# ARMOR


## The M1A2 — Plans to Make the Best Even Better (See Page 11)

PB 17-96-3

May-June 1996


If you haven't seen it already, you might like to look at the first iteration of "Issues in ARMOR." Hop into your net cruiser and go to:

http://www.awwg.org/~dave/armormag/cover.htm

(To get there you obviously must have access to the Internet.)

The Spring 1996 edition concentrates on a topic that has generated a lot of interest during the last year or so inside *ARMOR*. We've chosen to show all of the material on how the new technology is going to affect the ways we fight, the ways we train to fight, and how it should affect those fighting and training strategies. We've included a variety of articles, several letters to the editor, and a "Commander's Hatch" column, and woven them into a logical presentation that every practitioner of armored warfare should find engaging. There are 14 pieces of material to date. We start with LTC Hertling's vision on what warfare in a fully digitized unit might be like in a battle taking place in 2008, (*ARMOR,* Jan/Feb 95), and ending with a letter to the editor from 1Lt Besherse that appears in this very issue.

However, the story thread shouldn't end with the last letter by the Lieutenant. We envision a dynamic site where an interested *armorphile* can read through the string of relevant materials and see the development of thought — at least published thought — on an issue affecting the armor community. Then, if he wants to, that reader will have the opportunity to send in his own comments on what he has just read. If he chooses, he can add his own comments, via e-mail, to the discussion, to be posted by the "Issues in ARMOR" administrator.

This new electronic aspect of the magazine will never replace the copy you have in your hands. It is, however, going to help us show the development of an issue, the discussion of all the facets, and allow for participation in a different way. It will be a good tool for students at various Army schools, for we will have done some of the legwork in getting together in one place relevant thought on the issue topic. Research papers and staff studies may get faster running starts if the student chooses to use the "Issues" topic.

All of the material present at an "Issues in ARMOR" first posting will come from the pages of *ARMOR*. What is posted later will most likely be a mixture of published and unpublished materials. In this way, the site becomes much more than a neat place to go to in order to find *ARMOR* magazine things. We wouldn't go to all of the trouble if our efforts were easily replicated by you merely digging through that box in your basement or driving across post to the library to get that one article needed for your OPD/NCOPD.

When you go the Fort Knox Doctrine home page (http://members.aol.com/awwg/knoxdoc.htm), you'll find "Issues in ARMOR" linked to it. You won't see a reproduction of the magazine, so don't be disappointed. Most of the illustrations and photographs in the articles are missing unless they were key to meaning such as maps, diagrams, and charts. Maybe as system hardware gets faster, we'll add all the artwork back into the presentation, but to keep users from getting too frustrated as slow loading graphics appear on their pages, we'll omit the non-essential ones for now. True, pictures tell a thousand words, but words do contain the persuasive arguments.

If, as you cruise, you have substantive comments to add to the discussion, please send them to the e-mail address indicated. We have set up a dedicated mailbox to handle whatever volume of electronic mail we receive. We'll screen it, consider adding it to the presentation at the next update, consider publishing it in the letters to the editor section, and give you a response if one is necessary. As you read and think of improvements, let us know.

"Issues in ARMOR" is dynamic and meant to change as our knowledge of how to use the Internet grows. This column will never replace the magazine, but it will supplement some of the discussions that run through its pages. We want to encourage professional discussion in the armored force. Let us know how you like it, if you like it, whether it is useful, and what improvements you would want us to consider making.

Enjoy the ride. —TAB

By Order of the Secretary of the Army:

DENNIS J. REIMER
*General, United States Army*
*Chief of Staff*

Official:

JOEL B. HUDSON
*Acting Administrative Assistant to the*
*Secretary of the Army*

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# ARMOR

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## Features



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# Directory — Points of Contact

**DSN - 464-XXXX**
**Commercial - (502) 624-XXXX**

## ARMOR Editorial Offices

**Editor-in-Chief**
LTC Terry A. Blakely — 2249
E-Mail: BLAKELYT@KNOX-EMH1.ARMY.MIL

**Managing Editor**
Jon T. Clemens — 2249

**Editorial Assistant**
Vivian Oertle — 2610

**Production Assistant**
Mary Hager — 2610
E-Mail: HAGERM@KNOX-EMH1.ARMY.MIL

**Staff Illustrator**
Mr. Jody Harmon — 2610

## U.S. Army Armor School

**Chief of Staff, Armor School** — (ATSB-CS)
COL Paul E. Lenze — 1050
E-Mail: LENZE@KNOX-EMH1.ARMY.MIL

**Armor School Sergeant Major** — (ATSB-CSM)
CSM Gerald D. Utterback — 5405
E-Mail: UTTERBAK@KNOX-EMH1.ARMY.MIL

**16th Cavalry Regiment** — (ATSB-SBZ)
COL Don Elder — 7848
E-Mail: ELDER@KNOX-EMH1.ARMY.MIL

**1st Armor Training Brigade** — (ATSB-BAZ)
COL Fred A. Treyz III — 6843
E-Mail: TREYZ@KNOX-EMH1.ARMY.MIL

## U.S. Army Armor Center

**Commanding General** — (ATZK-CG)
MG Lon E. Maggart — 2121
E-Mail: MAGGART@KNOX-EMH1.ARMY.MIL

**Deputy Commanding General** — (ATZK-DCG)
BG Clayton E. Melton — 7555
E-Mail: MELTON@KNOX-EMH1.ARMY.MIL

**Chief of Staff** — (ATZK-CS)
COL Jerry L. Veach — 1101
E-Mail: VEACH@KNOX-EMH1.ARMY.MIL

**Command Sergeant Major** — (ATZK-CSM)
CSM Ronnie W. Davis — 4952
E-Mail: POSTCSM@KNOX-EMH1.ARMY.MIL

**Directorate of Force Development** — (ATZK-FD)
COL Edward A. Bryla — 5050
E-Mail: BRYLAE@KNOX-EMH1.ARMY.MIL

**Directorate of Training and Doctrine Development** — (ATZK-TD)
COL G. Patrick Ritter — 8247
E-Mail: RITTER@KNOX-EMH1.ARMY.MIL

**NCO Academy** — (ATZK-NC)
CSM Kevin P. Garvey — 5150
E-Mail: GARVEYK@KNOX-EMH1.ARMY.MIL

**TRADOC System Manager for Abrams and Armored Gun System** — (ATZK-TS)
COL John F. Kalb — 7955
E-Mail: KALB@KNOX-EMH1.ARMY.MIL

**Mounted Maneuver Battlespace Battle Lab** — (ATZK-MW)
COL Gary Krueger — 7809
E-Mail: KRUEGER@KNOX-EMH1.ARMY.MIL

**Office, Chief of Armor** — (ATZK-AR)
Aubrey Henley — 1272
E-Mail: HENLEYA@KNOX-EMH1.ARMY.MIL
**FAX 7585**

**Special Assistant to the CG (ARNG)** — (ATZK-SA)
LTC Randall Williams — 1315
E-Mail: WILLIAMR@KNOX-EMH1.ARMY.MIL

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***SUBMISSION POLICY NOTE:*** *Due to the limited space per issue, we will not print articles that have been submitted to, and accepted for publication by, other Army journals. Please submit your article to only one Army journal at a time.*

**GRAPHICS AND PHOTOS:** We can accept electronic graphics and photo files in most formats except Harvard Graphics. Compressed formats — .jpg and .gif take up the least disk space. We prefer PC Paintbrush (.pcx). If you use Powerpoint (.ppt), please save each illustration as a separate file. Try to avoid the use of color and shading, but if you must use shading to illustrate your point, send us an unshaded version of the illustration along with a printout of your shaded version. (We have found that when we convert files to a format we can use, the shading gets lost or distorted.) If you have any questions concerning electronic art submissions, call Vivian Oertle at the phone number above.

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**ARMOR HOTLINE — DSN 464-TANK:** The Armor Hotline is a 24-hour service to provide assistance with questions concerning doctrine, training, organizations, and equipment of the Armor Force.

# LETTERS

## Tank Qualification — A Leadership Right of Passage

Dear Sir:

CSM Dudley raises a long-brewing, but I feel underexamined, controversy within the armor/cavalry community (Letter to the Editor, "Ratings Should Be Tied to Tank Qualification," Jan-Feb 96). We indeed have moved away from the concept that leaders should/must qualify their prime mover — tank or Bradley. Unlike Dudley, however, I believe that qualification should not be directly used in rating an individual. Rather, in an indirect fashion, qualification is an indicator of leadership.

Qualifying one's vehicle speaks to two dimensions of a tank/Bradley commander's capabilities — technical competence and leadership.

Officer/NCO vehicle commanders require some base level technical knowledge. Our young soldiers respond to technically competent leaders who know their business. A leader who is worried or unable to qualify will spawn additional "bolos." Should leaders be as much a "tanker" as the section leader or master gunner? No. Our platoon leaders/troop and company commanders/battalion and squadron commanders have other irons in the fire. Should they recognize proper gunnery techniques (or more importantly, improper/unsafe actions)? Obviously.

Confidence is contagious. Winning and qualification breed further success. Leading by example is a staple of successful units.

Gunnery Table VIII is a training event. Unsuccessful engagement should be retrained until task standards are met. However, we must carefully analyze whether unqualified leaders have what it takes to care for our soldiers/units. As Dudley so clearly states, "...if he cannot train his crew and fight his tank, he just might not be able... [to] mentor other tank commanders to train their crews and fight their tanks." Our livelihood is the tank. We are privileged to possess the finest technological equipment manned by the most highly educated and motivated soldiers of any modern army. We should demand that leaders meet certain gates in order to maximize these capabilities.

MAJ DAVID G. MACLEAN
XO to the J4/7, USCENTCOM

## Museum Seeks to Acquire Ownership of Patton Statue

Dear Sir:

Visitors to the Fort Knox Patton Museum of Cavalry and Armor find the two most popular exhibits in the Patton section to be the pistols carried by General George S. Patton, Jr., and the life-sized, one-of-a-kind, hand-carved wooden statue of General Patton. Except for the helmet and a few other accouterments, this statue was carved out of a single piece of basswood with such intricate detail that it appears amazingly lifelike.

The statue's owner who originally provided it to the museum on indefinite loan in 1984, has elected to put the statue up for sale. Faced with losing this irreplaceable piece of art, the Cavalry-Armor Foundation, Patton Museum Development Fund — the private organization that for thirty-plus years has raised funds to support the multiphased campaign responsible for building the Patton Museum complex — entered into an agreement with the owner to purchase the statue and an associated painting for $150,000, payable in installments ending in December 1996. While the Army supports the museum with some operating funds, private funds must pay for this exhibit.

The first installment of $25,000 has been made and, to date, a little more than one-third of the money has been raised, much from Patton family members. The drive is now turning to tankers, cavalrymen, veterans, and other patriotic Americans to keep the statue where it belongs — in the museum honoring the man who even today represents mounted warfare.

The Cavalry-Armor Foundation is asking for the support of dedicated, loyal citizens, corporations, and organizations to bring this worthwhile cause to a successful completion. Contributions may be made in any amount to: Save the Patton Statue Fund, P.O. Box 25, Fort Knox, KY 40121.

OWSLEY C. COSTLOW
COL (Ret.), Armor
President, Cavalry-Armor Foundation

## Master Gunner School Is Not for Dilettantes

Dear Sir:

SGM Spurling's letter in the January-February issue was absolutely on the mark.

The Army spends a great deal of money to send tankers to Master Gunner School and give them an in-depth education into the "why's" of tank gunnery. Anyone can get the how's" by opening up an operator's manual and spending some time in the tank. Understanding why tanks work the way they do gives meat and substance to the procedures that we use, and to the credibility of master gunners.

For that reason, if you volunteer to go to Master Gunner School, be prepared for some pretty intensive studying and devotion to the art and science of tank gunnery for the rest of your career. Once you are known as a master gunner, you will forever be called upon to assist the commander in "Matters Relating to Tank Gunnery."

That doesn't mean that you will never see a leadership position again, but it does mean that your assignments will vary from the technical aspects of gunnery planning and management, to the intensive leadership challenges of platoon sergeant, first sergeant, command sergeant major, and yes, Sergeant Major of the Army. (Congratulations to SMA McKinney, a master gunner!)

Remember, Department of the Army doesn't select you to attend the Master Gunner Course. You volunteer. And you'd better be prepared to perform as needed, when told, on short notice, for the rest of your career. You won't get proficiency pay, and you won't wear a patch. If you're not prepared to do that, then you're probably not prepared for the intensive curriculum and will only contribute to the course attrition rate. Stay home.

MSG TERRY BALLINGER
Combat Developer
Directorate of Force Developments
Fort Knox, Ky.

## Seeks WSRO Participants

Dear Sir:

I am a former armor officer, a member of the Armor Association, and an amateur military historian. I am researching Operation Desert Storm, and am writing to ask for assistance from your readers with regard to one aspect of this operation.

Unlike previous wars, the Army planned to replenish battlefield casualties using preexisting combat arms platoons from units that had not deployed. Each such platoon deployed as a complete unit, with vehicles and equipment, personnel, and platoon leadership. This program was called "Weapons System Replacement Operations," or WSRO for short. Enough tank platoons were deployed to fill two tanks battalions: it does not appear that any scout platoons participated.

The Army is doing nothing to memorialize the participation of these units. I am trying to document the units that participated, and would like to hear from *ARMOR* readers who have information or documents that discuss the WSRO program in general, or identify any of the platoons that participated.

THOMAS D. DINACKUS
4719 Major Court
Alexandria, VA 22312

## Why Would the Force XXI Commander Want to Intervene?

Dear Sir:

Is *auftragstaktik* really dead with Force XXI? I must concede the most salient point of both CPT Bateman's article and CPT Brown's letter (*ARMOR,* Jan-Feb 96): battalion commanders have the ability to directly control movement — right down to the individual tank — on the Force XXI battlefield. Indeed, at all levels of training, an officer is taught that he must take care of and preserve his force. This thought alone might lead some battalion and above commanders to look into the microscope and reach down several echelons. But will they want to?

Going back to the basics, I remember being told that the Army found long ago it is easiest to directly command and control only 3-5 people. Tank commanders lead three other tankers; platoon leaders three other tanks; company commanders one XO, one 1SG, and three platoon leaders; and so on. Much more and a leader's ability to effectively control his element is diminished. This is not necessarily because he does not have enough information about these subordinates' actions. Rather, it is just as likely that his subordinates present him with more information than he can process. At the battalion level, its leader in garrison is burdened with commanding five subordinate commanders, an XO, and oftentimes giving direct guidance to four coordinating staff officers and receiving input from such personal staff as the command sergeant major and chaplain. Organized for combat, the commander also picks up several attachments. In the fight, at a bare minimum, he actively communicates with four or more company commanders, his S3 and XO, and, oftentimes, with his staff or attachment leaders. I believe the commander's desire to have these subordinates achieve his intent is enough work, no matter how much intelligence he sees on his screens.

Another Force XXI characteristic working against micromanagement is increased battlespace. As I offered in the Jan-Feb 96 issue, a company in the defense can cover what used to be a battalion sector; a battalion, that of a brigade. Companies in the offense can maneuver in as wide a zone as still allows the force to mass fires when necessary. Although the commander can see his entire force during any mission on his three user-friendly screens, units might be so dispersed prior to the fight that attempting to control individual platoons becomes too difficult a task.

While I believe CPT Bateman and CPT Brown's submissions must serve as a warning to the force, I truly hope they are both wrong. I also hope the inability to effectively apply direct control past that fifth man and the burden of observing quantitatively increased battlespace keeps *auftragstaktik* alive in Force XXI.

CPT MICHAEL L. PRYOR
HQ/1-156 Armor
Louisiana ARNG

## Drawing Lessons from Combat: The Desert Is Different

Dear Sir:

I agree with Major R.D. Hooker (Letters, Jan-Feb 96) when he states that we "should be very careful" about applying the lessons learned in desert combat to all operational scenarios. My intent — and apparently I did not stress this adequately — was to apply the lessons of Desert Shield/Storm to preparing for possible future operations in desert or other open terrain. I fully recognize that tanks and light infantry can, indeed do, work well together in many kinds of terrain, as evidenced by Major Hooker's description of the 3-325 Airborne Battalion Combat Team at the CMTC.

The above-mentioned CMTC rotation was noteworthy in three areas:

(1) The impressive toll inflicted on the OPFOR,

(2) The fact that 3-325 controlled two tank and two Bradley platoons,

(3) The omission of casualty figures for 3-325 ABCT.

If it had been a real combat mission, with the ABCT airdropped into an operational area, the (Abrams?) tanks and Bradley Fighting Vehicles — because they are not capable of LVAD delivery — would not have been there to provide support. What effect would the absence of the armored vehicles have had on the damage/casualties inflicted/sustained by 3-325 in the CMTC exercises?

In desert ops, dismounted infantry are at an extreme disadvantage in firepower and tactical mobility when facing an armored/mechanized opponent. Even Major Hooker admits this, when he says, "we know that we can fight heavy forces successfully in all but the most open kinds of terrain." I submit that a smaller force, equipped with light tanks and airborne fighting vehicles would be far more useful and effective in such open terrain than would a much larger number of dismounted infantrymen and TOW-HMMWVs.

In the desert and other open terrain, I still firmly believe that parachute infantry should have the same degree of mobility and protection as the light tanks with which they will operate. This is not a "veiled call" for mechanization — I'm stating it straight out. However, because of limited airlift capability, it is probably not practical to mechanize every airborne battalion, nor is it even desirable to do so, as there will always be plenty of scenarios where mechanized forces are not needed.

It would be unwise to rigidly apply the lessons of desert war to all situations, but neither should we ignore what was learned in Southwest Asia. Shouldn't we deploy a force best suited to the mission, enemy, and terrain, rather than simply opting for the greatest number of parachutes that can be dropped?

STANLEY C. CRIST
San Diego, Calif.

## Information Technology and the Armored Force

Dear Sir:

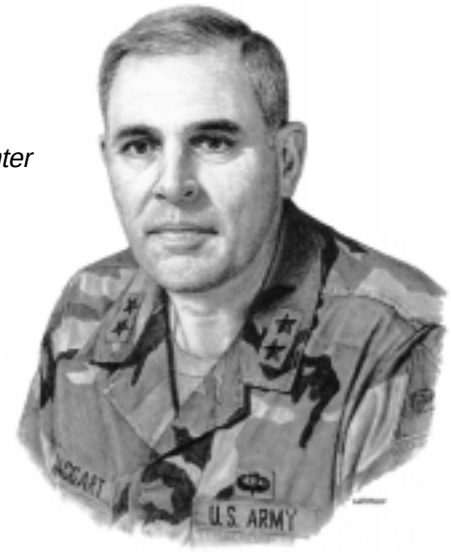
Over the past few years, there has been much talk about applying information technology (GPS, IVIS, Paladin, etc.) to the armored force and other elements of the Army. Ironically, it has only been recently, as we create digitally-linked brigades, that there has been any significant discussion about the impact of this new technology on our standard operating procedures, tactics, training, and so on. In the pages of January-February 1996 edition of *ARMOR,* we have seen both exhortations from the commander of the Armor Center to increase the tools in our virtual toolbag and another article in the continuing series of thought pieces from officers in the field (such as CPT Bateman's article on the death of *auftragstaktik*) about the possible implications of digitization.

Indeed, it appears that we are going where no Army has gone before. Where can we turn for guidance? What do these changes mean? How can we harness these new technologies and ride, as our cavalry predecessors did, into the unknown?

There are current, real-life examples we can draw from. Would you believe me if I said there is an industry that has been grappling with information technology issues for 15 years? Look around. In modern office buildings world-wide, people in the private sector deal with the implications of information technology everyday. Fax machines, LANs, WANs, cell phones, pagers, the World Wide Web, laptop computers, email, FTP, TCP/IP, teleconferencing, client-server technology, (and the list goes on!) have made the old fashioned, pencil-and-paper way of doing business just as obsolete as acetate and alcohol markers are to the digitized force. As a graduate student in information systems (also known as computers, by non-technical types), an analyst at an information technology consulting firm, and part-time cavalry scout platoon leader, I've had the opportunity to observe these changes firsthand and consider their impact on soldiering in the not-so-distant future. Although World Wide Web home

*Continued on Page 47*

*MG Lon E. Maggart*
*Commanding General*
*U.S. Army Armor Center*




# Plan For Success or Gird Against Defeat

The U.S. is moving rapidly towards a time when nothing will be as it once was. New organizations with leap-ahead technology that can be tailored and deployed quickly to meet a wide variety of contingencies are soon to be tested by the EXFOR at the NTC. The 4th Infantry Division and the 1st Cavalry Division now have digital systems that provide a relevant, common view of the battlefield and, for the first time ever, the capability to take the initiative even before the enemy can move out of his assembly areas.

A modernization strategy is underway that will give the mounted force of the next century a Future Main Battle Tank (FMBT) that will have no competitors on the battlefield, Command and Control Vehicles (C2V) from which staffs can operate on the move, and Future Scout Vehicles loaded with sophisticated surveillance and reporting equipment that will allow our reconnaissance forces to confirm what advanced target acquisition systems have discovered.

Even our garrison operations will be different. Army support processes will be more efficient, with the focus on the customer, not on the process. Information will move through fiber optics and to multiple locations as we begin using distance-learning techniques. Training will be structured and tailored to meet the specific needs of each unit. Training programs will permit units to use virtual and constructive simulations to achieve competence before advancing to live training. Change is upon us, and we must deal with it.

This is a particularly stressful time for the Army and the mounted force. There is much uncertainty, seemingly too many tasks to accomplish with not enough people and money, and there is the constant infusion of new technology with which we all must cope. While often infuriating and frustrating, the corporate Army seems to be focused on the future when the problems of today are consuming us. We all know that we must go through the present to get to the future, but there seems to be no clear path to follow.

Some of us have been there before. In the middle Sixties, when the Army priority was in Vietnam, those who served in Europe knew about running a tank battalion with twelve officers — one lieutenant colonel, two warrants, and nine lieutenants. Company commanders were second lieutenants, staff sergeants were platoon leaders, and if your company was lucky, you had a sergeant first class as a first sergeant.

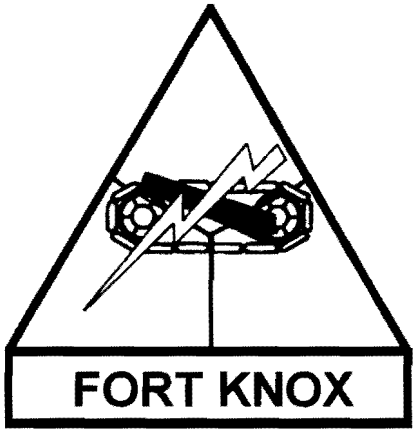
In those days, the missions were the same as before the drawdown for Vietnam. Monthly alerts required units to clear their kasernes and be on the road to the border within two hours. A ninety percent operational readiness rate was still the standard, even though getting parts was a problem. In some units, tanks were put into administrative storage because there weren't enough crewmen to man them. Each officer had twenty-five or thirty additional duties: trial and defense counsel, vector control officer, ammunition officer and pay officer (when we actually handed over cash to each soldier at pay day) and others. We all worked hard and spent long hours making up for the shortages in manpower, parts, and dollars. In the midst of these hard days, however, we all realized that things would get better.

We are at a similar crossroad today, with one possible exception: barring a large-scale war of some kind, end strength and budgets probably will not increase as the United States seeks ways to move more efficiently into the next century. We will have to find ways to accommodate the change brought on by new weapons, new technology, new organizations, and new missions, within existing manpower and budget constraints. We have no other alternative. We must accommodate change or become irrelevant. We will have to deal with the world as it is, not as we wish it to be.

It seems to me we have two choices in dealing with change. We can gird ourselves against defeat, or we can plan for victory. To gird against defeat is not to change. It is a wish for things to be other than they are. It is remembering

*Continued on Page 6*

# The Armor Center and School Functional Organization




*In order to accommodate change and prepare for the future, the Armor Center and School has completed a fundamental reorganization of functions. The directory on the opposite page describes both the organization and a telephone point of contact from a functional viewpoint.*

## Commander's Hatch (continued from Page 5)

how good times were in the past. It is embodied in that phrase, "If it ain't broke, don't fix it." Girding against defeat is to take the risks. It is reliance on hope as a method that, somehow, if we just stick to the ways that made us successful in the past, everything will work out for the future. Girding against defeat is admitting failure.

Planning for success, on the other hand, is to deal with the world as it is. No amount of wishing will get us a larger budget, more people, or fewer deployments. It is taking the long-range view, setting the conditions for future success today. It is building a strategic plan and carefully managing finances even beyond the POM years. It is making a plan, gaining consensus that the plan is about right, and then following the plan. It is making bold organizational and process changes to achieve efficiencies, if such measures are necessary. It is a realization that planning for success is a mindset that says, "If things can be done better, then why not?"

Planning for success also applies in the management of our careers. Officers who are not picked for resident CGSC are girding against defeat if they don't enroll themselves in the correspondence course. Failure to achieve MEL 4 status is a sure-fire way to miss the next promotion. Failure to get branch-qualified is another quick route to missing the promotion list. Armor officers who homestead, or accept the same kind of jobs repetitively, or who take easy jobs, are girding against defeat. None of us can afford to stay in jobs we are comfortable with and still grow intellectually or experientially.

There is no question that our Armor Branch is the best in the business. They also work very hard to make sure each of you gets a fair shot at branch qualification and schools. However, Armor Branch does not decide the priority against which officers are assigned. They assign officers and NCOs based on where they can best meet the needs of the Army in a changing environment. Your job is to work to your full potential in whatever duty you are assigned.

There are a couple of other things you can do to help yourself. Get the photographs in your file updated. Keep in touch with Armor Branch. Let them know your address, phone number, and what you would prefer for your next job, and tell them how it will enable your professional growth. The assignment officers at Armor Branch will do their best to match your desires with the needs of the Army. Spend a little time to truly evaluate your strengths and weaknesses so that you can help determine for yourself how you need to continue to grow professionally and intellectually. Seek employment in those jobs that will help you progress. Write letters to the commanders of units where you are about to be assigned, so they know you are coming and what you would like to do. Keep current on what is happening in the branch and in the Army at large. Get yourself enrolled in courses, especially CGSC if you haven't been selected to attend the resident course. Look for ways to contribute.

Finally, you need to know that your leaders are working to make the Army school and assignments systems match the demands that are being made on you and your families. And we will get it about right. In the meantime, try to look at change as a challenge, not as an impediment. These are precisely the times for Armor and Cavalry soldiers. Intellect, innovation, creativity, perseverance, and courage will win the day.

# U.S. Army Armor Center and School
# DSN 464-
# Commercial (502) 624-

### Office of the Commanding General
### 4-2121

- Chief of Staff, USAARMC.....4-1101
- Armor Center CSM.....4-4952
- Secretary of the General Staff.....4-1102
- Planning Group.....4-2886

### Office of the Deputy Commanding General
### 4-7555

- Chief of Staff, USAARMS.....4-1050
- Armor School CSM.....4-7091
- Operations.....4-8879
- Advanced Warfighting Working Group.....4-7699

### Armor Awards and Activities

- Editor, Armor Magazine.....4-2249
- Draper Award.....4-1439
- Kouma Award.....4-1736/4462
- Franks Award.....4-8878
- St. George/Joan D'Arc/ Noble Patron of Armor.....942-8624
- Armor Trainer Update.....4-1315
- Armor Conference.....4-8878
- Armor Association.....942-8624

### Armor Course Management

- Army Training Requirement and Resources System (ATRRS)..4-3585
- Training Requirement Analysis System (TRAS)
  - Officer.....4-2004
  - Enlisted.....4-2096
- Intl Students (IMSO).....4-3055

### Armor Proponent

- Issues/Policy.....4-5155
- Excellence in Armor Mgmt...4-5155
- Armor Hotline.....4-TANK
- Armor Hotloop.....4-4913/3446

### Armor Research and Reference

- Armor School Library...4-6820/6231
- Patton Museum.....4-3812
- Armor Magazine.....4-2249
- Cultural Resource Mgr.....4-1495
- Armor TV Branch.....4-3932
- Army Research Institute.....4-3450/6928 (Armored Force Research Unit)

### Doctrine

- Director, Tng/Doctrine Dev...4-8247
- Crew/Gunnery.....4-1736
- PLT/CO/TM.....4-3228
- BN/TF/BDE.....4-2328
- Cavalry.....4-6235
- CS/CSS.....4-5108

### Force Development

- Director, Force Development.....4-5050
  - Future Armor Systems.....4-8994/6152
  - Future Tank Systems.....4-4412/1250
  - Cav and Scout Issues.....4-8802/8668
- Battle Cmd and C4I.....4-1491/1323
- Science, Technology, and Programs.....4-8064/1587
- Armor Organizations.....4-4526/6714
- Intell and Threat Sys.....4-7563/7686
- Force Design/ Documentation.....4-6282/3914

### Foreign Military Sales/Asst

- Foreign Military Sales Training Office (FMSTO).....4-5591

### Initial Entry Training

- CDR, 1st Armor Tng Bde.....4-6843
- Basic Combat Training.....4-1646/5053
- Advanced Individual Tng 45/63 Series
  Al-Qurain (M1A2 Crew/Maint Tng)
  One Station Unit Training (OSUT) 19K
  Recovery Training
  ASI H8.....4-7910
- OSUT 19D.....4-1012

### Liaison Activities

- British LO.....4-6451
- Canadian LO.....4-7047
- French LO.....4-6148
- German LO.....4-7045
- Italian LO.....4-6253
- OSACG-ARNG.....4-1315
- Air Force LO.....4-3150
- Marine Corps Detachment CDR.....4-5950

### Officer/Noncommissioned Officer (NCO) Instruction

- CDR, 16th Cav Regt.....4-7848
- Commandant, NCO Academy.....4-5150
- Armor Officer Basic (AOB) Course
  Scout Platoon Leader Course (SPLC).....4-6654
- Armor Officer Advanced Course (AOAC).....4-5855
- Pre Command Course (PCC).....4-5014
- CAV Leader Course.....4-3154
- BN Motor Officer Course.....4-5110
- Sr. Officer Logistic Mgmt Course.....4-7133
- Master Gunner .....4-8530
- Unit Conduct of Fire Trainer (UCOFT)...4-4117
- PLT Gunnery Trainer (PGT).....4-1571
- M1A1 Tank Cdrs Course.....4-2540
- M1A2 Tank Cdrs Course.....4-6504
- Primary Leadership Dev Course (PLDC)4-4354
- Basic NCO Course (BNCOC).....4-6580
- Advanced NCO Course (ANCOC).....4-8563

### Training Development

- Director, Tng/Doctrine Dev...4-8247
- Chief, Tng Div.....4-1978
- Systems.....4-5656
- Task Analysis.....4-8568
- Training Strategies.....4-2505
- Force XXI Tng Program.....4-6806
- Course Design.....4-4913
  - Correspondence Course.....4-7468
  - Distributed Learning.....4-4913/3446
- Training Evaluations.....4-3446

### TRADOC System Managers

- TSM Tank/AGS.....4-7955
- TSM Force XXI
  - 4th ID Support.....4-6621/8224
  - 1st CD Support.....4-8980/3287
  - FXXI Training Program.....4-6806/8756
- Close Combat Tactical Trainer Project Office.....4-1600

### Mounted Maneuver Battle Lab

- Chief.....4-7809
- Mounted Battlespace FXXI Experiments.....4-2339
- Mounted Warfare Test Bed.....942-1092
- Force XXI User Laboratory.....4-1974

### Unit Training Support

- SIMNET Observer/Controller Team (Warthogs).....4-7558
- Office of the Special Assistant to the Commanding General, Army National Guard (OSACG-ARNG).....4-1315

*CSM Ronnie W. Davis*
*Command Sergeant Major*
*U.S. Army Armor Center*


# Once a Master Gunner, Always a Master Gunner

SGM Spurling was absolutely right in his letter to the editor in the January-February 1996 issue of *ARMOR* — "Once a Master Gunner, Always a Master Gunner." There are 292 master gunner positions in the Army, in grades of SFC through SGM, with six of those positions in the grade of SGM. This number will increase to 303 in FY 97, with the number of SGM positions remaining the same. Once you have been accepted as a master gunner, you have the responsibility to maintain your proficiency, regardless of your assignments. You are the best of the best, the commander's top gun, and are responsible to train soldiers in the most efficient way to deal death and destruction on the battlefield. Getting to be a master gunner hasn't been easy or cheap.

