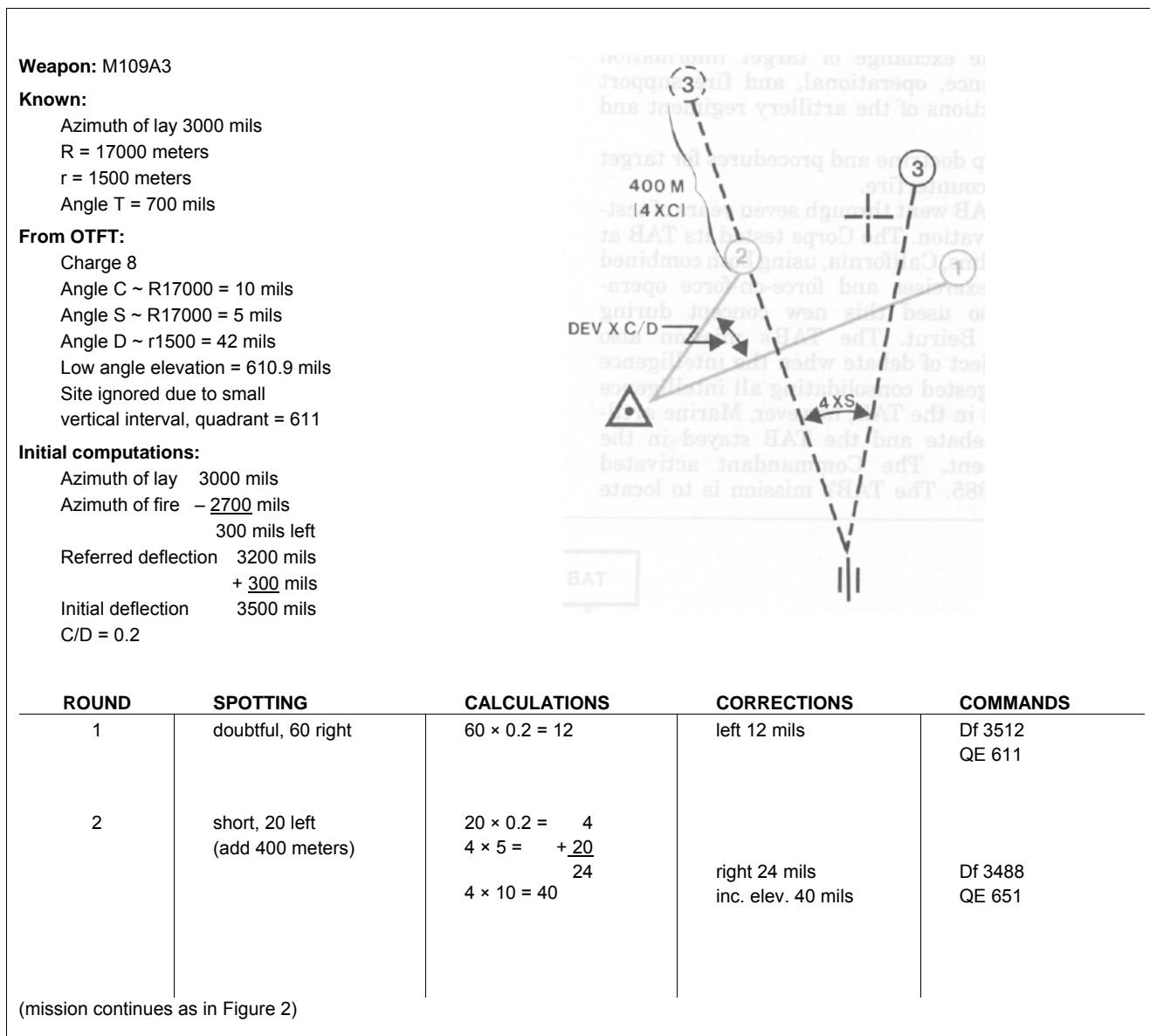


Figure 3. Large T Method

Fragments

FROM COMRADES IN ARMS

The Marine Corps Target Acquisition Battery

The Marine Corps Target Acquisition Battery (TAB) concept began in 1978 when the commanding general of the 2d Marine Division requested the Commandant of the Corps form a provisional TAB. At that time, all target acquisition assets were in the headquarters battery—and this overloaded the already burdened operations platoon.

