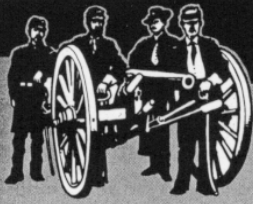


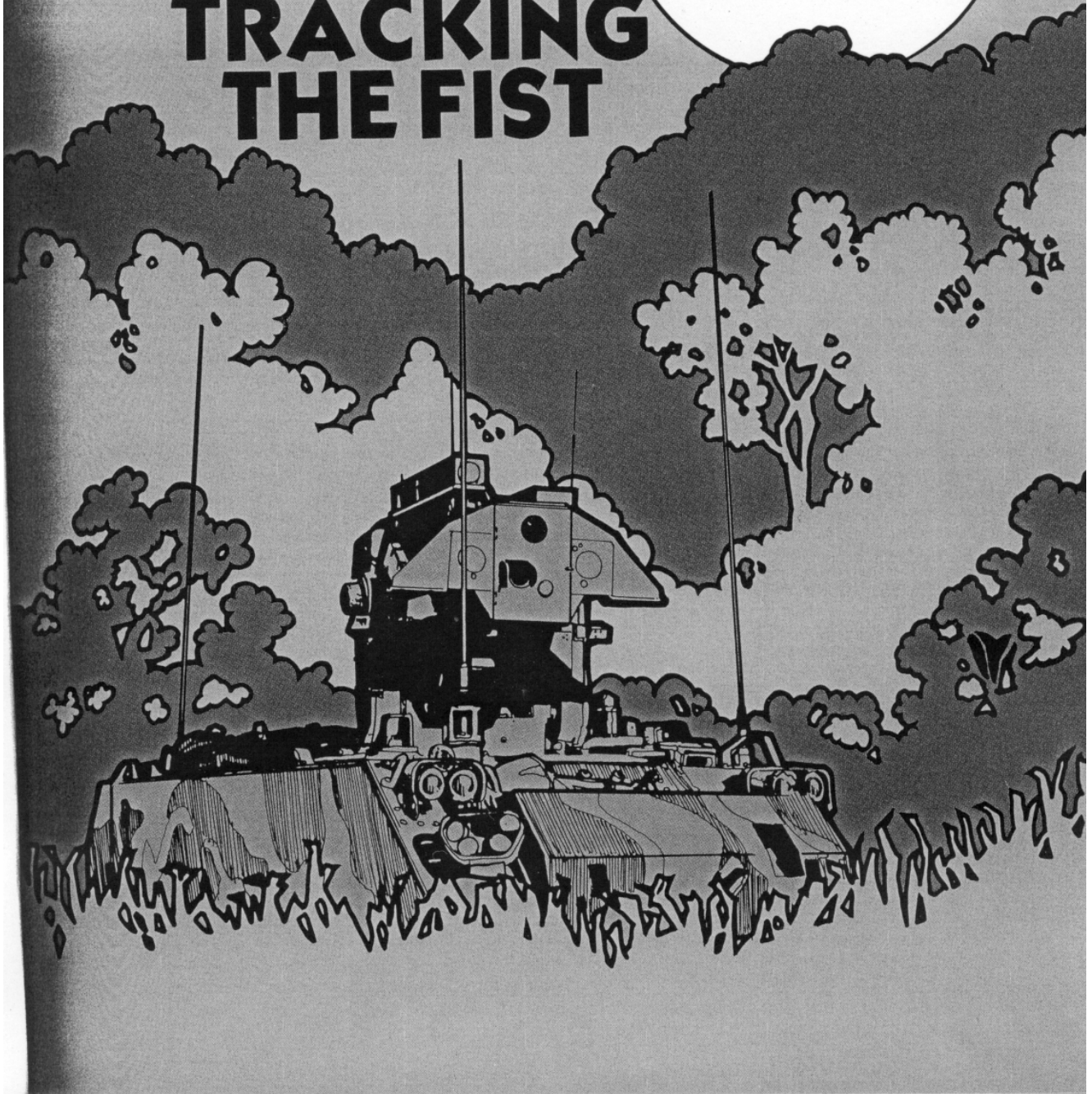
Field Artillery Journal



January-February 1983

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TRACKING THE FIST





THE JOURNAL OF FIRE SUPPORT

Volume 51

January-February 1983

Number 1

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The *Field Artillery Journal* is published bi-monthly at the US Army Field Artillery School, Fort Sill, OK. Funds for printing are approved by Department of the Army. However, unless otherwise stated, material does not represent official policy or endorsement by any agency of the US Army.

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

SUBSCRIPTIONS: May be obtained through the Field Artillery Association, P. O. Box 33027, Fort Sill, OK 73503. Telephone numbers are AUTOVON 639-5121/6806 or commercial (405) 355-4677. Dues are \$14.00 per year (\$27.00 for two years and \$40.00 for three years) to US and APO addresses. All other addresses should add \$7.00 for postage.

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SUBMISSIONS: All letters and articles should be addressed to Editor, *Field Artillery Journal*, P.O. Box 33131, Fort Sill, OK 73503. Telephone numbers are AUTOVON 639-5121/6806. Material submitted for publication is subject to edit by the *Journal* staff; footnotes and bibliographies may be deleted due to limitation of space.

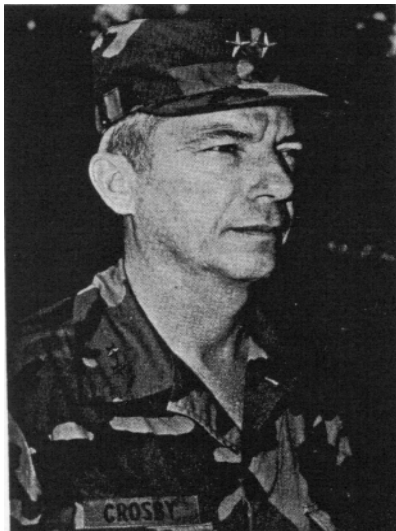
REPRINTS: *The Field Artillery Journal* is pleased to grant permission to reprint articles. Please credit the author and the *Field Artillery Journal*.

POSTMASTERS: Second-class official mail postage is paid by the Department of the Army, DOD 314, at Lawton, OK 73501. Send address changes to the *Field Artillery Journal*, P.O. Box 33131, Fort Sill, OK 73503.

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On the Move

MG JOHN S. CROSBY



For years field artillery commanders and their staffs have found it easier to emphasize the field artillery's ability to mass over a wide front rather than its ability to shoot deep. They had to concede that existing target acquisition systems did not allow them to see deep targets with the accuracy and timeliness needed for the delivery of effective artillery fires, and they knew that non-firing elements such as assembly areas and command posts were particularly difficult to acquire. Most of you know that solutions to this serious deficiency in target acquisition have been high on the combat development "fix-it" list. You are also probably aware that the Israelis demonstrated the utility of remotely piloted vehicles (RPVs) during their recent combat in Lebanon. Now, as we near the end of the developmental cycle of the Army's remotely piloted vehicle, the Aquila, I am convinced that the days of this particular shortfall are numbered; for the envisioned Aquila will provide a capability even more advanced than that of the Israeli Scout.

The Aquila, together with the Firefinder radar systems, was originally oriented primarily toward providing Redlegs the capability to see deep and shoot deep; but its growth potential became obvious and has been the subject of a continuing dialogue within and without the artillery community. A refined AirLand Battle doctrine and the emerging AirLand Battle 2000 concepts combine to make remotely piloted vehicles increasingly more cost effective as the means to support battlefield functions other than field artillery target acquisition. Far-sighted artillerymen recognized this potential and laid

the groundwork for a remotely piloted vehicle system which, when it is fielded in late 1984 to early 1985, will be well able to perform many of these additional complex roles.

With these thoughts in mind, I have outlined our future initiatives. There will be three phases to our efforts: the early fielding of the Aquila, the development of a new organizational and operational plan for the system, and a translation of its significant potential into reality.


Early fielding is a must. There is agreement that it will take time and effort to exploit completely the inherent capabilities of the Aquila, but we will not fall into the trap of delaying its fielding while we develop and refine the remaining enhancements. We simply must get it on the ground and into the hands of soldiers who will run it through its paces day after day and then tell all of the combat developers where they went wrong.

The organizational and operational plan must allow us to paint this system as Army green as possible. To this end we are expanding and intensifying our dialogue with the Intelligence and Signal Centers in order to better understand their needs in the remotely piloted vehicle arena, and we intend to include other centers in these discussions as we become more familiar with their problems. Our goal is to develop practical, affordable applications of the Aquila system which will not seriously impact on its ability to serve field artillery needs.

With a view to its expanded role on the AirLand Battlefield, we are relooking the organization of the RPV elements and the manner in which we intend to operate them. Things do not always work in the field — some level of degradation is the normal state of the battlefield. So we intend to field this system with an operational concept that recognizes this inevitable degradation and compensates for it — from fullup operational capability right down to minimum operational capability. Central to this concept is the positioning of the system's bigger signature equipment farther to the rear and the smaller control and downlink systems closer to the supported maneuver commanders. We intend to test a technique in which a Centralized Launch and Recovery Section (CLRS) hands off the remotely piloted vehicle to a Forward Control Section (FCS) which is normally located at the maneuver brigade tactical operations center. The FCS assumes control of the RPV, flies it until it gets low on fuel, and then passes control back to one of the two

CLRSs planned for the system. The FCS will be able to provide the supported unit a remote video terminal which enables the commander to obtain a real time, dynamic, over-the-hill picture of the battlefield. The maneuver and combat intelligence benefits here are obvious, and we foresee a significant enhancement in our target acquisition capability when we exploit this close interface with the maneuver tactical operations center through our digital or voice communications to the supporting field artillery. We intend to deploy four of these FCSs in order to provide responsive support to the maneuver brigades, as well as to other elements of the division such as the division tactical command post, the division artillery tactical operations center, the combat electronic warfare intelligence battalion, the signal battalion, and the engineer battalion. The CLRSs not only can provide backup capability for the FCSs, but also support rear echelon elements with rear area combat operations, route reconnaissance, or radio relay. In addition, the CLRSs allow the tailoring of mission payloads with special purpose packages developed by other users, and thereby enable us to honor diverse requirements over extended periods of time. Our overall goal is to validate the basic system so that we can proceed with production and fielding and, at the same time, assure ourselves that what we are fielding will be able to absorb the organizational and operational growth which we fully intend to pursue.

The final effort involves seizing this opportunity to involve all elements of the Army in an uninhibited discussion of the Aquila's potential. Our only limits are our own imagination and the state of technology. When one thinks of possible payload packages, the impact on the ways we do business is clear. Already surfaced are ideas encompassing airborne electronic relay and jamming.

There are hurdles to jump, parochialisms to overcome, work to do. The Field Artillery School accepts these challenges and intends to meet them through the framework outlined above. However, I remind each of you that the entire field artillery community plays a crucial part in this process; for it is you in the field who send us critical comments, imaginative ideas, and support for our efforts. I urge you to continue to let us know where we can improve upon the Aquila or any of our many other systems in order that the Field Artillery can better support the AirLand Battle. 

Incoming

LETTERS TO THE EDITOR

Speak Out

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

Wrong commander

This is to inform you of an error which appeared in the September-October 1982 *Field Artillery Journal*. The Commanders Update on page 36 lists LTC Morris J. Boyd as the commander of the 1st Battalion, 39th Field Artillery, but the commander of this battalion is actually LTC William D. Smith, Jr.

Edward D. Davis
CPT, FA
Adjutant
1st Bn, 39th FA
Fort Bragg, NC

You are correct, and I apologize for the error.—Ed.

Pershing brigade reorganization

Since my article "TACEVAL — Pershing's ARTEP," was published in the September-October 1982 *Journal*, the 56th Field Artillery Brigade (Pershing) and subordinate battalions have reorganized under new TOEs. Most significant was the activation of the 55th Maintenance Battalion. Beginning in August 1981 the service battery of each Pershing battalion became a forward support company (FSC) of the maintenance battalion. Additionally, the brigade headquarters aviation section and the 579th Ordnance Company were picked up on the TOE of the maintenance battalion, which has the mission of providing automotive, engineer, signal, and missile maintenance support plus most classes of supply support.

The headquarters and headquarters battery (HHB) of the Pershing battalions picked up the ammunition and security platoons from the old service batteries and is now designated the headquarters, headquarters and service battery (HHSB).

The 56th Field Artillery Brigade (Pershing) now has a headquarters battery, chemical detachment, and five subordinate battalions.

The Pershing brigade is a dynamic organization which will soon undergo another change to Pershing II. As time passes and classification allows, additional information on the conversion and fielding of Pershing II will be forwarded to the *Journal*.

Myron F. Curtis
LTC, FA
Commander
1st Bn, 41st FA
APO New York

Display materiel

In response to the "Hotline" request on page 7 of the September-October 1982 *Field Artillery Journal*, concerning sources of display materiel for armories and other organizations, the following information is submitted:

There are no artillery pieces or armored vehicles excess to the needs of the Army's museums. Neither is it likely that any will be available. Any such items which become excess to the needs of one Army museum are invariably required for use by another Army museum. It is possible that a military organization or armory may be able to obtain some sort of display item through some other organization (list available on request). These organizations might also be able to purchase something suitable for outside display, although large items suitable for outdoor display, whether originals or reproductions, are normally quite expensive.

Also, the information provided concerning the M1 155-mm guns is outdated, as the majority of these guns, which are located in Europe, have already been distributed. Those units in Europe seeking outside display pieces are advised to contact the Defense Property Disposal Region Office, Europe, at Lindsey Air Station, Germany; point of contact is Mr. Jahnke.

The Center of Military History will, upon request, provide a fact sheet and the list of military goods dealers discussed above. Point of contact is Dr. Norman Cary at AUTOVON 285-0311 or this address:

Dr. Norman M. Cary, Jr.
Curator, Museum Branch
Historical Services Division
US Army Center of Military
History
Washington, DC 20314

Why not a FIST battery?

After three years of experience as a service battery commander and a maneuver battalion fire support officer, I have come to the conclusion that a direct support (DS) battalion of a separate infantry brigade (TOE 06-185H) needs a fire support team (FIST) battery in order to train more effectively and to combine the administrative functions of the headquarters and service batteries and the battalion S4 into a more reasonable organization of headquarters battery.

All fire support personnel, over 100 men, would be transferred from headquarters battery. The battalion motor officer would become the FIST battery commander, thus relieving any fire support officer of the command function. The service battery first sergeant and his battery mess, supply, and maintenance sections would comprise the headquarters section of the FIST battery.

The battalion S4 would become a pure coordinating staff officer responsible for battalion logistical operations. The battalion supply, maintenance, and ammunition sections would move to headquarters battery, forming supply and maintenance platoons. Under this scheme, no additional equipment or personnel would be required.

In peacetime, the FIST officers would focus their total attention on training their personnel and on developing a close working relationship with their respective maneuver units — all under the auspices of a battery administration which is responsive to their needs and is familiar with their training requirements. This responsiveness and familiarity is not always present in Reserve Component or Active Army units.

In combat, the fire support personnel would join their maneuver units. The FIST commander and his headquarters section would operate in either the battalion or brigade field trains, supporting organic battalion personnel located there. The commander would maintain personnel and property accountability through daily reports from the fire support coordinators.

With the headquarters and service batteries combined, all of the battalion's command, control and communication (C³) elements would be in one unit. In the field, these units frequently

Field Artillery Journal

are collocated; so this change would not be a radical one. Under current doctrine, the unit's elements are divided between the field and combat trains locations. The battalion S1, S4, communications-electronics staff officer, executive officer, and maintenance officer would be available to supervise administrative/logistical operations, thus reducing the burden of the headquarters battery commander. With this unified organization, logistical functions should operate more smoothly.

Advantages of this proposal are:

- Requires no additional equipment or personnel.
- Permits more focused training of fire support personnel.
- Permits a net reduction in the size of the current headquarters battery, reducing the commander's span of control problems.
- Simplifies the functions of the battalion S4, making him a pure coordinating staff officer.
- Places all C³ elements of the battalion in one battery.

Disadvantages are:

- Switches the responsibilities of command from the S4 to the motor officer. True, but it seems a fair tradeoff, especially in a Reserve Component unit.
- In combat, it would be difficult to maintain personnel and property accountability from the trains area. True, but no more difficult than for the headquarters battery commander under the existing TOE.

This reorganization would markedly improve the effectiveness of the fire support training conducted in a direct support battalion. Also, it would streamline an oversized headquarters battery and simplify the battalion's administrative/logistical operations.

Thomas M. Green
CPT, FA
2d Bn, 110th FA (MDARNG)
Pikesville, MD

The continuing debate over how best to organize and train fire support teams (FISTs) is a reflection of our community's deep concern with providing quality fire support to supported maneuver units. In the July-August 1980 Journal, MAJ Kenneth Owen proposed establishing a Fire Support Battery — he, like you, wanted to consolidate the headquarters and headquarters battery and the service battery to enhance administrative functions and to make room for a more effective peacetime fire support organization. Your recommendations are another useful view from the field.—Ed.

Quick Smoke Data Worksheet

I am confident that the worksheet shown below can be particularly useful in Guard and Reserve units where training time is limited and turnover is high.

Neil D. Ferguson
2LT, FA
Glendale, CA

No doubt about it. The worksheet brings together all the required tables and orders them in a logical procedure for quick smoke. In addition to National Guard and Reserve unit FDCs, inexperienced Active Army FDCs could benefit from the worksheet.—Ed.

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A quick test for erratic rounds

One of the major sources of error in high burst (HB)/mean point of impact (MPI) registrations is data from erratic rounds. Two types of errors are possible when one is dealing with erratic rounds: the first type of error is the wasteful elimination of rounds which are not truly erratic, and the second is the failure to identify and eliminate rounds which are in fact erratic. The latter may be a more serious error because the resulting contaminated data may cause an erroneous GFT setting. There is, however, a way to eliminate both errors and quickly and accurately identify erratic rounds.

FM 6-40 suggests a number of approaches to the problem; but they all require the plotting or calculation of the mean burst location, the construction of a plus-or-minus four probable error box around that point, and the plotting or calculation of the did-hit location of each suspected round. Any round falling outside that error box is erratic and should be disregarded. These procedures are time-consuming because they require the conversion of observer data to did-hit data. More often than not, the FDO makes the decision to disregard a round as erratic after merely looking at the numbers; and, this approach, while quicker, carries a high risk of error.

The problem of identifying erratic data is routinely addressed in industrial quality control. The pioneering work in this area was done in the 1920s at the Bell Laboratories by Dr. Walter A. Shewhart, who developed the Statistical Quality Control Chart to plot data from production and identify those readings which were erratic. During World War II, the use of the Statistical Quality Control Chart became very popular, especially by defense industries, but declined sharply after the war. In the mid-1950s, the Japanese industry used American consultants to implement Statistical Quality Control Charts on a wide basis; and these charts are still one of the key elements of the much-vaunted Japanese Quality Control System today. Since the mid-1970s the use of Control Charts has again been on the rise in American industry.

The principle of the Statistical Quality Control Chart is very much applicable to the problem of erratic rounds in HB/MPI registrations. The Control Chart works on the

statistical concept of the standard deviation — virtually 99.73 percent of the observations of a given process can be expected to fall within plus or minus three standard deviations of the average (mean). Thus, these three standard deviations equate to the four probable errors of field artillery terminology. Probable errors for range, deflection, or height-of-burst are a function of quadrant elevation and are listed in table G of the appropriate firing table. But one can easily calculate a three-standard deviation spread of a group of observed rounds from the azimuths from either observation post (OP) or the vertical angle from O1, thereby eliminating the necessity of having to convert observer data into did-hit data for each suspected round in order to evaluate it against the four probable error box.

Using the control chart technique, one compares a suspected round to the ± 3 standard deviation control limits of the remaining rounds. These statistical control limits strike the optimum balance between the probabilities associated with both types of error: unnecessary rejection or failure to reject. Three pieces of information are needed:

- The mean (average) of the remaining rounds — either azimuth or vertical angle (VA).

- The total spread between the highest reading and the lowest reading of the remaining rounds.

- The control chart factor, known in statistical tables as E2. The E2 factor (table 1) is a function of the number of remaining useable rounds. In most normal six round registrations, this number will be five; however, the number could be smaller in abbreviated registrations.

Number of remaining usable rounds	E2
2	2.660
3	1.772
4	1.457
5	1.290
6	1.184
7	1.109
8	1.054
9	1.010

One can test a suspect round by using data from the remaining useable rounds to compute the following ± 3 standard deviation control limits: mean

(average of) remaining useable rounds plus or minus the spread in remaining rounds times E2. If the suspected round falls outside the computed control limits, it is erratic and should be discarded.

The following three examples demonstrate the technique.

Example 1:

O1 AZ	VA	O2 AZ
625	+13	6381
627	+13	6380
624	+11	6382
623	+12	6380
634	+11	6379
626	+13	6378

Round number five may be erratic because of the azimuth from O1. The average O1 azimuth of the five remaining useable rounds is 625. The highest azimuth of the remaining useable rounds is 627 and the lowest azimuth is 623, yielding a spread of 4. The E2 factor for five rounds is 1.290. The control limits would be computed as follow:

$$625 \pm 4 \times 1.290 = 625 \pm 5.16$$

(5 rounded to the nearest whole mil)

Therefore, the high control limit would be 630 mils and the low control limit 620 mils. Since the O1 azimuth of round number five is 634, it falls outside these limits, is probably erratic, and should be discarded.

Example 2:

O1 AZ	VA	O2 AZ
538	+6	6186
539	+8	6181
542	+7	6186
544	+6	6189
540	+8	6188
543	+7	6192

Round number 2 may be erratic because of the azimuth from O2. The average azimuth from O2 of the five remaining useable rounds is 6188.2 mils. The spread between the high and low azimuths of the five remaining useable rounds is 6 mils.

$$6188.2 \pm (6 \times 1.290) = 6188.2 \pm 7.74$$

(8 rounded to the nearest whole mil)

Therefore, the high control limit would be 6196 and the low control limit 6180. Since the O2 azimuth of round number two is 6181 and falls within the computed control limits, it is not erratic and should not be discarded.

Example 3:

O1 AZ	VA	O2 AZ
6020	+4	4372
6019	-2	4376
6025	+1	4369
6023	-1	4373
6022	-2	4375
6023	-1	4371

Round number one may be erratic because of the vertical angle. The average VA of the five remaining useable rounds is -1. The remaining highest VA is +1 and the lowest VA is -2; so the total spread in the vertical angles of the five remaining useable rounds in 3 mils. The control limits are as follows:

$$-1 \pm (3 \times 1.290) = -1 \pm 3.87$$

(4 rounded to the nearest whole mil)

Therefore, the high control limit would be +3 mils and the low control limit -5 mils. Since the vertical angle of round number one is +4 mils, it falls outside the computed control limits, is probably erratic, and should be discarded.

The significant strengths of this technique are that it is based on the actual lot of ammunition and actual conditions of firing, that the technique is quick and easy to use, that it eliminates the risks of guessing, and that it provides the same level of probability protection as plus or minus four probable errors. It is a fine instance of the applicability of industrial technique to a field artillery seeking to refine its flexibility and responsiveness.

David T. Zabecki
 CPT, FA, (ARNG)
 HHB, 2d Bn 123d FA
 Rock Island, IL

Reserve Components commanders update

I would like to add my voice to those who have commented about the desirability of Reserve Components commanders being included in the periodic "Commanders Update" published in the *Journal*.

During visits to Fort Sill, we are told that the Reserve Component comprise more than 50 percent of the US Army Field Artillery and also a large percentage of the Field Artillery Association; yet, our commanders are not indicated in your publication, which is the recognized voice of the Field Artillery. Reserve Components commanders generally serve longer in their positions than those of the Active Component, therefore requiring

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less updating.

In addition, photographs of Active Component commanders are prominently displayed in Snow Hall. Would it not be possible to include the Reserve Components commanders there? With some minor space reorganization, the Reserve Components commanders (at least at the 0-6 level) could be recognized at the Field Artillery Center. This would not only recognize the individuals involved, but would also further demonstrate the "total force" concept.

Anthony P. Vozzella
 LTC, FA (MAARNG)
 Executive Officer
 26th (Yankee) Infantry
 Division Artillery
 Rehoboth, MA

Your points are well taken, and many before you have expressed the same opinion. Fortunately, I can report some real progress. Plans for a Snow Hall display of the photographs of Reserve Components field artillery commanders are well under way, and the target date for completion of the project is 1 February 1983. I am also pleased to announce that commencing with this issue, a yearly listing of these commanders will appear in the January-February Journal.—Ed.

Gun, not howitzer

Because I am a history oriented reader, I was pleased to see CPT Donald Klinger's historical article on the Field Artillery Board in the September-October 1982 issue of the *FA Journal*. I would like to make a correction to the picture on the top right-hand side of page 15. The self-propelled gun illustrated is a T93 gun motor carriage mounting an 8-inch gun M1. It is not an 8-inch howitzer. Two T93s were built in early 1945 utilizing a heavily modified M26 heavy tank chassis. At the same time five T92 howitzer motor carriages also using the same chassis were built mounting a 240-mm howitzer M1. It was found that the guns overloaded the chassis and that there was not sufficient interest in the projects; so further development was stopped at the end of World War II. The complete story may be found in R.P. Hunnicutt's book, *Pershing — A History of the Medium Tank T-20*.

Peter A. Franden
 Silver Springs, MD

Filling white phosphorus projectiles

As a Canadian master gunner, I am presently employed as a trials officer in a Canadian Defense Research Establishment. Due to my background and training, I am often asked questions by field gunners about equipment and ammunition problems. One of the most frequent questions asked is how are white phosphorus projectiles filled.

I am aware that this was once conducted in a water-dominated environment which excluded the presence of oxygen. Surely, methods have changed and are more modern, safe, and efficient.

Within the bounds of prevailing security classifications, could you help me with the required information?

W. Fairbanks
 MWO (Mr Gnr)
 Armaments Division
 Defence Research
 Establishment Valcartier
 Courcellette, Quebec

The School's Weapons Department advises that the information you require concerning filling of white phosphorus rounds can be obtained by writing:

*Commander/Director
 Chemical Systems Labs
 ATTN: DRDAR-CLN-SE
 Mr. Charles Ferrett or
 Mr. Jim McKivrigan
 Aberdeen Proving Ground,
 MD 21010*

These people are the experts in this field and should be able to answer your question.—Ed.

Reunions

8th Infantry Division Artillery, Germany — 17-19 June 1983 in Nashville, TN. Contact J. W. Burwell, 104 E. Navajo, W. Lafayette, IN 47906.

278th Field Artillery Battalion Association — 5-8 May 1983 at the Quality Inn, Carlisle, PA. All former members of the battalion are welcome. For more information contact William N. Widmer, Lake Shore Drive, Pennsburg M.R. #1, PA 18073.

More on the missing charge 5WB sticks

On page 5 of the September-October 1982 *Field Artillery Journal*, 1LT Alma and 2LT Peaslee of the 1-27th FA discussed the problems caused by the lack of charge White Bag (WB) Graphical Firing Tables (GFTs).

I first became aware of these problems a few months after I was assigned as the battalion fire direction officer for the 2-35th Field Artillery. The absence of charge 5WB GFTs, which was never addressed in my Field Artillery Officer Basic and Advanced Courses and was never a problem in my M102 howitzer battalion, had me spending nearly a day trying to find NSN numbers to order them. There were no officers in my current M109 battalion who were comfortable with using a charge 5 Green Bag (GB) GFT to fire charge 5WB, but two battery chief computers taught me how to apply a cold-stick charge 5WB GFT setting using the tabular firing table (TFT) and the charge 5GB GFT setting obtained from a registration or meteorological plus velocity error (VE) computation. The Gunnery Department at Fort Sill informed me that this procedure was acceptable.

In the next battalion field training exercise (FTX), I registered with 5WB and transferred the GFT settings. Since the FADAC was not operational, the battery fire direction centers (FDCs) updated GFT settings with a met plus VE. While comparing the old and new GFT settings for all three batteries, I noticed large discrepancies between the elevation and time gagelines, and discovered that the common error was in the determination of the adjusted elevation.

FM 6-40, *Field Artillery Cannon Gunnery*, paragraph 6-12(1)3, instructs the computer to add the total range correction to the chart range and then set the GFT manufacturer's hairline (MHL) over this range to determine an adjusted elevation. When working with 5WB data on a 5GB GFT, however, the computer must enter the charge 5WB section of the TFT, table F, with the sum of the chart range plus total range correction and interpolate to find the correct adjusted elevation and corresponding time. This crucial step does not appear in FM 6-40; and if it is not followed, large errors result. At a range of 7,000 meters, discrepancy in adjusted elevation is 22 mils and the error is 320 meters. The range errors for

8-inch howitzers are even greater, approaching 600 meters when the range to targets is around 10,000 meters.