To be selected, you had to have been an experienced tank commander. That experience did not come from just the OSUT training you received at Fort Knox. It came from studying on your own and the maintenance and gunnery training you received at unit level. Then you were screened by the chain of command and personally interviewed to determine if your were the right soldier for the job. Finally, you arrived at Fort Knox to be trained. Eleven weeks and $28,128 training dollars later, you picked up the additional skill identifier (ASI) of master gunner. This marked the point where the responsibility for remaining current shifted from the schoolhouse to you.

It would be a shame to squander the considerable time and money invested in your training. In these days of decreasing dollars, the Army must depend on those already trained to fill critical positions throughout the force. You must take the time to study the Abrams tank gunnery manual, FM 17-12-1-1/2, and the Abrams technical manuals. Stay in touch with new tank developments, training devices, and simulators through *ARMOR* or *PM Magazine,* just to name a couple. The master gunner branch at Fort Knox will always assist you by providing updated information on gunnery-related skills while you are detailed outside the master gunner arena. If a new piece of equipment is fielded, you can return to Fort Knox for the necessary upgrade training. The opportunities are there; all that is necessary is your willingness to accept them.

In short, when you accepted the ASI of master gunner you accepted the lifelong commitment SGM Spurling described. There is no badge or extra money, but there is the satisfaction of knowing you taught soldiers to survive in combat. That is the essence of what we as noncommissioned officers do best, and master gunners have the additional training to do it better. No one twisted your arm to become a master gunner; it also helped you get promoted. The least you can do is stay current. The Army saw something special in you to train you as a master gunner. It is imperative that you maintain that cutting edge. Remember, once a master gunner, always a master gunner!

# BOSNIA REPORT

## *Task Force Eagle's Armor and Cavalry Operations in Bosnia*

**by Colonel Charles Lehner, Ret.**

LT Parnell and SFC Frederickson of B Troop, 1st Squadron, 4th Cav with newly acquired M973A1 SUSV. The Swedish articulated vehicle and the Russian BMD-2, both under 8 tons, are well suited to Bosnia's limited road net.

The purpose of this article is to examine the capabilities and limitations of armor and cavalry in Bosnia within the NATO alliance. This article is focused on Task Force Eagle, including attachments from other countries. In addition to the U.S. 1st Armored Division (minus the 3rd Bde), the task force includes a Swedish battalion (SWEBAT), a Russian airborne brigade, and a Turkish battalion.

### Armored Vehicles Available

Armor within TF Eagle includes a wide variety of equipment, including U.S. M1A1 Abrams tanks, M2 and M3 Bradley infantry and cavalry fighting vehicles, M113 APCs, M-109A6 155mm (Paladin) howitzers; Russian BTR-80 8x8 wheeled troop carriers and BMD-2 airborne assault vehicles; Danish Leopard 1A3 tanks (attached to SWEBAT); Swedish BV-206S armored articulated all terrain APCs, Pbv-302 APCs; and Finnish SISU XA-180 6x6 APCs.

### Terrain and Road Net

Fundamental to any discussion of armor and cavalry operations is a complete understanding of the terrain and road network in which they must operate. The former Yugoslavia is predominately a mountainous and hilly country. Elevations range from almost 2,900 meters above sea level at the highest peak in the northwest to sea level on the Adriatic coast. The former Yugoslavia can be divided into the following three landform divisions: the northern plains, the interior highlands, and the Adriatic coastal region.

The northern plains total about 20 percent of the land area. This landform comprises the river valleys of the middle and lower Drava, the lower and middle Sava, the lower Tisa, and the middle Danube. It is bordered in the south and west by the interior highlands and continues north into Hungary and Romania.

### Terrain and Weather Effects

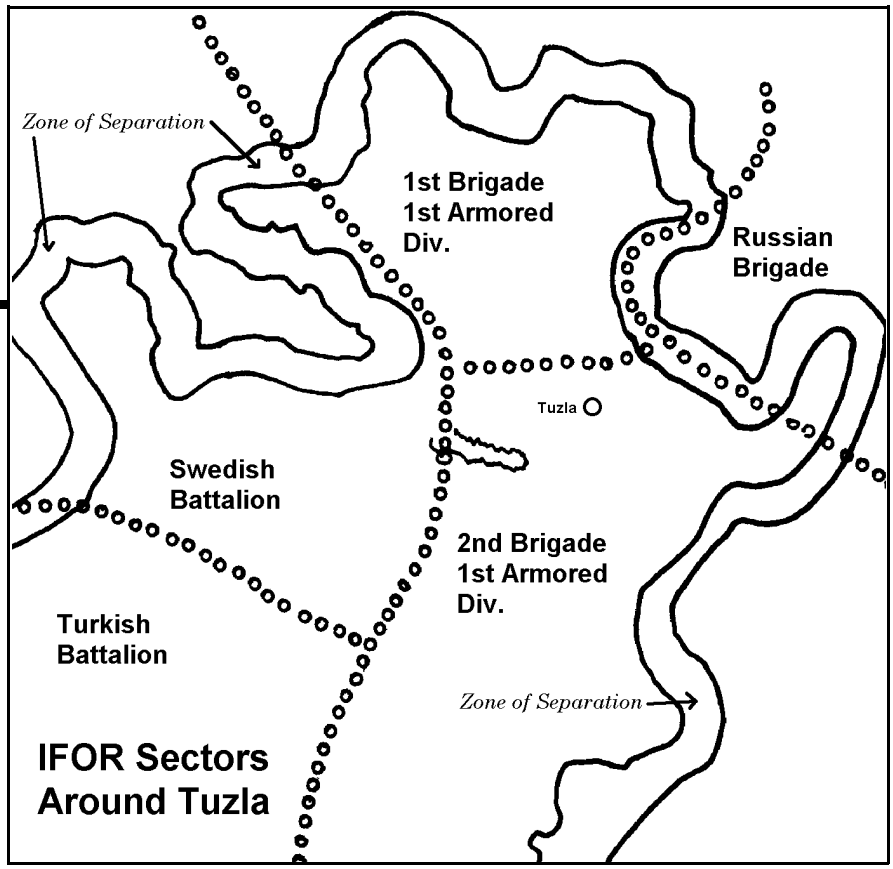
The mountains, steep hills, and rough karst topography that cover 70 to 80 percent of the country have a profound effect on military activities. Cross-country movement of wheeled and tracked vehicles is almost impossible in these areas. In the northern plains and in the valleys adjacent to dissected hills in the east, movement is feasible all or most of the year. Vehicular movement, in general, would be easier in summer and autumn than it would be in winter and early spring when the ground is soft and wet.

Most of the roads in the former Yugoslavia's highway system are asphalt surfaced, have numerous bridges, and traverse rough terrain. City streets, as well as more remote area roads, typically have uneven or broken surfaces of cobblestone, tar, or gravel. Current conditions of these roads are poor for the most part. By 1989, the highway system totaled 123,000 km of roads. Included are the 871 km major highway (Route 1), 73,527 km of asphalt-surfaced roads, 33,663 km of macadam-surfaced roads, and 15,133 km of earthen roads. Most areas of the country are accessible via modern asphalted roads. All the primary routes have numerous bridges that cross small to large streams. In some of the mountainous areas, bridges are easily washed out. These significant obstacles are difficult or impossible to bypass because of rough terrain.

### Preparation For Trip to Bosnia

In October 1995, I visited LTG John Abrams, CG, V Corps, in Heidelberg, Germany, and briefed him on recent events in Korea regarding the 2d Infantry Division, which he commanded prior to assuming command of V Corps. While in Korea, General Abrams directed a staff study on the limitations of High Mobility Multipurpose Wheeled Vehicles (HMMWVs) in mountainous terrain. The 2d ID staff concluded that it needed about 200 BV-206S (armored version of the U.S. Army's M973A1 small unit support vehicle) to replace HMMWVs in scout platoons of maneuver battalions, light infantry battalions, a signal battalion, an MI battalion, and an air defense battalion.

I suggested to General Abrams that BV-206S vehicles might also be useful in Bosnia's mountainous terrain. In November, I was asked by the V Corps Force Modernization Officer, LTC Ron Baynes, to formulate an organizational and operational (O&O) plan for employing BV-206S vehicles in the 1st




Armored Division for their upcoming deployment to Bosnia. I was told by the Swedish Embassy in Washington that only 17 BV-206S vehicles could be made available to meet the deployment of TF Eagle in December or January. I felt that all 17 BV-206S vehicles should be in one provisional cavalry troop so that a single commander would be responsible for training, maintenance, and logistic support. This did not preclude detaching scout squads or sections to other units as needed. I suggested that the cavalry troop be manned by the crews of some tanks left behind in Germany. The O&O concept was prepared and coordinated in December, with BG James P. (Pat) O'Neal, 1st AD ADC-Support in Bad Kreuznach; COL John Batiste, Cdr, 2d Bde in Baumholder; and LTC Tony Harriman, Cdr, 3d Squadron, 4th Cavalry in Schweinfurt, whose squadron was detached from the 3d Infantry Division and attached to the 2d Brigade of the 1st AD for TF Eagle. The O&O plan was well received and BG O'Neal said that all 17 BV-206S vehicles could be employed by the 2d Brigade, the unit assigned to cover the mountainous terrain south and east of Tuzla. However, when MG Nash, CG, 1st AD, reviewed the plan, he felt that he could not justify the expense of buying 17 BV-206S vehicles from Sweden; instead, he decided to requisition 20 M973A1 SUSVs (unarmored versions of the BV-206S) from U.S. Army stocks in Italy.

These visits with the 1st Armored Division enabled me to understand TF Eagle's upcoming mission in Bosnia and review the extensive training and preparation prior to deployment. I also conducted extensive research with the elements of the Swedish brigade, who have been operating in Bosnia and Macedonia for the past few years. Colonel Jan-G Isberg, former commander of the 1st Nordic Battalion, stated in his report dated February 15, 1994: "We were entirely dependent on the BV-206 to supply the positions, patrol the borders and to reconnoiter patrol tracks and locations for additional positions. All our BV-206 were exposed to heavy strain, both in stony and very rocky terrain in valleys and along steep mountainsides, where other types of vehicles could not pass at any time of the year. The BV-206 came up to all expectations. Thanks to them we were able to keep the operation running, and at no time we had to decrease our ambitions with the mission in spite of the extremely difficult terrain."

### Operations in Bosnia

The entire area of TF Eagle was previously the responsibility of the Swedish battalion, which now is responsible for only the NW sector of TF Eagle (see map, above). I stayed with the Swedes from 14 to 19 March 1996 and was accompanied in my travels by MAJ Claes Wolgast, Deputy Chief of Staff SWEBAT, and LT Christof Reychman, interpreter. I was impressed by the professional capabilities of the Swedes and their extensive knowledge of Bosnia.

As the Germans found out in World War II, TF Eagle also knows that Bosnia is not ideal "tank country." However, the decision to send the 1st Armored Division to Bosnia, rather than an infantry or mechanized infantry division, has had a profound effect. The awesome presence of a reinforced armored division can leave little doubt in the minds of the Serbians, Croatians, and Bosnians that the United States and its NATO allies mean business in implementing the Dayton Agreement. A platoon of Abrams tanks and Bradley fighting vehicles at a checkpoint is a strong reminder of the hundreds more that are also quite visible in the camps of the 1st Armored Division. There are some areas of Bosnia that are more like classic "tank country," such as the critical Posavina corridor in the 1st Brigade's sector. However, mud can be a real problem even in this relatively flat area.

M1A1 tanks with mine rollers have proved their worth in clearing roads of deadly antitank mines. Mine roller tanks could have prevented the serious accident which happened to the Danish tank company in the Swedish sector. This was a unique mine encounter in which three TMM-1 antitank mines, connected with detonating cord, went off simultaneously under a Leopard-1 tank. The bottom photo on Page 45 shows a road wheel arm sheared off by one of the mines.

*Continued on Page 45*

# The M1A2: Current and Future Program Plans

**by Wes Glasgow, Colonel Christopher Cardine, and David Latson**

The M1A2 main battle tank, the latest product-improved version of the Army's premier ground combat system, is at the forefront of the Army's modernization efforts. Such planning is imperative, especially in today's era of diminished funding for research and development of completely new systems. This reality, and the uncertain state of the Threat, means that the M1-series tanks may very well equip the majority of the Army's armor and armored cavalry units well into the 21st century.

The perception of a reduced foreign tank threat makes it difficult to justify a completely new tank system anytime soon. Thus, a prudent course in light of this situation — and given likely upgrades of foreign tanks with current technology and their sales to potential threat nations — is to plan for uncertainty and maximize options by upgrading the existing M1 fleet. This will both improve a known high capability and leverage the soldier's trust and familiarity with a proven operational system.

This article provides a view of the M1 modernization program by sketching its progress, giving an overview of the M1A2 (the vehicle currently being fielded), detailing plans for a bold System Enhancement Program (SEP) product improvement, and providing forecasts for even further upgrades, all designed to integrate the latest technologies. The chief goal is to ensure the M1 overmatches all possible threat vehicles, thereby maximizing our soldiers' chances for victory in the future.

## Progress

The M1 tank, entered service in the early 1980s, the first successful U.S. tank development program since the late 1950s. It represented a dramatic advance over the M60-series tanks which, throughout the 1960s and 70s, had been seriously overmatched by Threat vehicles like the Soviet T-64 and T-72. Although durable, lethal, and battle-proven in the Arab-Israeli Wars of 1967 and 1973, the M60 was vulnerable to antitank guided missiles (ATGM) — including those carried by infantrymen — as well as conventional tank and antitank gun kinetic energy (KE) threats.

During M1 Abrams development, the predominant design priority was crew survivability. The design countered the Threat by providing the soldier with significant improvements in armor protection, crew survivability, fire control, and mobility. Its most significant single enhancement, special armor that was effective against both KE and chemical energy (CE) rounds, provided excellent protection against many Threat direct fire weapons at various angles and

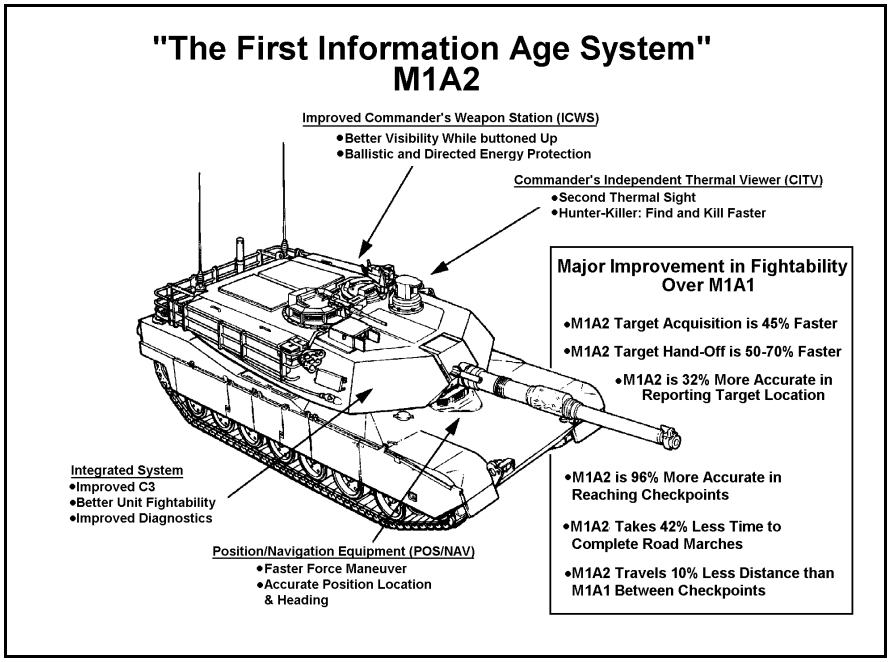



**Figure 1**

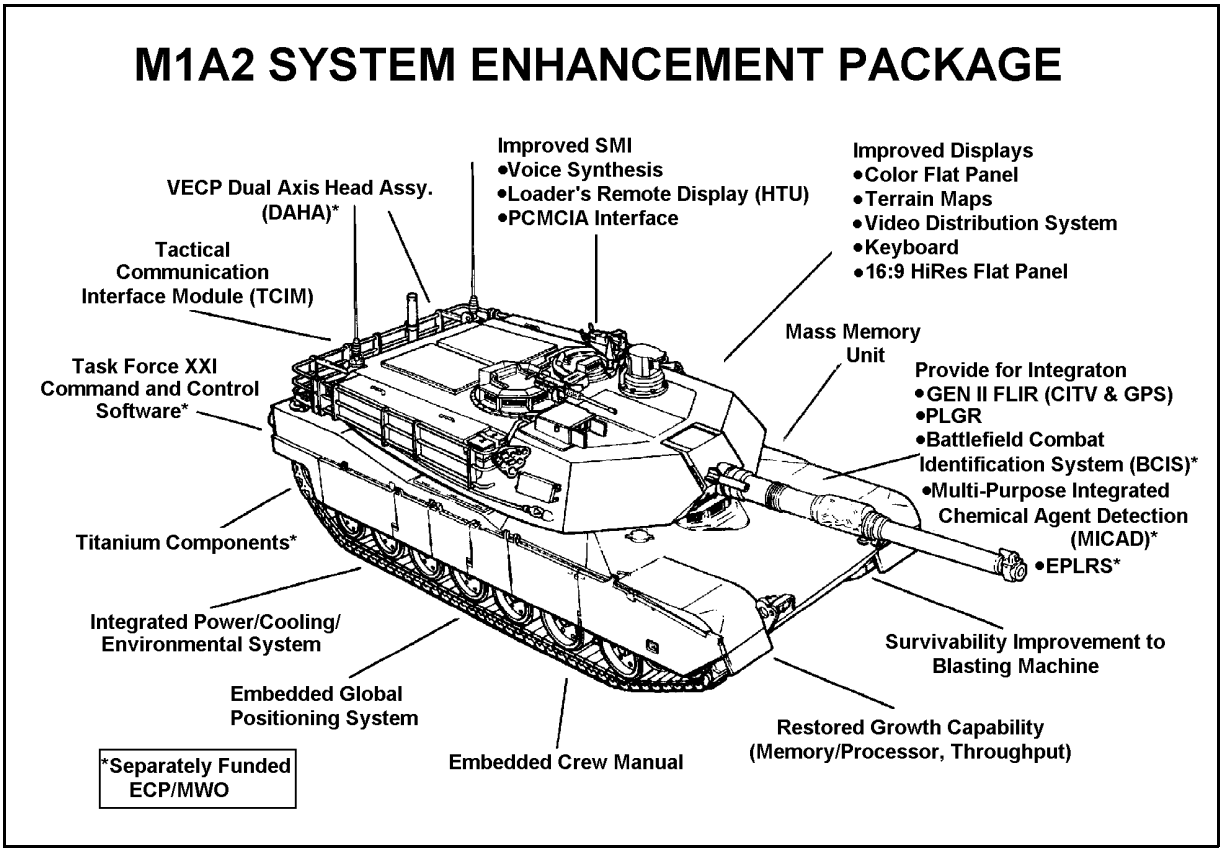



**Figure 2**

ranges. Throughout the program, the development of the armor package has proceeded apart from the tank itself, and later incremental improvements in armor and suspension were added to the last few vehicles of the M1 production run, which became known as the Improved M1 or simply the IPM1.

The first major vehicle block product upgrade, the M1A1, added a more powerful weapon system, the 120mm M256 smoothbore cannon, again improved the armor package, added an on-board positive pressure NBC system, and included a more durable track. The M1A1, produced in greater quantities than any other variant of the M1 series, equips the majority of the fielded U.S. armor and armored cavalry units. It is the tank equipping the armor units that deployed to the NATO peacekeeping mission in Bosnia.

The second major block product upgrade, designated the M1A2, represents a significant technological shift (Fig. 1). It incorporates a massive investment in digitization in its on-board systems, all aimed at improving the reliability, fightability, and operational capability of the tank. Reliability is improved through the use of integrated circuits and greater reliance on built-in diagnostic capabilities. Operations and fightability are enhanced through advances in battle management, fire control, survivability, maintainability, and supportability. The M1A2 is beginning its fielding now, and will principally equip the highest priority armored units worldwide.

### M1A2 Highlights

The M1A2 represents a major technological advance, due to its extensive use of digital electronics and microprocessor control. The core electronic architecture of the system is the backbone of the tank. The system utilizes a high-speed MIL-STD-1553B data bus with a sophisticated system integration package for transmitting digital information and commands throughout the tank. Electronic sensors and systems improve driving, target identification, and information flow between the computer-driven subsystems and the crew, as well as with the Inter-Vehicular Information System (IVIS) that links tanks and other combat elements. The commander, gunner, and driver have new displays. The scope of these changes is remarkable when one realizes that, in the previous generation M1A1, the Army has a tank that is about 10% digital and 90% analog. With the M1A2, the proportion is reversed, with 90% being digital and only about 10% analog.

Lethality and fightability are improved with enhancements to target acquisition and fire control. The Commander's Independent Thermal Viewer (CITV) gives him a 360-degree, all-weather, day-night, target surveillance system that allows the commander and gunner to act as a "hunter-killer" team. The commander searches for targets while the gunner engages a completely separate target. When the gunner fires the weapon, the commander can then "hand-off" a new target to the gunner with the push of a button. This capability greatly enhances the potential lethality of the system and measurably improves the engagement speed of the tank, getting multiple, accurate rounds down range. This is often the most critical factor in tank survivability on the battlefield.

The IVIS capability dramatically improves command and control in battle situations. The IVIS processes key information at the commander's control through an integrated, gridded mapping system of the area of operations. The

IVIS displays the locations of enemy and friendly vehicles, displays selected transmitted reports, and provides current status and diagnostics of key systems. These features alleviate some tiresome administrative tasks, while enabling vehicle and force commanders to better understand the battlefield situation. Knowledge of the precise status of friendly and enemy units will significantly aid the commander's ability to make rapid and correct tactical decisions.

IVIS is augmented by a Position Navigation (POS/NAV) system which, through the Commander's and Driver's Integrated Displays (CID and DID), displays vehicle position and heading references to both the commander and driver. The CID reduces the commander's previously burdensome and time-consuming navigational tasks and greatly improves overall situational awareness. For the driver, this capability enables him to move from point to point on the battlefield without constant direction from the commander, while the system's all-weather capability allows him to concentrate on correct tactical movements without constant reference to maps or key terrain features.

Improved weapons sights and stations also enhance survivability. The gunner's sight includes azimuth stabilization. The dual-axis stabilization greatly enhances target acquisition and target tracking functions, especially while on the move. The Commander's Independent Thermal Viewer increases his field of view to a nearly continuous 360 degrees to aid in target detection. Improved sight armor enhances survivability of these critical components. Other survivability advances include redundancy of electronic processors in the hull and turret and the dual redundant 1553 and 485 data/utility busses.

Supportability enhancements stem principally from the high commonality of components in the core electronics system. The extensive collection of Simplified Test Equipment (STE) required for the M1A1's on-vehicle diagnostics has been eliminated by built-in test and diagnostics capabilities. The software not only enables the crew to determine and isolate faults, but can automatically reconfigure the hardware to give the crew the highest level of residual functionality possible in light of the fault conditions. The crew and mechanics can initiate fault isolation tests to isolate faulty Line Replaceable Units (LRUs) so as to permit rapid repair by component replacement, and restoration to battle-ready condition.

Additional improvements have been added for special purposes and/or in support of export/joint vehicle programs. For example, a Mine Clearing Blade System can provide rapid and independent breach of simple minefields. For export to the Kingdom of Saudi Arabia and Kuwait, the tanks include slight modifications to their core electronics to interface with compatible intercom and radio systems in those armed forces. Additionally, the Saudi and Kuwaiti M1A2s are dual-language capable and display all information in either English or Arabic.

The M1A2 represents a major success as an acquisition program, especially so with respect to the major improvement in digitization. What other program, especially one as revolutionary as the M1A2, can boast of a Milestone II decision in December 1988 with a first prototype delivered in 1992, an Initial Operational Test and Experimentation (IOTE) in 1993, a MS III decision in April 1994, and a First Unit Equipped in 1995? These accomplishments are especially significant since the tank is the flagship ground digital platform and has also been represented in nearly every Army Warfighting Experiment (AWE) to date.

Overall, the M1A2 improvements provide a radical change in capability and present a unique opportunity. The digital capability enhances the vehicle's performance on the battlefield to permit it to overmatch any known comparable tank, both operationally with respect to situational awareness, and tactically with respect to lethality and performance. However, the potentiality for future growth holds even greater promise. The M1A2 user community and project office will begin to exploit this potential capability through implementation of the M1A2 System Enhancement Program (SEP).

### M1A2 SEP Overview

The M1A2 SEP was a direct outgrowth of discussions and plans at the M1A2 Milestone III review in April 1994 to keep the M1A2 in step with a heavy emphasis on digitization experiments under the AWE or Force XXI. These concepts are designed to mold Army doctrine and modernization toward the vision of a future digitized battlefield. Additionally, the constant advance of both microprocessor and memory capacity require regular computer hardware upgrades.

The SEP improvements focus on modifications to the computer core that are necessary to accept Army command and control software and operating standards, also known as the Common Operating Environment (COE). Yet they will have minimal impact on intra-vehicle software and standards which run individual vehicle components. These intra-vehicle systems should infrequently require new software code, certainly less often than the Command and Control or COE software. The improvements involve both extensive hardware and software enhancements (see Figure 2).

The most significant hardware improvements include the second-generation Forward Looking Infrared (FLIR) in both sights, the Enhanced Position Locating Reporting System (EPLRS), a Global Positioning System (GPS) to enhance the positioning and navigation (POS/NAV) system, an integrated under-armor power/cooling system to mitigate power consumption and electronics heat, enhanced memory and display components, and interfaces for the separately developed Battlefield Combat Identification System (BCIS), and Multi-Purpose Integrated Chemical Agent Detector (MICAD).

The major objective, however, is to provide for the assimilation of future electronic upgrades, including the Army's objective digitized command and control software COE. The SEP program will prepare for the acceptance of the Force XXI Battle Command Brigade and Below (FBCB2) software by incorporating better data processors, more memory capacity, better soldier-machine interfaces with adequate backup power, and cooling capability. The SEP allows for acceptance of that portion of the COE that affects inter-vehicle or inter-platform operations. The operations that affect only the activities within the internal vehicle systems can be carried on separately. This concept, a form of distributed architecture, is a critical feature in holding cost and complexity down. It means that software development of internal systems which, once

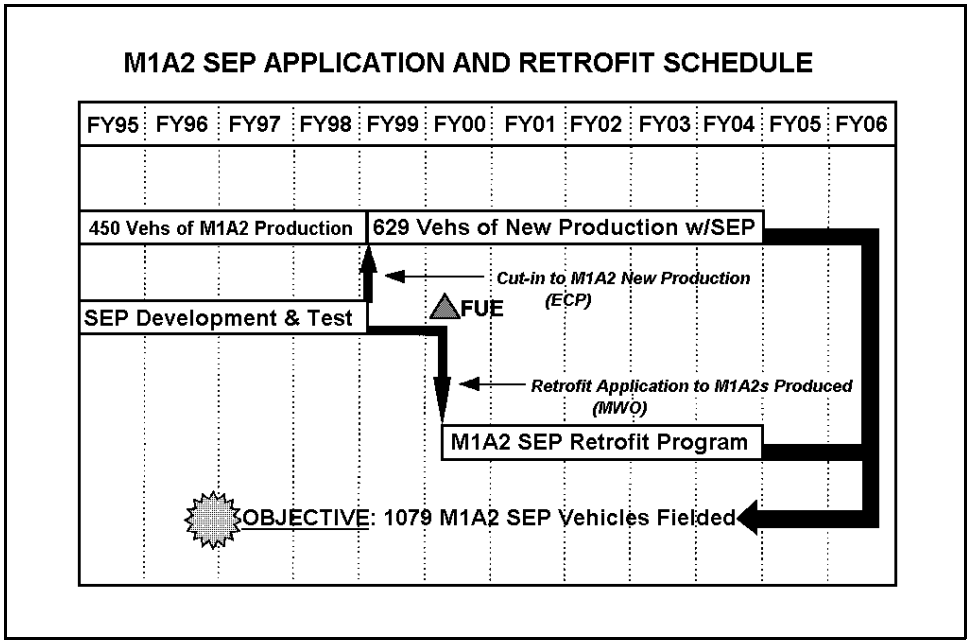



**Figure 3**

proven, will remain relatively robust. The architecture will be less affected, if at all, by different versions of inter-vehicle software, which will frequently change as new functionality and coordination is desired between vehicles and combat elements of the force.

The Under Armor Auxiliary Power Unit (UAAPU) is a key SEP component because of the power requirements of digitization. When the main engine is shut down, these new functions will require more power than can be sustained for long using on-board batteries. The UAAPU will provide electrical power during silent watch and will recharge the vehicle batteries with the engine shut down. The system can bleed air to the NBC overpressure system and will reduce the main engine operating hours and associated high fuel consumption. This will yield savings in operations costs and reduce engine wear and fuel consumption while increasing net operational range. It also provides power for the electronics cooling unit which reduces heat in the crew compartment, thus increasing electronic module reliability.

The second-generation FLIR system enhances the capability and reliability of the M1A2 in night and reduced visibility. In addition to improved visibility, the SEP/second-generation FLIR will upgrade and replace current hardware and software.

The current plan is to produce and test prototype tanks with SEP equipment installed. Upon approval, the entire fleet of 1,079 M1A2s will be fitted with the SEP equipment. A production Engineering Change Proposal (ECP) will be implemented for those tanks produced after FY 1999. Beginning in 2000, the retrofitting of already fielded M1A2s via a Modification Work Order (MWO) will start (see Figure 3).

The M1A2 SEP program does not exhaust the planned improvements that are available to keep the M1A2 current. Pre-Planned Product Improvements ($P^3I$) further enhance the tank, but loom farther out on the horizon past the final application of the SEP improvements. However, there is currently no funding in the Abrams program for product improvements beyond the SEP ).

Most of the additional improvements involve more advanced technologies, such as: digital processing of the second-generation FLIR sensor data for advanced functions (auto target tracking, target recognition, cueing, etc.), embedded training, helmet-mounted heads-up displays, and an integrated combat protection systems designed to automatically counter incoming threat projectiles and missiles.

Several of these refinements and technologies may mature early and be funded as a future $P^3I$ ECP/MWO within the production run of the M1A2. The key is that the bulk of the electrical and computational power and interface requirements will have already been built into the tank as a part of the SEP improvements and can help smooth the integration of these items.

The M1A2 $P^3I$ program will remain in a good position to maximize the digitization developments that are the outgrowth of the Army Warfighting Experiments. The key is an architecture that is rapidly adaptable to changing requirements, Threat capabilities, and emerging technologies. The M1A2 is just such a system, and is designed to leverage and interface with the other members of the combined arms team. As the foremost digital platform, the M1A2 will continue to lead the digitization effort through application of technology and will practically demonstrate which digital revolutionary concepts are doable.

## The Future

The M1A2 will be the Army's premier combat fighting vehicle through the foreseeable future. It is, and will remain, the only digital weapons platform that can survive on the close combat battlefield. Funding realities and the force structure, however, will dictate that not all units will receive the M1A2, nor will it be beneficial to do so, since many units will remain in the force structure that are not digitized or are equipped with a range of less integrated digital appliqué elements. Units below Force Package I will predominantly continue to be equipped with the M1A1; however, even some M1s will remain. Figure 4 shows this situation.

