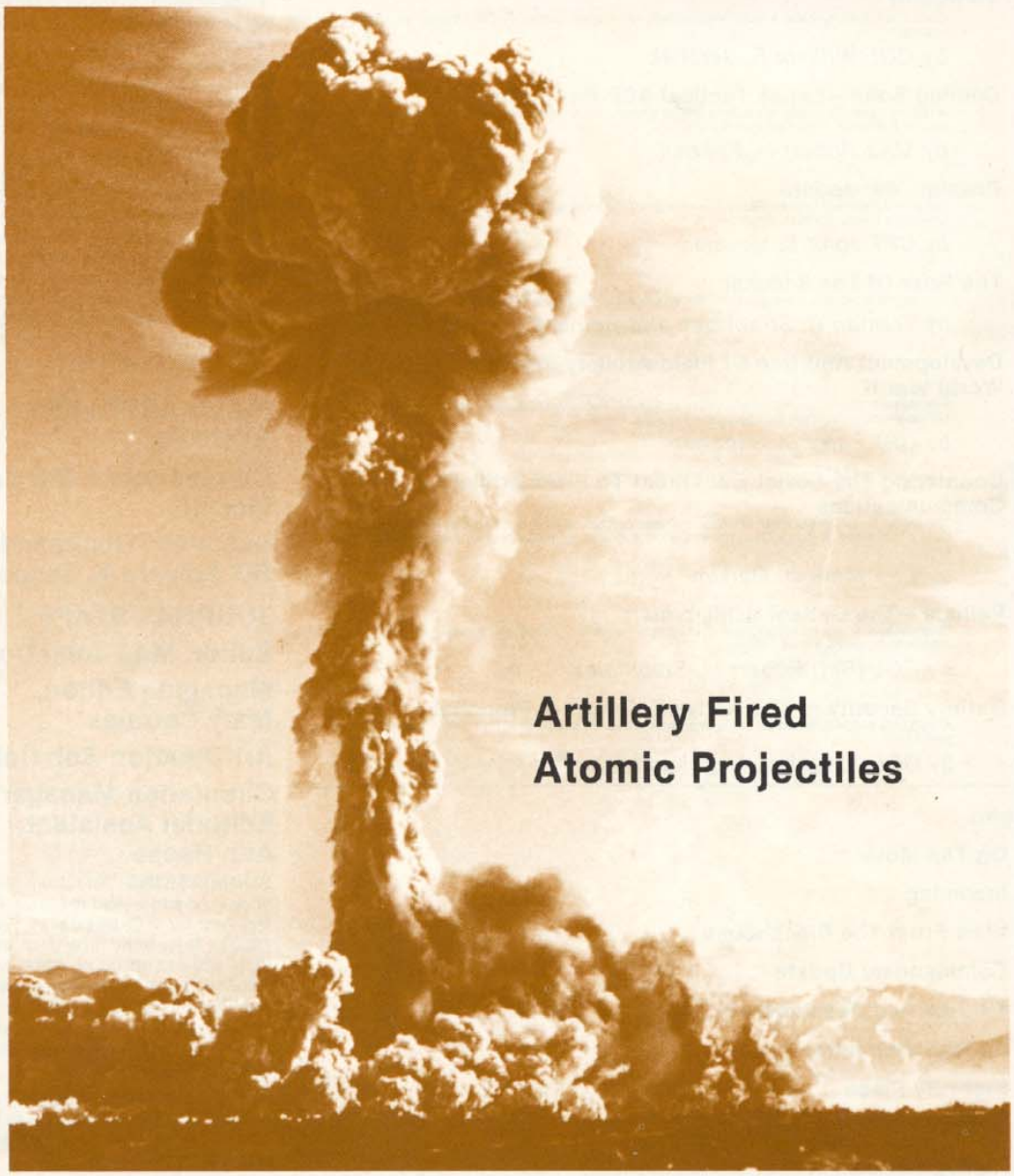
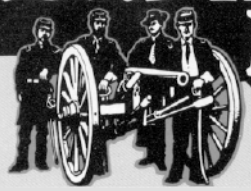
Field Artillery Journal

March-April 1980



Artillery Fired Atomic Projectiles

Field Artillery Journal



the journal of fire support

Volume 48 **March-April 1980** **Number 2**

Articles

Features

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

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On the Move

by MG Jack N. Merritt

During my more than two years as Commandant, US Army Field Artillery School, I have focused the major content of this column on discussions concerning the Army's and in particular the Field Artillery's need to improve hardware, material, doctrine and training developments to meet increasing technological challenges of the future. Certainly, if we are to survive on the modern battlefield we must continue to advance in these key areas.

It is my view, however, that even more important than possessing the best equipment and using the most innovative training methods is our continuing need for competent, experienced leaders within our officer and noncommissioned officer corps. It is here that any erosion of potential leadership, specifically among Field Artillery officers, should not be taken lightly particularly since current trends seem to indicate we are experiencing insufficient *officer retention* and *less than favorable Field Artillery officer accessions*.

I hold that the career environment now facing our senior Field Artillery commanders and company grade officers is the most difficult since World War II. For example, by this summer we will be challenged with a severe captain shortage which, by projection, will total nearly 850 officers. This shortage, similar to those we experienced after other major conflicts, is a direct result of post-Vietnam actions to reduce the total officer inventory and further reflects three major steps taken to accomplish the massive manpower drawdown:

- "Early Out" programs as well as liberalized policies to allow resignation or voluntary release from Active duty.

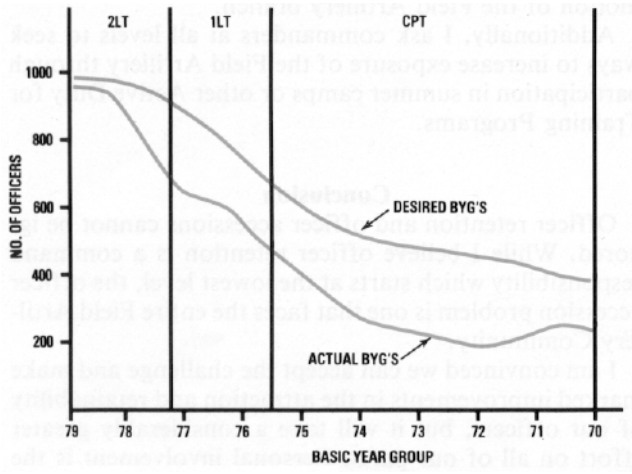


Figure 1. Field Artillery desired versus actual strengths.

- Three reductions in force (RIFs) in fiscal years 72, 74, and 76. (Army-wide, the number of officers separated by these reductions in force totaled over 12,000.)
- A significant reduction in the number of officers accessed in year groups 1972-78.

The results of these actions can be seen by comparing the desired company grade Field Artillery (SC 13) inventory with the actual inventory (figure 1).

As one might expect the end result is that we cannot properly man our FA units, with perhaps the greatest impact being felt at battalion level. It is here that commanders have been forced to grade substitute lieutenants for captains in command and key staff positions.

Understanding—Key to Retention

Now I know the situation described thus far is less than encouraging. However, it is important our junior officers are *made aware of* and *understand* the other side of the coin; that is, the positive effect an officer shortage can have on their individual careers. For example, it provides opportunity for rapid professional growth through early, repetitive command tours and utilization in primary staff assignments.

While I believe the battalion commander holds the key to this all important communication effort, I am particularly concerned that commanders at all levels are not impressing upon our young officers that this turbulence is temporary and not necessarily indicative of the kinds of things to expect in the future. Any failure by the commander to provide accurate and responsive dialogue can result in many potentially outstanding officers making career decisions based solely on their initial assignment.

These soldiers seek and must receive personal and professional assistance, and I urge you all to make special efforts to fulfill that responsibility.

Officer Losses

Another concern is the current misconception that our officers are resigning in wholesale numbers. *This is just not true!* To set the record straight I asked Field Artillery Branch representatives to provide data which shows total company grade losses OPMD-wide and FA losses resulting from voluntary resignations (RAD/RFRAD). Figure 2 illustrates their findings.

As shown, there has not been a sudden Army-wide upsurge in the number of officers resigning; in fact, OPMD resignation rates have remained fairly constant for the past couple of years. What I do consider a problem is the increase, although slight, in the number of Field Artillery officers voluntarily deciding to terminate their careers.

Now I understand many of our traditional values have changed and, with them, the reasons for which a young officer may or may not opt for a military career. First and perhaps foremost is a new thinking towards patriotism and service to one's nation based on simple economics. For example, a review of all company grade officer resignation requests cited a lucrative civilian job opportunity as the number one contributor for leaving the military.

With this strong outside competition then it should be clear that now more than ever, the Field Artillery must get on with the business of insuring our officers are aware of the full range of assignment opportunities available within the Army. We therefore must be able to provide all available information concerning the Field Artillery as well as our many other OPMS specialties. Without this kind of information, we cannot expect our young men and women to make sound career decisions.

Accessions—Field Artillery Image?

Of equal importance to insuring officer retention is our ability to obtain a "fair share" of officer accessions. Traditionally, we have always attracted a better than satisfactory number of outstanding young men and women; however, I have recently noticed a marked decrease in the number of cadets choosing the Field Artillery.

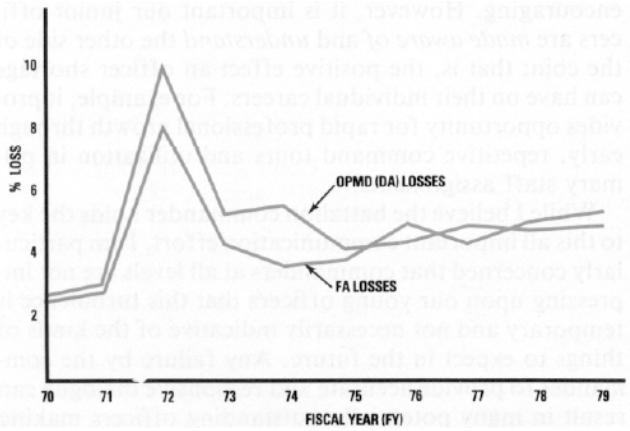


Figure 2. Company grade losses (RAD/RFRAD).

It's important to point out that FA officer input comes from three basic sources: United States Military Academy, Reserve Officers Training Corps, and Officer Candidate School. Within these sources the branch selection process is a function of order of merit and personal preference and is vital to our existence. Currently among the lieutenants found in a "typical" FA battalion, this selection process is reflected by the following statistics:

- One-third selected FA among their top three choices.
- One-third selected FA among their second three choices.
- The remaining third was "force-branched" to the FA.

In other words, one-third of our lieutenants did not desire to serve in the Field Artillery *at all*!

It is this extremely poor branch satisfaction rate that causes me great concern, and I have an idea it stems in part from shortcomings in our precommissioning efforts. In view of these alarming statistics, I have personally corresponded with every Field Artillery ROTC instructor, each FA officer assigned to a Readiness Region or Group and all Active and Reserve Component Field Artillery commanders. Based on their responses there appears to be two areas which require immediate attention and improvement:

- FA instruction at ROTC Advanced Camp.
- Realization by FA commanders, both Active and Reserve Component, of the importance of Cadet Troop Leadership Training (CTLT) and Simultaneous Membership Programs (SMP).

I believe if handled properly, gains in these areas will improve our recruiting efforts by giving the Field Artillery the professional exposure it deserves.

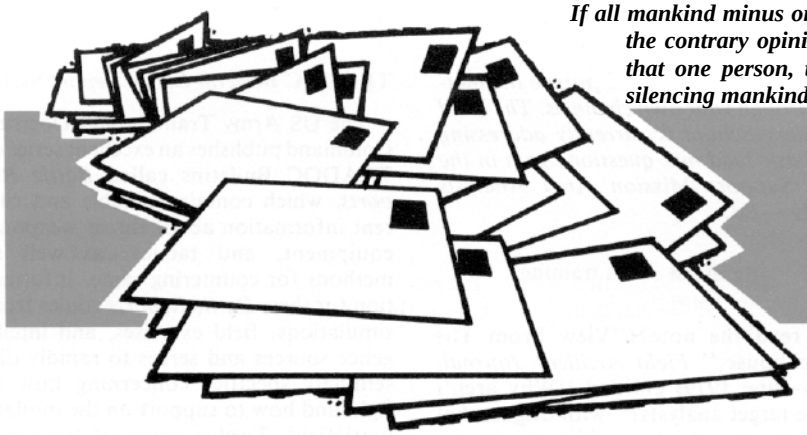
It is therefore incumbent upon all Field Artillery officers to make every effort to positively represent our branch and display the professional pride for which we have long been remembered. Specifically, I urge every FA officer assigned to the USMA or ROTC to understand that included among their responsibilities is promotion of the Field Artillery branch.

Additionally, I ask commanders at all levels to seek ways to increase exposure of the Field Artillery through participation in summer camps or other Active Duty for Training Programs.

Conclusion

Officer retention and officer accessions cannot be ignored. While I believe officer retention is a command responsibility which starts at the lowest level, the officer accession problem is one that faces the entire Field Artillery Community.

I am convinced we can accept the challenge and make marked improvements in the attraction and retainability of our officers, but it will take a considerably greater effort on all of our parts. Personal involvement is the only answer!



If all mankind minus one, were of one opinion, and only one person were of the contrary opinion, mankind would be no more justified in silencing that one person, than he, if he had the power, would be justified in silencing mankind. "On Liberty"—John Stuart Mill

Incoming

letters to the editor

Coverup and track blocks

Reference your material on the 8-inch coverup in the "Right By Piece" feature of the July-August 1979 Journal: If the unit leaves the winterization pole kit on all year round there is no need for the camouflage net carrying rack designed by SSG William Casey. By leaving the pole kit installed, there is a ready-made place to carry the camouflage screening system on the howitzer while on the move. Additionally, the top canvas of the winterization kit provides some very comforting shade in the heat of summer. The howitzer section chiefs of this battalion (1-36th FA) have been hauling their camouflage nets on top of the winterization kits as far back as anyone can remember.

This battalion has, however, come across another problem. Some of the track blocks of our M110A2 howitzers are cracking. Generally, these are hairline cracks and are very difficult to detect even under ideal PMCS check conditions. Also, there is a wide disparity in the thinking as to how large a crack constitutes a "problem"; i.e., a deadlined track block and, probably most important, true danger to the safe operation of the howitzer. Are other 8-inch units experiencing this same problem? Is there a "School solution"?

Ken Kriffin
1LT, FA
Btry C, 1-36th FA
APO New York

The device designed by Staff Sergeant Casey was reported in the ***Journal*** *as a "how to" suggestion since winterization kits are not utilized by all 8-inch organizations.*

Insofar as the problem with track blocks, assistance can be provided by your area Army Tank Automotive Material Readiness Command (TARCOM) technician. Additionally you are encouraged to submit an Equipment Improvement Recommendation in accordance with instructions provided on page 1-1 of the operations manual.—Ed.

Countermortar radar LPs?

Both FM 6-121 and FM 6-161 strongly support the technique of countermortar (CM) radar "queing" to enhance survivability and reduce transmission time. The frailty of adopting queing, as stated in those documents, is that there are no dedicated personnel to do the job.

An efficient FIST team *could* make a mortar spot report which *could* eventually filter down to the CM radar working for the DS battalion, but certainly there are no guarantees. The best doctrinal idea for queing would be to attach a radar to a sound/flash platoon, using the OPs (observation posts) as the eyes for the radar.

It seems to me that to optimize our radar capability, the CM radars require organic LPs (listening posts), two per radar, that could report rough azimuth and distance to a hostile mortar and do so in a timely manner. The DS battalion S2 could then be given the meaningful job of ordering the radar to fire its transmitter and to shift sectors of search based on concrete, near real time information.

Radar LPs are used by other armies quite effectively. If used in our system, they would assist us in hanging on to the vast sum we have invested into Fire-finder.

Daniel A. Jurchenko
CPT, FA
US Army Exchange Officer
Australian School of Artillery

The provision of LPs to our mortar locating radars as you suggest does not offer a viable approach for the Army. A greater response to enemy hostile mortars can be gained by using all of the available sources in a brigade or division zone to cue radars rather than designated LPs. These would include FISTs, all source intelligence, FSOs, sound/flash OPs, sound/flash centrals, and other agencies. One or even two LPs would be restricted in their zone of coverage and may have to move frequently to cover the zone of operation.

The adoption of LPs would require an increase of manpower in the battery table of allowance of up to 10 soldiers. The problems of increasing unit manning are well known and would not be justified in this case particularly since the current system of cuing is effective. Additional communications and transportation requirements would also be required.

Insofar as radars being attached to a sound and flash platoon to facilitate cuing, your suggestion is already current doctrine and radars are employed in this way as the situation requires.—Ed.

Info sought re 15th FA Brigade

There is a large monument located at Fort Bragg on "Smoke Bomb Hill" that has a scene of a howitzer crew firing a howitzer. Inscribed on the monument is the "15th Field Artillery Brigade" and the date "15 June 1942." The names "De Camillo" and "Swirin" also appear on the monument and may have been the designers. In any case, I would appreciate any information you might have regarding the *background* of this monument and the 15th Field Artillery Brigade.

Eric A. Erickson Jr.
COL, FA
Deputy Installation Commander
Headquarters XVIII Airborne Corps and Fort Bragg
Fort Bragg, NC 28307

The ***Journal,*** *representatives from the School, and Field Artillery Museum checked available reference indexes but could not locate information pertaining to the 15th FA Brigade. Should any of our readers be able to assist Colonel Erickson, please contact him directly by mail at the above address or by calling AUTOVON 236-8705/1525.—Ed.*

Incoming

Basic load needs changing?

I am writing to you from the 2d Battalion, 27th Field Artillery (155-mm, SP) of the 3d Armored Division, where I am currently the battalion ammunition officer.

Recently we have become concerned that our basic load allocations (governed by USAREUR Reg 710-65 and MTOE 06365HE101 with change 1) may not contain the best mixture of round types that would best assist us in accomplishing our wartime mission against expected Soviet forces. Specifically, we feel that we have too little of the dual purpose improved conventional munitions (DPICM) and rocket assisted projectiles (RAPs), and perhaps too much antipersonnel improved conventional munitions (APICM) (considering its usefulness against a heavily armored force) and white phosphorus (WP) (WP has been substituted for HC-smoke in our basic load and currently makes up almost 30 percent of our basic load).

While we are pursuing the question through our own channels, we recognize the need for established data in this area, based on various wargame simulations. We would, of course, need complete summaries of the simulations, to include assumptions used, the size and composition of the threat force, and the results obtained. We also recognize that portions of this information may be classified, presenting problems in transferring the information.

Any effort you could make to obtain these kinds of references or to put me in touch with the proper agency would be deeply appreciated. Point of contact this headquarters is MAJ Norman R. Cooney or CPT Michael D. Starry (Telephone: 06031-81-7153/8013) or myself, 1LT Thomas M. Perrin (Telephone: 06031-81-7126/8016) or write me:

1LT Thomas M. Perrin
SVC/2-27th FA
APO NY 09074

Your concern is certainly understandable and for the most part is borne out by the analytical results published in the April 1978 USAFAS "Ammunition Rates and Requirements" study, (3d Armored Division Artillery was included in distribution). Unfortunately, funding and production processes are slow to respond to technological and analytical developments; therefore, most units will not see basic load mixture changes as quickly as one would like. Procurement schedules however indicate progress for both the DPICM and the RAP. You are encouraged to continue to pursue the matter through your own channels. The Field Artillery School is currently addressing the basic load mix question again in the Fire Support Mission Area Analysis Study.—Ed.

Reservist seeks training

I read the note ("View From The Blockhouse," *Field Artillery Journal*, May-June 1979) entitled "Why aren't there target analysts?" with disgust that later developed into seething anger.

I completed the target analysis correspondence phase in January 1978. In February 1978 I applied for the resident phase and was denied admittance. Reason: The resident phase was now open only to Active Army personnel.

The less than 46 percent fill rate mentioned for the course certainly does not show very enthusiastic participation by the Active Army. I certainly would have welcomed the opportunity to attend!

Lewis D. Adams Jr.
CPT, FA, USAR
Morrow, GA

The US Army Field Artillery School offers two programs of instruction for training of nuclear and chemical target analysts. The resident 3-week, 3-day Nuclear and Chemical Target Analysis Course, NCTAC 2E-ASI5H, is open only to active duty officers. The Nuclear and Chemical Target Analysis Course-Nonresident/Resident, 2E-ASI5H-B, is open primarily to National Guard and Reserve Component officers, and is conducted in two phases:

- *Phase 1, consisting of FA Subcourses 8201, 8202, 8203, 8204, and 8205 (85 credit hours) must be completed within **six months** after date of enrollment in the course.*
- *Phase 2, consisting of I week of classified resident instruction at Fort Sill.*

The Nuclear and Chemical Target Analysis Course-Nonresident/Resident, implemented in February 1979, replaces the Nuclear and Chemical Target Analysis Course-Reserve Component which was deleted in 1978. The subcourses in the Nuclear and Chemical Target Analysis Course-Reserve Component required revision because of changes in tactical nuclear doctrine. Unfortunately, during the interim, several individuals who completed the correspondence courses for the superseded Reserve Components course were not allowed to attend the 1-week resident phase.—Ed.

TRADOC Bulletin *Battle Report* Series

The US Army Training and Doctrine Command publishes an excellent series of TRADOC Bulletins called *Battle Reports*, which contain valuable and current information about threat weapons, equipment, and tactics, as well as methods for countering same. Information for these *Battle Reports* comes from simulations, field exercises, and intelligence sources and serves to rapidly disseminate specifics concerning how to fight and how to support on the modern battlefield. Twelve issues of the series have been published to date, the most recent (Aug 79) of which is titled "Combat Vehicle Engagements." Future issues will discuss Soviet airmobile capabilities, TOW gunnery and tactics, terrain reinforcement, electronic combat, Soviet chemical operations and counter-measures, Soviet river crossing operations, and other subjects of current interest.

Comments from the field indicate that many units are not receiving copies of *Battle Reports* as they are published; confusion also exists concerning how to order additional copies. Units should confirm that block 432 of DA Form 12-11B reflects the number of copies of TRADOC Bulletins *(Battle Reports)* desired for initial pinpoint distribution from USAAGPC, Baltimore. *If block 432 is not completed, units will not receive initial distribution*. Pinpoint account holders wishing to order additional copies of the TRADOC Bulletin series must request same from USAAGPC, Baltimore, using Misc Pub 18 and DA Form 4569. Refer to DA Pam 310-3 and DA Cir 310-1 for current indexes of doctrinal, training, organizational, and "How-To-Fight" publications.

A new distribution system for TOE units, scheduled for implementation in third quarter, FY80, may alleviate some current distribution problems. This "PUSH" system will eventually replace the DA Form 12-series system, excepting classified requirements, in TOE units only. TDA activities are unaffected and will continue to use the present system.

Suggestions for topics for inclusion in the *Battle Report* series may come from any agency or individual and should be addressed to Commander, TRADOC, ATTN: ATDOC-DDD, Fort Monroe, VA 23651.

Donald R. Morelli
BG, GS
Deputy Chief of Staff for
Doctrine
TRADOC

Make every round count

In recent issues of the *Journal* there have been several notes on "who shot more?" While this provides some interesting statistics (especially for logisticians and audiologists) it seems to emphasize interest in the wrong end of the trajectory.

It brings to mind the PW interrogation of a German artillery officer in World War II who was asked if he thought the American artillery was effective. After considering a while he allowed that "on the whole it was quite effective." Since he appeared to have some reservations he was asked to explain. His statement ran something like this: "Since American artillery fires so much ammunition at so many areas, on the whole it achieves a reasonable amount of effect." A somewhat left-handed compliment.

In any future major war we will not enjoy such luxury. We are more likely to be in a position similar to the German artillery toward the end of World War II, when they had to make every round count. It is time we stopped simply plowing up real estate and measuring our "effectiveness" in tonnage of iron dispersed and start emphasizing actual targets destroyed or neutralized. Admittedly this is much more difficult. It requires a much better target acquisition and surveillance system than we now have and also more during- and after-action analysis; but it is a much more valid measure of "effectiveness."

The relative importance of targets obviously is a factor too, although this involves a rather subjective judgment and varies with each situation. Firing a battalion concentration on a lone patrol uses up a lot of ammunition but may not affect the battle as much as a well placed battery volley on some unit or installation farther back.

Arthur R. Hercz
COL (Ret)
Ann Arbor, MI

The well known and worn out saying of "it's not how, it's how many" might well apply to better golf scores, but as you point out, is not altogether applicable when analyzing effectiveness of the Field Artillery. Certainly delivery of timely and accurate steel on target is now and always has been our reason for existence. Through increased technology and improved individual training, "who shot more" articles may well become "who shot first, with the least, and did the best."—Ed.

Inadequate training

After reading the November-December 1979 *Journal* I would like to comment in two areas. First, Major General Merritt in "On the Move," said that OSUT skill level one training was adequate and that graduates are able to perform those tasks outlined in the Commander's Manual. *In a very narrow context that is accurate*. However, *what he means* is that of those 13B tasks associated with skill level one, only *65 out of 139 are taught at Fort Sill*. In a *purely subjective sense one can say that all graduates have received adequate training in the tasks*. The shorter training cycle prevents some repetitive training and may therefore directly affect retention beyond the end of course test. *The rest of the 13B skill level one tasks are now supposed to be the* ***responsibility*** *of the unit.*

I fully recognize the mandated constraints of the Carter administration on the training base and the resultant significant cuts in dollars, personnel, and therefore training time allotted. As a result, reasonable and informed men were required to analyze which tasks had to be exported to units in order to take up the slack created . . . (It is interesting to note that in order to "sell" this exportation, units were told that the training could be better accomplished in the unit). It is further understood that Training Center personnel are stretched thin to accomplish necessary tasks in the time permitted. Their efforts to provide additional training to selected soldiers are heartily endorsed. The Training Center is trying very hard to provide us good soldiers. No one could do better under the constraints imposed. However, let's all recognize that when the decision was made to export selected skill level one training to units in the field, no additional NCOs were authorized or assigned. No extra time was added to our clocks. This was not, as had been done in the past, a "one time AIT-in-units" effort. This is an additional, permanent, responsibility of the unit. No extra training was given to officers and NCOs who now must train soldiers in the most basic skills before they can effectively contribute to TOE section.

We work very hard to overcome these obstacles. We are only moderately successful. The result? We have fewer well-trained soldiers today than we had as recently as two or three years ago. That is a fact! Look at SQT results, Army-wide. There is no easy solution. *However, I personally believe that our senior Army leadership, to include Major General Merritt, must continue to argue for more personnel, time, and money for the training base and to remind our civilian leadership that soldiers in the Army are less well trained as a result of their decisions*. We should not throw up our hands in surrender simply because we could not articulate our cause in the face of a campaign promise. Do we now believe that we were wrong in arguing against the training cuts? Are we at the point where to continue to argue would be viewed as failing to follow orders of those appointed over us?

My second comment is directed to Captain Altersitz's letter regarding rangefinders. I find in my own unit, and it is apparent from Altersitz's letter, that artillerymen are prepared to engage Soviet Bloc tanks in a direct fire duel. That is sheer nonsense! Other than Copperhead we do not have a projectile that can destroy a T-72 tank. Whether one likes the image or not, in order to survive on the battlefield and to be able to provide indirect fires, we must evade enemy armor forces. The technique Altersitz suggests is a good one as long as everyone understands we should not use artillery direct fire against a Soviet tank unless we have no chance for escape and merely want to go down fighting.

John R. Cavedo
LTC, FA
1-19th FA
Fort Carson, CO

Your letter reiterates many points now made by the Fort Sill leadership to every Field Artillery command designee while they are in attendance at the Pre-Command Course during the Fort Sill phase. The requirement for a strong training base continues to be argued at every opportunity. All commanders are encouraged to mark calendars now and plan to attend the next Senior Field Artillery Commander's Conference to be hosted by Fort Sill this October.

Insofar as your comments concerning CPT Altersitz's piece, you are correct; however, the suggested use of rangefinders was not directed at a one-on-one situation between a T-22 and a M109.—Ed.

Correction

The Redleg Sutler gift shop in Snow Hall (phone number (405) 353-8641) is operated by the Field Artillery Museum Association rather than the Field Artillery Association as reported in the January-February 1979 *Journal*. All profits of the gift shop go directly to support the US Army Field Artillery and Fort Sill Museum.

Incoming

Let's find out

Colonel Serchak's article "A Field Artilleryman as Attaché" in your November-December 1979 *Journal* was interesting and pertinent. I agree. The military attaché is in a position to make useful contributions to our materiel acquisition process by keeping us informed of foreign equipment developments. The development/acquisition of a major system is an expensive, time-consuming (and frustrating) endeavor and is a process that can benefit by careful consideration of foreign developments.

In the past, as the article states, we have rarely ventured out of our own backyard in seeking to satisfy our requirements. I can attest, however, that the program for enhancement of Field Artillery capabilities for the 1990s and beyond includes an active, thorough assessment of all foreign systems—not just for information, but for acquisition consideration. The ESPAWS (Enhanced Self-Propelled Artillery Weapons System) program review, in late 1980, will evaluate the following:

1) Concepts for a new system.

2) An assessment of the product improvement potential of the current system.

3) Foreign systems/technologies to determine the direction of the program for this decade.

Once user interest is aroused, I feel that any foreign system/technology/component would have a good chance—better now than in the past—of a fair, thorough assessment. Understand, though, that foreign systems are not always as easy, as described in the article, to acquire for the purpose of the rigorous examination required for an adequate assessment of operational suitability, survivability, reliability, etc.

"Let's find out" is a more achievable goal now, I believe, and has a better chance now for some payoff in the long run.

James A. Quinlan
COL, FA
TSM Cannon
Fort Sill, OK

Are we going down?

I have just read "A Field Artilleryman as Military Attache" by COL William E. Serchak in the November-December 1979 *Journal*. Well do I understand the author's frustration; yet I am only a sergeant first class in the US Infantry.

Born in Switzerland, I saw the French Army defeat of 1940. Yet, as 10-year-olds, my buddy and I were able to understand the reasons for the defeat just by talking to French and German soldiers and officers, before and after the rout. We were even able to see through the Government propaganda about only the French being superior, enemy combat planes being inferior, German tanks being made of cardboard, etc. Well so much for that, but now I have the same feeling as before. We are going down.

I trained with the Swiss militia in assault units and became Sergeant Major. I have five years of airborne service, of which three were in combat with the French Foreign Legion. I have been attached to German and French army units and have kept in touch with soldiers of all ranks in several armies. I read enormously, by US standards, military publications in German, French, English, Italian, Spanish, etc. and in particular enjoy the Pentagon library.

It is so hard to fight this "not invented here," or this "yes, but . . . we are in the USA." I proposed one time to standardize our ammunitions with the Soviets, just to simplify our logistics. If there is a war in Europe, we wouldn't have to worry about quick resupply from the US, just attack and use Soviet ammo—very logical, simple, and cheap. Let the Soviets be our best logistical services. Finland used this sytem in 1939 very well, at least for small arms ammunition.

I agree with Colonel Serchak in his concern over this frustrating state of affairs. Please carry on. We owe it to our soldiers, to our nations, and to ourselves. I don't want to go down like France did in 1940.

Paul A. Manser
SFC, IN
US Army Operational Test and Evaluation Agency
Falls Church. VA

Pershing is challenging assignment

Reference Mr. Record's article that appeared in the September-October 1979 *Field Artillery Journal:*

The Pershing missile system is often misunderstood. Traditionally, Field Artillerymen have avoided an assignment with Pershing like the plague. This is my first assignment with Pershing and now I am a believer in the system. Commanders are constantly trying to get more realism in Pershing training. Because of its peacetime Quick Reaction Alert (QRA) mission, Pershing is one of the few Field Artillery units with a real-world day-to-day mission. I cannot imagine any training more realistic and meaningful than the time spent on QRA.

Pardon my cliche but Pershing is both a "challenging and rewarding" assignment.

Martin H. Beach
MAJ, FA
1-41st FA
APO New York

NG lieutenant would like to become active

This letter is in reference to your article, "The Company Grade Years—A Decade of Development," in the July-August 1979 *Journal*. Please send me LTC Leslie E. Beavers' address, or the address of the officer who is presently Chief of the FA Branch, Company Grade Combat Arms Division.

I would like to find out the possibility of a National Guard first lieutenant being granted a request to reenter active duty. I would also like to know what administrative action is necessary to make such a request.