The editor's reply to Almay and Peaslee did not completely explain the lack of charge 5WB sticks. Perhaps the Gunnery Department believes that artillery units rarely fire charge 5WB; but, if a higher WB charge cannot be used, charge 5GB is a more logical choice. Perhaps they also feel that there would be great confusion if both charge 5GB and 5WB sticks were available. There is also a popular misconception that few FDCs compute firing data manually in a world of FADAC, TACFIRE, and hand-held calculators, and that the handful of instances where charge 5WB would be manually computed do not justify the production costs of charge 5WB GFTs. However, my experience indicates that the computation of charge 5WB firing data is a common occurrence during peacetime in the Active and National Guard units in Georgia.

At Fort Stewart, for example, all the firing points approved for charges 6 and 7 are west of a Georgia State Highway over which local regulations preclude firing time or variable time fuzes. When I recently took my firing battery to the field, I was issued a preponderance of WB propellants and time fuzes and thus was forced to fire charge 5WB. My battalion's ammunition allocation last year was 3,300 WB and only 1,100 GB, an imbalance resulting in many instances when charge 5WB was the only choice. This past summer, I helped evaluate three National Guard battalions which had to fire charge 5WB manually. Most FDCs obtained their data straight out of the TFT, although three or four were able to transfer a cold stick GFT setting from the TFT to the charge 5GB stick and one was able to apply a GFT setting derived from a registration. None of the battery or battalion FDCs could properly compute the subsequent met data for the charge 5WB.

Numerous charge 5WB rounds may be going downrange with 300 to 600 meter errors since the crucial alteration to FM 6-40 manual computation procedures is not well known. The best solution would be to produce WB GFTs for charges 3, 4, and 5. If this is not feasible, officer and enlisted training courses at Fort Sill should address the proper procedures for using a charge 5GB GFT for a charge 5WB. Additions to FM 6-40 and exposure in the *Field Artillery Journal* would help

spread the word on this problem and its short term solution.

Daniel P. Doede
CPT, FA
A Btry, 2d Bn, 35th FA
Fort Stewart, GA

*Your solution for the determination of adjusted elevation is a correct one. The white bag TFT must be used to determine this value during any subsequent met GFT setting update. The lack of GFTs for the lower zones of white bag has prompted the discussion of the use of green bag GFTs for the lower white bag charges in the revised FM 6-40 (this revision should appear in fourth quarter of FY83). Additionally, the Field Artillery Officers Advanced Course now teaches the proper gunnery procedures for this situation. The Gunnery Department's position is that green bag GFTs can **only** be used to fire white bag data when a valid white bag GFT setting has been correctly applied for the appropriate charge. The GFT setting must be determined by firing a registration with that charge and then updating the GFT setting using the appropriate data for the white bag charge from the TFT or derived from a computer solution (FADAC, TACFIRE, or BCS). Until the solution to the subsequent met problem in FM 6-40 is updated, the Gunnery Department strongly suggests following the sample met plus VE problems in the introduction section of the TFT when determining adjusted elevation and adjusted fuze setting.—Ed.*

Accurate Artillery

We in the 7th Infantry Division Artillery have a saying that "we do it right the first time." Your September-October 1982 issue carried two bits of information about the 1-79th Field Artillery, and you got it right neither time! On page 36, the commander of the 1-79th FA should be LTC Morris J. Boyd. On page 47, the author of the "Historical MILPERCEN Site" article, CPT Peter C. Eisen, is assigned to the 1-79th FA, not the 1-97th FA. Let's do it right the next time!!!

Accurate Artillery,
The Officers and Soldiers
of the 1st Battalion,
79th Field Artillery

The Accurate Artillerymen of the 1-79th FA have eyes as sharp as a laser beam — except for page numbers. CPT Eisen's assignment appears on page 45, not page 47. Oh well, to err is human.—Ed.

Hot Off the Hotline

QUESTIONS AND ANSWERS

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.

Please do not use this system to order publications. Consult your FA Catalog of Instructional Material for this purpose.

Question: Are standardized loading plans available for all vehicles we use in the field artillery. If so, how may we go about getting them?

Answer: Standardized field artillery load plans do not exist for all of the vehicles used in the field artillery. They exist only for the M109A2/A3 howitzer, the M548 cargo carrier in support of the M109A2/A3, and the M548 cargo carrier in support of the M110A2 howitzer. These load plans include the stowage of ammunition or those items listed in the stowage guide for the respective vehicles. These three standardized load plans will appear in changes to the respective weapons system manuals.

Question: We have been experiencing problems with Map Tacks (plotting pins) NSNs 7510-00-5457/5458/5455/5454, SC 6675-90-CL-NO2-HR, which are not very strong and are easily bent. We reordered on NSNs 7510-01-045-3527, 7510-01-046-5086, 7510-01-045-3528 from SC 6675-90-CL-NO2 in November 1981 and received a 1/2-inch Map Tack with a drill point which is just as bad. We then checked the R&A Information Letter dated January 1982 and checked our AMDF with those NSNs (7510-00-274-5457/5458/5455/5454), and they are listed as "Deleted-Isolated." What are the current NSNs and nomenclature of the current and correct plotting pins?

Answer: Presently there is only one NSN active for Map Tacks, 7510-00-274-5458, color red; and it is coded L, which gives you authority to procure local purchase. (A recommended source for local purchase is Labelon Corp, Graffco Division, Canandaigua, NY, 14424.) All the rest of the NSNs 7510-00-274-5457/5455/5454

are inactive-deleted and have not been replaced.

Question: Our unit has found that there is as much as six degrees deviation between powder temperature thermometers when calibrated. Is there an established standard for the accuracy of these thermometers, and what stock number is used to replace the ones which are out of tolerance?

Answer: Technical Manual 9-500 (page 28-2) is the reference for powder thermometers M1 and M1A1, and the national stock number for ordering them is NSN 6685-00-344-4603. Common Table of Allowances 50-970 lists these thermometers as expendable items costing \$62.63. If there are wide discrepancies among different thermometer readings for the same powder at the same time, it is likely that one or more of the devices is defective. But, if the discrepancies are relatively minor, select that thermometer closest to the mean reading. Calibration in the true sense of the word is not possible with these thermometers, but general support maintenance can provide a correction factor between the thermometer reading and the actual temperature.

Question: My question concerns an answer in the Redleg Hotline in the May-June 1982 *Field Artillery Journal*. It stated that a film was available entitled "The M198 Towed Howitzer," which could be obtained from the Project Manager, ARRADCOM, Dover, NJ 07801, Mr. Dan Fortini, Project Manager, AUTOVON 800-2234. I have tried that AUTOVON number, and apparently it is not a working number.

Answer: The AUTOVON prefix for ARRADCOM is 880 instead of 800. In accordance with DA Pamphlet 108-1, page 15, your film library should have a copy of MF 6-5997, "The M198 Towed Howitzer."

Question: What is the status of Polaris II Reticle testing and fielding?

Answer: Testing and evaluation of the Polaris II Reticle is complete, and the Engineering Change Proposal (ECP) was approved by ARRADCOM, Rock Island, IL, on 7 Jul 82. The Polaris II Reticle should be available for requisition sometime in FY83 and should cost between \$15 and \$20.

It will be requisitioned as a spare part and scheduled for installation in the M2A2 aiming circle at the installation maintenance facility.

TAD point of contact is Mr. Jerry Shelley, AUTOVON 639-4787/2408.

Question: Is there any field artillery policy concerning the wearing of safety shoes by military ammunition handlers assigned to field artillery units?

Answer: Paragraph 59 of United States Army Field Artillery Center and Fort Sill Regulation 385-10-1 requires unit commanders and supervisors to issue the safety toe shoe to military ammunition handlers and enforce the wearing of these shoes by taking appropriate administrative actions against violators.

Question: I would like an explanation of the function of the field artillery section (FAS) located at corps headquarters.

Answer: Current doctrine on the function and operation of the field artillery section is contained in FM 6-20-2, *Division Artillery, Field Artillery Brigade, and Field Artillery Sections (Corps)*.

Question: The 13E Soldier's Manual for Skill Levels 1, 2, and 3, dated 24 June 1982, gives FM 6-40, Chapter 12, Section X, as the reference for the TI-59 hand-held calculator. At the present time, this reference does not exist in FM 6-40. Is there a new change to FM 6-40 in publication; and, if so, when can we expect it in the field?

Answer: The reference to FM 6-40 regarding the TI-59 is incorrect. The 13E Soldier's Manual Supplement scheduled for publication in early 1983 will delete the reference to FM 6-40.

Question: What is the procedure for determining the fuze setting to fire with the M577 fuzes; specifically, is the M565 fuze setting corrected or is it used as it is? Also, are there any special considerations for computing safety? And finally, is there a reference pertaining to these questions?

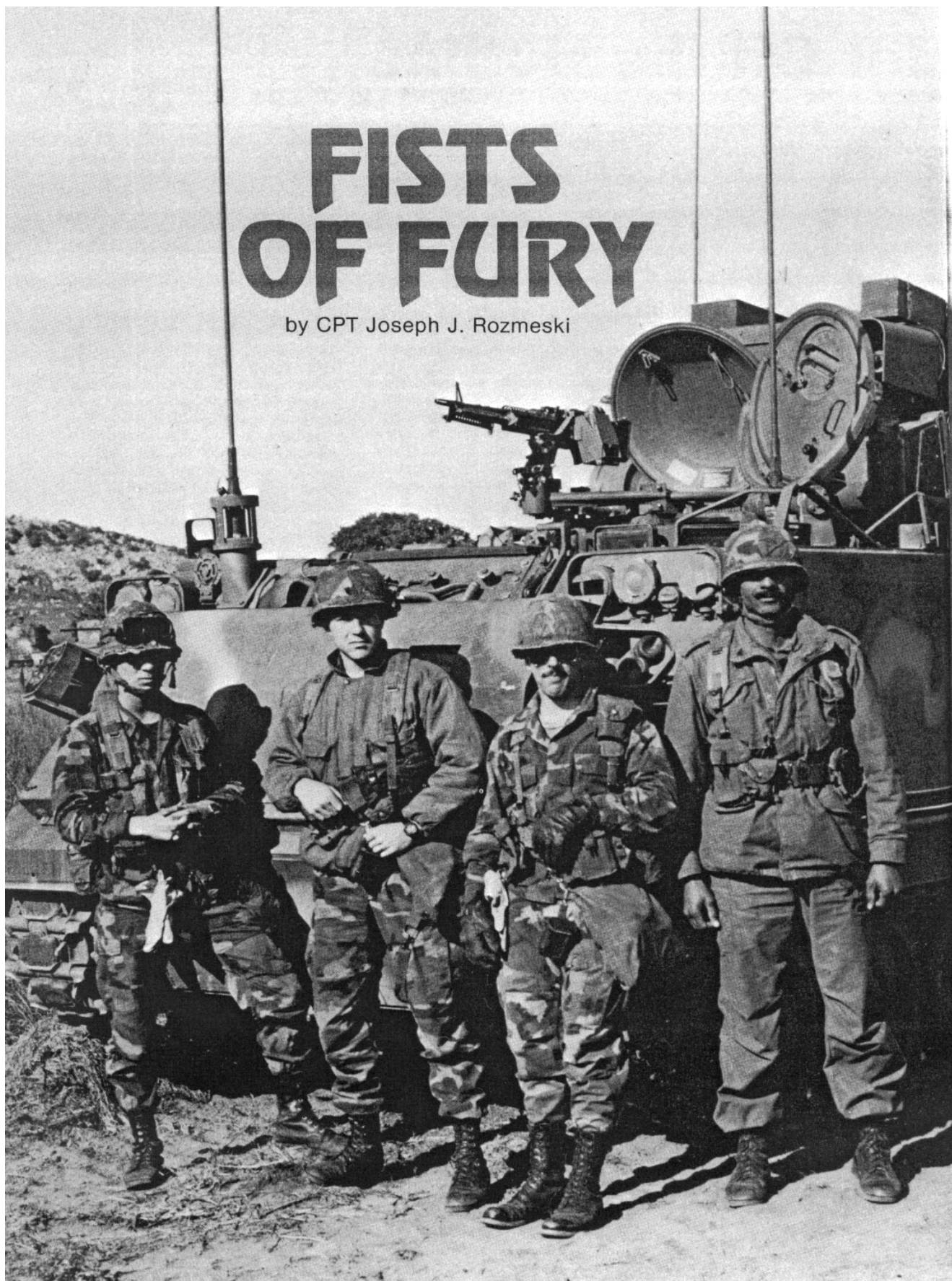
Answer: Corrections to fuze setting of fuze MTM565 for fuze MTSQ M577 are found in Table B for each charge in C9 to FT 155-AM-1. Computation of safety is the same after applying corrections.

Correction

The NSN for the Revision 5A FADAC tape reference in the Redleg Hotline response on page 7 of the September-October 1982 *Journal* should be NSN 1290-01-06-70396, rather than NSN 1290-01-06-0396.

FISTS OF FURY

by CPT Joseph J. Rozmeski



Recently, Home Box Office had a Bruce Lee night; and the leadoff movie, *Fists of Fury*, had enough bone crunching and head knocking to color the whole screen red. No offense Bruce Lee, but you haven't seen anything yet. The Army has its own "FISTS of Fury" that color the screen artillery red.

There has been a good deal of discussion over the past years about what the fire support team (FIST) is, but the maneuver commanders are rightly more concerned about what it can do. Perhaps the best way to illustrate the punch of the FIST is to match it against the capabilities of its most recent ancestors. The evolution of the FIST began with the first account of a distinct observer adjusting artillery fires through the use of flags during the Civil War. Though the requirement for an individual or an organization charged with planning and observing fires was constant, the ways of meeting that requirement changed radically.

Prior to World War II, the field artillery did not place forward observers (FOs) with the maneuver elements. Rather, each FA battery had a reconnaissance officer who was responsible for establishing a battery observation post manned either by himself or the battery commander.

During World War II, field artillery batteries did provide one FO to each supported maneuver battalion, but this single FO had to move from one company to another as these companies passed into reserve or were committed into battle. Thus, the maneuver commanders were routinely required to be their own observers; and they always did their own fire planning.

Between World War II and the Vietnam conflict, there was an attempt to relieve the maneuver commander of the forward observation role and put it in the hands of his trained field artillery or mortar observers. While maneuver enlisted mortar FOs were responsible for the employment of mortars, a three-man FO party, led by a commissioned field artillery officer, was developed to acquire and attack targets and to plan artillery fires in the support of maneuver operations. The maneuver commander was still responsible for doing his own integrated fire planning.

The fighting in Vietnam was a crucible for the FO concept, and certain impurities were revealed in the process. Though some of the old burden of fire support planning and target attack fell from the shoulders of the maneuver commander, he still had to insure that the efforts of mortar and field artillery observers were integrated both in the planning stages and in the execution of the plans. His attention to fire support detracted from his ability to plan, coordinate, and supervise the maneuver operations.

The nature of combat operations in Vietnam — maneuver platoons or squads frequently operating semi-independently away from the company command post — seriously reduced the effectiveness of the single three-man FO party and often forced the maneuver commander to reshoulder the whole

burden. He often had to draw extra observers for such operations, as was the case in June 1965 when the 3d Battalion, 319th Field Artillery, sent 10 additional forward observers (to include the battalion property book officer) to the 173d Airborne Brigade to support operations north of Bien Hoa.

Operations in Vietnam also demonstrated that the three-man FO party — a lieutenant, a sergeant, and a private — had a limited capability to operate over extended periods of time or when the party sustained casualties. The continuous 24-hour tactical scenario simply taxed the physical endurance of the party to the limit, and a casualty to a single member could upset the delicate balance of the party's effectiveness.

Two often cited studies of the late 1970s recommended a new organization built around the maneuver commander's real needs on the modern battlefield. Close Support Study Groups I and II developed the concept of the FIST.

In July 1975, Close Support Study Group I (CSSG I) was convened and tasked with the mission of optimizing observed fire support for maneuver forces on the modern battlefield. TRADOC centers and schools were invited to participate in the study. The study recognized that new challenges would face the maneuver company commander on the modern battlefield — among them a more effective enemy, wide sectors, and increasingly sophisticated direct and indirect fire weaponry. While the maneuver commander would remain the orchestrator of all available combat power, he obviously needed someone else to accomplish the detailed planning and coordination of indirect fire support. Based on the findings and recommendations of CSSG I, the fire support team concept was approved for implementation in June 1977; and does it ever meet the maneuver commander's needs!

The FIST envisioned by CSSG I would be an organization capable of providing the maneuver company with optimum, continuous fire support through the effective planning and coordinated employment of all available indirect fire means. Each FIST would provide the maneuver commander with a full time fire support coordinator—the FIST chief—and a platoon level observation capability in the person of field artillery forward observers or FIST-trained maneuver personnel.

While the maneuver company commander would still be responsible for the final fire support plan, as all maneuver commanders are, the FIST chief would plan all fires for him. Given the commander's guidance, he would develop an integrated fire support plan which could include the fires of mortars, field artillery, naval gunfire, and close air support. The FIST chief, a field artillery lieutenant, would no longer be the shooter that the lieutenant forward observer was; instead, he would be a true fire support coordinator. Relieved of the immediate responsibility for fire support matters, the maneuver commander could devote himself more fully to the maneuver operations and merely supervise the work of the FIST chief.

(Photo by James E. Williams)

January-February 1983



Above: FO party at Cherbourg in World War II. Above right: Three-man FO party as depicted in the October 1944 *FA Journal*. Below right: The artillery lieutenant FO was primarily a shooter in Vietnam.



Assisting the FIST chief in this effort were the other two members of the three-man FIST headquarters supporting all infantry companies and the other four members of the five-man FIST (consisting of a three-man headquarters and a two-man FO party) supporting armor and armored cavalry companies or troops. A fire support sergeant would be capable of replacing the FIST chief, and a fire support specialist could perform some of the duties of both the FIST chief and the fire support sergeant and would be as qualified in forward observation as his teammates. Thus, the FIST headquarters would have the capability of operating continuously and of providing temporary replacements to casualties in the platoon forward observer parties. The importance of a cross-trained fire support agency was evident as far back as World War II. For example, during the Siegfried Line campaign, northeast of Wuerselen, on 13 October 1944, the 120th Infantry was involved in a counterattack of the Birk Crossroads. Early in the attack, one rifle company sustained heavy casualties, including the one artillery observer supporting the company. His loss resulted in the suspension of artillery supporting fires, and it was almost three hours before the battalion artillery liaison officer made his way forward and set up an observation post.

The observation capability at infantry platoon level would resolve a number of the deficiencies identified during the conflict in Vietnam. The two-man platoon observation party would consist of a sergeant forward observer and a private first class radiotelephone operator; both members of the party would be trained to locate targets and adjust field artillery and mortar fires. Since each infantry platoon was to have its own observation party, the maneuver commander would be able to have the immediate response of a fire support system, even on the battlefield envisioned for the 1980s and 1990s — the broken, rugged, compartmentalized terrain of the country and the cities. Being able to spell each other during normal operations and having the FIST headquarters as a source for temporary replacements, the members of the platoon observation party could perform for extended periods of



time, even if one of them became a casualty.

CSSG I determined that platoon FOs were not required in armor platoons for several reasons. First of all, tank platoon leaders have heavy, close-in, immediately available firepower in the tank main gun. Also, there is no place for a tank platoon FO to ride. The study also concluded that tank platoons normally would be cross-attached with mechanized infantry platoons which would have platoon observers who would assist in providing close-in defensive fires. Though the armor and armored cavalry companies or troops would not have field artillery platoon observation parties, the FIST headquarters would provide on-the-job observation training to all platoon leaders, platoon sergeants, and enlisted scouts. In all cases, the maneuver platoon leaders, like their company or troop commanders, would have more time to devote to maneuver operations;

and the FIST headquarters could concentrate primarily on fire support planning and coordination.

CSSG I provided a quick-fix for the observed fire support system; however, experience gained through implementation of the FIST concept identified shortcomings which pointed to a need for refinement of organizations and doctrine. Convening in December 1978, Close Support Study Group II (CSSG II) was to optimize observed fire support to the maneuver forces into the 1986 time frame.

The study group examined the personnel organizations of the FIST established by CSSG I. While CSSG II verified the need for infantry platoon observers and the inappropriateness of platoon FOs for armor units, it concluded that the existing FIST headquarters were not appropriately manned to perform their required duties. Concluding that the three-man headquarters of an infantry company was insufficient for sustained operations, CSSG II augmented it with an additional fire support specialist. CSSG II also reduced the armor and armored cavalry FIST from five men to four, concluding that an indirect fire observation capability beyond that of the FIST headquarters and an observation party capability within the FIST headquarters were both unnecessary. A four-man headquarters was deemed sufficient for the conduct of prolonged fire support operations.

But enough of history and enough of organizations. The FIST clearly benefits the maneuver commander by means of its organization, but the message most welcome to the ears of a maneuver commander is probably the crash of steel on the target. At the risk of creating a litany from an entire field manual on fire support, one must make clear to the maneuver arms that the Army's FIST provides the commander with a doorway to the indirect fires available. The FIST can hit the enemy with shell high explosive, white phosphorus, smoke, improved conventional ammunition, dual purpose improved conventional munitions, illumination, scatterable mines, and smart rounds like Copperhead. The FIST can also attack the enemy with mortars (shell high explosive, white phosphorus, illumination, and smoke), naval gunfire (shell high explosive, white phosphorus, illumination, and armor piercing), and close air support (20-mm and 30-mm cannons, rockets, cluster bomb units, general purpose bombs, and fire bombs). The FIST can also designate targets for the Army attack helicopter equipped with the Hellfire missile.


The fire support organizations and doctrine are exploiting technological advances in the development and fielding of new equipment. In the laser and digital environment of the modern battlefield, the FIST vehicle (FISTV), a modified M113A2 armored personnel carrier which will be provided to mechanized infantry, armor, and armored cavalry FIST headquarters, will be a significant factor. It has battlefield mobility commensurate with that of infantry and cavalry fighting vehicles and will be

equipped with the Ground-Vehicular Laser Locator Designator (G/VLLD), four radio sets (one AN/VRC-46 and three AN/GRC-160 FM radios), a thermal night sight, a north-seeking gyrocompass, the position locating reporting system, a digital message device (DMD), and an improved FIST DMD for communicating fire missions, damage assessment, subsequent corrections, target lists, and any free text message of up to 37 characters.

With the Ground/Vehicular Laser Locator Designator, the FIST can designate stationary or moving point targets at ranges up to five kilometers and exploit the high first-round kill probability of laser guided munitions such as Copperhead and Hellfire. The G/VLLD allows the FIST to determine observer-to-aimpoint range to an accuracy of ± 5 meters at ranges up to 10 kilometers. Target location errors are reduced significantly with the azimuth and elevation angle data determined with the G/VLLD, which can be employed in a dismounted mode, away from the FISTV, if the situation so demands.

The FIST DMD, an improved DMD, permits digital communications between the FIST headquarters, subordinate FOs, the battalion fire support officer (FSO), and the various digitally equipped fire support means. It is a multichannel device which allows messages to be switched digitally from one net to another and allows the FIST headquarters to receive messages from the FO, review and/or edit the messages, and transmit them on the same or a second net to an appropriate fire support means. Digital traffic can proceed from a DMD, through TACFIRE, to a firing unit in 3.8 seconds.

The FISTV increases the fire support capabilities of the FIST headquarters and optimizes the use of the target location/designation devices and communications assets. Equipment can be employed dismounted, providing the FIST chief with several options for employing his headquarters. For example, the FISTV may be best positioned on dominant terrain within the company zone where the G/VLLD may be employed. However, the best position for the company commander may be forward in a position compatible with the range of his direct fire weapons. In this case, the FIST chief could accompany the company commander with an AN/PRC-77 radio set and the single-channel DMD.

The FIST is where fire support for the maneuver company commander begins. It can hit the enemy every day and every way. Bruce Lee's "Fists of Fury" are awesome, and a guy would be crazy to tackle him in a dark alley. But an enemy would have to be certifiably reckless to come within combat arms length of the US Army FIST. 

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EIGHT-BALL CANNONEERS

by COL (Ret) Bryce F. Denno

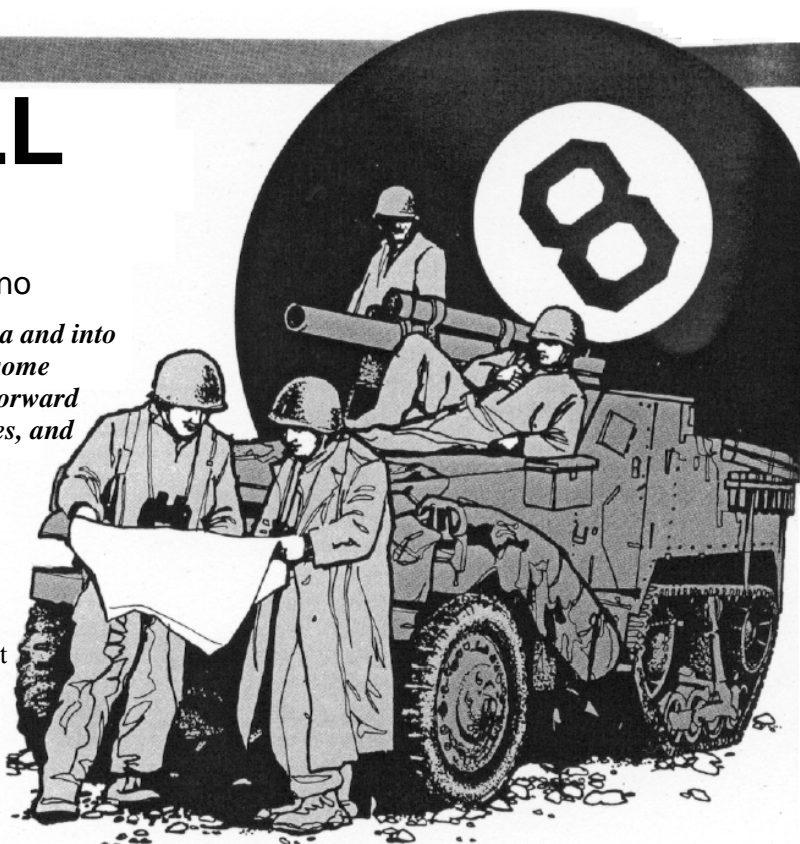
In their shoot and scoot across North Africa and into Italy, the "eight-ball cannoneers" give us some timeless lessons on training, survivability forward observation, air defense tactics, massed fires, and combined arms operations.—Ed.

During the late spring of 1942, in the midst of final training exercises and preparations for an overseas move, the First Infantry Division reorganized in accordance with new tables of organization and equipment (TOE). One result was the appearance of the regimental cannon company designed to provide close support artillery fire. Then a heavy-weapons company commander, I was ordered to activate, train, and command this new unit in the 16th Infantry.

The Cannon Company TOE provided for a company headquarters and three self-propelled howitzer platoons. Two of the platoons consisted of three 75-mm pack howitzers, each mounted on half-tracks. The third platoon had two 105-mm howitzers, each on a full-track mount (actually a medium tank chassis). A .50 caliber machinegun, mounted for antiaircraft fire, completed the armament of each of the company's eight howitzers. The self-propelled 75-mm gun was clearly an improvised weapon, utilizing a personnel carrier and a howitzer originally designed for transport on the backs of mules. By contrast, the self-propelled 105-mm howitzer was standard equipment for armored field artillery. These weapons, however, were not issued in the States, but would be provided at our overseas destination.

Thus, my first concern was to acquire a quick and practical education in the art of artillery, considered by many infantrymen in those days to border on the arcane. Accordingly, with two infantry lieutenants and a handful of noncommissioned officers (NCOs) I joined a firing battery of our regiment's supporting 7th Field Artillery (then undergoing intensive field and firing training) for some on-the-job training.

Subsequently, I returned to the regiment to intensify a previously-begun recruiting effort; and here, I encountered a problem. My regimental commander permitted me to select any two lieutenants in the regiment who were not commanding companies. However, I had to have the concurrence of the company commanders affected to recruit additional officers and all enlisted men.



This restriction caused me to resort to intensive negotiation, "horse-trading," and other maneuvering which I suspect is employed by modern executive "head-hunters." Needing experienced NCOs, I put out the word that I would accept "busted" NCOs who promised not to repeat past transgressions.

Finally, while packing for overseas movement, I filled out the company's complement of some 118 men and officers. In so doing, I acquired a few soldiers who (warranted or not) did not enjoy the best of reputations in the regiment. Hence, the brand-new company, in its early days, earned the nickname of "eight-ball cannoneers."

From carbines to cannons

When we reached England in August of 1942, we had all of our men and most of our equipment except for our cannons. We trained as a rifle company and also acquired proficiency with our machineguns. As weeks, then months, passed, our anxiety deepened because it was obvious that we were soon going to war; but would we go as a carbine company — the weapon with which most of us were armed?

We got our cannons, finally — in time to spend a day and a half on the firing range employing direct fire, the only method which time permitted. When targets eluded our fire on the moving target range against simulated tanks, discouraged gunners questioned the effectiveness of our howitzers. (Because of the howitzer's low-velocity and high trajectories, they were not as suitable as high-velocity guns for

direct fire.) Then, an officer crew took over, methodically demolishing moving targets until none remained, which at least partially restored confidence in our howitzers as antitank weapons. Shortly thereafter, we moved to ports of embarkation for the long sea voyage which would end in Oran, Algeria.