Once systems are fielded, however, the story does not end. The Abrams Integrated Management XXI (AIM XXI)

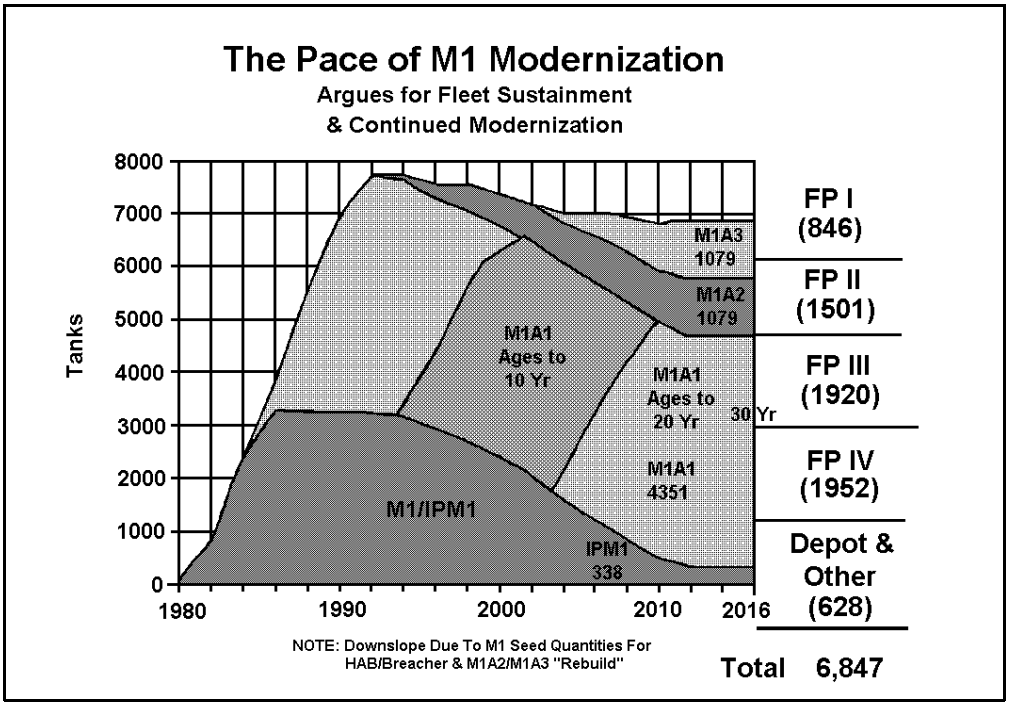



**Figure 4**

program is designed to maximize efficiencies through teaming of government and industry agencies to perform intensive management based upon their core competencies. The team will evaluate every facet of the program to sustain the fleet at minimal costs, while seizing opportunities to reduce management overhead and attaining operations and support cost reductions through component and process re-engineering.

The story of digitization will ultimately be developed by soldiers who will live, breathe and function digitally on the battlefield, both in warfighting experiments and day-to-day operation. The daunting challenge is to provide the facilities to undertake and support that capability so that the soldier can stretch his imagination to take digital doctrine and tactics to the highest levels of performance and, over time, develop the real potential of this new technology.

The tactical level of war in the digital environment promises a tremendous payoff in speed, battlefield dynamics, and flexibility. This promise is achievable only by freeing the soldier of routine, non-critical tasks and allowing him to focus on the tasks that are critical for success.

The digital applications and subsystems on the M1A2 are true pathfinders in these areas. The soldier will determine the true worth and utility of digitized operations and will find the things no one has thought of before. Those results may lead Army efforts in completely new and uncharted directions. The M1A2 program is ready to make those adjustments with a dynamic architecture that is structured for change.


Wes Glasgow is employed as a military equipment analyst and technical writer with Camber Corporation, headquarterd in Huntsville, Ala., with offices in Warren, Mich. He served in the U.S. Army from 1973-1993 as a field artillery officer with troop assignments at Ft. Riley, Ft. Sill, Germany, and Korea. He trained as a research, development, and acquisition specialist with assignments as an operational tester at Ft. Sill and materiel developer at the U.S. Army Tank-Automotive and Armaments Command in Warren, Mich.

Colonel Christopher V. Cardine was commissioned in armor after graduation from the U.S. Military Academy in 1971. His career assignments include cavalry platoon leader and troop XO, 3d Squadron, 7th Cavalry, 3d ID; BMO, tank company commander, and operations officer, 2-77 Armor, 9th ID; Test Officer and Product Manager for Automatic Test Equipment, Project Manager's Office, Bradley Fighting Vehicles; staff officer, G3 Operations, V Corps; squadron XO, 3d Squadron, 11th ACR; a member of the Armor/Anti-Armor and Heavy Forces Modernization Special Task Forces, the Pentagon; commander, 3-68 Armor, 4th ID; and Product Manager of the M2/M3 Bradley Fighting Vehicle System. He is currently serving as Project Manager, Abrams Tank System.

David M. Latson holds a BS in mechanical engineering from Michigan State University. He has worked for the government as a mechanical engineer, R&D Systems; Chief, Tech. Management Division, Project Manager, M113 FOV; and Chief, Tech. Management Division, Program Manager, Light Combat Vehicles. He is currently Deputy Program Manager, Abrams Tank Systems.

# M1A2 Update:

## *Training and Doctrine Observations From Saudi Arabian NET Training on the M1A2*

**by Major Kevin D. Poling**

RSLF units spend four weeks on the range during Phase II of New Equipment Training. Using a round-robin approach, units rotate through prime training, concurrent training, and maintenance/range support.

Fort Hood is not alone in fielding the M1A2 main battle tank. Since October of 1994, selected units of the Royal Saudi Land Forces (RSLF) Armor Corps have fielded the M1A2 tank and executed New Equipment Training (NET). Observations from this effort and lessons learned from NET offer some valuable insights for *our* army into the warfighting capabilities of the M1A2. My general intent is to share these observations in hopes that a comparison of these findings with the Fort Hood effort will produce a synthesis of ideas, not only to enrich the NET process in both locations, but also to enhance post-NET training. In addition, I will offer some viewpoints on the larger issues of training, doctrine, and digitization as it affects the U.S. Army, predicated upon my training observations.

Articles in *ARMOR* throughout 1995 have also addressed the issues of digitization and the capabilities of the M1A2, much to the authors' credit. My specific purpose, however, is to focus on the tank's warfighting capability as it affects the individual crewmembers, especially the tank commander. I believe this type of analysis is prudent because of the increased demands placed upon the M1A2 tank commander (TC) in comparison to his responsibilities in earlier tanks. Learning to use the M1A2's Intervehicular Information System (IVIS) is just one of the increased tasks the TC must learn to fight and win with his tank. How the individual tank commander optimizes the gunnery capabilities of the M1A2 will go far in allowing him to take advantage of the IVIS. One thing has not changed with the advent of the M1A2: effective gunnery is still a must. It does no good to be situationally aware of your battlespace if you cannot employ your tank effectively by putting "steel on target." The two must go hand-in-hand, but fighting the vehicle must not be lost in the maze of networks and downlinks. We must be fully aware of the demands digitization places on the tank commander (and the unit leader), vis-a-vis his ability to fight his individual vehicle (and unit).

### RSLF New Equipment Training

Let me briefly explain the four-phase NET process for RSLF armor units. Phase I is taught at the Armor Institute here in Tabuk, where an individual officer or soldier, totally unfamiliar with the M1A2, is taught the basics of the tank. Individual instruction is taught in four courses, which are essentially a cross between AIT and the tank certification courses at Fort Knox. Officer, Tank Commander, Gunner/Loader, and Driver constitute the four courses, ranging in length from twelve weeks for the driver's course to nineteen weeks for the officer's. Tank commanders and officers receive driving, gunnery, and tactics instruction, while the gunner/loaders and drivers receive instruction only in their respective positions. Cross-training for the latter individuals occurs in units. All students, except drivers, fire six rounds for familiarization fire prior to graduating to the next phase. In addition, a host of training devices supports the instruction, with students utilizing the improved-VIGS (Video Disk Gunnery Simulator), the Crew-Station Trainer (CST), and the Tank Driver Trainer (TDT). The M1A2 PCOFT is also on hand for training, both in UCOFT and PCOFT modes.[1]

Once a series of courses is complete, the students from all four courses form a company-sized unit within the tank battalion structure in order to execute Phase II. Prior to the start of instruction, the newly formed crews fall in on and inventory their tanks and corresponding equipment. During ten weeks, instructors re-evaluate these crews on the TCGST, and the crews methodically proceed from Combat Table I through Combat Table VIIA/B, in accordance with ST 17-12-1-A2, "M1A2 Tank Gunnery." During all tables, crews receive feedback from tank crew evaluators (TCEs) and AARs in order to gauge their progress. In addition, "jump" radios are used for both dry- and live-fire exercises. The unit conducts a weekly maintenance day, where the unit chain of command highlights both PMCS execution and training. Results from Phase II are extremely promising, with RSLF crews demonstrating their abilities to consistently hit targets. If properly prepared, the M1A2 will not miss.

At the completion of NET gunnery, the unit enters Phase III for five weeks of platoon tactical instruction. The concentration centers upon introduction of the four-tank platoon concept, with associated formations and drills, as well as use of the IVIS capability.[2] Platoons execute both day and night training exercises, with the AAR concept heavily emphasized. At the end of Phase III, the company conducts a three-week semi-annual service, which serves to train crews, the chain of command, and organizational mechanics in the conduct of this important event.

During NET and in home station preparation for qualification gunnery, units use their local training areas extensively. In preparing to execute Tank Tables I-IV, target silhouettes, snake boards, and boresight panels are available.

The completion of Phase III marks the official end of NET, but then the battalion embarks upon an eighteen-month sustainment training phase in order to build upon the foundation of NET. The unit will conduct collective training exercises through battalion level, as well as two sustainment gunneries, the first culminating in CT VIII, while the second culminates in CT XII. There is also a heavy emphasis on staff training to support the battalion's ramp-up toward full combat readiness.

### M1A2 Crew Commentary

This process reveals some interesting points about the M1A2 crew and the responsibilities of each member. In essence, the gunner, driver, and loader positions are *evolutionary* in nature with regards to their present capabilities. The M1A2 certainly provides these crewmembers with advantages and advances in technology that improve their abilities to perform individual and crew tasks better than any tank in the world. The driver possesses increased capabilities to monitor the tank's maintenance status through the Driver's Integrated Display (DID), while the POSNAV system allows the driver to both drive and navigate the tank simultaneously. The gunner enjoys similar advantages in engaging targets with a computerized fire-control system that has faster response times and improved ballistic sighting over previous M1-series tanks. The loader has increased responsibilities in assisting the tank commander with the communication system, to include IVIS. The bottom line, however, is that the gunner stills engages targets, the driver still drives the tank, and the loader still loads the rounds. From a theoretical standpoint, much has not changed, which leads me to label these crewmember positions as *evolutionary.*

The tank commander position, however, is another case altogether. The additional capabilities afforded by the M1A2, specifically the CITV and IVIS, truly make the M1A2 tank commander's position *revolutionary* in nature. The tank commander can acquire and determine range to targets independently of the gunner, using the CITV, while dramatically reducing target hand-off times to the gunner by utilizing the target designate button on the Commander's Control Handle Assembly (CCHA). The TC can monitor his battlespace, receive orders, integrate force multipliers into the operation, and report his tank's status more rapidly than ever before possible because of the IVIS. This also applies to individuals who are both tank commanders and unit leaders. The combination of these two categories, improved gunnery capabilities, and digitization truly make the TC a more powerful warrior than has ever been seen at his level.

How the tank commander exploits the advantages of the CITV and the IVIS, while not degrading his ability to fight the tank, will go far in determining how he, as both vehicle commander and unit leader, can effectively dominate his battlespace. As observed during training on the range and in the M1A2 UCOFT, the TC can get so absorbed in one area (i.e., CITV and fighting the tank) that he loses focus on the other (i.e., IVIS), thus negating its advantages. We must learn to use both simultaneously in order to maximize their potential, given the particular battlefield situation. A vignette from DESERT STORM serves to illustrate my point. The situation occurred on 27 February 1991, with the 2nd Brigade, 1st Armored Division attacking just short of "Medina Ridge." The unit was equipped, of course, with the M1A1.

*Sergeant First Class John Scaglione led D/1-35 AR to within 800 meters of the Iraqi lines. His platoon leader had fallen back in the formation and Scaglione had taken over the point position. He reluctantly stopped while two other tanks in his platoon fell back to cross-level main-gun ammunition. While this 20-minute operation was going on, Iraqi artillery and mortars began to fall behind them in the wadi.*

*In spite of increasingly accurate fire, Scaglione refused to sink into his hatch and forfeit his all-around vision. His platoon was isolated...and he could not afford to miss anything. He stood in the turret keeping a steady watch through binoculars while his gunner continued to swing the turret and its thermal sights back and forth. Suddenly, Scaglione was just able to make out the gun-tube of a T-72 as it rose over the top of a berm...He slipped down onto his thermal sights and twisted his override hard left, slewing the turret around. He laid his cross hairs just right and below the muzzle of the T-72. His gunner fired almost instantly...blasted through a berm, and unerringly found the steel body of the T-72. Again Scaglione popped out of the turret and continued to scan. In quick succession, his crew discovered and killed three more threatening T-72s before any could get off a shot.*[3]

How would SFC Scaglione have fought this engagement with an M1A2? Certainly, the CITV would have allowed him to scan a much wider sector than that of the gunner.

Target hand-off would have been much easier with the target designate function, and the IVIS would have allowed him to not only report the situation, but also to initiate a call for fire. The situation seems to be very straight-forward. I believe the troubling aspect of the whole matter, however, centers around where SFC Scaglione actually fought the M1A1....out of the hatch. To take full advantage of the M1A2 capabilities, he would have had to be down inside on the CITV, which would forfeit his peripheral vision: a factor central to his success in actually acquiring the T-72s. Only SFC Scaglione knows if the CITV capability would have helped or delayed his efforts in acquiring the targets. In addition, if SFC Scaglione had been using the IVIS in our M1A2 scenario and not scanning, would the engagement have played out differently?

This vignette raises some important issues in regard to fighting the M1A2, especially on the offense. Does the TC fight out of the hatch or down inside, and how much time does he dedicate to IVIS (read digitization) in fighting the tank? Suggestions for a "heads-up" display or some other technological solution to the this problem should actively be pursued in order to make the M1A2 capabilities as user-friendly as possible. I contend, however, that there is also a training solution, both in units and during institutional education. At the tank commander and unit leader level, we should use the "applicatory method" of teaching, by which I mean these individuals should be continuously challenged with problem-solving exercises involving the M1A2 to develop their thought-process, rather than "school solutions" to be memorized. Given a particular situation, the TC might choose to fight out of the hatch, but in doing so, his thought-process and rationale must be scrutinized.[4] In this way, we can further develop leaders who are situationally aware of both their battlespace and how best to fight the M1A2, given a particular circumstance. I believe, in general, that the decisions that optimize the use of the CITV and IVIS are the best solutions, but each individual TC and unit leader must make that call based upon the situation presented to him.[5]

### M1A2 Training Observations

To fully dominate one's battlespace in the way described above, the M1A2 tank commander must first acquire the necessary technical skills to fight the tank; in essence, he must learn how to effectively acquire and engage targets.

I believe that the tank commander who cannot master the host of technical skills in Combat Table I of ST 17-12-1-A2, as basic and simple as that sounds, will fail miserably in his ability to fight the tank. In addition, without mastery of those skills as a foundation, the independent capability to use IVIS and digital technology is flawed at best.

Observations from the M1A2 UCOFT reveal rather quickly which tank commanders have mastered CT I skills and which ones have not. The first exercise of the UCOFT sustainment program is #932110, which in UCOFT language means: Target Acquisition (TA) Level 1, Reticle Aim (RA) Level 9, and System Management (SM) Level 3. In English, that means the following: day unlimited visibility; stationary own vehicle; short-range, multiple, stationary targets; and a fully operational system using the GPS. The multiple targets do not come in the standard five groups of two, like the M1A1 matrix (10 total per exercise), but come in five groups of two or three, at random, and with a minimum 13 targets per exercise.[6] The crew will not meet the standards of this basic exercise without the TC's mastery of the CITV in search mode and target designate function on the CCHA because the targets appear across a wide front. Trying to fight the tank and negotiate the matrix as he would with an M1A1 (i.e. TC staying on the GPS extension) is a recipe for failure. The tank commander must use the CITV, and he and the gunner must have the target hand-off procedures mastered in order to advance in the matrix. Successful execution of Combat Table I will give these two a solid foundation in which to excel, not only in the UCOFT, but also during progression through the gunnery tables.

What makes Combat Table I, a very basic and simple sounding exercise, so important to the tank commander and crew proficiency? The reason involves the very complex skills that a TC must master in order to successfully fight the M1A2 and the different nature of those skills in building and sustaining crew proficiency. CT I still has the basic tracking and manipulation exercises using a snake-board for the gunner and TC to negotiate, with the TC now having two sights — the GPSE and the CITV. Gun-laying is still a part of this table and the TC must master this skill as before, even with the addition of the target designate function on the M1A2. This separate gun-laying skill is still necessary and required because the TC will at times need to fight the tank in CITV/GPS Gun Line-of-Sight (LOS) mode, meaning the CITV does not operate independent of the main gun and the CCHA acts as a normal TC override. In addition to these tasks, the TC must sustain his normal range determination skills and then learn to use the stadia reticle capability of the CITV. Most importantly, CT I challenges the tank commander on a variety of target designate, target hand-off to the gunner, and switchology exercises designed to take full advantage of the M1A2's capabilities. These skills constitute the heart of the tank commander's technical skills in fighting the M1A2, and provide that solid crew foundation for success in the UCOFT and on CT VIII, as well as taking advantage of the digitization capabilities of the tank. Of course, the CT I tasks must also be performed under closed hatch and NBC conditions as well.

I have already described the importance of these skills to success in the UCOFT, but there exists a great benefit to qualification on CT VIII as well. Six of the ten engagements on CT VIII involve at least three targets, and one of these six actually has four targets.[7] Also, the total number of CT VIII targets increases from 18 to 25, progressing from the M1A1 to the M1A2. A tank commander who cannot effectively employ the CITV and target designate functions of the M1A2 will not qualify. In addition, because of the tank commander's need to search for other targets, he can no longer afford the time necessary to check the gunner's lay or sense target effect from the GPSE. These functions will rest squarely on the shoulders of the gunner, and increase the importance of both the target hand-off and engagement termination drills between the gunner and TC. Switchology remains a significant element of this mix also, because four of those latter six engagements on CT VIII involve both main gun and troop targets. Successful crew execution of the UCOFT and CT VIII must be grounded in the basics of CT I, which constitutes one of the least resource-intensive training events available to units. I want to also reemphasize my central premise here: tank commanders and unit leaders will not be able to optimize the advantages of

digitization if they do not possess the skills required to effectively fight the M1A2. Even though it is a simple concept, unit leaders avoid executing Combat Table I to standard at their own peril.

Before analyzing some larger issues of digitization as they concern the M1A2 and the U.S. Army, I want to relate one additional training observation drawn from the RSLF NET experience. This area concerns tank fighting positions and the ability to use the target designate function. Currently, RSLF units are using a temporary range for firing. It includes full, dug-in fighting positions and offers the tank the three standard modes of positioning: hide, turret-down, and hull-down. When the tank is in the turret-down position, the TC can only target designate to targets within the limits of the fighting position walls before moving to a hull-down to engage. If the target falls outside this sector, the TC cannot target designate for fear of putting the gun-tube into the wall of the battle position. In this situation, the tank must first come to a hull-down position before the TC can target designate for the gunner.

This sequencing is important because of the contrasting manner in which the crew would normally train and execute a target engagement drill. Both in the UCOFT and on standard main-gun ranges, the tank commander can target designate in the turret-down position without fear of gun-tube interference. This capability gives the crew an additional few seconds in which to acquire the target and start their engagement drill before exposing their tank to the enemy. Units should train accordingly in preparation for any training event where dug-in fighting positions will be the norm. If using the standard fighting position, the front should face as close as possible to the tank's primary sector of fire so the target designate function can be used in the turret-down position. Sounds simplistic, but experience here has shown that the crew must be prepared to handle this type of situation in order to minimize exposure to the enemy. The Armor Center should study whether an alternate fighting position design is warranted, given this stated limitation.

### Doctrinal Considerations

Having examined some of the complexities of the tank commander's job in actually fighting his tank, and by extension, a platoon or company if he is also a leader, I want to propose some ideas involving the overlap of digitization upon these fighting requirements. The tank commander is faced, undoubtedly, with an immense challenge to integrate the IVIS capability with the normal modes of fighting the tank. 1LT Robert S. Krenzel, Jr., offered some extremely valuable insights into this process in his *ARMOR* article entitled, "The Armor Lieutenant and the M1A2."[8] He also recognized the enormous workload placed upon the TC, and offered his credible solutions to these challenges. One solution 1LT Krenzel proposed in order to reduce the reporting load via IVIS for the company chain of command, especially in the offense, involved the company XO playing a much larger role in the company's use of digitization and reporting information to higher headquarters. Although a bold proposal, I feel this particular solution places too much burden on the XO, relying on him to have an almost picture-perfect view of the battlefield, and also takes a gun tube out of the fight. This solution also leans toward a best-case scenario, one which a unit SOP should generally avoid. Although the XO possesses the increased capabilities of the M1A2 as an individual TC, there exists another answer.

I would offer an alternative solution, and one that maintains the XO's important role as battle captain, as well as offering the promise of increased influence in assisting the commander to fight the battle. I propose that the company XO be placed in an improved command and control vehicle (C2V), modeled after the role played by the ground cavalry troop XO, who currently rides in an M577. Placing the XO in this improved C2 vehicle offers several distinct advantages over him continuing to ride in a tank, both from the perspective of current digital reporting requirements and for an expansion of the company/team's mission profile on the future battlefield. I make a basic assumption in offering this alternative: a C2 vehicle is a better platform than the tank for the XO to optimize the advantages of current and future digital technology.

From the perspective of digital reporting, an XO operating from a C2 vehicle can efficiently send unit digital reports higher, while also possessing the capability to rapidly convert voice information from company traffic into a digital format. Use of digital reporting could therefore be enhanced in this manner, both horizontally and vertically across the battalion/task force, regardless of how the individual platoons were reporting the information.[9] Improvements to the digital protocols could enhance the unit XO's ability to share digital information with battalion and sister units (through their C2V-equipped XO), giving those units timely access to vital information while allowing the individual commanders to fight the battle as required. The same advantages apply to reports flowing to the company, where the XO can quickly disseminate this information. Current cavalry troop XOs function in this manner, reporting information and the situation both vertically and horizontally to keep other units informed, as well as receiving reports, freeing the commander to focus on the battle.

By using this approach, we allow the XO to better relieve that burden from his unit's leaders and permit them to focus on the battle. The XO can do this best from an improved C2 vehicle. Some will say this capability is unnecessary in tank companies or across the battalion because improvements in the digitization area will overshadow this solution. I am not positive this is entirely the case. In addition, the C2V-equipped XO can function as a force-multiplier for the company/team of the future, as the unit's mission-profile and battlespace expand. Recently, MG Maggart, the Chief of Armor, suggested that the Force XXI brigade would have to dominate the same battlespace as a Cold War division.[10] It is then fairly logical to deduce that future battalions and companies would have to dominate the same battlespace as current brigades and battalions, respectively. If our companies operate over increased areas, the expansion of their command and control capabilities will be a must. The improved C2 vehicle at the company-level, with the XO on board, meets that need.

Colonel Christopher V. Cardine, the current Project Manager-Abrams, wrote a report entitled, "Digitization of the Battlefield," in which he foretold an expansion of the battlefield capabilities of a company-sized element due to digitization.[11] In Colonel Cardine's scenario, a small company/team is given the mission of destroying a company-sized defensive position 50 kms away in order to establish a brigade passage point and pass the brigade through.

This company/team is reinforced with the following assets: a scout section; mortar, engineer, and air defense squads; and a logistics package. In addition, an M109A6 Paladin platoon, a scout-weapons team with RAH-66 Comanche and AH-64D Apache helicopters, and two F-15E Strike Eagles are in direct support of the operation. All these elements are digitally linked, giving the commander at this level unprecedented access to combined arms capabilities in order to accomplish his mission. At the center of the team, capable of assisting the commander in integrating these various assets, stands an improved C2 vehicle.[12]

In Colonel Cardine's scenario, the company/team successfully accomplished its mission by integrating these various resources and utilizing the advantages of digitization. As he concludes, "...mass was accomplished by the synchronization and concentration of fires on the enemy. Decisive victory was achieved by both individual crews and commanders employing digitized systems to outpace the decision cycles of their respective opponents."[13] The use of a C2 vehicle at the company-level was crucial to mission accomplishment, and seems a wise command and control investment if companies of the future are to operate successfully over greater distances and with expanded mission profiles.

As another example, digitization and remote sensors will give future commanders a much clearer picture of the enemy situation and their own battlespace, allowing them to effectively use the company/team in ways only now being realized. In similar fashion to the Cardine scenario, a company/team could be sent on a deep mission, not to engage enemy combat forces, but to bypass them in order to defeat the enemy through disruption of his command and control, artillery, and logistics elements.

The company raid could become an extremely viable mission in which to utilize the advantages of a digitized force and the company's ability to integrate various combined arms assets into the operation. Major O. T. Edwards spoke of new and different ways in which to utilize the digitized force.[14] I believe the company raid and deep attack could become significant missions in the future mission profile of the company/team.

## Conclusion

Digitization offers the Army the potential to integrate various combined arms capabilities at unit levels never before seriously considered. The M1A2 tank stands at the center of this capability. In designing upgrades to our digital forces and equipment, we must never forget the effects these improvements have on the individual soldier and his capacity for fighting on the battlefield. The M1A2 tank commander's job is certainly an example of the complexity faced by soldiers in integrating digitial technology with the basics of fighting in his particular position. Observations from RSLF NET conclusively show that, in order for the tank commander to optimize the digital capability of his equipment, he must first master the fighting complexities of the tank. I believe this example serves as a model for other battlefield positions as we overlay the demands of digitization upon the already complex nature of warfighting. We should not forget this important concept as we train and equip our future army.

## Notes

[1]Instruction is currently performed by a combination of RSLF cadre and U.S. instructors from Mansour General Dynamics, Ltd. (MGDL). Future plans have the RSLF assuming primary instruction for both Phases I and II, with MGDL providing technical assistance.

[2]The RSLF is changing from the three-tank platoon, ten-tank company to the four-tank platoon, fourteen-tank company in its M1A2 battalions. Each battalion has three line companies and two HQ's tanks.

[3]BG Robert H. Scales, Jr., USA, *Certain Victory — The U.S. Army in the Gulf War,* (Washington, DC: Brassey's, Inc., 1994), p. 294.

[4]For an analysis of this teaching methodology, see Michael Duncan Wyly's article entitled, "Teaching Maneuver Warfare," *Maneuver Warfare — An Anthology,* Richard D. Hooker, Jr., Editor, (Novato, Calif; Presidio Press, 1993), pp. 248-269.

[5]ST 71-2-2 (Revised Draft), *Tactics and Techniques for the Digitized Task Force,* (Fort Knox, Ky.: U.S. Army Armor School, January 1995). See pp. 1-6 and 4-16 for digital limitations in the offense.

[6]Exercise #942210, which is fired at long-range targets and at night (TA-2, RA-10, SM-4), actually presents *EIGHTEEN* targets to the crew. They are broken down into two groups of three, and three groups of four, for eighteen total targets for this exercise.

[7]ST 17-12-1-A2 w/change 1, M1A2 Tank Gunnery, (Fort Knox, Ky.: U.S. Army Armor School, June 1995). See Chapter Two for a complete description of the combat tables. CT I starts on p. 2-5.

[8]1LT Robert S. Krenzel, Jr., "The Armor Lieutenant and the M1A2," *ARMOR,* July-August 1995, pp. 15-22.

[9]Tank commanders and platoon leaders must still decide when to use digital or voice reporting, based upon the situation. No matter what vehicle the XO rides in, the M1A2 company still must execute a solid and disciplined reporting SOP to facilitate internal command and control.

[10]Sean D. Naylor, "Three Options for Four Starts — Army Weighs Choices to Decide Direction of the Future Division," *Army Times,* October 16, 1995 (56th Year, No. 12), p. 12.

[11]Colonel Chrisopher V. Cardine, "Digitization of the Battlefield," USAWC Strategic Research Report, (U.S. Army War College, Carlisle Barracks, Pa.: May 1994).

[12]*Ibid.,* p. 27.

[13]*Ibid.,* p. 35.

[14]Major O.T. Edwards III, "Digital Battlefield Training and Tactical Insights of a User," *ARMOR,* May-June 1995, p. 13.

Major Kevin D. Poling is a 1984 Distinguished Military Graduate of the University of Notre Dame, where he earned a BA in International Relations. As a lieutenant, he served as tank platoon leader, tank company XO, battalion adjutant, and battalion S3 Air in 1-35 Armor, 2d Bde/1st AD, in Erlangen, Germany. Assigned to the 3d ACR, he served as asst. regimental S3, 2d Sqdn S4, and commanded H Company, 2/3 ACR during Desert Shield and Desert Storm. He was most recently the Armor Team Chief at Readiness Group Dix (AC/RC), Fort Dix, N.J. He is a graduate of AOBC, AOAC, Scout Commander's Certification Course, Cavalry Leader's Course, and CAS$^3$, and holds an MA in American History from Rutgers University. He is currently Chief, M1A2 Fielding Division, Abrams Management Team, Tabuk, Kingdom of Saudi Arabia.

# Training Ammunition for Force XXI

**by Major Steve Thorson and Major Bruce Held**

Tank gunnery training in M1A1 and M1A2 units is currently accomplished with only two kinds of main gun training ammunition; M865 Target Practice, Cone Stabilized, Discarding Sabot-Tracer (TPCSDS-T) and M831 High Explosive, Antitank-Target Practice-Tracer (HEAT-TP-T).[1] Until recently, this has been adequate, only because Sabot and HEAT were the only service rounds available. This situation has already changed and will continue to change for the foreseeable future. Changes in the threats faced by the Armor Force, the development of new doctrine, and the introduction of new 120mm round types means that tank gunnery tables that include only M865 training sabot rounds and M831 training HEAT rounds should not be considered adequate.

While enemy tanks have never been the only threat that U.S. tanks have faced, our doctrine has emphasized them as the predominant one. This emphasis resulted from our preoccupation with a Soviet tank threat in Europe and our historical perspective, stretching back to the Second World War, of how to fight battles in a European Theater of Operations. However, the collapse of the Soviet Union has nearly eliminated any threat of a large-scale, tank-led invasion of Western Europe. While the number of tanks in the world has not really diminished, the *raison d'être* for the U.S. Army to maintain a large force of main battle tanks armed with *only* armor defeating main gun rounds has evaporated. Technological changes are also causing readjustments in assessments of threats to U.S. tanks. The introduction, some years back, of the long-range antitank missile and the antitank helicopter have placed new threats on the battlefield that a tank unit must be prepared to meet and defend against. Neither sabot nor traditional HEAT ammunition is particularly effective against these threats. Newer, more sophisticated smart tank munitions will also change the way our tanks are organized and equipped to fight. Enemy smart munitions — whether fired from a stealthy, high mobility platform, a mortar 5 kilometers away, or by a guerrilla from a second story window — will demand an agility of response that a tank equipped with only HEAT and sabot cannot provide.

In addition to the changes in the threat we face, and partially as a result of those changes, the Armor Force is reassessing its doctrine to take advantage of new technological capabilities. Desert Storm showed us the enticing possibilities available when you can outsee and outshoot your opponent. This capability is the direct result of the range advantage provided by our tanks, ammunition, and training. In addition, information technologies are driving the change towards a Force XXI doctrine. For the Armor Force, this new doctrine will extend battlespace in range and dimension. In other words, the tank of Force XXI must be able to see and shoot at extended range, to shoot at targets in the air, and to shoot at dug-in targets and those behind shelter in protected positions. The Force XXI tanker must also do this at a greatly elevated operational tempo. Target engagement decisions must be made instantaneously, and first shots must count. Anything less will bring defeat in the coming age of electronic decision-making and autonomous, guided munitions.

Finally, the basic load of tomorrow's tank will be very different than that carried today. In fact, the first round of ammunition for the Force XXI Armored Fleet, the M830A1 (MPAT) High Explosive Antitank-Multi-Purpose-Tracer (HEAT-MP-T), has already been fielded. The M830A1 is highly effective against armored vehicles, bunkers, and other ground targets. Importantly, it also provides American tankers with the world's first tank round with an effective antihelicopter capability, allowing American tankers to extend their battlespace into the third dimension. Other advanced tank rounds are currently being developed. The Smart, Target Activated, Fire and Forget (STAFF) round, currently in development, will provide us with an autonomously guided main gun round that flies over its target and fires down, denying our foes, for the first time, the protection afforded by digging in. Finally, the M829A3 Armor Piercing, Fin Stabilized, Discarding Sabot (APFSDS) kinetic energy round will provide unprecedented penetration capability at extended ranges.