The four areas the TAB may address are:

- Clarify the existing target acquisition concept.
- Train personnel in target location and use of TAB equipment.
- Promote the exchange of target information among intelligence, operational, and fire support coordination sections of the artillery regiment and the division.
- Help develop doctrine and procedures for target acquisition and counterfire.

The Marine TAB went through seven years of testing prior to activation. The Corps tested its TAB at Twenty Nine Palms, California, using both combined arms live-fire exercises and force-on-force operations. They also used this new concept during deployment to Beirut. The TAB's mission also became the subject of debate when the intelligence community suggested consolidating all intelligence collection assets in the TAB; however, Marine artillery won the debate and the TAB stayed in the artillery regiment. The Commandant activated them in July 1985. The TAB's mission is to locate enemy indirect fire

weapons systems; register and adjust friendly artillery; provide forward observation and laser designation teams; and process targeting information as collected from radars, forward observers, aerial observers, etc.

Based on experience with Q-36s in Beirut and various exercises, the Corps decided the smallest Marine air-ground task force that should use Q-36 radar is the Marine amphibious brigade (MAB). The Marine Corps has changed Army doctrine to meet its needs in amphibious warfare. The present structure of the TAB (figure 1) is undergoing study for a possible revision to fulfill the MAGTAF's requirements to provide:

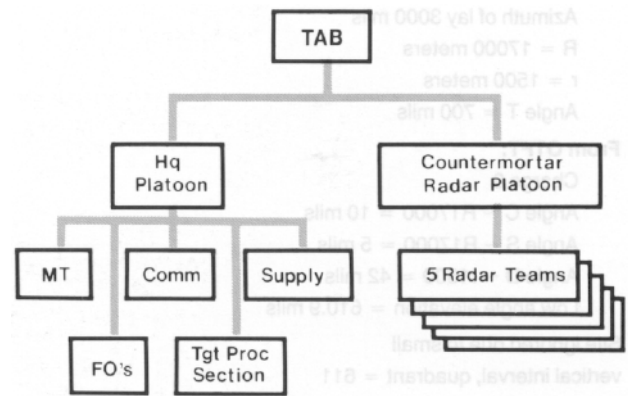


Figure 1. TAB current structure.

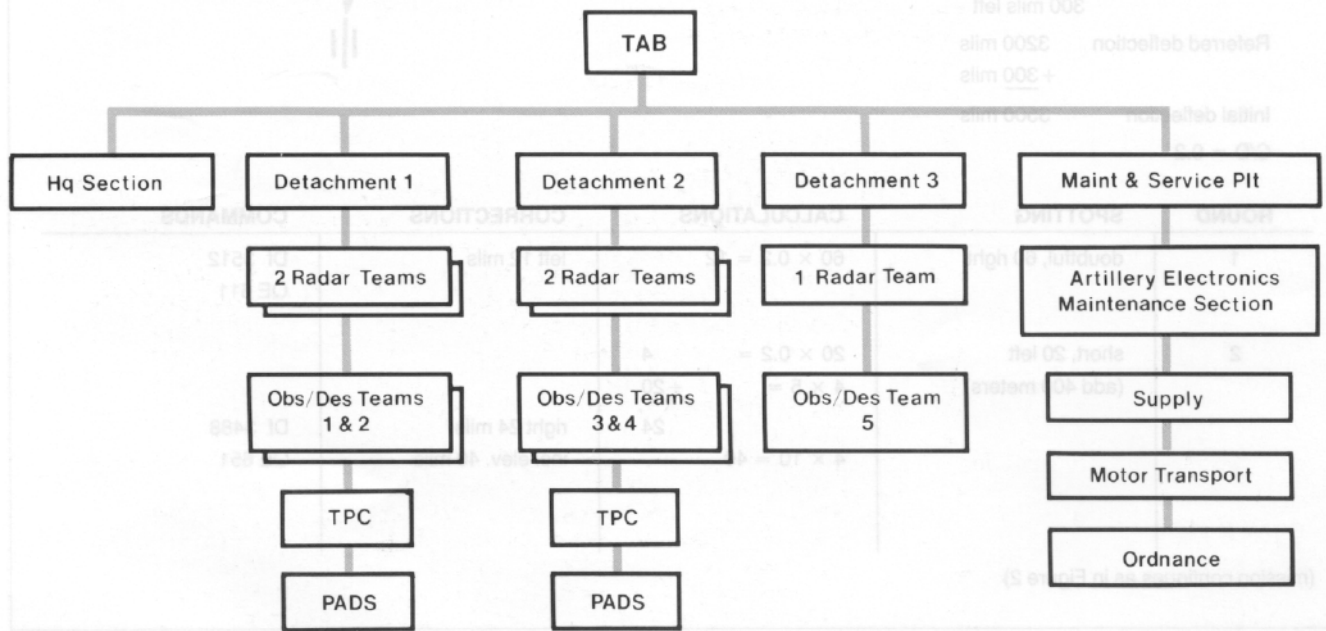


Figure 2. TAB restructure.