I was grateful for the time at sea in our slow-moving convoy because it allowed time for long skull sessions wherein officers and NCOs formulated the tactics we planned to employ in combat and then published them in a typed manuscript — probably the first Cannon Company field manual.

We envisaged three types of employment. The first was direct fire against stationary or moving targets with emphasis on the use of sight defilade to protect our howitzers from enemy fire. The second was indirect fire by single piece with the fire controlled by platoon leader or platoon sergeant, communicating by field telephone or radio. The third method was identical to that of conventional field artillery, with each platoon performing as a firing battery. Since we had trained only in direct fire, and very briefly at that, we realized we would have to rely on that method exclusively in our initial action.

First combat

On 8 November 1942, the 16th Infantry landed on Arzew Beach east of Oran. Our enemy were Vichy French forces, composed mainly of native troops with French officers. Attached initially to the 1st Battalion, we saw our first action. It took a form quite different from any we had envisaged when we employed our two half-tracks as scout cars. In so doing, we outflanked an enemy force which had pinned down a Ranger company by fire. With the help of a Ranger platoon, we took our first prisoners.

By nightfall second day, all our guns were safely ashore and the entire company moved through darkened Algerian villages toward Oran until we encountered the US 2d Battalion. This unit had met French resistance on the road to Oran, but all seemed quiet when the battalion executive officer and I moved forward to size up the situation. Then, a machinegun sputtered and bullets ricocheted nearby. We dove into a drainage ditch and crawled to the rear. Returning to my company, in column on the road, I deployed my first platoon, the 105mm howitzers, in line. We pointed them in the general direction of the enemy machinegun and fired a few resounding salvos into the darkness. There was no reply from the enemy, who was undoubtedly startled to receive artillery fire at such close range.

First light revealed a stretch of farmland astride the road to Oran dotted with widely-separated stone farmhouses, some surrounded by stone walls. The latter served as strongpoints for enemy riflemen and machinegunners.

When the US 2d Battalion's assault rifle companies attacked, our Cannon Company guns fanned out like

tanks before them, concentrating artillery fire on enemy strongpoints. Charging into enemy positions, cannoneers fired carbines, tommy guns, and machineguns while some threw hand grenades. In the close and confused fighting, the crew chief and another cannoneer of a full-track were hit; and their vehicle caught fire. The remaining crewmen, however, stayed with their gun, extinguishing the fire even as they exchanged shots with the enemy. Friendly riflemen and other guns rushed to their aid. One half-track moved cautiously to the crest of a small hill where crewmen heard the distinctive crack of a high velocity round, probably antitank. The gun withdrew quickly into defilade.

Fighting was intensive throughout the morning as our 2d Battalion riflemen and cannoneers overcame one strongpoint after another. Then, suddenly, enemy resistance dissipated. Rifle companies entered the outskirts of Oran, and Cannon Company guns assumed firing positions outside the city. The battle was over.

For its performance at Oran, Cannon Company received a Division unit citation; and its members were decorated with almost a third of the silver stars awarded within the regiment. My regimental commander permitted me to award a battlefield commission to any Cannon Company enlisted man of my choosing. (After two of my NCOs declined, a third accepted the promotion on the condition that he would remain with the company.) Morale was high as the company set up camp in a small village a few kilometers from Oran. There, my combat-experienced soldiers — fresh from their triumphs of the battlefield — resumed their basic artillery instruction which they had barely begun a few short weeks ago in England.

Our primary training mission was to learn to operate as conventional artillery, employing indirect fire. In effect, the company constituted a miniature field artillery battalion. Around the guns, crewmen employed the same drills and firing procedures which we had learned from the field artillery. In one respect, our 75-mm gun crews differed from those of the other two cannon companies in the division, which had four-man crews. By loading left-handed, we eliminated the need for a man. Initially, at least, we visualized that the company commander would direct all Cannon Company fire, employing forward observer methods exclusively.

Reports from US units then fighting in Tunisia stimulated our acquisition of indirect firing skills. Self-propelled howitzers employing direct fire, the reports emphasized, were favorite and vulnerable targets for the high velocity German 88-mm gun. We devoted days to gun drill and nights to blackboard instruction in the village's one-room schoolhouse. Nearby mountains provided us with ideal ranges for service practice with live ammunition.

Nor did we neglect direct fire training, especially against tanks. We needed no reports from Tunisia to underscore the inherent inequality of a contest between

our howitzers and the German tanks. The tank was heavily armored and, when buttoned up, was immune not only to small arms fire but also to shell fragments. None of our guns had overhead cover, and the fragile bodies of our half-tracks could repel only small arms fire. The tank's high velocity gun was infinitely superior to the low velocity howitzer in a face-to-face contest in the open.

Thus, we realized that we would have to employ surprise, speed, and caution in engaging tanks and developed procedures and drills to do so. Upon encountering tanks, Cannon Company howitzers would seek defilade quickly and would emerge to sight-defilade firing positions only after crew chiefs and gunners both had identified the location of targets, usually by crawling on their bellies to the crest of ground concealing howitzers from the front. (This procedure, of course, minimized the time needed to sight on a target and hence the time of exposure to enemy fire.) The howitzers would not normally fire more than three rounds without returning to defilade. We insured that the basic load of ammunition carried in each vehicle contained a substantial percentage of HEAT (high explosive, antitank) shells. To train gun crews in its use, we spent long hours tracking and firing with homemade dummy rounds at slow-moving jeeps which simulated enemy tanks. During our training, we also found time to exercise our antiaircraft machineguns.

Tunisia

By the time we moved from Oran to Tunisia in early 1943, we felt well-trained; and our subsequent performance in combat justified our confidence. Throughout Tunisia, we operated almost entirely as conventional field artillery although our positions were invariably well forward of our supporting artillery and often devoid of friendly infantry protection. Locations of our observation posts ranged from forward rifle company positions to hills in "no man's land" to mountains which were so popular they were festooned with other observers, mostly artillerymen.

Experience justified our early decision that the company commander would normally conduct fire of the company. Taking my orders directly from regiment, I usually had a good grasp of the overall situation when I set up my observation post. Thus, I avoided such common errors as firing on our own troops or into the zone of adjacent units. I felt then, as I still do, that the critical point in the whole artillery system focuses on the observer who brings the awesome fire of his guns, and often the guns of other supporting artillery, to bear on enemy targets. As our cannoners gained increasing proficiency with their weapons, our lieutenants spent more time on observation posts. I visualized a time when our platoon sergeants would assume completely the artillery role of battery executives and all officers, with the possible exception of the supply

officer, would man observation posts.

We employed direct fire in Tunisia only under special circumstances. On two occasions, we used single guns on raids against targets of opportunity. In doing so, we moved by well-defiladed routes behind a screen of cannoners deployed as an infantry patrol. On one raid, we took out a German antiaircraft gun and its crew with a single round, withdrawing rapidly as the enemy retaliated with mortar fire. On the other raid, we came out second best (fortunately without casualties) to a German machinegun which beat our half-track to the punch as it came out of defilade. Only once did we employ direct fire against enemy tanks and scored no hits.

Throughout the Tunisian campaign, we found frequent use for our antiaircraft machineguns. We had eight of these on our howitzers and three others on trucks frequently at gun positions. Thus, we could deliver a heavy volume of fire against German planes which habitually sought artillery as prime targets. Our tactics were basic — project tracers well ahead of an enemy plane and let it run into the fire. On more than one occasion, we sent attacking planes off trailing smoke. Cannoners delighted in shooting at enemy aircraft, but this popular diversion often became hazardous — not always from enemy action. Friendly antiaircraft fire against German dive bombers turned into grazing fire against us as adjacent gunners followed bombers to the low point of their dives. We lost a cannoner to such friendly fire.

El Guetar

The battle of El Guetar marked one highlight of our service in Tunisia. During the early stages of that contest, the German 10th Panzer Division swept through a valley bordered by rocky mountains to attack the 1st Infantry Division. At the time, my two half-track platoons, attached to the 18th Infantry, were on the 1st Infantry Division's right flank, which was firmly anchored in mountain positions.

The momentum of the enemy's thrust in the center carried him well past the division's right flank. Thus, from a hill overlooking my gun positions, I could see the Germans deploy in magnificent, if frightening, panorama. Lumbering Mark VI tanks led the assault, followed by motorized infantry and supporting artillery. Logistical units set up motor pools and other installations in the rear. The battleground was dotted by exploding rounds from our divisional artillery. The Germans sought defilade to their front as protection, but they were exposed on their left flank to our fire.

What followed was an artilleryman's dream as the guns of our unit and those of the 18th Infantry's Cannon Company (some 14 tubes in all) fired side-by-side in unending fusillade, scattering enemy infantry formations, destroying artillery pieces and

their crews, and demolishing motor pools. Clouds of thick black smoke rose from the carnage we had created. Then came retribution in the form of counterbattery fire which lasted two days and nights. I was thankful for the protection of the deep wadi (dry stream bed) in which my guns were positioned. Losses were negligible, but we suffered our first cases of what we then called "shell-shock" (later termed combat fatigue).

At one time, when it appeared that German infantry were forming to attack us, we prepared our defense; cannoneers transferred our machineguns from antiaircraft to ground mounts and sited them. Shovels flew as cannoneers turned riflemen dug foxholes near the crest of the wadi. The German infantry attack never materialized. But, if it had, I am convinced that my cannoneers, fighting as a rifle company reinforced by six machineguns, would have performed admirably.

The final stages of the Tunisian campaign were difficult days for the 16th Infantry; American troops fought through potent defenses in the Mateur sector to seize Tunis and end the war in North Africa. Rifle companies were well below half-strength, and our entire 1st Battalion was lost when it attacked at night through a mountain pass only to be surrounded and cut off the following day. Attempting to assist that battalion, I used a rifle company observation post to direct the fire of our divisional medium artillery as well as my Cannon Company. At the end of an eventful day — during which our own artillery fired mistakenly on us and we engaged in a close-in fire fight with German infantry apparently stalking the observation post — I returned exhausted to my company late at night and crawled into a sleeping bag.

The clatter of our machineguns awoke me at dawn, and I looked up to see a German plane zooming low and fast over our gun positions. Tracers entered the plane's fuselage; and it retired, trailing smoke. Soon, thereafter, came the order, "fire mission," and cannoneers leaped to their guns. Despite the noise, I fell back in a half-sleep.

Later, a lieutenant awakened me. My regimental commander was on the field telephone relaying the congratulations and appreciation of a regiment from the adjacent 34th Division. Cannon Company fire had savaged a German pack artillery battery and broken up the attack of an enemy infantry battalion in the sector of our neighboring regiment.

The next day, I visited my regiment to explain that I had slept throughout most of my company's performance. It was time for me to move on; and I did, joining our 2d Battalion as its executive officer.

Sicily

But I was to see the Cannon Company again sooner than I had anticipated, when its guns came to my aid in Sicily. It was late June 1943. As we filed out of the

heavily-guarded tent near Algiers, key officers of the 16th Infantry had just heard LTG Omar Bradley, II Corps commander, say in his high-pitched voice, "As the First Division goes, so goes the invasion of Sicily," and exchanged meaningful glances. We had served under General Bradley in the recently-concluded North African campaign and respected him and had confidence in his judgement. His briefing had confirmed our suspicion on what could be expected when we made our amphibious assault on beaches near Gela. In accordance with orders from regiment, my battalion, the 2d, had designated, by name, a succession of command beyond executive officer. I served in the latter capacity.

Results of a highly realistic training maneuver just conducted on North African shores were less than reassuring since, during that exercise, US tanks, simulating the German enemy, had overrun our regiment's assault battalions — the 1st and the 2d — soon after D-day. This was particularly disturbing since just beyond our planned landing beaches in Sicily waited the Hermann Goering Panzer Division; and we were not at all certain whether paratroopers of the 82d Airborne Division, scheduled to drop before H-hour in front of us, could delay enemy armor long enough for us to establish a beachhead. Also, heavy weapons (antitank guns, tanks, and artillery) were not expected to land until well after D-day.

The ensuing Sicilian invasion closely followed the scenario of our training exercise. Landing in heavy seas during the early hours of 10 July 1943, our assault companies (assisted by paratroopers) moved through artillery fire to overcome the resistance of Italian infantry and light armor. Then, on the second day of the invasion, tanks of the Hermann Goering Division struck.

Our battalion's rifle companies were forced to withdraw while enemy tanks continued the attack until overrunning our G Company dug in on a small hill. Here the battalion made its stand as infantrymen battled tanks with 37-mm antitank guns and bazookas.

By evening of our second day ashore, enemy tanks were again forming to our front. Using a field telephone, I directed, simultaneously, fires of 7th Field Artillery howitzers and the tremendously effective 6-inch guns of the US Navy's cruiser, *Boise*. Although the cruiser's shells sounded like locomotives as they passed aloft, we knew that it would take more than long-range fire to keep the enemy off our backs. It was then that I received word that our regimental cannon company, with its self-propelled 75-mm and 105-mm howitzers, was landing. (Two months previously, I had commanded this unit and had utmost confidence in it.) "Send me my cannoneers," I pleaded with regiment; "They'll get us out of this mess."

Cannon Company, however, was deployed on a broad plain east of Gela. There, in less than an hour,



it concentrated more than 1,000 rounds on advancing enemy tanks. While continuing to fight in this sector, it dispatched two guns — a 75-mm and a 105-mm — to assist the hard-pressed 2d Battalion. In subsequent action, the 75-mm gun was hit immediately, wounding the driver and disabling the vehicle, while the self-propelled 105-mm, which had silenced enemy machinegunners sweeping our position, caught a direct hit from a German Mark VI tank. It burned furiously and exploded.

Despite its losses, Cannon Company had given us the respite we needed. Reassembling the battalion's ragged elements, we launched a counterattack and eventually seized Niscemi, the regimental objective.

For its distinguished performance in Sicily, the 16th Infantry's Cannon Company received the Presidential Unit Citation. The text of this award noted the company's "heroic courage and perfect discipline," together with its "superior efficiency and devotion to duty" which enabled it to destroy some 16 enemy tanks in three days of incessant fighting.

The veteran infantrymen of Cannon Company, 16th Infantry, had come a long way in the 14 months since the unit's activation.

Wounded shortly after the Sicilian invasion, I did not see Cannon Company again; but I kept track of its subsequent exploits. It suffered severe equipment losses in the initial stages of the Sicilian campaign, but the cannoneers acquired three captured German 88-mm guns and ammunition. I could imagine their delight in employing these weapons — having been on the receiving end of their fire in so many occasions.

When Sicily fell, the 1st Division returned to England. There, Cannon Company received the truck-drawn 105-mm howitzers which supplanted self-propelled guns in the reorganized infantry Cannon Company. The new weapons inevitably changed the character of the company which almost exclusively became a field artillery unit. It continued to perform in superb fashion; and, during the Normandy landing, when it lost all but one of its guns at sea, it went into action as a rifle company. Two of its commanders were killed in action during fighting in Europe.

It had been the self-propelled guns, however, which had permitted Cannon Company to play its distinctive and unusual role throughout the short 11 months it possessed these weapons.

Reflections

When I was reassigned to Headquarters, Army Ground Forces in early 1944, I found the Army beset by reservations and doubts concerning the infantry cannon company's role, organization, and armament. With time for reflection on my

departure from Sicily, I had begun to entertain similar doubts.

It seemed to me that the infantry cannon company had been organized and equipped almost exclusively to provide its regiment with artillery fire delivered in conventional field artillery fashion. The fact that its howitzers were self-propelled, however, invited the company's assumption of additional roles. Cannon Company of the 16th used its guns as scout cars and tanks during the North African invasion. Throughout Tunisia, it delivered artillery and antiaircraft fire, but it also conducted raids. In its finest hour, during Sicily, Cannon Company assumed the role of tank destroyer. It did so, firing howitzers which — especially in the case of the 75-mm with which the company was principally armed — fell far short of being ideal antitank weapons.

I therefore reached the conclusion that what the infantry regiment needed most was not more artillery fire supplementing that provided by its supporting field artillery battalion and other artillery units. It required a unit designed to perform additional tasks which had been assumed, through exigencies of the battlefield, by the cannon company. What I had in mind was a medium tank company which, among other uses, could help the infantry regiment meet its greatest threat — the enemy tank.

True, the regiment had an antitank company (then armed with truck-drawn 57-mm guns), but these had special usefulness when sited in prepared defensive positions. In the attack, however, or even in a mobile defense, they were vulnerable, when moving, to enemy artillery and even small arms fire. They were also road-bound, at least partially. A tank, however, could move over rough ground; and its crew would be protected from ordinary artillery and small arms fire. Also, it could engage other tanks or point targets.

Nevertheless, the self-propelled infantry cannon company made a unique contribution, despite its short existence, to the evolution of the infantry regiment.

While doing so, Cannon Company of the 16th attained a place of honor in the annals of its regiment. It pulled its weight on the team and earned the respect of its fellow infantrymen who, even today, recall its members as the cannoneers of the 16th Infantry. ☒

COL (Ret) Bryce F. Denno, IN, graduated from the United States Military Academy in 1940. During World War II, he was a heavy weapons company commander assigned to the 16th Infantry, 1st Infantry Division, where he was ordered to activate, train, and command the "Cannon Company." He was wounded in Sicily and finished out his tour of duty with the 71st Infantry, 66th Infantry Regiment.

Redleg Newsletter

ITEMS OF GENERAL INTEREST

USMAPS is accepting applications

The primary mission of the United States Military Academy Preparatory School (USMAPS) is to prepare soldiers for admission to the United States Military Academy at West Point, NY. Located at Fort Monmouth, NJ, USMAPS gives soldier candidates 10 months of instruction, primarily in English and mathematics, designed to improve their scholastic abilities and their chances of competing successfully for an appointment to West Point.

To be eligible, a soldier must be of high moral character, possess leadership potential, be motivated toward a career as a Regular Army officer, be in excellent physical condition, and be medically qualified as outlined in Army Regulation 40-501. In addition, applicants must meet the following requirements:

- Be at least 17 but not 21 years of age on July 1 of the year the soldier enters the Military Academy Preparatory School.

- Be a citizen of the United States, or be able to become a citizen prior to entering the Academy.

- Be unmarried and have no legal obligation to support a child or children.

- Be a high school graduate or equivalent.

Commanders should identify soldiers eligible to attend USMAPS and encourage them to apply for admission. Application procedures and eligibility criteria can be found in Army Regulation 351-12. The application deadline for the 1983-1984 class is 1 May 1983.

Field jacket to be issued

The Army will begin issuing the camouflage field jacket for use with the battledress uniform in March 1983. Recruits will receive one of the jackets, along with one of the current field jackets, until October 1983. After that time, only the camouflage field jacket will be issued. Clothing sales stores will also begin selling the new jacket in March. The field jacket, which features an infrared reflective dye, requires the same care as the rest of the battledress uniform.

T-shirt wear rule revised

As of 1 January 1983, soldiers must wear either the brown or green T-shirt with the battledress uniform. Wear of the white T-shirt is authorized only through the end of this year. After that time, soldiers may wear the white T-shirt only if it has been dyed brown using procedures recently distributed to the major commands. Detailed information is available from the Army Troop Support Agency, ATTN: DALO-TAS, Fort Lee, VA 23801 (AV 687-2310).

January-February 1983

Compensation statements to be issued

Beginning last November, all Army personnel received a special annual statement from the US Army Finance and Accounting Center at Fort Benjamin Harrison, IN. Called a Total Value Compensation Statement, the form itemizes a soldier's pay, allowances, tax advantages, and other military benefits in order to reflect the total monetary "value" of military service.

One part of the form shows the direct compensation—base pay, quarters allowances, separate rations, etc.—as of 31 October 1982. Another part shows the value of retirement benefits, medical care, death and survivor programs, and social security coverage. In the final parts of the form, a soldier is asked to estimate the value of things such as commissary and exchange privileges, education programs, recreational activities, and space-available travel—all depending on how often he or she takes advantage of these types of military benefits.

According to a compensation and entitlements officer from the Army's Office of the Deputy Chief of Staff for Personnel, all the military services are being directed by Congress to issue these statements to insure that servicemembers understand the full value of their pay and benefits.

Award approvals

The Secretary of the Army has approved certain changes to AR 672-5, which outlines levels of approval authority for Army awards. Effective 1 December 1982, commanders in the grade or position of colonel will be authorized to approve awards of the Army Commendation Medal (ARCOM) and Army Achievement Medal (AAM) to members of their commands or agencies. Also, commanders in the grade or position of lieutenant colonel will be authorized to approve awards of the AAM to members of their commands.

Project managers working for the US Army Materiel Development and Readiness Command (DARCOM) will have authority to approve awards to members of their projects. Major generals will be authorized to approve Meritorious Service Medals (MSMs), ARCOMs, and AAMs; brigadier generals and colonels will be authorized to approve ARCOMs and AAMs.

Check stored garments

The normal 5-year shelf life of chemical protective overgarments manufactured between 1977 and 1980 may be extended if the garments are inspected every 12 months. The Army plans to begin a program of regular inspections of stored chemical protective overgarments during 1983.

SQT requirements

There are some important changes coming soon to the Army Skill Qualification Test (SQT) for E1 through E7 soldiers. The refined SQT program still requires an annual formal test, but now gives commanders the opportunity to informally evaluate their soldiers' proficiency. According to the Deputy Commander of Army Training Support Center's (ATSC) SQT Management Directorate, COL Nathaniel R. Roache, it also adds emphasis to basic soldier combat and individual skills.

The new program will have three parts: a common task test, a unit-selected hands-on evaluation, and a written SQT.

- The common task test is based on the Soldier's Manual of Common Tasks, FM 21-2. Ideally, each soldier in grades E1 through E7 will take the common task test annually, although frequency of testing may differ slightly in Reserve Components. The hands-on test requires no formal test site; in fact, it can be included in the ARTEP for field training. A checklist used to give the common task test will be incorporated into the Soldier's Manual of Common Tasks as it is revised for publication, and the common task test will have a written backup test for those units without the necessary equipment.

- The second part of the new SQT program covers hands-on evaluation of MOS tasks, also applicable to all soldiers E1 through E7. Commanders will have total flexibility in choosing Soldier's Manual tasks for hands-on evaluation and in conducting the evaluation. Hands-on evaluation checklists are also being included in the Soldier's Manuals. Commanders can use Soldier's Manuals to conduct training as well as to evaluate it; so commanders can include these hands-on evaluations in an ARTEP, deployment exercises, or, most importantly, in routine and opportunity training. Commanders will be encouraged to conduct formal spot checks of training using these hands-on evaluations, but will not report the test results outside the unit. Until TRADOC revises all the Soldier's Manuals with hands-on checklists, the command will produce Soldier's Manual Supplements.

- The last part of the new program is the written SQT. Ideally, each soldier, E1 through E7, will take this written test annually (except in the Reserve Components, which may test every other year). The formal test will last about two hours and will evaluate from 16 to 37 Soldier's Manual tasks, depending upon MOS. Also, the test period will be three months rather than nine months.

Key features of the refined program are its simplified administration, enhanced flexibility to commanders, and more effective evaluative mechanism, which will reduce the amount of administrative requirements now associated with the SQT. Also, the amount of material in the test notification has been drastically reduced, and will now consist of only a task list about two pages long. The change

of the hands-on evaluation from a formal requirement to an informal one reduces the administrative load and provides desired flexibility to local commanders by eliminating the need for the supporting paperwork and formal test sites. The refined SQT will test a sample of MOS tasks and will not normally be oriented toward a particular job or duty position, thereby improving promotion equity and allowing MOS proficiency to have a greater influence on the soldier's promotion and retention.

The majority of the transitions toward the new system will be completed during FY83. An Army training regulation to cover individual evaluation in its entirety, including the SQT, is being drafted by the Department of the Army and should be available within the next few months. Also, DA's personnel managers are reviewing AR 600-200, the *Enlisted Personnel Management System*. The first MOS to change to the new SQT system was 15D (Lance crewmember). The Soldier's Manual Supplement for MOS 15D was available in December last year. In January this year, five MOSs changed to the new SQT: 13R (Firefinder radar operator), 15J (Lance operations fire direction specialist), 54C (smoke and flame specialist), 95D (special agent), and 96B (intelligence analyst).

More MOSs will change over each month, and the current three-component SQT will phase out completely by 30 June 1983. The new common task test will begin in March 1983. DA Circular 350-82-3, now being published, contains the entire FY83 schedule for SQTs.

New uniform policy

Army Chief of Staff GEN E. C. Meyer has approved ten changes in Army uniform policy, based on results of the 128th uniform board meeting on 30 June 1982.

- New enlisted accessions will receive a \$25 clothing-bag allowance to buy commercial athletic shoes. These soldiers probably will start getting the allowance sometime in FY83.

- An AG-344 trooper cap will be adopted as cold-weather headgear. The cap will be an optional purchase for both men and women soldiers to wear with the Army green uniform and black all-weather coat, green overcoat, or green raincoat. It is expected the cap will be available by November 1983.

- One Army green coat will be deleted from the clothing bag of active-duty men and women soldiers sometime during FY83.

- A 100-percent texturized polyester fabric will be selected for use in optional-purchase, washable Army green trousers, skirts, and slacks.

- A camouflage maternity work uniform will be adopted. Two uniforms will be issued, and the commander will have the option of issuing the camouflage maternity uniform and/or the white maternity uniform.

- New optional-purchase blue and white mess uniforms will be made available for enlisted women and women officers. Jackets will be dark blue and

white. Officers' jackets will have branch colored lapel facing (blue jacket only), sleeve trefoil, and shoulder knots. Enlisted jackets will have a dark blue lapel facing (blue jacket only) and sleeve ornamentation; shoulder knots will not be worn. The current knee- or full-length white or black skirts will be worn with the new white jacket. A knee- or full-length, dark blue skirt will be worn with the new dark blue jacket. Current white and black mess uniforms will be authorized for wear by women officers as long as the uniforms are serviceable.

- Issue of the white scarf for enlisted women will be discontinued; only the black scarf will be authorized for optional purchase and wear with the black all-weather coat by all soldiers.

- The OD field sweater (organizational clothing) or the black pullover sweater (optional purchase and wear) will not be issued as a clothing-bag item.

- Male soldiers still are not permitted to carry an umbrella while in uniform. Female soldiers may continue to carry an umbrella while wearing the service, dress, or mess uniforms.

- Enlisted infantrymen will be authorized wear of the blue disk and cord if they are assigned to infantry units as recruiters, advisors, and ROTC instructors or assigned to initial entry training at brigade or lower level. Infantrymen assigned to an infantry squad, section, or platoon within other than infantry units are authorized to wear the disk and cord, and officers are authorized to wear the infantry cord. Battalion commanders are the approval authority for awarding the disk and cord if a soldier meets all the following criteria:

- 1) Completed individual infantry training or awarded combat or expert infantryman badge.

- 2) Possess an infantry MOS.

- 3) Assigned to an infantry duty position in an infantry unit or to an infantry squad, section, or platoon within other than an infantry unit.

- 4) Recommended by commander.

Officials in the office of the Army's Deputy Chief of Staff for Personnel say specific dates on which the changes will take effect will be announced later.

Distinguished graduates of the Army Officer Candidate Course

The US Army Infantry School Commandant has the authority to designate the upper third of the graduates of the Branch Immaterial Officer Candidate Course as distinguished graduates. An interim change to AR 601-100 increased the number of distinguished graduates eligible to apply for Regular Army commissioned officer appointments from the upper ten percent to the upper third.

The top graduate of each class will receive an offer of a Regular Army commissioned officer appointment from Headquarters, Department of the Army (DAPC-OPP-P), if otherwise eligible under the provisions of AR 601-100. An application by the selectee and evaluation by a field board are not required. All other distinguished graduates are

eligible to apply for Regular Army commissioned officer appointments within one year after graduation from an Officer Basic Course, providing they meet the eligibility requirements in chapter 1 of AR 601-100, and receive a favorable recommendation from the infantry branch school commandant and from his or her own branch school commandant. This selection for Regular Army appointment is not automatic, but is the result of an individual evaluation by a Headquarters, Department of the Army board of officers. Applicants need to submit an application packet consisting of Regular Army applications (DA Form 61), letters of recommendation from both school commandants, and all required forms listed in table 2-1, chapter 1, AR 601-100.

The encouragement and assistance of commanders concerned about the need for competent young officers in the Regular Army will facilitate the timely Regular Army commissioned officer application of Branch Immaterial Officer Candidate Course distinguished graduates. For additional assistance, contact the FA Branch Representative at Fort Sill, AUTOVON 639-5206 (MAJ Walter P. Lantzy III) or the FA Branch Team (MILPERCEN), AUTOVON 221-0116 (CPT Steve Curry).