New doctrine, new capabilities of the tank, and new ammunition will only go so far. To make the Armor Force as effective as possible, the quality of the tanker must remain high. The key that produces high quality tankers is, of course, high quality training. For the individual tank crew, the epitome of high quality training is realistic gunnery that stresses and improves the men and machines that make the Armor Force. For gunnery to be realistic, scenarios must replicate, to the extent safely possible, scenarios dictated by our doctrine and the threat. One of the issues that must be addressed for realistic training in the future is training ammunition. For the M1A1 and M1A2, our current inventory of training ammunition is ill equipped to address the training needs of the Force XXI tanker. There is currently no training round for the fielded M830A1. No training round is planned for STAFF, so gunnery tables will not include some of the unique features that will distinguish STAFF engagements. Finally, while we have a good KE training round in the M865, long-range engagements are just not in its repertoire. This deficiency in

realistic training ammunition for tomorrow's tankers must be addressed soon with the development of a new generation of training ammunition and the ranges to support it.

### Training Round Limitations

Training ammunition has unique limiting requirements. These limitations are driven by three competing factors. First, the ammunition must have a short maximum range. Second, within the limits of the maximum range, it must be as realistic as possible. Finally, and the 'Catch 22' in designing training ammunition, is that it must be relatively inexpensive so that enough may be procured to train the force.

A modern KE round will fly over 40 kilometers if fired at maximum elevation from level ground. The long range results from the desire to maximize muzzle velocity and minimize the aerodynamic drag on the round so that its striking velocity maximizes target penetration. At most, if not all, training areas, a 40 kilometer range will cause a round to overfly the impact area. Therefore, the range of training ammunition must be limited. In most cases, a range limitation of 8 kilometers is imposed on training ammunition. In other words, a round of training ammunition must hit the ground within 8 kilometers, 100 percent of the time, even if fired at maximum elevation. With current training ammunition, this range constraint is achieved by making projectiles with high-drag shapes. The M865, for example, uses a high-drag cone for stabilization, instead of the low-drag fins that are used on service KE. This allows the M865 to be launched with a high muzzle velocity. Its high drag slows it down rapidly; it loses more than 30 meters/second of velocity for every 100 meters traveled. Unfortunately, high-drag projectiles tend to lose accuracy as they lose velocity. Thus, it is difficult to turn high-drag projectiles into long range training rounds.

While range limitation is a primary requirement, there are other safety-related constraints on training ammunition design. Combined Arms, Live Fire Exercises (CALFEX) and platoon-level tank tables place several firing platforms on the training range at the same time. This creates obvious opportunities for fratricide. The M865, even with only a steel core, can damage an Abrams, and possibly hurt the crew, if the round strikes the tank's most likely impact point, the sides or rear, at close range. It will penetrate almost every point on a Bradley, likely resulting in the destruction of the vehicle and death or serious injury to the crew. Ideal training ammunition would, therefore, be nonpenetrating to prevent such tragedies. Also, most training ranges are not equipped to handle explosive rounds. Their destructiveness would destroy targets and target devices. The inevitable duds would leave explosives lying around in areas that must remain accessible. This makes development of training ammunition difficult for rounds that use explosive effects or do not have to strike their targets (STAFF and M830A1) to be effective. Finally, ricochets of the round or its fragments create a safety hazard that the ammunition developer must keep in mind.

For maximum training value, training ammunition must appear to replicate the performance of service ammunition. This requirement often competes with the safety requirements discussed above. For example, development of a training round for the M830A1 that could be fired in a ground-to-air training scenario will be difficult. Even assuming that a 'hovering helicopter' target could be effectively placed on a training range, simulating the proximity engagement of the M830A1 against this target would be difficult without some sort of explosive round.

In addition to simulating the target effects of the service ammunition, training ammunition should have the look, feel, and handling of the corresponding service ammunition, so that the loader gets the most realistic training experience. If a round of service ammunition weighs almost 50 pounds and is over 40 inches long, the loader will get a false sense of handling ease if the training round only weighs 40 pounds and is less than 35 inches long.

Ideally, the ballistics of the training ammunition will also be the same as the service ammunition. This allows the same ammunition subdesignation (AMMO SUBDES) to be used. Again though, safety constraints, primarily the range restriction, make this difficult to achieve. As a case in point, the M865's ballistics are radically different than those of any of the M829 family of service KE.

As a final requirement, training ammunition must be inexpensive. A tank is allocated 78 M865s and 22 M831s for annual gunnery training. At approximately $646 for M865 and $697 for M831, the annual main gun ammunition costs for a battalion are already nearly $4,000,000. In these times of tight budgets, expensive training ammunition could cause a reduction in the number of rounds that each tank crew gets to fire. That could be a worse detriment to training than having training ammunition ill-suited to current service ammunition and doctrine.

### Training Round Concepts

MPAT Trainer. The MPAT trainer round is the next logical step in a continuous effort to provide soldiers with the best possible gunnery training experience. The current M831 performs well as a training round for the M830, but it just won't provide an accurate training experience for the M830's replacement, the M830A1 MPAT. The M831 and M830A1 just look, feel, and fly too differently. The M865 cannot be used realistically as a training round for MPAT either, since neither the gunner nor loader would change anything between SABOT and MPAT engagements. M865 would remain indexed and the loader could pull any round he wanted, since they would all be the same. Because the need for an MPAT training round is so clear, the process of getting it to the field was initiated some time ago. The Operational Requirements Document (ORD) for this round is now being staffed and five concepts have been examined as potential candidates. Three were eliminated because they could not meet minimal operational, safety, or reliability requirements. The remaining two concepts were promising enough to pursue. Unfortunately, neither concept will be capable of ground-to-air engagements, and this means that the Unit Conduct of Fire Trainer (UCOFT) is likely to remain the primary training tool for these engagement types.

The first MPAT training round concept attempts to simulate an M830A1, in appearance only, by the application of a visual modification (VISMOD) to the existing M865 KE training cartridge. This is accomplished by using the entire M865 and attaching one of two plastic nose cap designs. Option 1

is a simple nose cap design that attaches to, and covers only the spike of the M865. Option 2 is a larger design that, like the first option, attaches to the spike of the M865, but extends to the sabot, making the cartridge a more realistic portrayal of an M830A1. Both design configurations retain the M865's trajectory since the nose cap adapter separates from the projectile when fired.

The VISMOD concept was ultimately rejected for a variety of reasons. Most importantly, it did not meet the look, touch, and feel operational requirements. The overall appearance with either nose cap is marginal at best. The VISMOD concept also failed the operational requirement that the MPAT trainer cartridge weight be within 4 lbs. of the M830A1. In fact, the VISMOD trainer is 12 lbs. lighter than the service MPAT round, and the weight distribution is significantly different than the M830A1. With VISMOD attached, the cartridge is also 3 inches shorter than the M830A1. All the physical differences between the M830A1 and the VISMOD cartridge mean that the loader cannot achieve an accurate training experience with this concept.

The second concept, a full developmental MPAT Trainer program (dubbed the XM1002 MPAT Trainer), meets the operational requirements and was selected to become the future replacement to the M831 HEAT training round. Unlike the VISMOD proposal, the XM1002 will pass the 'look, touch and feel' test. Its exterior configuration and dimensions replicate the M830A1 exactly, to include a movable Air/Ground fuse cap. The cartridge weight is just 2 lbs. lighter than the service round, and importantly, the weight distribution of the training cartridge is right on the mark. In an effort to reduce the expense and lead time associated with new developmental programs, the XM1002 will use common M830A1 components, specifically, the propulsion system and the sabot. A significant reduction in system cost is also expected by reutilizing propellant from demilitarized M829s.

Planning for future performance improvements to the MPAT Trainer should also begin now. As mentioned above, the current MPAT Trainer concept still does not include a ground-air mode. Future improvements to the round and training ranges must enable tankers to engage air targets. Current and emerging technology should enable ammunition developers to achieve this significant performance improvement cheaply and in the near term. Most importantly, this added capability would provide tank crews a more accurate training experience.

Long Range KE Trainer. See, Hit, Kill. In Desert Storm, U.S. tankers were engaging targets at the limits of the ability of the tank's sights and well beyond what they were used to firing in training. Long range gunnery will continue to be the norm in combat. Force XXI doctrine stresses the extension of battlespace. Newer, higher fidelity target acquisition technologies are being fielded with the M1A2 and improvements in gun, ammunition, and fire control are making even longer range engagements possible. This means that there is a growing need to pursue a tank training ammunition development program that will allow soldiers to "train the way they are expected to fight" in the future. Unfortunately, the current M865 KE Trainer will not accommodate long range gunnery requirements. Its probability of hit (Ph) at ranges beyond 2 kilometers is just not acceptable.

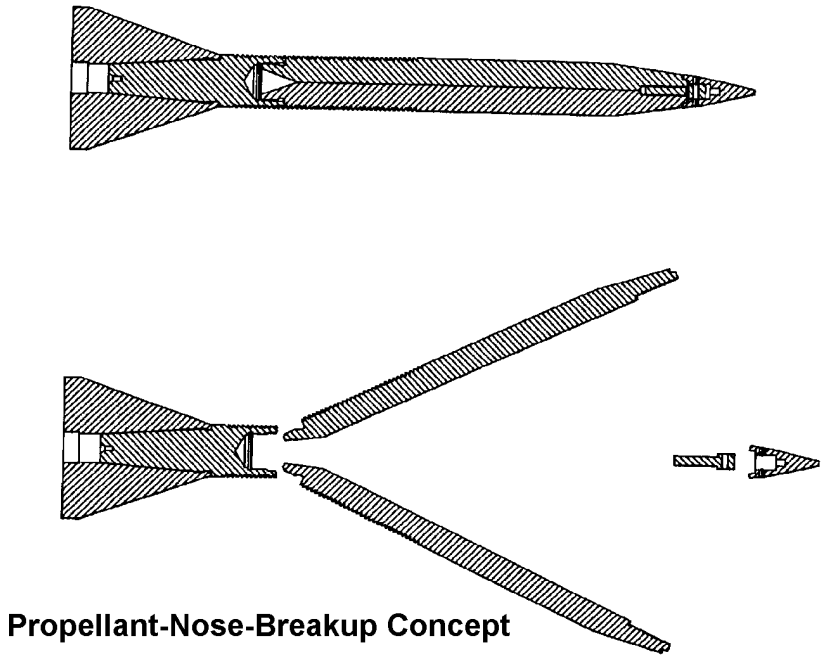
Developing a long range gunnery training capability is not a simple matter. Nearly all multi-purpose range complexes (MPRC) are limited by an 8 kilometer range fan. Although some can extend another 2-4 kilometers, only the National Training Center (NTC) can currently accommodate the needs of long range gunnery training. A major MPRC upgrade directed at expanding the range limits of MPRCs throughout the U.S. Army would be prohibitively expensive, even if possible. However, there are MPRCs that cannot be expanded beyond their current range limitations, so they would be left out of the upgrade. Another option would limit long range tank gunnery training to a unit's annual NTC rotation. Although possible, it would probably provide only familiarization, rather than adequate long-range gunnery training, plus, it would leave the OCONUS units unable to even familiarize at the longer ranges. The UCOFT can fill some of the void, but can never fully satisfy the requirement. The best way to fulfill a long range gunnery training requirement is to develop a long range KE trainer that will perform to specified requirements, yet be safe to fire at all MPRCs as they currently exist.

Anticipating the need for extended range training ammunition, tank ammunition developers are currently examining the possibilities for future long range training round candidates. A simple improvement to the current M865 KE trainer may seem to be the obvious solution. In fact, the M866 Long Range KE Trainer was produced several years ago and is an extremely accurate round. It combines the penetrator of an M865 with fins replacing the M865's tail cone. The max range of the M866 is typical of finned KE rounds, however, and its use would be restricted to the tank gunnery range at the NTC.

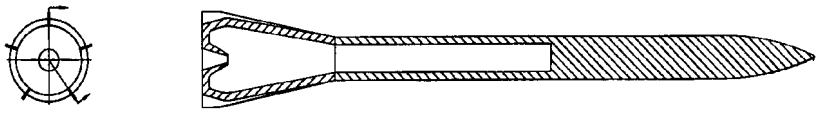
Another concept is known as the M865E2. The M865E2 was born through the M829 reclamation program, the goal of which was to convert M829 APFSDS-T cartridges (Tactical) to new TPFSDS-T cartridges (Training). The M829's depleted uranium (DU) core was replaced, but most other M829 components are reused. As an added benefit, the M865E2 is much closer to the look, touch, and feel of service KE than is standard M865. A version of the M865E2 has been designed for long range firing and is still in development. Like the M866 however, the M865E2 (Interim Long Range Training Cartridge Version) will probably not be range-limited to 8 kilometers.

This brings us back to the basic question: How can we design a 120mm KE trainer cartridge that performs at extended range, but falls to earth within 8 kilometers? Currently, the only choice seems to be to design-in a 'braking' system. A number of concepts with this feature have been suggested and examined. The most promising of these are being considered as possible alternatives to the M865E2 and are described below. As always, safety remains the number one design constraint, and the reliability of the 'braking' system is the key safety factor for all the concepts.

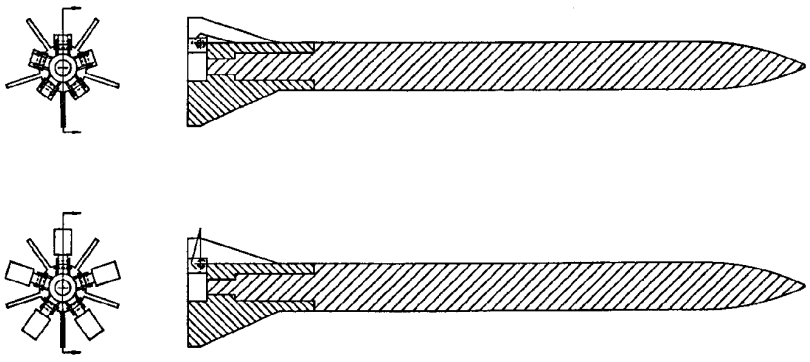
In the Propellant-Nose-Breakup[2] concept, the body segment of the projectile rod is split down the center. The bottom of the split rod penetrator is held together by a solid metal base and fin. The tip of the penetrator is held together by a heat sensitive nose cap. The idea takes advantage of aerodynamic heating of the nose cone during the projectile flight. At a specific range,



Propellant-Nose-Breakup Concept



Boosted-High-Drag-Projectile Concept

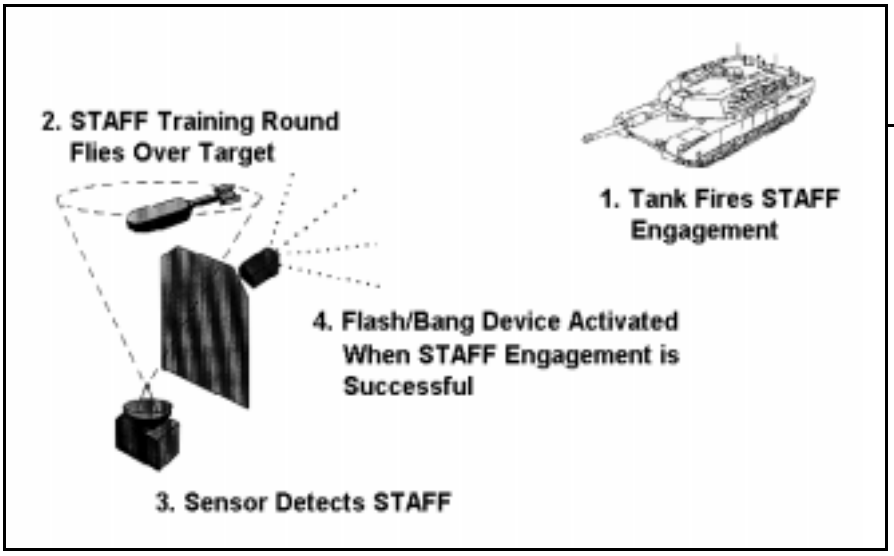


Low Drag/High Drag Fin Concept (Drogue Flap)

the nose cone gets hot enough to cause propellant imbedded in the nose cap to ignite. Once ignited, the shear pins that hold the nose cap together fail; the projectile breaks up; and the pieces tumble quickly to the earth. Currently, this concept is the most mature of the range-limited, long-range training round concepts and was demonstrated some years ago. Reliability remains a concern, however. Two problems occur if the nose propellant fails to ignite. First, the penetrator will not break up and the round could overfly the impact area. Second, the nose cap will contain an unburned propellant and would probably require handling by EOD personnel.

The Boosted-High-Drag-Projectile[3] concept is a projectile with an aluminum body and a steel nose. Aerodynamic stability and high drag is achieved with a straked cone,[4] rather than fins. Extended range is achieved by the using a small, solid propellant rocket engine to offset the high drag during the first few kilometers of flight. This feature is invisible to the tank crew, and the round is launched normally. Following the launch, the rocket engine ignites for approximately 2.1 seconds and burns to 3 kilometers. At 3 kilometers range, the rocket engine burns out and the high drag cone slows down the projectile enough to cause it to hit the ground within 8 kilometers. Essentially, this is a fail-safe cartridge. If the rocket engine fails, the round's range is limited by the tail cone in the same way as an M865. Unfortunately, this training round could also contain unburned propellant material (the rocket motor). A round whose motor failed would have to be handled by EOD personnel.

The Ablative-Nose-Projectile[5] concept was validated at the same time as the Propellant-Nose-Breakup concept. This concept integrates a standard training projectile body, a 5- or 6-bladed fin and a nose cone of ablative material.[6] Aerodynamic heating generated during the flight of the round causes the nose cone to ablate away during flight, thus changing its shape and aerodynamic characteristics. At some design range, the nose cone is ablated to a level that its changed aerodynamics destabilize the projectile. As stability is lost and




drag increases, the round starts tumbling and falls to earth. Performance reliability is less of a concern, but is still a consideration. The round must function properly. If not, the projectile will travel well beyond the 8 kilometer range limitation.

The Ablative-Fin-Projectile concept[7] is similar to the Ablative-Nose-Projectile concept. It also integrates a standard training projectile body, spike nose, and a 5- or 6-bladed fin. Instead of the nose being made of ablative material, one or more of the fin blades is made of this material. Again, the aerodynamic heating generated during flight causes ablation of material, but this time at the fin. The fins retain their stabilizing capability to the maximum desired engagement range. Beyond this range though, one or more fin blades is ablated enough to cause the projectile to lose stability and tumble to the earth within the 8 kilometer range limitation.

The Low Drag/High Drag Fin Concept (Drogue Flap)[8] integrates a standard training projectile body, spike nose, 5-bladed fin, and a 'braking' system. The braking system is made up of five sets of pin holders, pins, and drag flaps. They are attached to and hidden at the base of the projectile, but forward of the fin. When the drag flaps deploy, they provide a high level of aerodynamic drag in a manner similar to the air brakes on aircraft. With the flaps folded, the round is nearly as aerodynamic as service sabot, so it can have the same level of accuracy. The drag flaps are designed to deploy at a specified range. This range is set so that it is beyond the maximum engagement range of the training exercise, but short enough to give the flaps time to drag the projectile down inside the 8 kilometer range limitation. Performance reliability is a concern in any concept that requires the round to actively do something, and the Drogue Flap concept is no exception. If the 'brakes' do not function properly, the round will travel beyond the 8 kilometer range limitation.

STAFF Trainer. Development of a STAFF training round is not being considered at this point. Instead, the plan is to train STAFF engagements only in a simulation environment. This decision is based primarily on the perceived cost of a STAFF training round, but it could have an adverse impact on the training of tank crews. The STAFF is easily the most radical of the new rounds being fully developed for the Force XXI tank fleet. It can be used to engage very long range targets, targets in defilade, maneuvering targets, and flying targets. Since there will probably only be a few STAFFs in the basic load, deciding which round to use becomes a critical skill for the tank commander. The gunner and loader must also be well trained in its use. With only a few of these high cost, high payoff rounds, the tank crew must insure that they are not wasted because of inadequate training. The best and most realistic training for STAFF can only occur on a gunnery range.

There are ways to get around the potentially high cost of a STAFF training round. One method is to avoid making the training round a non-explosive copy of a real STAFF. Instead, by tying the training range and the round together, the overall cost of the round can be greatly reduced. To minimize the cost of the training round itself, the flight body of the round could be reduced to an inert slug. Folding fins are required on the actual STAFF in order to rotate the explosively formed penetrator (EFP) to its correct orientation in relation to the target. A slug round does not have an EFP, hence does not need the complex and costly control mechanisms and folding fins of the real STAFF. Inexpensive, static fins, similar to those on the M831, would probably suffice for flight stability of the slug. In terms of training, this is okay since the tank crew only sees the actual STAFF from the adapter forward and the tail and fins of a real STAFF are hidden from the crew in the cartridge case. The training STAFF would not need to carry the expensive electronics of the real round either. On a gunnery range roles can be reversed and the target can sense the STAFF, instead of vice versa. A directional sensing device, such as a radar or sky screen, could be placed in a protected position just behind the target. It is possible to make such a device 'look' into the space above the target and sense if a STAFF training round flies over the target and through the basket from which an EFP could be successfully launched. When a successful engagement is sensed at the target, a flash/bang device (such as a Hoffman device) would be activated at the target.[9] This would simulate the launching of an EFP so the tank crew could sense the engagement and be scored accordingly.

This training round concept has a number of advantages. First is cost. A slug round, as described above, should cost approximately the same as current training rounds. Some additional cost for the sensing and flash/bang devices will be incurred, but this should be small over the life of the device. This kind of training round and its associated target equipment could also be used on all current tank ranges that allow main gun firing. Finally, and most importantly, use of this training scheme would simulate a STAFF engagement to the tank crew. The tank commander would issue a fire command and call for STAFF. The gunner would index STAFF, identify the target, and announce the range. The loader would set the range switch (could be a dummy) and load the round. The gunner would fire the round. The round now only has to fly over the target. The round is sensed as it overflies the target, and if

*Continued on Page 36*

# A Study In Armored Exploitation

## *The Battle of the Slim River: Malaya, 7 January 1942*

**by Lieutenant Colonel Martin N. Stanton**


For the most part, the story of Japanese armored employment in the Pacific war was a dismal tale of small units employed in static or infantry support roles. The Malayan campaign is the one instance in WWII where the Japanese used armor effectively in an exploitation role. The best example from this campaign occurred in the battle of the Slim River on January 7th, 1942. Although overlooked by most U.S. Army students of armored warfare, it holds some important lessons in exploitation, improvisation, and junior leader initiative.

The British defeat in Malaya has been the subject of much misconception, the greatest being that it came about due to the superior jungle fighting ability of the Japanese. In fact, little fighting was done more than a few kilometers from trafficable roads. The battle for Malaya was a battle for the maneuver corridors through the Malayan mountains and jungle. These corridors were from 50 meters to several kilometers wide, and were cultivated with rubber tree plantations as well as other agriculture. Towns dotted the main roads and railroads that ran down the length of the corridors. Although certainly lush with vegetation, the corridors could not truly be classified as jungle. Significantly, the rubber plantations had numerous side roads that connected with the main road and allowed parallel trafficability.

By January 5th, 1942, the British were in full retreat from northern Malaya. They had suffered through a month of disastrous engagements, forced out of position after position by Japanese envelopments. On more than one occasion, the roadbound British units had to attack through Japanese roadblocks to be able to retreat. This unbroken string of disasters had left its mark on all the British units engaged, particularly the 11th Indian Division, which had done much of the fighting. The men who were to occupy the defenses at Slim River were punchdrunk with fatigue and suffering the low morale of constant defeat.

The Japanese, on the other hand, were on a roll. Although fewer in aggregate numbers, they were able to more effectively mass their combat power along the maneuver corridors. Their tactics were simple but effective. Their advance guard, a reinforced battalion of combined arms elements, including infantry (often mounted on bicycles), armor, and engineers would advance down the maneuver corridor until they made contact. If not able to immediately fight through, the Japanese would launch battalion- or regimental-sized infantry envelopments to get behind the British positions, cut their lines of communications, and attack them on their unprotected flanks. The key to the Japanese success was their ability to sustain momentum and keep the pressure on the British.

By January 4th, the 12th and 28th Brigades of the 11th Indian Division moved into positions forward of Trolak and extending in depth back to the vicinity of the Slim River bridge. The division commander, General Paris, hoped to forestall the previous effects of shallow Japanese envelopments by placing his troops in depth. To quote him:

"In this country, there is one and only one tactical feature that matters — the roads. I am sure the answer is to hold the roads in real depth."[1]

This statement is not as unreasonable as it may first appear.

Although the Japanese logistical tail was considerably shorter than that of the British, it still had to use the road system to sustain its force. General Paris reasoned that any Japanese attempt to conduct a short envelopment through the jungle, as previously experienced, could be counterattacked by the brigade in depth. The maneuver corridor did not present much more than a single battalion's frontage, even considering outposts and security elements placed up to a kilometer into the jungle on either side. Instead of trying to extend their forces into the bush to confront the Japanese while they were infiltrating, the British would commit

reserves to counterattack them when they appeared. This would keep their forces mobile along the road system.

The 12th Brigade took up forward positions with its battalions arrayed in depth, beginning in the vicinity of mile post 60 and extending back to mile post 64 (see map, following page). Two battalions of the Indian Army occupied the forward positions; the 4/19th Hyderabad occupied the initial outpost position and the 5/2nd Punjabi occupied the main defense about a mile back.

A third British battalion, the Argyl and Sutherland Highlanders, was positioned in the vicinity of Trolak village, where the jungle began to open out onto an estate road. The brigade reserve, the 5/14th Punjabis, was positioned at Kampong Slim with the mission of being prepared to move to a blocking position one mile south of Trolak near mile post 65. The 28th Brigade's positions were south of the 12th along the maneuver corridor, and were arrayed as single battalions in depth, much like the 12th Brigade. However, on the early morning of January 7th, the brigade had still not occupied the positions, having been instructed by General Paris to rest and reorganize.[2] The British infantry units had 12.7-mm antitank rifles and 40-mm antitank guns. The AT rifles were only marginally effective. The AT guns would penetrate any Japanese tank with ease.

A key to the defensive scheme would be the defenses and obstacles along the main road. The British should have had enough time to construct defenses that would have precluded a quick Japanese breakthrough. The British were also in the process of preparing to demolish numerous bridges along the main road. However, several factors were to conspire against them.

The first factor was fatigue. Their forces were tired, to the point where they didn't do a good terrain analysis when setting in their defense. There were many sections of the old highway running parallel to the newer sections that had been straightened. These old sections ran beside the main road through the jungle and were excellent avenues of approach. There were also numerous side roads through the rubber plantations, and many of these roads were overlooked. Others were noted, but did not have sufficient forces allocated to them.

Secondly, the British units had all suffered numerous casualties. Many of their formations were under new and more junior leadership. These leaders were trying to cope with the monumental task of reorganizing their stricken units while conducting defensive preparations, and they were suffering from fatigue as much as (if not more so) than their troops.

Another critical British deficiency was communications equipment. The 11th Indian Division had lost a great deal of its signal equipment in the month-long retreat prior to the Slim River battle. As a result, there was not sufficient communications equipment

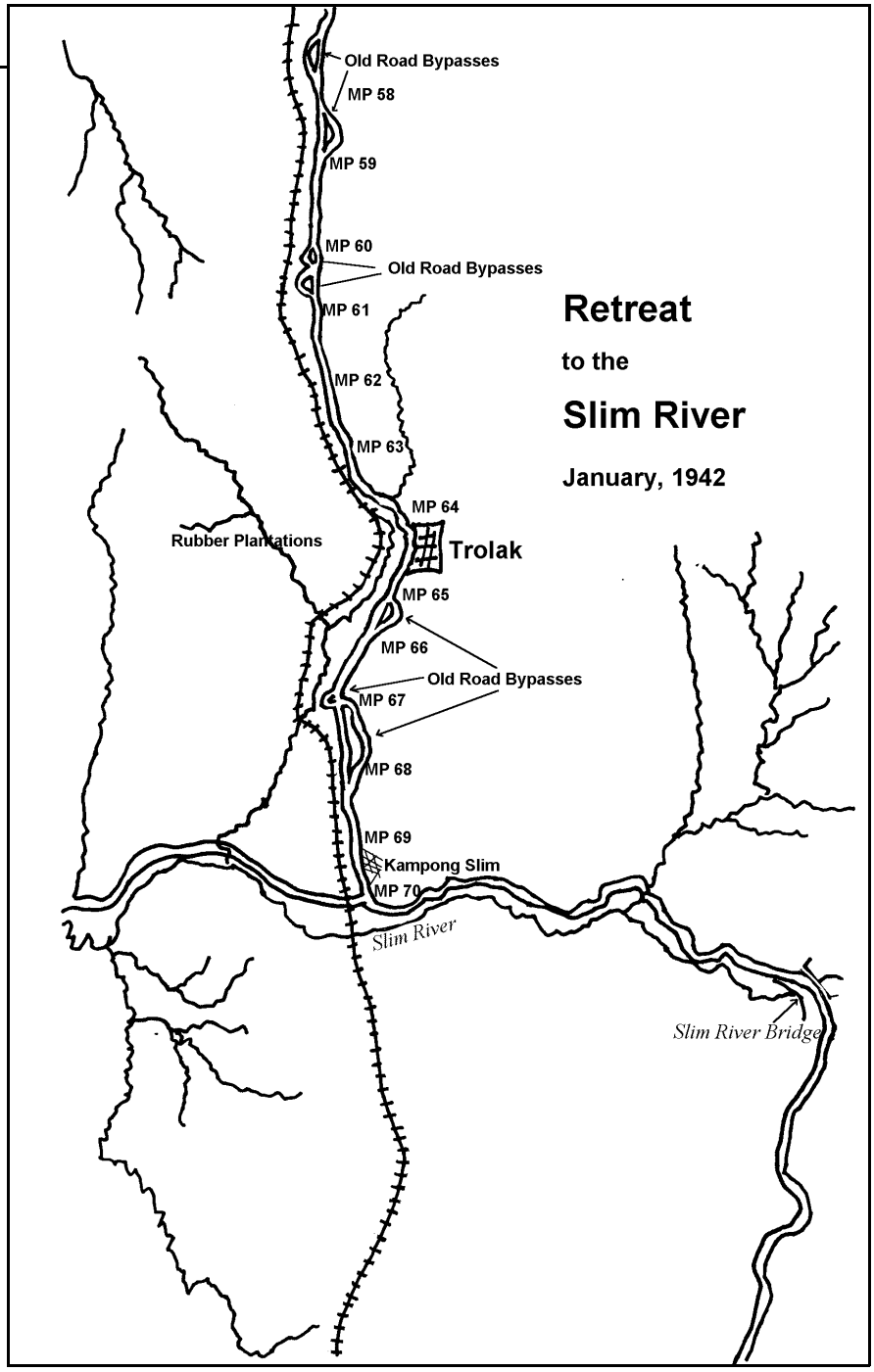
to lay commo wire between the brigades. This lack of communications, combined with fatigue, also prevented the British artillery from laying in and registering its batteries to support the infantry positions. Lastly, the Japanese had complete mastery of the air. This precluded the British from moving up their supplies in daylight and severely limited the extent of their defensive preparation.

All of these factors combined to rob the British of their opportunity to build a cohesive defense. They had sufficient barrier material, in the form of mines, concrete blocks, and barbed wire to construct an effective obstacle system in depth, but at the time of the Japanese attack, only a fraction of it had been brought forward. In the location where the Japanese actually broke through, there were only 40 AT mines and a few concrete blocks emplaced when the Japanese attacked.[3]

On the afternoon of the 5th, the British 5/16th (the covering force) withdrew, and soon afterward the advance guard of the Japanese 42nd Regiment, 5th Infantry Division, made contact with the forward elements of the Hyderabad battalion. The Japanese probed the Hyderabads' forward positions and were repulsed. The Japanese advanced guard commander, Colonel Ando, decided to wait for tanks and other supporting troops. The 6th of January was spent by the Japanese reconnoitering the British defenses and preparing for their usual infiltration along the British flanks.

Major Shimada, the commander of the Japanese tank unit attached to the 42nd Infantry (a company plus of 17 medium and 3 light tanks from the organic tank battalion of the Japanese 5th Infantry Division) implored Colonel Ando to be allowed to attack straight down the road. Ando was at first skeptical, but finally acquiesced, reasoning that if the tank attack failed, the infiltration could still continue.[4] The Japanese tank company, with an attached infantry company and engineer platoon in trucks, was set to begin the assault at 0330 the next morning.

The Japanese attack began with artillery and mortar concentrations falling on the 4/19th Hyderabad's forward positions, while at the same time infantry units assaulted the forward positions of the Hyderabads, and engineers cleared the first antitank obstacles along the road. At approximately 0400, the Japanese armored column started forward, crewmembers initially ground-guiding their vehicles through the British obstacle.