Ronald H. Thorne
B/4-114th FA MSARNG
Forest, MS

Written correspondence to LTC(P) Leslie E. Beavers, Chief of the Field Artillery Branch, should be addressed as follows:

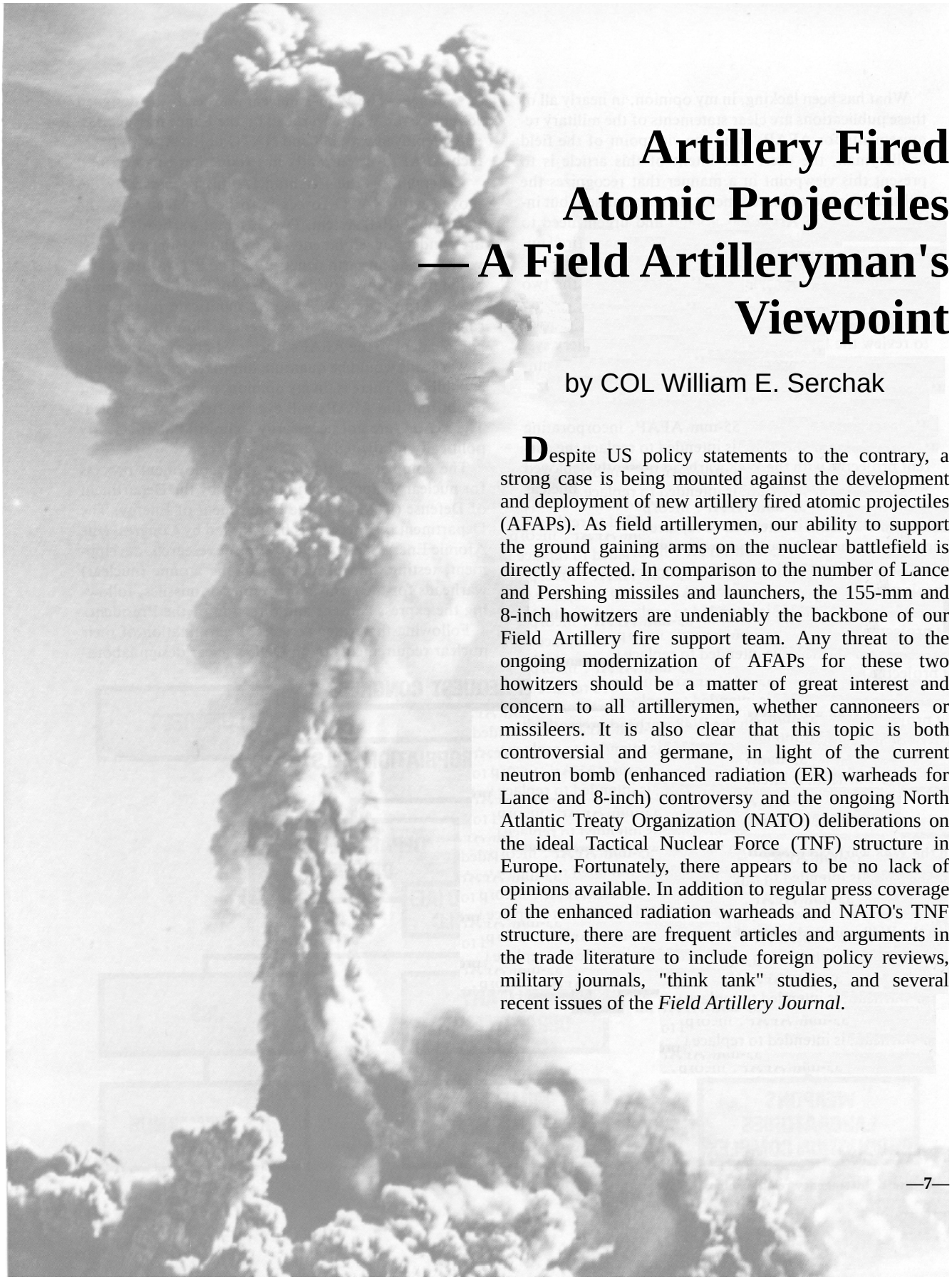
USAMILPERCEN
ATTN: DAPC-OPE-F
200 Stovall Street
Alexandria, VA 22332

Additionally, LTC Beavers can be reached by telephone at AUTOVON 221-7817/0187 or commercial (202) 326-7817/0187.

Insofar as your questions concerning application for active duty, Army Regulation 135-210 entitled "Order to Active Duty as Individuals During Peacetime, National Emergency or Time of War" contains complete details and eligibility requirements for active duty programs available to ARNGUS/USAR officers. If qualified, you should submit DA Form 160 "Application for Active Duty," in duplicate, through appropriate Guard channels.—Ed.

Reunion

Headquarters and Headquarters Battery, 8th Infantry Division Artillery, will meet May 16-19 at the Holiday Inn, Philadelphia, PA. Contact James C. Woolley, 1011 Cliff Pl, Baltimore, MD 21126.



Artillery Fired Atomic Projectiles — A Field Artilleryman's Viewpoint

by COL William E. Serchak

Despite US policy statements to the contrary, a strong case is being mounted against the development and deployment of new artillery fired atomic projectiles (AFAPs). As field artillerymen, our ability to support the ground gaining arms on the nuclear battlefield is directly affected. In comparison to the number of Lance and Pershing missiles and launchers, the 155-mm and 8-inch howitzers are undeniably the backbone of our Field Artillery fire support team. Any threat to the ongoing modernization of AFAPs for these two howitzers should be a matter of great interest and concern to all artillerymen, whether cannoneers or missileers. It is also clear that this topic is both controversial and germane, in light of the current neutron bomb (enhanced radiation (ER) warheads for Lance and 8-inch) controversy and the ongoing North Atlantic Treaty Organization (NATO) deliberations on the ideal Tactical Nuclear Force (TNF) structure in Europe. Fortunately, there appears to be no lack of opinions available. In addition to regular press coverage of the enhanced radiation warheads and NATO's TNF structure, there are frequent articles and arguments in the trade literature to include foreign policy reviews, military journals, "think tank" studies, and several recent issues of the *Field Artillery Journal*.

What has been lacking, in my opinion, in nearly all of these publications are clear statements of the military requirements for AFAPs from the viewpoint of the field artilleryman, the user. The intent of this article is to present this viewpoint in a manner that recognizes the politically-inspired impediments that have arisen, but insists that the US Army has a valid and urgent need to modernize both the 155-mm and 8-inch artillery fired nuclear rounds.

It may not be possible to adequately discuss the two AFAPs out of context with ongoing Lance and Pershing developments. For clarity, then, it would be worthwhile to review the four major US Army nuclear artillery systems. (It just so happens that all four warheads (155-mm, 8-inch, Lance, and Pershing) are undergoing modernization.)

• **155-mm**—The new 155-mm AFAP, incorporating the W82 nuclear warhead, is intended to replace the current projectile with the W48 warhead presently deployed with US and NATO artillery units. The W82 nuclear warhead is presently in Development Engineering at the Department of Energy (DOE) (formerly ERDA and, before that, AEC) laboratories.

• **8-inch**—The new 8-inch AFAP, incorporating the W79 nuclear warhead, is designed to replace the current projectile with the W33 warhead, also presently deployed with US and NATO units. The W79 warhead is in Production Engineering at the same DOE laboratories.

• **Lance**—The W70-3 nuclear warhead was designed to replace the W70-2 warhead on the Lance missile presently deployed with US and NATO units. As with the 8-inch AFAP, it is currently in Production Engineering.

• **Pershing**—The Pershing IA missile presently deployed with NATO forces is to be replaced with the Pershing II (PII) system. Two different warheads for PII are under development—an airburst/surface burst warhead and an earth penetrator. The PII warheads are, at the time of this writing, in Development Engineering.

The Army's new AFAPs give significant increases in range, reliability, and responsiveness. Similarly, and as a complement to the AFAPs, the new Lance and Pershing II warheads would be quantum improvements to current capabilities. There is, in my opinion, no small amount of doubt that the AFAPs will ever be fielded as designed. The reasons are not necessarily technical but are clearly politically motivated.

The complete development and deployment process for nuclear weapons is a joint effort by the Department of Defense (DOD) and the Department of Energy. The Department of Energy has been tasked by Congress (the Atomic Energy Act of 1947) with the research, development, testing, and production of the atomic (nuclear) warheads for the Army's projectiles or missiles, following the express consent and direction of the President.

Following the armed services' determination of their nuclear requirements (with DOE nuclear design laboratories'

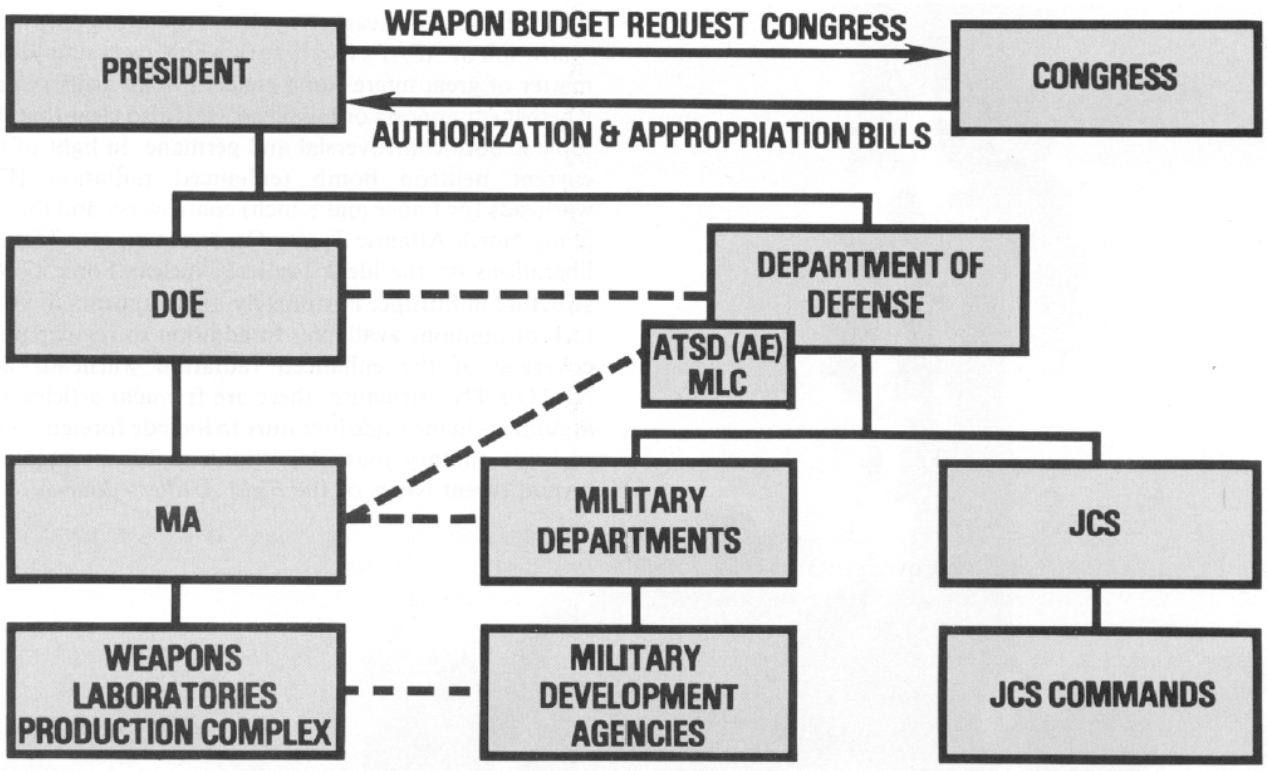


Figure 1. Interagency relationships.

Neutron Killer Warhead Buried in ERDA Budget

(Washington Post, page 1A, June 6, 1977)

By Walter Pincus Washington Post Staff Writer

help), it becomes necessary for the levels above the services to massage and meld these requirements into a national program (figure 1). In addition to the actions of the Secretary of Defense and the President, there are a host of no less powerful agents at work who can more easily change, impede, or frustrate than facilitate the services clearly stated and fully justified needs. The Office of Management and Budget (OMB), The Arms Control and Disarmament Agency (ACDA), Program Analysis and Evaluation (PA&E), and the National Security Council (NSC) plus the members of Congress and their aides and consultants all can be named as having a key role in nuclear weapons development.

How many times have you heard that all decisions in this area are politically inspired? The so-called "neutron bomb" was certainly one. The neutron bomb was a misnomer created by Mr. Walter Pincus of *The Washington Post* in the summer of 1977 and then applied to the above mentioned W79 and W70-3 warheads for the 8-inch and Lance systems, respectively. The correct terminology for the W70-3 and W79 warheads is "reduced blast/enhanced radiation (RB/ER) warheads" not "neutron bombs." Lance and 8-inch warheads were already in Production Engineering at the time that the RB/ER warheads first came to public notice on 6 June 1977. *The Washington Post* story immediately triggered widespread debate in the United States and abroad. Despite the fact that both had been approved and funded by the President and Congress for several years, the ER warheads quickly became a political albatross to the Carter Administration. Abetted by the furor created overseas by our NATO allies and the Soviet Union, DOE's FY 1978 Authorization Bill contained the Byrd-Baker Amendment which gave Congress 45 days to veto any production decision by the President who would have to state that the production of ER warheads was "in the national interest." In effect, there followed a complete halt to the ER warhead development for one year. Regardless of the problems and frustrations this stoppage caused both the Departments of Defense and Energy, it took over one year for the Administration to "test the waters" and decide *not to decide* the question of production and deployment of ER weapons. On 7 April 1978, President Carter made a public statement on the resumption of production activities. It wasn't until six

BYRD-BAKER AMENDMENT

". . . PROVIDED FURTHER, THAT NONE OF THE FUNDS APPROPRIATED IN THIS ACT SHALL BE USED FOR PRODUCTION OF ENHANCED RADIATION WEAPONS UNTIL THE PRESIDENT CERTIFIES TO CONGRESS THAT PRODUCTION OF THESE WEAPONS IS IN THE NATIONAL INTEREST; PROVIDED FURTHER, HOWEVER, THAT AFTER SUCH CERTIFICATION IS RECEIVED, PRODUCTION MAY PROCEED, UNLESS WITHIN 45 DAYS CONGRESS BY CONCURRENT RESOLUTION DISAPPROVES SUCH PRODUCTION . . ."

PRESIDENTIAL STATEMENT ON ENHANCED RADIATION WARHEADS
7 APRIL 1978

"I HAVE DECIDED TO DEFER THE PRODUCTION OF NUCLEAR WEAPONS WITH ENHANCED RADIATION EFFECTS. THE ULTIMATE DECISION REGARDING THE INCORPORATION OF ENHANCED RADIATION FEATURES INTO OUR MODERNIZED BATTLEFIELD WEAPONS WILL BE MADE LATER . . .

"ACCORDINGLY, I HAVE ORDERED THE DEFENSE DEPARTMENT TO PROCEED WITH THE MODERNIZATION OF THE LANCE MISSILE NUCLEAR WARHEAD AND THE 8-INCH WEAPON SYSTEM, LEAVING OPEN THE OPTION OF INSTALLING THE ENHANCED RADIATION ELEMENTS . . ."

months later, however, that DOD and DOE received any clarification of exactly what the President had in mind in his April statement. A Presidential decision was announced in simultaneous White House and DOE press releases on 17 October 1978 and confirmed the statement of 7 April 1978 but, did not address deployment to Europe. The decision directed DOE to:

- Modernize Lance missile warehead with W70-3.
- Modernize 8-inch howitzer shell with W79.
- Deliver new warheads to Defense Department without the enhanced radiation features.
- Be prepared to add an enhanced radiation capability if directed to do so.

So while DOE resumed production engineering of the new warheads in FY 1979, it was clear that the W79 and W70-3 warheads would be "emasculated" versions of the original designs. Through the efforts of the designers, Sandia and Lawrence Livermore Laboratories of California, a way is being devised to add the ER capability, if directed at a later date. Army officials however were so anxious to get on with it after a one-year delay that they were willing to tell Congress that even without a fielded ER capability, they wanted the new warheads anyway. The current 8-inch projectile is such an example; its short range and ballistic simulitude deficiencies and lack of modern safety, security, and reliability features caused the Army to accept the ER "convertible" warheads, thinking perhaps that a different President could be convinced to convert to the ER capability.

It is interesting to note that the Lance and 8-inch development had progressed through the Government in a completely ordinary way until the controversy erupted in June 1977. Some have charged that the Administration tried to "sneak" the weapon through Congress, but nothing could be farther from the truth. And none were more surprised than DOD and DOE at the magnitude of the storm that broke; it was such a storm that might arise, say, over the decision to replace one model of tank by another.

The Pincus article in *The Washington Post* had at least one useful consequence: It forced intense public review of the fundamental issues regarding nuclear weapons production and deployment. The late Senator Hubert Humphrey in a major Senate debate on ER weapons on 13 July 1977, said: ". . . we have . . . blown this weapon out of all proportions." Whether the pun was accidental or deliberate is not recorded, but the statement is certainly accurate.

Death and destruction are not novelties to the soldier, but neither were they introduced into the world by the advent of ER weapons. "Ordinary" nuclear weapons would lead to identical or worse death and destruction than ER weapons with the possible exception that the victims might well be more innocent and numerous. Many participants in the ER controversy have expressed hostility to ER weapons on alleged ethical grounds. The complaint is that it is immoral to have a weapon that would kill people but not destroy property. This so-called ethical part of the argument is unrealistic. Bows and arrows are even less effective at destroying property, but they kill people quite handily. Yet, it has never been alleged that this is a moral defect of bows and arrows. It cannot be argued that the unwanted destruction of property, even if personnel are not involved, is somehow a moral good.

The ethical argument also overstates the reduction in blast or other nonneutron effects that ER weapons provide. Such effects would be reduced by a factor of 10 for ER weapons compared to standard fission weapons of the same effectiveness. But, when dealing with energy yields of thousands of tons of TNT, a factor of 10—while important—should not be confused with the difference between night and day. Few of us live in homes we would

wish to have directly under an ER weapon detonation, even if we weren't home at the time!

The important point to note here is that the original military requirement for an ER weapon for 8-inch and Lance has been completely subverted by purely political considerations. There continues to be analysis and debate of the effect upon the Army's war gaming models and responsiveness of those "emasculated" ER warheads, if and when they reach an initial operational capability (IOC).

Why AFAPs in the force structure?

The advantages of cannon for the nuclear mission continue to be that they—

- Exist on the battlefield in large numbers for the conventional mission.
- Can quickly convert to the nuclear mission without significant additional force structure.
- Can engage targets in close proximity to friendly lines.
- Limit collateral damage in the battle area.

Much of the current debate has treated this reduction in unwanted (collateral) damage as if it were a purely humanitarian or political consequence. Without minimizing humanitarian or political objectives, it should be noted that reducing collateral damage has important military consequences as well. It is difficult to move friendly forces through towns or forests that have been transformed into a sea of rubble, especially if it is highly radioactive. Further, ER weapons can be used against enemy forces much closer to one's own troops than is feasible (safe) for fission weapons of the same radius of antipersonnel (radiation) effect. Friendly troops would then be able to quickly attack and exploit the effects of the close-in nuclear detonation on the dazed enemy forces.

Why would a military planner be interested in neutron-effect weapons, especially ER weapons? There are two interrelated answers to that question. First, ER weapons are more effective against a major, if not *the* major, military threat against NATO in Central Europe; i.e., Soviet armored forces. Second, ER weapons can be less destructive to NATO soil than ordinary fission weapons of comparable effectiveness against Soviet armor.

In regard to the first answer, tanks and armored personnel carriers are relatively invulnerable to most nonneutron effects, such as blast and thermal radiation, but are highly vulnerable to neutron radiation. More precisely, it is not the tanks *per se* that are vulnerable, but the crews which are well protected against blast and thermal effects, but not against neutron radiation which easily penetrates the thick armor wall. Lethal doses of neutron radiation from ER weapons would enable the NATO military planner to destroy enemy armor with lower or reduced blast effects.

The second answer to the military planners' quest is that casualties to friendly frontline troops or civilian communities would be reduced. For the same radius of military damage against tanks, an ER weapon would have about one-tenth the yield of a standard fission weapon.

Over the years, there have been numerous studies and analyses of the ideal artillery force structure. As artillerymen we have an inherent feeling for the importance of a spectrum of conventional and nuclear fire support means. Tube artillery has been and will continue to be the "bread and butter" of fire support. Too many times in the arguments over nuclear artillery, it appears that the debators forget the importance of the direct support and reinforcing tube artillery in providing the frontline infantryman with close and continuous supporting fires. It is not so cataclysmic for an artilleryman to expect a transition to close-in nuclear fires if that time ever comes. The accuracy and all-weather capabilities of tube artillery are unique in the fire support structure. Would an infrantryman in close contact with a superior enemy force or faced with a large, fortified enemy strongpoint choose a tactical air (TACAIR) air nuclear strike or a medium range ballistic missile? How about in bad weather or at night? No, that soldier knows he can always count on his conventional direct support tube artillery when the going gets rough and he can expect the same in nuclear combat. The artillery forward observer in infantry companies, be they a lone NCO or fire support team, mark our willingness to personally "deliver the goods" where and when needed. Artillery fired atomic projectiles must not be the sole justification for 155-mm and 8-inch tubes in the force structure. The number of nuclear rounds in the stockpile that will be fired through tube artillery is dwarfed by the tons of HE that Redlegs will be delivering daily. This point is perhaps lost amoung most people above the armed service level in our government. Artillery fired atomic projectiles perhaps ought to be thought of more as an anomaly in the fire support structure rather than the sole reason for the existence of tube artillery.

Artillerymen only too well also realize the limitations of tube artillery and know that Lance and Pershing are required to reach deep beyond the forward edge of the battle area. They complement the tube artillery but do not obviate it. What missiles gain in range and size, they may lose in responsiveness and survivability. Senator Sam Nunn (D-GA) has stated that the lack of range in AFAPs only guarantees that they will land on NATO soil; however, this is of little interest to the infantryman in close contact. The infantryman wants the nuclear hardware delivered to his immediate front, right now! He is not concerned that the Pershing or ground launched

cruise missile (GLCM) should have struck deep in Warsaw Pact country and knocked them all out before they crossed the border. Not only would a Pershing or GLCM be inappropriate to fire in support of the infantryman in contact, but its priorities and ability to respond in time are doj btful. And what of the target acquisition capabilities of our force structure? Granted the Defense Intelligence Agency and Air Force have developed extensive lists of fixed targets in Warsaw Pact countries that may be taken out if war arises. But once underway and across the border, do we have the capability to locate and destroy a fast moving armored blitzkrieg in a timely fashion with medium range ballistic missiles or TACAIR—in bad weather or at night? Also, what about the fast moving second echelon forces that are far beyond the field of vision of the forward observers?

That 155-mm and 8-inch howitzers are dual capable artillery, able to deliver either conventional or nuclear projectiles, is an important "given" also forgotton by many individuals above armed service level. NATO units generally have four to five times as many 155-mm as 8-inch tubes in their force structures (direct support versus general support ratio). Therefore, the existence of large numbers of 155-mm tubes help assure the survival of a substantial short range nuclear capability in the event of a Warsaw Pact attack. A widely dispersed 155-mm nuclear capability prevents the enemy from simply focusing his attack on the less numerous 8-inch artillery. NATO countries are looking forward to the development of a modernized 155-mm nuclear projectile for the FH70-SP70 howitzers they are developing. This capability will upgrade their 155-mm systems and help make up for the deficiency in 8-inch tubes in their sectors. If the present AFAPs are not replaced, the nuclear capability of the howitzers in NATO will erode in time as the existing warheads age and are retired.

The deficiencies of the present 8-inch warhead are well known by US artillerymen. The W33 entered the inventory nearly 24 years ago and was designed with the technology of the 1950s. Its complicated field assembly, range limitations, and relatively imprecise mechanical time fuzing will all be corrected by the new projectile and warhead.

Both new AFAPs are being designed to ballistically match the high explosive (HE) conventional ammunition for the howitzers, thus eliminating the need for a special spotting round. Greatly improved range capabilities for both projectiles increase targeting flexibility and counterbattery capabilities as well as survivability of the Tactical Nuclear Force.

As with the new 8-inch AFAP, command and control of the new 155-mm warhead would be improved by use of a new permissive action link (PAL) system and a disablement device to allow nonviolent disablement of the warhead.

The outlook for AFAPs

It should be clear that above the Department of the Army (DA) level, relatively little support exists for tactical nuclear weapons vis-a-vis strategic systems. Even the most casual observer must be aware that the costs and level of effort behind systems, such as TRIDENT and MX, dwarf those of the Army's AFAP program. Why hasn't the Army been able to generate the support it needs for its systems? The opinions and scenarios on the role of AFAPs are as numerous as there are officials in the nuclear weapons community. Strategic weapons dominate the nuclear development scene in the US, just as big gas guzzlers dominate the automobile industry. In a manner analogous to big automobiles, the strategic weapons with their high initial costs and expensive options have dominated our nuclear war planning and hold our leadership in thrall.

General Merritt, USAFAS Commandant, stated (*FA Journal*, September-October 1979) that in nuclear doctrine and material development the US Army has a systemic problem: It lacks a basic concept for operations on an integrated nuclear/nonnuclear battlefield. It is my contention that in the Department of Defense, Congressional, and budgetary arenas this systemic problem is nearly a mortal wound. For the Army to compete against the other services for the money and support necessary to complete the development of a new generation of AFAPs with clearly defined roles in the TNF structure, it will require a great deal more effort than is in evidence to date. Division '86 may end up only treating the symptoms of the malaise. It would be unrealistic and naive to state that the US Army alone can save the day and reverse the present trend in strategic versus tactical nuclear systems development.

Yet, as field artillerymen with a mission to support the ground gaining arms, we must begin to fight back by getting our own house in order. We must speak with one voice and we must gain the support we sorely need for modernizing the 155-mm and 8-inch projectiles, as designed. If we are to have tactical nuclear weapons at all, then we must have the best. We would be remiss to do anything less.

The thoughts and items presented in this article do not necessarily represent official US Army policy or endorsement by the US Army Field Artillery School.—Ed.

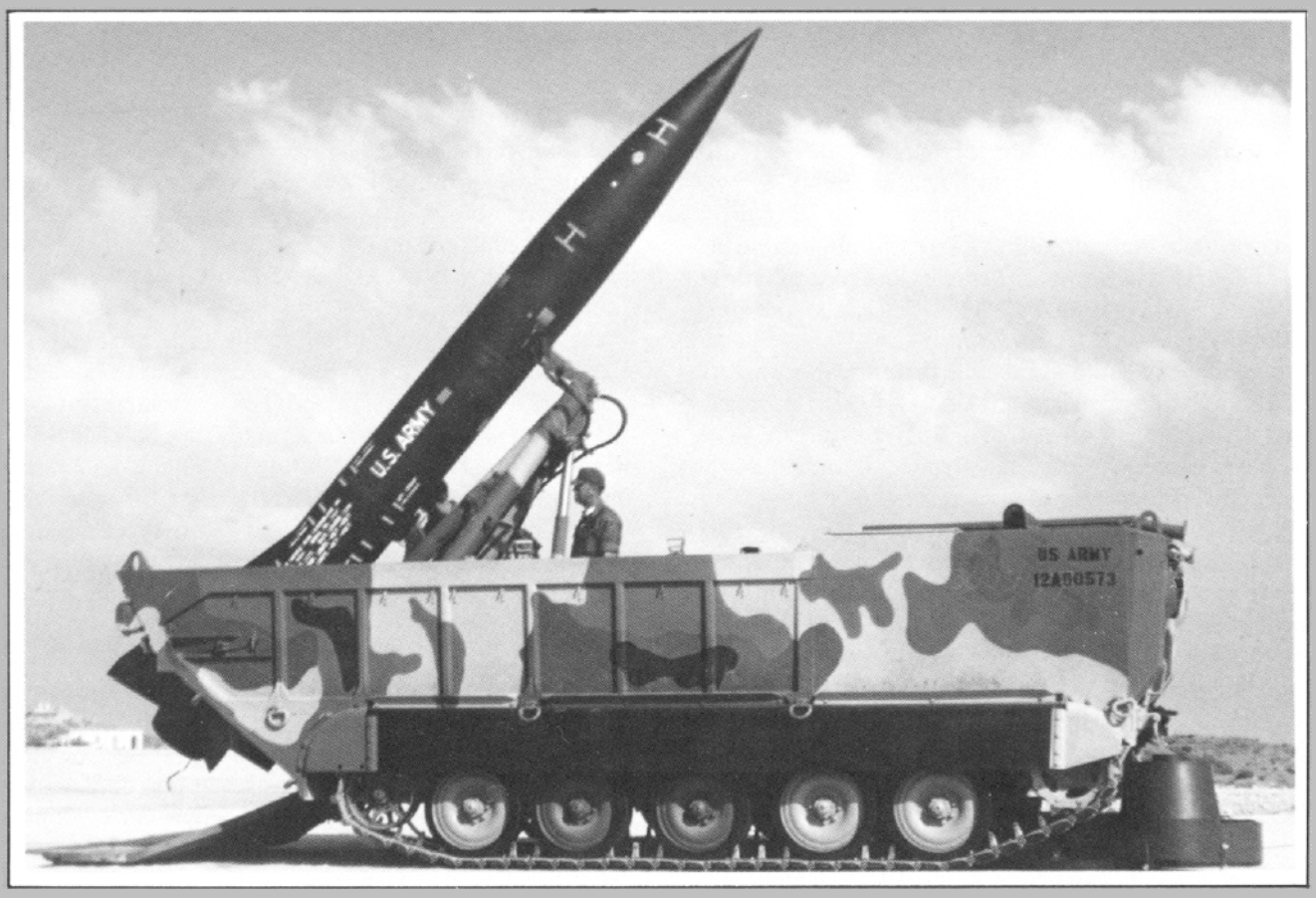
COL William E. Serchak is assigned to the Research, Development, and Test Division, Office of Military Application, US Department of Energy, Washington, DC.

Coming Soon: Lance Tactical ASP For Europe?

The Lance system has been in Europe for six years. During these six years, development of Lance tactics in a live fire exercise has not been possible because missile ranges are not available in Germany. This real world constraint has made it difficult for Lance battalions in Europe to train for its combat mission.

Currently, each Lance firing battery in Europe must travel by an Air Force C-130 to the Greek island of Crete once a year to fire one missile for its annual service practice (ASP). Unfortunately, the purpose of the ASP is not to develop or improve current Lance tactics but is to provide an opportunity for crew members to prove to themselves that the system is reliable and that they can indeed launch the Lance missile. However, even this noteworthy purpose is not always achieved.

by MAJ Robert H. Kimball



Firing platoon evaluation in Crete. (Photo courtesy Roy Stevens)

In the past several years, Field Artillery officers have been trying to develop a tactical ASP; i.e., a program to "train as we will fight." The program requires a unit to fire a missile in a tactical environment to include the use of individual weapons, protective mask, combat vehicles, combat personal gear, exercise of the logistical system, etc. Today, the ASP at Crete is conducted in a non-tactical environment. No individual weapons, mask, combat vehicles, or individual combat gear is used. All movements are administrative and conducted on commercial buses. There is no tactical situation given to participants. Firing and survey data are computed by non-unit technicians.

In 1978, the 9th Missile Group at Fort Sill prepared an outstanding "Tactical ASP Plan/Checklist" for White Sands Missile Range. The two CONUS-based Lance missile battalions are currently using this tactical ASP plan. In May 1979, a European-based Lance battalion sent 36 personnel to White Sands Missile Range to test a thesis that the six European-based Lance battalions could effectively conduct a tactical ASP at White Sands Missile Range. Travel costs and other problems encountered by the European-based Lance unit made this approach to a tactical ASP undesirable.

USAREUR and VII Corps are currently conducting a study to determine what events of the 9th Missile Group's Tactical ASP Plan are being conducted now and could be conducted in the future at Crete. Unfortunately, many of those responding are providing arguments against a tactical ASP at Crete. These arguments against a tactical ASP are not new. During a visit to Crete in late 1978, MG George S. Patton Jr., Deputy Commander of VII Corps, was told that a tactical ASP at Crete was impossible because of the strict safety requirements and the limitations placed on participating NATO countries by the host country.

In reality, one could argue that there are more safety checks on cannon artillery units than there are for Lance. Lance is a simple system that is easy to operate. The monitor programmer essentially reduces many safety requirements. The safety checks on a Lance consist of checking the elevation with a gunner's quadrant, laying, boresighting, and insuring that the APU rod is out, ignitor safe arm is armed, control surfaces are locked in, and the range factor is set correctly on the monitor programmer. Unlike cannon units there are no requirements to check registration or met data to reconstruct your safety diaglam, nor are there requirements for safety officers to check on the correct charge, type fuze, type projectile, or other cannon related items. Arguments against a tactical ASP based on safety are unfounded.