New joint domicile program

The Army has changed its procedures for assigning married soldiers together; therefore, soldiers married to other soldiers should be on the lookout for special letters from the Department of the Army concerning joint domicile assignments. A letter dated 24 September 1982 provides information and instructions for those married soldiers wishing to participate in a new married Army couple reassignment program. Soldiers married to other soldiers participating in the program will automatically be considered for assignment with their spouses when one member of the couple comes up for reassignment. One can apply for the program by submitting DA Form 4187 and a married Army couple data code sheet through the local military personnel office. Then, the spouse's social security number and military personnel class (officer, enlisted, warrant) will be noted in the applicant's own personnel files. When the applicant comes up for reassignment, his or her career manager will see this data and will automatically locate the spouse's file to consider him or her for an assignment to the same location.

Although this program does not guarantee an assignment together, it does simplify things somewhat for Army couples. Married soldiers will no longer have to request a joint domicile each time one person is reassigned.

If a career manager cannot grant a joint assignment to a short-tour area, the manager will try to assign the spouse somewhere else in that short-tour area or to another short-tour area, so that the couple will rotate back to the United States at the same time. Also, couples can drop from the program whenever they wish. Army couples who do not participate in the program will continue to be managed according to current policies.

Education is mandatory for Reserve officer promotions

Army Reserve officers approaching the time for mandatory promotion consideration must meet certain mandatory education requirements in advance.

Thousands of Army Reserve officers have not been selected for promotion simply because they did not meet the education requirements.

What are the requirements? How can they be met?

A second lieutenant must complete any officer basic course within three years after being commissioned. Also, the officer basic course is a requirement for promotion from first lieutenant to captain. It can be completed in an active Army resident program if funds are available or by correspondence courses.

A captain must complete an officer advanced course before being promoted to major. This requirement can be met in one of four different ways, depending on funds and which method is most convenient for the Reservist. He/she can participate in a USAR school or a correspondence program, or attend an Active Army resident course or in some cases a Reserve Components resident course.

For promotion to lieutenant colonel, one must complete at least 50 percent of the Command and General Staff Officer Course; or one can substitute either the Logistics Executive Development Course or the Associate Logistics Executive Development Course. The first logistics course may be taken only in residence. The Associate Course combines correspondence and two-week resident phases.

To become a colonel one must complete the Command and General Staff Officers Course by participating in a USAR school program, a correspondence course, or a combination of both. It can also be completed by attendance at the resident course.

For more information, contact the nearest USAR school or the personnel management officer at RCPAC.

Assignment changes ahead for some Army Reserve women

A related series of personnel moves will soon affect the assignment of women in the Army Reserve. This action is the result of studies by the Women in the Army Policy Review Group.

Although the number of Reserve women is projected to increase by another 5,500 in 1983, women will be phased out of some Army Reserve units; and their numbers will be reduced in others. Also, the Active Army female enlisted strength will increase over the next few years from the present 65,000 to approximately 70,000.

Two main areas of concern for the review group were the exclusion of women from direct combat and the ability of women to physically perform duties which demand considerable upper body strength.

The solution according to the review group is to assign to each duty position a special probability code, P1 to P7,

to show the likelihood of a soldier in that duty position being engaged in direct combat. This will be done for every type of unit in the Army by table of organization and equipment (TOE).

Women will be barred from P1 positions, which include assignments at the brigade level and below. In addition, many service and support roles such as medic, military policeman, or administrative specialist will be classified as P1 depending on the unit's mission and location on the battlefield.

The immediate effect of the review group recommendations is that women have been excluded from 23 more occupation specialties, bringing to 61 the total number of MOSs barred to women. Approximately 1400 active duty soldiers are affected, and nearly 400 Army Reserve women will have to change specialties based on the probability of combat criteria. These women may retain their specialties for the balance of their current enlistment but will have to be reclassified upon reenlistment.

The increasing percentage of women serving in the Army Reserve, the redefined combat exclusion policy, and the addition of strength and stamina criteria promise changes in the ratio of men and women in certain units. But, there will be no largescale reclassification of Reservists. Officials state that transition plans are being drafted and that all current enlistment contracts will be honored.

Officer counseling

The Military Personnel Center (MILPERCEN) has announced that formal counseling procedures for officers not selected for promotion to the grades of captain through colonel have been expanded.

MILPERCEN's officer personnel management directorate will counsel a non-selected officer at his or her request or, if preferred by the officer, will forward individual file summaries and interview sheets to the officer's commander for counseling. Although career managers and commanders have always been involved in counseling, this expanded program will formally include commanders and provide them with materials for counseling.

Officers desiring counseling should contact their career managers at their respective branches.

Wear of skill badges on the BDU cap

A review by DA DCSPER to consider the wear of skill badges on the battledress uniform (BDU) cap has been completed. Based on the results of the review and a subsequent Chief of Staff of the Army decision, skill badges are not authorized for wear on the BDU cap. This decision reaffirms the current policy found in AR 670-1, Wear and Appearance of Army Uniforms and Insignia, and TRADOC message, DTG 081520Z Jan 82, subject: Proper Wear of the Uniform.

Overseas post exchange privileges

According to Army and Air Force Exchange Service (AAFES) officials, some Army Reservists may not be entitled to post exchange (PX) privileges abroad.

In the Federal Republic of Germany, US Army Reserve (USAR) Troop Program Unit members and Reinforcement Training Unit members are not allowed PX shopping privileges based upon Inactive Duty Training (IDT). This is an exception to the stateside rule allowing one day of unlimited PX privileges for each Unit Training Assembly performed during IDT. These Reservists are, however, entitled to those privileges while in an Annual Training (AT) or Active Duty for Training (ADT) status.

For example, Reservists who move as a unit during AT conducting Overseas Deployment Training and those in an ADT status participating in exercises such as REFORGER are granted PX privileges in Germany.

To shop in PXs in Germany, Reservists must have a ration card and an indorsement to their AT or ADT orders. Individuals should obtain these from the Active Component unit to which attached or from the personnel processing activity at their first duty station in Germany.

The ration card is an AE Form 1150, USAREUR/USAFE Ration Card, valid only in Germany. For all other countries, an AE Form 1151 is used. A ration card is needed to buy cigarettes, coffee, tea, and Class VI goods and is also required for admittance to commissaries in Germany.

The commander of the Active Component unit of attachment provides the indorsement to AT or ADT orders which attests that the individual has reported for active duty.

Individuals requiring more information should review Annex C to USAREUR Regulation 600-700 (Individual Logistic Support for US Reserve Component Personnel on Active Duty for 30 Days or Less).

Use of military exchanges abroad is governed not only by Department of Defense regulations but also by Status of Forces Agreements (SOFAs). SOFAs carry the force of law, superseding other US laws and regulations within their jurisdiction. They deal with a broad range of issues of mutual concern to the governments and frequently affect the use of such facilities as post exchanges.

IG Hotline

The Office of the Inspector General (IG) has established a toll-free hotline to assist individuals in registering complaints; in reporting fraud, waste, and abuse; and in requesting assistance. This service, however, is not a substitute for the chain of command in attempting to resolve individual problems. If an individual feels that the chain of command is not responsive, then he or she may contact the local IG who, in nearly all cases, is in the best position to take appropriate action. Those needing assistance

on whom to contact may call the hotline. Depending on the nature of the problem, the caller may be provided with the name and location of the local IG or the address and phone number of the major command (MACOM) IG or the Department of the Army IG. Only when the situation dictates the need for expeditious handling to prevent hardship or loss will the Office of the Inspector General begin action based solely on a phone call.

Individuals wishing to report fraud, waste, and abuse will not be required to leave their names; however, such information is of significant assistance when an inquiry must be conducted.

Individuals wishing to use the hotline in Virginia should call 800-572-9000. For those in the remaining 49 states, Puerto Rico, and the Virgin Islands, the number is 800-446-9000. The service is not available in Europe or other overseas areas. Personnel stationed in those areas should contact their MACOM IG or write to Department of the Army, ATTN: DAIG-AC, Pentagon, Washington, DC, 20310.

Pinpoint assignments altered

During a special 12-month test, Army personnel officials will alter their procedures for issuing pinpoint assignment instructions to certain soldiers going to Europe.

Pinpoint assignment instructions are those which prepare a soldier for reporting to a specific duty assignment, as opposed to reporting to a replacement depot.

The test, which began in December 1982, affects soldiers reporting to non-divisional units within VII Corps. During the test, these soldiers will not receive pinpoint assignment instructions until their DA Form 4787 (reassignment processing) has been received by personnel officials in Europe.

Among other things, this form provides assignment officers with information about what a soldier plans to do with his or her family members while overseas. Under current practice, assignment officials issue pinpoint assignment instructions without having this information, thus running the risk of creating inconveniences for some Army families.

Pinpoint assignment instructions for unmarried soldiers and those electing an "all others" (unaccompanied) tour will go from VII Corps to the soldiers' local military personnel offices. Instructions for soldiers requesting family travel will go from the 1st Personnel Command, in Germany, to the local stateside personnel office.

As in the past, pinpoint assignment instructions are not issued to soldiers in grades E1 to E4 unless those soldiers are requesting family member travel to Europe.

Soldiers going to non-divisional units outside of VII Corps will not be affected by this test. Any questions can be answered by local personnel officials.

RECON SMART

by LTC Floyd V. Churchill, Jr.



Consider this familiar scene: Somewhere in an area frequently used for field artillery training, a jeep pulls up in the middle of a field, and a commander jumps out; an advance party vehicle moves in beside him; and in an instant the area is alive with running, yelling, pointing soldiers hectically setting up equipment. Another battery reconnaissance selection and occupation of position (RSOP), designed to look good for an ARTEP evaluator, is under way.

Unfortunately, the good looking design can often teach habits which may get these same soldiers killed on some future battlefield. Although most professional artillerymen can describe the tactics which enemy long-range reconnaissance and commando units will employ and are aware of the possibility and probability that these highly-trained units might engage artillery units, few seem to have translated their knowledge into operational procedures which will enhance unit survivability. The commander who wants to recon smart and operate professionally must always plan, organize, and execute his RSOP as if he were operating in an *enemy* or *contested* area — planning for any less demanding environment is inviting disaster.

It is true that the training required to accomplish an effective RSOP is demanding, but it is by no means impossible. The following techniques and procedures represent an effective way of managing personnel, equipment, the sequence of events, and emergency drills to achieve RSOP training which is smart and professional.

Personnel

As with any complex undertaking, the people who conduct the RSOP form a key ingredient. For example, the commander must insure that he provides an adequate number of people to locate the positions of each vehicle and provide limited close-in security for the party as it works. He must, however, keep in mind that this party will be fighting in a 24-hour-a-day environment; thus, the organization must allow for appropriate periods of rest. One solution to this thorny problem is to establish a two-team RSOP party, with each team composed of completely different personnel to allow for continuous operations. But the commander will need to consciously balance his talent, experience, and leadership between the two teams to insure adequate performance by both. The existence of two fully manned and trained teams has other advantages, such as:

- First, should a particularly intense period of frequent moves be required, the battery can provide continuous RSOP operations by alternating parties with no degradation in the RSOP process.

- Immediately available, fully-trained replacements can be provided should members of one party become casualties.

Organizing and using only one "superstar" party not only denies necessary training to others, but also develops dependence on personal working relationships which will have to be broken to form a second team during extended combat operations. Table 1 shows one possible organization of the two-team RSOP party:

Table 1. Organization for the two-team RSOP party.

Position	Team A	Team B
OIC	BC	XO/AXO
NCOIC	CFB	1SG
Security team	Two from communication or gun section	Two from communication or gun section
Gun guides (1 per gun)	One per section	One per section
Maintenance	One per section	One per section
Mess	One per section	One per section
Ammo section	One per section	One per section
Communication (wire)	One per section	One per section
FDC	One per section	One per section

Obviously, a section representative cannot be the same man for each team; also, sections such as mess and ammunition cannot participate if their section is not forward.

Equipment

The two key criteria for equipment selection are detailed definition of requirements and standardization. Each member should know exactly what equipment (in addition to his normal battle gear) that he is expected to carry as a member of the RSOP party. The equipment requirement for each team member should remain the same regardless of the time of day a party goes out in case the parent unit is delayed until darkness.

Each soldier should have a flashlight with various colored filters; also, each section representative must carry a DR-8 with jack and a TA-312 telephone to install his section's portion of the battery wire system. Gun guides must carry two wooden aiming poles with lighting devices and an orienting tape for the gun. The maintenance section representative is responsible for bringing the mine detector forward in order to sweep entrance and exit routes. Table 2 portrays the equipment requirements for each RSOP team, other than normal individual items.

RSOP sequence

The heart and soul of a good RSOP system is a detailed delineation of duties and responsibilities made habitual by repetitive realistic training to demanding standards. Detailed RSOP standing operating procedures (SOPs) and frequent performance-oriented training on the normal sequence of tasks are means to that end. Experience indicates a trained RSOP party can quietly (no human sounds audible beyond 10 feet) set up a completely new battery position within 20 minutes of arrival to include

Table 2. Equipment requirements for each RSOP team.

Item	No.	Responsibility	Purpose
M60 MG	2	Communication section	Provide OPs (2)*
M72 LAW	2	As desired.	Antiarmor protection
Mine detector	1	Maintenance section	Clear road
Aiming circle	1	1SG/CFB	Provide initial orienting direction
Gun lay tape	4-6	Section guide	Provide initial orienting direction
TA-312	1 per section	Section guide team NCOIC	Establish communication net
DR-8 w/jack	1 per section	Section guide team NCOIC	Establish communication net
Aiming post night light	8-12	Section guide	Establish position location at night
MX-155/SB-16	1	Communication chief	Establish communication net
¼-ton	1	OIC/NCO/driver	Lead party
1¼-ton or 2½-ton	1	All other party personnel	Transport party
Chemical detection equipment	1	OIC	Detect NBC contamination
M2 compass	2-3	One per two section guides	Orient gun lay tape

***May come from a gun section if the communication section is too small.**

the initial wire system and gun lay tapes. Leaders are free to analyze the position area and handle emergencies because the troops already know how and when they must act. The perfect RSOP would be one in which the leader does not have to issue a single directive for the party to accomplish its task.

All personnel participating in RSOP activities should think and prepare as infantry — individual camouflage is particularly important to prevent unnecessary exposure of personnel or equipment to enemy observation. The constant assumption is that enemy reconnaissance is in the immediate vicinity.

The RSOP sequence starts when the RSOP party receives the requirement to conduct an RSOP. Then, the OIC of a team tells his NCOIC to alert the sections to nominate the on-call team personnel for move-out. The personnel then prepare themselves and their equipment under the supervision of the NCOIC. Based on the time available to the RSOP



party OIC, he alerts his NCOIC to have the team assembled at the normal meeting point (BOC is recommended) early enough to allow the NCOIC and OIC to conduct a standard briefing and inspection to insure that all important aspects of the mission are addressed. Once the party leaves the battery area, the trailing vehicle maintains the required interval, normally 100 meters, stopping when the lead vehicle stops and moving when it moves. During halts, the trail vehicle should habitually take advantage of available natural cover and concealment.

Since every position inspected will not be satisfactory, the trail vehicle will not deploy unless the trail vehicle NCOIC sees the party OIC get out of his vehicle and silently motion for the party to come forward on foot. Unless the OIC directs otherwise, the spot where the OIC's jeep stops automatically becomes battery center. The leader of the party then gets out and begins to analyze the terrain in detail. Seeing the OIC get out of his vehicle and motion the party forward, the trail vehicle NCOIC has all personnel get off the second vehicle and move quickly, without running, to positions around the jeep (figure 1). Each man always goes to the same position in relation to the front (12 o'clock) of the OIC's vehicle. Once in position around the jeep, each man gets down, facing out. Each team member's job is to protect the command group while the OIC gives instructions to the NCOIC. These initial instructions must include the —

- Security sweep pattern and depth, if other than standard.
- General location for security OPs.
- Location of the aiming circle.
- Search pattern for the mine detector operator.
- Connecting and switching kit (MX-155/GT) location.

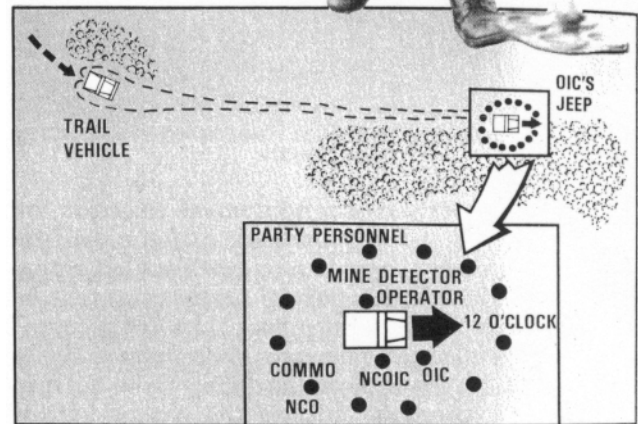


Figure 1. RSOP party command group security.

Using hand signals, the NCOIC then directs the RSOP party personnel to get up and conduct a security sweep of the area. A typical sweep pattern is the daisy pattern, which covers the area out to the point where small arms can be brought to bear effectively against the battery position (figure 2). Several other actions are taking place simultaneously:

- The mine detector operator is sweeping access routes.
- The NCOIC is positioning the security OPs.
- The communications chief is putting in the MX155.
- The OIC is selecting the gun positions for the center platoon.

Once all sweep personnel have returned to the jeep, the OIC shows the gun guides the general location for the line of metal and the location of the two center guns. He provides the azimuth of fire, identifies the location of the MX-155, and points out the entrance to the position.

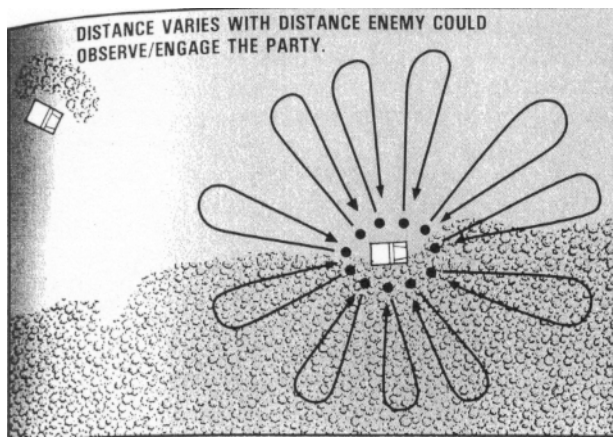


Figure 2. The daisy pattern security sweep.

The gun guides then determine their gun positions by moving down the indicated line of metal the appropriate distance right or left of the center platoon. Each guide then selects where to put his gun lay tape.

The BC then briefs other section guides on the general location of their vehicles and the location of the MX-155. These guides then move to their respective locations, prepare for occupation, and run a wire line from their locations to the MX-155. Each guide then installs the telephone at the intended vehicle location and walks the intended vehicle route to make sure it is passable. Upon receiving approval from the OIC for the proposed route, the section guide returns to his section position and gets down into a defensive posture facing the outside of the

Table 3. RSOP sequence of events.

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
BC/XO decides where to stop (btry center).	Decide location of security OP, aiming circle, routes in/out, and MX-155.	Confirm gun positions.	Show gun positions; give azimuth of fire, MX—155 location, and general vehicle location	Approve all locations.	Supervise.	Hide; await btry; recon alternate location.
ISG/CFB	Receive guidance on location of aiming circle and sweep positions.	Conduct sweep; put out OPs	Set aiming circle and telephone.	Give initial deflection to gun guides.	Camouflage aiming circle; direct vehicle into covered positions.	Supervise; hide; develop btry defense plan.
Communication chief	Move to jeep; receive guidance on locations of aiming circle and sweep positions.	Set up MX-155	Lay line to aiming circle; install telephone.	Look for helicopter pad nearby.	Inform BC of pad site and help guides with communication problem.	Hide; await instructions.
OIC driver		Set up and monitor NBC agent alarm.	Monitor radio.			
Maintenance representative	Move to jeep; Put mine detector together; receive guidance on where to sweep.	Sweep roads.	Put mine detector in box in jeep. Get location of maintenance vehicle from OIC.	Select location, string wire, install telephone, walk route in, and confirm route with BC.	Hide; await instructions. Face outside of perimeter.	
Security team	Move to jeep; form perimeter around jeep.	Move to location identified by NCO.	Protect RSOP party.			
FDC/ammunition/mess representatives	Same as as above	Participate in sweep.	Receive guidance on general location of section vehicle.	Same as above.	Same as above.	
Gun guides	Same as above.	Same as above.	Same as above, plus azimuth of fire and gun position.	String wire, install telephone, receive initial deflection from NCO, lay gun, and lay tapes.	Walk route; confirm route with OIC.	Same as above.

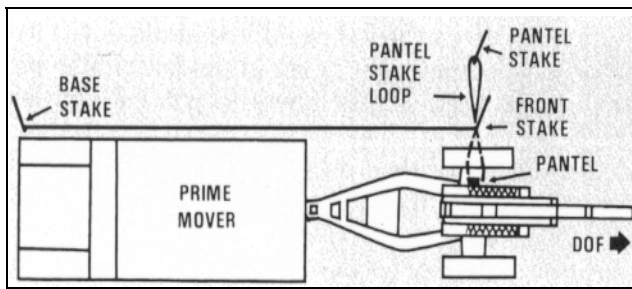


Figure 3. Overview of towed howitzer tape and stakes.

position and stays there until told to move out or to move to the entrance to meet the incoming vehicles.

Meanwhile, after laying his wire, each gun guide puts up a marker pole at the anticipated location of the howitzer pantel. The 1SG/CFB can then quickly announce an initial deflection over the phone. Then, working in pairs, the gun guides orient the gun lay tapes to the azimuth of fire using the M2 compass. (The tape should be the length of the vehicle for self-propelled units and the length of the prime mover plus gun for towed units.) First, one of the two gun guides places a section stake at the proposed location of the howitzer pantel. Then, the other gun guide emplaces the base stake and uses the M2 compass to align the front stake which is handled by the other section guide in the two-man team. The base stake should be tall enough for the section vehicle driver to see when his front bumper is touching it.

The gun guide initially locates the pantel stake loop over the proposed pantel location. It remains there until he receives an initial deflection from the RSOP party NCOIC. He then records that deflection on the pantel stake for the gunner's use during occupation. Once he secures this information, he swings the pantel loop outside the vehicle path and restakes it. To facilitate night occupations, each section should have a unique combination of colors and signal shapes for their stakes, lighting devices, and flashlights. (Figure 3 depicts the taping for a towed system.) The gun guides follow the same procedure as the other guides until alerted to move or meet the battery. Personnel moving to the battery entrance must do so quietly and take up a concealed position. When the guide's vehicle is in sight, he moves toward it, without orders or noise, and guides it to its location. (Table 3 presents the entire sequence of events for each duty position in time-phased, sequential steps.)

Emergency action drills

Once the commander has designed his basic RSOP scheme, he must address one more very important elements of planning — what to do if the basic plan does not work. The key to survival in most combat situations is the ability to react quickly and gain the initiative. One obvious solution to this contingency aspect of RSOP operations is stringent training in emergency action drills.

Emergency action drills allow the RSOP teams to react almost instantaneously to adverse situations without requiring the commander to issue detailed orders. These drills fall into three general categories:

- Counterambush.
- Meeting engagement.
- Reaction to attack while conducting the RSOP.

Counterambush

The counterambush procedures for an RSOP team are the same as those applicable to any convoy. If either team vehicle is outside the kill zone, the soldiers in that vehicle need to assault the ambushing force as quickly as possible from the flank. If caught in the ambush, team personnel should immediately get out of the vehicle and attempt to establish fire superiority; artillery fires — either preplanned along the RSOP route or called in as needed — can help do the job.

Meeting engagement

If the RSOP party is moving down a road and happens to run into an enemy unit moving in the opposite direction, speed and rapid reaction are critical. The object of the team's efforts must be to disengage quickly and use a prearranged signal to alert the rear vehicle of the danger. The driver of the

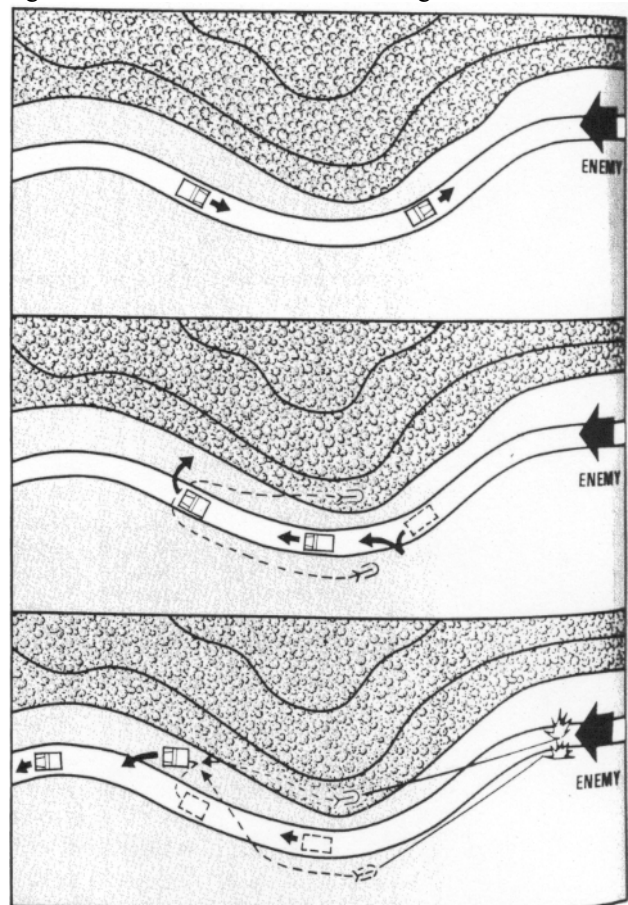


Figure 4. RSOP party in a meeting engagement.

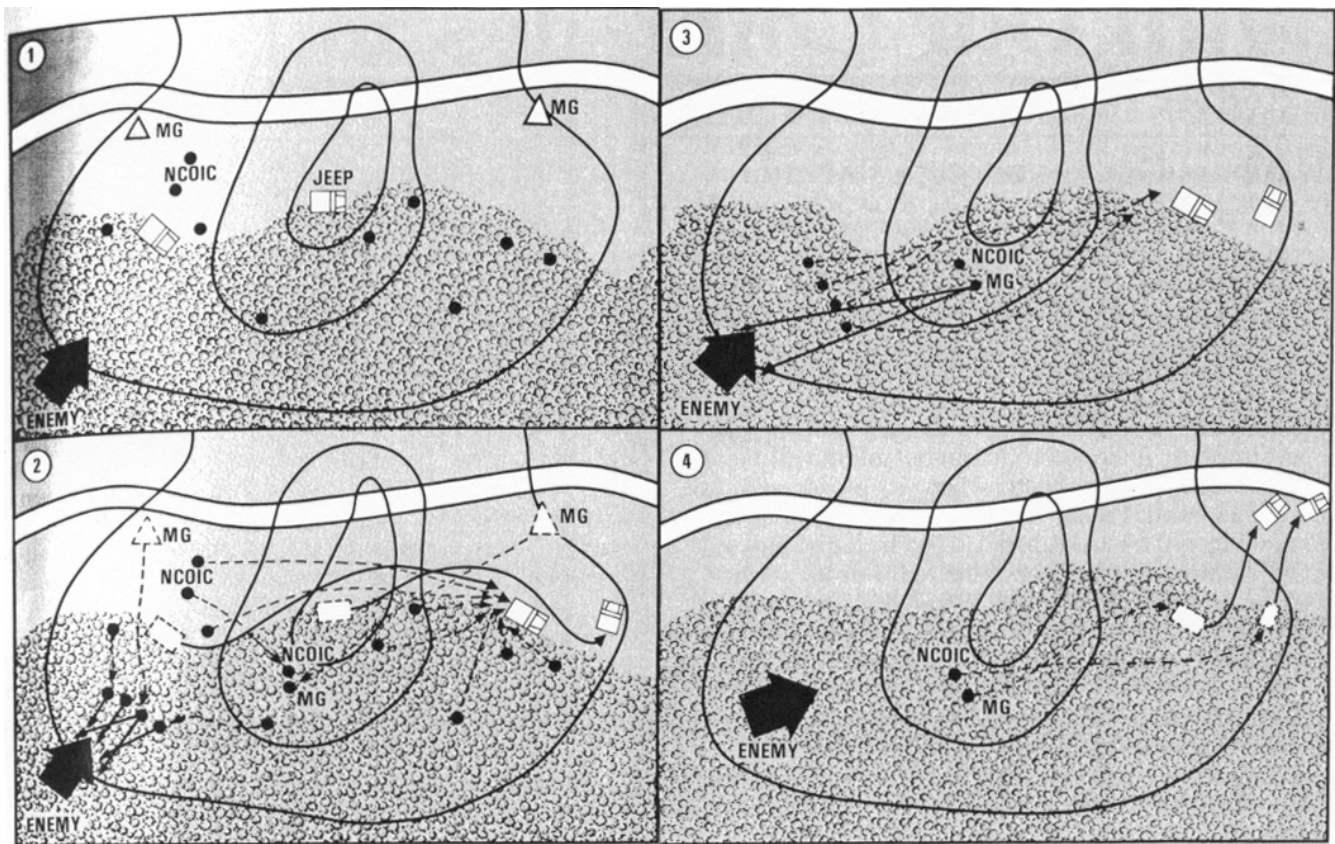


Figure 5. RSOP attack battle drill.

front vehicle stops, gives the signal, turns around or backs up as rapidly as possible, and moves away quickly. Upon receiving the signal, the second vehicle immediately stops, and two individuals armed with M72 LAWs exit the vehicle and move forward a short distance to cover the withdrawal of the lead vehicle by slowing or stopping the enemy unit (figure 4). Once the front vehicle has passed and the second vehicle has turned around, the antitank team members return to their vehicle and move out to rejoin the commander to continue their mission by an alternate route.