The Hyderabads had no antitank guns, but did manage to call artillery fire on the Japanese, which knocked out one tank. The rest of the Japanese column swept through the breach and continued down the road to the next battalion position. Behind them, the remainder of the 3rd Battalion, 42nd Infantry, completed the destruction of the Hyderabad battalion, leaving only disorganized and bypassed elements to be mopped up later.

The Japanese column moved on. By 0430, it had reached the main defensive belt of the 5/2nd Punjabi battalion. The lead tank hit a mine and was disabled, and the remainder of the column stacked up behind the disabled vehicle almost bumper to bumper. The Punjabis attempted to knock out the Japanese tanks with Molotov cocktails and 12.7-mm antitank rifles, but were largely stopped by a heavy volume of fire from the Japanese tanks and infan-

try. At this point, the Japanese found one of the unguarded loop roads that paralleled the main road and took it, bypassing the Punjabi defenses and taking them in the flank. The Punjabis' defense collapsed into a series of small units fighting where they stood or trying to escape. The Japanese armor continued on, leaving the tireless 3d Battalion, 42nd Infantry, and other elements of the Japanese advance guard to complete the destruction of the Punjabis.

Unfortunately for the British, this was the last prepared defensive position facing the Japanese. The Punjabis had emplaced only a single small minefield. In spite of this, they somehow managed to hold the Japanese for almost an hour, taking heavy casualties from the tanks' fire, before the Japanese found another loop road and were off again. It was about 0600; the Japanese were exploiting like broken-field runners. Almost 1,000 British and Indian soldiers were dead, prisoners or fugitives in small groups heading south along the edge of the jungle.

Tragically for the British, no word of the fiasco had reached either the remaining battalions of the 12th Brigade (the Argyls and the 5/14th Punjabis) or the 28th Brigade. The Japanese armored juggernaut, (about 16 tanks strong at this point), with what remained of the accompanying infantry and engineers, continued south at a fast pace.

The next unit they encountered was the unsuspecting Argyl and Sutherland Highlanders, who had established two roadblocks in their defensive sector. The speed of Japanese movement, and the abysmal nature of British communications, caught the Argyls unaware and unprepared. The Japanese column burst through the first blocking position almost before the Argyls could offer any resistance. The fight at the second roadblock took only a little longer, with the Japanese destroying several British armored cars before continuing on. The remainder of the Argyl battalion was engulfed by the follow-on Japanese infantry in much the same manner as the other battalions.

To their credit, the Argyls fought ferociously in small groups and held the Japanese infantry longer than any of the other battalions. This, in turn, increased the distance between the Japanese armored column and the follow-on infantry. Had the 28th Brigade been in a better defensive posture, this might have made a difference. As it was, the Argyls' sacrifice was in vain.

The Japanese tankers took full advantage of the confusion in the British defense to continue their advance down the main road towards the Slim River bridge. Upon reaching Trolak, they scattered the engineers who were preparing the bridge for demolition. The lead tank platoon leader, Lieutenant Watanabe, personally dismounted from his command tank and slashed the demolition electrical wires with his sword.[5] The lieutenant and his company commander sensed that they had the momentum in this drive and that it was urgent to keep the pressure on the disorganized British. The Japanese tanks and the few remaining infantry and engineers that had somehow stayed with them raced ahead. It was approximately 0730. South of Trolak, the Japanese armor encountered the 5/14th Punjabis, who were moving along the road in march column towards their designated blocking position. The tanks literally raced through the surprised battalion, machine-gunning a large number of the Punjabis before they could even get off the road. In only a few minutes, the 12th Brigade's reserve ceased to exist as an effective unit. The Japanese armor continued its unchecked advance along the main road.

The British had lost track of the battle. General Paris was not informed of the breakthrough until 0630.[6] He immediately ordered the 28th Brigade to occupy its defensive positions and to detach its antitank battery forward to the 12th Brigade. Unfortunately, the battery met the Japanese while moving up the road and was destroyed before it could unlimber its guns and engage the enemy. Thus, one of the few units in the 28th Brigade that was capable of stopping the Japanese armor was eliminated at the outset of that brigade's fight. Incredibly, the 28th Brigade had not received word of the complete penetration of the 12th Brigade. The Japanese armor slammed into the 28th Brigade while it was moving to its defensive positions and swept it aside in a series of short bloody encounters. Like the 5/14th Punjabis, the 2/1st Gurkhas were surprised in march column on the road while moving to their defensive positions and suffered severe casualties before they could get out of the way of the Japanese armor. The other battalions of the 28th Brigade, 2/9th and 2/2nd Ghurkas, tried to engage the Japanese armor, but with no antitank obstacles and only a few 12.7-mm AT rifles, they were quickly bypassed.

The Japanese armor continued to move down the road, shooting up transport columns and disrupting demolition efforts on the road and at three lesser bridges. The Japanese tanks had by now completely outrun their accompanying infantry and engineers. The follow-on infantry battalions continued to fight through the disorganized defenses bypassed by the armor. The Japanese tanks next shot up two artillery batteries of the 137th Field Regiment before reaching the Slim River bridge at approximately 0830. The antiaircraft defenses of the bridge consisted of 40-mm Bofors antiaircraft guns. These engaged the Japanese tanks but were ineffective — their shells would not penetrate. Their crews took many casualties from Japanese return fire. The antiaircraft gunners and the engineers preparing demolitions on the Slim River bridge scattered. Lieutenant Watanabe (who was wounded by this time) directed the machine gun fire of his tank against the wires to the bridge demolition and succeeded in severing them. The Japanese force (by this time consisting of about a dozen tanks) left two of their number to guard the bridge and continued south along the main road. Finally, after continuing for two more miles, the Japanese ran into another British artillery battalion, the 155th Field Regiment. This artillery unit deployed its 4.5-inch howitzers in the direct fire mode and engaged the Japanese over open sights at less than 200 meters. The lead Japanese tank (commanded by Lieutenant Watanabe) was destroyed and the entire crew killed. Other Japanese tanks were damaged. Checked at last, the Japanese tankers returned to the Slim River bridge to guard their valuable prize. The Japanese infantry accompanying the tanks, not less than a company in strength, arrived a few hours later. The main body of the 42nd Infantry Regiment did not link up with the armored unit until almost midnight. The Japanese had lost about eight tanks, some of which were recoverable. Their infantry losses had been moderate, but replacable. Their morale was sky high.

### Summary

The Japanese had won a smashing victory. In the space of about seven hours, with a single company of obsolete tanks supported by infantry and en-

gineers, and followed by an infantry regiment (-), they had almost completely destroyed an entire British division. By the afternoon of the 7th of January, the British units the Japanese armor had bypassed were a jumble of disorganized fugitives. In the best shape were the infantry battalions of the 28th Brigade, who could retreat across an adjacent railroad bridge. In the worst shape were the men of the 12th Brigade; literally all of them were either killed, taken prisoner, or moving in fugitive groups trying to infiltrate back.

The losses to the Argyl and Sutherland Highlanders were especially tragic to the British, as they had repeatedly proven themselves to be the best trained battalion in Malaya. Had they not been surprised by the Japanese armor, they could conceivably have held the Japanese advance long enough for the 28th Brigade to have reached its positions and unlimbered its antitank guns. The battle probably could not have been salvaged, but at least a more orderly retreat would have been possible, followed by the demolition of the Slim River bridge. As it was, less than one hundred men of this battalion managed to reach British lines. The magnitude of the disaster is reflected in the number of survivors from each brigade. Only 400 men of the four battalions in 12th Brigade managed to break out and rejoin the retreating British army. The 28th Brigade did slightly better, with approximately 700 men, but this unit was also clearly decimated. All in all, the British lost two brigades in the Slim River battle, along with most of two battalions of artillery, as well as transportation, signal, engineer, and other supporting units. Those British and Indian soldiers and units that escaped, escaped on foot. Not a single vehicle was retrieved from north of the Slim River.

The remainder of the Japanese pursuit of the British down the Malay peninsula retained the same flavor as the Slim River actions — relentless, aggressive Japanese pursuit of tired British units who had suffered too many losses in personnel and equipment and who could never keep the Japanese from operating inside their decision cycle. The Japanese did meet a series of reverses when they encountered fresh Australian troops of the 8th Australian Infantry Division. A cautionary note on headlong armored exploitation was sounded just 11 days later near the small town of Bakri. The Japanese attempted to repeat their Slim River success by sending a light tank company to attack down the main road. The Australians defending the antitank obstacle on the road coolly waited for the Japanese to begin negotiating the obstacles and then quickly knocked out nine Japanese tanks with antitank gun fire. The accompanying infantry was also temporarily stopped by the Australians, suffering numerous casualties. The Japanese formula from Slim River was unchanged. The defenders however, were fresh troops who had had the opportunity to emplace their defense properly. Unfortunately for the Australians, the rest of the British forces were simply too depleted from their earlier defeats to offer an effective resistance. As a result, they were compelled to retreat to the island of Singapore with the rest of the British army, abandoning Malaya to the Japanese on 30 January. Singapore would surrender two weeks later.

### Lessons Learned

- Armored exploitation and exploitation in general is something to be seized upon. Had the Japanese halted to regroup, or waited for additional forces after having penetrated the 12th Brigade near Trolak, the 28th Brigade would have had enough time to go into a hasty defense. The experience of the Japanese tank company that was shot up by the Australians while trying to repeat the events of January 7th shows what would have happened to the Japanese on that day had the British been able to get their antitank guns into action. The Japanese decision to press on was taken by junior officers and supported by their commander, who didn't wait for a perfect sitrep. The Japanese knew that they had the British disorganized, and that they had to just keep hitting them.

- Like the OPFOR at the JRTC, the Japanese were able to avoid British defenses and sustain their momentum by pushing their mass down side trails that were poorly defended or undefended. They sacrificed frontage to do this, and on several occasions had a mass of vehicles stacked up in column while only the first few in line could fight. Had the British been able to accurately mass artillery on them, they could have slowed their advance. However, the British often didn't know the Japanese armor was there until it burst upon them out of the side roads. The momentum of the Japanese advance did not allow the British to track the battle effectively. The lesson here is that armor units cannot be wedded to wide avenues of approach. By assuming risk on the side roads, the Japanese were able to bypass British defenses and surprise the British units.

## Japanese Armor at Slim River

The Japanese used two types of tanks at the Slim River battle. The main medium tank used was the Type 94, which was the most common Japanese medium tank throughout the early part of the Pacific war. The light tanks used were Type 95s, which were encountered by Allied forces throughout the entire war.

The Type 94 was an older design that was first introduced in 1934. Weighing 15 tons, its armor was only 17mm at its thickest. The tank had an advertised maximum speed of 28 mph, although 20 mph or less was the norm due to its being relatively underpowered. The 57-mm gun was a good infantry support weapon; however, there was no coaxial machine gun — the turret machine gun faced out of the turret rear. In addition, there was a hull machine gun. The Type 94 did carry a large amount of ammunition: 100 57-mm rounds and 2,800 rounds of machine gun ammunition. It was cramped for its crew of five men, and visibility from it was poor. There was no radio to communicate with other vehicles, communication being done by flags or shouted orders. The Type 94 had an unrefueled range of 100 miles. (See illustration on pp. 26-27.)

The Type 95 light tank was a slightly newer design that had some of the same problems of the Type 94 as well as many of its own. The 10-ton tank had even thinner armor than the Type 94 (14mm). It was slightly faster than the Type 94 and could achieve its maximum speed of 25(+) mph. It was armed with a 37-mm gun, as well as two machine guns in a similar arrangement to the Type 94. However, the three-man crew could not operate all the weapons at once. The commander was particularly overtaxed, having to load and fire the main gun or turret machine gun, as well as command the tank. The Type 95 also had an operational radius of about 100 miles.

Source: *Defeat In Malaya:* Arthur Swinson, pp. 70, 71.

• Hand-in-hand with this is the lesson that "tankable terrain" is any place a tank can physically go. The British had dismissed Malaya as terrain unsuited for armored operations.[7] The narrow frontages confronting them made even the limited number of Japanese tanks available decisive. In a narrow maneuver corridor, an armored unit does not have to be of divisional strength to have a critical impact on the outcome of the battle.

• The Japanese exploited their success by rushing units after their armored column as quickly as possible. Had they not done so, the armor, with its small complement of accompanying infantry and engineers, would have been overwhelmed and destroyed by regrouping British units. By following hot on the heels of the armor, the Japanese denied the British the opportunity to regroup.

• The Japanese proved again the value of a large volume of suppressive fire. Several times, the Japanese column was stacked up amongst the British defenses. The extremely high volume of fire placed on the British by the tanks and their accompanying infantry allowed them to survive this exposure until the obstacles could be reduced or a bypass found.

• The experience of the British in being unable to set in an adequate hasty defense is a stark example of the strain of retrograde operations under pressure. The unpreparedness of the British defenses was due largely to fatigue and the requirements of reconsolidation after a month of continuous fighting. There were sufficient mines and barrier materials, as well as antitank weapons and artillery, available for the British defensive scheme of maneuver. Anyone who shrugs off the British in this case study as just another unit that failed their defensive prep phase at the NTC is missing the point. What confronted the leaders up and down the chain of command in those two brigades was about as bad as it gets. They were planning a hasty defense in unfamiliar terrain while reorganizing units that were at about 66 percent strength from combat losses (a high percentage of those losses were leadership personnel). They hadn't slept for two days, and were under constant air attack. Leaders at all levels should contemplate that, and think about how they'd overcome those conditions.

• A final lesson is an oft-repeated one in armored warfare. Ultimately, it isn't the machines; it's the men who drive them. The Japanese tanks were obsolescent, even by the standards of the day. The mediums could barely travel 18 mph and had very thin armor that could be penetrated with ease by British antitank guns. The light tanks were literally three-man tin cans, with the commander also acting as the loader and the gunner. The Japanese tank machine guns were magazine-fed, as opposed to belt-fed, and the visibility from the vehicles was poor. All in all, they were not ideal weapons of war. However, they were driven by crews who were well trained in their use, understood their capabilities, and who possessed a ferocious will to combat the enemy. This factor bears consideration in today's world. When was the last time one of us shrugged off an enemy armed with T55s?

## Conclusion

Although not involving nearly as many tanks as the great battles in Europe and Africa, the Japanese attack and exploitation at the Slim River was one of the most decisive uses of armor in WWII. Lieutenant Watanabe and Major Shimada and their men certainly belong in the ranks of the great tankers of WWII. Their exploit was equal to the best of the Americans of the 4th Armored Division, Rybalko's Tank Guards, or Hermann Balck's 11th Panzers. Although the vehicles they used were little better than tin cans, their offensive spirit and willingness to relentlessly pursue an off-balance enemy was in the best traditions of the combat arm of decision.

## Notes

[1]Falk, Stanley, *Seventy Days To Singapore*, G.P. Putnam and Sons, 1973, p. 148.

[2]Percival, Arthur LTG, *The War in Malaya*, Byrne and Spotteswoode Publishers, London, 1949, p. 203.

[3]Kirby, Woodburn S., *Singapore — The Chain of Disaster*, Macmillan Co., 1971, p. 177.

[4]Allen, Louis, *Singapore — 1941-1942*, Associated University Press, p. 149.

[5]Tsjui, Manaboru, *Singapore, The Japanese Version*, Oxford University Press, 1960, p. 172.

[6]Palit, P.K. Brigadier, *The Campaign in Malaya*, The English Book Store Press, New Delhi, 1960, p. 59.

[7]Swinson, Arthur, *Defeat in Malaya*, Ballantine Books, 1969, p. 41.

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Lieutenant Colonel Martin N. Stanton received his infantry commission in 1978 from Florida Tech. He served as a company XO with 1st Infantry Training Brigade at Ft. Benning; rifle and TOW platoon leader with 1-9 Infantry in Korea; assistant G3 staff officer with 9th ID, and commander, D Company, 2-2 Infantry, both at Ft. Lewis, Wash. He served as company and S3 observer/controller at the NTC at Ft. Irwin; senior brigade advisor, 2d Saudi National Guard Mech Brigade, Hofuf, Saudi Arabia, and as S3, 2-87 Infantry, Ft. Drum, N.Y. His combat service includes the Gulf War in 1991 and Somalia, 1992-93. A graduate of the College of Naval Command and Staff at Newport, R.I., he is currently assistant J5 Policy, USCENTCOM.

# Company C, 194th Tank Bn in the Philippines, 1941-42

*A California National Guard Tank Battalion, Federalized in 1941, Arrives In the South Pacific As War Breaks Out*

**by Burton Anderson**

*The author wishes to thank the following Company C Bataan survivors for their input into this article: CWO Ero Saccone, USA, Ret.; Frank I. Muther; Leon A. Elliott; Roy L. Diaz; Thomas J. Hicks, and Glenn D. Brokaw.*

Company C was a California National Guard outfit that traced its roots to Troop C, 1st Squadron of the California Cavalry, organized in Salinas, California in 1895. After WWI, the Army converted one company in each of the 18 National Guard Divisions to a tank company, and in 1924, the Salinas Guard company became the 40th Tank Company in the 40th Infantry Division. The company was first equipped with French design Renault tanks left over from WWI.

The spectacular success of the German Panzer Divisions in the fall of France and Belgium caused the Army to form four tank battalions, from the 18 scattered National Guard tank companies, numbered 191, 192, 193, and 194. On September 8, 1940, the old 40th Tank Company became Company C, 194th Tank Battalion and was alerted for possible call-up. It didn't take the Army long to decide to induct various National Guard units into federal service, and on February 10, 1941, Company C was federalized and ordered to Fort Lewis, Washington, for training. At Fort Lewis, the Salinas company joined with Company A from Brainerd, Minnesota, and Company B, from St. Joseph, Missouri, to form the 194th Tank Battalion with Major E.B. Miller as commanding officer.

At Fort Lewis, it seemed that everything that could go wrong, did go wrong, from lack of uniforms to shortages of tanks and equipment. In addition, the Regular Army general at Fort Lewis viewed "latter day" soldiers with contempt, which made life even more difficult. In spite of all this, the 194th was rated among the best tank battalions in the Army and was shipped out from San Francisco on September 8, 1941, with 54 new Stuart M3 light tanks, bound for Manila. The unit had the distinction of being the first U.S. armored unit overseas in what was to become WWII.

Upon arrival in the Philippines, the shortage of supplies, especially gasoline and spare parts, hampered the battalion's training exercises, even though there were adequate supplies in the quartermaster warehouses in Manila. It was so bad that a request for spare parts often took 30 days to navigate the Army red tape. More critical was the fact that live ammunition wasn't issued until December 2, and the 37-mm tank guns had never been fired. The 37-mm HE ammo was never shipped to the Philippines; Ordnance finally improvised some HE ammo during the campaign.

On November 20, the 192nd Tank Battalion arrived in Manila and Company D, which was on board, was assigned to the 194th to replace Company B (from St. Joseph, Missouri) which had been detached at Fort Lewis and sent to Alaska. Colonel R.N. Weaver, a Regular Army officer, was placed in command of the Provisional Tank Group, consisting of the 192nd and 194th Tank Battalions, which was under the direct control of the U.S. Army Forces Far East (MacArthur), bypassing MG Wainwright, the ground

forces commander. This split command structure was to cause many problems in the defense of Luzon.

When the Japanese struck Clark Field December 8, 1941, the day after Pearl Harbor, Company C tankers were in defensive positions around the perimeter of the field. They had just finished lunch and were cleaning their mess kits when they saw an approaching formation of bombers and assumed they were U.S. bombers until the bombs started falling. The attacking force consisted of 53 bombers followed by 34 fighters. C Company soldiers ran to their tanks and half-tracks and commenced firing in spite of the bombs falling all around them. The enemy bombers smashed the neat rows of B-17s and P-40s lined up on the runway and then the fighters strafed everything that was left. At the end of the raid some 40 minutes later, half the U.S. Far Eastern Air Force was destroyed. In all, 55 men were killed and over 100 wounded, but miraculously, Company C suffered no casualties even though its soldiers were firing from exposed positions.

The fighters flew so low that it seemed a shotgun could bring one down. At that point, a "green" Regular Army lieutenant grabbed a private first class's arm and yelled that shooting at the planes would give away their position — as if it mattered at that point. The GIs blazed away with everything they had, and Private Earl G. Smith of Company C was credited with downing one of the nine enemy fighters shot down that day.

After the raid, the company spent the night loading machine gun belts from Springfield rifle clips because they had fired all their belted ammo. The next day, the company was split off from the battalion and bivouacked two miles northeast of Clark Field. It remained there until December 12, when it was detached from the 194th and ordered to join the South Luzon Force under the command of Brigadier General Albert M. Jones. They marched south at night, about 40 miles, and then made a daylight dash to Muntinlupa and on to Tagatay Ridge on the 14th. The company remained in this area from the 14th to the 24th and conducted reconnaissance patrols, hunting presumed fifth columnists who were flashing mirrors by day and setting off flares at night near our ammo dumps. No one was ever captured, but after C Company shot up some suspected native huts, the suspicious activities ceased.


The Japanese landed 7,000 troops at Lamon Bay at 0200 on December 24 and proceeded inland in the direction of Lucban. Meanwhile, Company C moved into position on Christmas Eve to assist the Filipino 1st Infantry Regiment. During Christmas Day, Brigadier General Jones personally conducted a reconnaissance down a narrow road toward the enemy, escorted by a Company C halftrack manned by Sergeant Keith Lewis, Sergeant Leon Elliott, Private First Class Jim Hicks, Private William Hennessey, and Private Fred Yeager. They were reconnoitering north of Piis, Luzon, when they came under fire from an enemy advance guard. The halftrack, in attempting to turn around, fell into a ditch, but the crew was able to remove their guns and provide covering fire as they retreated, enabling General Jones and his driver to escape unharmed. For this action, General Jones recommended the crew for the Distinguished Service Cross, but no action was taken until April 1946, and then the recommendation was denied. Instead, the five crew members were awarded the Silver Star, but by then, only Sergeant Leon Elliott was still alive.

On December 26, the 2nd platoon was ordered by a Filipino major to move down a narrow mountain trail, firing as they went to impress the Filipino troops. The platoon leader, Lieutenant Needham, protested the order and suggested they do a reconnaissance first to see what was out in front, but the major assured him that the enemy only possessed small arms and ordered the platoon to carry out the mission. The tankers set out and promptly ran into an antitank gun and some concealed field pieces. The lead tank was hit, mortally wounding Lieutenant Needham and Private First Class Robert Bales. Staff Sergeant Emil S. Morello, in the second tank, drove around the disabled tank and ran over the antitank gun. Sergeant Morello's tank was also hit, wounding Private Eddie DiBenedetti, who was hit in the neck by a flying rivet. (This incident

prompted the War Department to change from riveted to welded construction in new tank production.) Another tank, commanded by Sergeant Glenn Brokaw, was hit and Privates First Class Jim Hicks, McLeod, and Seifort were killed and Brokaw seriously wounded. (Ironically, Hicks had volunteered to drive Brokaw's tank when the regular driver became ill.)

In all, five tanks were hit and immobilized. Sergeant Morello and four wounded stayed buttoned up inside their tanks, not daring to move because the Japanese had camped for the night alongside the tanks, unaware that anyone inside was alive. In the morning, the enemy left, and Sergeant Morello began tending the casualties. He gathered up five wounded, and they escaped through coconut groves and rice paddies.

With the help of Filipino guides they hired, Sergeant Morello and the wounded soldiers all showed up in Manila five days later after fleeing through enemy territory. He left DiBenedetti in a Catholic Hospital in Manila and, with the other wounded, made his way by Banca to Corregidor. Later, during February, Sergeant Morello was able to rejoin the company on Bataan. For this action, Sergeant Morello was awarded the Silver Star.

The action described above resulted in the loss of an entire platoon of tanks and five soldiers, and was a grim lesson about the consequences when reconnaissance is ignored and tanks are sent out on a mission, essentially blind.

Manila was declared an open city on December 24, and, on the 25th, General MacArthur ordered the implementation of Orange Plan-3, which provided for the withdrawal of all Philippine and U.S. forces into Bataan as a last defensive position. In compliance with the order, Company C withdrew from South Luzon on December 29, acting as a rear guard for General Jones's troops. They moved to Tagatay Ridge on the 31st and made a sleepless 100-mile night dash to Bocaue where they rejoined the rest of the 194th Tank Battalion.

On the march North, the troops were to bypass Manila because it had been declared an open city; however, the rear guard, led by First Sergeant Ero "Ben" Saccone, was unsure of the route around the city. They decided to go through central Manila (the only maps they had were Atlantic Richfield service station maps) and it didn't seem to matter that the city was off limits.

In the dark, one of Company C's tanks hit the Jose Rizall statue while trying to avoid hordes of fleeing civilians. The tank threw a track on impact and bent an idler. The crew worked all night trying to repair it, but by daylight, they saw it was hopeless. They disabled the tank and tried to hitch a ride with some Filipino troops in Bren Gun carriers. None would stop until the tankers leveled their .45 cal Thompson submachine guns at the convoy. Then they got a lift; they were the last armored troops out of Manila.

From Bocaue, the company headed for the Calumpit Bridge over the Pampanga River on Route 3. This was a vital structure, since all traffic fleeing Manila toward Bataan had to pass over this bridge. It was here that C Company witnessed 100-150 empty Filipino trucks in headlong flight from Manila, where there were ample supplies in the warehouses. Had these supplies been moved while there was still time, the U.S. and Filipino forces on Bataan could have conceivably held out longer and with far less suffering. Also, had these supplies been moved prior to the outbreak of hostilities, as called for in Orange Plan-3, the troops wouldn't have nearly starved to death. Perhaps the inaction was due to General MacArthur's belief that war would not break out until April 1942.

All the South Luzon forces were across the Calumpit Bridge by 0230 January 1, followed by C Company in the rear guard. Then the bridge was blown up. From there, the tanks moved through San Fernando at the critical junction of Route 3 and Route 7 from North Luzon. Again, the tankers formed successive road blocks on Route 7 during the next three days.

At 1600 on January 5, Captain Fred Moffitt, commanding officer, C Company, leading two tanks and two halftracks, assisted by four self-propelled 75-mm guns and the 31st Infantry, ambushed 750-800 enemy troops. Our forces inflicted 50 percent casualties on the Japanese and left the town of Lubao in flames. Had they not stopped the enemy troops there, our retreat into Bataan would have been cut off.

Moving toward Bataan on January 6, another night battle took place near Remulus. Captain Moffitt's halftrack took a direct hit from an enemy shell that took off Private William Hennessey's left foot and wounded Private First Class Walter Martella. Both died of their wounds, Martella within a few days due to gas gangrene, and Hennessey at Camp O'Donnell after the surrender on Bataan. In the same battle, Staff Sergeant Carl F. Abbott scored a direct hit on an enemy tank before his tank was hit and disabled; however, he escaped injury and the tank was retrieved the next day.

The withdrawal toward Bataan continued, and by January 7th, Company C was at the Culo River, guarding the left flank of the Layac Bridge, which was the gateway to Bataan. As soon as all forces were across, the tankers withdrew and the bridge was blown up, temporarily sealing off the Bataan Peninsula. The blowing of bridges had become of critical importance, and the commanding officer of the 194th had to give his personal order before a bridge could be demolished. This order came about because of the loss of six tanks by the 192nd at the Agno River in Northern Luzon, when panicky Filipino troops blew a bridge and stranded the tanks on the enemy side.

The withdrawal into Bataan to a bivouac south of the Abucay Main Battle Line afforded the troops a slight lull from battle. They had been in action for 30 consecutive days and were exhausted. To add to their misery, MG Wainwright ordered the food ration cut in half, to only 30 ounces per man per day. In the first month of combat, Company C had lost seven tanks and six men killed in action. The losses necessitated reorganizing the company into three platoons of three tanks each, plus one command tank (prewar strength was five tanks to a platoon plus the CO and XO tanks, for a total of seventeen). The remaining tanks were long past the 400-hour scheduled maintenance and had been run so hard the rubber track plates had been worn down to the metal. Fortunately, some replacement parts were available from the Service Command Area in southern Bataan.

The next significant action involving a platoon of C Company was after General Wainwright sent three tanks to Bagac, on the west coast of Bataan. The following day, they were ordered to advance north to reopen the coastal highway to Moron. The tanks were moving in advance of the main body and as they rounded a curve, the lead tank (Staff Sergeant Frank Muther) was fired on at point-blank range by an antitank gun. Incredibly, the round went right over the turret, and in returning fire, the tank knocked out the enemy gun. Two tanks following 600 yards back hit land mines placed by the Japa-

nese after the lead tank went by. This use of land mines was a favorite tactic of the Japanese. Muther's tank was able to turn around and withdraw past the disabled tanks, and the platoon got out without any personnel casualties. The disabled tanks were towed out the next day and used for spare parts.

This incident was another case where an order to send tanks out alone, ahead of infantry, nearly became a suicide mission. Throughout the campaign, tanks were not used properly. The generals regarded them as mobile pill boxes. They also tended to send only a platoon when a full company was needed. Conflicting orders from the Provisional Tank Group Commander (Colonel Weaver) and General Wainwright kept the tank battalion commanders in constant turmoil, and often they had to rely on their own judgment. The tanks were often assigned piecemeal to various units by Tank Group or by Wainwright's ground commanders, thereby losing the advantage of combined arms protection. In addition, few senior officers had any experience with tanks, and they did not know how to employ armor to the best advantage.

By the middle of January, lack of food and medicine caused malaria, dengue (dengue fever), and dysentery, which took a heavy toll on the malnourished troops. Especially critical was a shortage of quinine to treat a virulent form of malaria prevalent on the Bataan Peninsula. The constant hordes of flies and mosquitoes made their problems worse. The troops had not received any mail since the war started. Occasionally, they could get some news via short-wave radio from San Francisco, but otherwise listened to Tokyo Rose for entertainment.

On January 26th, C/194 covered the withdrawal from the Abucay Main Battle Line toward the next defensive position at the Pilar-Bagac Road. (The only satisfactory road across Bataan.) As Company C was moving across an area called Hacienda Flats, the U.S. forces inflicted at least 1,500 casualties. The Japanese retaliated with a heavy bombing attack. A dud bomb went though the fender of Muther's tank but didn't explode. Another tank stalled on a bridge and had to be pushed over the side to prevent a roadblock. Captain Moffitt was wounded in the leg by a flying timber while crossing a bridge just as it was blown up.

By February 8, the U.S. and Philippine forces had fought the enemy to a standstill in spite of their supply, disease, and malnutrition problems. There was a lull in infantry action, but the Japanese kept up the relentless shelling and bombing of our lines. Company C was on the east coast of Bataan and used mainly for beach defense, to ward off any attempt by the enemy to invade Bataan from Manila Bay. During an aerial attack near Lamao, a .50 cal machine gunner from C Company hit a Japanese plane that was last seen smoking and diving toward Manila Bay, a fact confirmed by Sergeant Lewis. The company was split up into various beach positions, and some of the locations were near enough to Japanese lines that 14-inch mortar fire from U.S. guns on Corregidor landed uncomfortably close to our tanks.

By the middle of March, the food ration was cut again, down to 15 ounces per man per day. The troops subsisted mainly on rice, supplemented by anything they could scrounge, including worms, snakes, monkeys, and an occasional native caribou. General Wainwright, an old cavalry man, had to order the slaughter of 250 horses and 42 mules from his beloved 26th Cavalry Regiment to ward off starvation. In spite of the extra meat, the Bataan forces were in dire straits, with one fourth of the troops in the hospital with disabilities associated with disease and malnutrition.

Toward the end of March, the Japanese resumed their offensive after being reinforced by Imperial Marines released after the fall of Singapore. On April 3, the enemy began an all-out offensive, accompanied by constant bombing and shelling. Major General Edward P. King (in command after Wainwright moved to Corregidor) made one last effort to stop the enemy across Southern Bataan.

Four tanks from the 2nd platoon were sent from Lamao, on April 6, over mountain trails to the vicinity of Mount Samat in south central Bataan. The tanks were to support the Philippine 45th and 57th Infantry, Philippine Scouts, who were opposing the enemy coming down Trail 29. On the morning of April 7, the Filipinos were in headlong flight, and the tanks moved down Trail 8 to try and stem the tide. At the junction of Trail 6, the lead tank encountered antitank fire, which blasted it off the trail, knocking out the tank commander. Corporal Ray Peoples took over command, and with the other tanks covered the withdrawal under intense enemy fire. The retreat was made more difficult by the hundreds of troops and vehicles clogging the trail. The platoon managed to regain its starting point without further casualties. However, Sergeant Morello's tank, which suffered an engine lockup, had to be towed to the shop at Cabcaben.