Those that insist that the limitations of facilities and maneuver areas in participating countries which currently prevent a tactical ASP must remember that these limitations were negotiated and imposed by research officers and technicians. These early negotiators perceived the purpose of the ASP as a check and confirmation of systems reliability. After six years, the system has more than proved its reliability; therefore it is now time to aggressively pursue a tactical ASP for European-based Lance battalions.

Crew preparing for firing in Crete. (Photo courtesy Roy Stevens)

Currently, the ASP at Crete for each of the 18 US Lance firing batteries in Europe consist of a nine-day exercise. It begins with an airlift of 45 members of each firing battery to Crete from Germany on a Saturday. The next day, Sunday, and the following Thursday, Friday, and Saturday are designated as free time for tours, etc. On the following Sunday the unit returns to Germany. Therefore, only three days out of a possible seven are used for training (these possible seven days do not incude travel days).

Of the three work days, only Monday is a full day. Tuesday and Wednesday are half days. The unit mates the missile on Monday and conducts a mock mission on Tuesday morning. On Wednesday morning the unit launches a Lance missile. The afternoons on Tuesday and Wednesday are designated as free time. Consequently, of a nine-day ASP period, approximately 16 hours are devoted to training and the actual firing exercise.

Unfortunately, these 16 hours do not give the crew confidence in the system. On the morning of firing, the crew prepares to lay the launcher on a concrete slab. While they are laying the missile, personnel from the battalion's first echelon maintenance team (missile technicians), direct support battalion, general support battalion, Army Missile Readiness Command, Army civilian contractor, and multi-national evaluation team are all on or near the launcher checking and double checking each other on the Lance launcher system.

How can the individual soldier obtain confidence that he can launch the Lance when all these technicians feel it necessary to participate in the launch? The soldier will no doubt leave the launch pad at Crete wondering how he will ever launch a missile in combat without all the technicians.

Missile leaving launch pad in Crete. (Photo courtesy Roy Stevens)

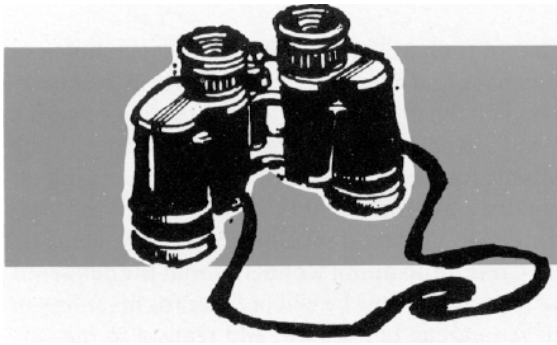
If we are to train as we will fight, all these technicians must stand back and allow the crew to perform the operations to launch the missile. This is the first step toward a tactical ASP. Another step, already adopted by White Sands Missile Range, is to replace the concrete firing pit with a sandbag reinforced bunker and remove the concrete firing slab. When the soldier views the concrete bunker at Crete he no doubt wonders about the danger of an actual launch and how he will prepare for his safety in the field. A sandbag bunker will add realism to the current sterile environment.

Another step toward a tactical ASP that can be taken immediately is improvement of the current evaluation system. The current system discriminates against any effort to apply a tactical situation to an actual launch. In 1978, one Lance battery decided to conduct a mission in an NBC environment and the soldiers had to put on their masks. The crew was severely penalized by a loss of points because they did not meet the required time for the mission. This type of evaluation discourages units at Crete from incorporating any tactical application to the ASP.

A tactical ASP at Crete is not only possible but is an absolute necessity for improving combat readiness. Our host country is pleased to have the NATO Missile Firing Facility (NAMFI) on the island of Crete. It is believed that they would take the steps necessary to accommodate any changes we desired to conduct a tactical ASP at Crete to include maneuver areas and storage facilities. Once the approval of the host country for maneuver areas and facilities is received, all the equipment for one Lance battery should be prepositioned at Crete. This equipment could be utilized by all 18 US batteries in Europe for a tactical ASP along the lines of the 9th Missile Group's Tactical ASP Plan.

In summary, it is important to remember that the non-tactical situation and sterile environment at Crete have been brought about by us. Our host country did not prepare our 16-hour training program or require 12 technicians plus the crew on the launcher during preparation for firing. There are many steps we can take to improve the tactical aspects of the ASP at Crete without waiting for improved facilities, equipment, and expansion of the training area.

MAJ Robert H. Kimball is assigned to Headquarters and Headquarters Battery, 210th FA Group, in Europe.



View From The Blockhouse

notes from the school

Close Support Study Group II

Close Support Study Group II (CSSG II), a TRADOC sponsored and Field Artillery School conducted study of fire support organizations from company through maneuver brigade level, has recently been completed. Study results were briefed and approved by the Commanding General, US Training and Doctrine Command, for implementation into the current force structure and inclusion with Division '86 planning.

Several significant highlights/recommendations of the study are as follows:

• An increase in the size of each mechanized infantry/infantry company fire support team (FIST) from nine personnel to 10.

• A reduction in the size of each tank company/armored cavalry troop FIST from five personnel to four.

• The addition of armored cavalry FISTs for the ground troops of the air cavalry squadrons in the infantry and air assault divisions.

• Addition of a fire support section for the air cavalry squadron of the air assault division.

• An increase in the number of Field Artillery air observers to eight in the airborne division and to 10 in other type division.

• Implementation of a new fire support organization of three personnel (an officer, a sergeant first class, and a specialist fourth class) for each air cavalry troop attack helicopter company. These individuals would be assigned to and provide fire support representation for these aerial maneuver units. TOE action will be initiated by the US Armor School.

A significant doctrinal change is being made to reflect attachment of fire support personnel to the appropriate maneuver units at the onset of hostilities or prior to deployment. This action will also impact on the prepositioning of FIST and fire support section equipment from Field Artillery to maneuver units. A complete refinement of current and future equipment requirements for the fire support organizations was made and appropriate force structuring plans are being developed for the acquisition and implementation of these items.

With the advent of precision guided munitions and lasers, additional observation/lasing teams will be provided for support of each type division.

Copies of the results and recommendations of the CSSG II study are being distributed to each major artillery commander. As a follow-on to the study, a training circular will be developed detailing the various changes in the operational and organizational changes in fire support organizations from company/troop through brigade/regiment level.

Further details on CSSG II will be presented in a subsequent issue. (MAJ Feret, TCAD)

FA survivability

A committee, composed of US and Allied officers assigned to the US Field Artillery School, is currently studying Field Artillery battlefield survivability, a subject that has been heretofore treated with a "shotgun" approach in US Field Artillery doctrinal publications and other literature.

An article presenting current doctrine of represented NATO allies and discussion of ideas and trends will be published in the May-June issue of the *Journal*. The purpose of the article is to engender discussion from the NATO Field Artillery Community concerning current and proposed doctrine and new techniques which may enhance battlefield survivability of artillery forces.

M90 radar (velocimeter)

A recently published reference note on the M90 radar chronograph is available on request from the Schools' Gunnery or Weapons Departments.

Because of an accelerated acquisition process of the M90, the radar will be fielded before the units receive official Department of the Army supporting publications. As a result the reference note, along with a letter from BG Edward A. Dinges, Assistant Commandant, USAFAS, and muzzle velocity correction tables will be forwarded to each unit scheduled to receive the M90. (SFC Evans, GD)

Library acquires DIALOG and DTIC service

The Morris Swett Library, USAFAS, will soon add two unclassified on-line bibliographic data services to its Reference Department which should be of interest to authorized researchers. In addition to a line to the Lockheed Missiles & Space Company, Palo Alto, CA, (via a portable terminal planned to be equally shared with the Nye Library), there will be an unclassified link to the Defense Technical Information Center (DTIC), Alexandria, VA.

The on-line DIALOG service computer data-banks at Lockheed provide access to a wide range of subjects from science, education, and social science to business/economics. There is also an intermediate spread of subjects covered by the more than 50 data-banks, and the number is growing. Over a dozen of these deal in abstracts of information related to specific scholarly fields. (An abstract is a summary of an article on a given subject.) In addition to these services, interlibrary loans with the Ohio College Library Consortium (OCLC) can be arranged.

As the name implies, the Defense Technical Information Center is a field data collection agent of the Defense Supply Agency. The kind of report holdings they have are suggested by how well three open-ended questions are answered. These are, what research on behalf of the Federal government is in progress, what studies are being planned, and what are the results? DTIC now has more than a million documents indexed in four computer databanks.

To obtain this wealth of free information, one simply goes to the Reference Department of the Morris Swett Library, Room 16, Building 730, Snow Hall and explains what he is interested in with a member of the library staff. Together they will develop a "search profile." The request is then typed out on one of the on-line terminal printers. Within a matter of seconds a bibliography display will appear. The patron scans this list of books, periodicals, or abstracts and selects items of interest.

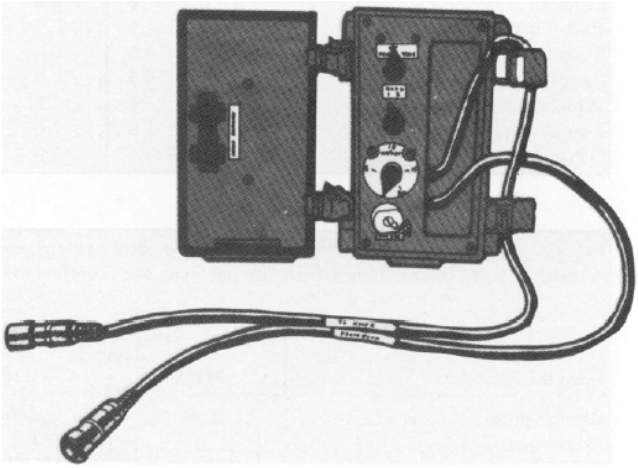
Persons can obtain these microfiche from DIALOG or microfiche/paper copies from DTIC. Third class mail requires seven days and first class averages three days for articles to get to Fort Sill from either Palo Alto or Alexandria. As stated before, the studies are free and may be kept by the requester.

The library also offers the holdings of the collection for other materials. The library now totals 198,000 printed and microform (microfiche and microfilm) documents. These include books, pamphlets, periodicals, government reports and studies, phonograph records, war games, a classified collection, and the USAFAS archives section. Keys to locating a specific item are the card catalog, periodical indexes, and abstracts. A retrospective card file covers military periodical articles back to 1850.

Both the DIALOG and DTIC terminals are externally developed computer systems; that is, they are prepackaged, turn-key networks which expand the dimensions of participating libraries. The addition of these machine systems is an exciting development for special libraries designed to support specific constituencies.

Electronic counter countermeasures training device

Interference generator SG-886T/UR is an electronics communications counter countermeasure training device designed for use by radio operators in forward area tactical communications. The device operates in a 2- to 76-megahertz range and is capable of producing tone and noise interference which is used to modulate standard tactical AM, FM, and single side band radio transmitters. The countermeasures set will allow AM, FM, and single side band equipment to be used as communication jammers. External modulation received by a separate receiver can be fed through the device to modulate radios to provide electronic counter countermeasures (ECCM) training. The device is designed for use in the field or classroom to develop skills of radio operators to distinguish between intentional and accidental jamming and to promote proficiency in working through interference that does not completely disrupt communications. This device can be obtained by a work request through your local Training and Audiovisual Support Center. (Mr. Dennis, CED)



Interference generator SG-886T/UR.

Keep 'em rolling

Keeping unit vehicles running is the unit's responsibility with the motor officer and maintenance personnel providing the expertise. Even though many breakdowns cannot be predicted other than in a very general sense, the conscientious motor officer is interested in narrowing down the cause. Equipment downtime has a direct relation to the quality of a unit's maintenance program.

A recent analysis by the Directorate of Evaluation, USAFAS, of data collected by the US Army Armament Materiel Readiness Command through what is referred to as the Artillery Data Collection Program may provide a valuable contribution to "keeping 'em rolling." All M109 and M110 equipment failures from April 1977 through April 1979 were investigated to determine whether the failure was due to the equipment, human errol, or "fail, wear, and tear." The analysis deals with those incidents considered to be directly attributable to either errors of the operator or the mechanic and identifies patterns to provide the inexperienced motor officer an indication of where he can anticipate the most trouble.

Table 1. Number (N) of malfunctions attributed to mechanics and operator/crew for the M109 and M110 and percentage of total system incidents attributable to each subsystem.

Subsystem	System			
	M109		M110	
	Mechanic	Operator /Crew	Mechanic	Operator /Crew
	N=279	N=686	N=484	N=889
Engine	15.8%	0.5%	10.3%	3.5%
Transmission	5.0	1.9	5.5	0.6
Fuel	12.5	5.5	8.7	7.3
Cooling	12.2	9.9	23.8	14.1
Electrical	27.6	28.5	11.2	12.6
Suspension	3.6	17.2	5.5	14.5
Hull/carriage	0	0	2.3	14.6
Transfer assembly	1.4	1.5	8.3	2.6
Cannon	5.4	8.4	.6	3.9
Recoil mechanism	3.2	1.2	.8	.7
Turret	7.2	11.6	10.5	5.5
Spade/trails	0.4	1.3	5.5	.0
Winch/boom	0	0	.4	.6
Fire control	2.5	5.1	1.9	7.6
Other	3.2	2.5	4.5	1.9

Table 2. General patterns associated with the total system and percent of total incidents in which the patterns are manifested.

General patterns	System	
	M109	M110
Carelessness	40%	26%
Missing/stolen parts	5%	6%

For the experienced officer the patterns may come as no surprise. In either event the study suggests areas where maintenance and unit awareness should be focused to reduce system downtime.

Table 3. A description of the most pronounced patterns of operator/crew induced malfunctions (seven incidents or more).

Subsystem	System	
	M109	M110
Engine	Overheated engine, insufficient coolant (10).	Overheated engine, insufficient coolant (10).
Fuel	Contaminated filters (10).	Contaminated filters (6). Air intake bag (10). Washed in soap & water (5). Mishandled (4).
Cooling	Broken cross-over tubes (11). Unlubricated cooling fan (22).	Fan belt misaligned, wrong tension fatigue (104).
Electrical	Broken wiring harness (7). Cases involving storage batteries (35): Improver long term storage (15). Master switch left on overnight (13). Excessive use of power (7). Voltage regulator burned out due to improper slaving (17). Push switch installed improperly and/or not adjusted properly (12). Starter burned out—engaged too long (21). Electrical connector to temperature transmitter was stepped on & broken (also 1 oil transmitter) (7).	Control assembly: improper slaving (20). Starter: engaging starter too long, improper slaving, moisture (22). Rammer switch incorrectly positioned (13).
Suspension	Track connector bolts & wedges missing and improperly seated (14) Loose idler wheel nuts (8). Idler wheel was damaged (3). Idler wheel mounting nuts loose, broken or lost; improper torque and not checked (10). Road wheel hub seal leaking (23); Lack of exercise (17). Field wire around suspension arm (3). Seals contaminated (2). Lack of lubrication (1).	Idler arm: lack of lubrication (7). Self-locking hexagonal nut: improper torquing, some too loose, some too tight (15). Hexagonal head screw cap: improper torquing (12). Shoe track vehicular track assembly: operating with pads having excessive wear (23).
Hull/carriage	None	Engine: transmission deck clip lost or stolen (7). Air cleaner: access door not closed while vehicle in motion (15). Vehicle cab hatch door unsecured in open or closed position while vehicle in motion (10).
Spade/trails	None	Spade lifting assembly: Dirt on piston rod causing seals to leak (46). Using piston rod as a step. Failure to unlock spade lock. Spade lock assembly (14). Failure to unlock spade from trail position.
Fire control	Tube level vial cracked (17): Vial uncovered (12). Mishandling (5).	Vial covers left open neglect in handling (18). Register: moisture in mounts (11).

Table 4. Brief description of the most pronounced patterns of mechanic-induced malfunctions (seven incidents or more).

	System	
Subsystem	**M109**	**M110**
Cooling	None	Fan pully, clutch drive shaft sheave alignment was incorrect (54). Set screws loose or stripped (7). Belt tension incorrect (12).
Electrical	Water temperature broken in working on power pack (7). Voltage regulator incorrectly adjusted (12).	None

There were 965 M109 incidents and 1,373 M110 incidents in which human error in operation or in mechanic maintenance areas were investigated. This represented 32 percent and 35 percent, respectively, of the total number incidents occurring during the period of study.

Table 1 shows the proportion of incidents associated with each subsystem for the M109 and M110. In both systems two general patterns that cut across subsystems were evident in the reports. These two patterns are listed in table 2. The number of incidents in both patterns appear to be higher than they should be and suggest that if improvement is expected a general tightening of maintenance procedures and supervision is required.

Moisture was a factor in 4 percent of the M109 incidents and was probably about the same for the M110. Most of this moisture, which is particularly troublesome in the electrical subsystem, was probably the result of careless use of a high pressure hose.

Tables 3 and 4 provide a brief description of most frequent problem areas, based on seven or more incidents. The patterns are an aggregate of data across units and, consequently, may or may not provide an accurate basis for generating expectations within any one unit. The data should, however, enable maintenance personnel to anticipate problems and subsequently better focus their supervisory effort.

Keeping the vehicles on the road is a must, but to do it within the framework of an austere economic environment places an additional burden on maintenance personnel. Keying their efforts to the most likely areas of failure should constitute a strategy that can help. The objective of a sound maintenance program is, of course, to prove wrong the expectations that this report reflects. If feedback on data of this type contributes to this end, the information presented herein will have served its purpose. (Jack G. Anthony, DOE)

Requisition authority for PHHC

As reported in the January-February *Journal*, unit requisition authority for the Programmable Hand-Held Calculator (PHHC) has been received. The authorization is:

DA Message: DAMO-RQA 212000Z Jan 80
Subj: Authority to Requisition Programmable Hand-Held Calculator

Funded requisitions should be forwarded to:

HQ, ARRCOM (B14)
ATTN: DRSAR-MMH-L
Rock Island, IL 61299

Organizations that have already purchased TI-59 calculators should requisition the following:

- Required program kits.
- External power source connectors.
- Connector, plug, electrical (NSN 5935-01-082-1638, Part No 9331190).
- Cable assembly, special purpose, electrical (NSN 1220-01-082-1637, Part No 9331189).
- Technical Manual (TM) 9-1220-242-12P&HR.

Current GFTs, GSTs, and TFTs

The Gunnery Department periodically publishes "R&A Division Information Note #1," which is now being updated. Note #1 lists all current tabular firing tables (TFTs), graphical firing tables (GFTs), graphical munitions effect tables (GMETs), FADAC program tapes, hand-held calculator program kits, and selected plotting equipment. The listing is separated by caliber and model of weapon to make it easier to distinguish which equipment applies to each type of howitzer. The Information Note (IN) also contains a short explanation of how and from where to order the items.

The IN will be forwarded by direct mail to battery-level artillery units in the Active Army and Marine Corps and to battalion-level units of Reserve Components. Receipt of the material should be expected by the end of this month (March 1980).

Additional copies of Information Note #1 can be obtained by writing:

Commandant, USAFAS
Gunnery Department
ATTN: ATSF-G-RA
Fort Sill, OK 73503

or by calling: AUTOVON 639-6108/3901. (SFC Evans, Mr. Varline, GD)

COUNTERFIRE SYSTEMS REVIEW

NET course for AN/TPQ-37

During the period 4 February through 20 June 1980, a new equipment training (NET) course is being conducted by Hughes Aircraft Company and the Counterfire Department for those individuals who will participate in field testing of the AN/TPQ-37 artillery locating radar. Training will consist of a two-week basic digital electronics course followed by an 18-week maintenance course on the AN/TPQ-37. This training represents the final NET program to be provided by contractor personnel on the AN/TPQ-37 system. The Radar Division of Counterfire Department is developing resident programs of instruction to be implemented in October 1980.

The maintenance students will, upon completion of their NET training, be involved as player personnel in Developmental-Operational Testing (DT/OT) III, which will be conducted by personnel from US Army Test and Evaluation Command and US Army Operational Test and Evaluation Command during the period 14 July through 7 November 1980. The objective of DT/OT III is a final evaluation of the operational and maintenance concepts for the AN/TPQ-37 system under field conditions.

Netted universal radar system

The US Army Field Artillery Center and Fort Sill has been named proponent for the Netted Universal Radar System (NURADS). This system is currently programmed to replace the AN/TPS-25, AN/TPS-58, AN/PPS-5, and AN/PPS-15 radars.

A draft Requirement of Operational Capability (ROC) is currently being staffed prior to submission to Department of the Army for approval. The total concept is to provide a system that will net at one control station the outputs from all target acquisition means within the Fire-finder (AN/TPQ-36, AN/TPQ-37), Passive Artillery Ranging System (sound), Moving Target Locating Radars, Remotely Piloted Vehicles (RPVs), and possibly the Standoff Target Acquisition System (SOTAS).

A successful Phase I demonstration of NURADS was conducted at Fort Sill during the fall of 1978, which demonstrated the concept and technology necessary for automated and adaptive netting of radar systems.

A follow-on Phase II demonstration, to be conducted in November and December this year, will utilize a four- or five-radar net, to include the multifunction advanced ground surveillance radar, AN/TPQ-36, and an airborne moving target indicator radar. This demonstration will feature integrated communication and advanced netting performance. NURADS is presently scheduled for fielding during the 1986-87 time frame.

Standard survey party

The Counterfire Department is conducting a study on standardizing the one conventional survey party that will remain at all levels of survey when fielding of PADS (Positioning and Azimuth Determining System) is accomplished during the second quarter of FY82.

Under consideration is the concept of adopting the T2 (0.002-mil) theodolite, a newer model DM60 with a range of 10,000 meters, and the present SIAGL (Survey Instrument, Azimuth, Gyro, Lightweight) as standard equipment in all division artillery, battalion, and target acquisition battalion survey sections. Also being considered is a new 3/4-ton or 1 1/4-ton vehicle with trailer to replace the current M561s and M880s.

The standard survey party as envisioned would greatly reduce instructional loads both within the School and at unit level. Additionally, it would lead to simplification of SQT and ARTEP evaluations, as well as permitting adoption of STANAG standards for accuracy specifications.

Comments and/or suggestions concerning the standard survey party concept are encouraged and may be submitted in writing to:

Commandant, USAFAS
Counterfire Department
ATTN: ATSF-CF-S
Fort Sill, OK 73503

or by calling AUTOVON 639-2805; commercial (405) 351-2805 (MAJ David R. Rogers).

Sound ranging—essential to counterfire

It has been said that "Next to bugles, the Field Artillery is the best means for knocking down walls." In future warfare, the Field Artillery will be indispensable whether opposing forces are heavy (mechanized and tank) or light (infantry). Since the Soviets use massive artillery attacks as an integral part of their combat operations,

we must, if we expect to win any potential war against either the Soviets or a Soviet designed and supported force, have the capability of neutralizing this formidable threat.

To accomplish effective counterfire, enemy indirect fire weapons must first be located. Our present capability, although limited, allows us to do this with the AN/MPQ-4A weapon locating radar and sound/flash ranging. This system, however, is "slow" by current standards.

When introduced into the inventory, the recently developed Firefinder radars, AN/TPQ-36 and AN/TPQ-37, will provide us an excellent capability of locating enemy weapons; however, as with any radar, they do have an "Achilles' heel." Since the AN/TPQ-36/37 are active systems (electronic emitters), they can easily be located by radar direction finders and attacked by either fire or jamming.

Survivability of Firefinder can be greatly increased if a passive system (not an electronic emitter) is used to cue the radars as to when and where to search. Such a passive system currently exists in sound ranging; however, its utilization has been limited since the Korean War and therefore not readily understood by today's Army. This limited utilization was a result of old equipment (World War II vintage), as well as the requirement for long wire lines from microphones to the sound recorder and the need to locate each microphone by survey.

The need for effective sound ranging was recognized several years ago, and since that time improvements have been and are still being made within the entire system. For example, the World War II vintage sound recorder was transistorized and reduced to one package. This equipment, known as the AN/TNS-10, has been issued at 50 percent fill to all Active Army units, while the remaining items are currently in production and should be issued this year.

Another stop-gap improvement was to partially eliminate slow, laborious manual computations required for target location through FADAC. This was a "band-aid" fix since FADAC itself was old and rapidly wearing out; therefore, a sound ranging program has been developed and tested for the Hewlett-Packard 9825 calculator, a component of the OL192 (the OL192 is a product improvement to the current ballistic meteorology set). The HP 9825 will allow sound ranging computations to be accomplished faster with fewer people and less training time.

These two improvements to sound ranging however did not really eliminate the system's key limitation; that is, the six to eight hour installation time necessitated by survey and the use of long wire lines. As a result, in mid-November 1979, the Counterfire Department, with support of C Battery (TA), 25th Field Artillery, conducted a series of informal tests to demonstrate that a fully operational sound base could be installed in much less time. Using the AN/TNS-10, the Radio Data Link AN/GRA-114, and the Positioning and Azimuth Determining System (PADS), the time required for installation was reduced to one hour. Both the AN/GRA-114 and PADS are in production and should be ready for unit issue by early 1982.

These improvements to sound ranging, although significant, may not be considered sufficient by those concerned with a fluid type battlefield. However, with the anticipated intensity of Soviet electronic warfare, the US Field Artillery must have a viable passive artillery locating system. The key today in the "come-as-you-are-war" philosophy is that we have to use what we have. Therefore, it is essential that division artillery and its target acquisition battery exercise the sound system to accomplish the Field Artillery's Counterfire mission in the support of maneuver forces. (LTC C. G. Berk and Mr. Max Conerly)

Commanders Update

COL Thomas D. Reese
7th Infantry Division

LTC James F. Roberts
1st Battalion, 5th Field Artillery

LTC Joseph Sarakaitis
1st Battalion, 6th Field Artillery

LTC Ronald O. Pruitt
1st Battalion, 8th Field Artillery

LTC William J. Furtado
2d Battalion, 8th Field Artillery

LTC Richard F. Entlich
2d Battalion, 10th Field Artillery

LTC John C. Crump
3d Battalion, 17th Field Artillery

LTC Richard L. Meredith
1st Battalion, 18th Field Artillery

LTC Jerry Harrison
1st Battalion, 29th Field Artillery

LTC Ronald A. Coleman
2d Battalion, 35th Field Artillery

LTC Gary J. Walk
1st Battalion, 77th Field Artillery

LTC James F. Reynolds
3d Battalion, 79th Field Artillery

LTC Robert V. Murdock
1st Battalion, 80th Field Artillery

LTC John M. Pickler
2d Battalion, 81st Field Artillery

LTC Miguel Monteverde
Training Command Battalion

Division '86: Update

by CPT John B. Gavalas

In previous issues of the *Journal*, the Commandant, US Army Field Artillery School (USAFAS), discussed the heavy division modernization effort now known throughout the Army as "Division '86." Additionally, he described battlefield tasks for which USAFAS is responsible or has substantial involvement, such as—

- Target-servicing indirect fires (TSIF).
- Counterfire (CF).
- Battlefield interdiction (BI).
- Suppression of enemy air defense (SEAD).

An important step in evaluating the Field Artillery has been taken through the use of "force analysis." Because of its significance, it is important to explain the Field Artillery Force Analysis study, the nature of its product, and the major force structure efforts that have recently followed it at USAFAS and throughout US Army Training and Doctrine Command (TRADOC).

In late 1978, TRADOC published the *Battlefield Development Plan* (BDP) which provided the logic to tie the analyses, studies, research and development, resource allocation, organizations, and force designs into coherent force structure alternatives for TRADOC's presentation to the Department of the Army (DA), Office of the Secretary of Defense (OSD), and finally, the Congress (figure 1).

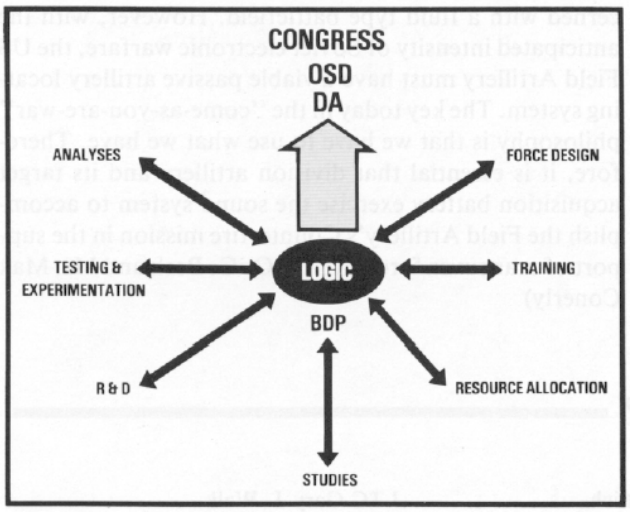


Figure 1. Battlefield Development Plan logic.

The BDP stated the requirement for a permanent force review and modernization cycle, the first fruits of which have been an improvement of communications among TRADOC agencies now involved in force structuring and Division '86. Among the many major insights gained from Division '86 was a reconfirmation of the importance of Field Artillery everywhere on the battlefield and the need for a larger division artillery with organic Multiple Launch Rocket Systems (MLRS). These needs pointed out a challenge for Field Artillery: Where would it obtain the manpower spaces needed to accommodate the vast list of oncoming hardware and organizational development for 1979-1986?

It, obviously, was high time the Field Artillery School became involved in force structuring, a function which, through analysis and military experience, synthesizes doctrine, materiel, and organizational designs into effective Army-wide force alternatives within authorized budgetary and manpower constraints. This function governs the organization and equipment of all Army units, with regard to both current enhancement programs and transition to future target force structures.

In April 1979, the Commander, TRADOC, tasked USAFAS to:

- Lay out all Field Artillery in the Total Force.
- State the Total Force's requirements by mission area for the FA's roles of target-servicing indirect fires, counterfire, and battlefield interdiction.
- Determine shortfalls in the currently programmed Field Artillery force for 1986.

This study became "The Field Artillery Force Analysis." The School, along with other centers and schools, developed three alternative organizational designs:

- "Level I Heavy Div Arty" proved to have so small a potential for artillery mission accomplishment that it was dropped as a candidate design.
- "Level II" (about 3,500 strong) added a division target acquisition battalion (DTAB) to the division artillery and an MLRS battery to the general support (GS) battalion.

• "Level III" (about 4,000 personnel) had similar headquarters, target acquisition, and direct support (DS) battalion configurations. The principal difference was organization of a separate MLRS battalion.

With these organizational or force designs in hand, the study devised a scheme (figure 2) to analyze the total Field Artillery force, for each year, 1979 through 1986.

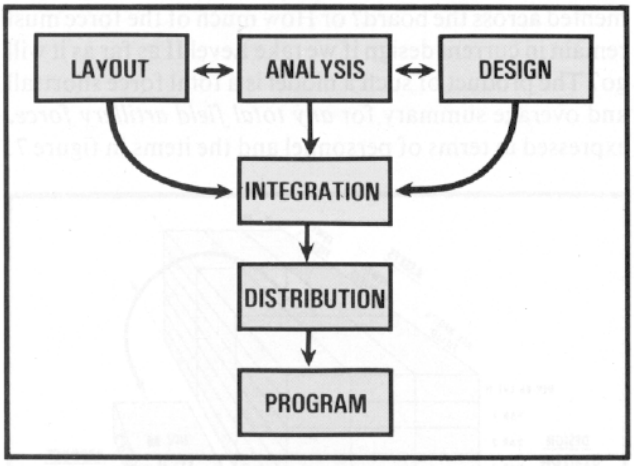


Figure 2. Force analysis.

The first area explored was a unit-by-unit count of every organization in the Army Field Artillery—Active, Guard, and Reserve. This research answered fundamental questions such as: *Where* are our field artillerymen? *How* are they organized? *Which* weapons are they authorized, and *how many? What* are the units' higher headquarters?" Once this "flag count" was conducted, the total number of artillery weapons authorized TOE units, by caliber, could then be calculated, including programmed MLRSs. Other major end-items critical to Field Artillery operations (figure 3), to include some now in the force such as M577s and others from the long list of new items, also had to be "counted." The inventory was made complete by a count of all authorized personnel, present and future, and those presently on hand.

WEAPONS	EQUIPMENT	
105 T	M548	FIST-V
155 T	M577	GLLD
155 SP	M113	PADS
8˝ SP	GOER	Q36
MLRS	10-TON	Q37
PERSHING	5-TON	RPV
LANCE		BCS
		BN TACFIRE
		DIVARTY TACFIRE

Figure 3. Selected Items.

Next, the worldwide deployment of Army Field Artillery was examined. This study included a review of the current 1979 as well as the programmed 1986 forces in terms of aggregate strength and total battalions on the ground by caliber. A more detailed estimation was made of the force capability of mobilizing and redeploying these units, on paper, for general war in Europe, and for a "half-war" or contingency operation elsewhere.