RSOP attack

The RSOP attack battle drill involves the reaction of an RSOP party during attack while it is in the process of conducting its RSOP at the selected future battery location. As with counterambush and meeting engagements, the key to survival is reacting rapidly and gaining the initiative. This whole action should take no more than three minutes. The most likely time for an attack is when the initial security sweep goes out. It is essential that the first person who sees the enemy open fire and, with the team members in his immediate vicinity, attempt to gain fire superiority. The nearest of the two automatic weapon OPs then relocates as required to provide increased volume of fire. At the same time, the second OP moves rapidly to a position between the engaged element and the party vehicles. From this location he can provide covering fire for the withdrawing party (figure 5). All other personnel,

other than the NCOIC, move immediately to the vehicles, and the drivers move their vehicles to covered positions. As soon as all nonengaged personnel are past the second machinegun, the party NCOIC directs the forward element in contact to disengage and move directly to the vehicles; the second machinegun covers this movement until all personnel are on board. Under the control of the party NCOIC, the second machinegunner then picks up and moves to his vehicle and both rapidly exit the area in a direction determined by the OIC.

These RSOP techniques and procedures are part of an integrated training system which will produce an RSOP team that can fight and survive on any battlefield. They are geared to meet the needs of a demanding, hostile environment. In other words, they teach a field artilleryman to "Recon Smart."



LTC Floyd V. Churchill, Jr., FA, is Commander of the 1st Battalion, 6th Field Artillery, in Fort Bragg, NC. He received his commission through The Citadel in Charleston, SC, where he was a distinguished military graduate. Among his varied assignments, he served as the C3 Operations Officer for the Combined Field Army, Korea and Executive Officer for the 18th Field Artillery Brigade (Airborne).

With Our Comrades in Arms

NEWS OF OTHER BRANCHES AND SERVICES

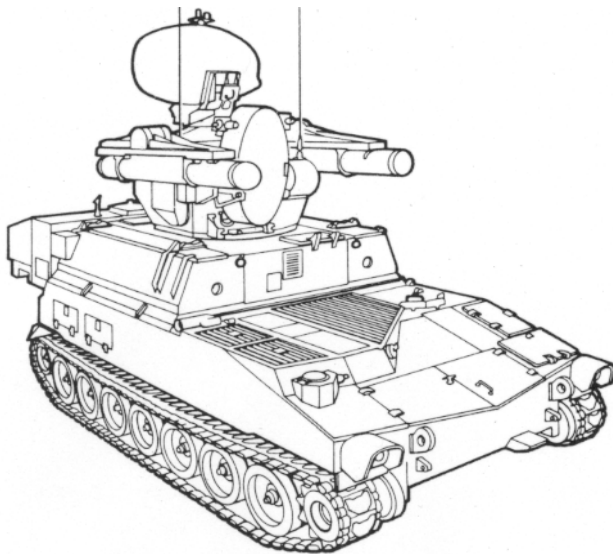
National Guard unit gets Roland

A new air defense battalion equipped with the short-range, all-weather US Roland missile system will be activated in the New Mexico National Guard under the same basic plan which had been developed for the Active Army.

The battalion, which will be stationed at McGregor Range, NM, near Fort Bliss, TX, will acquire 27 fire units for support of early contingency operations. It is hoped that the battalion will be at least 50-percent manned when it is formed in mid-1984, and reach full battalion strength approaching 400 by 1 October 1985. The latest Roland TOE shows a net personnel increase of 20 servicemembers, up from 374 to 394. Additions include NBC and manportable air defense systems NCOs, a personnel warrant officer, and three personnel NCOs. Also added were two tactical wire and one decontamination specialist. Other major changes include the upgrading of crew positions to E4 and E5.

Produced in this country by Hughes Aircraft Company and Boeing Aerospace, the US Roland is designed to protect troops and other battlefield targets against low-altitude air attack. Acquisition of the new missile system marks a new, expanded mission for the Army National Guard. For the first time in history, the Guard is receiving a new weapon not previously fielded by the active Army, clearly pointing to the increased importance of the Guard's role as part of the total Army program for national defense.

Training for the new missile system will be conducted by the US Army Air Defense School, Fort Bliss, TX, and is scheduled to begin in the latter part of 1983.



US Roland undergoes testing at Fort Lewis, WA.

Patriot intercepts jet

The Army's new Patriot air defense system has successfully intercepted a pilotless F-86 fighter at the White Sands Missile Range, NM, in the first engagement utilizing Patriot production hardware. Armed with a live warhead, the Patriot production missile knocked down and completely destroyed the high performance aircraft flying at medium range.

Patriot, the Army's newest and most advanced air defense system, has already undergone and demonstrated firepower and performance capabilities in a highly successful research and development program against targets in severe countermeasure environments. The first production equipment was delivered to the Army earlier this summer.

A Patriot fire unit includes the phased array radar, the computer-controlled engagement control station, and several remotely located launchers. Support equipment includes an electronic power plant and an antenna mast group.

Additional flight tests are scheduled in the months to come to confirm and verify component and system changes in production hardware.

The highly mobile, all-weather Patriot will be the cornerstone of field Army air defense against medium to high altitude aircraft in the 1980s and beyond. (*The Redstone Rocket*)

Patriot construction begins in Germany

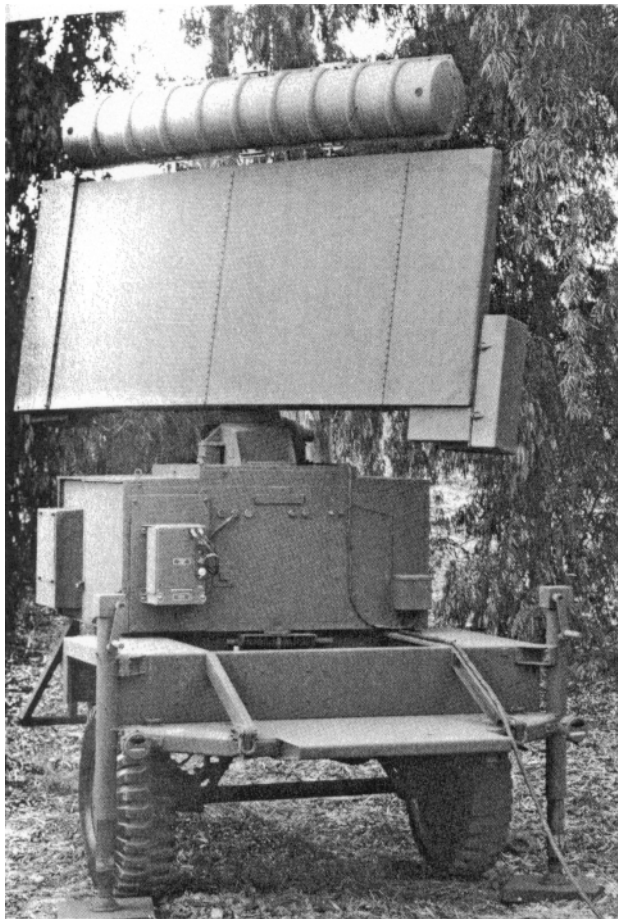
Ground-breaking ceremonies for the first Patriot missile site in Germany were recently held at Headquarters, 2d Battalion, 2d Air Defense Artillery, in Giessen. The battalion site, first of nine, will eventually be part of a Patriot network stretching from Giessen in the north, to Munich in the south, and as far west as the Luxembourg border.

Patriot is designed to be the keystone of theater air defense and to defeat saturation raids by large numbers of sophisticated aircraft employing electronic jamming, chaff, and other countermeasures. The new system will greatly enhance 32d Army Air Defense Command's ability to provide maximum coverage in NATO's integrated air defense operation.

The Army plans to acquire over 100 fire units and more than 6,000 Patriot missiles. The system is due to be operational in Europe by early 1984.

Black Hawks to Korea

Army aviation units in Korea will begin receiving UH-60A Black Hawk helicopters in October 1983, according to an Army spokesman. (*Current News, Air Force Times*)



The Low Altitude Surveillance Radar can be easily transported by a variety of vehicles and can detect and track low-flying aircraft despite clutter. (Hughes photo)

Low altitude radar unveiled

The prototype of a highly precise, mobile radar that automatically detects and tracks low-flying aircraft was unveiled recently at the annual Association of the US Army show in Washington, DC.

The Low Altitude Surveillance Radar (LASR) system is an advanced technology air defense radar which can detect fast, low-flying aircraft and helicopters despite severe clutter, such as a mountainous background.

Its three-dimensional pulse doppler can pinpoint the location and altitude of ground-hugging aircraft precisely and rapidly.

This new radar capability is based on the extremely successful AN/TPQ-36 Firefinder weapon locating radar used by ground troops to locate artillery, rockets, or mortars.

Current ground-based radars, with their broad-beam scanners, have a difficult time differentiating between the target and its background, but the LASR's pencil beams, which are considerably narrower in scope, limit the amount of clutter which is picked up; thus, low-flying aircraft cannot "hide" in the clutter to become a surprise attack threat to frontline troops and armor.

During the tests, the LASR system operated around-the-clock without failures. A variety of fixed-wing and helicopter targets were successfully tracked at altitudes from 10 feet above the ground to 6,000 feet at speeds ranging from zero miles per hour (mph), such as a hovering helicopter, to more than 575 mph.

The LASR is a highly reliable, mobile transportable radar system with software control which provides significant flexibility of operation and data reporting. Its pencil beam feature will allow it to maintain performance in a severe electronic countermeasures environment. (Ken Munroe, *Hughes News*)

Light armored vehicle on the way

The US Army Tank-Automotive Materiel Readiness Command has awarded a contract to General Motors of Canada for 60 of its 14-ton, 8-wheel, Piranha design light armored vehicles (LAV), each to be equipped with a 25-mm M242 chain gun. The 60-vehicle contract represents only the first year of a joint Army-Marine Corps buy that is expected to total 969 vehicles over the next five years. The Marine Corps' portion of this contract is 289 vehicles plus options which would enable it to procure models of five different variants to fill mortar, logistic, antitank, command/communications, and recovery roles.

It is anticipated that the first LAV will be activated at Twentynine Palms early in 1984. Although Marine Headquarters has announced no changes to the tentative light armored assault battalion (LAAB) structure, the decision to delay the air defense and particularly the assault gun variants for more than five years serves notice that some significant revisions may be pending in both the structure and the Marine Corps' employment concept. (*Marine Corps Gazette*)



Piranha light armored vehicle (Photo by SGT Knott, USMC).

THE MAGIC FORMULA

by LTC Peter D. Heimdahl

"Number 2, deflection 2738!"

"Number 2, deflection 2738!"

Seven mils!

Ready for recheck!"

The crusty old first sergeant and the battery commander (BC) were standing by the aiming circle watching the executive officer (XO) lay the battery. After hearing the seven-mil deviation, the first sergeant turned to the BC and said, "Betcha a beer that the next reading will be zero mils."

"You're on, Top."

Seconds later the XO bellowed, "Number 2, deflection 2738!"

"Number 2, deflection 2738! Zero mils!"

"Number 2 is laid!"

The BC, trying to look unimpressed, said to his gloating sergeant, "Lucky guess, Top. Bet you can't do it again."

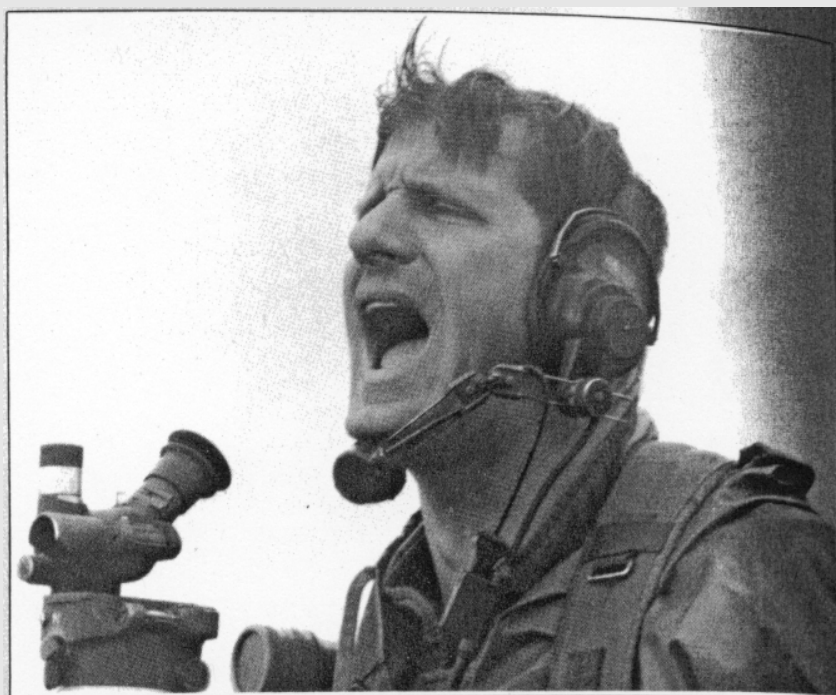
After the XO finished laying the rest of the battery, the BC owed the first sergeant a six-pack. "Ok, Top, you got me," the BC said. "What's your secret?"

"No secret, Captain. I must have laid a million howitzers from both sides of the aiming circle. You just get a gut feeling when the deviation is small enough to guarantee that the next reading will be zero mils."

"You know, Top," said the BC after some thought, "It seems to me that we could save a lot of time by not giving the last reading, since you seem to be able to predict pretty accurately when it will result in a zero mil deviation. What's your magic formula?"

"I don't have one," replied the first sergeant. "I just go by experience. It's not something you can put in numbers." And with that the BC and first sergeant wandered off in the direction of the mess truck.

The first sergeant made an important observation: The last two



(Photo by SP4 Dave Schad)

deflections one reads from the aiming circle in laying a howitzer are the same, signifying a zero mil deviation at the gun. If there is some way of reliably predicting that the aiming circle has reached its zero deflection, the last reading is unnecessary. Contrary to what the first sergeant believed, his experience *can* be expressed in numbers — there is a "magic formula."

The reason that a series of aiming circle deflection readings is required is that the gun sight is offset from the center of rotation of the tube. The initial orientation of the aiming circle is on the original location of the sight. Given his lay deflection, the gunner traverses the tube, thereby changing the physical location of the sight. Although the howitzer sight is now oriented on the deflection given by the aiming circle, the sight as registered by the aiming circle is at a different angle than before. Every new deflection causes the gunner to

traverse the tube and the howitzer sight position changes slightly. Fortunately, this procedure converges rapidly to zero mils, but the convergence may be more rapid and orderly than it appears.

Knowing the relationship of the sight to the center of rotation of the tube facilitates one's understanding of the magic formula. Figure 1 shows the sight location for US howitzers in the inventory and the path of the M109 sights and locations of all others. Since the sight location is fixed with respect to the center of rotation, the sight will travel in a circular path about the center of rotation when the tube is traversed through 6400 mils. Radii and angles of orientation with respect to tube direction are based on rough data provided by the Weapons Department at the Field Artillery School, and any slight inaccuracies in the measured data will not significantly affect the following analysis.

The sight location for self-propelled howitzers is left and forward of the center of rotation, whereas for towed artillery it is left and to the rear. In all cases, the angle of orientation of the sight position with respect to the tube direction is roughly 800 mils.

Since the habitual location of the aiming circle is to the left front of the battery, any reorientation of the sight of a self-propelled howitzer tends to move the sight perpendicular to the line of sight from circle to sight. Therefore, the aiming circle deflection

changes significantly with any motion of the sight. On the other hand, motion of the towed sight is mostly parallel to the line of sight, causing very little difference in the location of the sight as seen from the aiming circle. Figure 2 illustrates this concept for a slight traverse of idealized towed and self-propelled howitzers with the circle oriented 800 mils to the left front.

It is impossible to cover all the possible effects on sight location shifts on subsequent circle readings since there are infinite combinations of circle to sight distance and initial tube deviations from the azimuth of fire. The worst effect, however, would come from the following situation involving an M109 howitzer (figure 3).

- The circle is located such that the line of sight initially passes through both the howitzer sight and the center of rotation (initial motion of the sight will be exactly perpendicular to the line of sight).

- The aiming circle is located 50 meters (1968.5 inches) from the howitzer. (No minimum distance exists in the literature. From experience, 50 meters seems to be as close as one would ever place the

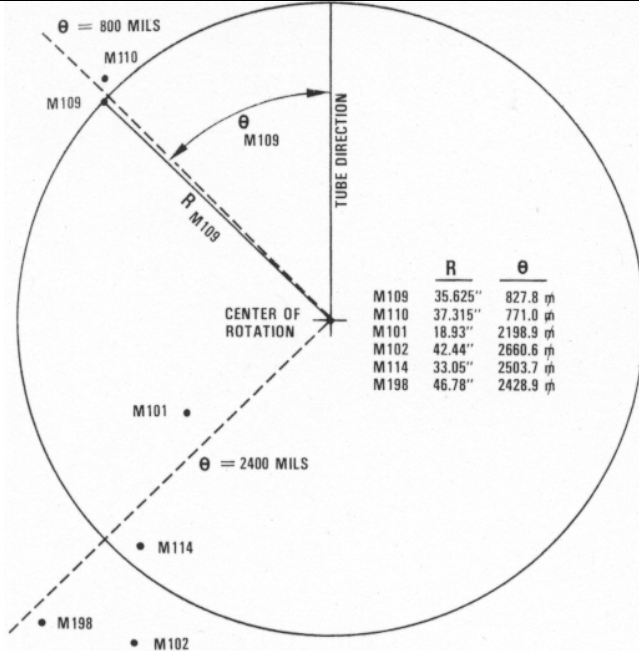


Figure 1. Relative sight positions.

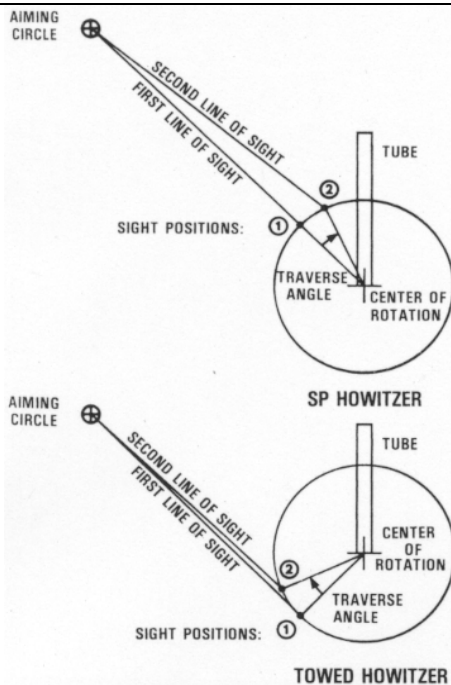


Figure 2. Comparative residual angles, self-propelled versus towed artillery.

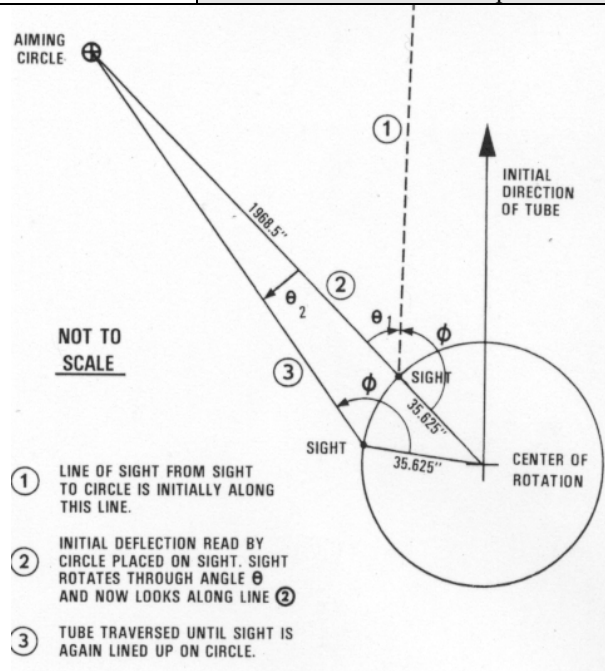


Figure 3. Residual angle geometry.

aiming circle to the howitzer. In any event, the greater the distance the less the change in circle deflection after a shift in sight location. Distance to the right platoon will always be considerably greater than 50 meters.)

The deflection read from the aiming circle is placed on the sight, resulting in a rotation of the *sight alone* through the residual angle, θ_1 . (The residual angle is simply the difference between the deflection read on the aiming circle to the sight and the angle from the sight to the aiming circle. For example, in giving the initial deflection to a howitzer, the XO would announce: "Number 2, deflection 2578." The gunner's response would be: "Number 2, deflection 2578, 22 mils." The difference of 22 mils is the residual angle.) Note that the angle θ is now fixed. The tube (along with the sight) is now rotated until the sight is laid on the aiming circle. The sight location has changed; therefore, the circle deflection has changed by the residual angle θ_2 ; and, θ_2 as devised in table 1, is only 18.1 mils. The entire sequence of residuals to be expected can be developed easily using figures 4-1 and 4-2 (figure 4-2 is simply the first 200 mils of figure 4-1 on an expanded scale), which derive from the worst-case situation assuming that the initial motion of the sight begins perpendicular to the line of sight. All subsequent sight movements will not meet this worst-case criterion, so the subsequent residuals would always be less than those calculated from the figures. However, to be conservative one should always assume the worst-case chart to be valid.

Here is an example of the use of figures 4-1 and 4-2. The chief of section for an M109 occupies a position so that he is initially 1600 mils out, and the line of sight from the aiming circle passes through his sight and the center of rotation of the tube. He puts the initial circle deflection on his sight and traverses back onto the aiming circle. Entering figure 4-1 with a residual angle θ_1 of 1600 mils, he notes that his residual

angle, θ_2 , on the second reading from the circle should be 18.1 mils. He will have to take at least one more reading. He now enters figure 4-2 with a residual θ_1 of 18.1 mils and sees that the next reading should be only 0.321 mils away from the aiming circle deflection. Since this residual is less than 0.5 mil, rounding off would give the chief of section an announced residual of zero mils. One can make two important observations from this example:

- A gun should require at most three different readings from the aiming circle *even under the worst of circumstances!*
- When the initial residual angle θ_1 results in a subsequent residual angle θ_2 of less than 0.5 mil, there should be no need for the next reading since its residual should round off to zero mils.

As shown in figure 4-2, a θ_2 value of 0.5 corresponds to a θ_1 of 28.18 mils, which means that if the XO hears a deviation of 28 mils or less from his chief of section, he is theoretically assured of a "zero mil" announcement after his next deflection reading to the gun. So why not give this deflection to the chief of section and declare his howitzer laid? The gunner simply sets this deflection on his sight and traverses onto the aiming circle, and the XO can give his attention to another howitzer.

Another example of how this would work is when the chief of section comes in only 200 mils out (still too much!). Therefore, after the first reading from the aiming circle, the gunner will announce a residual angle θ_1 of 200 mils. Entering figure 4-2 with a

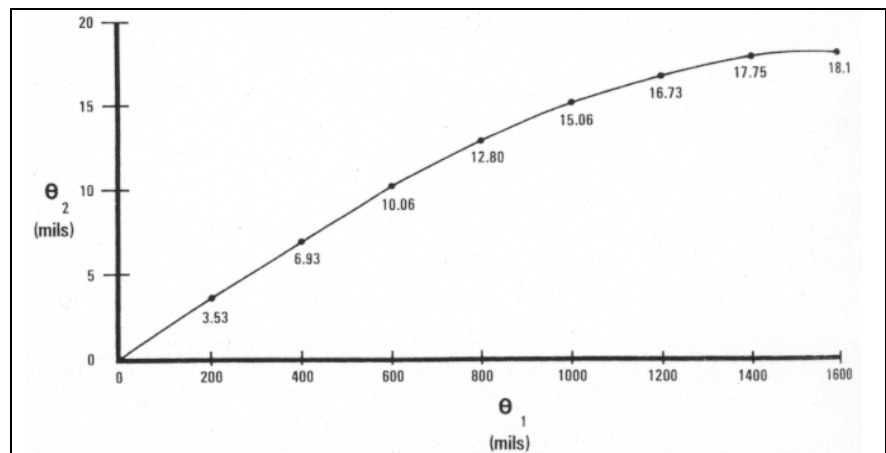


Figure 4-1. Residual angle θ_2 versus θ_1 (M109 laid from left front) ($\theta_1 = 0 \Rightarrow 1600$ mils).

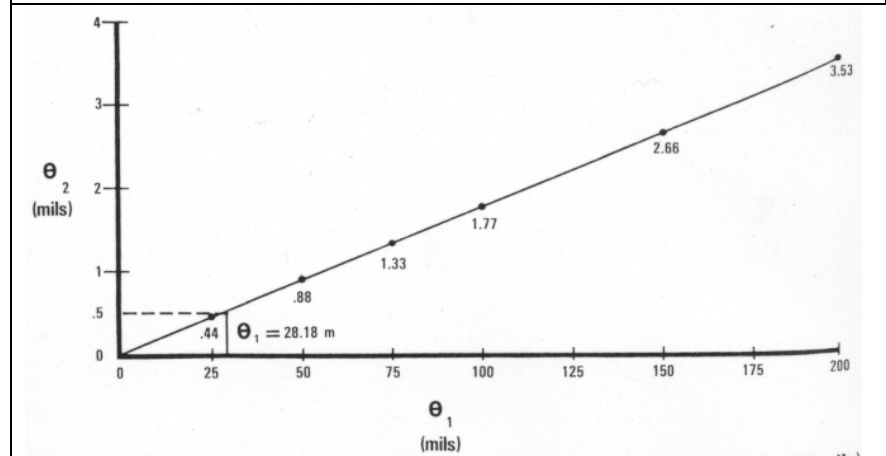


Figure 4-2. Residual angle θ_2 versus θ_1 (M109 laid from left front) ($\theta_1 = 0 \Rightarrow 200$ mils).

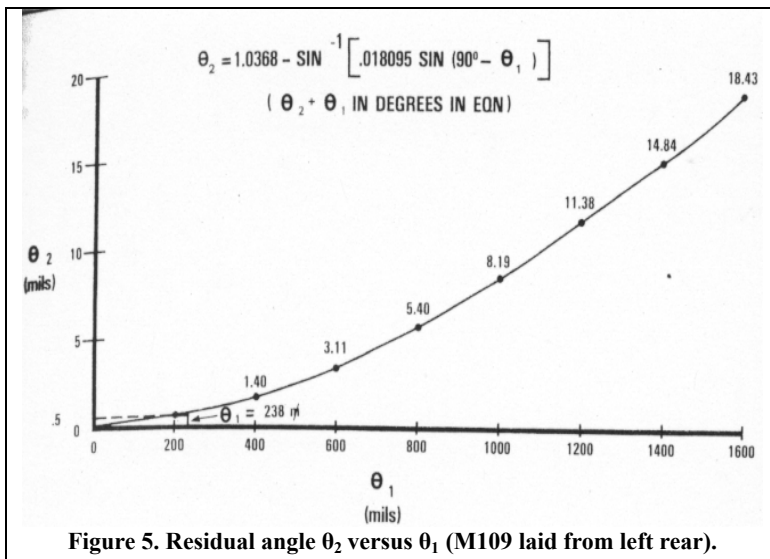


Figure 5. Residual angle θ_2 versus θ_1 (M109 laid from left rear).

residual angle θ_1 of 200 mils, the chief of section sees that θ_2 will be 3.53 mils. This means that the gunner's announced residual angle after the second aiming circle deflection will be either 3 or 4 mils. Entering figure 4-2 with a residual angle θ_1 of 3.53 mils, the chief of section notes that θ_2 equals 0.063 mils. Since this residual is much less than 0.5 mil, the gunner's third residual angle would be zero mils. After the XO hears the 3- or 4-mil deviation after his second reading, he could be assured of a zero mil response after his next reading and thus would not require the third reading.