- Radar coverage of the MAGTAF area of operations.
- A range processing capability to the highest artillery headquarters of the supported unit.
- Observation-designation teams for flexible use throughout the unit's sector.
- Support for two Marine amphibious brigades simultaneously.
- Increased survivability of the AN/TPQ-36 radar teams.

The restructuring of the Marine TAB will increase its flexibility of radar coverage, provide for the Marine version of combat observation and lasing teams (COLTS), and provide position and azimuth determining systems (PADs) support for rapid repositioning of the radars. (See figure 2.) Each division will tailor its TAB to meet its unique requirements, but the proposed structure is one method of meeting the Marine Corps' doctrinal requirements.



Space Age Technology

2LT Kevin Lutz wears the new POTMAC suit and SP5 Dennis Warner an older M3 TAP suit during chemical tests on a 250-pound bomb December 22. Both soldiers are in the 17th Ordnance Detachment, Explosive Ordnance Disposal, 101st Airborne Division (Air Assault), Fort Campbell, KY. (Photo by SP4 William F. Powell)

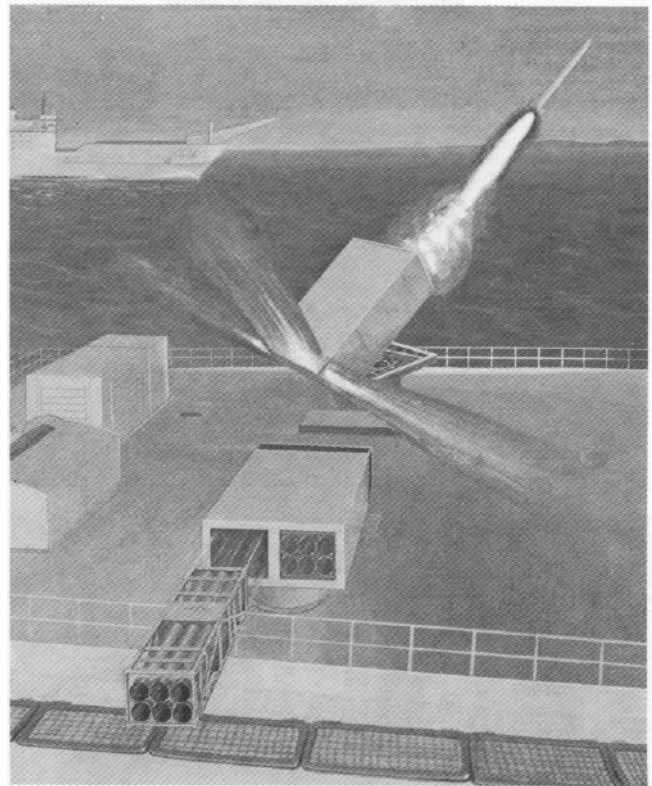
Navy ABRS Version of MLRS

The US Navy is considering buying a shipboard Assault Ballistic Rocket System (ABRS) similar to the Army's multiple launch rocket system (MLRS). The ABRS, made by LTV Aerospace and Defense Corporation of Dallas, is a 12-rocket, rapid-fire and reload system. Every 680-pound rocket contains 644 M77 bomblets, each with the destructive power of a hand grenade.

The ship-to-shore ABRS provides immediately available massed area coverage. In fact, a single 12-rocket load can drop 7,328 submunitions in an area about 600 yards wide. Likely Naval uses for ABRS include support of amphibious operations and attack of enemy shipboard radars. The ABRS offers distinct advantages.

- Increased range over existing Naval guns.
- Use of existing LST platforms.
- Availability with minimum development time and cost.
- Highly cost-effective.

The office of Vice Admiral Joseph Metcalf, Deputy Chief of Naval Operations for Surface Warfare, has proposed ABRS sea testing during 1987. Pentagon sources theorize the weapon project might die because of congressional pressure to trim spending. But as every Field Artilleryman knows, the son of MLRS will be hard to beat.



LTV Aerospace Defense