While this immense inventory was taking place, other organizational designs were being created, and Levels II and III layouts were expanded to look at the entire corps, in order to embody several overlapping sets of divisional and corps artillery capabilities. This capability spectrum illustrated the FEBA-to-corps-rear requirement for Field Artillery and began to fulfill emerging demands on the artillery at corps (figure 4). While some of these demands have always been with the corps and simply needed to be done *better,* others were under serious consideration for the first time. Each of the design variants, then, illustrated the following:

- Organizations of the division artillery.
- Design of the artillery organizations at corps.
- The "division slice," of corps artillery (those corps artillery assets habitually "chopped" or allocated to a division).
- A summary of assets (weapons and personnel) in the "division slice" (divisional and corps artillery in the division zone).

Each variant had, of course, advantages and disadvantages. The corps slice for Level II consists of a brigade headquarters, two 8-inch battalions (3 × 4 and 3 × 6) and an MLRS battalion (3 × 9) to yield a division slice of 72 155-mm weapons, 46 8-inch weapons, 36 MLRS, and 5,239 personnel. The Level III corps slice is similar, except for a 2 × 9 MLRS slice, and thus a division slice with 54 MLRS and 5,577 personnel.

BATTLEFIELD INTERDICTION
JSEAD PLANNING, COORDINATION, EXECUTION
NUCLEAR PLANNING, UPDATING, EXECUTION
REORGANIZATION FOR COMBAT DURING BATTLE
OPERATIONS IN SUSTAINED COMBAT
AMMUNITION AND LOGISTICS RESPONSIBILITIES
COMMUNICATIONS
FIRE SUPPORT FOR REAR AREA SECURITY

Figure 4. Emerging demands on the artillery at corps.

Design Variant	DIVISION		SLICE	
	#155MM	#8˝	#MLRS	#SPACES
DIV 86 LEVEL II	72	46	36	c. 5240
Var 1 -HHB Corps Arty	96	32	36	c. 5190
Var 2-Fixed Divarty	96	32	36	c. 5220
Var 3-155mm Replaces 8˝	136	0	45	c. 5070
Var 4-All 155mm 4×8	160	0	45	c. 5480
DIV 86 LEVEL III	72	46	54	c. 5580

Figure 5. Variant summary.

Several other design variants were constructed, each with a different mix of cannon, rocket, and other assets (figure 5).

Analysis of the combat effectiveness of design variants consisted mainly of gaming 3d Armored Division in the Artillery Force Simulation Model (AFSM) after varying the organization for combat, using the aforementioned design variants against its likely opponents in Europe. It was concluded that unless a suitable replacement for the 8-inch nuclear capability could be found, the preferred designs, in terms of effectiveness, were—

- Division '86 Level III.
- Division '86 Level II.
- Variant 1 or 2.

These effectiveness analyses indicated *how well* the notional force designs could "fight" in a simulated battle. What was needed next was an expression of *affordability* of each variant if it were to be used to organize the entire artillery force structure against programmed manpower levels and materiel acquisitions. This force distribution problem was seen to have three inputs or dimensions (figure 6):

• The *assets*, materiel and personnel, currently programmed to be in the force.

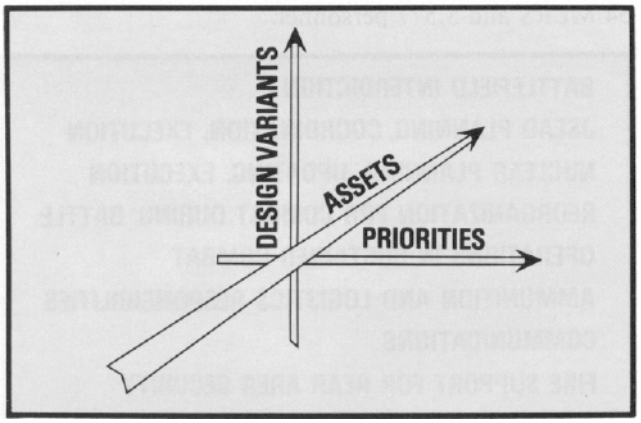


Figure 6. Field Artillery Force distribution construct.

• The *design variants*, embodying a spectrum of corps and divisional artillery capabilities.

• The numerous *priorities* for the Army, expressed in terms of deployment schedules, the DA Master Priorities List, or any notional unit listing.

By varying these inputs, a myriad of "what-if" questions can be answered, such as Can Level II be implemented across the board? or How much of the force must remain in current design if we take Level II as far as it will go? The product of such a model is a total force shortfall and overage summary for *any total field artillery force*, expressed in terms of personnel and the items in figure 7.

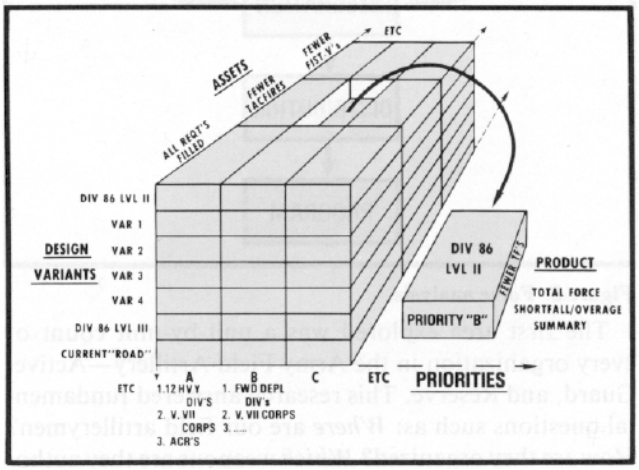


Figure 7. Field Artillery Force Distribution Variables.

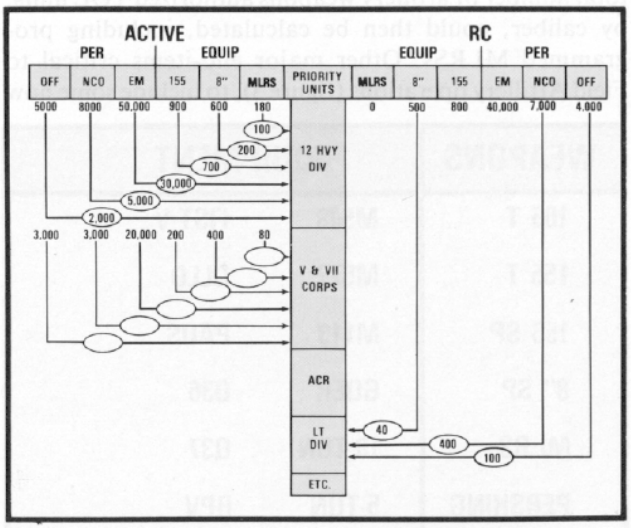


Figure 8. Distribution model.

By computerizing the distribution model (figure 8) to create a rapid-response tool, a summary was derived for many options. After studying the several summaries, the major finding of the force analysis was determined: Of all variants, Division '86 Level II Div Arty design is most

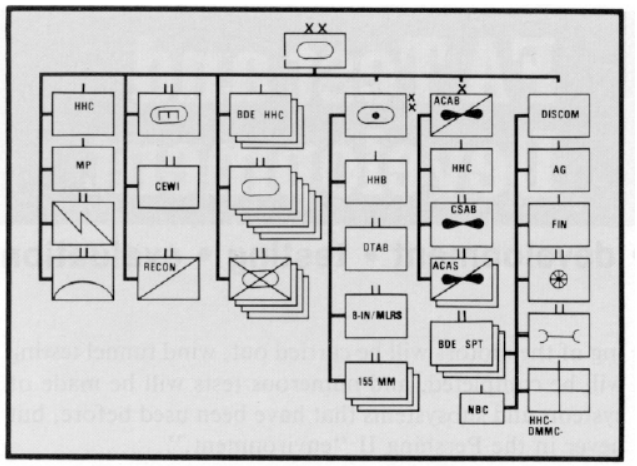


Figure 9. Objective Heavy Division.

efficient and most affordable. In August 1979, the Commander, TRADOC, approved the Objective Heavy Division shown in figure 9.

As of October 1979, no separate maintenance batteries or companies were to be established in battalions of the Objective Heavy Division. These batteries were indicated during DRS (Division Restructure Study) as the best solution to the "fix-forward" requirement for howitzers. In December 1979, the Commander, TRADOC, directed that organizational maintenance assets be consolidated at battalion level. Direct support maintenance cells from the division support command (DISCOM) maintenance battalion would be allocated to FA battalions when deployed for training or combat.

The division artillery portion of the Division '86 Level II organization was made part of the Objective Heavy Division. At the Combined Arms Center (CAC), Fort Leavenworth, KS, a phase of division wargaming (DIVWAG) for the Objective Heavy Division was concluded in late January, and an interim report on the objective division's supportability and effectiveness will be submitted by CAC to TRADOC at a later date.

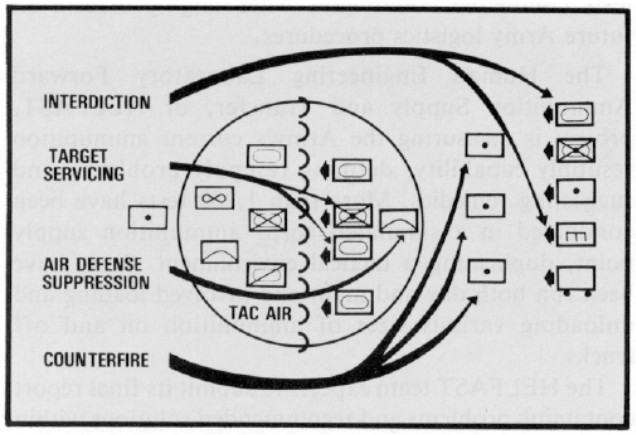


Figure 10. Field Artillery roles.

Training and Doctrine Command has also initiated its studies of the light divisions (infantry, airborne, air assault), the heavy corps, and echelons above corps (EAC). The first phases of these studies are entitled Infantry Division '86, Heavy Corps '86, and EAC. Here, USAFAS will be involved in careful analyses of these subjects to develop the most combat-effective artillery and fire support coordination structures for artillery to fulfill its roles on the modern battlefield (figure 10).

Although an examination of the Army Field Force's assets has been completed, a more thorough statement of the total requirement, by mission area is required. In this, the Fire Support Mission Area Analysis will take a front-to-rear approach to this task (figure 11).

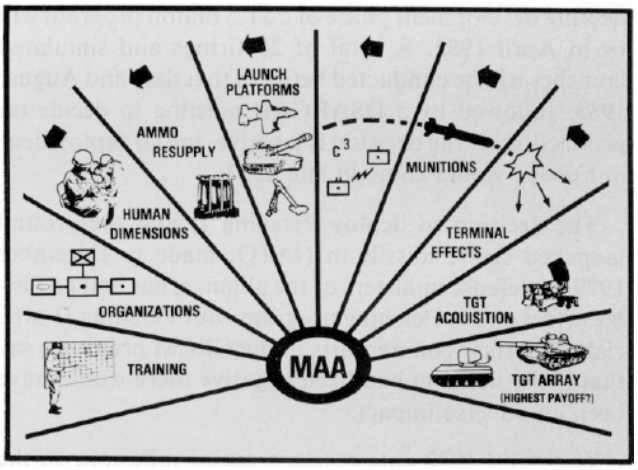
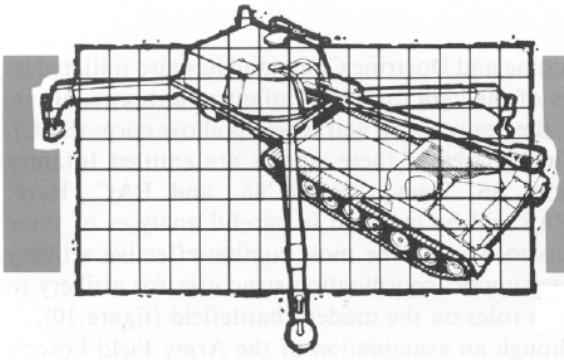


Figure 11. Front-to-rear approach.

Phase I of the analysis which states capabilities of the fire support system and enumerates its deficiencies was completed in January this year. Phase II will shift emphasis to an objective analysis of deficiencies from Phase I, and potential corrective actions in doctrine, training, force structure, and materiel will be identified. An action plan will then be devised by the end of July to address the deficiencies.

CPT John B. Gavalas is assigned to the Force Structure Division, Directorate of Combat Developments, US Army Field Artillery School, as the Heavy Division Artillery Action Officer.



FA Test and Development

design • development • testing • evaluation

Pershing II launch slated for April 1982

First launch of the Pershing II missile now in the engineering development phase of a $1.5 billion program will be in April 1982. A total of 28 firings and simulated launches will be conducted between that date and August 1983, followed by a DSARC III meeting to decide on production. If the decision is positive, initial deployment in Europe would come in late 1983.

The decision to deploy Pershing II and the ground launched cruise missile in NATO, made in December 1979 by defense ministers of the alliance, has had no visible effect on the Pershing program. But Pershing II officials, like their counterparts in the GLCM program, say that if the decision had been negative there would have been an adverse impact.

The April 1982 date marks a major milestone in the Pershing II project. Of the 28 firings that will begin in 1982, prime contractor Martin Marietta will perform the first 14, with close monitoring by the Army development community. The remaining 14 will be strictly Army, with developers as well as operational units participating. Tests in this development and operational test and evaluation (D/OTE) series will take place at a number of locations, including White Sands Missile Range, NM, and Fort Sill, OK. (Only "dry" firings will be performed at Fort Sill.)

Prior to actual test firing, several actions remain to be accomplished. In FY80, for example, continued flight testing aboard helicopters and jet aircraft of the correlator portion of the Goodyear guidance system is slated, material must be procured for the prototype air vehicles and ground support equipment, prototype re-entry vehicles must be fabricated, wind tunnel testing of the Hercules propulsion sections will be performed, and work will continue on a "referencing generation facility" for the guidance part of the program.

In FY81, development testing of the propulsion sections will be completed, preliminary flight readiness testing of the motors will be carried out, wind tunnel testing will be completed, and numerous tests will be made of systems and subsystems that have been used before, but never in the Pershing II "environment."

In FY82, static testing of the propulsion sections is slated, and fabrication of prototype ground support equipment will be completed.

New ground support equipment (GSE) is required since one of the goals of the Pershing II program is to have fewer people involved in the field. The Army has told Congress, however, that Pershing II will be deployed "in a similar manner" to the Pershing Ia now operational in Europe. This concept envisions three US battalions of four firing batteries each with three firing platoons consisting of three erector launchers with missiles. The Army now has 108 Pershing Ia launchers, with the number of missiles being classified. Pershing II would replace the earlier models, however, on a one-for-one basis.

Ammunition resupply improvements studied

The man-machine interface in ammunition resupply has been under intensive study for more than a year. Officials at the Human Engineering Laboratory, Aberdeen Proving Ground, MD, state that results of the tests conducted could have wide-ranging effects on future Army logistics procedures.

The Human Engineering Laboratory Forward Ammunition Supply and Transfer, or HELFAST, project is measuring the Army's current ammunition resupply capability, defining resupply problems, and suggesting remedies. More than 1,200 tests have been conducted in a simulated corps ammunition supply point, duplicating a tactical environment. Tests have been run both day and night and involved loading and unloading various sizes of ammunition on and off trucks.

The HELFAST team expects to submit its final report containing problems and recommended solutions within the next six months.

New air-to-ground data link under development

A vital air-to-ground data link for two major Army weapons systems is now in full-scale development for the Army Electronics Research and Development Command (ERADCOM). The Modular Integrated Communications and Navigation System (MICNS) will be used not only on the Army's Standoff Target Acquisition System (SOTAS) and unmanned vehicles including the Remotely Piloted Vehicles (RPV), but will also play a significant role in the Air Force Precision Location System (PLS).

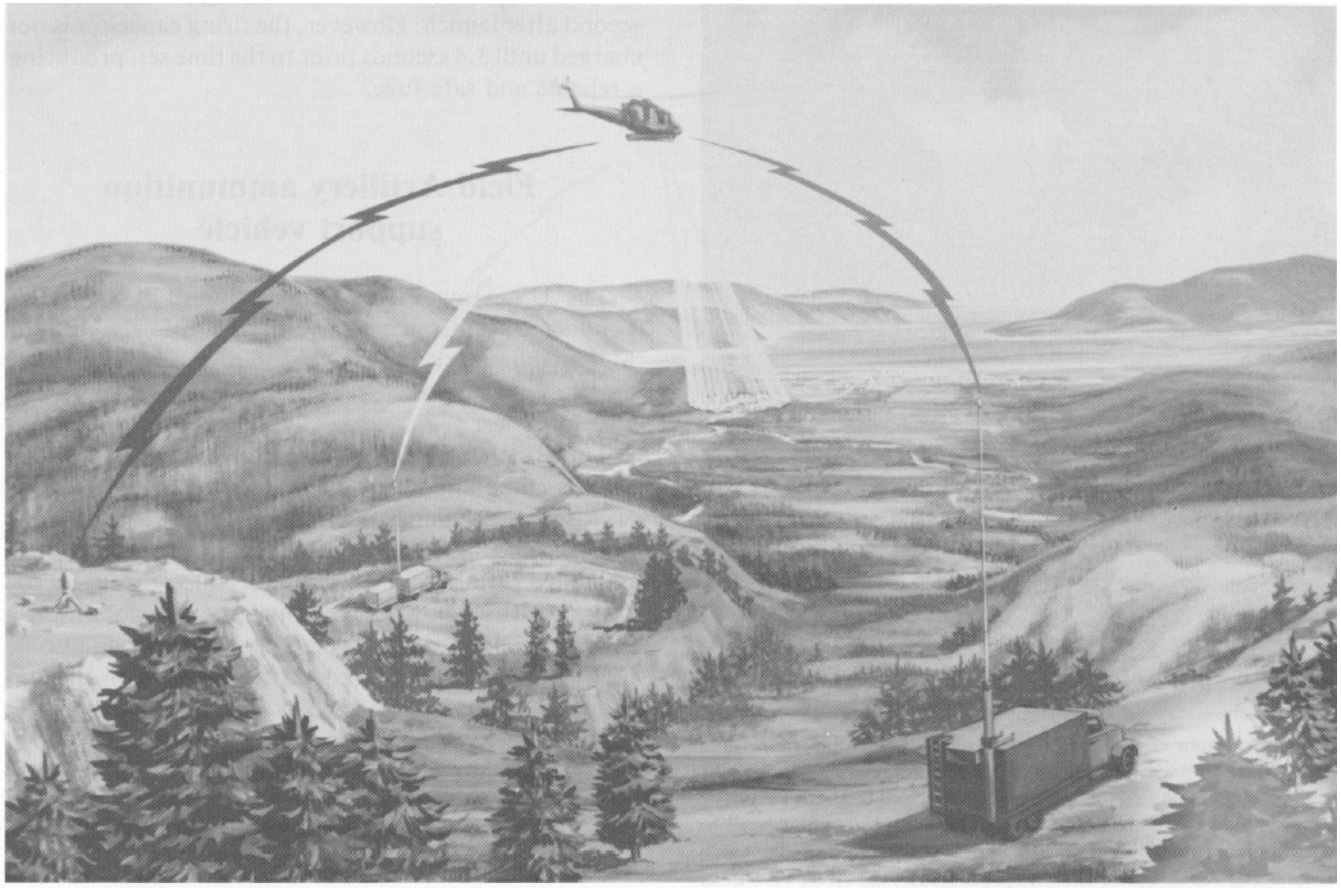
According to the MICNS project officer, Mr. Bernard Reich, "The key feature is its commonality of hardware which make up the airborne and ground data terminals of the system. The design is based on modular building blocks that will give future systems the anti-jam capability for command communications application, including the transmission of video data."

The air and ground data link will use 18 Complementary Metal Oxide Silicon on Sapphire Semiconductors (CMOS/SOS) and eight other high technology custom Large Scale Integration (LSI) circuits used primarily in military applications. These circuits provide high speed data processing using relatively low power. The size, weight, and power problems in the RPV and PLS data terminals dictated their maximum use as well as the application of the LSI and hybrid microwave integrated circuits.

MICNS will be incorporated into the Army's SOTAS, which, in the REFORGER exercises of 1976 and 1977, was called "the single most effective and valuable collector of (targeting) intelligence." The SOTAS radar, mounted on a modified Black Hawk helicopter, can detect and locate moving targets deep within enemy territory even at night. Once generated, the data is transmitted via MICNS to a ground control station where a field commander can determine the most appropriate artillery to use on the target.

In carrying out its prime mission of seeking out targets beyond the forward edge of the battle area, an RPV will use a television camera and with MICNS provide real time imagery of targets which are beyond the range of ground observers.

First delivery of MICNS is expected during the latter part of 1980. Harris Corporation, Melbourne, FL, is the development contractor.



The Modular Integrated Communications Network, an air-to-ground data link, is used to transmit targeting information acquired from helicopter or other airborne radars and sensors to ground-based stations.

Night vision devices

Two contracts totalling more than $12 million were recently awarded for continued production of night vision equipment by the Electronics Research and Development Command's contracting office at Fort Monmouth, NJ. These devices allow battlefield observation during darkness and poor visibility.

Numax Electronics, Hauppauge, NY, received over $5 million for night vision sights for individual and crew-served weapons. The two sights have a common eyepiece, image intensifier assembly, battery, and housing, which reduce acquisition and life cycle costs. Only the objective lenses are different.

The individual weapons-mounted scope (AN/PVS-4) used on the M16 rifle and M60 machinegun provides the capability for delivering accurately aimed fire during darkness. When the scope is hand-held, it aids in night surveillance.

The AN/TVS-5 device is primarily designed for employment on the 106 recoilless rifle, M2 machinegun, and other crew-served weapons. It can also be used as a tripod-mounted forward observer device for adjustment of artillery fires.

The Army's new crew-served weapon sight, AN/TVS-5, represents a giant step forward in night vision technology. The new night sight easily detects and recognizes vehicle-sized targets at night at ranges over 1,000 meters. The 7-pound sight replaces the AN/TVS-2, a 16-pound night sight first used during the mid-1960s. Aside from being much lighter than its predecessor, the AN/TVS-5 does not bloom and cut off when viewing bright lights such as those encountered during tracer fire.

Testing of MLRS fuze

The XM445 fuze, selected for use on the Multiple Launch Rocket System (MLRS), was tested in November 1979 at White Sands Missile Range, NM. Thirteen rounds were successfully fired and all fuzes functioned within the tolerance window of the set time. This tolerance window is required to be ± 50 milliseconds or ± 0.15 percent of the time set on the fuze (whichever is greater).

The fuze was designed and developed by the Electronics Research and Development Command (ERADCOM) and is a product of the Harry Diamond Laboratories. The Army provides the fuzes to the competitive contractors for MLRS—Boeing Company and Vought Corporation—for system test and evaluation.

This electronic, time fuze is remotely set from the fire control panel inside the cab of the MLRS. It employs a gearless safe arm device which must have both acceleration and power to arm. The required acceleration of 130 milliseconds is achieved shortly after launch which in turn activates the timer. After 0.6 second has elapsed, enough power is generated to start the arming device. Thus the fuze is mechanically armed approximately one second after launch. However, the firing capacitor is not charged until 3.4 seconds prior to the time set, producing a reliable and safe fuze.

Field Artillery ammunition support vehicle

The US Army Field Artillery Board (USAFABD) conducted a Concept Evaluation of the Bowen McLaughlin York (BMY) version of the Field Artillery ammunition support vehicle (FAASV) in November and December last year.

The BMY FAASV has a modified M109 howitzer chassis (tube and turret have been removed) with an enclosed cargo compartment. The 10-ton vehicle is fully armored and has a 14,500-pound hauling capacity. It can be loaded with 10 round horizontal pallets through a top door or with single rounds through the rear door using a hydraulic operated conveyor. The conveyor can also be used for passing prepared projectiles and propellant charges into the supported howitzer. Additionally, other ammunition handling equipment (AHE) has been added to facilitate moving of projectiles between the bulk storage area and the conveyor.

The FAASV concept was developed to provide a vehicle with commonality of parts to the M109 series of howitzers, ballistic projection, and suitable AHE to enable more rapid resupply than current equipment.

Observed fire trainers

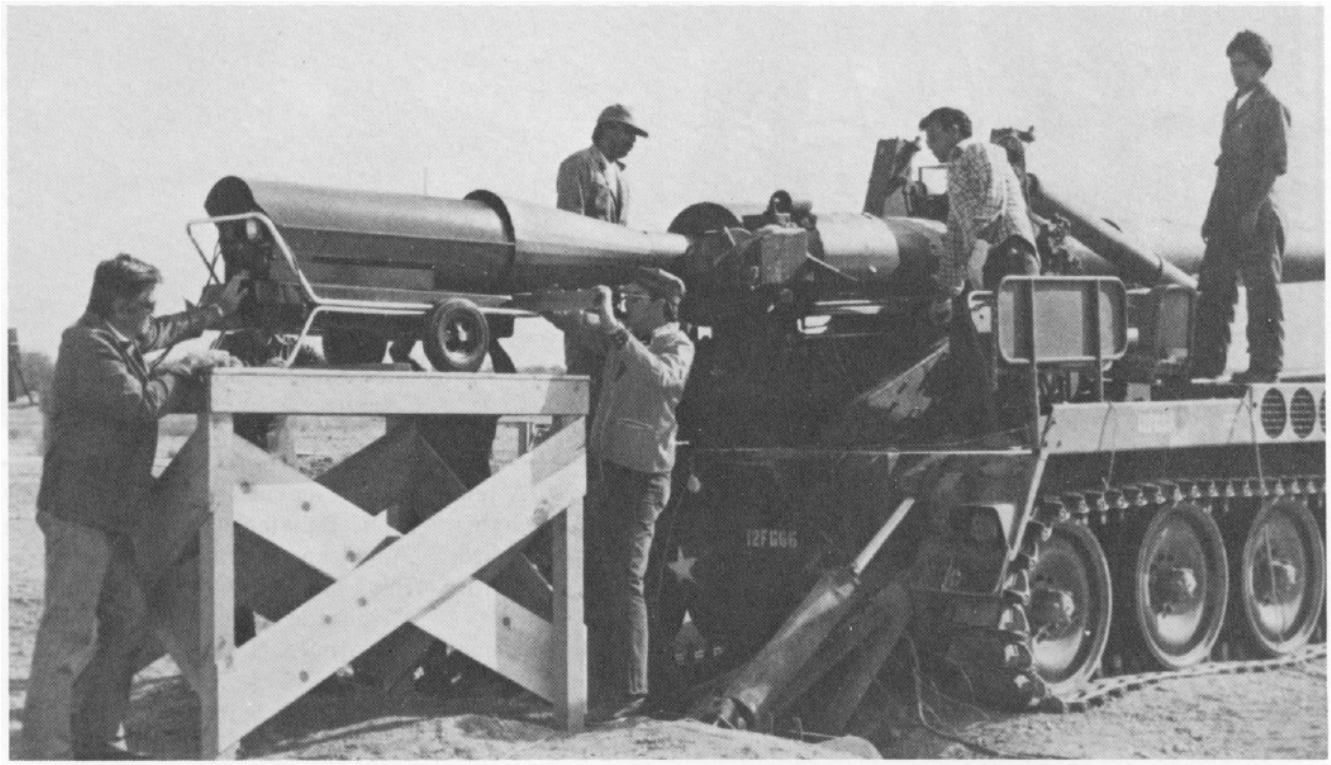
The US Army Field Artillery Board (USAFABD) is conducting an operational feasibility test on two separately contracted observed fire trainers (OFTs). The purpose of this test is to provide data to determine the suitability of the Master Gunner Artillery Classroom Trainer and the Invertron Artillery and Mortar Fire Control Training Simulator.

Test data will be collected and evaluated by USAFABD personnel to determine whether these devices meet the Army's need for an OFT as specified in the Training Device Requirement.

The traditional method in training tactical unit personnel and service school students in forward observer (FO) procedures requires expenditure of live ammunition on an artillery range. This kind of training, however, is costly in terms of ammunition expended and time required of students and instructors. In 1978, the US Army Field Artillery School (USAFAS) was informed of two observed fire trainers under development in the United Kingdom, and subsequently sent representatives to England to observe these devices in operation. As a result, the School determined that both items had excellent training potential, and arrangements were made for the US Army to lease both devices for formal evaluation at Fort Sill.

The Marconi Master Gunner Artillery Classroom Trainer and the Invertron Artillery and Mortar Fire Control Training Simulator display simulated terrain scenes to student observers nearly identical to those anticipated from actual points of observation. The instructor will be able to portray stationary and moving targets on a selected basis. A shell burst presentation with sound effects, to include both ground and air detonation (with or without ground effects) and obscured ground bursts, can be simulated with these training devices. Other capabilities of these systems include coordinated high explosive bursts under illumination and field artillery smoke consistent with wind speed and direction. Both training devices project a field view of 1,200 mils to provide a realistic environment for the student.

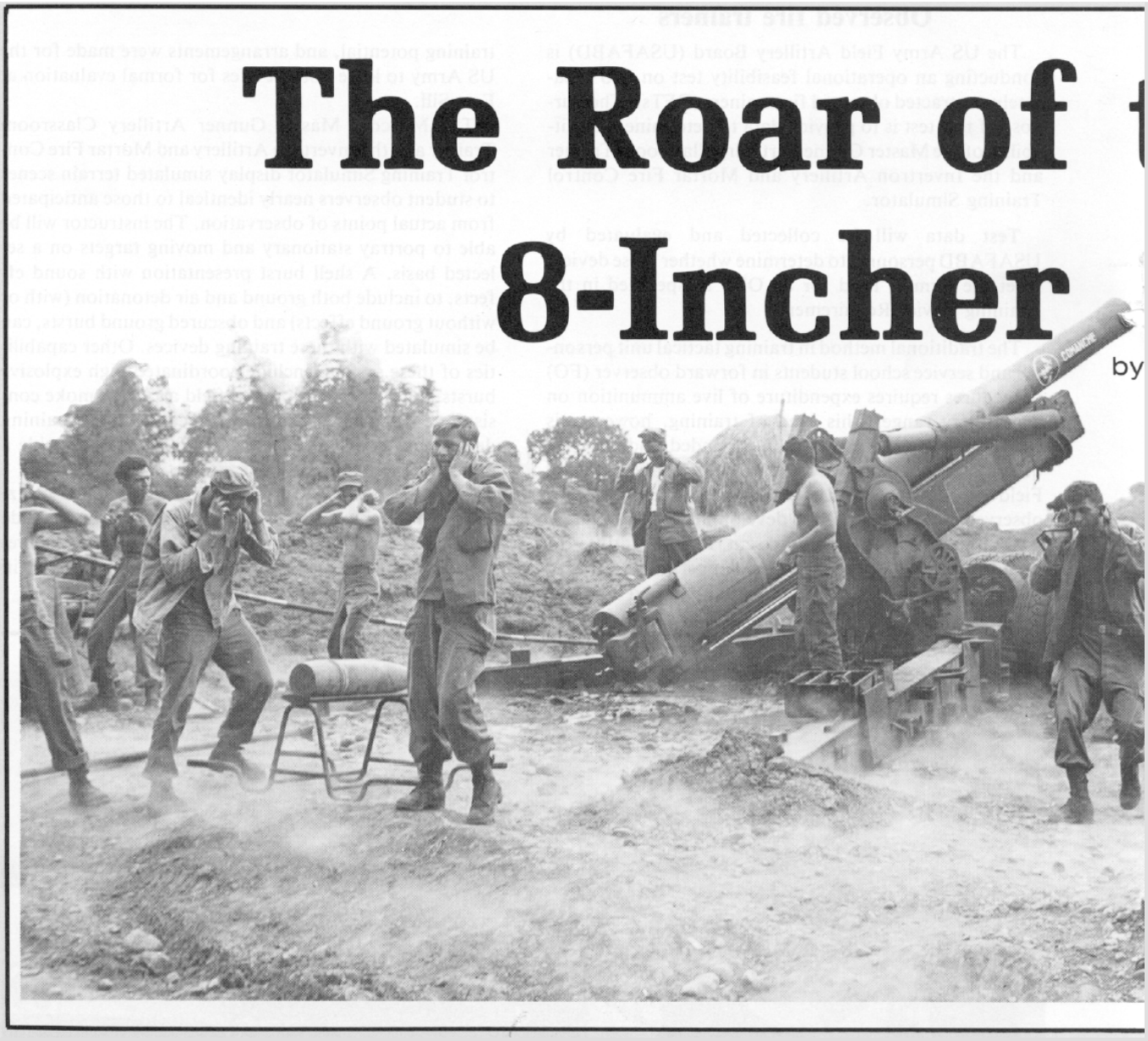
The OFTs can operate on a 220-volt, 50/60-hertz, single-phase power source which permits use worldwide and allows training of 30 students simultaneously. A report on the operational feasibility test will be published in May 1980.