Under normal circumstances, no more than two deflections (even less with a well-trained section) need ever be given to any gun from the aiming circle. For example, consider the case of Staff Sergeant Sharp, who has trained his driver and advance party men into a finely honed team. His initial residual angle is 14 mils. Since this is less than 28 mils, the XO declares the howitzer laid and in only one reading! Furthermore, the outlook is even better for towed artillery laid from the left front (or self-propelled artillery laid from the left rear). Since the sight is located to the left rear of the center of rotation, most of the sight motion will occur on a path almost parallel to the line of sight from the circle. A similar worst-case analysis for

the situation in which the line of sight is perpendicular to the radius from the center of rotation to the sight (rather than passing through these points) gives a $\theta_2 - \theta_1$ graph of the general form shown in figure 5. Very large initial residuals result in almost negligible subsequent residuals. In fact, for the distances used in calculating figures 4-1 and 4-2, the first residual angle can reach a value as high as 238 mils before the second residual angle is 0.5 mils. In other words, the towed howitzer laying procedures can converge to zero mils much more quickly than a self-propelled howitzer when laid from the left front; but, in any event, the towed howitzer falls well within the worst-case analysis depicted in figures 4-1 and 4-2.

Thus, a standard for training has emerged which should be of considerable interest to those in the field. No howitzer should require more than three distinct aiming circle readings to be laid. Furthermore, when the howitzer is initially oriented close to the

azimuth of fire by a well-trained driver and advance party man, no more than two distinct readings (and usually only one) should ever be necessary. Any requirements for readings exceeding these numbers are strong indicators of sloppy gunnery or careless operation of the aiming circle.

Most importantly, one now has a worst-case limit of residual reflection which does not require a subsequent reading from the circle — approximately 28 mils for the M109. The magnitude of this deviation limit may make many experienced field artillerymen justifiably uncomfortable; so there may be considerable resistance to a procedure which does not itself require the zero-mil reading, no matter how small the previous residual. Though the theory supports a limit of 28 mils, perhaps there is a practical limit (10 mils? 15 mils?) which would be universally acceptable. In any event, the Weapons Department of the Field Artillery School has verified the mathematical basis for the abbreviated lay procedure and tested it successfully. But no testing is like testing in the field; and before possible incorporation in the next revision of FM 6-50, the Department desires comments from the field concerning experience in using the procedure in firing battery training. Of particular interest are the validity of the 28-mil limit, recommendations for changes to the limit, accuracies (or inaccuracies) of lay experienced using limits of various magnitudes, and training problems encountered. The Weapons Department point of contact is CPT James L. Doyle, Weapons Department, USAFAS, Fort Sill, OK, 73503. The magic formula, which is really no magic at all, may be yet another way that a field artillery unit can enhance its responsiveness.



LTC Peter D. Heimdahl, FA, is a Permanent Associate Professor in the Department of Mechanics at the United States Military Academy. He graduated from the Academy in 1961 and received his PhD in mechanics from the University of Illinois in 1969. He served tours in Germany and Korea and, among his other assignments, was a battery commander; commander of the 2d Battalion, 34th Field Artillery; and S3 of the 72d FA Group.

View from the Blockhouse

FROM THE SCHOOL

Field Artillery School staff

For the convenience of those who need to contact a member of the Field Artillery School staff, the following list is submitted:

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COL Keith Painter—Deputy Assistant Commandant	2301
COL Billy W. Fugitt—Director, Directorate of Combat Developments	6980
COL Aquila E. Stipe—Director, Directorate of Course Development and Training	2005
COL Paul A. Slater—Director, Tactics/Combined Arms and Doctrine Department	4704
COL Paul T. Wickliffe—Director, Target Acquisition Department	6207
COL Forrest W. Appleton—Director, Communications/Electronics Department	3115
COL Rush S. Yelverton—Director, Weapons Department	2400
COL George F. Kraus, Jr.—Commander, Field Artillery School Brigade	5265
COL Phillip Kitchings Jr.—Director, Directorate of Training Developments	6403
LTC(P) Thomas P. Easum, Jr.—Director Gunnery Department	2014
LTC Truman R. Arnett—Director, Directorate of Evaluation and Standardization	2002
LTC Ronan I. Ellis—Secretary, US Army Field Artillery School	6702

Standardization/interoperability (NATO/ABCA)

The 12th meeting of the NATO Artillery Working Party was held at Headquarters, NATO (Belgium) during the week of 11-15 October 1982. The US Army Field Artillery School, as the TRADOC proponent and DA action agency, provided representation for the United States. Once again the US delegation included an "on-the-ground" observer from Headquarters, USAREUR, out of Headquarters, V Corps.

One of the most important "products" which the Artillery Working Party is trying to produce is the credibility and integrity of the STANAG program when used by national forces interoperating with each other. It is expected that in some future exercise *verification* of one or more STANAGs will be evaluated.

In its March-April 1982 issue, the *Field Artillery Journal* published a list of all STANAGs/QSTAGs ratified by the US and implemented in FM 6-series training literature. In this issue the sequence in the development of another STANAG/QSTAG will be given. In NATO it is known as STANAG 2887, and in ABCA it is known as QSTAG 217. The purpose of these agreements is to establish a common understanding of the control of field artillery in current use by NATO forces and ABCA forces. For US field artillerymen, particularly commanders, S3s, fire support officers, fire direction officers, and FISTs, it is imperative that these agreements are understood.

Although US field artillerymen are thoroughly indoctrinated with the four standard tactical missions and variations of a nonstandard mission, they must be familiar with the tactical missions used by other NATO/ABCA nations. The following terms/definitions, which are part of STANAG 2887 but not used by the US, are provided for information and education:

•**In support:** [Used by the United Kingdom, Canada, and Australia] Artillery in support of a formation or unit provides fire support and may be required to provide additional communications to achieve this. For some nations this artillery may already be in direct support of another formation or unit, and may therefore be unable to provide liaison and observation.

•**At priority call:** [Used by the United Kingdom, Canada, and Australia] A precedence applied to the task of an artillery unit to provide fire to a formation/unit on a guaranteed basis. Normally observer, communications, and liaison are not provided. An artillery unit "in direct support" or "in support" may simultaneously be placed "at priority call" to another unit or agency for a particular task and/or for a specific period of time.

•**Reinforcing by fire:** [Used by France] Task given to artillery units under command of adjacent combined arms formations or higher echelons, which consists of providing a certain proportion of their fire, within given conditions, to reinforce another formation having artillery at its disposal, the fire of which is reinforced. When the units of several adjacent combined arms formations are tasked to reinforce by fire the other units, such a task is called mutual support.

Queries regarding the above information should be addressed to:

Commandant
US Army Field Artillery School
ATTN: ATSF-CDS
Fort Sill, OK 73503

(Mr. B. M. Berkowick, USAFAS International Standardization Coordinator, NATO/ABCA)

TOE development

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

•TOE — A TOE is a table which describes the normal wartime mission, organizational structure, and personnel and equipment requirements for a type unit; and it is the basis for the authorization document, the modified tables of organization and equipment.

•MTOE — The MTOE prescribes the modification of a basic TOE necessary to insure that a unit can perform its assigned mission in a specific geographical or operational environment and is the document which allows units to requisition personnel and equipment. Most FA units are organized under a TOE, and the remainder normally fall under a table of distribution and allowances (TDA).

•TDA — The TDA is a document which prescribes the organizational structure, personnel, and equipment authorizations and requirements of a military unit to perform a specific mission for which there is not an appropriate TOE. TDA units are normally non-deployable and are uniquely developed to perform a specific support mission, as in the case of the US Army Field Artillery School (USAFAS).

The developmental cycle of a TOE is complex and lengthy (figure 1). Normally, a TOE evolves through a study process, such as Division 86. The Division 86 supportive studies, which were orchestrated by the US Army Combined Arms Center at Fort Leavenworth, KS, and approved by the Chief of Staff of the Army, resulted in the 155-mm self-propelled (SP) 3x8 direct support (DS) battalions and the 8-inch/MLRS composite battalion for the heavy division artillery, as well as new structures for other elements of the division. Studies to determine the structure for the light and special divisions are still ongoing. In support of these studies, the Combat Developments Directorate, USAFAS, prepares Automated Unit Reference Sheets (AURS) for the FA elements of the divisions. The AURS (which is similar to the TOE but lacks much of the detail) reflects personnel requirements established by doctrinal manning levels, standard position, and Manpower Authorization Criteria (MACRIT). The appropriate field or technical manuals drive the doctrinal positions. Standard position requirements, determined through tests, maneuvers, and experience, are normally based on the number and types of units and personnel supported. These positions are composed of administrative, legal, and logistics clerks, supply specialists, aidmen, cooks, and drivers. The MACRIT positions are determined by the annual maintenance man-hours (AMMH) required to maintain that unit's required equipment. Detailed analysis of the unit's combat mission reveals the equipment

requirements.

The AURS is transformed into a draft TOE after the study is approved and documentation is initiated to establish the three strength and equipment levels prescribed in AR 220-1. Each of these levels is a balanced organizational structure. Level 1 represents full requirements for sustained combat; Levels 2 (90 percent) and 3 (80 percent) provide balanced organizational structure reflecting reduced capabilities in terms of staying power in combat or ability to perform at given work loads. A unit organized at reduced levels will initially be able to execute its mission effectively, but will require build-up to Level 1 in order to maintain combat effectiveness.

This draft TOE, after staffing within the Field Artillery School and among other TRADOC schools, is forwarded to Headquarters TRADOC with a mission/capability statement, limitation and dependency statements, personnel and equipment justification, loading plans, MACRIT computations for maintenance personnel, and communications diagrams. The draft TOE, after review at TRADOC, goes to the major Army commands (MACOMs) for an area of interest review and to Headquarters, Department of the Army, for final staffing and approval — a process which normally takes seven months, although incorporation of comments and TRADOC priorities may lengthen this period to a year or longer. Upon approval of the TOE by HQDA, the MACOMs begin preparation of the authorization document based on the TOE.

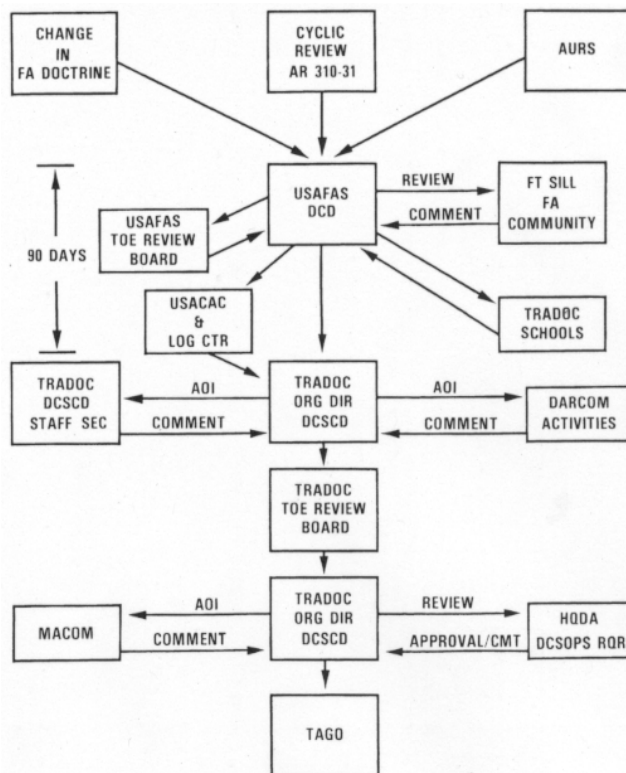


Figure 1. TOE development.

View From The Blockhouse

The MACOMs (USAREUR, FORSCOM, and WESTCOM), the Office of the Chief, Army Reserves (OCAR), and the National Guard Bureau (NGB) submit their modified TOE to HQDA for final approval, at which time it is entered into The Army Authorization Documents System (TAADS). (TAADS is an automated system for developing and documenting organizational structure, requirements, and authorization of personnel and equipment necessary to support the assigned missions of Army units.) Upon approval by HQDA, the MTOE will be implemented on an effective date (EDATE) for specific units. The MTOE provides the commander with his organizational structure and personnel and equipment authorization.

The required and authorized columns of the MTOE are derived from TOE equipment and personnel manning levels established by AR 220-1. The authorized column is a line-by-line extract of the TOE Level 1 or 100 percent of the required strength. The authorized column is based upon the unit's established authorized level of organization (ALO). Normally an ALO of 2 or 90 percent of the required strength is authorized. At this level, a unit should be able to operate and maintain all of the major equipment items authorized at the 100 percent level and consequently will normally be authorized 100 percent of combat mission essential equipment when organized at the 90 percent personnel level. In order to provide for rapid fill to 100 percent when maximum readiness is required, the personnel reductions to ALO 2 normally affect only those positions with relatively low skill levels. Equipment fill is based on a myriad of variables such as budgetary constraints, distribution priorities, production limitations and shortfalls, or a lack of an established logistical base. Therefore, FA units normally experience a disparity of equipment fill from unit to unit, with many units receiving substitute items. In an era of budgetary consciousness, this situation will continue to exist.

This brief explanation of a relatively complex subject can supplement the more detailed explanation of the TOE development found in AR 310-31 and explanation of The Army Authorization Documents System in AR 310-49.

A special note to commanders—hands-on evaluation feedback

Results of hands-on evaluations are no longer reported for EPMS purposes. However, in order for the Field Artillery School to improve its products, it is essential that training diagnostic feedback be obtained from the field. Upon completion of periodic hands-on evaluations, it would be most helpful if commanders would provide the Field Artillery School with a consolidated analysis. Strict unit anonymity will be maintained. The School is only interested in obtaining sufficient data to identify tasks and performance measures which indicate a need for improvement in our training products. Although data in any

form will be accepted, the elements in the following example would be most meaningful to the School:

Task number	Number of soldiers evaluated	Total number "No Go"	Steps Failed
061-294-1104	20	5	Step 3(2), step 5(1), step 6(2)

If commanders are aware of any external factors which affected the results of their evaluation, they should identify them. Informal, handwritten feedback will be fine. Again, this request is entirely voluntary; and unit anonymity will be maintained. Please send your responses to:

Commandant
US Army Field Artillery School
ATTN: ATSF-DI
Fort Sill, OK 73503

Instruction proponency transferred

On 1 October 1982, the Target Acquisition Department transferred the proponency for division artillery tactical operations center (TOC), targeting, and artillery threat instruction to the Tactics, Combined Arms, and Doctrine Department. Six instructors were transferred from the disestablished Targeting Division to work in Advanced Tactics. This transfer places all TOC operations instruction in Advanced Tactics and will produce more contiguous instruction for the Field Artillery Officers Advanced Course (FAOAC). Targeting doctrine will be removed from FM 6-121 and eventually added to FM 6-20.

TACFIRE SQT tapes

As of 1 March 1983, the TSOs possessing the magnetic tape cartridge (MTC) for the Hands-On-Component (HOC) Test MOS 13C, Skill Levels 3 and 4, will sign these tapes over to the nearest TACFIRE-equipped division artillery or artillery brigade S3. Once the tapes are signed over to the respective units, they will no longer be considered FOUO (for official use only) and are to be utilized for training purposes until obsolete. This action comes as a result of the changes to the Skill Qualification Test (SQT) for 1983. Hands-on evaluations will now be conducted by units strictly for training and diagnostic purposes. Only the written test will be part of the formal SQT with scores reported for Enlisted Personnel Management System (EPMS) purposes. In addition to use by unit commanders for local evaluations, the tapes will also provide a realistic training medium and should be made available to all TACFIRE-equipped units on a frequent basis. The provisions of hands-on evaluation guides in the new MOS 13C Soldier's Manual and Soldier's Manual Supplement will also assist trainers in evaluating the performance of their soldiers while maintaining job proficiency.

Soldier training product status

Table 1 provides a summary of current Soldier's Manuals and the projected dates for submission of new products. Since the SQT is based on the current Soldier's Manual, it is important to insure that publication accounts are kept up to date. It normally takes about six months for a Soldier's Manual to be printed and distributed after it is forwarded for production from the Field Artillery School to the Army Training Support Center (ATSC). If units have not received new manuals, they should check their accounts. Specific inquiries should be directed to:

Commander
USA AG Publication Center
ATTN: Customer Service
2800 Eastern Boulevard
Baltimore, MD 21220
AUTOVON 584-2272

As a result of the recent changes to the SQT program which were discussed in the November-December 1982 *FA Journal*, Soldier's Manual Supplements (SMS) are being prepared to assist units in the conduct of hands-on evaluations. This is an interim measure until Soldier's Manuals are published with the new format. The distribution of the supplements will be expedited through Training Standards Office (TSO) channels. Units should receive them approximately two months after they are submitted to ATSC; otherwise, the unit should contact its local TSO.

MOS	Current Soldier's Manual date	Next Soldier's Manual submission date	Soldier's Manual supplement submission date	Remarks*
13B	Aug 82	Dec 84	Oct 82	(1)
13C	Dec 80	Feb 83	Nov 82	(1)
13E	Jun 82	Feb 85	Dec 82	(1)
13F	May 82	Mar 84	Dec 82	(1)
13R	Dec 81	Oct 84	Sep 82	(1)
15D	Mar 82	Dec 84	Sep 82	(1)
15E	Jun 82	Jan 84 (PII)	NA	(1)(2)
15J	Mar 82	Nov 83	Sep 82	(1)
17B	Oct 80	Nov 82	NA	(4)
17C	Nov 79	Dec 82	NA	(4)
21G	Jun 82	Jun 84 (PII)	NA	(1)(2)
26B	Nov 80	Nov 82	NA	(4)
34Y	NA	Mar 84	NA	
82C	Nov 79	Nov 82	NA	(4)
93F	Nov 79	Jan 85	Mar 83	(3)
13M	NA	Oct 83	NA	

*Remarks:
(1) *Trainer's Guide* contains sample HOC scoresheets. SMS will not duplicate.
(2) SMS will not be published due to transition to PII.
(3) HOC scoresheets are contained in current SM.
(4) New SM in final production with evaluation guides.

Supply economy

Often, when one replaces the BNC connector (NSN 5935-01-043-0629) on any RG-58 coaxial cable, some parts of the old connector are damaged and cannot be reused. This is particularly true for the rubber gasket in the sleeve assembly; however, instead of reaching for a new package which contains the connector parts and costs approximately 83 cents, reach for a package that contains the gasket only. This item can be requisitioned individually at a cost of only 23 cents through the supply system (MS90133-2, Gasket, NSN 5330-00-892-4099). A suggested number of gaskets to order is a 6-months' supply. Continue to order the complete BNC connector package to replace those that are damaged or badly corroded.

Gunnery Department receives fire observation sets

The Enlisted Instruction Branch of the Gunnery Department has received four Training Sets, Fire Observation (TSFO) to augment the observed fire training for nine courses of instruction at the Field Artillery School.

The device can accommodate 30 student observers; and, with the stair-stepped seating in the Fort Sill classroom, each student and instructor can readily view the terrain scenes, targets, and bursts projected on a fixed screen. The TSFO portrays the effects of survey errors, wind speed/direction, limited visibility, moving targets with sound effects, actual time-of-flight, and accurate flash-to-bang.

Photographs of any tactically desirable location can be programmed for TSFO use to provide training in real-world situations. Plans for improvement include the addition of improved conventional munitions (ICM) rounds to the ones which can be displayed and the incorporation of a version on the ground/vehicular laser locator (G/VLLD). Modifying the TSFO to permit its transportation in a trailer is also under consideration.

Another developmental project involving the TFSO is a closed loop trainer — a device strategy to train the entire cannon artillery system at a local training area or in garrison. The fire support team (FIST) would train with the TSFO and pass its calls for fire to the fire direction center in the local training area. The howitzer sections would prepare a dummy round (the field artillery shootable practice round); and the Firing Battery Trainer (FBT) would measure deflection, quadrant, elevation, fuze setting, charge, and projectile at the time of firing. All measured data, including any errors which may have occurred, are transformed into a "did hit" grid location which is sent to the TSFO and displayed on the viewing screen. Then, FIST personnel would determine corrections from the burst symbol displayed on the screen.

View From The Blockhouse

FADAC maintenance

Fielding of the Battery Computer System (BCS) has commenced; but, at the current rate, the active force will not reach complete fill until 1987. During the interim, FADAC must remain a viable part of the gunnery team, and so FADAC maintenance will require continued emphasis. In this respect, there are several lessons learned in the past which merit special emphasis today.

- Commanders should insure that FADAC repairmen (31V10F7) are properly assigned and utilized.

- The proper diagnostic stock should be on hand.

- Programming is an organizational responsibility—there is no need to transport the FADAC to a direct support organization and accrue transportation costs and the risk of programming for the wrong caliber.

- If transportation is required, the FADAC requires shock mounting (NSN for the kit is 1220-00-179-1312) or at least adequate cushioning. Proper handling will reduce the chance of the circuit cards becoming loose while in transit.

- Follow-up on requisitions and turn-ins should be continuous to prevent computers and components sitting around for months before action is taken.

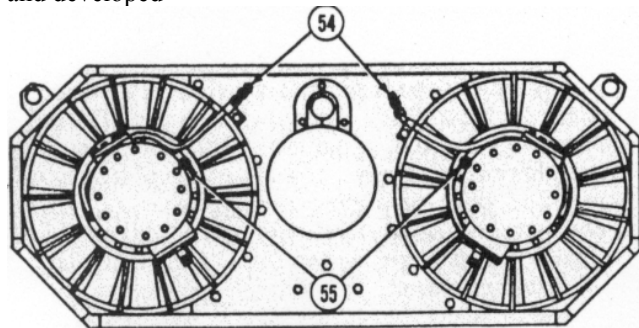
- Maintenance assistance for the FADAC, as well as for the 3-kilowatt generators which provide power for it, is available through the field maintenance technicians in the area.

The use of sound judgment and common sense and emphasis on maintenance by commanders will enhance the operational effectiveness and durability of FADAC until its final replacement by BCS.

M109A2 fan tower problem

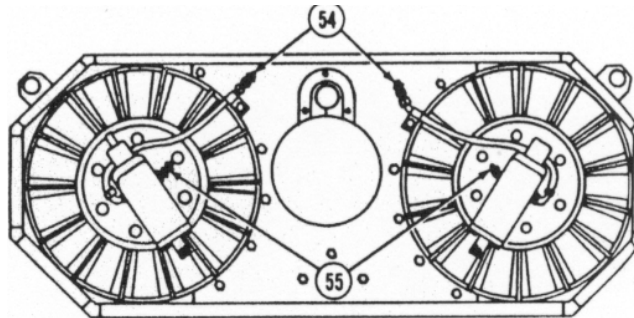
The M109A2 fan tower is still causing field artillerymen problems. The manufacturer's design is partly responsible for frequent fan tower failure, but improper maintenance by the unit is also a contributory factor.

The Combat Vehicles Division, Tank-Automotive Command, states that the M109A2 production fan towers were manufactured with inadequate torquing specification for the fan gear assembly. Accordingly, Tank-Automotive Command engineering personnel looked into the problem and developed



Joy cooling fans.

new torquing procedures and specifications for the fan drive gear assembly. Although the specifications are presently in the technical writing phase, field units should get their direct support maintenance unit to retorque the fan gear drive nuts from 60 to 70 foot pounds. After the technical writing phase, the procedures and specifications will first appear in a Technical Bulletin 43-0001-39-4 series and later in the 34-series technical manual for the M109A2.



Pesco cooling fans.

Another thorny problem is the parts shortage in impellers for the Pesco model fan tower (the other manufacturer makes the Joy model), and units with the Pesco model can anticipate continued difficulties in this area. The other biggest factor affecting fan tower failure is the lack of proper PMCS (preventive maintenance checks and services). TM 9-2350-303-20-1, page 6-35, describes the proper method for insuring that the radiator is cleaned and free of clay, sand, and oil by employing the radiator cleaning tool found in the special tools for the vehicle in combination with a mixture of detergent and water. A dirty radiator causes the engine cooling fans to work ineffectively. Additionally, LO 9-2350-303-12, page 18, calls for the fan tower drive gears to be lubricated with GIA (grease, aircraft and instrument), MIL-G-23827. Proper PMCS will prolong the life of the fan towers until the faulty ones are phased-out of the system. (CW4 William T. Anders, WD)

JINTACCS

The Field Artillery School is taking part in the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) tabletop tests. These tests establish the Army position on the adequacy of the JINTACCS fire support messages, the correctness of Army and joint interfaces, and the adequacy of related data standards. In the formation of these standard message formats, participants are using TACFIRE message formats and technical interface requirements, the Marine Corps Automated Fire Support System, the United Kingdom Battlefield Artillery Target Engagement System (BATES), the German ADLER, and STANAG 5602 (The Standards for the Interoperability of Automated Data Processing (ADP) Fire Support Systems).

The purpose of JINTACCS is to establish a tactical command and control (C²) data exchange standard which is adequate for joint service operations and also useable for both current (primarily manual) interfaces and future automated interfaces. This program has four functional message groups as follows:

- Intelligence.
- Air operation.
- Fire support.
- Operations control.

Revision 6 FADAC tapes

Revision 6 FADAC tapes, developed to handle the proliferation of munitions and new systems, differ from the Revision 5(5A) program tapes in several functional areas, as the following brief synopsis will illustrate.

Deletions:

- 1) Charge Selection Routine.
- 2) All of Matrix 2 (Survey, Chronograph, etc.)
- 3) No-Fire Areas.
- 4) Temporary Mission Store and Recall.
- 5) Enable White Bag.
- 6) Derive MV.

Combine:

- 1) Locate, Orient, Traverse, and Trilateration.
- 2) Input Met Message and Single Line Input.

Add:

- 1) Chronograph Delay/Measure MV (M90/M36).
- 2) Prop Type.
- 3) True Target (laser mission)
- 4) CLGP Mode (Copperhead).
- 5) Cloud Ceiling (Copperhead).
- 6) Lase Alert (Copperhead).

Revision 6(6A) tapes have been developed for the following systems:

Item	Revision	National stock number	Part number
M109A1/A2/A3	6	1290-01-068-0367	8213330-128
M198	6	1290-01-071-9136	8213330-130
M114A2/109	6	1290-01-071-9145	8213330-131
M101A1	6	1290-01-071-9146	8213330-132
M102	6	1290-01-071-9147	8213330-133
M31 (Trainer)	6	1290-01-071-9143	8213330-134
M110A2	6A	1290-01-115-0504	8213330-136
M109A1/A2/A3	6A	Controlled issue by the Gunnery Department, USAFAS.	8213330-138
M198	6A	Controlled issue by the Gunnery Department, USAFAS.	8213330-139

Revision 6 conversion kits are provided without cost to the unit for the initial issue and include tapes, matrices, flag cards, and instructional material necessary to convert from

Revision 5 to Revision 6. The primary difference between the 6 and 6A 155-mm tapes is the addition of the Copperhead projectile; but the Copperhead data on these tapes is provisional, and their issue (along with the hand-held calculator modules, GFTs, and TFTs) will be controlled by the Gunnery Department. Only units fielded by the G/VLLD Copperhead NET Team will be issued these materials. The M109A1/A2/A3, M198, and M110A2 conversion kits have been distributed to the field; and the M102, M101A1, M114A2/109 and M31 (trainer) conversion kits will be ready for distribution in the near future.

Questions pertaining to Revision 6 for FADAC should be directed to:

Commandant
USAFAS
ATTN: ATSF-GA
Fort Sill, OK 73503
Telephone: AUTOVON 639-3901/6108

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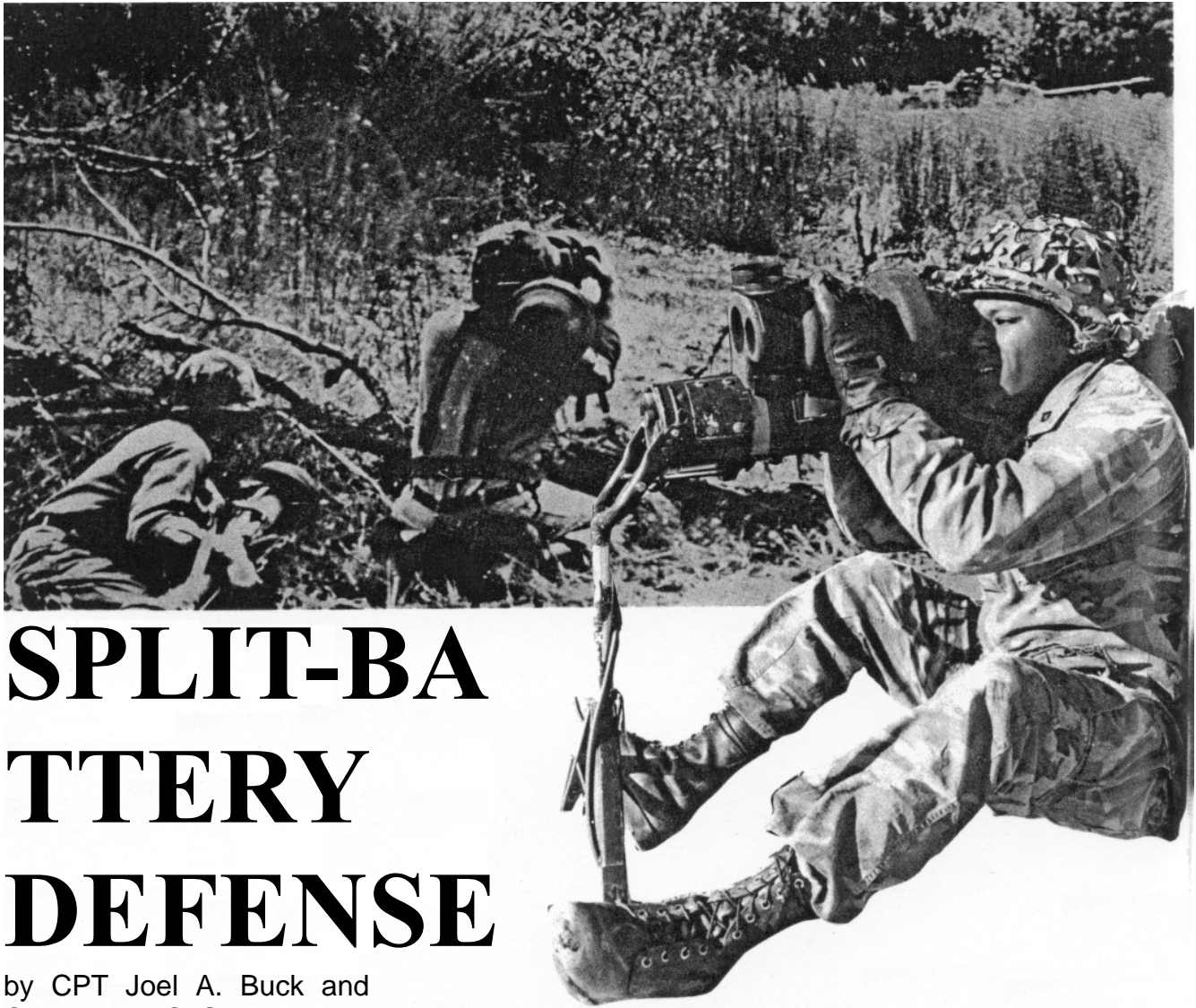
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SPLIT-BATTERY DEFENSE

by CPT Joel A. Buck and
CPT Patrick C. Sweeney

Right now is a very exciting time for artillerymen with all the new equipment hitting the field at a record rate. Even though we are given ideas on how to use our new assets, holes sometime develop in the overall doctrine where not all tactics mesh together as strongly as they did before this new equipment and ideas were put to work.