Meanwhile, the 3rd platoon, under the command of First Sergeant "Ben" Saccone, with two tanks and two halftracks, was ordered to attempt an enveloping maneuver by moving to the west coast of Bataan via the coast road to Mariveles and on to the Pilar-Bagac Road. They were in the vicinity of Mount Samat where they encountered fierce resistance at an enemy road block. (It was virtually impossible for the tanks to get off the trails because of the thick jungle and trees. This was a constant problem during the entire campaign. The platoon was out of radio contact with battalion headquarters and was unable to assess the situation, so it reversed its march and made it back to Mariveles, where it rejoined the remnants of the company. These two actions were the last for Company C, which by April 8 had been in combat for four months, lost ten tanks, and had six men killed in action.

General King, on April 8, acknowledged that the situation was critical and that further resistance would result in the massacre of his troops, including 6,000 sick and wounded and 40,000 refugees. The troops still on the line were less than 25 percent effective and couldn't last for more than a day. Consequently, he ordered the troops to cease fire and to destroy their equipment when the code word "Blast" was given. This occurred at 0700 April 9, 1942, and hostilities on Bataan ceased. As it turned out, the U.S. and Philippine troops were doomed from the start of the war by the lack of air power, supplies, and reinforcements. However, due to the heroic efforts of units like C/194th Tank Battalion, the Japanese advance was critically slowed.

General Homma had expected to take the Philippines in three months, but instead it took five, and the U.S. gained precious time needed to go on the offensive in the Pacific.

Company C, 194th Tank Battalion was officially inactivated April 2, 1946, in the Philippines, and the chapter closed on a courageous outfit. The combat and prisoner of war ordeal had taken a heavy toll on the company and out of 105 men who left Salinas, February 18, 1941, only 47 returned. During the time the company was in combat, it earned three Presidential Unit Citations (Defense of the Philippines,

Luzon, and Bataan) and the Philippine Presidential Unit Citation for service from December 7, 1941 to May 10, 1942. In Company C, there were six Silver Stars awarded to tankers, and the entire company received the Bronze Star. Unfortunately, this didn't happen until well after the war, and by then, many medals were given posthumously. It took tireless effort by men such as Chief Warrant Officer Ero "Ben" Saccone to enable these men to receive their well-merited medals.

In 1947, Salinas again had a tank company when the Headquarters Company, 1st Battalion, 149th Armor was activated. Since that time, the company has been assigned to various units. At present, it is Headquarters and Headquarters Company, 1st Battalion, 149th Armor. Its unofficial motto is "Remember the Road to Bataan," a lasting tribute to the men of Company C, 194th Tank Battalion.

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Burton Anderson served as an ensign aboard the heavy cruiser *USS Pensacola* during WWII and during the Bikini atom bomb tests in 1946. He graduated from the University of California at Berkeley in 1949 and joined a firm in the lettuce business. He retired in 1985 after spending 36 years with the company, rising from ranch manager to executive. Currently, he is an independent agricultural consultant and is staff historian for the *Coastal Grower* magazine. He has written numerous articles on agriculture and Salinas Valley history.


# Force XXI Training Ammunition

(Continued from Page 25)

it flies through the correct basket, a flash/bang is activated and detected by the crew.

## Conclusion

New doctrine and technology is changing the way the Armor Force will fight its future battles; therefore, the need for new training ammunition is real. New service ammunition has been, or will be, introduced into the Army that has no counterpart in the training world. If we are to remain true to the credo that we train the way we fight, the Armor Force's training tools need adjustment. The best tank, ammunition, and war fighting doctrine in the world must continue to be complemented by the world's best training, and that requires new training ammunition.[10]

## Notes

[1]The M831 is currently being replaced by the M831A1. For the tank crew, the difference is invisible.

[2]Armaments Research, Development and Engineer Center (ARDEC) concept. The Propellant-Nose-Breakup Concept is a variant of the 105mm XM797.

[3]The Boosted-High-Drag-Projectile Concept was developed within the Weapons Technology Directorate of the Army Research Laboratory.

[4]Aerodynamic strakes are raised bands of material that extend along a surface. In this case, think of them as long, very low fins that extend the length of the tail cone.

[5]The Ablative-Nose-Projectile Concept is the original 105mm XM797 concept that was developed by ARDEC in the late 1970s and tested in the early 1980s.

[6]Ablation is a process of burning away a surface. Ablative materials are formulated to absorb heat energy by controlled burning away of the surface material.

[7]ARDEC concept.

[8]The Low Drag/High Drag Fin Concept (Drogue Flap) was developed within the Weapons Technology Directorate of the Army Research Laboratory.

[9]The authors would like to thank Mr. Mark Frank of ARDEC for some simplifying suggestions to this concept.


Major Steve Thorson earned his commission in Armor in 1981 from the Officer Candidate School, Ft. Benning, Ga. He served as a tank platoon leader, support platoon leader, and battalion S4 in 1-35 Armor, Erlangen, Germany, and later assigned as BMO, and commander, Co C and HHC, 1-34 Armor, Ft. Riley, Kan. He served as a force design analyst at the Force Design Directorate, Combat Developments, Combined Arms Center, Ft. Leavenworth, Kan. He was next assigned to the IG Office, HQ, USAREUR, Heidelberg, Germany. He is currently an Acquisition Corps Officer at the Office of the PM, TMAS, Picatinny Arsenal, N.J. He holds a BA degree from John Jay College of Criminal Justice, New York City, and an MA in Management from Webster University, St. Louis, Mo. He is a graduate of AOB, QMOAC, MAMC, AOAC, and CGSC.

Major Bruce J. Held was commissioned from the U.S. Military Academy in 1980. He served with the 32d Armor at Ft. Carson, Colo., and with the 2d Armored Cavalry Regiment in Bamberg, Germany. He has also served in the Army Research Laboratory as an Armor Technology Manager and is currently assigned to the Office of the Project Manager for Tank Main Armament Systems. He earned an MS in aerospace engineering from Stanford University and a law degree from the University of Maryland School of Law. His military education includes MIOBC, AOAC, MAMC, and CGSC.


[10]The authors would like to thank the people who read drafts of this article and made many helpful suggestions. In particular, Mr. Ed Fennell and Phil Donadio of ARDEC, Mr. Don Guziewicz and MAJ Dave Gallop of PM TMAS, and Mr. Al Pomey and SFC Robert Horner of the Armor Center.

**BACK TO THE FUTURE:**

# Javelins and Skirmishers on the Battlefield

**by Major James K. Morningstar**

The arrival of the JAVELIN fire-and-forget antitank missile can allow the combat units of the United States Army to maximize the effect of direct fires in tactical depth on the battlefield by employing skirmishers. Throughout history, successful armies have adopted forward-deployed missile systems as skirmishers to effectively harass, delay, and disrupt enemy formations. Cyclic trends in tactics and technology have caused us to replace skirmishers in current doctrine with indirect artillery, but with the advent of smart missiles for ground combat we should reinstate the skirmishers to their historically proper place on the battlefield.

Armies as old as the early Greeks came to dominate their opponents with tactics that included skirmishers. They would open battle with javelin throwers or slingers hurling volleys of missiles to break the enemy's formation. Their armies combined the effect of accurate missile fire followed by the superb shock effect of the phalanx of heavy infantry. By 352 B.C., Philip of Macedonia built the world's finest combined arms army, with lines of heavy infantry phalanxes flanked by groups of heavy cavalry. "The extreme end of the right wing consisted of light cavalry and sometimes archers and slingers who were ready to move out as a screen of harassers and skirmishers to open the action. When these were driven back by the advance of the enemy, they ran to the rear through lanes opened for them by members of the phalanx." Philip's son, Alexander, inherited this army and with it conquered the known world.

The Romans also relied on skirmishers. Vegetius tells us, "The most active and best disciplined men were selected for this service; and as their number was not very great, they easily retired in case of a repulse through the intervals of the legion, without thus occasioning the least disorder in the line." Vegetius goes on to say that, if the skirmishers repulsed the enemy, they would pursue. The heavy infantry would never pursue because it would break their disciplined formations.

When the shock action of heavy cavalry dominated the battlefield, skirmishers adopted the bow and crossbow. At Crécy in 1346, French skirmishers opened battle with the English. The French employed Genoese crossbowmen who shot one bolt per minute at targets up to 350 yards away. The English longbowmen, whose range was only 280 yards, answered with 10 arrows per minute. The thousands of longbow arrows released that day broke the French skirmish line and cavalry charges. Like latter day indirect artillery, the high-angled fire of the longbow seemed to displace the shots from the skirmishers.

The advent of gunpowder increased the role of skirmishers. In the early 1700s, Field Marshal Maurice de Saxe described his very successful tactics when he wrote:

> *"In attacking infantry, the light-armed foot are to be dispersed along the front, at the distance of a hundred, one hundred fifty, or two hundred paces in advance. They should begin firing when the enemy is about three hundred paces off, without a word of command and at will, until the enemy approaches within fifty paces. At this distance, every captain is to order a retreat, taking care to retire slowly towards his regiment, keeping up his fire from time to time, until he arrives at his battalion, which should be starting to move."*

He dismissed the notion that his skirmishers were endangered when outnumbered by the enemy, saying, "Can they fire against seventy men scattered along the front of my regiment? It would be like firing at a handful of fleas." His time and distance calculations convinced him that his skirmishers would each get off thirty well aimed shots at the advancing enemy. (Imagine thirty accurate antitank missiles launched by each skirmisher today!) Skirmishers eroded the enemy both physically and morally by targeting their leadership in the front ranks. This led the field marshal to conclude,

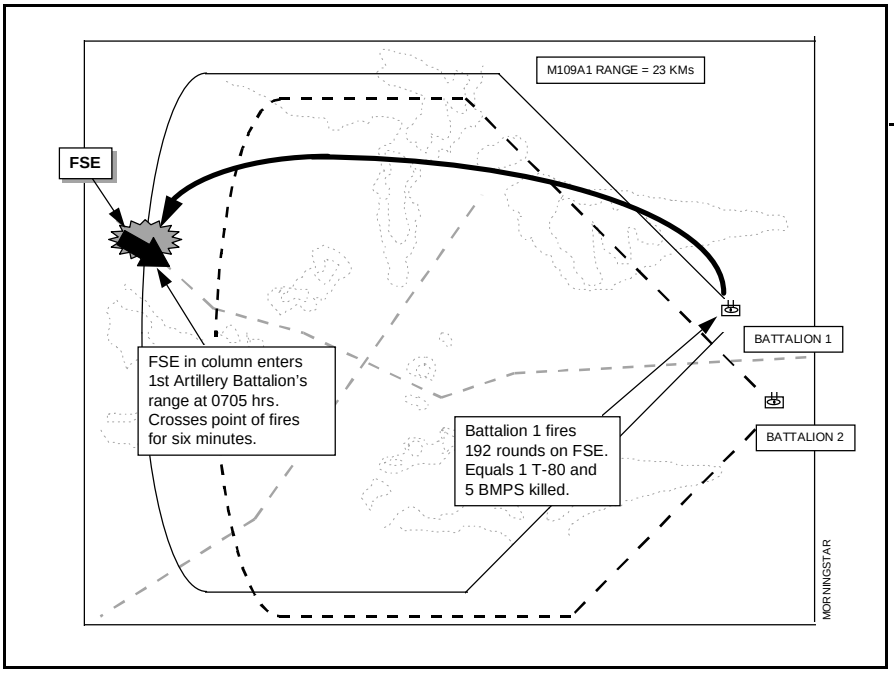



**Figure 1.** The initial artillery strike in a perfect world.

"I contend that a single shot from one of these irregulars is worth ten from any other."

Skirmishers became more widely used as accurate rifles became available in the latter half of the eighteenth century. The British army resisted adopting skirmishers until General Braddock's force ran into them in the French and Indian War. They then established a "light" company in each foot regiment to cover advances and perform other special missions. The French abandoned linear tactics altogether, along with military organization, as a result of the Revolution. They covered the dense formations of the *levée en masse* with "clouds of skirmishers," a habit Napoleon would retain even after he restored discipline to the army. Throughout the American Civil War both sides employed skirmishers as an essential element of their battlefield tactics.

Skirmishers fell out of favor as artillery and mechanization began to dominate the battlefield. The deadly effect of artillery and machine guns effectively transformed the infantry attack. No longer would soldiers form into the tightly packed masses which were so vulnerable to the skirmishers. By World War II, the battlefield was dominated by indirect artillery, the shock power of armored tanks, air power, and amorphous groupings of infantry. Once again, skirmishers lost their place on the battlefield.

Shadows of things past still emerge in the present on today's battlefield. In the past, massed infantry would be exposed to the slings and arrows of the enemy before closing to destroy the other side's massed infantry. Today, massed armored vehicles are attritted by indirect fires before closing to destroy the other side's massed armored vehicles. Artillery has displaced skirmishers as the dominant forward missile weapon, with one important difference: the skirmisher *aimed* for *particular* targets. Artillery most often uses forward observers and spotters to direct artillery into a general area.

Skirmishers of the Civil War would aim and rapidly fire specifically at the lead horsemen of the attacking cavalry formation. Killing those leaders could have two effects. First, an obvious loss in cohesion would follow. Second, other leaders might be more reluctant to step forward. This is how enemy formations and intentions were broken by skirmishers.

Indirect artillery *on its own* cannot reproduce the effects of skirmishers. Two displays of artillery used against an opposing force (OPFOR) at the National Training Center (NTC) illustrate this point. In the first case I notionally apply artillery against an OPFOR formation depicted as it actually looked on an attack in the fall of 1994. The conditions are ideal for artillery as the OPFOR attacks through constricting terrain in column formation with a lead Forward Security Element (FSE) followed by the Advance Guard Main Body (AGMB). In this example, I use two notional artillery battalions that are timely, perfectly accurate, and never lose a gun.

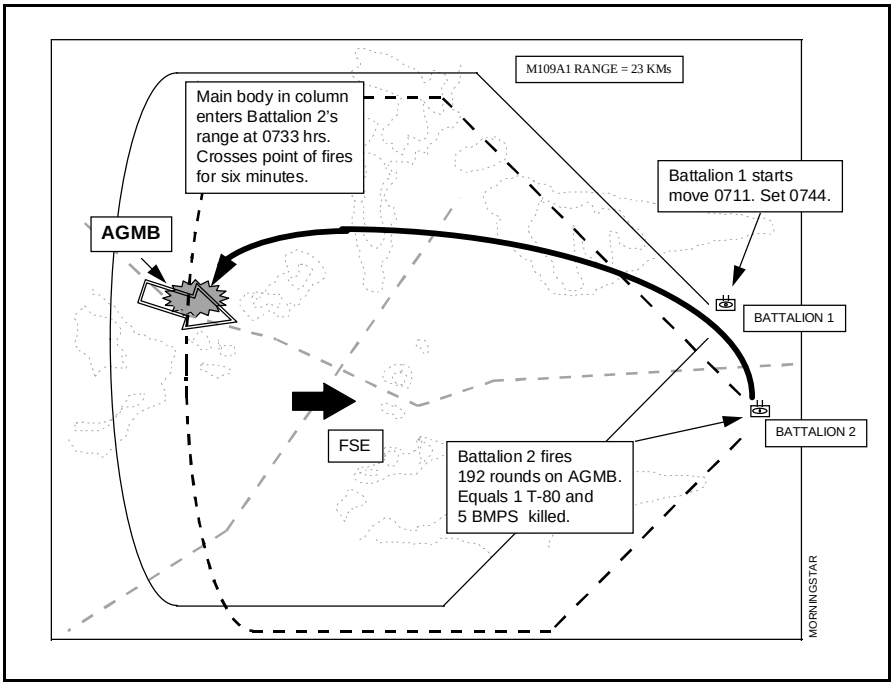



**Figure 2.** The continuing use of artillery in a perfect world.

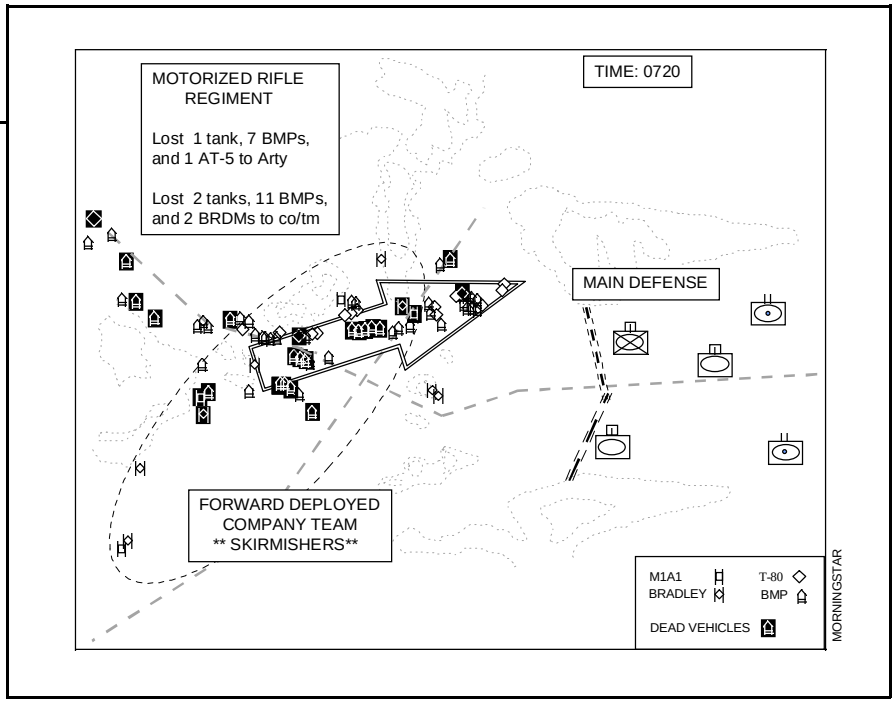



**Figure 4.** The Team skirmish line greatly increases enemy losses. Between 0620 and 0720, the entire enemy regiment advances only 9 kilometers.

In Figure 1, the first artillery battalion engages the enemy FSE as it enters the battalion's maximum range. The FSE, consisting of three T-80 tanks and seven BMP armored personnel carriers, takes 6 minutes to cross a point on the ground. If the 24-gun battalion fires on the FSE for 6 minutes, 192 rounds land on the FSE (3 rounds per tube for the first minute, 1 round per tube per minute for the next 5 minutes). By the standards set at the NTC, that translates into enemy losses of about one T-80 tank and five BMPs.

The minute it completes its fires, the battalion does a doctrinal survivability move to avoid enemy counterbattery fires. It takes a good battalion, under ideal conditions, about 15 minutes to break down, 3 minutes to move the minimum of 1 kilometer, and another 15 minutes to set up again. Add to this the 7 minutes the battalion will need to obtain its next target and we cannot expect to have the first artillery battalion available to fire again for forty minutes. While the M109A6 Paladin-equipped battalion reduces the time threshholds for all operations, the sequence of events remains the same.

Although we could use the second artillery battalion to continue pounding the FSE, we wait to fire on the AGMB. If we did engage the FSE, calculating as we did above, we would kill about one T-80, three BMPs and four AT-5 anti-tank systems. This battalion would then have to conduct a survivability move and may not be ready when the AGMB arrives. As it turns out, the FSE was scattered over nearly eight kilometers following our first strike and does not offer much of a target.

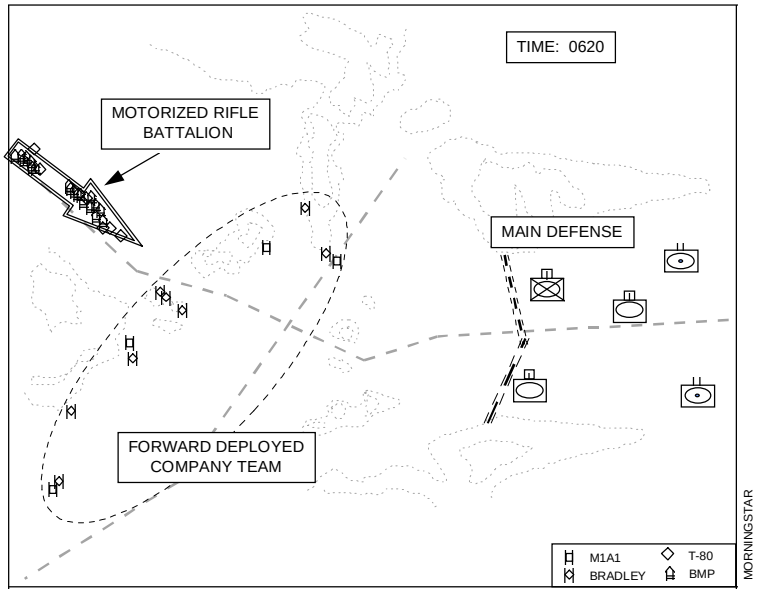
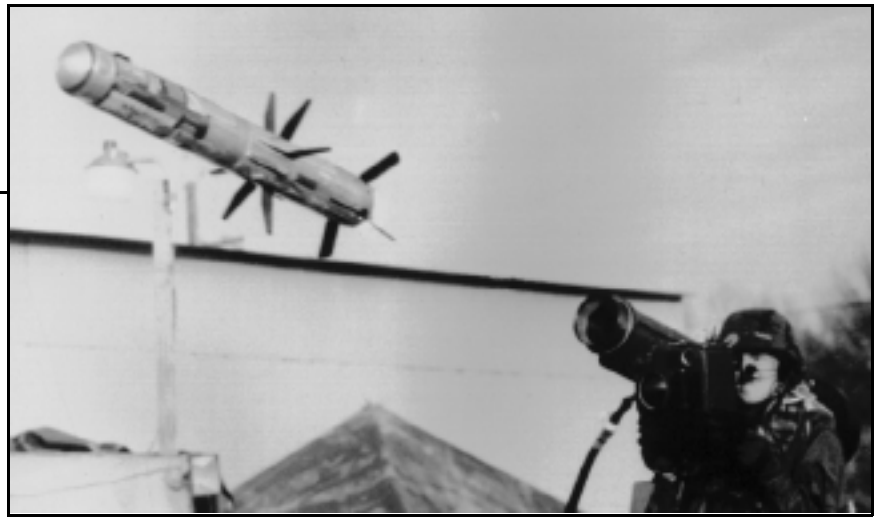



**Figure 3.** A forward deployed company team ready for the FSE is surprised by an entire motorized rifle battalion.

Meanwhile, in Figure 2, we see that the enemy AGMB enters the second artillery battalion's range at 0733 hours. If we calculate fires as above, the second artillery battalion would destroy one T-80 and five BMPs. We accept the risk of keeping the second battalion from moving until the first battalion is set to fire at 0740 hours. In the seven minutes from 0733 to 0740 hours the second battalion fires only an additional 48 rounds, enough to kill perhaps 2 BMPs if they could adjust fires on the moving target. Before the enemy enters the close engagement area range, the first battalion gets one more shot at the main body. Results: one more T-80 and five BMPs. Total enemy losses are: FSE lost one T-80 and three BMPs; the AGMB lost two T-80s and 12 BMPs. That leaves in these units about 10 T-80s and 28 BMPs rapidly concentrating on a point in our defensive line.

This scenario assumes perfect conditions for the artillery. The enemy attacks in columns right into our targets, we never miss, and we avoid counterbattery fires. Our survivability moves were only one kilometer, allowing us to recycle our artillery very quickly. In this perfect world we destroy about 23 percent of the enemy's tanks and 35 percent of his personnel carriers. In reality, ten to fifteen percent would be

*"The new breed of smart missiles are about to fundamentally change ground battle systems, organization, and tactics."*



very good. That is why, time and time again, we see brigade commanders who told their fire support planners to delay, disrupt, or worse, *destroy* the enemy disappointed at battles end.

Compare the results above with what happened in another battle at the NTC in the fall of 1994. A brigade in the defense had expected the enemy to attack with an FSE followed by a AGMB (Figure 3). They decided to place one company team forward of their main defenses as a screen line to engage and destroy the FSE and then fall back to a reserve position. The enemy, however, decided not to use an FSE; they led with a whole battalion.

As shown in Figure 4 the company team engaged the enemy battalion as it emerged from the passes. By the time they realized they had their sights set on something big, it was too late to fall back. The brigade's artillery had a better than average deep fight and killed one tank, one AT-5, and seven BMPs, which equates to about 8 percent of the enemy's tanks and 16 percent of his other systems. The forward-deployed company did even better, killing two tanks, two BRDMs, and 11 BMPs and raised the total enemy casualties to 23 percent of his tanks and 43 percent of his other combat systems. Remember also that part of the artillery's success resulted from the enemy's delay on targeted areas while his lead elements tried to deal with the forward-deployed company team. The forward company team was an ad-hoc skirmish line.

Imagine if the team employed above had been trained to execute as true skirmishers with fire-and-forget weapons. They could have planned to fire and fall back along the enemy flank in successive positions all the way back to friendly lines. What would be the compounded effects of targeting enemy lead, command, and engineering vehicles? How can such actions be tied into our indirect fire plan, obstacle plans, and close air support?

One of the problems preventing the proper employment of skirmishers has been the lack of proper weapons systems to do the job. The wire-guided missiles require crews to visually track the missile into their target and they are too cumbersome for the skirmish role.

When a BRDM fired a SAGGER at my company in the Gulf War, at least six tanks saw the flame of the missile's launch and fired at the BRDM **before its missile reached us.** Add the technical limitations of firing wire-guided missiles over trees, water, or snow and such missiles are impractical for use by skirmishers. Laser designators are vulnerable to tracking difficulties, too unwieldy for run-and-gun tactics, and require coordination for munitions. Current tanks are potential skirmishers but are better designed for shock weapon roles. Recent technological advances now offer a perfect solution for arming skirmishers.

The new breed of smart missiles are about to fundamentally change ground battle systems, organization, and tactics. One such missile, the JAVELIN, offers us the opportunity to gain tactical depth by adopting skirmishers. The JAVELIN utilizes an infrared seeker that takes only 10 seconds to cool down and can defeat smoke and fog. The missile flies 2,000 meters, then uses a top-attack flight path to strike the thin top armor of an enemy tank with a tandem warhead that also defeats reactive armor. Unlike wire-guided missiles, the JAVELIN can be fired over trees, water, and power lines. The fire-and-forget technology means the gunners no longer have to track the missile optically, so they can quickly move, set up, and engage with reduced risk of observation. It enables rapid direct firing against selected targets in enemy formations, thus increasing our ability to disrupt the enemy. With the latest communication and battlefield awareness technology, the effect of skirmishers directed by an informed commander can be like that of a scalpel in the hands of a surgeon.

Half a century ago it was common for big ships to carry big guns and close to within sight of each other to duel. Now smart missiles reach out and touch enemy ships. Fighter pilots who flew into the teeth of enemy formations to bring down bombers now release missiles from standoff ranges. Before long, it is possible that skirmish lines with smart missiles can similarly change armored warfare. These weapons and tactics are a critical step in the "smart weapon" revolution. Skirmishers can make a shot from such a weapon, to paraphrase Marshal Saxe, "worth at least ten from any other."

Major James K. Morningstar is a graduate of the U.S. Military Academy and Kansas State University. He has served in a variety of armor positions, including tank platoon leader and company executive officer in the 1-33 Armor Battalion in Germany, S4 in 1/4 Cavalry at Ft. Riley, and company commander of Delta Company, 3-37 Armor in the Gulf War. Before his current assignment, he spent three years as a brigade operations trainer/observer controller with the Bronco team at the National Training Center at Ft. Irwin. He is currently assigned as the Army Liaison to the Commander of U.S. Navy Second Fleet (Atlantic) on board the *USS Mt. Whitney* somewhere in the Atlantic Ocean.

# Maneuvering The Enemy

**by Captain Charles D. Starbird**

The dream is always the same... I am sitting through the after-action review at the end of a lost battle. Though most of my staff is half asleep, somehow I am still awake, probably because I am still angry.

They cheated! The OPFOR had so many unfair advantages. They seemed to know just where to attack us. The OCs probably told them what our plan was. It couldn't possibly have been my fault...

The senior observer/controller is telling us that we are a bunch of losers. That's some AAR technique this guy has: "Beating the OPFOR at the National Training Center is tough to do. Losers at the NTC criticize the advantages that the OPFOR has, including familiarity with the terrain and numerical superiority. They claim foremost that the 'real' enemy is not as good as the OPFOR, which is probably true. Our experiences in Southwest Asia seemed to uphold this idea. But it is also possible that we are cheating ourselves, that someday we could fight a well-trained, well-disciplined enemy with good equipment on his home ground. Hopefully, we would do better than most units do at the NTC."

I hate this guy already.

He starts to lecture us, and suddenly his face changes and he looks just like my old AOAC instructor (which is allowed to happen in dreams, I guess). His voice assumes that sleep-inducing tone that I remember from many tactics classes years ago.

"Sun Tzu wrote, 'All warfare is based on deception.' Current Army doctrine recognizes surprise as a principle of war, but our operational manuals give little guidance on how to achieve it. Another wise man once said that a commander can lose a battle, but only his soldiers can win it. Solid execution of the commander's intent is usually the most critical factor in the outcome of any battle. Unfortunately, all too often at the NTC the commander *does* lose the battle, despite the valiant efforts of his troops. A study of generalship illustrates a quality found in great commanders that our doctrine does not attempt to cultivate; for lack of a better term, I will call it the ability to 'maneuver the enemy.'

"FM 100-5 defines maneuver as the combination of fire and movement to obtain a 'positional advantage' over an enemy. Normally, we think of maneuver in terms of moving *our forces* to gain that positional advantage in order to destroy the enemy or accomplish our mission. Unfortunately, the enemy's ability to move his forces often thwarts our attempts to outmaneuver him. This may seem like an obvious point, but many commanders fail to take the enemy's free will into account when they are planning their schemes of maneuver. Sometimes the commander is led astray by his staff. Intelligence officers (S2s) are trained to predict the enemy's courses of action based on information that is often sketchy at best. Sometimes the enemy's movements are oriented on a specific terrain objective, but many times the enemy is only concerned with destroying our forces. The prediction that the enemy will come down a certain avenue of approach can lead the commander to take risk elsewhere. The enemy will then move his forces to exploit those weaknesses which his recon elements identify. The S2 who only looks at terrain and ignores disposition of friendly forces in his analysis of enemy courses of action is setting his commander and the entire unit up for failure."

Looking two seats to my right, I see my S2 weeping uncontrollably. To my left, my S3 is shaking his head and muttering "We should have wargamed it," over and over. Finally I have someone else to blame. I am about to rise up and defend myself when the OC speaks again:

"One way to impede the enemy's freedom to maneuver is to destroy his recon. If he doesn't know where you are, he cannot exploit your weaknesses. The OPFOR relies heavily on recon. One good technique that you used to deny his recon was positioning a large counter-recon force forward. Although this was a complicated operation, your soldiers executed it very well, and it could have forced the enemy to choose a course of action without complete information. Unfortunately, it was impossible to know if you had destroyed all of his recon elements, and if you did get them all, he could have just sent out some more. That is exactly what happened — one dismounted recon team called in all of your positions and obstacles. Thus, recon denial is only a partial solution to the problem of maneuvering the enemy."

Now I know for sure that this is a dream because an OC almost told us that we did something right. Suddenly, his uniform changes, melting away in a flash of light. As my eyes readjust, his face changes again and I am staring at Napoleon! He starts in French, but

changes to English in mid-sentence, "...so another way to influence the enemy's maneuver is to employ a deception plan. Current U.S. maneuver doctrine promotes the use of deception mainly in the role of force protection prior to battle. Deception at the strategic and operational levels is emphasized over tactical deception. Planners at brigade and task force level seem to see deception as an unneccessary complication and usually only plan it to support other deception plans from higher. Nevertheless, a successful deception plan can 'maneuver the enemy' to a position of disadvantage, allowing friendly forces to maneuver to destroy him. The key is to influence the enemy's decision-making process, convincing him to choose the course of action you want him to choose. One way to accomplish this is to portray strength where you *don't* want him to go by using obstacles, fake battle positions, false radio traffic, and denial of recon. At the same time, portray weakness where you *do* want him to go by allowing his recon and lead elements initial success there. This is exactly the tactic that I used in 1805 at Austerlitz to defeat a much-larger enemy force. Read about it sometime!"