Personnel from Yuma Proving Ground maneuver a specially adapted 350,000 BTU space heater into position at the breech of an 8-inch howitzer tube. The heater raises the tube temperature to 130-F for tests of M188E1 propellant charge, thereby saving two-and-a-half hours of firing time and 30 or more full-charge 8-inch rounds normally required to achieve such temperatures. (US Army photo by T. Ockrassa)

The Roar of t 8-Incher

by



For more than 60 years these big howitzers have smashed targets for advancing US troops

ALL too often, the World War II GI fighting in Europe discovered the path to victory blocked by strong, heavily fortified positions, defended by German veterans. A call then went back for the real heavyweight, the 8-inch howitzer. A few 200-pound explosive shells from this awesome monster usually smashed the way clear, opening a breach for the American infantry.

The call for these howitzers came most frequently from the men of General Mark Clark's Fifth Army, bogged down in mountainous Italy, pounded by German 170-mm guns that could sit back out of range of counterbattery fire. Struggling against an enemy who turned every stone building into a fortress, the Americans were desperate for something big enough to punch a hole in German defenses. To meet this need, the Army sent two battalions of 8-inch howitzers, which reached the Italian front by November 20, 1943 and played a decisive role in the destruction of fortifications at Cassino.

Their use, however, was not restricted

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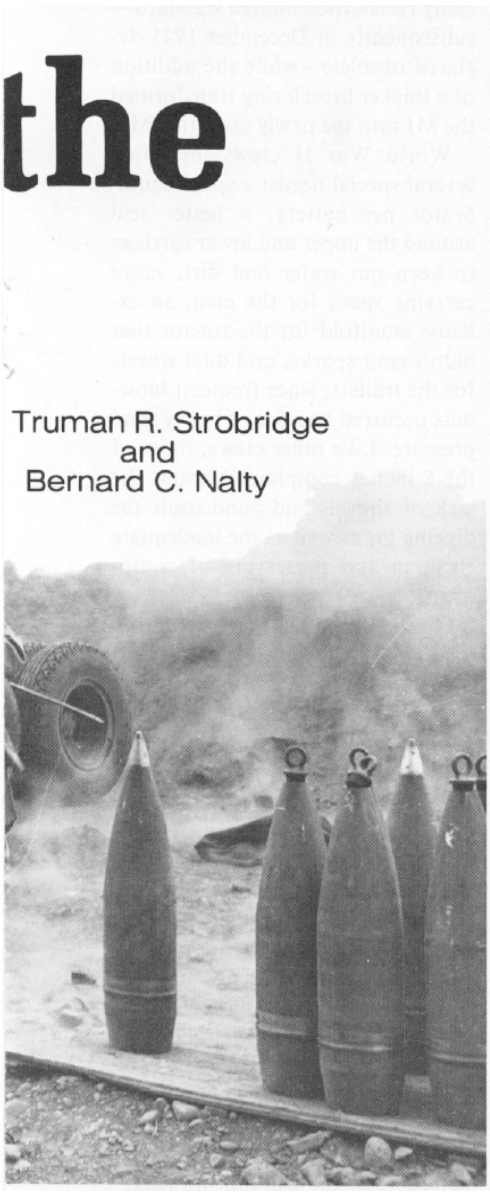


The 8-inch howitzer in action during WWII.

to the Monte Cassino fighting, for infantry units continued to benefit from their accuracy and power. "One heavy shell silenced enemy mortars in ravines when our own mortars and light artillery were without an exact location," reads one field report from the Italian front, and the "infantry asked for help from the 8-inch howitzer when it needed especially accurate fire on strongpoints and close-in fortified targets." One such target was a building in an Italian town. Its map coordinates were phoned back to the fire direction center of the 8-inch howitzer battalion, where these were corrected to true trigonometric coordinates. "The first round struck the building and the 5 subsequent rounds, all direct hits, destroyed it."

Many times, the presence of Germans in "easily defended towns . . . demanded their destruction, and San Angelo, Pignataro, Cassino, and Acquino tell a good before-and-after story—before and after 800 rounds from the 8-inch howitzer battalion." According to a British artillery brigadier, "the fire of the 240-mm and 8-inch howitzer batteries was largely responsible for the ultimate reduction of fortifications at Cassino." In March 1944, twelve 8-inch howitzers and two 240-mm howitzers were shifted from the Cassino front to the threatened Anzio beachhead. Their first fire mission demolished a tower in Littoria, thus denying any further use of this strong German observation point that had been used to call down direct fire on the port. Shipment of these heavy artillery pieces to Northern Europe was begun after the fall of Rome.

Pacific Theater

Meanwhile, on the other side of the world, the 8-inch howitzer had helped pierce the defenses of Manila, then added the weight of its 200-pound projectiles to that of other artillery shells in battering down the 40-foot thick walls of fortifications at Intramuros, where the last Japanese defenders held out. The 8-inch howitzer also played a decisive role in the Battle of Okinawa, the last of the bloody island campaigns, lending its power to the greatest artillery concentration of the Pacific War—the pre-dawn assault bombardment of the Shuri Line on April 19, 1945.

In all, 324 artillery pieces, ranging from the 8-inch howitzers to the 105-mm howitzers, averaging 75 for each mile of front, blasted the Shuri defenses for 20 minutes, before rolling their barrages beyond the frontlines. When the enemy crawled out of his dugouts to fire upon the American infantry, this thunderous barrage returned to kill the exposed defenders. This time, the massive barrage lasted 40 minutes. When the infantry next swept forward, they overran the smashed entrenchments, but the Japanese hiding in caves were scarcely harmed and awaited to drive them back. Only with determined infantry, employing the rifle, machinegun, hand grenade, bayonet, and flamethrower, could these coral strongholds be conquered, although the fighting would have been bloodier without the 8-inch howitzer.

World War I

Americans first fired an 8-incher in combat during the trench fighting of World War I. The British, fat in equipment but lean in personnel, gladly issued their Vickers Mk VI 8-inch howitzer to the ordnance-poor doughboys. The US Army promptly redesignated this foreign weapon as the Model 1917, with the subsequent Model 1918 being merely an American adap ion of the English design. Several batteries of American built 8-inch howitzers saw action with the US Army prior to the armistice, although most artillery pieces fired by the doughboys were of French or British manufacture.

One tactical lesson of World War I was that artillery had become the deadliest battlefield killer, accounting for more than 50 percent of all combat casualties. As a result, the War Department, less than a month after the guns had fallen silent, appointed a board, headed by BG William Westerveldt and composed of artillery and ordnance officers, to recommend appropriate types of artillery for a field army. The final report of this so-called Caliber Board recommended greater range,

traverse, and elevation than had been provided by World War I 8-inchers and declared that these wartime weapons had been, at best, medicore corps artillery pieces.

Ordnance specialists discovered to their delight that the Westerveldt Board set forth almost identical requirements for the carriages of both the 8-inch howitzer and the 155-mm gun. The Ordnance Corps could now channel its scarce development funds into one device for both weapons, the Model 1920E, 155-mm gun/8-inch howitzer, recoil mechanism and carriage. Unfortunately, with an 8-incher that weighed some 9,000 pounds and hurled a 200-pound projectile some 16,250 meters, the dual-purpose carriage proved unstable when the weapon fired at maximum charge. The carriage, moreover, was built to be towed by that day's slow artillery tractors, for designers had not anticipated the development of high-speed motor transport for the bigger cannon.

Rush project

Not until the summer of 1930 did a more suitable carriage appear. That year, determined to use available funds that otherwise would have reverted to the Treasury Department, a Rock Island Arsenal drafting crew completed blueprints in just 81 days, and the arsenal's craftsmen built a prototype in another 87 days. Their handiwork, the T2 carriage, contained several radical features. Among these "firsts" for heavy field artillery pieces was all-welded construction, which permitted high-speed towing. Another innovation was the roller bearing bogie at either end of the carriage that enabled the weapon to negotiate sharp turns. In addition, built-in jacks extended from the bottom of the carriage insuring stability during firing.

Since enough money remained to modify only one cannon to fit the new carriage, the 8-inch howitzer was chosen because it would test the new design under the more severe load. The 155-mm gun had to wait another four years before being modified to fit the T2. The radical carriage passed all its tests and trials with flying colors, surpassing all expectations and hopes. Indeed, the design proved so advanced that it served for over three decades practically unchanged.

As a result, the 8-inch howitzer, the 155-mm gun, the recoil mechanism, and the T2 carriage were standardized in 1935 as the M1. None were produced prior to Pearl Harbor, however, because Army planners considered these pieces less useful than lighter ones. Thus, the 475 8-inch howitzers with which the United States entered World War II dated from the previous conflict and lacked both mobility and range.

Specifications

The M1, 8-inch howitzer weighed 10,240 pounds by itself. When coupled with a hydropneumatic M4 recoil mechanism, M1 carriage, and limber, it totalled 31,700 pounds. The rate of fire was 1 round every two minutes, and it hurled a 200-pound projectile for a maximum range of more than 16,700 meters. Its maximum elevation and depression were 64 and 0 degrees, respectively, while its traverse either to the right or left was 30 degrees.

This new M1, 8-inch howitzer design entered service in 1942. The 1,006 weapons of this type that rolled from wartime production lines quickly gained a reputation for both accuracy and ability to knock out fortified positions at long ranges. World War II production of all types of 8-inch howitzer ammunition amounted to 2,531,000 rounds, an impressive total for such a heavyweight. In March 1945 alone, for instance, 629,752 rounds of 8-inch howitzer ammunition were shipped to the European theater. The same month, the original M1 was officially reclassified limited standard—subsequently in December 1945 declared obsolete—while the addition of a thicker breech ring transformed the M1 into the newly classified M2.

World War II crews identified several special needs: a spare equilibrator per battery, a better seal around the upper and lower carriage to keep out water and dirt, more carrying space for the men, an exhaust manifold for the tractor that didn't emit sparks, and dual wheels for the trailers, since frequent blowouts occurred because of heavy road pressure. Like other crews, those of the 8-incher complained about the lack of shovels and hand tools for digging in, as well as the inadequate cleaning and preserving of equipment.

On the battlefield, the reputation of the 8-inch howitzer for accuracy quickly spread throughout the Army. Its forte was destroying strong buildings and houses in cities used by the Germans as fortifications.

During the North African campaign, the 8-incher became a bridge buster. Once, firing 10 rounds from a distance of 15,000 yards, an 8-inch howitzer knocked out a heavy stone briged abutment, causing an entire span to crash down into the river. Soon, every one of the battalion's 8-inch howitzers boasted of this fact by a bridge painted on the gun shield.

Combat experience proved the 8-inch howitzer more accurate, though lighter, than the 240-mm howitzer. Well-trained 8-inch howitzer crews boasted, with some justification, of being able to place successive rounds into a barrel-sized target. As this reputation spread, the World War II GI called more frequently for the 8-inch howitzer when assaulting small, hard targets, such as pillboxes and fortified caves.

First SPs

Once the self-propelled (SP) 155-mm gun, called the "Long Tom,"

Self-propelled 8-inch howitzer firing in Korean action.

demonstrated an ability to move in quickly, knock out pillboxes, and rout German troops from reinforced concrete buildings, ordnance planners rushed to get heavier cannons on motor driven chasis. Unfortunately, production of the resultant M43, an 8-inch howitzer mounted on a modified M4 tank chassis, started too late in 1945 for this self-propelled heavyweight to contribute to victory in the Pacific. In fact, only one battalion of towed 8-inch howitzers could be assigned to the Okinawa invasion force, because there was not enough ammunition available for even a second unit.

With the end of hostilities, the United States cut back on ordnance research. As a result, when war erupted in Korea just five years later, the armed forces had no new conventional weapons, forcing the GI to fight with World War II weapons, including the towed and self-propelled 8-inch howitzers.

Never did the big 8-inchers accomplish more than during the darkest hours of the Korean War, the critical week following Thanksgiving Day 1950. Hundreds of thousands of Chinese communist soldiers crossed the Yalu River and pounced upon an overextended Eighth US Army that was approaching the boundary between North Korea and China. The sudden appearance of these overwhelming numbers turned advance into the longest retreat in US military history.

Frontline artillery

The burden of screening this retreat devolved upon the 2d Infantry Division, commanded by MG Laurence B. Keiser. Because of the confusion surrounding the withdrawal, 8-inch howitzers of LTC Elmer H. Harrelson's 17th Field Artillery Battalion stood face to face with hostile infantry instead of occupying firing positions well to the rear. The use of towed 8-inchers as a rear guard typified the plight of the division, for artillery on the march always presents a vulnerable target, but never more so than in retreat. The tractor prime movers that had provided essential mobility during the northward advance now had to inch their way bumper to bumper over a twisting path littered with wreckage. Fortunately, each tractor mounted a .50- and a .30-caliber machinegun to fight off the Chinese infantry that swarmed over the landscape.

The decision to use the road leading from the 2d Infantry Division's Kunuri positions southward to Sunchon was made at noon on November 30, 1950. For five days, the rifle units had been falling back, never breaking contact long enough to establish a holding position. Now the division commander watched his weary infantrymen try unsuccesfully to drive the enemy from the ridges overlooking the valley. General Keiser concluded that his motorized units, including the 8-inch howitzers, might be able to slam through over the Kunuri-Sunchon road, even though the enemy held the high ground. He knew that his command could not remain at Kunuri and risk being cut off and slaughtered.

Unknown to the general, the road that he thought was comparatively clear was in reality a six-mile long roadblock, under direct fire from Chinese machineguns and mortars dug in on the hills above. His vehicles would have to run a gantlet of hostile fire. Worst of all, at the end of this narrow road lay the pass, a defile where the enemy had dug, determined to seal this gantlet at its end by concentrated fire from automatic weapons. The decision to send the division into the gantlet organized only for a motor march and not disposed for battle nearly proved disastrous. Men who had survived for five days with little food and almost no sleep had to ignore both the grumbling of their empty stomachs and the bitter cold and push themselves to the limits of human endurance to endure the horror yet to come.

When darkness fell at the end of the first day, most of the infantry had either fought their way through the pass to safety or were in sight of it, but the 8-inch howitzer crews were less fortunate. The artillery column

reached all the way back to its original jumping off point, where some vehicles still waited for road space to join the procession. Hours earlier, an officer in the last rifle unit to move out toward safety had warned the cannoneers that "now there is nothing in front of you." Nothing except the enemy.

With the coming of dusk, a line of Chinese skirmishers, formed in a rough crescent, attacked the 8-inchers bringing up the rear. Enemy machineguns opened up at 600 yards to support their infantry, and the American artillerymen fought back from their tractors with .50- and .30-caliber machineguns. Those who were neither drivers nor machine-gunners dismounted to fire carbines or rifles from the cover provided by the guns and carriages. "Such was the roar and rattle of the fire," reads one description of the battle, "that all other noise was drowned out." This action continued until the enemy withdrew under cover of night. One cannoneer recalled that of the four men closest to him, two were shot in the leg, one in the chest, and the other in the shoulder.

The big howitzers continued southward, riding almost bumper to bumper through the darkness. The crews had to keep moving, while trying to support the column by fire, and at the same time defending the guns. Tractor treads and carriage wheels passed over frozen corpses. One sharpeyed soldier realized what the objects in the road ahead actually were and halted the column in time to prevent the vehicles from crushing American wounded. The nearer the artillery unit came to the pass, the more the road became clogged with broken and burning vehicles. A great heap of debris from exploded vehicles littered the Pass itself across the road, and the ditches and gullies on either side were filled with guns or vehicles that had toppled from the roadway.

Despite their vulnerability on the road, all of the 8-inchers except one successfully ran the gantlet and squeezed through the pass to safety. The lost howitzer had careened over the edge into a 40-foot ravine. To deny its use to the enemy, a volunteer slid down the slope and exploded a thermite grenade in the barrel. His heroism and the courage of his fellow GIs reflected the highest traditions of the artillery.

A new designation

On June 21, 1956, the self-propelled 8-inch howitzer was redesigned and standardized as the M55. The towed version, subsequently redesignated as the M115 on May 18,

The 8-inch howitzer in Korean action.

1961, has undergone no further modification or redesignation. Considered an obsolescent weapon today, the M115 is utilized by US Reserve units for training.

Because it seemed less vulnerable on a nuclear battlefield, the self-propelled 8-inch howitzer received the attention of ordnance and artillery experts. Instead of merely removing a standard towed artillery piece from its carriage and installing it in a modified tank hull, these men designed a thoroughly modern weapon, the M110 self-propelled 8-inch howitzer, type classified standard on March 9, 1961.

This new howitzer resembled the weapon tested in 1920 and had a top carriage and recoil system dating from 1930, but it was mounted on a very modern self-propelled chassis. Sharing this identical chassis was the new 175-mm gun, M107, which entered service at the same time. According to [then] MG David Ewing Ott, a former commandant of the US Army Field Artillery School, use of this single type of chassis gave an option to the field artillery commanders in Vietnam, since "the common practice was to install those tubes that best met the current tactical needs. One day a battery might be 175-mm; a few days later it might be half 8-inch." During the Vietnam Conflict, the effectiveness of both these new weapons was amply demonstrated.

American GIs fighting in the rice paddies and jungles of Southeast Asia—like their fathers crossing similar terrain earlier in the Philippines and Okinawa—found the 8-incher useful. PEGASUS, the combined American-South Vietnamese relief operation that raised the 66-day siege of Khe Sanh, brought along a battery of 8-inch howitzers. Once the PEGASUS artillery came within range, their rapid and massive counterbattery fires helped silence the North Vietnamese 152-mm and 130-mm guns that had shelled the Marines and South Vietnamese rangers defending Khe Sanh.

Direct fire

So widely used was the 8-incher that the enterprising artilleryman who perfected an effective direct fire technique for defending fire bases against enemy ground attack called it "Killer Senior" when used with the 8-inch howitzers, and "Killer Junior" when used with 105-mm or 155-mm howitzers. This technique used mechanical time-fuzed beehive projectiles set to burst approximately 30 feet off the ground at ranges of 200 to 1,000 meters. Since each beehive round contained over 8,000 small steel darts, the Viet Cong could not avoid the flying flechettes of the beehive by lying prone or crawling.

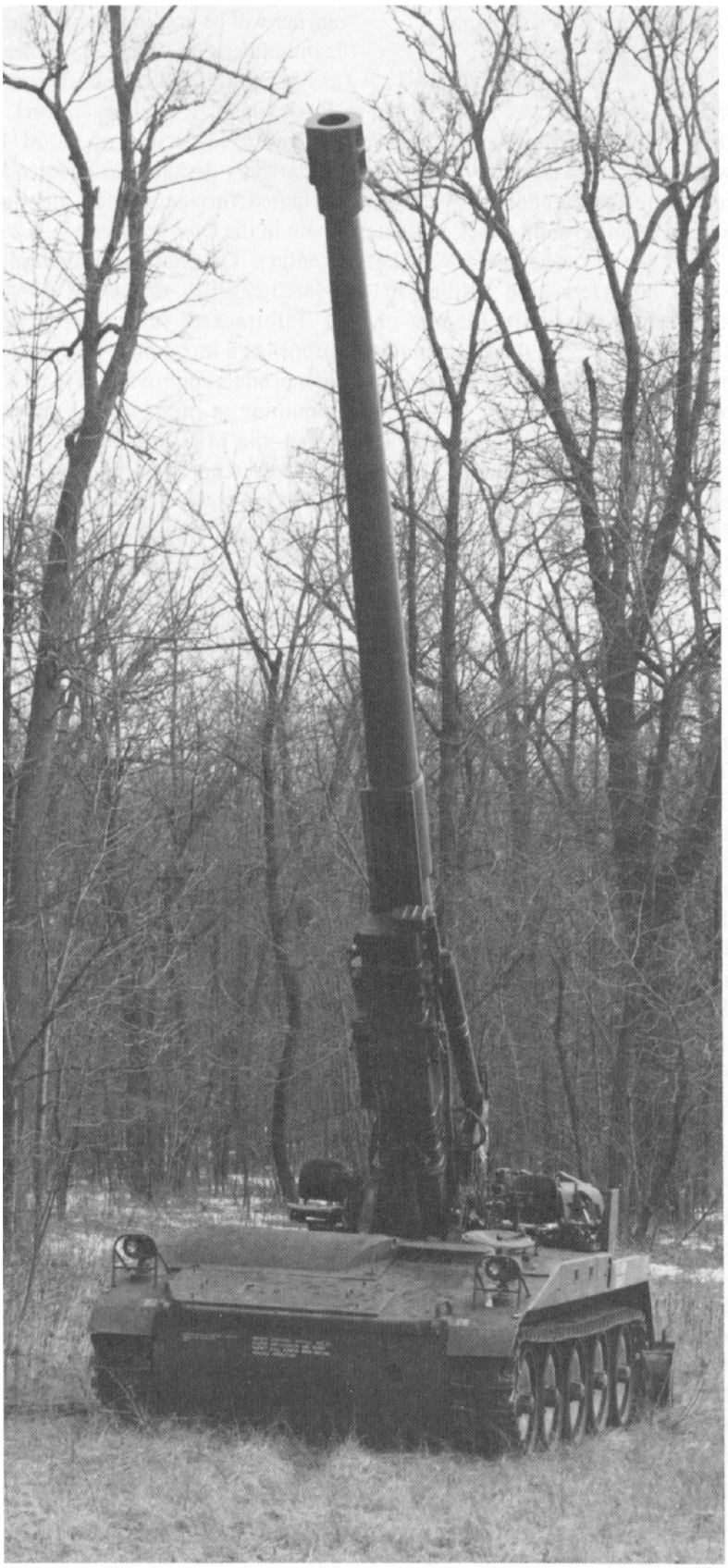
Several times during the critical moments of the Tet offensive in early 1968, the 8-incher saved the day. Elements of the 25th Infantry Division, for example, were pinned down by fire from enemy bunkers near the highway linking Saigon with Cu Chi. Finally, an 8-inch howitzer delivering direct assault fire eliminated these bunkers. Also, the quick and devastating fire of a battery of 8-inch howitzers prevented the collapse of the Xuan Loc base camp, which came under heavy attack. The battery fired 35 8-inch rounds, killing 80 of the attackers and saving the post. Other 8-inchers attached to the 1st Infantry Division fired an average of 235 rounds a day during Tet and were credited with accounting for a good percentage of the over 1,000 enemy troops believed killed by the division. During the siege of Hue, a battery of 8-inch howitzers was flown from southern Vietnam by order of General Creighton W. Abrams to breach the walls of the Citadel and permit recapture of this ancient fortress.

New designs

The latest research in the US Army laboratories gives promise that the 8-incher will be accompanying American soldiers on future battlefields. As early as 1969, the designers at Rock Island Arsenal began work on an improved version of the M110, specifically designed to counter anticipated foreign artillery development in the later decades of the 20th Century. Type classified standard on March 29, 1976, the new M110A1 is a full-tracked, unarmored, self-propelled 8-inch howitzer consisting of a product-improved M110 chassis mounting a new totally chrome tube—the M201 cannon— and an M139 telescope providing a Mil scale reticle to replace the range reticles currently being used. It has replaced all M110s and all but two 175-mm battalions in both the Active Army and the Reserve forces. New families of projectiles, both conventional and nuclear, as well as "super" propellant charges, have been concurrently developed with the M110A1 to increase its destructive force and make it more versatile.

Actually, only armament changes, the replacement of the old tube and range reticle by the new M201 cannon and M139 telescope, will transform the M110 and M107 into the new M110A1. Already designed, tested and accepted, however, are 18 separate improvements for all M107, M110, and M110A1 weapons. Organized into product improvement kits, these changes will improve reliability, availability, and maintainability. The latest refinement of the 8-inch howitzer is the M110A2, basically the M110A1 equipped with a double baffle muzzle brake added to cope with the additional momentum of the new propellant charges. It became standard equipment in February 1978.

The US Army's decision to product improve the M110 rather than design a totally new 8-inch weapon system will save millions of dollars, a most desirable thing in these days of tight Defense appropriations. The



The M110A2 as it looks today.

estimated cost of product improving the M110 into the M110A1 is merely $80,000 per weapon, while the production costs alone, after developing an entirely new weapon system, would be $700,000 per weapon, "a spell-binding figure when one contemplates a fleet of 1,000 vehicles."

Today, 60 years after the US Army first adopted the 8-inch howitzer, this large caliber artillery piece with a mighty punch seems destined to remain a part of the US Army's inventory for the foreseeable future. Surviving veterans of World War I may fondly remember its awesome roar and today's cannoneers look confidently into a dimly-perceived future, knowing they can depend upon its range and destructive punch to back them up anywhere in the world.

The M110A1 "long tube" 8-inch howitzer has replaced all of the "short tube" M110s in both the Active Army and the Reserve Components. This weapon, coupled with the new M188 charge 8, and the Rocket Assisted Projectile, M650 RAP, can achieve a maximum range of 26.8 kilometers.

By addition of the muzzle brake to the M110A1 (the tube being already threaded to accept this), the M110A1 becomes the M110A2. This muzzle brake kit, known as Product Improvement Package (PIP) number four then allows the firing of the M188A2 charge 9. This charge, also coupled with the M650 RAP achieves a range of 30,000 meters. The application of this muzzle brake kit is currently underway. Though the maximum range of 30,000 meters is presently the maximum for the M110A2 series weapons, two additional PIP kits, numbers 5 and 6 are being tested for application at a latter date. The PIP kit 5 consists basically of improvements to the chassis reliability, and number 6 to the gun mount reliability.—Ed.

The authors have collaborated on a number of articles for military publications. Mr. Truman R. Strobridge is Historian of the US European Command and Mr. Bernard C. Nalty is a resident of Hyattsville, MD.

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Development And Use of Field Artillery Proximity Fuzes in World War II

by CPT Larry D. Gahagan

The development and use of the proximity (variable time (VT)) fuze by US and other Allied Field Artillery units in World War II was one of the most spectacular tactical and scientific breakthroughs to occur during that period. Combined with the newly fielded US doctrine of massing Field Artillery fires, the VT fuze, or Pozit as it was first named, contributed heavily in bringing effective and destructive indirect fires on enemy troop concentrations and other soft targets. Several major field commanders of the period stated the artillery VT fuze "precluded troop movement in the open," thus causing a dramatic change in basic tactical doctrine of moving and massing troops and supplies without considering adequate cover and concealment.

As early as 1930 German scientists may have developed the basic design concept for an automatic airburst fuze for artillery use. Several unique fuzes were researched and evaluated worldwide prior to 1944, including one which was optically guided. However, one basic design concept was adopted using the Doppler effect radar developed by British scientist Sir Robert Watson-Watt in the mid 1930s.

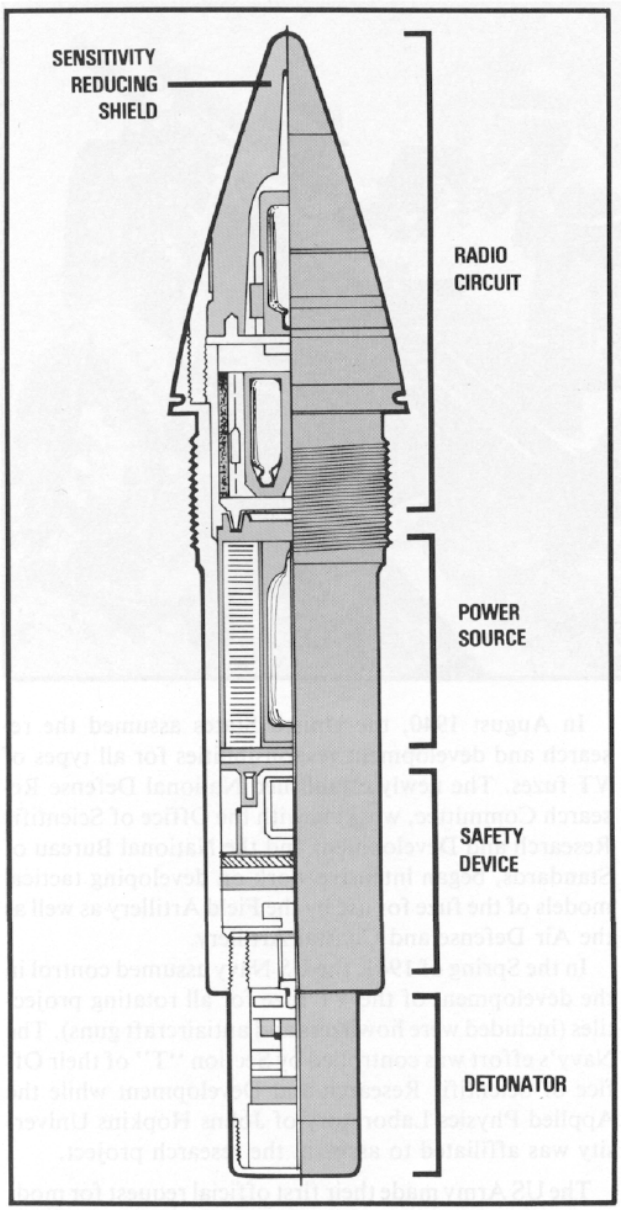
Before the Battle of Britain in 1940, UK scientists had developed a radio-electric (mini-radar) fuze for antiaircraft artillery. It proved to be very effective against the German V1 rockets, when used in conjunction with the highly developed British Coastal Defense Radar System. Even though the original use of the VT fuze was in the antiaircraft role, several allied war planners saw the enormous potential for using the new fuze design against troop-type ground targets.

In August 1940, the United States assumed the research and development responsibilities for all types of VT fuzes. The newly established National Defense Research Committee, working with the Office of Scientific Research and Development and the National Bureau of Standards, began intensive work on developing tactical models of the fuze for use by the Field Artillery as well as the Air Defense and Coastal Artillery.

In the Spring of 1941, the US Navy assumed control in the development of the VT fuze for all rotating projectiles (included were howitzers and antiaircraft guns). The Navy's effort was controlled by Section "T" of their Office of Scientific Research and Development while the Applied Physics Laboratory of Johns Hopkins University was affiliated to assist in the research project.

The US Army made their first official request for modification of the existing antiaircraft fuze for their howitzer use in April 1943. Until that time, all work had been centered on producing the VT fuze for the US and British Navies in antiaircraft gun applications. The successful British *Mark 33* VT fuze for the 3.7-inch gun had a devastating effect against the German air attacks on Britain, possibly causing Hitler to decide to terminate *Operation Sea Lion*. Because of the increasing interest in the VT fuze by all US services, the Joint Chiefs of Staff then established a program to assign priorities for developing the new fuze for all applications.

In redesigning the antiaircraft fuze for howitzer use, several "special" characteristics had to be incorporated. Longer battery life was required, because times of flight



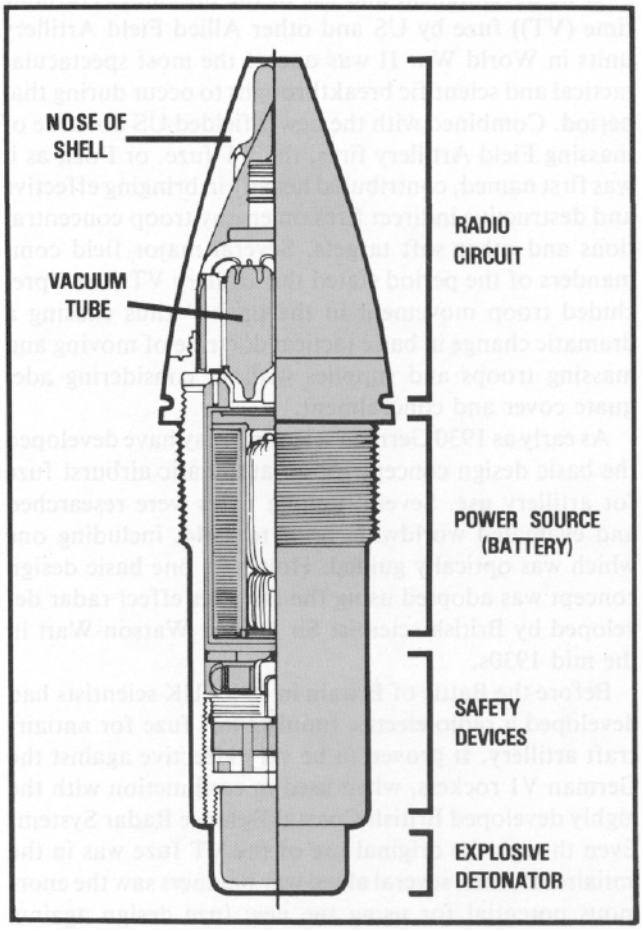
Early test version of artillery VT fuze.

for howitzer projectiles were longer than for antiaircraft rounds. Also howitzer fuzes needed a lower electronic sensitivity than those for the antiaircraft systems because the howitzer projectile had a flight path over both land and water. In actuality the howitzer VT fuze was to be a complete redesign, not a modification, of the original types.