The direct support battalion is transitioning from the present three six-gun batteries to one in which each battery has eight howitzers. The mission of providing immediately responsive fire support while operating over wide frontages with frequent displacement remains the same. While the doctrine for deploying these batteries as two four-gun platoons has received much attention — 400 to 1,600 meters between platoons, and the battery operations center (BOC) and trains usually 1,000 or more meters farther to the rear — the position area defense for this split battery needs to fall under the spotlight.

The main mounted threat to artillery positions will come from lightly armored combat reconnaissance elements,

closely followed, within 30 minutes, by company-size elements equipped with tanks and armored personnel carriers (APCs). Engagement from 800 to 1,500 meters normally precedes a hasty attack. The commander's decision to defend in place rests on his analysis that the current mission of his firing units is so critical that he will maintain his position despite a high probability of destruction and the possible nonavailability of the firing unit in future operations — even if his defensive fires destroy the enemy reconnaissance vehicles, he can expect a lethal attack by following enemy ground or air forces or by artillery fires.

The passive steps taken in maintaining position security (i.e., position selection, noise and light discipline, position fortifications, concealment and camouflage, and communications security) remain of paramount importance in enabling the battery to escape detection and subsequent attack. The early warning and time gained by well-sited observation and listening posts (OP/LPs), antiarmor ambushes,

and mines are next in importance. The use of air defense teams and antiarmor weapons is an integral part of a total defensive plan; and howitzer direct fire, although used only as a last resort, requires detailed advance planning. Indirect fires of smoke, illumination, improved conventional munitions, and dual purpose improved conventional munitions should be part of the defensive plan and available on call, either from a supporting platoon or from other artillery assets coordinated through the artillery battalion tactical operations center (TOC).

Although his first priority in selecting a battery position is the ability to provide indirect fire support, a commander must also consider the likely enemy mounted approaches into the area and the defensive possibilities of the ground. Artillery in the direct fire mode is most effective at ranges less than 600 meters.

Adequate early warning will enable antiarmor ambush positions to engage the mounted threat and buy time for the battery commander. The early warning system for battery defense must be two-layered. Limited local OP/LPs provide the inner layer; and the early warning systems of the supported maneuver units, tied into the field artillery TOC through fire support officer (FSO) and liaison officer (LNO) channels, provide the larger outer layer. The purpose of the OP/LPs is not to repel attacks, but to gain time for a commander who must weigh the decision to displace or to repel the attack. The manpower pool from which to draw to man these OP/LPs is very limited; and the drain of manning more than one or two makes the idea of providing 6400-mil security physically unrealistic.

Obstacles and fortifications which the battery can construct without engineer support can canalize the threat advance. Perimeter wire is useful, but valuable primarily against infantry. Antiarmor and antipersonnel mines are better devices for covering avenues of approach and offer a commander the options of retrieving the devices or blowing them in place.

Counterbattery fire will be at least as significant a threat as an air or ground attack, and displacement will not always be possible or practical. Properly prepared fortifications can provide protection for personnel, ammunition, and equipment. As noted by Field Marshall Rommel, "With the increased power of modern weapons, increased dispersion and digging of foxholes is vital to the safety of any unit. Too much spade work is better than too little. Sweat saves blood."

The best defense against air attack is good concealment and camouflage, but Redeye or Stinger teams exist at battery level for defense against air attack. These mobile teams can effectively complement the activities of the battery OP/LPs in providing early warning of ground attack.

The battery position is often subject to dismounted attack by units as small as a squad and frequently larger. Employment of direct fire and automatic fire from the battery position is best for dealing with the harassing small arms fire of these units.



(Photo by Ed Thomas)

It may be necessary to send out a patrol to deal with the attackers, but this option should really be the last resort of a defense based on keeping battery soldiers within the battery or platoon perimeter. Again, early warning of the type of threat will enhance the survivability of the battery.

Employing eight howitzers in two separate four-gun positions significantly increases the survivability of at least half of the battery firepower in the event of a ground attack. Under the present concept, indirect fire support for one battery will come from a mutually supporting battery. But, with platoon firing positions, one platoon will be able to provide timely indirect fire support for its sister platoon.

Under Division '86, the Dragon medium antitank weapon (MAW) will be a part of each howitzer section. A Dragon in battery defensive plans increases the effective antiarmor engagement range from the 200 meters of the light antitank weapon (LAW) and the 600 meters of the howitzer to 1,000 meters — a standoff which could make a big difference in survivability.

The following is an example of how a battery might react to a mounted attack:

- OP1 sights an enemy force (figure 1). The battery operations center is informed of the size, composition, location, and disposition of the threat and alerts both platoons and trains. Antitank positions capable of engaging the threat are occupied (OP1), and other OPs are brought back into platoon positions (OP2).

- Antitank weapons are fired; the command is given to detonate mines, if applicable; and teams displace rapidly to the designated point (figure 2). The battery operations center directs one platoon to fire pre-planned targets while the other displaces by section to the alternate position area or rendezvous point, as designated. Direct fire positions will be occupied only if absolutely necessary. The platoon headquarters vehicle displaces to pick up the antitank team.

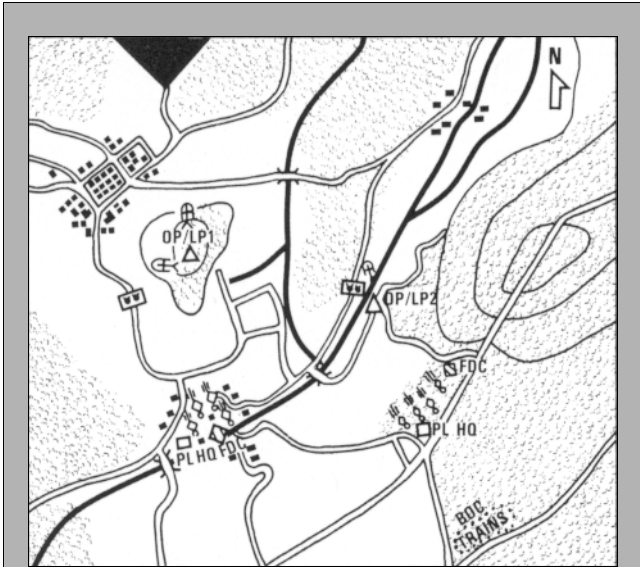


Figure 1.

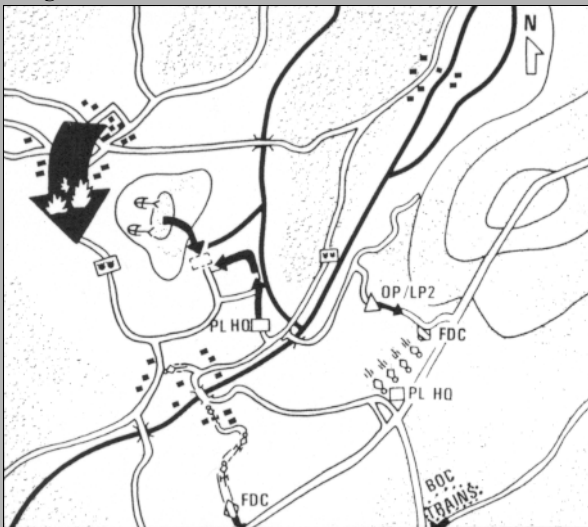


Figure 2.

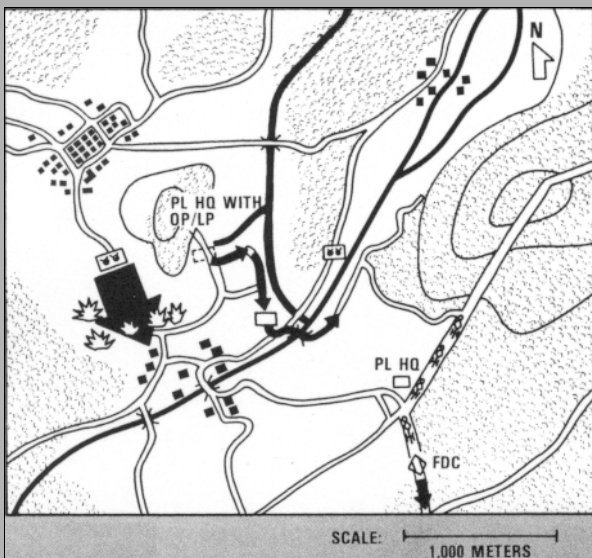


Figure 3.

•The TOC is informed of the situation and requests artillery fires on preplanned targets (figure 3). The trains displace to the alternate position or rendezvous point, as designated. The last platoon displaces by section to the alternate position or rendezvous point, as designated. The platoon headquarters vehicle sends an updated enemy situation report (SITREP) to the tactical operations center and passes through old positions, if possible, to insure that all personnel and equipment are accounted for.

The purpose of the antitank teams is not to destroy the advancing force as much as to force it to slow down and buy time for the delivery of preplanned artillery while the battery is displacing to another location.

Proper siting of even just a few antitank and antipersonnel mines can also gain time while generating confusion in the mounted enemy force.

Conclusion

Much has been written about providing position area defense for a firing battery; for example, TC 6-20-9 and chapter 4 of FM 6-50 explain these general principles in detail. But, under the 8-gun battery concept, these tactics must be reviewed and applied not at the battery level as much as at the platoon level. The problems involved with establishing security at the platoon level, primarily the shortage of necessary manpower, is offset some by the increased range available from properly sited DRAGON weapons and the mutual support that one platoon can offer the other under the close coordination and control of an on-the-scene battery commander. ☒

CPT Joel A. Buck, FA, is assigned to the US Army Logistics Center, Fort Lee, VA. He received his commission through the ROTC program at Kansas State University. Following a tour in Germany where he served as Commander of C Battery, 2d Battalion, 3d Field Artillery, 3d Armored Division, he attended the Infantry Officers Advanced Course at Fort Benning, GA.

CPT Patrick C. Sweeney, FA, is a Field Artillery Instructor at the US Army Infantry School, Fort Benning, GA. He received his commission through The Citadel, in Charleston, SC. He also received his master's degree in public administration from Western Kentucky University and is a graduate of the Armor Officers Advanced Course. He was a battery commander with the 2d Battalion, 320th Field Artillery, 101st Airborne Division.

Right by Piece

NOTES FROM UNITS

M198 ARTEP

FORT LEWIS, WA — More than 450 soldiers from the 3d Battalion, 34th Field Artillery, recently braved cold temperatures and persistent rain to become the first battalion in the Army to be evaluated under the Army Training Evaluation Program (ARTEP) while using the M198 155-mm howitzer and the Tactical Fire Direction System (TACFIRE), both of which are new to the Army's equipment inventory.

The ARTEP culminated more than a month of hard training. The unit spent two weeks live firing at the Yakima Firing Center and conducted two



P4 James Briggs, Battery A, 3d Battalion, 34th Field Artillery, 9th Infantry Division, stands ready with an M60 machinegun while his battery moves their M198 howitzers to a new firing position during a recent ARTEP. (Photo by SP4 Dave Schad)



A cannon crewmember from the 9th Infantry Division's 3d Battalion, 34th Field Artillery, puts his weight into the firing lanyard of an M198 howitzer during a recent ARTEP. (Photo by SP4 Dave Schad)

January-February 1983

battalion-sized field training exercises designed to familiarize them with their fifteen M198s and prepare them for the evaluation.

During the four-day ARTEP, the battalion was attacked frequently and was constantly dressed in Nuclear, Biological, Chemical (NBC) protective gear. Also built into the demanding scenario were frequent night movements and night fire missions.

Since the M198 uses a caseless propellant similar to that used with the M109 self-propelled gun and the 8-inch gun, the battalion's noncommissioned officers who had worked with these weapons passed on their knowledge to the battalion's younger soldiers during the transition/preparatory training. (SP4 Dave Schad, *The Ranger*)

Top Guns evaluated as "Division's Best"

FORT CAMPBELL, KY — Forward observers from the 1st Battalion, 321st Field Artillery "Top Guns" played a key role in the Division Mortar Competition last September.

The observers, who routinely survey battlefields for the selection of targets and adjust indirect fire assets such as mortars, field artillery, and close air, were evaluated as "The Division's Best" during the event.

The mortar competition included evaluation of the observers who are associated with the infantry battalions.

SGT Nyle T. Sports, Jr. and PV2 Joseph E. Brotemarkle served as the 1st Battalion, 501st Infantry's observers and scored 395 points out of a possible 400. The score was the highest out of the three observer teams judged.

The teams were rated on calls for fire, tactically occupying observation posts, adjust fire missions, registration and adjustment of sheafs, and immediate smoke.

They were also judged on emergency missions, polar plot missions, battlefield and coordinated illumination, day and night occupations, terrain sketches, and selection of a tactical route from garrison to the observation post.

In addition to these fire support team tasks, common skills tasks like using the light antitank weapon, M16A1 rifle, claymore mines, and map reading were evaluated.

"It was an excellent opportunity to utilize the specialized training of fire support team personnel in conjunction with infantry tactics and maneuverability on the battlefield," Sports said. (1LT Jerry Sullivan, *Fort Campbell Courier*)



FORT LEWIS, WA — An M198 howitzer from the 3-34th FA is prepared for air movement as part of the battalion's Emergency Readiness Deployment Exercise (EDRE). The 3-34th also practiced loading a five-ton truck, a jeep, and a trailer at McChord AFB before their departure to Yakima Firing Center for two weeks of training. (Photo by Geary McSpadden)

TACFIRE Park puts realism in training

FORT LEWIS, WA — A TACFIRE Park training facility and secure equipment storage area, perhaps the only one of its kind in the Army, is being used by 9th Infantry Division Artillery to provide an intensive and realistic training environment for units equipped with TACFIRE.

LTC Lawrence J. McCollum, div arty executive officer, said that TACFIRE, "with its automated data processing capability, can provide more (fire direction) information at battalion level than what was previously available to division commanders."

However, for TACFIRE's sophisticated computers to be employed properly, div arty units and field artillery brigades equipped with the system must provide their troops and supported maneuver units with intensive and repetitive training. For example, McCollum said the 9th Inf Div Arty staff estimates that TACFIRE operators who participated in a 105-day new equipment training course when TACFIRE arrived in the division early this spring, now require 16 to 20 hours of training each week to maintain their proficiency.

To provide that training, div arty has constructed a secure motor park area where the TACFIRE vans and trucks are broken down into three direct support battalions, a general support battalion, div arty and division fire support center, and organized into a command post exercise (CPX) configuration for around-the-clock operations. "It's an entire training system," said McCollum, "and we train together all the time."

In addition to providing the training environment sought

by the div arty staff, the 9th Div's TACFIRE Park has yielded a considerable dollar savings over the past system in which units had to go to the field for TACFIRE training. That's because the TACFIRE vans now can operate off commercial electric power, rather than gasoline generators, when they are organized into the CPX training configuration.

McCollum said the division spent \$90,000 for the installation of security lighting; \$23,000 for a security fence, and \$4,000 for the rental of construction equipment. Commercial power is brought into the park and converted to 400 cycles and 220 volts by two surplus power converters previously used with a Nike/Hercules missile system.

The div arty staff expects that it will recover the expenditures in less than a year on fuel alone, which officials estimate under the old system would have cost \$150,000 to \$200,000. (Jim Tice, *Army Times*)



FORT LEWIS, WA — In an effort to keep his BC scope dry, SSG Bernard Conrad, Battery A, 5th Battalion, 333d Field Artillery (Target Acquisition), draped his poncho over the device and the result was an E.T. look-a-like. Battery A, 5-333d FA, was supporting the 3d Battalion, 34th Field Artillery in an Army Training and Evaluation Program. (Photo by SP4 Dave Schad)



FORT CARSON, CO—The 1st Battalion, 29th Field Artillery, supported the 4th Infantry Division (Mechanized) during a recent field exercise. The battalion safely fired live ammunition over the 2d Brigade troops, and the confidence of the gun crews and maneuver personnel grew accordingly. In this picture, SSG Eddie Cintron (right), chief of a 155-mm howitzer section, assists SP4 Kenneth Miller in setting an M564 time fuze with the M27 fuze wrench. (Photo by Ed Thomas)

Eighth-Army competition awards presented

CAMP STANLEY, KOREA — Two soldiers from the 2d Infantry Division Artillery received fourth quarter awards in the all-Army competition for units in Korea. SSG Charles G. Anderson of Service Battery, 1-38th Field Artillery, won NCO of the 4th Quarter; and SGT Song, In Suk, Headquarters and Headquarters Battery, 2d Infantry Division Artillery, won KATUSA of the 4th Quarter. GEN Robert W. Sennewald, Commander of United Nations Command/United States Forces, Korea, presented the awards to the two noncommissioned officers in September of last year.

1-84th trains on Yakima plains

FORT LEWIS, WA — The 1st Battalion, 84th Field Artillery, recently completed 17 straight days of field training, starting at the lowest level and working up to a battalion field problem. The field problem began with an emergency deployment readiness exercise (EDRE); then the battalion deployed by convoy to the Yakima Firing Center. The first training phase consisted of four days of individual and section training, followed by a six-day combination battery-controlled field problem and battery Army Training and Evaluation Program (ARTEP). The final phase was a three-day battalion field problem that included a 24-hour continual operation exercise.

During the course of the field problem, the 1-84th provided support for the 1st Battalion (Ranger), 75th Infantry, from Fort Stewart, GA. (The 2d Battalion (Ranger), 75th Infantry, provided forward observers for the exercise.)

The training area at Yakima allowed a full testing of the weapons systems, and the 1-84th FA was able to shoot within 800 meters of the frontline of the Rangers to give them an increased feeling of what it would be like in combat.

The battalion also used its new TACFIRE system to good advantage — sending firing data to the guns more quickly, increasing the number of first-round hits, and reducing time on the radios to a bare minimum.

The other side of the operation dealt with maintenance. The interface that developed in the maintenance sections enabled the battalion and batteries to achieve less down time and more usage — the turn around time for vehicles and tubes was less than 24 hours.

The Yakima Firing Center permitted a dimension of training not possible at Fort Lewis, and the 1-84th FA's field exercise highlighted the battalion motto of "Performance Above All." (1LT Robert E. L. Titus, *The Ranger*)



FRANKFORT, KY — Embarking on a new career was a major decision for Don Offutt of Lexington, KY, who, at age 35, enlisted in the Kentucky Army National Guard Headquarters Battery, 138th Field Artillery Brigade. Private First Class Offutt completed Basic and Advanced Individual Training at Fort Sill, OK, where he earned the Distinguished Graduate of the Cycle trophy and also Certificates of Achievement and Commendation.

Commanders Update

LTC Albert E. Slucher, Jr.
4th Battalion, 4th Field Artillery

LTC James A. Henderson
1st Battalion, 5th Field Artillery

LTC Glen D. Skirvin, Jr.
6th Battalion, 14th Field Artillery

LTC Gill H. Ruderman
1st Battalion, 29th Field Artillery

LTC David A. Schulte
2d Battalion, 35th Field Artillery

LTC Raymond T. Roe
3d Battalion, 35th Field Artillery

LTC John F. Nau, Jr.
6th Battalion, 37th Field Artillery

LTC William D. Smith, Jr.
1st Battalion, 39th Field Artillery

LTC Edwin T. Vernon
2d Battalion, 75th Field Artillery

LTC Freddy E. McFarren
1st Battalion, 319th Field Artillery

LTC Robert N. Lichtenberger
Training Command Battalion
Fort Sill, OK

Reserve Components Update

The following is a list of US Army National Guard and Reserve unit commanders as of 1 November 1982.

ARMY NATIONAL GUARD

XI Corps

BG James E. Lee
1-140—MAJ Donald M. Ewing
1-145—LTC Robert L. Hansen
2-222—LTC Randy J. Ence

26th Division Artillery

COL Donald P. Eriksen
1-101—LTC John J. O'Neil
1-102—LTC James W. Russell
2-192—LTC Terrance J. McGurk
1-211—LTC Edward Machado

28th Division Artillery

COL Elton D. Reep
1-107—MAJ(P) James O. Smith, Jr.
1-108—LTC Clarence A. Bricker
1-109—LTC Joseph F. Perugino
1-229—LTC William C. Rischar

38th Division Artillery

COL Richard L. Chastain
1-119—MAJ(P) Howard A. Becker, Jr.
3-139—MAJ(P) David L. Huffman
2-150—LTC Ronald W. Henry
1-163—LTC Donald E. Christy

40th Division Artillery

COL Melvin G. Gordon
1-143—LTC Marshall L. Wattel
1-144—LTC Jack R. Armstrong
2-144—LTC Stephen A. Tyler
3-144—LTC Eugene W. Schmidt

42d Division Artillery

COL Robert H. Ford
2-104—LTC Robert Rose
1-105—LTC John T. Ruggiero, Jr.
1-187—LTC John F. Boyle
1-258—LTC Guy Ruggieri

47th Division Artillery

COL Philip L. Potter
2-123—LTC Edward L. Goett
1-125—LTC Fredrick A. Meyer
1-151—LTC Duane A. Geisen
1-175—LTC John P. Pedersen
1-194—LTC Donald E. Banwart

49th Division Artillery

COL Paul N. Biediger, Jr.
2-131—LTC Jame R. Cantwell
1-133—LTC David L. Harmon, Jr.
3-133—LTC James C. Harvie
4-133—LTC Sherman L. Vinyard

50th Division Artillery

COL Richard S. Schneider
1-86—LTC Harold Lyon
1-112—LTC Thomas B. Sitzler
3-112—MAJ(P) George J. Blysak
4-112—LTC Hector G. Pieretti

45th Field Artillery Brigade

COL Norman Duckworth
1-158—LTC Ronald W. Holt
1-171—LTC Johnny L. B. McWhirter
1-189—LTC William G. Francis

57th Field Artillery Brigade

COL Charles F. Scharine
1-121—LTC John L. Dunlap
1-126—LTC James W. Holmes

103d Field Artillery Brigade

COL Cyril E. Frost, Jr.
1-103—LTC Richard P. Kanaczet
2-103—MAJ Donald E. Dowling

113th Field Artillery Brigade

COL Kenneth R. Newbold
4-113—LTC Charles H. Cross
5-113—LTC Maylon C. Baker

115th Field Artillery Brigade

COL John Zaysoff
1-49—LTC Robert D. Carter
3-49—LTC Robert G. Sharp

118th Field Artillery Brigade

COL Donald Burdick
1-214—LTC Joe W. Seymour
2-214—LTC Elton F. Hinson

130th Field Artillery Brigade

COL Joseph H. Wolfenberger
2-130—LTC Fred H. True
1-161—LTC Malen E. Dowse

135th Field Artillery Brigade

COL Dale L. Strannigan
1-128—LTC Elbert F. Turner, Jr.
1-129—LTC Thomas T. Catlett

138th Field Artillery Brigade

COL Paul G. Collins
1-623—LTC Walter R. Wood

142d Field Artillery Brigade

COL Howard N. Riggs
1-142—LTC James R. Pennington
2-142—LTC Bobby H. Armistead

147th Field Artillery Brigade

COL Roger D. Kernn
1-147—LTC George L. Loudenslager
2-147—LTC Leon J. Vanderlinden

151st Field Artillery Brigade

3-178—LTC Claude W. Booner
4-178—LTC John B. Duffie

153d Field Artillery Brigade

COL Benny P. Anderson
1-180—LTC David H. Pilcher
2-180—MAJ Jose A. Diaz

169th Field Artillery Brigade

COL Robert G. Hancock
1-157—MAJ(P) Gerald G. Neel
2-157—LTC Charles A. Rodgers

196th Field Artillery Brigade

COL Holman J. Walker
1-115—LTC Marion K. Wynne
1-181—LTC James P. Darling

197th Field Artillery Brigade

COL John S. Sullivan
1-172—LTC Francis E. Merrill
2-197—LTC Roland W. Couture
3-197—LTC Wallace I. Getchell, Jr.

209th Field Artillery Brigade

COL Joseph N. Brill
1-156—LTC Glenn W. Losel
1-209—LTC John L. Petri

224th Field Artillery Brigade

COL Robert C. Dechert
1-111—LTC Terry J. Tyler
2-111—LTC Claude A. Abernathy

227th Field Artillery Brigade

COL John C. Woodley, Jr.
1-116—LTC Leo A. Lorenzo

631st Field Artillery Brigade

COL Charlie D. Brakeen
1-114—LTC James L. Elmore
4-114—LTC Carl B. Cooper

Separate Units

2-110—LTC August P. Boerschel
1-113—LTC Roscoe Lindsay, Jr.
2-114—LTC Shelby K. Brantley
3-115—LTC John R. Ward
2-116—LTC Terry O. Ballard
1-117—LTC Samuel M. Carr
2-117—LTC Robert W. Williford
3-117—LTC Billy R. Norman
1-120—LTC Ellis R. Langjahr
2-122—LTC Walter J. Whitfield
1-127—LTC Ronald D. Tincher
1-136—LTC Thomas A. Middeler
2-138—LTC Thomas R. Ice
1-141—LTC Urban B. Martinez, Jr.
2-146—MAJ(P) Gordon C. Goheen
1-152—LTC Nathan L. Grass
1-160—LTC Ray W. Standifer, Jr.
1-162—LTC Rafael Casellas
2-162—MAJ Ernesto A. Ramos
1-168—LTC William S. Christy
1-178—LTC Harry J. Vann
1-182—LTC Joseph A. Latyszewski
1-201—LTC William G. Hartman
5-206—LTC David G. Dodd
2-218—LTC Fred R. Flint
1-230—LTC Fred W. Shaver
1-246—LTC Ronnie M. Guthrie
1-487—LTC John K. Hao

UNITED STATES ARMY RESERVE

Separate Units

5-5—MAJ Michael M. Jones
4-8—LTC Robert E. Burkett
7-9—MAJ Charles H. Sadek
3-14—MAJ Donald D. Dwyer
3-15—LTC Toby W. Craft
4-17—LTC David R. Taylor
5-28—LTC David L. Terry
3-42—MAJ Martin W. Sayne
3-75—LTC Jackie D. Robinson
3-83—LTC George L. Norwood
6-83—LTC Harold E. Seit
3-92—MAJ George A. Fromholtz
Field Artillery Journal

FA Test and Development

DESIGN • DEVELOPMENT • TESTING • EVALUATION

HELP program continues

The M109E4 Howitzer Extended Life Product Improvement (HELP) continues toward developmental and operational testing during FY84. Recent inquiries have questioned whether the on and off road speed and agility of the M109E4 will be comparable or equal to the M1 tank and M2/3 fighting vehicles. The answer to that question is no. Speed and agility of the M109E4 are basically unchanged from that exhibited by the M109A1/2/3.

Speed and agility are functions of engine power, transmission final drive ratios, and suspension assemblies. The M109E4 retains the same basic engine, transmission, and suspension assemblies common to the M109 family. The M109 cannot accept the components required for significant mobility improvements without major modifications to the engine compartment and hull. Early in the HELP Product Improvement Program (PIP) formulation stage, a conscious decision was made to not attempt a significant upgrade of the M109 engine, transmission, and suspension assemblies within the scope of HELP. The rationale for this decision was based on HELP being an interim measure pending the advent of the Division Support Weapon System (DSWS). Other factors included program cost and schedule impact.