I hate reading history, but I make a note to do a little research. I vaguely recall studying that battle in school — Napoleon tricked Alexander into exposing a flank, effectively maneuvering his enemy to a poor position and then annihilating him. Maybe with some more guidance, my staff could have created a deception plan. I decide to try it next time.

In the blink of a very tired eye, Napoleon becomes General George S. Patton. He looks a lot like George C. Scott. He continues with great vigor: "The last key to maneuvering the enemy is retaining flexibility. The deception plan must be combined with the flexibility to react if the enemy chooses a different course of action than the one you intend him to. A quick, lethal reserve is essential in order to mass your combat power at the critical place and time. You must plan all of the possible contingencies and identify the decision points for them. The reserve must rehearse and be prepared to execute all of them. Do not leave your reserve with the mission to destroy 'leakers' though the defense; the reserve is meant to be committed to the main fight. Remember, the enemy will mass his combat power, to include artillery and air assets, at one point to penetrate your defense. You must, either make him choose the point *you* want, or be flexible enough to get to the point he chooses with enough combat power to win. Covering all of the possible avenues is not enough; you must decisively defeat his main effort!"

Captain Charles Dodd Starbird is the assistant brigade engineer for the 2d Brigade, 1st Cavalry Division. He is a graduate of the Armor Officer Advanced Course. His past assignments include platoon leader, assault and obstacle platoon leader, company executive officer, and battalion maintenance officer in the 4th Engineer Battalion, 4th Infantry Division.

Suddenly, he vanishes. The generator outside dies, and the AAR van goes dark.

I am shaken awake by my executive officer, "Nap's over, Sir. We have an intel update for you. Looks like they're attacking a little earlier than we expected. The S3 is waiting for you behind Alpha Team. Your crew has the tank cranked. Good luck, Sir."

The sun is coming up as I ride out over the desert toward the artillery fire already pounding my main effort team. Rubbing my eyes as the sand blows into my face, I wonder what I was dreaming about. Four phrases keep buzzing through my head: maneuver the enemy!... deny recon!... use deception!... retain flexibility! I have no idea why they keep coming to mind, but it must have been a really bad nightmare — I feel like I didn't sleep at all.

## *ARMOR* and AOAC Are Going on the Internet

By the time this issue is in your hands, you will probably be able to access "Issues in *Armor*," a forum based on continuing discussion and debate of issues raised in this magazine.

It is expected that the issue selected will change several times a year. The first discussion reprints letters, articles, and comments on the effect the new IVIS system will have on command and control, a debate that continues in this issue's Letters column.

Browsers will be able to add their comments to the forum, which will be edited by the Armor home page administrator, thus furthering the discussion.

Some changes are currently being made improve the server's capacity, but as we go to press, the current address is:

http://www.awwg.org/~dave/armormag/cover.htm

The **Armor Officer Advance Course** is on the Internet. Incoming officers can review course content prior to arriving at Fort Knox, and can contact the AOAC cadre for further information or to ask specific questions about upcoming classes.

Some of the subjects covered include AOAC reading requirements, student-taught classes, book review format, scoring system, decision paper format, physical training, and the AOAC welcoming letter.

The AOAC home page is tied into the Fort Knox home page and can be found by using search engines for Fort Knox on the World Wide Web. The AOAC home page address is:

http://147.238.100.101//armsch/aoac1pg.html

The cadre e-mail address is:

AOAC@Knox-emh1.Army.Mil

# Tactical Employment Of the Heavy Mortar Platoon

**by Captain Matt Sebenoler**

A wave of apprehension washes over me. I sit in my office as the new battalion mortar platoon leader and think, "What the hell do I do now?" All around me, infantrymen prepare for the day's event: EIB training. I feel very alone. What happened to the casual days in the motor pool, doing important things like changing track and performing grease gun maintenance? What do you mean the gut truck doesn't stop here?

I feel like a fish out of water, but I have a plan. I lean back in my chair, clear my throat and say, "Hey platoon sergeant, how about showing me your FM 7-90?" He slowly lifts his head to meet my eye, takes a drag from his cigarette, chokes down at least a pint of the blackest coffee I have ever seen from a mug the size of a small mop bucket and says, "What's that...Sir?"

What had I gotten myself into this time?

Eventually, wedged behind a bookshelf, I found the manual I was looking for — FM 7-90, *Tactical Employment of Mortars.* I began to read.

Later that month, I attended Infantry Mortar Platoon Officers Course and learned everything I ever wanted to know about the 4.2-inch mortar. I was now an expert, in the Army's opinion. All I had to do now was prove it to somebody.

In all fairness to the reader, I will begin by giving you the doctrinal solution, FM 7-90, on how one should employ a mortar platoon. Then, I will proceed to tell you why little of this works, based on my experiences as a mortar platoon leader before, during, and after Desert Storm. I will also provide a tactical alternative to doctrine that proved very effective in combat.

Doctrinally, the mortar platoon breaks down into six squads of four men each; two fire direction centers, also with four men each; and a headquarters section with four men. Each squad rides into battle on an M106A2 Mortar Carrier, with a driver, ammo bearer, assistant gunner, and gunner. Each fire direction center rides in an M577 Command Post, with a driver, check computer operator, chief computer operator, and section sergeant. The headquarters section is the platoon leader and platoon sergeant, who each have a HMMWV, and their respective drivers. A simple math check tells you that the platoon has 35 enlisted soldiers and one officer. Uncle Sam, however, thinks you only need 34 enlisted. The first organizational problem was to find a driver for the platoon leader. No problem! Just take an ammo bearer from one of the gun tracks and drive on. But remember, one of your squads is now short a man.

The general concept of mortar employment is actually quite simple. The platoon operates as split sections. Each section will have three squads (three tubes), a fire direction center, a section sergeant, and either the platoon leader or platoon sergeant. The platoon leader is usually with alpha section, and the platoon sergeant is with bravo.

The purpose of this two-section approach is two-fold. First, splitting the platoon into two separate elements increases its survival chances, which allows the platoon to provide indirect fire for the battalion even if one section is destroyed. Second, it allows the platoon to accomplish its mission of providing responsive, accurate indirect fires to the battalion as these sections move by either alternate or successive bounds. After a section completes a bound, the platoon leader or platoon sergeant is responsible for ensuring that the section is properly laid. The platoon leader or platoon sergeant then leaves to recon the next position and prepare it for the next bound. The four-man fire direction team processes mission data in the M577 and sends this data to the guns via land line. That's basically it.

Of course, mortar platoons don't always operate in split-section configuration. They can act as separate sections as I've just discussed, as a whole platoon, or even as individual guns. The situation will dictate the employment technique. The important thing to remember here is that all this stuff is doctrine, and, as we all know, sometimes doctrine doesn't provide the best solution.

After reading FM 7-90, attending IMPOC, shooting a few live fires, and passing a platoon ARTEP, I felt pretty good about my platoon's ability to perform in combat if necessary. About a month later, we got a chance to prove it. Deploying to Operation Desert Storm woke me from my false sense of security and demonstrated that I had some serious problems. I wasn't as sure that all the pieces of the pie fit together properly within the platoon anymore, and I needed to evaluate its configuration.

According to the book, we were doing everything right, but my platoon sergeant and I agreed that we needed to make some changes. My platoon sergeant had served in combat during Vietnam and this experience proved invaluable to our reorganization process. "The first problem we got," he said, "is that all our eggs are in one basket." It took a full five minutes of verbal exchange between us before I finally realized what he was talking about.

Doctrine calls for three of the most important individuals in the platoon to ride in the same vehicle — the chief computer, the check computer, and the section sergeant. He was telling me that we should split this group up on separate vehicles to maximize the surviv-

ability of the fire direction center and the platoon's combat effectiveness. All this accomplished initially was to create more problems. We deployed to Saudi Arabia with many unanswered questions.

We arrived in Saudi Arabia, got our equipment from the port, and deployed to the desert. I understood the concept of separating the key personnel within the platoon to enhance its survivability, but I had trouble with one small subject. Where does everyone ride? This seemed like such a simple question while cruising the training areas at Fort Riley. Now, when the stakes were higher, this question became very difficult to solve. The problem, ironically, is the platoon leader and the platoon sergeant. Doctrinally, we accomplished our individual tasks while riding in our assigned vehicles: the two HMMWVs. The two section sergeants were the track commanders of the M577s and the computer operators also rode on these command tracks. During Desert Storm, my battalion commander restricted all HMMWVs to the field trains, effectively leaving us two vehicles short. Now I had to reconfigure the platoon's fire direction centers, establish new load plans for its equipment, and find a place to ride.

The platoon leader and platoon sergeant became the track commanders of the two M577 command posts. It was simply the only place where one could maintain control of the unit and talk to higher at the same time (more about this later). I moved the section sergeants to the lead gun track, where he took control of that track while the platoon maneuvered; the squad leader was still responsible for the gun and his soldiers during fire missions. Being in the first track allowed the section sergeant to quickly lay the section to fire because he was right there with them. He had the M-2 aiming circle with him on the track, allowing him to dismount and begin to orient the circle before the dust had settled. To finish our reorganization, I sent the check computer operator to one of the wing tracks. He had a mortar ballistic computer with him, and would act as the backup computer operator in case the chief computer operator was killed or wounded. The chief computer operator stayed with me in the command post, and assisted me in tracking the battle between fire missions. I was happy with this solution. I believed that the combat effectiveness of the platoon greatly increased with this new configuration. There remained one problem, however. If the command post was destroyed, how would I talk to higher? The only vehicles that had dual and green net (secure) capability were the M577s and the HMMWVs. Somehow, I needed to come up with some extra radios and a couple of Vinsons. Figuring that whomever got stuck driving my HMMWV in the field trains wouldn't need to talk to anyone, I stripped its commo system. I took this tangle of cables back to my platoon and managed to coerce a handy 31V communicator into installing it in one of my gun tracks. This track now had dual net green capabilily, and would act as my jump track if necessary.

Fully reconfigured now and prepared for battle, confidence was high as we crossed into Iraqi territory on the first day of the ground war. This confidence quickly abated, however, as the task force slowly but surely crept away from us. The fully loaded M106A2s could not handle the rapid pace of the tanks and Bradleys, and we were forced, once again, to modify doctrine. Instead of using alternate or successive bounds — otherwise common doctrinal movement techniques for a heavy mortar platoon — we displaced as a platoon and only stopped when required to shoot a mission. Although this action reduced the responsiveness of mortar fires, I felt that it was better than not having any mortars at all.

At this stage, we finally had it figured out. Our SOP went something like this: We traveled in a vee formation as far forward (usually behind the lead company/team) as possible. The M577 was in the center of the vee, providing command and control, and the company/team to our front provided us with frontal security. Upon receipt of a fire mission, I would orient the M577 to the approximate center of sector and stop. The computer operator immediately began to initialize the MBC and the M-16 plotting board. Noticing my hand and arm signals, the section sergeant would orient his track along the approximate center of sector and stop. He would then dismount, grab the aiming circle and emplace it. The other two tracks had positioned themselves by this time and the squad leaders prepared their mortars for firing. The ammo bearers quickly emplaced the aiming poles for their sights, ran to the back of the track, grabbed a loose end of wire from the DR-8 and sprinted to the command post to hook up for wire communications. The other computer operator had completed initializing his computer and co-located with the command post to act as check computer. At the peak of their proficiency during Desert Storm, this entire operation took less than two minutes for the platoon to complete.

As we all know, doctrine is simply a guideline. The SOPs and configurations I've discussed here are certainly not the best or only solutions to the many problems we encountered during the war with Iraq. They may not even be right! The key is that, right or wrong, good or bad, they worked in that specific situation. We knew our doctrine, but consciously deviated from it because the battlefield's conditions made modification necessary. We, as the leaders of today's Army, owe it to our soldiers to give them every opportunity to succeed and win in combat. This responsibility sometimes calls on us to make some hard decisions. It would be nice to believe that every decision you might be called upon to make was neatly laid out for you in some field manual. Of course, they are not. Our soldiers' lives and mission success depend directly on our ability as dynamic leaders to adapt existing doctrine to the specifics of each new battlefield and, ultimately, to the accomplishment of the commander's intent.

Captain Matthew Sebenoler wrote this article based on his experiences in combat while acting as task force mortar platoon leader for 3d Battalion, 37th Armor, 2d Brigade, 1st Infantry Division. He was commissioned in 1988 from the U.S. Military Academy. A graduate of the AOAC, AOBC, IMPOC, BMOC, SERE, Air Assault, and Ranger Courses, he served as a tank platoon leader, mortar platoon leader, tank company XO, and S3 air for 3-37 Armor at Ft. Riley, Kan. After AOAC, he served as the S3 air and C Company commander, 2d Battalion, 67th Armor, 1st Armored Division.

# Bosnia (Continued from Page 10)

Russian Army LT Alexander Woistinov, a BMD-2 platoon leader, with his vehicle, which at less than 8 tons effectively negotiates the Bosnian road network. The Russians also employ 8-wheeled BTR-80 APCs for patrols.

Another accident that could have been prevented with a mine roller tank involved a Swedish Pbv-302 APC which struck a single TMA-3 antitank mine (6.5kg explosive) in the zone of separation. Unfortunately, two Swedish infantrymen lost their legs in this accident.

However, mine rollers off-road are another story. SFC Michael A. Tucker, 2nd Platoon, B Troop, 1st Squadron, 4th Cavalry, reported that the mine rollers bog down in off-road areas where the soil is more likely to be soft or muddy.

The use of tanks and APCs in mountainous areas is very limited. M1 tanks and M2 or M3 Bradley fighting vehicles are simply too heavy and too wide to operate effectively in the mountainous Bosnian terrain. LT Graehme Parnell and his lead scout, SFC Frederickson, 1st Platoon, B Troop, 1st Squadron (formerly 3d Squadron), 4th Cavalry, reported that much of the mountainous road net in the 2d Brigade sector is inadequate to support M1A1 tanks and M3 Bradley CFVs. Many of these mountainous roads are barely wide enough for the CFVs — SFC Frederickson noted that an M3 CFV collapsed the shoulder of the road at one location, which damaged the roadway, prohibiting further passage. LT Parnell also reported that most of the bridges on these mountain roads are constructed with local timber and are barely strong enough or wide enough for passage by CFVs. Another example cited was an "S" turn which could only be traversed with a CFV going downhill. They also reported that on one narrow road a smoke grenade launcher was ripped off while the vehicle hugged the side of the cliff to avoid falling off the roadway.

The author, with Swedish Army LT Christof Reychman, his interpreter, standing in front of a Finnish SISU 6x6 wheeled APC. The v-shape of the vehicle's hull bottom deflects mine blast effectively.

LT Parnell reported another noteworthy incident in which some vehicles of the 501st MI Battalion were attempting to go to a snow-covered hilltop in the B Troop sector. They were unable to get some of their HMMWVs up the hill, despite equipping them with tire chains. Six of the HMMWVs had to be towed by LT Parnell's M3 CFVs to get to the top. MAJ MacFarland, XO 1/4 Cav, also reported an incident with a HMMWV descending Mt. Vis, east of Tuzla; the vehicle overturned on a snow-covered road and crushed the driver.

The mobility situation has improved by the mid-March arrival of M973A1 vehicles for use in the 2d Brigade's sector. Had M973A1 vehicles been issued earlier, the accident on Mt. Vis could probably have been avoided.

After conducting a patrol with an M973A1 SUSV, LT Parnell reported his findings in the letter dated March 21, 1996. In his summary, LT Parnell stated, "The BV-206S is an ideal vehicle for Operation Joint Endeavor. It provides adequate protection and firepower for the peace enforcement mission. However, it should be used in conjunction with tanks and Bradleys to convey the overwhelming firepower image. Most importantly, it provides the mobility needed to access secondary roads, cross MLC <30 bridges, and climb snow covered mountains..."

In spite of these problems, the job of patrolling the zone of separation is being accomplished remarkably well, especially with air cavalry in conjunction with ground cavalry. The two air cavalry troops in each cavalry squadron (1/1 Cav and 1/4 Cav) are performing very well in covering those areas of the zone of separation which are not easily reached by each squadron's three ground cavalry troops. LTC Greg Stone, CO, 1st squadron, 1st Cavalry, reported that both air cavalry and ground cavalry troops are doing a superb job in the 1st Brigade's sector. The OH-58D (Kiowa Warrior), with its mast-mounted thermal imaging system, can patrol the zone day and night. The firepower of the armed OH-58D, along with the awesome firepower of the 4th Brigade's AH-64 Apache helicopters, is also an effective deterrent.

Lighter combat vehicles in TF Eagle have been more successful in adapting to the limited mountainous road nets. For example, the Finnish SISU 6x6 wheeled APC being used by the SWE-

Mine damage to Danish Leopard I.

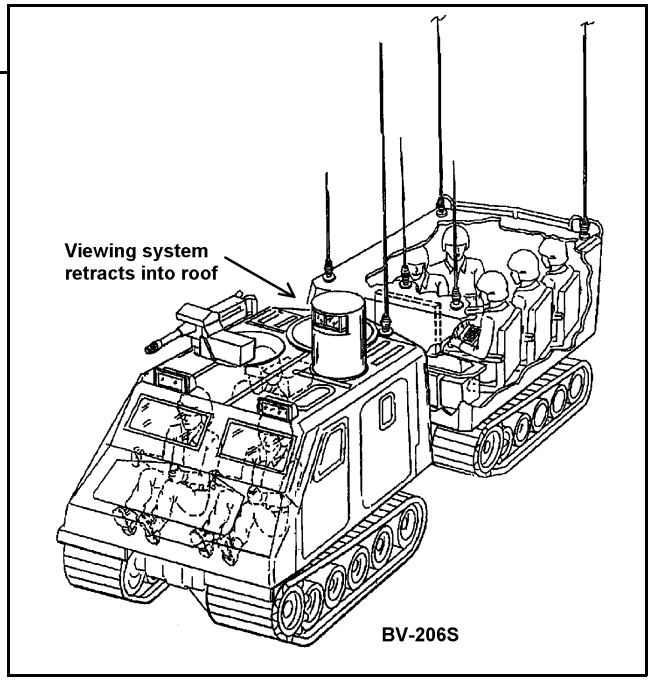
BAT, and the Russian BTR-80 are doing a good job in patrolling the roads in the zone of separation. The SISU has also demonstrated better survivability when striking an antitank mine. The SISU's "V" shaped bottom apparently deflects the blast toward the sides. In one mine encounter in SWEBAT's sector, the crewmen were not seriously injured. Moreover, these wheeled APCs are less likely to tear up the roads, compared to tracked APCs.

The lighter tracked vehicles of the SWEBAT and Russian airborne battalion are also well suited for Bosnia's limited road nets. The Russian BMD-2 and the Swedish BV-206S, weighing less than 8 tons each, are able to negotiate the narrow roads and small bridges and have better cross-country mobility. The demonstrated performance of these two lightweight tracked vehicles are worth remembering when considering the future scout vehicle (FSV), which has emerged as TRADOC's highest priority vehicle requirement. Lessons learned from Bosnia will undoubtedly have an impact on the development of the FSV.

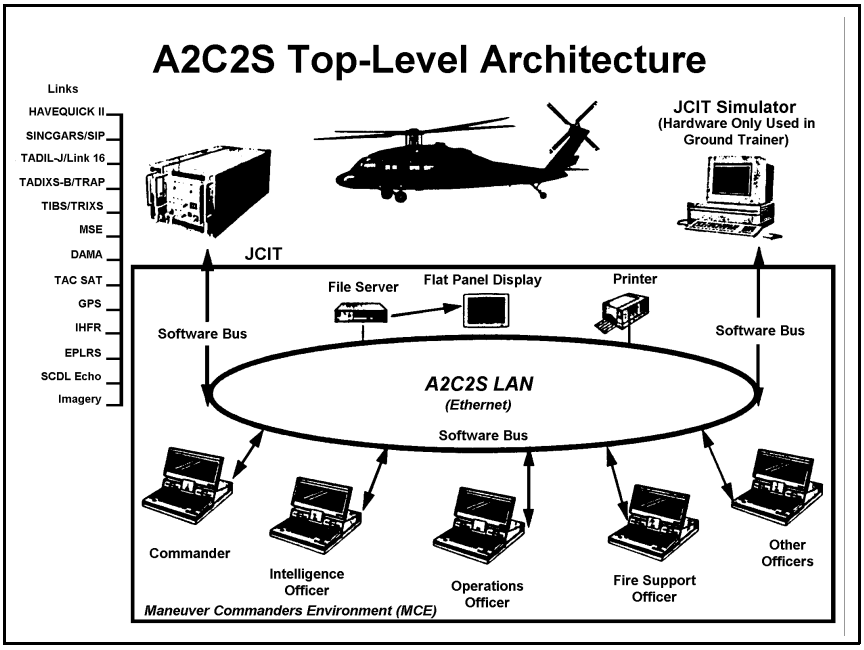
### The Future

Based on what I saw in Bosnia, I am more convinced than ever that wheeled scout vehicles, such as HMMWVs, be replaced with light tracked vehicles in the scout platoons of the maneuver battalions. The same is true for the HMMWVs of the division MI, air defense, and signal battalions. As mentioned above, this same conclusion has been reached by the 2d Infantry Division in Korea, which also must operate in mountainous terrain. HMMWVs sometimes can't get to where they need to be — on high ground to perform their missions. Most would agree that having to tow HMMWVs to mountaintops to do their job is unacceptable.

As illustrated in my article in *ARMOR*'s July-August 1994 issue, an articulated vehicle such as the BV-206S is the right way to go for a future scout vehicle. LTG Timmons, CG, Eighth Army and CofS USFK, has requested funds for the Naval Research Laboratory (NRL) to assemble scout and command and control variants of the BV-206S for assessment by the 2d ID in Korea, prior to acquiring the larger number of BV-206S vehicles that their staff study indicates they need.




Proposed battle command variant of the BV-206S, an armored version of the Army's M973A1. Schematic of command and control architecture is seen below.




The scout and battle command variants of the BV-206S envisioned have the same external configuration so that the command variant will not stand out as a "signature vehicle." NRL, developer of the U.S. Army's Airborne Command and Control System (A2C2S), intends to include the A2C2S C41 suite in the BV-206S, which will allow the commander to operate either from his UH-60 Blackhawk or from his BV-206S battle command vehicle, which can take him to a mountaintop to "see the battlefield" with the 2d-generation FLIR, and function with his command group from a single vehicle.

The scout version of the BV-206S will also have the same 2d-generation FLIR and abundant communications capability using the same Joint Combat Information Terminal (JCIT) as A2C2S. The BV-206S is capable of being carried internally in CH-47 and CH-53 helicopters, which will enable the scout to be employed deep (up to 100 km beyond the FLOT as required in the FSV mission need statement). The scout version would reduce the workstations in the rear car, from 5 to 1 or 2, to enable carrying up to three remote sentries, the imagery of which can be monitored from the remaining

workstation(s). JCIT can also receive imagery from OH-58D scout and AH-64 attack helicopters. Some of those operating in Bosnia are equipped with this feature and are operating in theater.

The U.S. Marine Corps also has a need for a helicopter-transportable future combat vehicle (FCV). LTG Zinni, CG, I Marine Expeditionary Force (MEF) recently sent a letter to LTG Timmons, CG, Eighth Army, stating that when the 2d ID validates their need for BV-206S vehicles, that the I MEF would also need the BV-206S for their reinforcing mission in Korea.

### Summary

Task Force Eagle is doing an excellent job in its peacekeeping mission in Bosnia. I was very much impressed with the cooperative spirit and professionalism demonstrated by all U.S. and allied units that I visited. The troops are highly motivated and their morale is high. GEN Joulwan, SACEUR, said in a recent article: "With Russia and others willing to participate in IFOR, we have a real opportunity to help achieve a lasting peace in the Balkans, and thereby take one step closer to a stable and democratic Europe."

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Colonel Charles Lehner, (USA Ret.) commanded tank and armored cavalry troops in Korea, Germany, and CONUS, and was operations officer of the 2d Armored Division's aviation battalion. He also served as Chief, Weapons Technology and Concepts Division, Tactical Technology Office, Defense Advanced Research Projects Agency. He holds a B.S in Mechanical Engineering from the USMA, and an M.S. in electronics engineering from Georgia Tech. After his retirement from the Army, he has been director of combat vehicle development for AAI Corporation, a consultant to Sandia National Laboratories and the Draper Laboratory, and is currently a consultant for the Naval Research Laboratory, working on $C^3I$ architecture and the Army Airborne Command and Control System contract for the Army's Project Manager, Advanced Engineering Concepts.


# LETTERS (Continued from Page 4)

page design isn't much like a zone recon, at a conceptual level there are many lessons the Army can learn (for free!) from the experience of private industry in the very difficult time it's had at maximizing the effectiveness of expensive new technology.

Very generally speaking, below are a few of the many "lessons learned" and other issues I've identified from private businesses as they apply to the armored force of tomorrow:

**Information is a strategic and tactical resource.** Remember the discount airline, People Express? American Airlines put them out of business with the help of its ticketing and aircraft routing computer system. American was able to use its information system to undercut People Express on key routes while recouping losses on others. Likewise, the digitized battlefield commander of the near future must be able to use "strategic" information about the enemy — obtained by satellites, JSTARS, scouts, or contact reports — to effect the battle at key tactical points. His ability to use information effectively and thereby "win" the information war will give him a decisive advantage over the enemy.

**Data overload vs. just enough of the right information.** Although data (raw facts or figures) is nice, information (data with context and meaning) is what we're after. The solution is to identify the core of what individuals need to know to do their jobs effectively and then make sure those people get it. Although my commander today would say that we platoon leaders don't report enough, the future commander may encounter information overload from having so many data sources (as mentioned above) trying to send him information all at once. Although something like IVIS can enable us to pass reports more efficiently, the question is, are we really passing the right information? For example, can we do better than the SPOTREP? Does it convey the right information? If we're not telling commanders or subordinates what they need to know in a format they can use, we're just filling the air with bogus FM waves more efficiently than we did before.

**E-mail and the demise of middle management.** E-mail (or electronic mail, for the unconnected) is the latest implementation of the "asynchronous communication" concept. "Asynchronous communication" means that the sender and the receiver don't have to talk to each other at the same time to communicate. E-mail, as the modern version of this concept, enables upper level management to communicate inexpensively and instantaneously with their employees. Likewise, an employee can reply directly, without having to go through layers of bureaucracy. The combination of quick communication and a better educated workforce has resulted in the position of "manager" becoming irrelevant in many companies. The effect of this phenomenon has been to "flatten" organizational hierarchies, thereby enabling quicker response to changing situations. If battalion commanders, by virtue of the information they have available, become more situationally aware (as CPT Bateman suggests) than company commanders, then what would we need the company commander for? If we can't come up with a good answer, then maybe the company commander position would go the same way as that of the private industry middle manager. Likewise, if we were able to "plug in" platoon leaders to the same information sources and train them accordingly, we would reduce the role of CPT Bateman's battalion commander to the simple position of report-passer. Since all of that can be automated with information technology too, what would we need battalion commanders for? In this new scenario, platoons would be enabled to operate in the finest traditions of *auftragstaktik* while being even more responsive than before to the distant command control cell of your choice (brigade, division....?). At the macro level, we can apply the same concept. Corps and MACOMs would also become irrelevant, as DA would have situational awareness of brigades deployed world-wide. The bottom line is that information technology will get us to the point where the layers of command and control that we rely on today to make decisions and pass information will

no longer enhance, but hinder, combat effectiveness.

Greater efficiency and effectiveness gains (read as combat effectiveness) are obtained by reworking old procedures rather than by "paving a cowpath with silicon." One of the most expensive lessons private businesses have learned is that, if you automate procedures which don't work or are only moderately effective, all you've got afterwards is automation which doesn't get the job done either. To date, we have digitized a battalion plus support elements, but the orders process, tactics, and procedures are not substantially different than they were decades ago. We will see the gains we expect to see ONLY when we make information technology support the way we want to fight tomorrow, instead of applying information technology to the way we fight today.

If there's one thing I've learned in the Army, school, or the workplace, it's the value of asking the right questions. In many respects, the Armor community has not framed the Force XXI debate properly. Instead of asking, "what do we do with this technology?" the question should be, "how do we want to accomplish the mission, and what information technology do we need to do that?"

In closing, consider a historical example of the application of a new technology. Between World War I and II, the cavalry school conducted field exercises where house-mounted cavalrymen would be trucked, horses and all, to battle. However when the battle was joined, it was anticipated that the trucks would be abandoned and the cavalryman would ride his mount into combat, as cavalrymen had for centuries. Today we realize the futility of attempting to turbocharge horses. Let's not make the same mistake and attempt to plate our tanks with silicon.

1LT ANDREW D. GOLDIN
A/1-158 Cav (Recon)
Maryland ARNG

## *Auftragstaktik* Is Not Dead

Dear Sir:

As a future company or troop commander, I read CPT Robert L. Bateman's article (Jan-Feb 96) with some concern until I realized that the situation he is describing exists now, in the non-digital chain of command. The challenge of granting company- and platoon-level leaders the authority to execute the mission is a leadership question for the battalion or squadron commander and has little or nothing to do with digitization. The *Auftragstaktik* concept implies centralized planning, decentralized execution. The digital battlefield shortens the planning cycle and optimizes decentralized execution.

Digital communication allows us to bring initiative, agility, depth, synchronization, and versatility to an increasingly lethal and empty battlefield. Digitization shortens our decision cycle, but does not fundamentally change our culture.

The concern CPT Bateman is expressing is valid since the way we fight will change, based on the information available to Force XXI commanders. Where the commander positions him or herself on the battlefield has been the subject of debate in professional military circles since before Alexander the Great. Digitization just adds another factor to the commander's planning process. What we may find in the Information Age is that, just as there are virtual communities, there will also be virtual locations on the battlefield. CPT Bateman is right — the commander will be able to "see" more of the battlefield from a purpose-built command vehicle than from a HMMWV or Bradley on the frontline. What we must change is the paradigm that the commander must be forward with his troops to best command. The commander, as always, must position himself where he can best visualize the battlefield and COMMAND.

Leaders must always balance directive with informative communication. This is true from platoon leader through general officer. In response to CPT Bateman's examples, why is the battalion commander on the platoon net, anyway? The battalion commander, instead of saying "Platoon X, orient left and destroy enemy forces there," should say, "Company Y, there is an enemy force on Platoon X's left flank; destroy it." The company commander learns that his battalion headquarters is doing its job, providing him with information and a mission. The soldiers (over time) learn that, even though to them the battlefield looks empty, someone at battalion is watching out for their safety and making the RIGHT decisions at the right time. Besides, the company commander is then free to manever his platoons to accomplish the mission, and the platoon leaders are free to maneuver sections and teams. *AUFTRAGSTAKTIK!*

1LT KEITH E. BESHERSE
Assistant S3
2-17 Cavalry
Ft. Campbell, Ky.

## Do We Still Test Station 5A?

Dear Sir:

When was the last time that anyone in an armor battalion heard, "The purpose of this test is to evaluate your ability to clear the main gun, and remove, disassemble, assemble, install, perform a function check, and conduct a firing circuit check on the M256 breechblock."

Can't remember? Why is that? Well, an informal poll, conducted on Ft. Knox, indicated one reason. The breechblock or associated parts get damaged or lost during the test, rendering the vehicle non-mission capable for an extended period of time. The three most common parts that get damaged are the firing pin, the plunger, and the extractor shaft.

The firing pin is usually broken during lowering of the breechblock or installing the breechblock. If the crewman doesn't remove the firing mechanism prior to lowering the breechblock from the breech mount, the firing pin will be snapped off. This also occurs if he installs the firing mechanism when the breechblock is on the floor prior to installing it back into the mount. It is also broken if it is set on the ledge of the turret, causing it to fall on to the floor.

How can this be prevented? One way is to ensure that the crewman and evaluator are properly trained and made aware of critical points in the test that may result in damage to the equipment. Another way is to add a warning box prior to step W in the -10 indicating that the firing mechanism must be removed prior to doing step W. Also a warning box prior to step A indicating that the firing mechanism should not be in place. As far as preventing it from falling, placing it in the flashlight holder at the TC's station is one of a few solutions.

The plunger gets stuck up in the breech mount or shoots out into the turret, rolling under the turret sub floor.

What causes this? Sometimes the plunger gets burred or damaged during routine maintenance when using a screwdriver to push it up into the breech mount. It slips off, causing it to burr so that it will not release from its slot when trying to remove it during step S of the -10. Use the fabricated plunger tool instead of the screwdriver. *PS Magazine* has the instruction for fabricating a plunger tool.