The US Army selected COL H. S. Morton as the VT fuze project officer who worked as liaison between the Johns Hopkins Laboratory and Headquarters, Army Ground Forces, the major backer in the howitzer fuze development. Ironically, the official Army request came when the 90-mm antiaircraft fuze was experiencing design difficulty. Since higher priority had been placed on the 90-mm fuze, none of the current scientists could work with Colonel Morton on the howitzer prototype; therefore, a new research team was formed at Johns Hopkins.

This new group first determined effects of terrain on the sensitivity of the fuze and then computed relative reflecting powers for different wet and dry terrains. In April 1943, the fuze was field tested using the obtained data and the 90-mm gun through live firing conducted at Romney Creek, Aberdeen Proving Ground, MD. Other design features were incorporated into the prorotype 155-mm fuze. For example the size of the new fuze had to match the projectile electronically as well as complete the ballistic shape of the round. In June 1943 the 5-second delay feature was chosen for the howitzer fuze because it provided improved troop safety, less chance of muzzle burst, and better overall fuze reliability. The 5-second delay is still used in modern-day fuzes.

The first 155-mm howitzer VT fuze was fired on 16 June 1943 at Aberdeen and the 8-inch fuze was fired a month later. Development continued at a rapid rate in the summer of 1943. COL M. R. Cox of the Army War



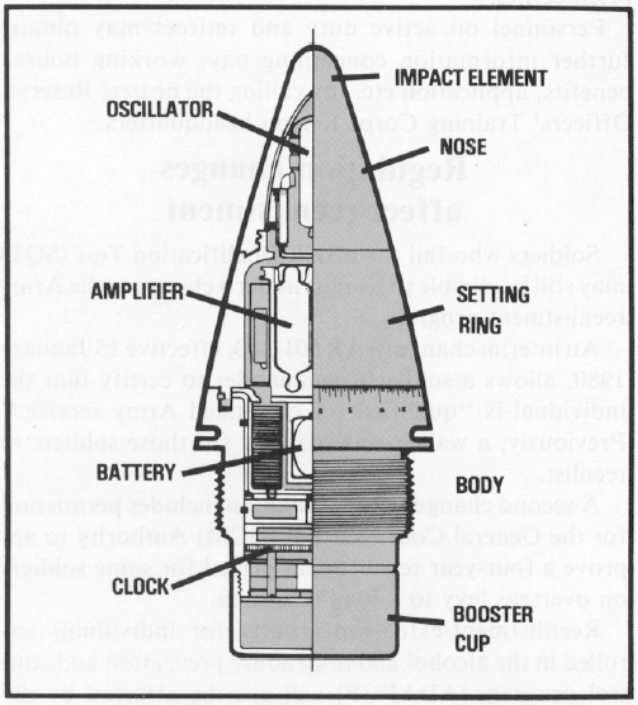
Typical fielded version of artillery proximity VT fuze.

College observed the 8-inch test and provided an enthusiastic report which may have helped the Joint Chiefs of Staff to subsequently raise the development priority for howitzer VT fuzes. By August 1943 the *Mark 2* fuze models had been developed to achieve consistent operational rates better than 90 percent.

Several 8-inch fuzes were installed and fired in 155-mm projectiles and *vice versa*. The resulting lower performance rates caused the Army to direct redesign of one fuze model for all howitzer weapon systems, which was accomplished within a few months.

Production of the approved VT fuzes for the allied armies for all calibers began in late 1943 by the Radio Corporation of America and Eastman Kodak Company. By early 1945, over 120 industrial plants were either manufacturing components for VT fuzes or assembling them for shipment to the combat theaters. The US Army Signal Corps was responsible for quality control during production.

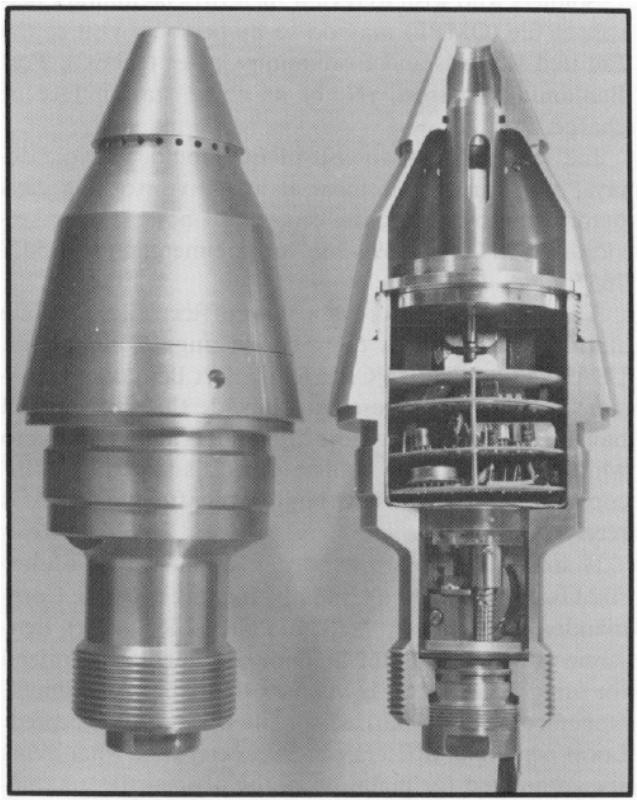
The VT fuze was released to US Field Artillery units for combat in September 1944, and the first reported use in battle was recorded during the German Ardennes Woods Offensive on 18 December 1944 by the 12th US Army Group. A report from the 1st US Army Field Artillery dated 23 December 1944 says, "It is hard to believe, but cumulative figures indicate 2,000 [enemy] dead which could be observed and and counted. . . (VT) ammunition is most deadly." First month expenditures in the European Theater for the new VT fuze averaged about 25 percent of the total rounds fired for all calibers.



Later development of variable artillery VT fuze.

Prisoners of War indicated that the use of the VT fuze, especially at night, was effective in not only killing personnel but also in demoralizing troop units.

The first documented malfunction of a VT fuze in combat, injuring a US Redleg occurred near Pompey, France, on 1 March 1945. Battery A, 39th Field Artillery, firing 105-mm howitzers, had one man injured during an apparent muzzle burst. Explosive Ordnance Disposal Teams investigated the incident, but the use of VT fuzes was not suspended because of the incident. The 39th FA praised the fuze for its effects and continued to use it heavily, as did many Field Artillery units.



Future artillery VT fuzes.

Thus from these early wartime development and research efforts, the modern family of VT fuzes has emerged. Since the Battle of the Bulge, extensive research and development continues today to make the VT fuze a more reliable and effective option for the fire support coordinator in providing timely and accurate fires in support of the combined arms team.

CPT Larry D. Gahagan is assigned to the Career Branch, Gunnery Department, US Army Field Artillery School.

REDLEG NEWSLETTER

EM options for review of official military file

Soldiers who wish to review their official military personnel file (OMPF) may do so by personal visit to the Enlisted Records and Evaluation Center (EREC), Fort Benjamin Harrison, IN, or at home station free of charge.

Individuals opting to visit EREC should, to avoid delays, make an appointment at least five working days beforehand by calling the center's 24-hour inquiry service at AUTOVON 699-2657 or commercial (317) 542-2657.

Those who want to review their official files at home station can obtain a copy by writing: Commander, USAEREC, ATTN: PCRE-RF-I, Fort Benjamin Harrison, 46249. The request must include the soldier's full name, signature, social security number, and address to which the file is to be mailed. Officials said the OMPF copy normally is mailed within 15 days after the request is received.

A soldier's official file may be updated with authorized material during a visit or by mailing items to: Commander, USAEREC, ATTN: PCRE-FR-S, Fort Benjamin Harrison, IN, 46249. Only documents authorized for filing in the OMPF by AL 640-10 will be microfilmed. Documents not authorized for file will not be accepted. Local personnel officers can help determine what items are authorized for inclusion in the official file.

Level 2 ARTEP scrapped

As a result of a recent Department of the Army decision to go with a single level ARTEP, all Active Army and Reserve Component units are now expected to train to a single standard. After 10 October this year, Level 2 requirements in Army Training and Evaluation Programs will no longer be published. According to DA training officials this decision was bolstered by all major Army commands (MACOMS) and represents a major effort to provide only one standard for combat.

Local commanders of Reserve Component units which are short personnel, equipment, or funding to train to the Level 1 standards should report shortages and tasks affected to their next higher headquarters.

Officer and NCOs may qualify for teaching reserves

Army officers and noncommissioned officers within one year of retirement or who have been retired within the last five years may qualify as instructors in the Army Junior Reserve Officers' Training Corps (AJROTC). Officers through the rank of colonel and noncommissioned officers in ranks from staff sergeant to sergeant major are eligible.

The Army JROTC program, offered at more than 650 high schools throughout the nation, stresses youth citizenship development and provides an opportunity for students to learn the basic elements and requirements for national security and the Army's role in support of national objectives. Instructors teach leadership development, map reading, marksmanship, methods of instruction, and military history. Classroom instruction is augmented by military drill, orientation trips, field trips, mini-summer camps held on Army installations, and orienteering.

Personnel on active duty and retirees may obtain further information concerning pay, working hours, benefits, application etc., by calling the nearest Reserve Officers' Training Corps Region headquarters.

Regulation changes affect reenlistment

Soldiers who fail their Skill Qualification Test (SQT) may still be eligible to reenlist under a change to the Army reenlistment program.

An interim change to AR 601-280, effective 15 January 1980, allows a soldier's commander to certify that the individual is "qualified for continued Army service." Previously, a waiver was required for those soldiers to reenlist.

A second change to the regulation includes permission for the General Court-Martial (GCM) Authority to approve a four-year reenlistment period for some soldiers on overseas levy to a long tour area.

Reenlistment-extension criteria for individuals enrolled in the alcohol and drug abuse prevention and control program (ADAPCP) will also be affected by the change.

If a soldier has successfully completed the ADAPCP and is otherwise qualified, he may be allowed to reenlist or extend his enlistment without a waiver under the change. There is no longer a minimum participation time in the follow-up program. Officials said that the local medical authority, along with the unit commander, may determine when an individual has successfully completed the ADAPCP.

Individuals needing additional service time to complete their enrollment in the ADAPCP may be extended for the necessary number of months.

Artillerymen selected for advanced military schooling

The Field Artillery Journal congratulates the following named artillerymen who were recently selected to attend Senior Service/Command and Staff College level schooling during academic year 1980-81:

Senior Service College attendance

LTC Creighton W. Abrams
LTC Robert D. Alhouse
LTC George R. Ax
LTC Joseph W. Bagnerise
LTC Alanso Bartholomew
LTC Roger K. Bean
LTC Jerry L. Bell
LTC Roger L. Bernardi
LTC Arthur F. Bondshu
LTC Joseph D. Britton
LTC Harold L. Briggs
LTC Gary L. Brown
LTC Roger A. Brown
LTC Robert H. Cole
LTC Ronald A. Coleman
LTC Richard O. Cullum
LTC Norvell B. Deatkine
LTC James E. Dewire
LTC David L. Dunham
LTC Rudolph Ehrenberg
LTC James B. Fairchild
LTC Homer J. Gibbs
LTC Michael Gilmartin
LTC Earl S. Greason
LTC Hartmuth Guenther
LTC Jerry C. Harrison
LTC Darryl R. Hawn
LTC David W. Hazen
LTC William L. Heiber
LTC Lynn C. Hooper
LTC Joseph W. Hutchison
LTC Alex J. Johnson
LTC Larence Karjala
LTC James C. Laslie
LTC Gerald R. Lauzon
LTC James F. Lynch
LTC Richard Manupella
LTC James P. McGinnis
LTC Marshal R. McRee
LTC James L. Merchant
LTC Michael Mosbrooker
LTC Milton S. Newberry
LTC Richard R. Noack
LTC Charles S. Nobles
LTC Kenneth G. Norman
LTC Frederick L. Nuffer
LTC Harry S. Ota
LTC Johnson Pennywell
LTC Fred R. Pope
LTC Marko L. Popovich
LTC Robert Rosenkranz
LTC Lee C. Smith Jr.
LTC Rayburn C. Stovall
LTC Donaldson P. Tillar
LTC William B. Ward
LTC Gene R. Wilson
LTC William T. Zaldo

Command and Staff College attendance

MAJ Lawrence J. Adair
MAJ Daniel E. Adams
CPT Terrell Abendroth
MAJ David M. Anderson
MAJ Richard C. Ashley
LTC John C. Baird
CPT Frederick S. Berry
MAJ George J. Blanc
MAJ Larry E. Ball
MAJ Frederick T. Balzer
MAJ Stephen A. Bauman
CPT Leo J. Baxter
CPT Charles S. Beeson
MAJ Clarence L. Belinge
CPT Robert C. Kuhn
MAJ Warren S. Lacy
CPT John T. Bolger
MAJ James B. Briggs
CPT Robert C. Brand
MAJ David E. Bronner
MAJ Philip R. Butler
MAJ Thomas B. Cameron
MAJ Phillip Childress
CPT Dennis C. Cline
MAJ Julius E. Coats
MAJ Kent L. Confer
MAJ James T. Cook
MAJ Tommy W. Cookson
MAJ Joseph M. Cummings
CPT William F. Daly
MAJ Philip J. David
CPT Ronald G. Davidson
MAJ Samuel E. Denton
CPT George J. Dotsey
MAJ James T. Dowdy
MAJ Orin A. Durham
CPT Kermit Edney Jr.
MAJ James E. Elliott
CPT Joseph W. Eszes
MAJ James P. Evans
MAJ Michael K. Evenson
CPT Norviel R. Eyrich
MAJ Charles Feldmayer
MAJ John M. Feret
CPT Richard M. Frykman
MAJ Evan R. Gaddis
MAJ James J. Gallivan
MAJ Thomas U. Gibbons
CPT Alan S. Gilbreth
CPT John A. Gloriod
CPT Jon R. Goodman
MAJ Landon W. Gore
CPT Maston L. Gray
MAJ Michael A. Green
MAJ William K. Hall
MAJ Kevin T. Hanretta
MAJ Louis J. Hansen
MAJ Everett Hawthorne
CPT Robert J. Henderson
MAJ Herbert M. Hill
MAJ Jeffrey L. Hmara
CPT Thomas R. Hogan
MAJ Gilbert L. Holmes
CPT Roger Hoopengardner
MAJ Billy W. Horn
CPT Terry M. Hulin
MAJ James H. Jackson
CPT Robert A. Janzen
MAJ Clyde W. Johnson
MAJ George B. Jones
MAJ George Kellenbenz
CPT Edward M. Kelly
MAJ Lester A. Kelly
MAJ Robert F. Kemp
CPT Michael A. King
MAJ Ronald D. Koontz
MAJ Roy E. Korkalo
MAJ David C. Kregar
MAJ Robert A. Kromer
CPT Harlan A. Lawson
MAJ Karl J. Leatham
MAJ Eddie W. Liles
LTC Charles J. Lockwood
MAJ Michael D. Lucas
CPT John A. Macel
MAJ Steven W. Magner
CPT John J. Marcello
MAJ Meredith Mazza
CPT Kenny P. McDaneld
CPT William A. McNutt
CPT John J. Meyers
MAJ Phillip L. Michaud
MAJ Francis C. Moen
MAJ Gary L. Moon
MAJ Brian J. Mulligan
MAJ Samuel L. Murphey
MAJ Edwin M. Nakasone
MAJ Donald A. Nemetz
MAJ George E. Newman
MAJ Dean H. Nichols
CPT Michael D. O'Brien
MAJ Robert W. Oslin
MAJ Kenneth A. Owen
CPT Stephen B. Peth
MAJ Daniel J. Petrosky
MAJ Richard A. Phalan
MAJ Ray E. Porter
CPT Stephen L. Rapier
CPT Robert N. Rawles
MAJ Ralph G. Reece
MAJ Phillip K. Reinaas
MAJ Terry L. Riddle
CPT Ronald R. Rollison
CPT James W. Roy
MAJ William K. Rudewick
MAJ Carl A. Schott
CPT David K. Schottel
MAJ James E. Shane
CPT Richard W. Sherwood
CPT Christopher Shoemaker
CPT David O. Smith
MAJ John S. Smith
MAJ John D. Spengler
MAJ James R. Staats
CPT John G. Stapler
MAJ Charlie Tamez Jr.
MAJ Kenneth W. Teasdale
MAJ Robert L. Testerman
MAJ Ellis D. Thornton
CPT Robert E. Townsend
MAJ Albert H. Voegeli
MAJ Alan H. Walter
MAJ Michael L. Warner
MAJ Abel White
MAJ Duane E. Williams
MAJ John J. Williams
MAJ Carl F. Witschonke
MAJ Marvin Wooten Jr.
CPT Joe R. Worley
MAJ Paul M. Yaksic

Notes For Reserve Officers

The following notes have been provided by the US Army Reserve Components Personnel and Administration Center (RCPAC) for the information and assistance of USAR officers.

The PMO

The principal duties and responsibilities of your Personnel Management Officer (PMO) are as follows:

- Manages the careers of approximately 1,200 unit and nonunit Reserve officers.
- Formulates, supervises, and executes personnel plans, policies, and procedures for USAR officers not on extended active duty.
- Plans, coordinates, and completes assignments based on requirements of the service and career needs and personal desires of the individual.
- Reviews and maintains the Career Management File (CMF) and updates Officer Record Briefs.
- Determines the desires of the officer through questionnaires, telephone conversations, and counseling sessions.
- Monitors the professional growth of each officer and makes recommendations for future professional development.
- Monitors officer selection and nonselection for promotion.
- Participates in special studies and task forces related to assignment matters.

Nonparticipation letters

Individual Ready Reserve (IRR) officers who do not earn the minimum number of participation points required for a satisfactory year receive a nonparticipation letter, in addition to their annual points statement. If you receive one of these computerized letters, you *must* provide an answer. If you do not answer the letter, by law, US Army Reserve Components Personnel and Administration Center must discharge you.

Attached to each letter are phone numbers instructing you how to contact your Personnel Management Officer (PMO). If you do not fully understand your options or if you desire career guidance, please contact your PMO and ANSWER THE LETTER.

MOBDES assignments

Mobilization designation (MOBDES) annual training will receive priority consideration in FY80 and is, therefore, the best insurance that an officer (especially field grade) will receive a tour of duty this year. Due to promotions, program expansion, and reassignments, vacancy lists are published frequently. Contact your Personnel Management Officer (PMO) for further information.

Guardsmen can apply for CGSC and OCS

Applications are now being accepted from Army National Guardsmen wishing to attend the Reserve Component Command and General Staff College (CGSC) or the Officer Candidate School (OCS) Reserve Component course later this year.

National Guard applications for the Reserve Component CGSC (to be held 3 August through 19 December 1980) should be mailed by 30 April to the Army National Guard Military Education Branch, ARNG Operating Activity Center, Building E4430, Edgewood Area, Aberdeen Proving Ground, MD 21010.

Applications for OCS (18 September through 25 November 1980) attendance should be mailed to the Military Education Branch at the above address by 1 July. Commanders should thoroughly screen all NG OCS applicants to make sure they can meet the course prerequisites.

According to the National Guard Bureau, CGSC applications will be accepted only from captains and majors with at least eight years' commissioned service who have successfully completed their branch advanced course. Applicants must include a recent photograph of themselves in a Class A uniform without cap and must also meet the height and weight standards in NGR 600-0.

Involuntary recruiting duty

Approximately 1,000 soldiers will be selected for involuntary recruiting duty by the end of this month (March 1980) to help meet FY80 recruiting goals.

Last fiscal year, when more recruiters were needed than were volunteering, a test was conducted of involuntary assignments for about 500 noncommissioned officers. Most of these soldiers were selected from CONUS posts.

The program is now being expanded to overseas commands and will involve shorter tour lengths for some individuals.

Soldiers will be selected using the following guidelines:

- Whenever possible, individuals will be assigned to recruiting duty upon completion of an overseas tour.
- Some soldiers serving overseas in long tour areas may experience tour cuts up to one year.
- The Department of the Army will try to avoid cutting tour lengths in short tour areas.
- Soldiers in Space Imbalanced MOSs (SIMOS) will not have tour lengths shortened for recruiting duty.

Currently, soldiers in the following MOSs will *not* be selected: 05H, 11H, *13F,* 16R, 27F, 31E, 31S, 35M, 45K, 97B, and 98C. This list will be reviewed and changed if necessary.

Officer Separation Rules

Officers who desire to leave the Army after notification of reassignment have 30 days from receipt of the alert notice to resign or retire.

To be eligible for separation, an officer must not have existing service obligations, such as those incurred as a result of participation in certain education and training programs.

Only career managers at the US Army Military Personnel Center's (MILPERCEN) Officer Personnel Management Directorate (OPMD) can make commitments to officers regarding service obligations. Individual officers and local personnel offices can verify the existence of service obligations by contacting the personnel actions section of the appropriate career management division within OPMD.

According to MILPERCEN any one of the following actions constitutes "initial alert" for reassignment:

- A firm "where and when" assignment notification from a MILPERCEN career manager to an officer during an interview.
- Telephonic or written communications from a MILPERCEN career manager to an officer with a firm "where and when" assignment notification, as documented in the Career Management Individual File maintained by OPMD.
- Receipt of a copy of the request for orders (RFO) generated by MILPERCEN.

Application deadline for West Point Prep School

Eligible attendess for the US Military Academy Preparatory School (USMAPS), Fort Monmouth, NJ, are reminded that all applications for Class 1980-81, which begins in August this year, must be turned in prior to May 1. To qualify for selection, soldiers must:

- Be 21 years of age or younger as of 1 July 1980.
- Be a US citizen or become one before entering the US Military Academy at West Point.
- Be single with no legal obligation for child support.
- Not have a criminal record.
- Have graduated from high school, or equivalent, with emphasis on college preparatory study.

Interested individuals who have not taken a Scholastic Aptitude Test (SAT) are encouraged to check with their local education center.

Army Regulation 351-12, "Nomination to the United States Military Academy, Enlisted Categories-Army," outlines in detail application procedures for USMAPS which should be noted are the same for Active Duty and/or Reserve Component personnel. Additionally, information can be obtained by calling the USMAPS Admission Office at AUTOVON 992-1807 or commercial (201) 532-1808 or by writing the Commandant, US Military Academy Preparatory School, ATTN: MAPS-AD-A, Fort Monmouth, NJ 07703.

Your "Redleg Hotline" is waiting around the clock to answer your questions or provide advice on problems. Call AUTOVON 639-4020 or commercial (405) 351-4020. Calls will be electronically recorded 24 hours a day and queries referred to the appropriate department for a quick response. Be sure to give name, rank, unit address, and telephone number.

Countering The Soviet To Field Artillery

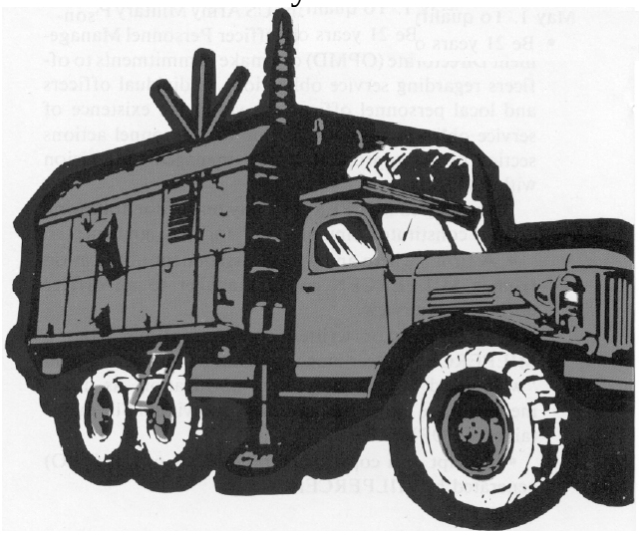
by CPT Mark O. Oetken

In view of current and projected Soviet electronic warfare (EW) capabilities, it is by no means certain that our Field Artillery units will be able to effectively communicate in a prohibitive EW environment. That the Soviets place tremendous significance on the use of electronic warfare is readily apparent in their establishment of an "all forces" radioelectronic combat (REC) doctrine. This article will explore the extent of the Soviet REC threat, its impact upon US Field Artillery communications, and the means that will allow us to combat this opposition.

Radioelectronic combat requires the integration of EW and combat firepower to neutralize all C^3 (command, control, and communication) capabilities. Here the Soviets expect to disrupt 50 to 60 percent of our command and control facilities through concurrent application of EW and traditional fire support means. In his book *Soviet Military Strategy,* Marshal V. D. Sokolovsky writes ". . . the development of radioelectronic devices has now acquired the same important significance as the development of nuclear rocket weapons . . . ." He then discusses in detail just how EW can accomplish its assigned goals.

> *One of the main missions of such warfare is to disrupt the direction and control of troops and weapons by active radio interference and destruction of the enemy's most important radiotechnical systems and installations. This involves: destruction or jamming of the electronic fuzes of bombs and missiles by radiation; interception of radio signals and creation of interference in the radioelectronic equipment of enemy airplanes and missiles; interdiction of enemy use of radioelectronic equipment for aerial reconnaissance, navigation, bombing, and guiding of missiles in flight; and the disruption of the working of the enemy's ground radioelectronic means used for directing troops.*

To support their REC doctrine, the Soviets and their Warsaw Pact allies in the past decade have increased by more than 70 percent the number of radars deployed in Eastern Europe. When this increase is correlated into specific figures, the electronic order of battle is approximated as follows:



- 1000—ground based radar jammers.
- 1200—communications jammers.
- 250—dedicated EW aircraft.
- 195—helicopter communications jamming systems.

Their use of this vast array of technical equipment in conjunction with documented REC doctrine indicates a clear willingness and readiness of Soviet forces to initiate significant EW. Perhaps the best example of this resolve was demonstrated in 1968 just prior to the Warsaw Pact invasion of Czechoslovakia. Utilizing chaff and barrage jamming techniques, the Soviets created a vast electronic blanket along the border between Czechoslovakia and Western Europe. The movements of large-scale forces and troops airlifts were masked from NATO surveillance nets, resulting in a "surprise" invasion. The EW capability possessed by the Soviets represents a real and potent weapon that poses a clear threat to US forces, particularly to our command, control, and communications. The communications aspect of the EW threat and its impact upon the Field Artillery will now be examined.

US Field Artillery is particularly vulnerable to the Soviet EW threat because of our nearly total reliance upon radio communications for mission accomplishment.

EW Threat Communications

Only in the most static situations will FA units have the luxury of communications over wire nets; therefore, artillery units pose most lucrative EW targets. The Soviets will use radar jammers to hinder our radar capabilities; communications jammers to disable our command, control, and coordination efforts; and radio direction finders (RDFs) to locate and eventually destroy each respective type of emitter. To be sure, the Soviets have the capability of locating radiating electromagnetic command and control sources within 30 seconds to the following accuracy:

Acquired Distance	Location Accuracy
60,000 meters	1,000 meters
30,000 meters	500 meters
15,000 meters	250 meters

How then can an artillery unit best cope with this type of threat? There is no single answer, but rather a series of existing steps which when properly utilized can significantly degrade the capabilities of Soviet EW equipment. These steps are generalized under two categories:

• Operator techniques—measures the radio/radar operator can initiate to reduce EW vulnerabilities.

• Technical techniques—equipments that are available to physically degrade the EW threat.

Operator techniques provide the most common electromagnetic counter-countermeasures (ECCM). These techniques consist of specifically prescribed actions that artillery communicators should initiate in an EW environment. The general principles are outlined below.

• **COSMEC** (communications security) measures. Change frequencies and call signs daily, and use abbreviated call signs and brevity lists. Use radio checks sparingly, and operate in low power until jamming is experienced and only then switch to high power. Proper COMSEC usage sharply reduces the chances of developing a characteristic unit signature.

• **EMCON** (emission control). Limit the use of radios and impose radio listening silence whenever possible. Remove recurring reports and statistical updates from FM nets and direct normal logistical traffic to alternate means. Plan well ahead to reduce communications requirements. Operate a free (as opposed to a directed) net to reduce communications requirements and when transmitting, use rapid burst transmissions. Unquestionably, our most severe problem today is EMCON, or excessive talking, as evidenced in figure 1.

• **Antennas.** Use expedient/directional antennas in conjunction with terrain masking and shielding to reduce vulnerabilities, and decoy antennas to confuse the enemy. Of all the operator ECCM techniques, the employment of various antenna arrays provides the greatest flexibility and most options. Therefore, the use of antennas to counter EW will be discussed later in more detail.

• **Frequencies.** Use the entire available band of frequencies but assign more critical nets to the highest available frequencies (higher frequencies are more difficult to jam and pose a special problem to RDFs).

• **Transmitters.** Remote transmitters whenever possible. Transmitters must be remoted a minimum of one kilometer for this technique to be effective.

• **Alternate means.** Use alternate communications assets to include motor courier, land lines, pyrotechnics, and hand and arm signals.

• **MIJI.** Use the MIJI (meaconing, intrusion, jamming, and interference) report to notify higher headquarters whenever EW is suspected.

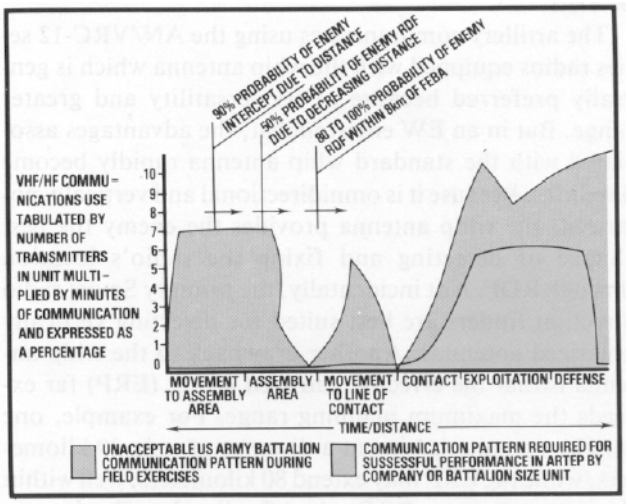


Figure 1. VHF/HF communication performance required for successful ARTEP versus previous historical performances.

Other ECCM techniques are available to include numerous kinds of electronic deception, but these are generally beyond the means of the artillery radiotelephone operator (RTO). However, with a little imagination there are other ways to conduct artillery business in an intense electromagnetic environment as clearly demonstrated by the 1st Battalion, 10th Marines, at Camp Lejeune, NC.

In an effort to deliver responsive and accurate artillery support on the EW battlefield, the Marines devised a system, called "Quick Death," that allowed the observer (in this case an aerial observer) to call for and adjust artillery fire without radios. The aerial observer, piloting an OV-10a aircraft, used 12-by 12-inch flash cards (black letters on a white background) to relay his call for fire and subsequent adjustments. The initial call for fire was determined, written on a card, and then dropped by the aerial observer either directly to the fire direction center (FDC) or to a remote ground observer position. For subsequent rounds, the aerial observer merely used one of 12 standard corrections pre-recorded on a flash card and flew over the remote ground observer's position displaying the correct adjustment. The system proved to be quite successful with only a moderate loss in responsiveness. At standoff distances up to 300 meters, the ground observer was capable of reading the flash cards at altitudes up to 500 feet and at airspeeds up to 200 knots with the naked eye. Such a system has many possible adaptations and demonstrates that just a little imagination can neutralize a significant EW threat.

The EW threat can not only be neutralized by the application of various operator techniques, but also by the imaginative use of equipment that is readily available in unit inventories. In particular, sound knowledge of antenna systems will provide the artillery communicator numerous means of operating through electromagnetic barriers.

The artillery communicates using the AN/VRC-12 series radios equipped with the whip antenna which is generally preferred because of its versatility and greater range. But in an EW environment, the advantages associated with the standard whip antenna rapidly become liabilities. Because it is omnidirectional and vertically polarized, the whip antenna provides the enemy the best chance of detecting and fixing the radio's location through RDF. Not incidentally, the primary Soviet radio direction finders are best suited for detecting vertically polarized antennas. Another drawback to the whip antenna is that the effective radiated power (ERP) far exceeds the maximum planning range. For example, one may be communicating at a distance of only 20 kilometers, while the ERP may extend 80 kilometers, well within the range of enemy RDFs. And finally, the effectiveness of a vertically polarized antenna depends on the surrounding terrain. Shifts in the antenna location of only a few meters can substantially reduce the received signal strength.