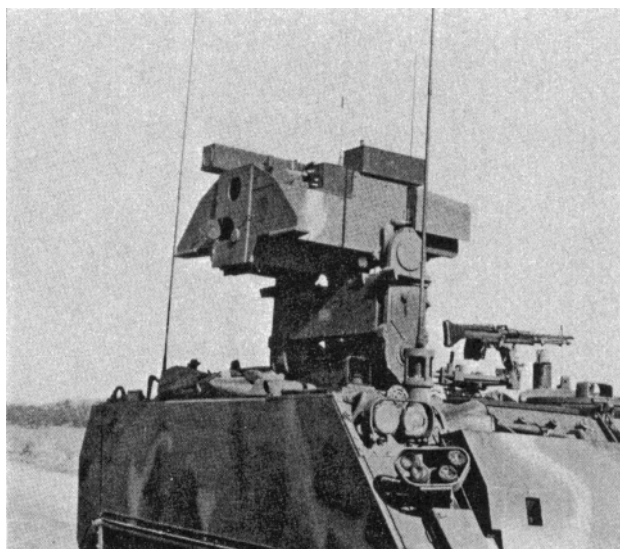
The severity of the disparity in speed and agility will be lessened to a large degree by the increase in flexibility and responsiveness afforded by the HELP Automatic Gun Positioning System (AGPS). With AGPS, the M109E4 will be capable of delivering accurate fires from practically any point over which it halts, almost immediately and without survey and reference to external aiming points. More information on the M109E4 and its AGPS will be published when prototypes are delivered in third quarter FY83. (Mr. Browder Willis, AUTOVON 639-2953)

MLRS FDTE cancelled

The MLRS Force Development Test and Evaluation (FDTE) described on page 23 in the September-October 1982 edition of the *Journal* has been cancelled. Equipment availability problems and a narrow test window for the previously scheduled MLRS Operational Test III (OT III) forced the cancellation of the FDTE. Suitable dates for an FDTE following the MLRS OT III are under consideration at this time.

New Laser-equipped vehicle tested

Testing a new laser-equipped vehicle, capable of finding and tracking targets for conventional and laser-guided artillery, was conducted recently at



Fire support team vehicle (FISTV).

Fort Sill. The fire support team vehicle (FISTV) was put through its paces to see if it can perform in combat. The FISTV is an armored personnel carrier modified to carry a laser locator-designator. Because it is a tracked vehicle, it can keep up and maneuver with mechanized infantry vehicles and tanks.

The FISTV was tested with the helicopter-launched Hellfire missile using Cobra helicopters from 101st Airborne Division, Fort Campbell, KY.

The vehicle will try several "swims" to evaluate its ability to ford streams and rivers.

Almost all of the testing involved combined arms tactics, using mechanized infantry and tanks supported by artillery.

Because the laser ray can cause eye injuries, strict safety precautions were in effect during the testing. All personnel in the area were required to wear specially treated eye glasses, while glossy surfaces on vehicles, including glass, were covered to guard against any unintentional reflection of the laser beam.

The laser device, along with the digital communications equipment in the vehicle, allows the FIST team to rapidly locate a target and send accurate target information to a TACFIRE computer in the artillery fire direction center.

The TACFIRE computer then selects the firing unit and electronically sends the mission to the Battery Computer System. This is expected to dramatically improve the speed and accuracy of future fire missions.

The laser also pinpoints "hard" targets (e.g. tanks) for laser-guided projectiles such as the Copperhead and Hellfire. (SP4 Linda Grus, *Cannoneer*)



Direct Fire Subcaliber Exercise

by LTC James A. Broderick

Faced with severe shortages of ammunition for the tank main gun, mortar, and artillery the past three years, National Guard Armor, Infantry, and Field Artillery units have been forced to place increasing reliance on subcaliber gunnery to meet training objectives.

Although subcaliber devices have been used by tank crews for many years, particularly for preliminary gunnery training, their employment by infantry elements is relatively recent and is a brand new experience for the artillery.

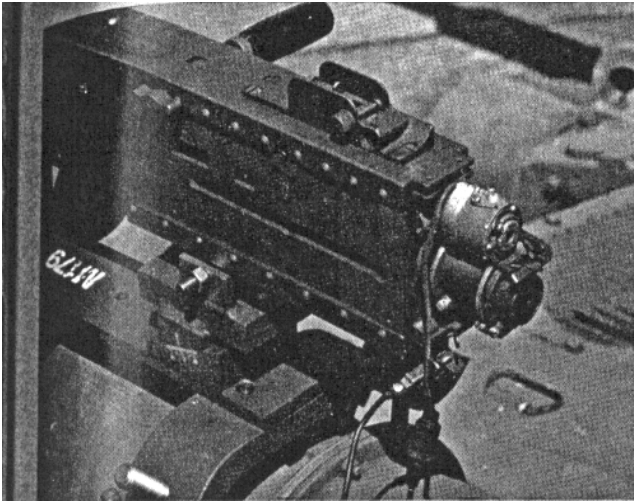
Initially, shortages forced artillerymen to simply reduce the number of rounds which could be fired for practice exercises. Although gun crew proficiency suffered to some degree, much of the erosion was forestalled through the implementation of improved training techniques. One area, however, where the impact was severe was direct fire training for howitzer crews. This mission, always considered a secondary function by artillerymen, was virtually eliminated to save ammunition for the more conventional indirect fire tasks.

Direct fire proficiency is nevertheless a critical skill at the battery level, since it is perhaps the battery's most effective defense against ground attack, particularly when the attacking elements are armor-supported infantry.

The problem was partially solved, at least for the 105-mm and 155-mm gunners, through the use of the Field Artillery Direct Fire Trainer (ADFT).

The ADFT is a helium gas laser which is mounted on 105-mm and 155-mm howitzer tubes by large C-clamps. As currently designed, it cannot be used with the 8-inch howitzer. The device, with lead and elevation compensating controls, is activated by an electrical lanyard. It is employed indoors or outdoors on one-tenth scale ranges. The gun crew, using proper direct fire procedure, fires at a stationary or moving retro-reflective target. The helium-neon gas laser produces a bright burst of intense red light each time the device is activated. Hits on the target are indicated by the reflection of the laser flashes, which can be visually observed by the gunner, assistant gunner, and chief of section.

Although the ADFT is an excellent device for use in the early stages of crew training, it does have limitations. One of the primary problems is the absolutely flat trajectory and blinding speed of the laser flash, which eliminates the use of the telescope reticle for laying. The reticle, of course, is designed



Machinegun, rear view, showing backplate with electrical firing solenoid.

for the ballistic characteristics of the low muzzle velocity high-explosive howitzer ammunition. Additionally, laser exercises do not fully employ all members of the gun crew, as would be the case while firing full-bore ammunition.

Recognizing these limitations, COL Lawrence H. Bryant, Chief of the New Jersey National Guard State Headquarters Training Branch, had an idea.

Why not experiment with one of the subcaliber devices employed so successfully in direct fire exercises by armor crewmen? After considering several alternatives, Colonel Bryant chose the .50-caliber machinegun mount Training Device M179, developed by armament technicians at the US Army Armament Research and Development Command (ARRADCOM), Dover, NJ.

The M179 is a vastly improved descendant of the Telfare Device, first developed and used by the Gunnery Department of the US Army Armor School, Fort Knox, KY. It permits a .50-caliber M2, heavy barrel machinegun to be mounted on, and boresighted with, the main gun tube so that it can be fired using the normal turret controls and optics employed for the main armament.

Realizing that the M179's strap mount was designed for the slimmer 105-mm tank gun, Colonel Bryant sought the assistance of MSG John J. Walentine, Armament Repair Foreman at the 50th Armored Division Combined Support Maintenance Shop, to modify the device to fit the tube of an M109A3 155-mm howitzer.

Walentine, a highly skilled technician who has received several awards for his expertise in the development of small arms and artillery training devices had previously worked with Colonel Bryant on similar projects. Thus, in a short time, he developed a method of modifying the strap mount.

To test the device, Colonel Bryant contacted LTC Joseph A. Evangelist, Commander of the 3d Battalion, 112th Field Artillery, which had pioneered employment of the laser, now in routine use by all of the 50th Armored

Division's 155-mm howitzer battalions.

Lieutenant Colonel Evangelist quickly agreed to the test and named CW4 Arthur A. Frenzel Jr., Organizational Maintenance Shop Foreman, as project officer. The test, which proved highly successful, was conducted on one of the tank gunnery subcaliber ranges at Fort Dix, NJ, during April 1982.

Although dry forest conditions forced a ban on the use of tracer ammunition, the howitzer crew encountered no problems in firing the exercise with .50-caliber ball ammunition.

After boresighting the howitzer, machinegun, and ballistic telescope on a 6-by 6-foot panel at 1,200 meters, the crew fired at an array of hard targets at ranges of 800 to 1,500 meters and quickly gained "old hand" proficiency. Surprisingly, it was found that the rounds could be placed right on target with the 155-mm telescope ballistic reticle.

The crew members, interviewed later, unanimously agreed that it was an excellent training experience and that the device was nearly as effective as a full-bore direct fire exercise.

Satisfied with the results, Colonel Bryant has recommended to the Training Aids Service Center (TASC) at Fort Dix that a set of straps for the 155-mm howitzer be fabricated for a selected number of the M179s in the TASC inventory, so that they may be employed routinely in artillery direct fire exercises.

If not successful in convincing TASC authorities, Colonel Bryant has been assured that MSG John Walentine will modify enough straps to provide two sets per battalion for the 50th Armored Division Artillery.

Several of the units plan to conduct more testing with the device while at Annual Training at Fort Drum, NY.

The test proved conclusively that the M179 is fully adaptable to artillery direct fire training and can be readily mounted and employed by an inexperienced crew after approximately 15 minutes of instruction.

More information about this training innovation may be obtained by contacting Colonel Bryant:

Address: The Chief of Staff
New Jersey Department of Defense
ATTN: POTO-T
Eggert Crossing Road, CN 340
Trenton, NJ 08625

Telephone: AUTOVON: 445-9251
Commercial: 609-984-3606



LTC James A. Broderick, AR, is the Safety and Occupational Officer for the New Jersey Army National Guard. He received a direct commission in 1955 and has served in armor units as a company commander, battalion S3, and battalion executive officer. Prior to his present assignment, he was the Training Site Manager in the Plans, Operations, and Training Office, New Jersey Army National Guard.



(Photo by James E. Williams)

SEARCH!

Extending the Intelligence Preparation of the Battlefield

CPT(P) Christopher E. Strauss

A maneuver staff needs only enough evidence of enemy intentions to support tactical decision making — the intelligence preparation of the battlefield (IPB) process described in draft Training Circular 34-3 reveals that evidence. The field artillery, however, must locate all of the commander's priority targets individually; and the IPB process does not generate sufficient detail to produce specific targets. The targeting element requires graphic aids which will simplify and streamline the process for accurately predicting specific targets

and attacking them before they move. A new search templating system designed specifically for artillery targeting element use may well be the answer.

Search templates provide targeting elements with a tool that facilitates accomplishment of the Army Training and Evaluation Program (ARTEP) 6-300 missions. The operations/intelligence element of the corps field artillery section, the fire support element provided to a division by its organic artillery headquarters, and the targeting element found in both the division artillery and

field artillery brigade tactical operations centers (TOCs) are the primary targeting organizations. Their ARTEP missions include developing targets and potential targets from combat information, predicting and producing targets for order-of-battle information, employing target acquisition assets against threat force artillery, and analyzing targets for attack by indirect fire. Such missions require targeting elements to locate high priority targets quickly and accurately.

These mission requirements are very different from those of the maneuver unit commander. The existing intelligence preparation of the battlefield process serves his needs specifically by providing him with a system of determining enemy intentions far enough in advance to permit counteraction. A brief resume of the existing IPB process will serve to highlight the advantage of search templating.

Part of the current IPB process derives its validity from the premise that threat forces will adhere (during most combat operations) to specific tactical doctrine and standard formations commonly referred to as norms. The IPB uses a five-step graphical templating, or patterning, process to create its final product; and the templates are normally acetate overlays in the applicable map scale, usually 1:50,000 or 1:250,000. The first template prepared is a doctrinal template depicting the anticipated threat force tactical deployment. The IPB process next incorporates extensive terrain, weather, and mobility analyses onto a combined obstacle overlay. Situation templates evolve from a comparison of the doctrinal templates with the combined obstacle overlay at successive points along each anticipated avenue of approach. The deployment of the threat unit at each point is adjusted to fit the terrain constraints. An event template and an event analysis matrix identify locations and times when activity of the threat unit demonstrates the enemy's intentions. The decision support template evolves from the event template through the selection of decision points along each avenue of approach. This decision support template depicts when the various sets of options available to the commander must be either exercised or lost and is the primary product of the IPB process. If carefully and objectively executed, it will depict the most probable courses of action available to the enemy and identify the critical points at which the maneuver commander must act to influence the battle in his favor.

The search template system of producing targets is similar to the IPB process in that it is also based on the assumption that threat forces will deploy their units according to doctrinal norms as influenced by terrain constraints. It departs from the IPB, however, by focusing on specific types of targets, their battlefield signatures, and their deployment relationships both to

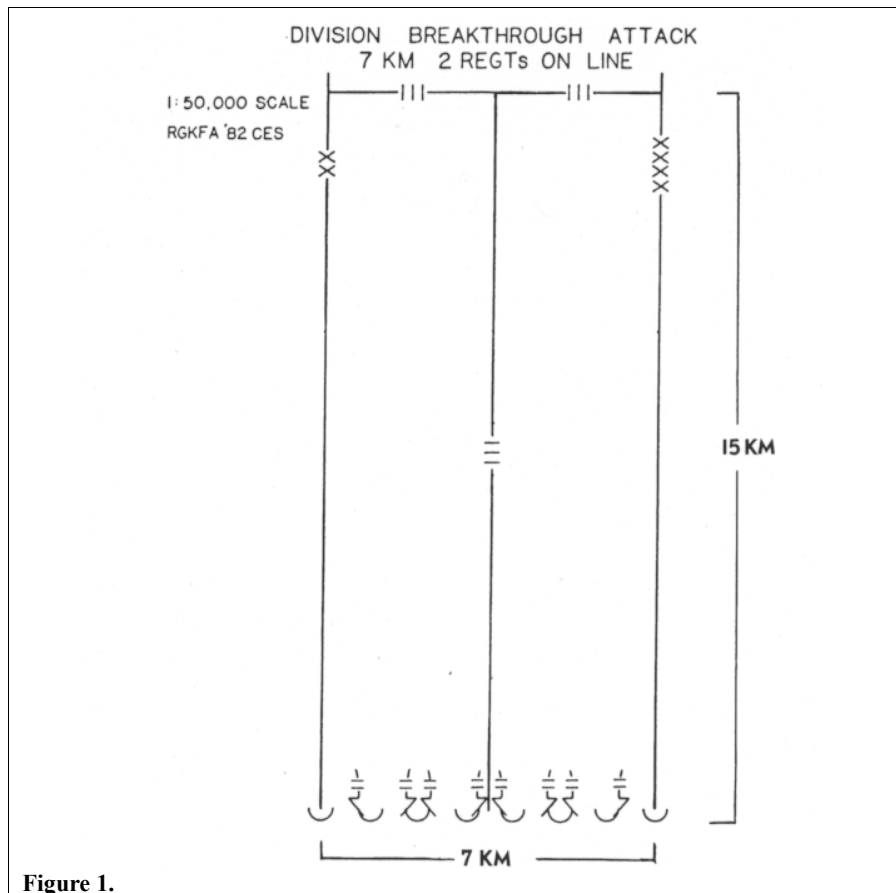


Figure 1.

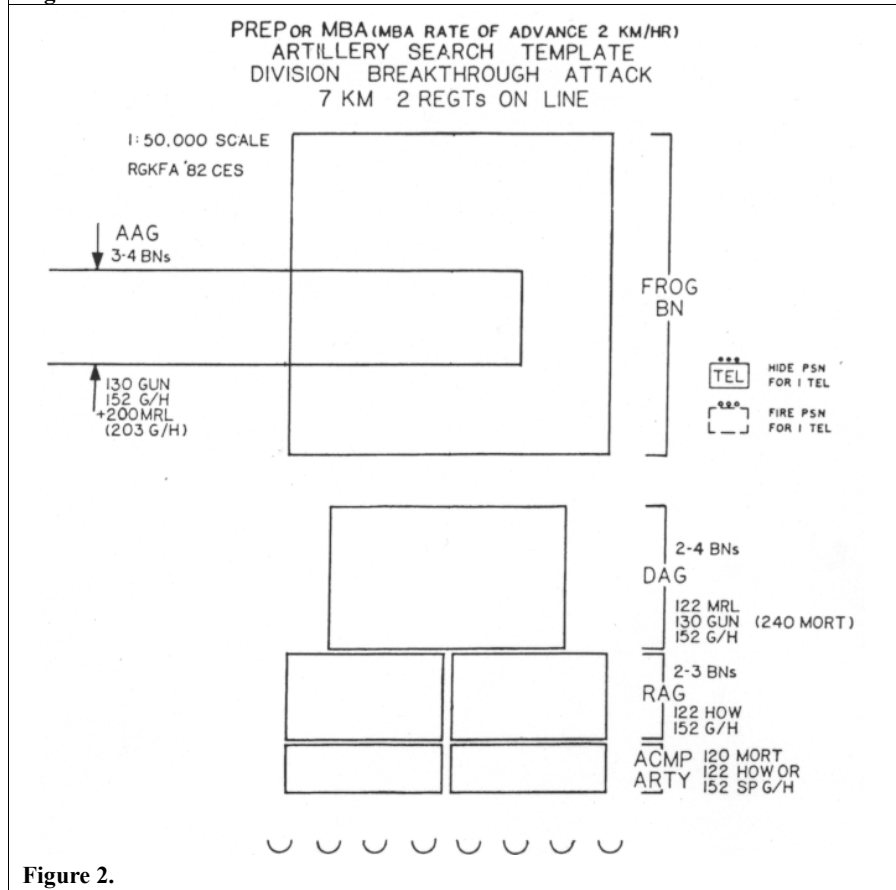


Figure 2.

one another and to the enemy frontline trace.

Unlike the IPB products, the search template system is not tied to a specific piece of terrain. Instead, several sets of search templates reflect different combinations of four key factors which influence target predictions — the size and operational frontage of the threat formation, the tactical maneuver (i.e., hasty defense, breakthrough attack, river crossing, etc.), the anticipated rate of advance, and the probable target density. Based on assumed variables, search template sets are far more flexible tools for the targeting element than any previous IPB product because one can relocate them on the map as the threat force moves.

As an example of a search template set from the four key factors, the preparation of an artillery search template for a division breakthrough attack (figure 1) results in the template shown in figure 2. It depicts the artillery assets of a threat motorized rifle division (MRD) that is attacking on a seven-kilometer front with two motorized rifle regiments in the first echelon. The template is valid for both the stationary artillery positions from which a preparation would be fired and for those positions which support a rate of advance of up to two kilometers per hour. The target density is based on the nine battalions of artillery organic to the division, the allocation of four additional battalions from Army and Front assets, and the positioning of an Army artillery group (AAG) across a portion of the division rear area. The AAG consists of a composite artillery group from the Front's artillery division. This target density information is based on an order-of-battle estimate and, due to its subjectivity, is best placed on a separate template from the other three factors. As a result, each search template set is made up of two separate but closely related templates. Template "A" (figure 3) displays the search areas for the target units in relation to the enemy frontline trace and is derived from all the

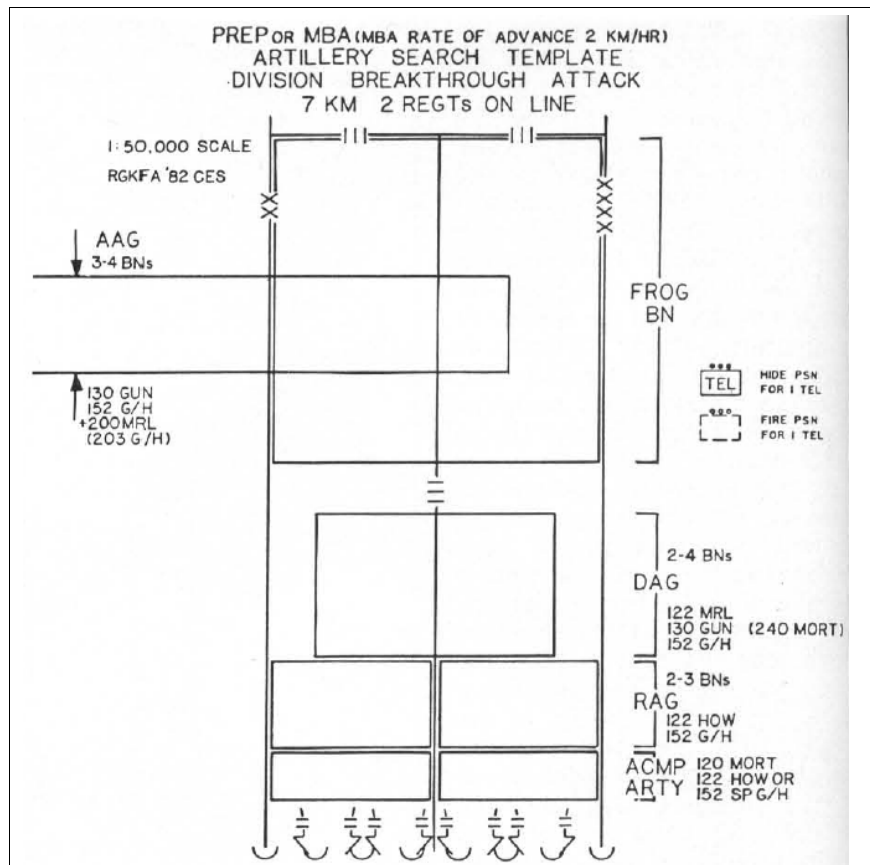


Figure 3.

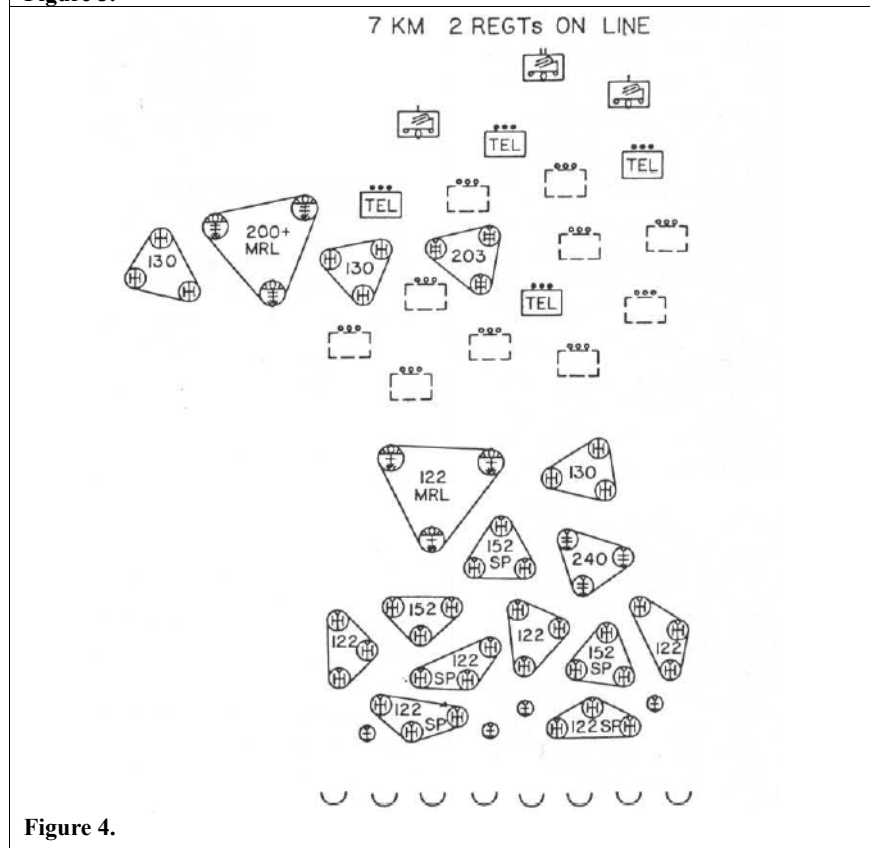


Figure 4.

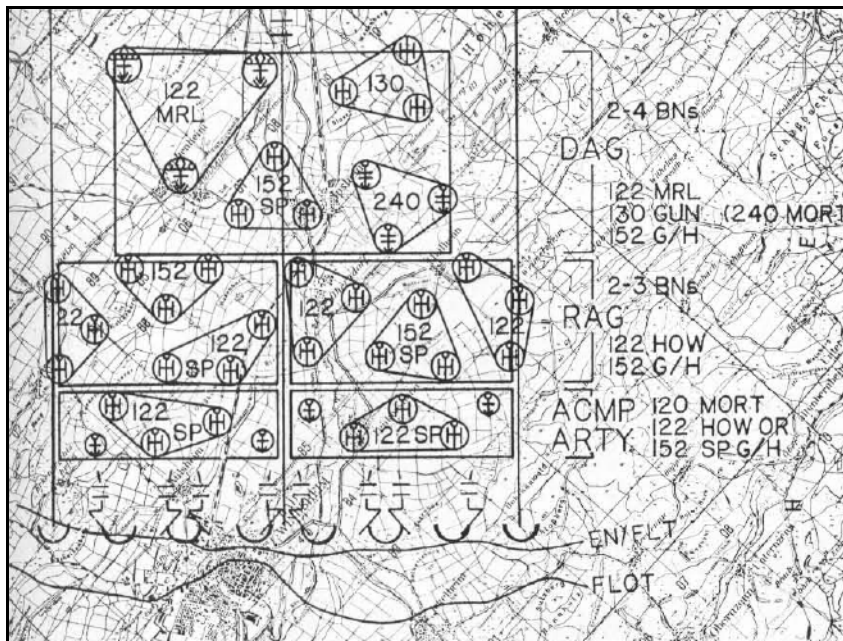


Figure 5.

factors except target density. Template "B" (figure 4) depicts the deployment of the estimated threat artillery assets. These assets, plotted as battalions and batteries, are positioned within the search areas according to threat artillery doctrine. The use of the threat frontline trace on both templates provides a common index between the two templates and establishes their relationship to the current threat maneuver force locations.

The utility of search templating becomes evident in the early stages of battle planning. Once the IPB process has defined the enemy's capabilities and the maneuver staff has formulated plans to counter them, the targeting element starts predicting targets in support of the fire plan. Search templates are oriented along each avenue of approach at the points where the enemy force must deploy due to terrain or friendly force barrier plans and at the limit of acceptable penetration into the friendly force defensive zone. One can then predict the priority target array at each critical point (figure 5). The predicted targets are ideal for planning nuclear weapon fires before combat begins, and one can also plan preparation and counterpreparation fires based on the predicted target arrays. Different

schedules of fires can be planned for all contingencies by targeting with the appropriate template sets. Additionally, plans for employment of target acquisition assets can be prepared in depth to provide maximum coverage of high yield target areas during the battle. Once the battle starts, the search template system is the only process flexible enough to keep pace with the rapidly changing situation.

As the battle develops, order-of-battle analysts seek out those indicators identified during the IPB process which will reveal the enemy's intentions and thus enable them to use the search template system to find the high priority targets which must be neutralized immediately. The targeting element uses the measured rate of advance to select the correct template and then moves it on the map as the enemy frontline trace shifts. A specialized template portrays rapid rates of advance because the targets are more likely to be moving rather than in position and firing. Shifting the template enables the targeting element

to visually determine the need to move or reorient acquisition assets, predict new target locations, and eliminate invalid targets from current fire plans and schedules. These search templates better enable the targeting element to provide the most current target data to the firing units. The search template system also provides the flexibility necessary to target rapidly changing situations. When attrition or reinforcement alters the order-of-battle estimate of target density, one simply modifies the template to reflect the change. Should attrition or reinforcement alter the enemy force's size or composition, tactical maneuver, or rate of advance, the substitution of another set of templates incorporating the updated information is a quick way for the targeting element to keep pace. The search template system also provides accurate refinement of nuclear weapon aimpoints far enough in advance of the time-on-target to allow for processing the missions. In this instance, the template helps aid in the prediction of the final target locations at time-on-target by projecting the movement from current positions.

While the IPB process lays the groundwork for target planning before the battle, only the search template system can keep up with the changes and the pace once the battle begins. Search templates are the logical extension of the intelligence preparation of the battlefield process. They are much more specific tools because they focus on the high priority targets and are tailored to meet the particular requirements of artillery targeting elements. The adaptability of search templates to a changing situation and the ease with which they can be modified make them highly flexible resources which should be incorporated into the IPB process. ☒

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