The extractor shaft gets bent against the 7.62 ammunition stowage box and radio rack while the crewman attempts to lower or raise the main gun because he fails to completely remove the extractor shaft from the breech mount. Generally, when the crewman installs the shaft and finds that it is not aligned properly, he attempts to lower or raise the main gun without removing the shaft, causing the shaft to get bent against the 7.62 ammunition stowage box and radio rack. This can be prevented by simply reading the cautions in the -10 prior to step T and by adding that same caution prior to step G.

Does breaking or damaging any of these parts warrant a reason for not testing this station? A firing pin costs $11.58, a plunger costs $10.20, and an extractor shaft costs $223.00. They take, on average, anywhere from 21 days to 90 days to come in. Each duty station varies in the amount of time it takes to receive parts. The cost of the part is not significant enough to stop us from training or testing this station. However, the amount of time the vehicle is down awaiting parts could have an impact on this. A soldier is trained to clear, disassemble, assemble, perform a function check, and load his individual weapon. The tank crew should keep the same standard when

maintaining their main gun. It is the price of our profession.

CPT RICHARD R. ROULEAU
HHT, 3/16 Cav, Ft. Knox, Ky.

SGT CARL L. WANDREI
C Trp, 4/16 Cav, Ft. Knox, Ky.

## Maneuver Warfare: Just "Buzz Words?"

Dear Sir:

I just finished reading Captain Vandergriff's article, "The Exploitation from the Dieulouard Bridgehead," in the September-October 1995 edition. I found the whole article interesting, but I agreed with very few of Captain Vandergriff's conclusions. My focus of disagreement can be summed up in two small words: "buzz words."

I would like to find, somewhere, a clear definition of "Maneuver Warfare," and, yes, I have read the book. So far as I can find, it appears to be gettin' there fastest with the mostest, attacking the bad guys where they ain't, and supporting the guys that do the best. All of these make simple common sense. Unfortunately, the advocates of "Maneuver Warfare" can't stop there — they seem to feel that by a suitable application of buzz words and other adjectives, they can both supply a coherent doctrine and cure the common cold.

History is not, despite what we like to think, perfect 20/20 hindsight. There can be little doubt that the exploitation from the Dieulouard Bridgehead was a successful operation. I submit that the reasons that the operation was successful are because of combat-hardened men, a weakened enemy, and outstanding leadership. We might fault General Eisenhower or General Patton, but we were not there, and Monday morning quarterbacking will not change the fact that we won that war.

I am all for a stable manning system that promotes excellence and weeds out incompetence. I am all for keeping doctrine up to date with technology. I have never been, am not now, and will never be in favor of replacing successful doctrine with buzz words and euphemisms.

SFC MATT STANCHFIELD
B/1-163 IN, MTARNG
Butte, Mont.

## DMA Seeks Input from Field

Dear Sir:

I am a cartographer with the Defense Mapping Agency (DMA) here in St. Louis.

Recently, my newly-formed team completed team training. As a result of this effort, we are is seeking input from the users of DMA products so that we might improve those products. Being in dialogue with our customers would give us an improved sense of purpose.

I am seeking comments from your readers. Already, one soldier has told me that he uses a magic marker to mark the grid values on 1:50,000 and 1:100,000 scale TLM maps to make them easier to see.

Are there any ideas out there from one person or a small group which allow them to outperform others? These new ways, if adopted by all, could result in everyone being more successful. New ideas might save us $$$ or you lives.

If your readers would like to learn more about DMA products, e-mail: CoghlanT @DMA.gov for a DMA Corporate Report. I can be reached at CarlsonW@DMA.gov.

BILL CARLSON
Defense Mapping Agency
St. Louis, Mo.

## New Systems Will Anticipate Logistics and Maintenance Needs

Dear Sir:

I read with interest the article, "Regenerating Combat Power at the National Training Center," published in the January-February 1996 issue. We in the Ordnance Corps agree with the maintenance problems encountered by units not only during rotations at the NTC, but in any training or field environment.

I believe it is important to outline to the Armor community that the Ordnance Corps is addressing these problems by leveraging technology, a long-term, definitive solution to the maintenance problems we are experiencing. Several concepts are already in the works to overcome many of the specific maintenance challenges presented in the article. While these enablers are being developed, you can rest assured that the Ordnance Corps will continue to work diligently and intelligently to maintain readiness for Armor.

Currently, we are developing diagnostic/prognostic modules and sensors to capture and report maintenance problems. This concept, being worked with commercial manufacturers, will also anticipate repair part needs and provide an automated link to the appropriate support personnel for action. We will use laptop computers to extract this data, then analyze, troubleshoot, order, and transfer data via various automated communications systems. This has shown very real potential for creating a total anticipatory and situationally-aware logistical and maintenance environment.

We are also developing interactive modular test and diagnostic/prognostic equipment which can be carried and operated by a single person. This equipment can be used for both troubleshooting and training at all levels of maintenance. The same equipment will be used in both field and garrison locations, with information transmitted via satellite or Internet. This technology is available today and is currently being tested or scheduled for testing.

Another example of our initiatives to improve customer support is a device known as the Digital Diagnostic and Prognostic System (DDAP). This system, being worked with the Mounted Battle Lab, is essentially a small sensor mounted on tank engines to collect, store, and analyze turbine performance. The DDAP can alert maintainers to potential, pending catastrophic failures, and also (via SINCGARS) provide real-time ammo and fuel status to logistical support activities.

All of these systems will not only provide considerable savings in manpower and monetary resources, they will also improve our ability to anticipate battlefield logistical and maintenance requirements. This means increased readiness for the supported armor unit.

The Ordnance Corps also has, in the early stages of development, a Standard Maintenance System (SMS). This will replace the current non-interactive system (SAMS/ULLS). Electronic Technical Manuals are being produced on CD ROM, eliminating the need to maintain bulky, paper technical manuals. With the addition of the capability to interact with the current ULLS-G system, the soldier can order his repair parts from the same system.

As players in the Combined Arms Support Command ongoing initiatives in Battlefield Distribution and Velocity Management, we are working to significantly improve order ship time, asset visibility, and the rapid delivery of critical Class IX repair parts.

These are exciting times as we move into the 21st Century. We must leverage technology to improve our maintenance and supply processes. While this will not solve all of our maintenance problems, and obviously won't solve our problems of today right away, we firmly believe that these types of enablers will make us more efficient and effective in serving our soldiers and meeting the demands of the maneuver commanders. The result is increased combat power.

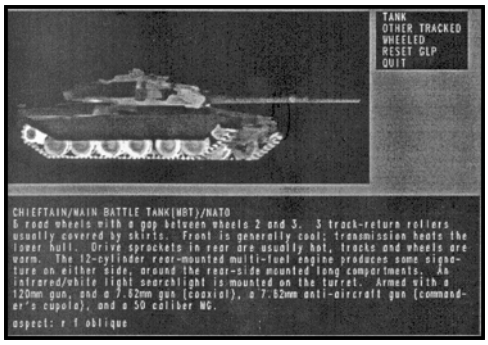
ROBERT D. SHADLEY
BG, USA
Chief of Ordnance

### Armor/Cav Gunnery/Training Doctrine Answers

Any question pertaining to Armor/Cav gunnery/training doctrine should be addressed to: Gunnery Training and Doctrine Branch, Ft. Knox, Ky., DSN 464-1736/5807/5765, Commercial: (502) 624-1736/5807/5765, FAX: (502) 624-5708; e-mail: ATSBSBEE@knox-emh1.army.mil.

***Software Review***

# The Combat Vehicle Identification TIS Training Package: A Thermal Identification Trainer That's On Target!




While thermal sighting systems have increased our ability to acquire and kill targets on today's battlefield, these systems have also presented us with a unique training challenge. How do we train our soldiers to positively identify combat vehicles using thermal sights?

Now, there is a solution, the Combat Vehicle Identification TIS Training Package, developed by E-OIR Measurements Inc. and the United States Army Communications-Electronics Command, Night Vision and Electronic Sensors Directorate. This superb thermal software-based identification trainer teaches a soldier to understand the basic principles of thermal signatures and how to recognize the signatures of fielded U.S., NATO, and former Soviet Union armored and wheeled vehicles. It is ideal for use at the company level, and is easily integrated into a unit's gunnery program. Ultimately, it will help reduce the risk of fratricide on the next battlefield.

In my opinion, this a company commander's and master gunner's dream come true. The software presents 30 vehicles, both wheeled and tracked, including the T-80, BMP-1, M1A1, and HMMWV, to name a few. All of these vehicles can be viewed in both daylight and thermal modes, from ranges of 500 to 3000 meters, and from three different aspects (frontal, right front, and left rear). As we all know, thermal identification of vehicles is difficult, and oftentimes cannot be successful because of range, camouflage, and climatic conditions. However, teaching our soldiers to understand thermal signatures and thermal cues improves the chances of positive identification on the next battlefield. This program provides the closest representation of thermalized targets that I have seen. Undoubtedly, using an actual vehicle with TIS is better, but this is the next best thing.

As I began to use the system, I was quickly humbled. My vehicle identification skills were immediately put to the test. This was not just some neat computer game; this was a serious training tool. My learning curve was steep. After a few hours, I was able to identify, or at least classify, target vehicles at 2000 and even 3000 meters. Those "green hazy images" started to make sense, and my thermal identification skills steadily improved. It didn't take me long to determine that this was a training tool that could benefit all armored soldiers.

The Combat Vehicle Identification Training package is a DOS-based program that requires a 386 or higher CPU, super VGA display, and at least four megabytes of RAM. Additionally, the user has the flexibility to choose from three different installation options. The first is the complete package, and requires 34 megabytes of hard disk space. The second bypasses the Signature Understanding Module and requires only 17 megabytes. The third option installs the Signature Understanding Module as a standalone package and requires only 11 megabytes of hard disk space. However, to fully utilize the strengths of the program, I recommend installing the entire package if space permits.

The training is separated into six modules. After gaining familiarity with the program, and based on a soldier's particular training needs, he is able to directly access a module without having to progress sequentially through all of the training. The following is a synopsis of the training modules:

**Sensor Description -** This module gives the user a brief explanation about the TIS and allows for practicing thermal focusing skills.

**Signature Understanding -** This module provides the fundamentals of thermal signatures. The computer displays vehicles at close ranges, from the front, right front, and left rear, as viewed through the TIS. This allows the soldier to better understand the common thermal cues that allow him to positively identify a vehicle. At the bottom of the screen, a dialogue box displays additional information about the vehicle, such as distinct thermal and visual cues and vehicle armament.

**The Training Module -** This module is the core of the training package and probably the most valuable. The soldier can compare and contrast up to three different vehicles at once. These vehicles appear at various ranges and from three different aspects, both in daylight and in thermal mode. For instance, an M1, a Leopard 2, and a Chieftain can all be viewed together from a frontal aspect at 500 meters. Additionally, a dialogue box again appears at the bottom of the screen and displays pertinent characteristics of each vehicle.

**Self Testing -** This module allows users to test themselves. Targets appear at different ranges, and from different aspects. The user must select the target classification, either tracked or wheeled, the aspect from which the vehicle is being viewed, and vehicle nomenclature. The observer is allowed 15 seconds to respond. A correct answer allows the observer to continue, but an incorrect answer is identified with a beep, and his wrong choice is identified alongside the correct answer. The dialogue box again appears to allow for a more detailed comparison.

**Test Generation -** This module enables the user or instructor to choose the test desired. Users can pick from several test variations, including randomly generated tests, or they can develop their own test. For instance, a master gunner could generate a specific test that would focus on a specific training objective, such as only tanks at ranges of 1500 meters or greater.

**Scored Testing -** This module provides a formal test and records and reports the user's results. No feedback is given during this test, and there are no computer-imposed time constraints. Upon completion of the test, a formal report is printed that displays the correct response adjacent to the user's response. A summary breaks down the results and scores the test according to target classification, target identification, and target aspect.

The Combat Vehicle Identification TIS Training Package is an outstanding thermal identification trainer. It answers our need for thermal signature identification training, is user-friendly, and most importantly, is ours for the asking. To receive a copy of this software, provide a written request on unit letterhead with your intended use for the software to:

Director, NVESD
10221 Burbeck Road, Suite 430
ATTN: VISPD-O'Kane
Ft. Belvoir, VA 22060-8060

You may also FAX your request to: (703) 704-1753, ATTN: B. O'Kane. Distribution is limited to DOD components and DOD contractors.

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*Captain Robert S. Hughes is a 1986 Graduate of Fordham University ROTC. He has served as platoon leader and XO, D Trp, 2-10 Cav, Ft. Knox, Ky.; Senior Class Advisor, AOB 14-91, Ft. Knox, Ky.; and Commander, A Co, 1-37 Armor, FRG. He is currently Armor Advisor to 2-163d Cav, Montana Army National Guard.*

BOOK ESSAY

# New Biography Offers Fresh Insights on Patton

**Patton: A Genius for War,** by Carl D'Este. Harper Collins Publishers, New York. 1995, 992 pp. with maps, bibliography, and notes. $35.

For more than half a century after his death, General George S. Patton Jr. remains one of the most colorful, complex, charismatic, and controversial figures in the annals of military history. The author focuses on a general who was — in all his moods: cantankerous, charming, arrogant, sensitive, and humble — a military genius who spent his entire life in preparation for what he passionately believed was his destiny, to lead a great army triumphantly in battle.

Patton's outlandish public image was a contrived, self-centered ploy which hid the true character of a man of many contradictions. He was extremely religious, but his profanity was legendary. Moreover, he believed that God had ordained him to achieve honor and victory on the battlefield, just as his ancestors, whom he worshipped, had done. Life-long preparation, intelligence, and an intense desire to achieve his destiny provided Patton with an extraordinary knowledge of history, war, and the profession of arms. This separated him from his contemporaries, none of whom could match his record in combat.

Patton has been perceived as the brash, profane, impetuous show-off who wore ivory-handled pistols and loved war so much he was nicknamed "Old Blood and Guts," a name he abhorred. The author, a military historian, penetrates the perceived image held by the general public, as well as the one cultivated by Patton. Although short on fresh discoveries, no other narrative account of the general's life has filled in the gaps left by other studies as fully as this superbly crafted work. This scholarly tome reflects extensive research in its detailed bibliography and meticulously documented array of primary and secondary sources.

D'Este describes the ancestors who haunted Patton's mind, some real, some imagined, the models on whom he would seek to pattern his life. He was immersed in ancestor worship. Born to a patrician California family with a strong military heritage, Patton trained for greatness with resolute determination. Unfortunately, he had to struggle during his entire life to overcome dyslexia. Tutored at home, the youngster could not read until age eleven, the year he attended a formal school for the first time. The disfunctional reading aspect of dyslexia is only part of the disorder. There is a strong tendency to boast, and to undergo mood swings and feelings of inferiority, which may both help to account for his erratic behavior and contribute to his overwhelming desire to achieve. While a struggling cadet at West Point, he wrote his parents, "I would be willing to live in torture, die tomorrow, if for one day I could be really great." He devoted a lifetime of painful study to the effort.

D'Este recounts Patton's exploits under General Pershing's command, both in Mexico and in World War I, and culminates with his unparalleled but controversial World War II campaigns. He also explores some of Patton's less distinguished adventures. Patton's impetuous drive to succeed against perceived obstacles had occasional setbacks. His slapping of two soldiers after accusing them of cowardice in the Sicilian campaign, and his politically troubling remarks about the Soviet Union, then an ally, nearly resulted in his relief. Fortunately, his faults were exceeded by his matchless ability. "Patton is indispensable," said Eisenhower.

Patton justified such confidence — from Normandy, through the Battle of the Bulge, and on to Germany's defeat — by his remarkable willingness to take risks and to make crucial life-and-death decisions no one else would have dared to make. He seemed to have a sixth sense of what had to be done in the heat of battle.

To a far greater extent than earlier biographers, the author explores a side of Patton that few outside the circle of his close friends and immediate family even knew existed. Contrary to the public perception, a lack of compassion was not a part of Patton's personality. He was deeply affected by the carnage of war. He was an emotional and often humble man who could weep one minute and turn the air blue with his swearing the next. He was an intellectual who could quote scripture and verse for hours at a time, a voracious reader with a prodigious memory. Patton's prolific writings included scores of essays, poems, notes, lectures, and diaries. To his family, he was a spellbinding storyteller whose tales were usually based on the lives of ancient heroes.

**Patton in 1944**

D'Este correctly emphasizes the Army's perfunctory investigation of Patton's fatal automobile accident, calling the failure to thoroughly investigate incomprehensible and inexcusable. Despite its significant strengths, the author's argument concerning the accident would have benefitted from consulting with Horace Woodring, Patton's driver, who is still alive, and Robert L. Thompson, the driver of the 2-1/2-ton truck, who died in June, 1994. Woodring's account of the accident has remained essentially unchanged for the past 50 years. Thompson did not "drop out of sight," as some said, but returned home like thousands of other soldiers. Eyewitness accounts of two of the four participants in the accident would have produced a more complete portrait of the accident.

This outstanding biography succeeds in what the author attempted to do. *A Genius for War* is a discerning work that refuses to allow faults and failings to obscure the strengths of the most unique American soldier of this, or any other, century.

**Denver Fugate**
Radcliff, Kentucky

*(The reviewer's article on the accident that led to Patton's death appeared in the November-December 1995 issue of ARMOR. - Ed.)*

# BOOKS

**The M4 Sherman at War: The European Theatre, 1942-1945** by Steven J. Zaloga (70 pages, $13.95).

**D-Day Tank Warfare: Armored Combat in the Normandy Campaign, June-August 1944** (72 pages, $13.95)

**Tank Warfare in Korea, 1950-53** by Steven J. Zaloga and George Balin (72 pages, $9.95).

Concord Publications Company, Hong Kong.

These three booklets written by Steven J. Zaloga and George Balin cover the photographic history of the tanks that engaged in armored combat in the European Theater of Operations during World War II and in the Korean War half a decade later. The booklets are aimed at military modelers and include detailed diagrams and photos of famous tanks, such as *Hauptmann* Michael Wittman's Tiger I, presumably so that those with the talent can build their own versions. In this regard, the works have more appeal to the military buff than the military professional. On a different level, however, these booklets are valuable in examining the life cycle of a tank. By perusing the photos and captions that fill these works, one can see the adaptations and improvisations that armored crewmen in World War II and Korea had to make in order to survive in the harsh environment of combat. Of all the tanks in these wars, no other was more extensively modified — both officially and unofficially — than the M4 Sherman.

Few tanks in the history of armored warfare have proved as versatile as the Sherman. The United States produced more Sherman tanks — 49,234 in all — during World War II than any other tank produced by any other nation. Because of the relatively late start of American rearmament, the War Department's decision to produce the M4 had far-reaching consequences. Simply put, the Army had to live with the Sherman, since its successor did not appear on the battlefields of Europe until 1945, and then only in small numbers. The technological characteristics of the M4 tank significantly influenced Allied operations in Africa, Sicily, Italy, France, Germany, and in the next war in Korea. The appearance of superior German tanks — the Mark V Panther and the Mark VI Tiger — forced U.S. units to respond with *ad hoc* measures to ensure their survival and accomplish their missions. Engagements with more powerful enemy vehicles forced units to adjust their tactics, techniques, and procedures in order to survive.

The M4 Sherman evolved over time as a result of product improvements intended to correct the deficiencies of the tank. The Ordnance Department could have done more to correct the greatest weakness of the Sherman — the low muzzle velocity of its main gun — but the Army did not realize the changing nature of tank combat until the huge losses in Normandy forced the Army's leadership to face the stark reality of modern armored warfare. In the ensuing battles of France and Germany, weight of numbers and the application of a sound combined arms doctrine enabled the Armored Force to prevail over the panzers of the *Wehrmacht,* despite the Sherman's limitations.

Armored crewmen were the first to realize its problems and did what they could to fix them. In one booklet, there is a wonderful photo of Gen. George S. Patton, Jr. rebuking a tank crew for adding sand bags around their vehicle. Patton believed the extra weight led to premature engine breakdowns. Tank crews who had to fight the poorly armored tank widely ignored Patton's orders on the subject. Other crews added logs; at least one encased the turret in cement!

When designed in 1941, the M4 Sherman was a logical and appropriate choice to execute U.S. Army mechanized doctrine as it then existed. The experiences of World War II in Europe convinced the Army's leadership that American antiarmor doctrine was wrong and that tanks had to fight other tanks on the battlefield. That change in attitude altered the design parameters of future armored vehicles; the primary mission of American tanks after World War II was to engage and destroy enemy tanks.

If anyone had lingering doubts about the essential role of the tank in battle, the Korean War dispelled them. The T-34/85 tanks of the North Korean People's Army (NKPA) outmatched American M24 light tanks and the 2.36-inch rocket launcher in the first month of the war. Not until M26 Pershing and M46 Patton tanks and a larger 3.5-inch rocket launcher appeared did the forces of the United Nations gain armored supremacy in Korea. Interestingly enough, over half of the tanks used by U.N. forces were World War II-vintage M4A3E8 Shermans, which proved comparable to the T-34/85 in combat. The key was the superior training of American tankers compared to their North Korean counterparts.

The M4 Sherman was obsolescent by the end of World War II, but the tank proved to be an adequate — and adaptable — combat vehicle if the crewmen who operated it were well-trained. "In spite of the flaws and shortcomings of our equipment and our training," wrote Brigadier General Anthony F. Daskevich to the author a few years ago, "the soldiers made the equipment do the job — sometimes by changing the equipment, sometimes by applying new and different techniques to fit the situation at hand, and sometimes in learning how to work together on the battlefield, taking advantage of all weapons systems in concert." The lesson for today is clear. In an era of declining budgets, the U.S. Army must once again return to its roots and learn how to adapt the equipment on hand to accomplish its assigned missions. The M1-series Abrams tank is here to stay for some time to come. The Armored Force must wring the most out of its capabilities, for its replacement is nowhere on the horizon. We as an Army have become too comfortable with the proverbial technological "silver bullet." What these photographic histories remind us is that it has not always been that way. The greatest strength of the American soldier is his ability to learn and adapt.

MAJ PETER R. MANSOOR, Ph.D.
Operations Officer
1/11th ACR
Ft. Irwin, Calif.

**Strategy and Tactics of the Salvadoran FMLN Guerrillas: Last Battle of the Cold War, Blueprint for Future Conflicts** by José Angel Moroni Bracamonte and David E. Spencer. Praeger Publishers, 88 Post Road, Westport, Conn. 1995. 216 pages. $59.95.

The regular military forces of El Salvador defeated an externally supplied communist insurgency in 1992 after approximately 12 years of conflict. *Strategy and Tactics of the Salvadoran FMLN Guerrillas* addresses this successful employment of conventional forces to combat and defeat a disciplined, motivated, and logistically sound insurgency.

This work details tactics, techniques, and procedures employed by FMLN forces. Reproduction of FMLN mission orders and analysis of both successful and unsuccessful tactical engagements provide a thorough depiction of guerrilla actions. FMLN after-action review procedures and lessons learned are also evaluated.

As military professionals, it is critical that we seek out threat evaluations beyond national military experiences. For many potential threats, neither Soviet-style conventional techniques nor unconventional warfare tactics will be viable. Forces throughout the world continue to evolve doctrine compatible with their unique social, operational, manning, and logistical circumstances. Threat studies from the Gulf War, the Cold War, and the Vietnam War are not all-encompassing.

American military forces remain committed to operations other than war, and such commitments may increase in the future. There are many potential threats today, and the more styles of warfare we make

ourselves familiar with, the more rapid our evaluation of the next threats we face.

The hardbound price of this book will prevent its inclusion in most personal libraries: Instead, consider urging post library systems to acquire and stock works of this genre. *Strategy and Tactics of the Salvadoran FMLN Guerrillas* reads well, and the translations of military terms, concepts, and conclusions from Spanish into English are well executed.

If the authors are correct in their assessment of the Salvadoran insurgency as a "blueprint for future conflicts," then this book can provide us both the schematics and marginal notations of that blueprint. Regardless of the prescience of Messrs. Bracamonte and Spencer, it is worthwhile to have a threat doctrinal and operational model for someone besides the Group of Soviet Forces in Germany. If you are unable to read this work, find a work of the same type and read that.

KEVIN M. RIEDERS
1LT, Armor
2d U.S. Cavalry
Ft. Polk, La.

**Dark Moon: Eighth Army Special Operations in the Korean War** by Ed Evanhoe, Naval Institute Press, Annapolis, 1995. 193 pages. $25.95.

Within "The Forgotten War" of Korea (June 1950-July 1953), few people today remember the epic battles of the Pusan Perimeter, Inchon, or the Chosin Reservoir. Fewer still know anything at all about the brazen special operations conducted by the U.S. Eighth Army behind enemy lines in North Korea during that brutal conflict.

Ed Evanhoe's first book, *Dark Moon,* dramatically reveals the bittersweet American and South Korean special operations and partisan efforts from 1950 to 1953. As a Korean War veteran and career intelligence operative specializing in Far East operations, Evanhoe is well-suited to tell this remarkable cloak and dagger tale. This is the sixth book in the Naval Institute's Special Warfare Series.

Shortly after thousands of North Korean troops stormed across the border into South Korea in June 1950, it was quickly apparent that American intelligence efforts were sadly and tragically lacking. Little cooperation existed among the impotent intelligence agencies, as agency jealousy and rivalry thwarted effective organization and collection. The State Department, the military, and the newly-formed CIA all pointed fingers at each other and clamored for a solution.

In response, within the U.S. Eighth Army, a disparate collection of colorful and imaginative individuals surfaced, providing the nucleus of talent and guts that launched the special operations side of intelligence gathering. Although supported by several CIA agents, British SAS officers, and a Marine, most of the Eighth Army's special operations work was performed by U.S. Army Rangers and Airborne soldiers, as well as volunteer South Korean soldiers and anticommunist partisans. Initially because of serious military setbacks, lack of logistical resources, and myopic vision, higher headquarters could not devote much manpower or equipment to special operations. As usual, the necessary resources were begged, borrowed, and scrounged. Captured Japanese and Russian weapons and ammunition, obsolete radios, even German SS uniforms, and hijacked boats outfitted the early special operations. Soon, however, the new leader of this resourceful group, Colonel John H. McGee, could begin to train and field spies, saboteurs, assassins, raiding parties, and guerrilla units.

Using partisan-controlled islands off the east and west coasts of North Korea, the special operations group mounted numerous intelligence missions into North Korea. Later in the war, airborne operations were added to insert spies and saboteurs into central North Korea. Evanhoe's unabashed accounts of these operations are riveting in their action and suspense. With their motley collection of weapons, equipment, and characters, McGee's men fight the North Koreans and Red Chinese in their own backyard, destroying trains, ambushing unsuspecting enemy units, assassinating communist officials, blowing up bridges and tunnels, and creating rear area havoc.

Several missions, done as pranks, without command approval, also produced far-reaching results. Frogs painted fluorescent orange, airdropped into North Korea, convinced the communists that the Americans were using bacteriological warfare. A large, somewhat unconventional explosion in Wonsan harbor had the communists (and most of the Free World) believing that someone had detonated an atomic bomb. Best of all, an anticommunist partisan unit wearing German SS uniforms resulted in a Russian complaint that Germany had entered the war!

This is not all a success story, however, as betrayal, incompetence, tragic accidents, enemy counter-guerrilla operations, bad weather, and Murphy's Law conspired to disrupt missions and cost valuable lives. The dedication, valor, and sacrifice of the Americans, British, and South Koreans is stunning and truly serves as a tribute to the spirit of adventure of all those involved in special operations.

Evanhoe's narrative is crisp and vivid with just the right balance of fact and detail, and is well-supported by maps and photos. This is a superb story of triumph and tragedy in America's "Forgotten War."

COL WILLIAM D. BUSHNELL
USMC, Retired
Harpswell, Maine

**Hell On Wheels: The 2d Armored Division** by Donald E. Houston, Presidio Press, Novato, Calif., 1995. 466 pp. $14.95.

Originally published in 1977, this second paperback edition of Donald E. Houston's *Hell On Wheels* is a welcome addition to the plethora of books published to commemorate the 50th anniversary of the end of World War II. Houston's history of the 2d Armored Division is a first-rate account of the division from the day it was activated until the summer of 1945, when it was notified for return to the United States. Mr. Houston's work is carefully researched and balanced. Houston tells the story well and draws conclusions. Accordingly, *Hell On Wheels* is no slapdash narrative, long on hyperbole, and short on analysis.

Houston's discussion of the division's early history is of particular interest, not only because George S. Patton served as the division's first commander, but because of the rapid expansion, ongoing modernization, and continuing experimentation which characterized the early months of the 2d Armored Division's history. Those were exciting and turbulent days as the division learned to operate new equipment, experimented with new tactics, and assimilated hordes of new soldiers, all while conducting collective training to prepare for war. Those of us who complain of shortages and too much to do would do well to read early chapters of *Hell On Wheels.* The 2d Armored Division's role in the Louisiana Maneuvers is of direct interest for serving soldiers. Through the eyes of soldiers who served fifty years ago, we are able to gain insight into the contemporary Army's experiments with Force XXI.

The combat history of one of the Army's premier World War II divisions extends from North Africa, to Sicily, the Normandy Breakout, Aachen, the Bulge, and finally the culminating battles of the war in the West. Houston tells the story clearly and shows a division whose soldiers make mistakes, but learn from them. Houston ably weaves first-person accounts into the fabric of his narrative while remaining sufficiently removed to criticize when appropriate. It is this technique that assures the validity and importance of *Hell On Wheels.* Mr. Houston's work will remain useful for the casual reader, the serious historian, and the serving soldier.

COL GREGORY FONTENOT
Cdr, 1st Bde, 1st AD

# A Thicker Ballistic Shell For Combat Vehicle Crewman's Helmet

The current Combat Vehicle Crewman's (CVC) helmet does many things well, allowing tank crewman to talk to each other on the vehicle intercom system and to other members of their unit through the vehicle radio system, but it does not provide ballistic protection from small arms fire and shell fragments.

Desert Storm established the need for this increased ballistic protection. In response, the Directorate of Force Development at the Armor Center has developed an improved ballistic shell for the helmet. It will provide the same level of ballistic protection as the current Kevlar helmet, and is identical to the standard CVC helmet shell, with the exception of its thickness and an increase in weight from 1.5 lbs to 2.5 lbs.

The initial fielding plan for this new shell calls for a fully funded Army buy of approximately 40,000 shells. The first 2,500 will be stored for contingency purposes, and those remaining will be issued, through supporting central issue facilities, to units in accordance with a Department of the Army priority sequence. The first unit to receive this improved ballistic shell will be the 82d Airborne. If you would like a copy of the complete fielding plan, contact us here at the Directorate of Force Development. The fielding of this shell is scheduled to start in May 1996 and will take approximately two years to complete. Upon completion of initial fielding, remaining units without the increased ballistic shell may request them using organizational funds. The National Stock Numbers to use when ordering this new shell are: 8470-01-389-3815 for small to medium and 8470-01-389-3821 for large size.

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As a result of the article: "Dangers of Wearing Synthetic Underwear" in the January-February issue of *ARMOR,* we received several calls asking for National Stock Numbers (NSNs) for 100% cotton cold weather underwear. The NSNs are listed below. To prevent being issued a substitute that may be made of a synthetic fiber, you must use an advice code of 2b on your requisition.

Drawers, 100% cotton, cold weather, color natural:

| | |
|---|---|
| 8415-01-051-1176 . . . . . | X-Small |
| 8415-00-782-3226 . . . . . | Small |
| 8415-00-782-3227 . . . . . | Medium |
| 8415-00-782-3228 . . . . . | Large |
| 8415-00-782-3229 . . . . . | X-Large |

Undershirt, 100% cotton, cold weather, color natural:

| | |
|---|---|
| 8415-01-051-1176 . . . . . | X-Small |
| 8415-00-270-2012 . . . . . | Small |
| 8415-00-270-2013 . . . . . | Medium |
| 8415-00-270-2014 . . . . . | Large |
| 8415-00-270-2015 . . . . . | X-Large |

Currently there is a short stockage of the 100% cotton underwear available at the depot. However, a contract has been awarded for more 100% cotton underwear, scheduled to be delivered to the depot in March 1996. If you have any additional questions or need any other information on this or the increased ballistic protection CVC shell, call Mr. Larry Hasty at the Directorate of Force Development, DSN 464-3662, or commercial (502) 624-3662.

PIN: 074669-000