A simple way to reduce these vulnerabilities is to horizontally polarize antennas which makes it more difficult for an RDF to locate and reduces the ERP of the radio. Further, in densely wooded terrain, a horizontally polarized antenna actually provides better communications than its vertically polarized counterpart. For AN/VRC-12 series radios, the conversion to the horizontal mode is most easily accomplished by simply bending the whip antenna downward and pointing the antenna tip in the direction of the desired receiver. With the AN/PRC-77, this technique can be further modified by carrying the radio upside down and keeping the antenna tip about one foot above the ground. In terms of the overall communications scenario, it is best to use both vertically and horizontally polarized antennas to compound the enemy's RDF difficulties. The primary drawback is that transmitting and receiving stations must operate with identical antenna polarization to communicate, obviously requiring thorough prior coordination.

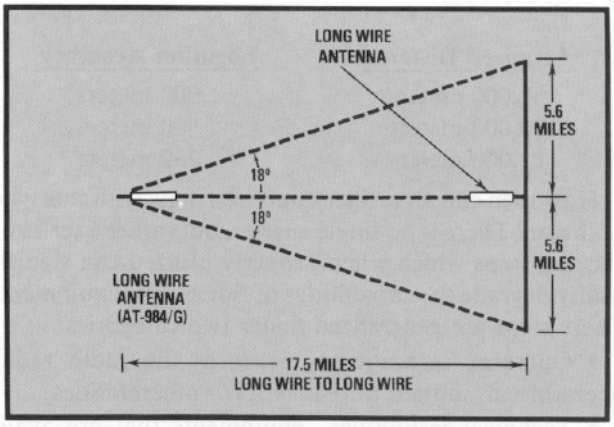


Figure 2. Type field expedient directional antenna.

Field expedient directional antennas are another means of combating the EW threat. The long wire antenna AT-984A/G used with the AN/PRC-77 is an excellent example of what can be done with little more than normal antenna wire (figure 2). Similarly, a V-antenna (figure 3A) provides excellent unidirectional transmission capability as shown in figure 3B.

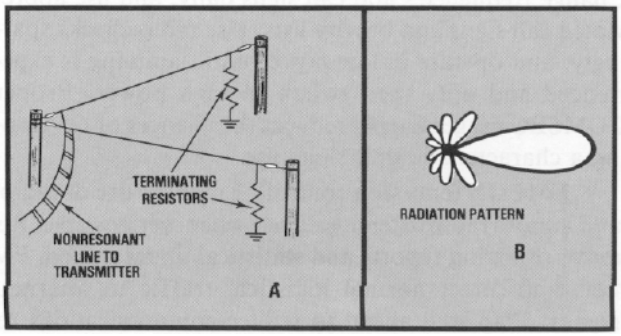


Figure 3. Type field expedient V-antenna.

There are innumerable easily constructed antennas that can improve communication capabilities. With adequate foresight, appropriate antennas can be prefabricated and carried with the unit on a permanent basis. Thus equipped, the artillery will be considerably more capable of accomplishing its supporting mission.

The future will see the introduction of several new ECCM hardware systems to the Field Artillery. The SNAP-1 or steerable null antenna processor (CP-1830/VRC) should be the first of these systems. Compatible with all AN/VRC-12 series radios, the SNAP-1 functions by pointing a spectral null (attenuator) in the direction of interference. This effectively degrades a strong interfering signal to a level below the desired weaker signal as depicted in figure 4. The principle characteristics of the SNAP-1 are as follows.

- SNAP-1 operation is automatic and it functions in both stationary and mobile modes.
- It can discriminate between friendly communications signals and undesired interference.
- It has no electronic signature, and it uses standard antennas and installation hardware.

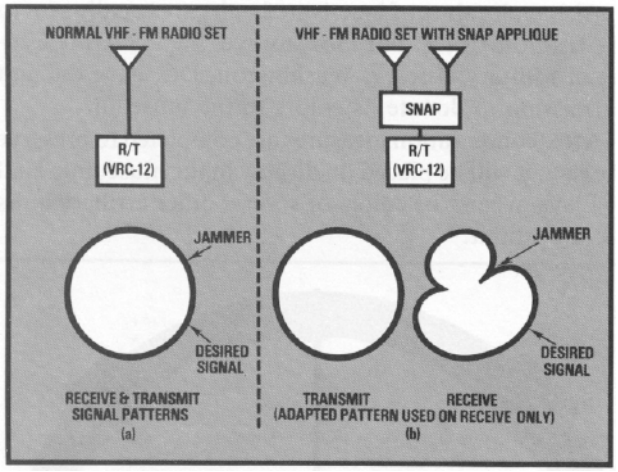


Figure 4. The SNAP-1 antenna processor degrades a strong interfering signal to the desired weaker signal.

The only apparent liabilities of the SNAP-1 are its requirements for a second antenna, additional space, and DC power needs. A schematic showing the hookup of SNAP-1 is in figure 5.

One of the more promising future communications systems with outstanding ECCM characteristics involves the use of fiber-optic cable. Such a system would utilize dielectric fibers to guide optical energy modulated with information for distances to 60 kilometers. The advantages associated with the fiber-optic cable currently being considered as a replacement for the multichannel system are numerous. It will eliminate recurrent electrical or short circuit problems and reduce the total system power consumption. Furthermore, fiber-optics will greatly increase

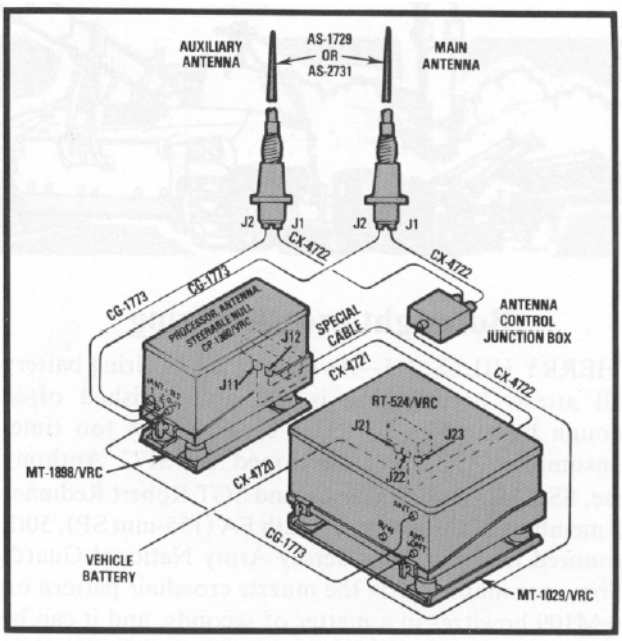


Figure 5. Hookup of the SNAP-1.

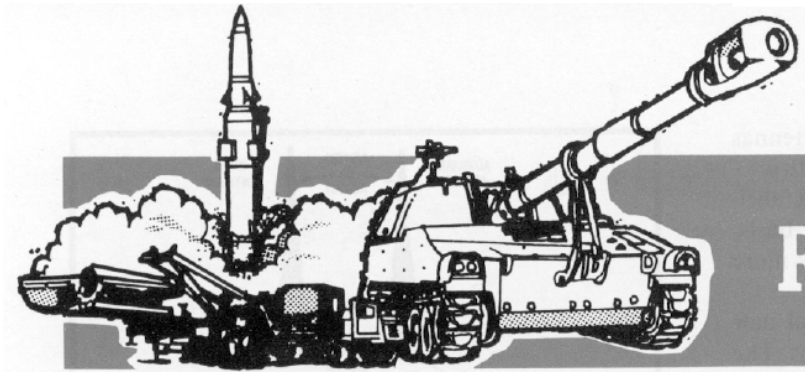
our communications system's reliability and maintainability. Other associated benefits of fiber-optic cable are its larger information transfer capacity and inherent design benefits in labor, shipping, and handling.

One final ECCM system being developed is the unattended/expendable or U/E ECCM system. It is unique in that it is offensive rather than defensive in nature and is employed on the enemy's side of the battlefield. Consisting of numerous small battery-operated jammers, the system would be air or artillery delivered into the enemy area of operations and activated on signal. Due to its small size and reduced power requirements, the U/E ECCM would be difficult to locate and would not cause mutual interference with friendly radios. Once fully developed, U/E ECCM should provide the artillery good EW defense.

The systems described in this article represent only a few of the promising ECCM that are being developed to counter the enemy EW threat. For example, developments currently underway such as the remotely piloted vehicle (RPV) barrage jammer and the laser target designator jammer may revolutionize EW in the near future.

In summary, the EW threat facing the Field Artillery is real and menacing. Fortunately, materiel is being developed to improve this situation. If a major battle were fought today, our radio communicators would be forced to rely almost entirely on operator techniques and field expedient measures to function in an intense, hostile electromagnetic environment.

CPT Mark O. Oetken is assigned to the 1st Battalion, 29th Field Artillery, Fort Carson, CO.



Right by Piece

Boresight crosshair ring

CHERRY HILLS, NJ—As most chiefs of firing battery will attest, boresighting is not accomplished often enough by artillery batteries because it is too time-consuming. A device, developed by SFC Anthony gese, SSG Maynard Pinkham, and SGT Robert Redman, all members of C Battery, 1-112th FA (155-mm SP), 50th Armored Division, New Jersey Army National Guard, allows one man to affix the muzzle crosshair pattern on an M109 howitzer in a matter of seconds, and it can be modified to fit any artillery weapon. The ring is placed on the end of the tube and is aligned with the witness marks by notches etched on the outside of the ring. The wires go toward the tube. The time saved by using the ring releases one man for other duties while the weapon is being boresighted.

The ring was used during Annual Training at Fort Drum, NY, by C Battery and proved its usefulness in a field environment. For further information, contact SFC Anthony C. Saggese at C Battery, 1-112th Fa, Cherry Hill Armory, Grove Road and Park Boulevard, Cherry Hill, NJ 08002.

18th FA gives colors to Sill

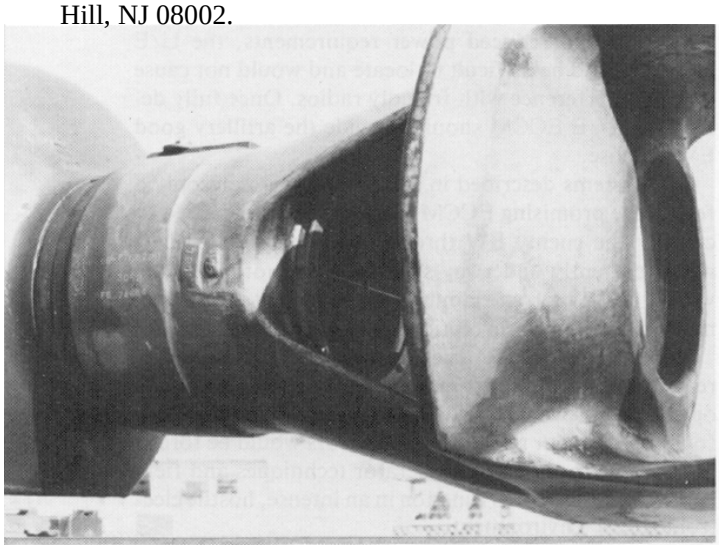
FORT BRAGG, NC—The colors of Headquarters and Headquarters Battery, XVIII Airborne Corps Artillery, have been donated to the Fort Sill Museum.

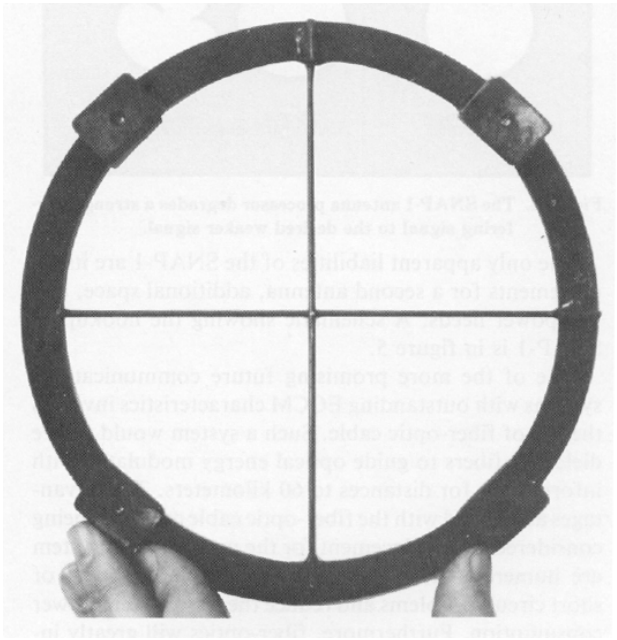
COL Joseph L. Nagel, commander of the 18th Field Artillery Brigade (Airborne), Fort Bragg, NC, presented the colors to Herbert C. Morrow, museum director.

In September 1978, Headquarters and Headquarters Battery, XVIII Airborne Corps Artillery, was reorganized and redesignated as Headquarters and Headquarters Battery, 18th Field Artillery Brigade (Airborne). In 1979 the unit was authorized new colors by the US Army Institute of Heraldry.

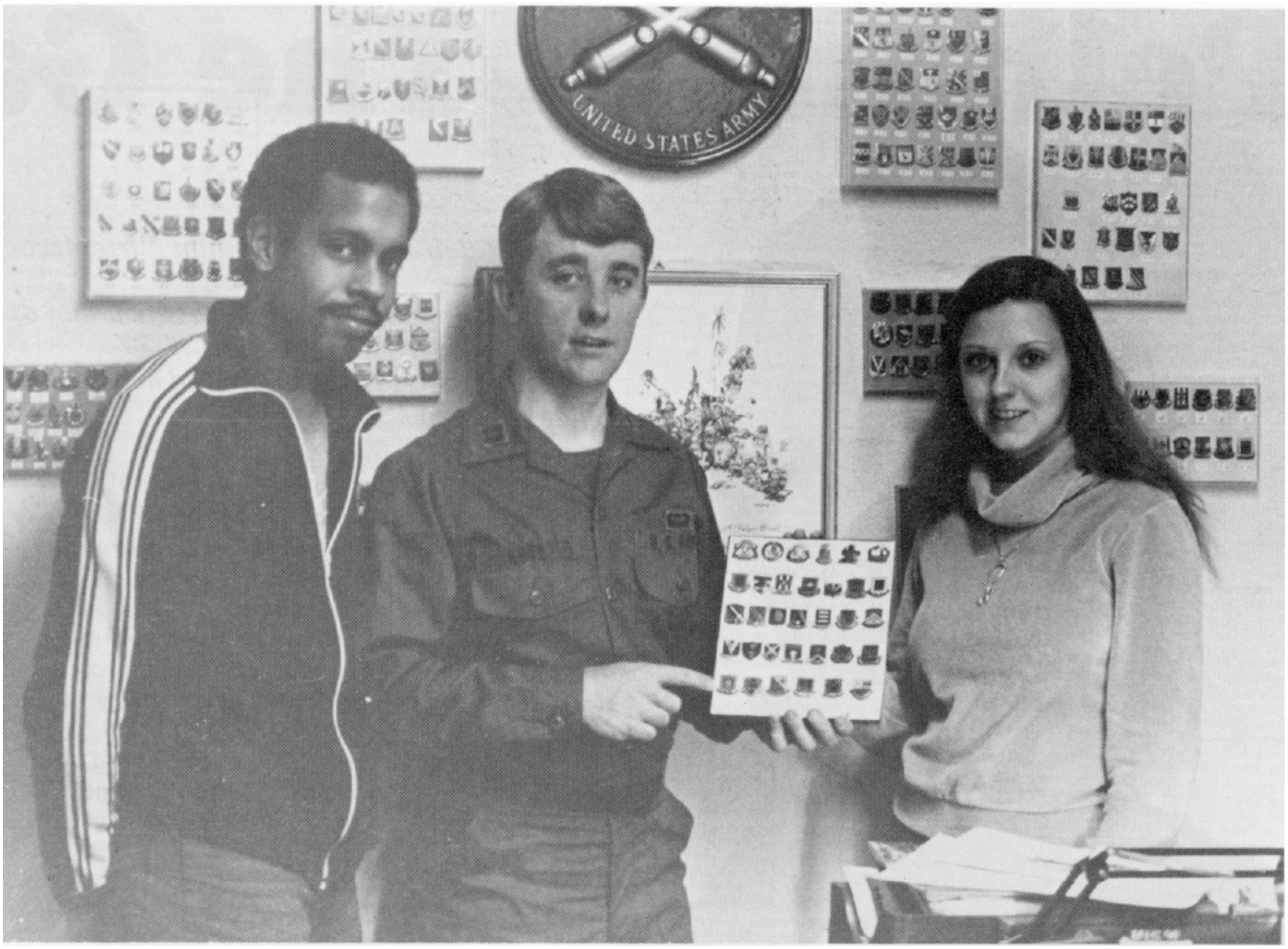
Although colors of inactivated units are usually sent to the Institute of Heraldry for storage, the US Army Center of Military History, Washington, DC, gave the unit permission to donate its colors to the museum.

After conservation measures are completed to preserve the flag, it will be placed on display in the museum's Hall of Flags, where the colors of several other artillery units are on exhibit.





The boresight crosshair ring (right) is affixed to the tube of an M109 howitzer as shown above. The ring can be modified to fit any artillery weapon.



PHILADELPHIA, PA—La Salle College ROTC Advanced Course cadets Roland Finger (left) and Maria Bezubic (right) assist instructor CPT Stephen Lutz in adding the distinctive insignias (unit crests) of the 41st Field Artillery, 56th Air Defense Artillery, and 1st Division Artillery to the School's collection. Advanced ROTC students at the Field Artillery branch-oriented ROTC school are required to take the three-credit Artillery course taught by Captain Lutz, which includes 40 hours of instruction on duties of the FIST, firing battery, and the fire direction center (FDC). Additionally, training and field firing have been conducted with the New Jersey (1-112th FA) and Pennsylvania (1-108th FA) National Guards. As a part of the Artillery course, Captain Lutz required all students to write the history of an Active, Reserve, or National Guard unit. These histories have been compiled into a library for future use. Until the ROTC department can build their own collection, Captain Lutz has donated the use of his personal collection of over 300 Artillery unit crests. In the last two years, some 60 plus Army artillery units have donated crests and histories to the La Salle College collection. La Salle College is very proud of its collections and also the fact that it and Virginia Military Institute (VMI) are the only two remaining Field Artillery branch-oriented ROTC detachments.

Personnel awards for the 2-37th FA

FORT SILL, OK—Fort Sill's 2d Battalion of the 37th Field Artillery recently received two personnel recognition awards: A 2-37th FA private was selected as the December Soldier of the Month and a sergeant was named Post Noncommissioned Officer of the Quarter.

PFC Richard Ecie, artillery mechanic and special weapons chief, was singled out as Fort Sill's top junior enlisted soldier in December. SGT Charles L. Sharp Jr., who received the noncommissioned officer (NCO) award, is a howitzer section chief.

Sharp is a native of Melbourne, FL, while Ecie entered the Army at Lincoln Park, MI.

Sharp said he plans to make the Army a career and wants to become either a warrant officer in military intelligence, a commissioned officer in Field Artillery, or simply "go as high as I possibly can." Although undecided about his future Army career, Ecie said his main goal is to get his Specialist 4 rating and to perhaps work as an instructor at the Artillery Training Center.

"I feel I would be an asset as an instructor," he said. "I work mainly on the guns. I keep them shooting."

Pelham — The Gal

General Jeb Stuart called him "irreplaceable."
General Stonewall Jackson classified him as "incomparable."
General Robert E. Lee described him as "the gallant Pelham."

The individual so depicted and honored was Major John Pelham, Commander of Stuart's Horse Artillery, Confederate States of America.

Of Pelham, General Stuart wrote: "I loved him as a brother; he was so noble, so chivalrous, so pure in heart, so beloved." Easily he might have added: "So courageous, so efficient as an artilleryman, so responsive to the sound of battle."

At age 24, having already achieved the rank of major, Pelham fell mortally wounded after just one and a half years of successful and heroic handling of guns in battle.

by COL (Ret) Robert M. Stegmaier

lant Artilleryman

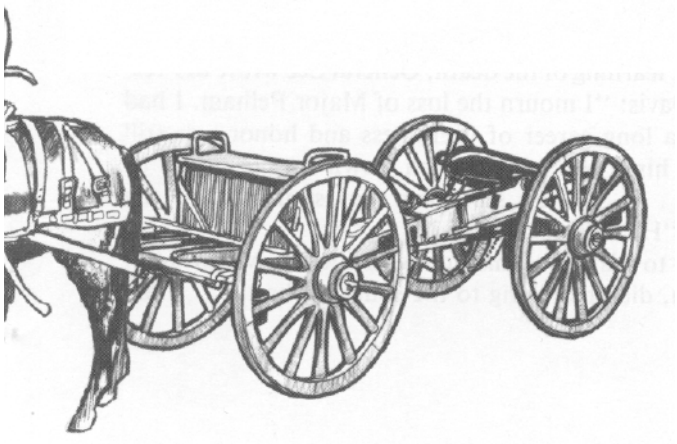
Like many Confederate young men, Pelham volunteered his services at age 22. Assigned as drill master of Captain Ephraim Alburtis' battery, he became a member of Jeb Stuart's cavalry and of the Army of the Shenandoah under command of that great artilleryman of the Mexican War—Stonewall Jackson.

Pelham's objective was to impress these two great combat officers with the outstanding quality of his battery crew which he hoped to accomplish by transforming raw recruits into disciplined gunnery teams. He stressed mobility of his guns, speed in limbering and unlimbering, and rapidity and accuracy of fire.

From the very beginning of training, Pelham's zeal and demand for perfection caught the attention of General Stuart; however, as ever battle had to be the test of metal and mettle.

Pelham's opportunity in combat came in the first battle of Bull Run. Assigned in that conflict to guard Jackson's right flank from enfilading Union attackers, Pelham effectively carried out the mission. When ordered to retire a short distance from his exposed position, he, beginning his retrograde movement, detected the approach of Sherman's division against the unprotected flank. Without hesitation he halted his guns, unlimbered, and held off the threat with artillery fire until infantry support came to his aid.

In reward for his outstanding training of his crew and for impressive success in battle, Pelham was promoted to captain. More rewarding however was his transfer to Stuart's personal command as commander of a mobile artillery unit to be known and famed as the Stuart Horse Artillery.



What the young captain then had to accomplish was to resurrect the esprit of the "flying battery" of the Mexican War and to increase its mobility to "keep up" with the cavalry. General Stuart, often watching the precise drill of the Horse Artillery, was impressed with the highly efficient expertise of his new organization.

In the Peninsular campaign at Williamsburg, when Stuart's troopers were hit hard by General Stoneman's Federal horsemen, Stuart ordered Pelham to the front. The latter, having heard the sound of battle, had already responded, and his fire stopped the Union advance. Stoneman then ordered up his batteries, but Pelham more than held his own against the heavier enemy barrage by firing his guns in sequence, thus maintaining a steady stream of canister.

For his performance of duty at Williamsburg, he received the following accolade of praise from General Stuart: "I consider the most brilliant feat of the battle to have been a dash of the Stuart Horse Artillery to the front. Coming suddenly under a galling fire, only 200 yards from the enemy in the woods, they wheeled into action sustaining in the most brilliant manner the fortunes of the day until the infantry could come to their support."

Pelham had received recognition of the great value of the Horse Artillery by Stuart; now recognition by Stonewall Jackson was his next goal. That opportunity came when General Lee ordered Jackson's troops to strike the unprotected right flank of Fitz John Porter's Corps. Stuart's unit was instructed to screen Jackson's movement on the right flank. Heavy woods slowed down the advance, and enemy batteries began to zero in on the flanking troops. As Jackson's batteries were too far to the rear, Pelham was assigned the task of neutralizing the guns. Quickly he brought up his 12-pounder Blakely and a Napoleon. The Blakely was disabled almost immediately, but the lone Napoleon engaged the Union guns for two hours. When Jackson inquired how many guns of the Stuart Artillery were engaged, he was surprised to hear: "Captain Pelham now has only one gun in action, but he is fighting like a tiger." Jackson's simple comment was: "Good work."

Pelham continued to impress Stuart with his effectiveness. At White House, his accurately placed shells caused the "Marblehead," a large Union warship, to up anchor and retreat. While at Harrison's Landing, the Horse Artillery actually sank two troop ships. Of these actions, Stuart officially wrote: "Captain John Pelham, of the

Horse Artillery, displayed such signal ability as an artillerist, such heroic example and devotion in danger, and indomitable energy under difficulties in the movement of his battery, that, reluctant as I am at the chance of losing such a valuable limb from the brigade, I feel bound to ask for his promotion, with the remark that in either cavalry or artillery no field grade is too high for his merit and capacity." In response to this recommendation, General Lee added: "Your masterly handling of the Horse Artillery contributed greatly to our recent successes. In recognition of your outstanding services you are to be promoted to the rank of major in the Confederate States Army."

Outright praise from Stonewall Jackson however had not as yet been achieved. In the second battle of Bull Run, the Army of the Shenandoah faced the Iron Brigade of Wisconsin. Neither side gave an inch, and casualties were high. Jackson had to hold until Longstreet's Corps showed. Pelham had one gun disabled and, although ordered to retreat, he refused to abandon the gun—one of his proud boasts was that he never lost a gun to the enemy. Maintaining his exposed position, he continued fire by frequent maneuvering of his one serviceable Blakely. Of this action, Jackson officially reported: "Owing to the difficulty of getting through the woods, I did not have as much of that arm (artillery) as I desired at the opening of the engagement; but that want was met by Major Pelham with the Stuart Horse Artillery, who dashed forward on my right and opened upon the enemy at a moment when his services were much needed." To this Stuart added: "Pelham is always in the right place at the right time."

On the following day, as General Pope posed his Army to crush the Confederate opposition, Pelham received the much sought-after recognition as he was ordered to report directly with his Artillery to Jackson. Showing Pelham the battlefield, Jackson gave him these independent free-wheeling instructions: "When the enemy strikes, I want you to rush the Horse Artillery to the threatened sector and drive him back. I am giving you discretionary orders to employ your guns where and when you deem best." What an honor for a 24-year old to have the freedom to use his own judgment.

This mutual trust was more than justified. When General Hill chose to attack, he requested Pelham's assistance. For two hours, Stuart's Horse Artillery dueled with General Pope's massed batteries, and later, with five guns out of ammunition, Pelham dispatched them to the rear. For 20 minutes he continued the duel with a single gun. When only two rounds remained, Pelham reluctantly retired. When Lee and Longstreet arrived, the tide of battle had changed. That evening, Jackson asked Stuart once again to loan him Pelham's services which Stuart granted. Jackson further added: "Of course you may have him back after the battle. But if you have another Pelham, please give him to me."

In all subsequent battles, Pelham's free-wheeling actions were brilliant. At Antietam, when Rosser's Cavalry and Pelham's guns were surrounded by Union soldiers attempting to stop Lee's trek southward, Pelham proposed to Rosser to fake a frontal attack while his guns attacked the blue-coated ranks to the rear to provide an escape route. The ruse succeeded, and Jackson exclaimed: "It is really extraordinary to find such nerve and genius in a mere boy. With a Pelham on each flank I believe I could whip the world."

At Fredericksburg, General Lee instructed Stuart to ". . . place Pelham and the Horse Artillery where they can break any enemy demonstration against our right flank." In the battle, Pelham personally took a Blakely and a Napoleon to an isolated exposed position from which to enfilade any enemy movement against that flank. With those two guns he stopped the forward advance of three infantry divisions of Franklin's Corps. When the Blakely was damaged, he dueled for one hour against 100 of the enemy's massed guns. Only when his ammunition was expended did he respond to Stuart's order to: ". . . stop firing and withdraw your gun, you crazy gallant Pelham." In his official report General Lee too described the young artillerist as "the gallant Pelham." Even the *London Times* wrote: "No one of an equal age in either army has won an equal reputation."

When Stuart wrote that Pelham, for coolness, courage, ability, and judgment, deserved promotion. General Lee appended his opinion: "No one deserves promotion more than Major Pelham."

His response to the sound of battle regardless of circumstances led to his untimely death. While visiting in Culpeper alone, he heard intense firing along the Rappahannock. Without orders, he mounted and dashed to the sound of battle. As his horse cleared a stone fence, he was toppled by a Union bullet and died.

After learning of the death, General Lee wrote to President Davis: "I mourn the loss of Major Pelham. I had hoped a long career of usefulness and honor was still before him. He was stricken down in the midst of both. . . ." Stuart's statement was short and to the point: "He is irreplaceable."

True to his code, this young artillerist, Major John Pelham, died marching to the sound of battle. 

COL (Ret) Robert M. Stegmaier, a regular contributor to the *Journal,* lives in Sun City, AZ.

With Our Comrades In Arms

2-16th Infantry (Rangers) returns to Big Red One

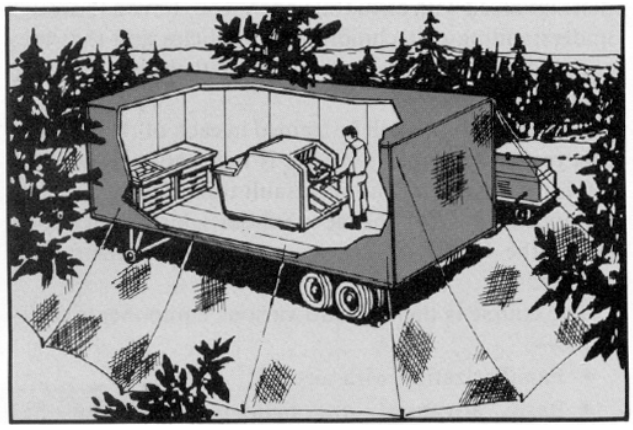
In ceremonies held last December, at Fort Riley, KS, the 2d Battalion, 9th Infantry (THE MANCHUS), formerly assigned to the 2d Infantry Division, Korea, was inactivated and redesignated the 2d Battalion, 16th Infantry (Rangers), thus rejoining the 2-16th with the US 1st Infantry Division.

Color copier may reach battlefield

In the not too distant future, a larger version of the electrostatic color copiers now used in office reproduction may be installed in semitrailer vans of the Army Engineer topographic units that produce maps and battlefield graphics for combat troops.

Researchers at the Army Engineer Topographic Laboratories, Fort Belvoir, VA, are investigating the idea of borrowing the technology used in office copiers and applying it to reproduce large map sheets. This technological innovation now appears to be practical, because a recently developed laser scanner has improved the "dry copying" process, making possible the fine resolution needed for map reproduction.

The need for a faster way of copying topographic map overlays was identified in an official post-war study of World War II map usage. The study revealed that only about 10 percent of the topographic maps available in the European Theater of Operations had been used. Compiled and printed in advance, these maps had become obsolete by the time they were needed for military engagements.



Artist's concept of the Army's Quick Response Multicolor Printer which will be engineered to produce full-color revised maps from an original in one simple step in a single semitrailer van.

The Army's need for quickly reproduced, up-to-date maps is even more acute today, as current battlefield scenarios commonly predict that the first, and possibly decisive, round of a conventional war may be concluded in three days. If a massive offensive is launched without warning, there may not be time for revision and printing of new maps on presses located in the United States or topographic support vans in the field.

Currently, tactical overlays are drawn in color on transparent sheets. The drawback to using transparent overlays with printed maps is that they cannot be quickly duplicated in the field. Each additional copy of the overlay must be redrafted by hand.

A representative of the Topographic Laboratories' project to develop a Quick Response Multicolor Printer described a typical combat situation where such a device could help US forces win battles. "Suppose you are an artillery battalion commander, and you have just learned of a shift in enemy forces. The old lines of deployment are quickly erased from your master overlay, and new lines are drawn in. But what about your battery commanders, who also need this information in graphic form? They need it right away. Using metal plates, colored inks, and a printing press, the job will take at least three to four hours, and by then the tactical picture may have changed completely. An electrostatic printer could do the job in 10 minutes."

The new technique of scanning the color original with a laser beam instead of flash-exposing the entire original with a diffuse light source will give even exposure from center to edges of a 24- by 30-inch map. To use the older method of exposure on such a large sheet would have resulted in a reproduction that was too light in the center and too dark at the edges.

After fabrication and successful testing of prototype models, it is proposed that the Quick Response Multicolor Printer be produced in quantities for use by topographic elements at corps and division headquarters and the engineer topographic battalion at theater army level.

Army receives new aircrew training system

A versatile, highly mobile aviator combat training system recently left the assembly line and entered the US Army inventory. Known as the TRTG (Tactical Radar Threat Generator), the system will add significantly to the Army's ability to train aircrews to survive and win in combat while under heavy antiaircraft fire.

The TRTG resembles a civilian truck-bed camper shell with a three-foot radome mounted on the top. The US Army TRTG is a self-contained, state-of-the-art electronic system. Its emissions are designed to represent electronic impulses of antiaircraft weapons currently in the inventories of many Soviet affiliated countries. The system contains a modified Emerson military aircraft radar, turret, radome, TV display, camera, turret drive, gimbals, electronic system monitoring device, controls, and an integration of electronic equipment. All subsystems are modularly designed and enclosed within a shelter that can be carried on a variety of military vehicles.

Using the TRTG, the Army will now be able to train aircrews to effectively operate against various potentially hostile antiaircraft weapons. The crews will have actively experienced how enemy fire control systems will affect their own aircraft's equipment. Through personal peacetime experience, they will know how to overcome the threat and how to avoid being a combat casualty.

Initially, the TRTG was independently designed and manufactured by the Electronics and Space Division of Emerson Electric Company in St. Louis, MO.

The US Army TRTG system is compatible with the US Army, Navy, and Air Force radar warning devices. Its use will improve joint team aircrew training. (Emerson Electric Company photo)

East Central ROTC trainees board a Chinook helicopter, which took them to Fort Sill, OK, for the weekend as part of a military orientation program. They took part in a series of artillery displays and exhibitions and returned by bus. (Photo by Cadet Tommy Stewart)

New Air Assault School

Necessitated by the high number of organic aircraft and increased airmobile activities, the 25th Infantry Division recently opened a new Air Assault School in Hawaii. Instruction and hands-on training at the School centers on sling-load operations.

According to MAJ E. L. Smith, Chief of the Division's G3 Training Branch, "Junior enlisted soldiers as well as officers will be trained. It is essential that soldiers involved with airmobile operations have a thorough understanding of techniques and policies and that they are confident in the equipment and in their own ability to sling-load properly."

Some 50 soldiers will be trained in each of three classes this year. The five-day course is non-badge producing, but is modeled after the air assault training given at Fort Campbell. Two of the new School's instructors completed the Fort Campbell course and were instructor-certified.

The course is divided into various components to include—

- Familiarization with aircraft — 4 hours.
- Basic, advanced, and helicopter rapelling—5½ hours.
- Pathfinder operations—10 hours.
- Rigging and sling-loading—21½ hours.

XM2 tests termed "highly successful"

Can the XM2 Infantry Fighting Vehicle operate successfully in water? That was the question posed during the last series of tests of the vehicle at Aberdeen Proving Ground (APG), MD. Preliminary results indicate that the answer to this question is yes!

APG's Material Testing Directorate (MTD) conducted the tests, which involved driving the XM2 into the APG Spesutie Narrows waterway. Results were termed "highly satisfactory."

Prototypes of the new XM2 and XM3 Cavalry Fighting Vehicle arrived at APG in June of last year as part of a 10-month developmental test program. Both vehicles are designed to complement the Army's new XM1 main battle tank for the 1980s.

APG received two XM2s and an XM3 from the eight prototypes produced by the FMC Corporation. FMC kept one prototype for developmental testing and the remaining four were sent to Fort Carson, CO, for operational testing.

Some operational testing involving the vehicles' ability to "swim" will be conducted at APG in the future because of the installation's waterways.

During the recent operations, MTD technicians tested the XM2's towing power speed, which was 4.4 miles per hour, and stability and maneuverability in water. They also checked for leaks and the ability of the XM2's bilge pumps to handle water.

Another important phase of the tests was to evaluate the vehicle's "swim curtain," a heavy-duty, vinyl-coated nylon sheet surrounding the top of the vehicle which enables it to displace enough water to remain afloat. The test was conducted with the XM2 at "combat weight," which is about 47,000 pounds.

The Spesutie Narrows are about 10 feet deep at the test site. Since June 1979, MTD has completed safety, tracking and turrent testing on the XM2. The data are reportedly applicable to both vehicles.

Before the vehicles leave APG in April this year, MTD will complete firing accuracy and mobility testing and check other performance capabilities of the three vehicles. Part of that testing will be to accumulate 6,000 road miles on each vehicle and fire 12,000 rounds from each for a reliability, availability, and maintainability assessment.

The XM2 and XM3 are identical in outward appearance and are essentially identical on the inside, except for differences in crew papacity and weapons and ammunition capabilities and storage capacities.

Both vehicles will replace the Army's M113 series of armored personnel carriers, currently used by the mechanized infantry and armored cavalry.

The vehicles feature a 2-man turrent with a 25-mm cannon as the primary weapon that fires both armor-piercing and high-explosive shells, and a 2-missile TOW launcher as the secondary weapon, designed to knock out enemy tanks at ranges over two miles.

The XM2 will be the first US combat vehicle that enables an infantry squad to make a mounted attack. Development of the new system began in November 1976. Both models are expected to be in production by May 1981. Production models are estimated to cost $472,000 each. (Army RD&A Magazine)

Stinger on the way

The Army recently received its first Stinger air defense weapon system from the General Dynamics Corporation of Pomona, CA.

This initial unit and several subsequent rounds will undergo contractor tests at White Sands Missile Range, NM, to insure that production hardware meets Army requirements. Following these tests, the government will fire additional rounds to evaluate missile reliability.

Weighing approximately 35 pounds, the Stinger is an all arms weapon providing immediate air defense against low level aircraft attacking from any direction. It has improved range and maneuverability, significant countermeasures resistance, and a device to identify aircraft.

Stinger—the shoulder-fired plane killer.

Battery Security in the Active Defense:

A Proposal

by COL Joseph L. Nagel and
MAJ(P) Floyd V. Churchill

This material is follow-on to an article by MAJ(P) Floyd V. Churchill (September-October 1979 ***FA Journal****) entitled "Battery Perimeter Defense: The Last Resort" which presented the situation as it exists and attempted to indicate the undesirability of accepting combat in a battery perimeter.—Ed.*

"The traditional close-in defensive perimeter provides insufficient protection against an attack by mechanized or armored forces. The best defense is one which allows the commander sufficient early warning to enable him to make the decision to move away from the threat or to stand and fight."

This excerpt from FM 6-50 (Firing Battery Operations) succinctly states the purpose of this article which is to explore the parameters and criterion of the "best" battery defense concepts and procedures.

Use of the nonstandard term "battery security" in the title instead of "battery defense" was intentional in order to emphasize that maintenance of the firing battery as a viable combat unit encompasses much more than just planning a defensive perimeter. Adequate battery security is a complex process which includes a combination of carefully developed standing operating procedures (SOP), allocation of battery resources and command orientation. This article describes a workable security system based on current Modification Tables of Organization and Equipment (MTOE), continuous 24-hour operation and anticipated manpower and equipment limitations.

The proposed operating techniques for battery security are based on the following assumptions:

- Unit personnel strength is 80 percent or less.
- Selected items of equipment strength is 90 percent or less.
- Battalion utilizes the consolidated (HHB(-) and service battery) trains concept.
- Wire teams with vehicles are attached to line batteries.

Strict enforcement of all aspects of OPSEC (operations security) and adherence to a strong, workable SOP are cornerstones of effective security. A key element in the process is the organization, equipping and deployment of a viable early warning system.

The organization of an adequate (as opposed to an ideal) security system must be based on a keen analysis of the real world limitations imposed on a battery, such as operating at extended distances from other battalion elements, continuous day and night operations and reduced manpower and equipment. In most cases, the realistically achievable maximum number of battery-provided observation posts (OPs)/listening posts (LPs) is limited to five one-man positions at any given time. This modest effort alone requires at least 12 or 13 individuals (given shift rotations in a 24-hour environment) whose primary duty will be security operations. For such a minimum force to provide adequate warning, communication systems must be tied in and coordinated with the early warning systems deployed by other units. This "tie in" is provided by the tactical operations center (TOC) for units in the immediate vicinity and by the fire support officers (FSOs) or liaison officers (LNOs) with deployed maneuver units. Thus, the early warning network includes several layers, the outermost being the surrounding units, augmented with battery OPs/LPs as an inner ring to reinforce the most dangerous avenues of approach or cover areas not otherwise provided adequate surveillance.

Equipment as well as manpower for the OPs/LPs must be austere and realistic. Paradoxically, communications and observation equipment are equally the most critical factors in adequate warning and traditionally the least rigorously thought out and exercised. *Every* OP/LP *must* have either a radio or TA/312-PT telephone, and night observation devices must be provided for high speed approach routes. An OP/LP without real time communications is worse than none at all because it is incapable of accomplishing its mission and a false sense of security is created.

Table 1. Selected rates of advance in meters per minute.

Assigned rate of advance in kilometers per hour	Meters per minute		
	Open terrain	Semi-open terrain	Restricted/night operations
15	250	–	–
12	200	200	–
10	167	167	167
5	84	84	84

Notes: Assigned rates of advance (15, 12, 10, and 5) which appear in the table represent doctrinal approach rates in kilometers per hour as follows:

15—Mounted operations over open terrain.

12—Mounted operations over semi-open terrain.

10—Restricted or night mounted operations.

5—Footborne operations (other than swamp or mountainous terrain).

To determine rates of advance in meters per minute, take the assumed rate of advance in kilometers per hour, multiply by 1,000, and then divide by 60.

Formula: Assumed RA (km/hr) × 1,000 ÷ 60 = RA in meters per minute.

Also, appropriate weaponry must be provided. Since the purpose of these posts is to provide early warning and not repel attacks, each post should have one or two light antitank weapons (LAWs) and the individual soldier's weapon. The LAW's primary function is to slow an approaching enemy's rate of advance to allow more time for the battery to displace and OP/LP personnel a reasonable opportunity to return to the battery. Likewise, OP/LP personnel along the dismounted route carry individual weapons plus several trip flares and claymore mines. As with the LAW, the claymore mine is used to increase the battery's reaction time and allow the OP/LP personnel to displace safely, rather than to cause enemy casualties.

Of equal importance with the equipping and organization of the OPs/LPs is the process of determining where to emplace them. Common sense and limited assets demand that the mounted and dismounted avenues of approach into the battery position be determined and then listed in priority according to potential danger. The avenues of approach are then portrayed graphically to determine which are covered by other artillery or maneuver units. The remaining routes then become the prime candidates for manning, along with reinforcement for those posing the greatest threat. Positions for the OPs/LPs are determined, based on the results of a simple mathematical computation to determine the minimum distance (MD) for deployment which includes the following:

- The rate of advance (RA) of the enemy force over a given route in meters per minute (table 1)
- Time required (in minutes) for the battery to clear the position, or displacement time (DT).
- A "fudge factor," or safety factor (SF) (in minutes) to allow for unforeseen events.

It is possible to take these various elements and develop a simple formula which will provide a reasonably accurate guide for determining the minimum adequate distance for either a mounted or dismounted approach route. The formula is:

$$MD = (DT + SF) \times RA$$

For example, if a battery commander (BC) needed to place an OP/LP on a mounted approach route, he could determine the MD as follows:

- Hasty displacement time for the battery is 3 minutes (DT = 3).

• An adequate safety factor is 2 minutes (SF = 2).

• On a given approach route, the likely rate of enemy advance is 10 kilometers per hour or 167 meters per minute (RA = 167).

Using the formula, MD = (3 + 2) × 167 = 835 meters. This *does* not mean that the battery commander must position his men this far away; only that they must be able to observe to this distance. An interesting ramification of this approach is that, as opposed to current practice, nighttime LPs may have to be located farther out than daytime OPs to compensate for limited visibility, although this can be attenuated to some degree by the use of night observation devices and a slower rate of enemy advance.

With the early warning posts in place, the battery commander can now address the mechanics of organization, preparation, and, if required, execution of the battery-related elements of the security system. Assuming that the commander has received adequate warning, he has essentially two alternatives: stand and fight or conduct a hasty displacement to an alternate position before the enemy can close to within visual range. The desirability of the first option is best summarized in TC 6-50: "The use of a close-in perimeter defense against a mechanized or armored force is a last resort, used only when the battery is unable to move away from the threat. (This option is covered in detail in TC 6-20-9 and FM 6-50.)

The commander's option for a hasty displacement will depend on a strong, workable tactical SOP. The simplest way to identify such an SOP is to "walk through" the process of a battery executing such a security system from RSOP (reconnaissance, selection, and occupation of position) to displacement.

For example, a battery commander receives instructions from the battalion tactical operations center (TOC) to execute an RSOP. The BC moves his RSOP party to the proposed site and, as part of his position preparation, determines the most likely avenues to be manned and works out their respective minimum distances. The BC then has the first sergeant designate the close-in dismounted route OP/LP locations while he locates the most distant, high-speed route locations by vehicle. Based on these positions, the BC selects a series of 5 to 10 defensive targets along enemy approach routes and on the battery position. Once the targets are selected and coordinated with the first sergeant, they are sent by radio to the battalion TOC for allocation to available firing units. The BC then provides locations of distant OP positions to the communications chief. Having completed these actions, the BC and senior personnel

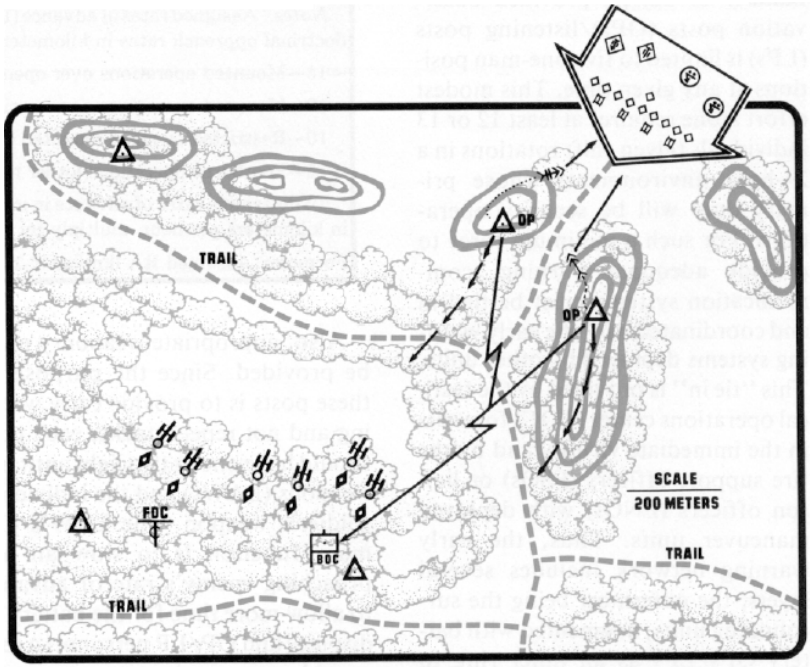


Figure 1. Initial sighting/contact of enemy forces.

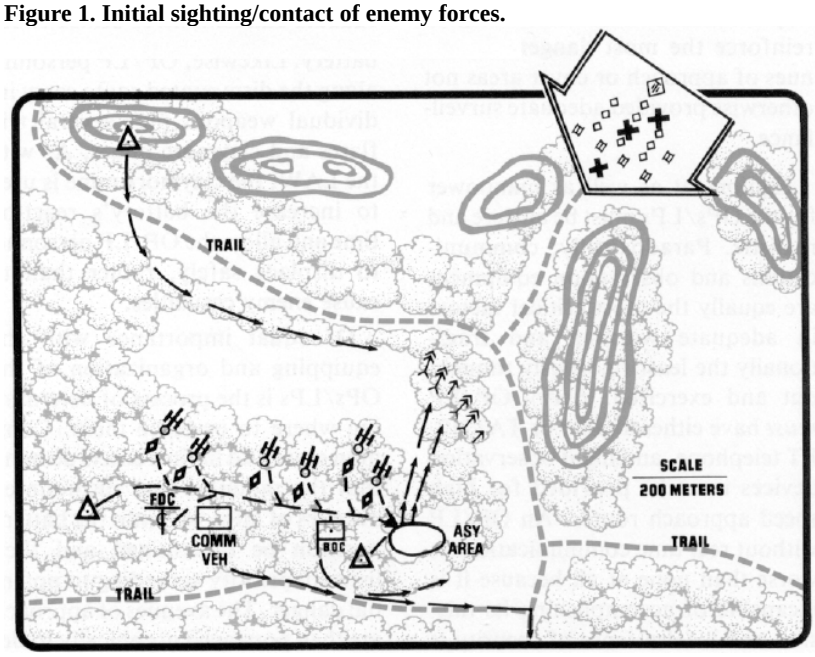


Figure 2. Deployment of screening force for hasty displacement.

prepare to execute the following security-related actions as the battery moves into its new position:

• The first sergeant positions two or three close-in OPs/LPs.

• The communication chief drives distant OP/LP personnel to their locations. Personnel lay wire from the vehicle as they are taken out—these lines constitute the first priority lines upon occupation of position.

• All radio (AN/PRC-77) and telephone (TA/312-PT) communications tie into the BOC which manages the battery security system. Radios are monitored by one of the AN/VRC-46 radios in the BOC vehicle, and telephones connect into the battery's switchboard (SB-993/GT).

• The BOC monitors OPs/LPs and battalion FSO/LNO and manages the rotation of OP personnel.

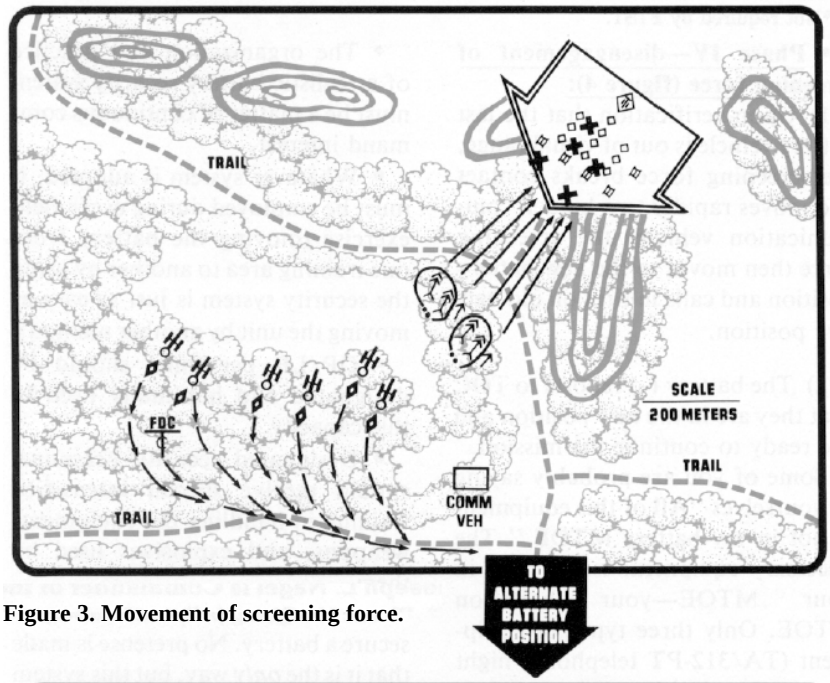


Figure 3. Movement of screening force.

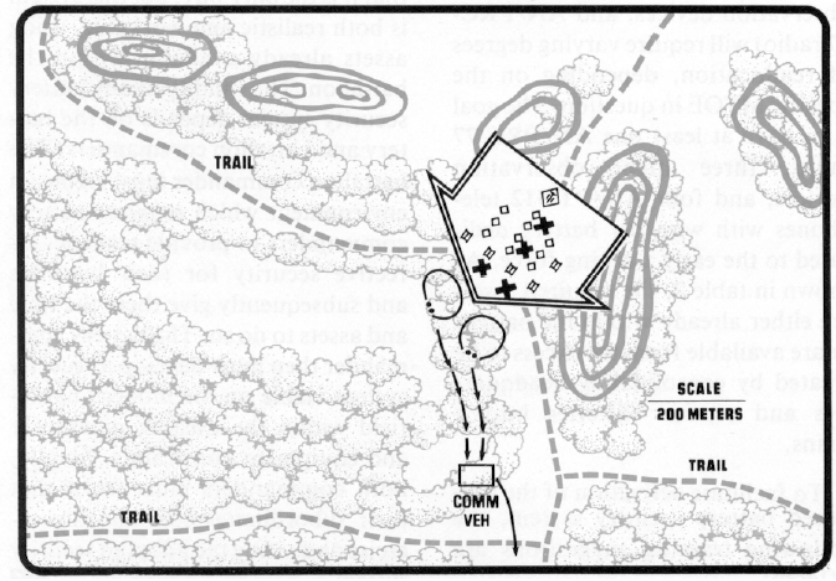


Figure 4. Disengagement of screening force.

• The first sergeant prepares a battery defense diagram with a list of artillery defensive targets for the battery commander's approval. (The defense plan is then maintained in the BOC.)

• The BC's driver or the communications chief takes *all* drivers to the first alternate position and battery rendezvous point.

With the execution of these actions, the battery security system is essentially complete; now "all" that remains is to exercise it when the situation requires. As mentioned earlier, this requirement could be received from one of two layers—the first being the FSO/LNO or battalion TOC and the second being the battery's own OPs/LPs. Should the warning be by the first means, the battery simply calls in its OPs (sending out a vehicle to get the distant ones) and conducts an orderly displacement to the predesignated alternate position or as directed by the battalion TOC. However, should the alert means be the battery's own OP/LP, the following series of parallel actions must be initiated to avoid the battery's engagement in direct fire:

• **Phase I—initial sighting/contact (figure 1):**

1) The OP/LP informs the BOC of size and composition of threat and speed of approach; trips command detonated explosives or fires LAW; and leaves rapidly via a covered route.

2) The BOC alerts battery and other OPs/LPs to come in and identifies defensive targets to FDC.

3) The FDC informs TOC that the battery is under attack and is displacing and requests preplanned FA targets along enemy's route.

4) Battery sections dispatch predesignated screening force personnel to vicinity of BOC with M60s and LAWs. Sections prepare to move independently to the first alternate position or the rendezvous point, as designated.

• **Phase II—screening force deployment for hasty displacement (figure 2):**

1) OP/LP personnel return to battery and join screening force.

2) The BOC displaces immediately to identified location at first alternate position or rally point to facilitate arrival of the rest of the battery. Communication personnel are dropped off at critical points along evacuation routes to act as road guides.

3) Battery (-) vehicles prepare to displace independently to identified locations at first alternate position or rally point.

4) The communication vehicle moves to a predesignated, covered position with access to an escape route to the new battery position.

5) The screening force moves to a predesignated position between the advancing enemy force and the displacing battery elements with M60s and LAWs.

6) The TOC indicates FA targets to be fired at extended and mid ranges and requests TACAIR and/or helicopter support.

7) Based on available information, the BC rapidly determines whether the battery will displace to its alternate position or to its rally point to the rear. He then informs BOC and FDC of his decision for dissemination and execution.

• **Phase III—screening force movement (figure 3):**

1) The battery vehicles move independently out of old positions into new position.

2) The FDC relays to TOC requests for shifts in artillery targets sent by the screening force.

3) The screening force engages approaching enemy force at maximum range with all available weapons, changes defensive targets fired in support of disengagement by other artillery units, and monitors the displacement of the battery.

4) The TOC relays the requested target changes.

Table 2. Equipment needed for proposed security system.

Item of equipment	Battalion MTOE					
	(8-inch SP)		(155-mm SP)		(155-mm towed)	
	Firing battery	Total in trains	Firing battery	Total in trains	Firing battery	Total in trains
TA/312-PT telephone	17	40*	19	31*	19	41
AN/PVS-2&4 night observation devices	4	5	4	6	4	8
AN/PRC-77 radio	—	6*	—	5*	—	6*

*Not required by FIST.

• **Phase IV—disengagement of screening force (figure 4):**

1) Upon verification that the last battery vehicle is out of visual range, the screening force breaks contact and moves rapidly to a hidden communication vehicle; the screening force then moves to the new battery position and calls in fires on old battery position.

2) The battery (-) reports to TOC that they are in the new position and are ready to continue the mission.

Some of you are probably saying to yourselves "All of this equipment is not in my battery MTOE." The necessary equipment is, in fact, in your MTOE—your battalion MTOE. Only three types of equipment (TA/312-PT telephone, night observation devices, and AN/PRC-77 radio) will require varying degrees of reallocation, depending on the specific MTOE in question. The goal is to have at least one AN/PRC-77 radio, three night observation devices, and four AN/PT-312 telephones with wire per battery dedicated to the early warning force. As shown in table 2, the required assets are either already within the battery or are available from the excess to be created by consolidating headquarters and service batteries into a trains.

To facilitate activation of the proposed battery security system, the following training suggestions are offered:

• The organization and practice of a realistic battery security system must be a matter of continuous command interest.

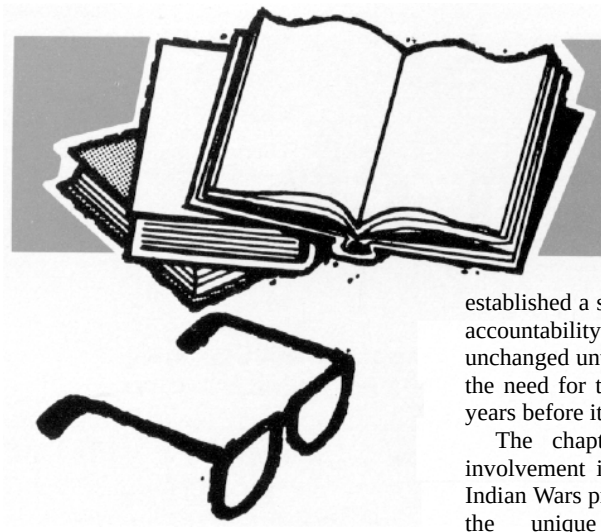
• Whatever system is adopted, it must be employed during every field exercise (moving the battery from one training area to another by using the security system is just as easy as moving the unit by another method).

• OP/LP personnel should be designated and habitually used in this capacity.

• Designated security personnel should receive special intensified training in handling the equipment, weapons, and explosives used by them.

The foregoing proposal is *a* way to secure a battery. No pretense is made that it is the *only* way, but this system is both realistic and workable, using assets already available within the battalion. The validity of any battery security system depends on the battery and battalion commanders. The battalion commander must create an environment which *requires* battery commanders to provide realistic, effective security for their batteries and subsequently give them the time and assets to do so. The battery commander then must develop a security system viable on the modern battlefield within the existing manpower and equipment constraints. Finally, both commanders must insist that their subordinates continuously exercise and refine the adopted security system.

COL Joseph L. Nagel is Commander of the 18th Field Artillery Brigade (Airborne) and MAJ(P) Floyd V. Churchill is the Executive Officer, 1st Battalion, 6th FA, 18th FA Brigade (Airborne), Fort Bragg, NC.



Redleg Review

MALIGNED GENERAL, by Chester L. Kieffer, Presidio Press, CA, 376 pages, $16.95.

The biography of Thomas Sidney Jesup is an account of the interesting life and half-century career of a soldier whose reputation was maligned by elements in the political arena and the press. Unfortunately, until publication of this volume, General Jesup's fame probably stemmed only from accusations leveled at him as being disloyal to General Winfield Scott and being the violator of a white flag of truce during his campaign against the Seminole Indians. The story surrounding both these incidents, however, is only a small part of the life and history of the first Quartermaster General of the US Army.

General Jesup joined the Army in 1808 and was advanced in rank from lieutenant to brevet colonel by the end of the War of 1812. His activities during that war justified his rapid promotion. By 1818 he was well known in government circles and was appointed to the position of Quartermaster General of the Army, a position created as a result of Secretary of War Calhoun's reorganization of the War Department.

Jesup was beyond reproach in both his public and private activities. He was meticulously honest and dedicated to public service and demanded the same honorable conduct from his subordinate Quartermaster officers. Jesup's unswerving adherence to strict principles and his influential position as holder of the purse strings for the Army combined to make him a lucrative target during the pitched political battle between the Whigs and Democrats in the 1830s. General Jesup abhorred the waste and fraud he witnessed early in his career. He established a system of property and fund accountability which remained virtually unchanged until World War I. He foresaw the need for the Quartermaster Corps 60 years before it was established.

The chapters dealing with Jesup's involvement in the Creek and Seminole Indian Wars provide a clear description of the unique problems faced by commanders operating against an irregular force in an uncharted wilderness. The facts presented also remove any tarnish from his reputation concerning the charges that he was disloyal to his superior and had violated a white flag of truce. Jesup's actions during the Mexican War, as described by the author, provide interesting details about the strategy, civil-military relations, and logistical complications of that war.

As a former military historian for the Quartermaster General's Office and coauthor of the official volume on Quartermaster operations in World War II, Mr. Kieffer appears uniquely qualified to write the biography of General Jesup. The book supplements many other works dealing with that period. It is well documented and of value to anyone interested in that era.

LTC Robert B. Adair, FA, is the Senior Advisor to the 28th Infantry Division Artillery, PAARNG.

THE ROYAL OAK DISASTER, by Gerald S. Snyder, Presidio Press, CA, 1978, 240 pages, $10.95.

In Scotland's remote Orkney Islands lies the almost landlocked natural harbor of Scapa Flow. A harbor thought to be impregnable, it was chosen as the anchorage for the British main fleet. But with skill and daring, the Germans penetrated the weakened defenses with a submarine—the U-47—sinking the battleship, HMS *Royal Oak*, with the loss of 833 lives.

Snyder has done an excellent job in capturing the emotions of those involved. His research efforts have captured the minute details, adding greatly to the human interest. With access to recently declassified official records, he has spared no effort in correcting errors contained in earlier books.

This account is far more than just a story of a single naval mission. Snyder sets the stage with background information concerning the German and British navies prior to World War II to place the events of early WW II in perspective. An excellent follow-through reports on the people involved who, even today, have an annual reunion of survivors of the *Royal Oak* and the U-47. This is a story about people on both sides of a war, doing a job that had to be done.

SFC Robert R. Cordell is assigned to the ROTC department at Northwestern Oklahoma State University.

THE OFFICIAL MILITARY ATLAS OF THE CIVIL WAR, by MAJ George B. Davis, *et al*, Arno Press/Crown Publishers, New York, 1978, 175 plates, $60.00.

Gorgeous. That's the only way to describe this complete collection of exquisite maps, engravings, and drawings. All the major battles of the Civil War are included in this massive volume (13.5 × 16.5 × 1.7 inches). In addition to the topographic portrayals with battle lines and general maps of key areas, the book contains plates of uniforms, insignia, and badges of both armies and diagrams of weapons, means of transport, and miscellaneous materiel used during the "war of rebellion."

The detail of this volume cannot be overstresed. Not only are battle lines and unit locations and movements shown in full color maps but, where appropriate, other features such as tidal flooding are shown in supplemental charts. By studying this book, the reader gains added appreciation for what the battle captains of that period knew and did not know about the terrain in making their combat plans and orders. A thorough index completes this masterful work.

LTC W. A. Cauthen is the Public Affairs Officer, Fort Jackson, SC.

☆ **US GOVERNMENT PRINTING OFFICE: 1980—671-120/2**

Conversion chart

Approximate Conversions to Metric Measures

When You Know	Multiply by	To Find
LENGTH		
inches	2.5	centimeters
feet	30	centimeters
yards	0.9	meters
miles	1.6	kilometers
AREA		
square inches	6.5	square centimeters
square feet	0.09	square meters
square yards	0.8	square meters
square miles	2.6	sq. kilometers
acres	0.4	hectares
MASS (weight)		
ounces	28	grams
pounds	0.45	kilograms
short tons (2000 lb)	0.9	tonnes
VOLUME		
teaspoons	5	milliliters
tablespoons	15	milliliters
fluid ounces	30	milliliters
cups	0.24	liters
pints	0.47	liters
quarts	0.95	liters
gallons	3.8	liters
cubic feet	0.03	cubic meters
cubic yards	0.76	cubic meters
TEMPERATURE		
Fahrenheit	5/9 (then subtract 32)	

Approximate Conversions from Metric Measures

When You Know	Multiply by	To Find
LENGTH		
millimeters	0.04	inches
centimeters	0.4	inches
meters	3.3	feet
kilometers	0.6	miles
AREA		
sq. cm	0.16	sq. in.
sq. meters	1.2	sq. yd.
sq. kil.	0.4	sq. mil.
hectares (10,000m2)	2.5	acres
MASS (weight)		
grams	0.03	fluid ounces
kilograms	2.2	pounds
tonnes (1000 kg)	1.1	short tons
VOLUME		
milliliters	0.03	fluid ounces
liters	2.1	pints
liters	1.06	quarts
liters	0.26	gallons
cu. meters	35	cu. ft.
cu. meters	1.3	cu. yds.
TEMPERATURE		
Celsius	9/5 (then add 32)	