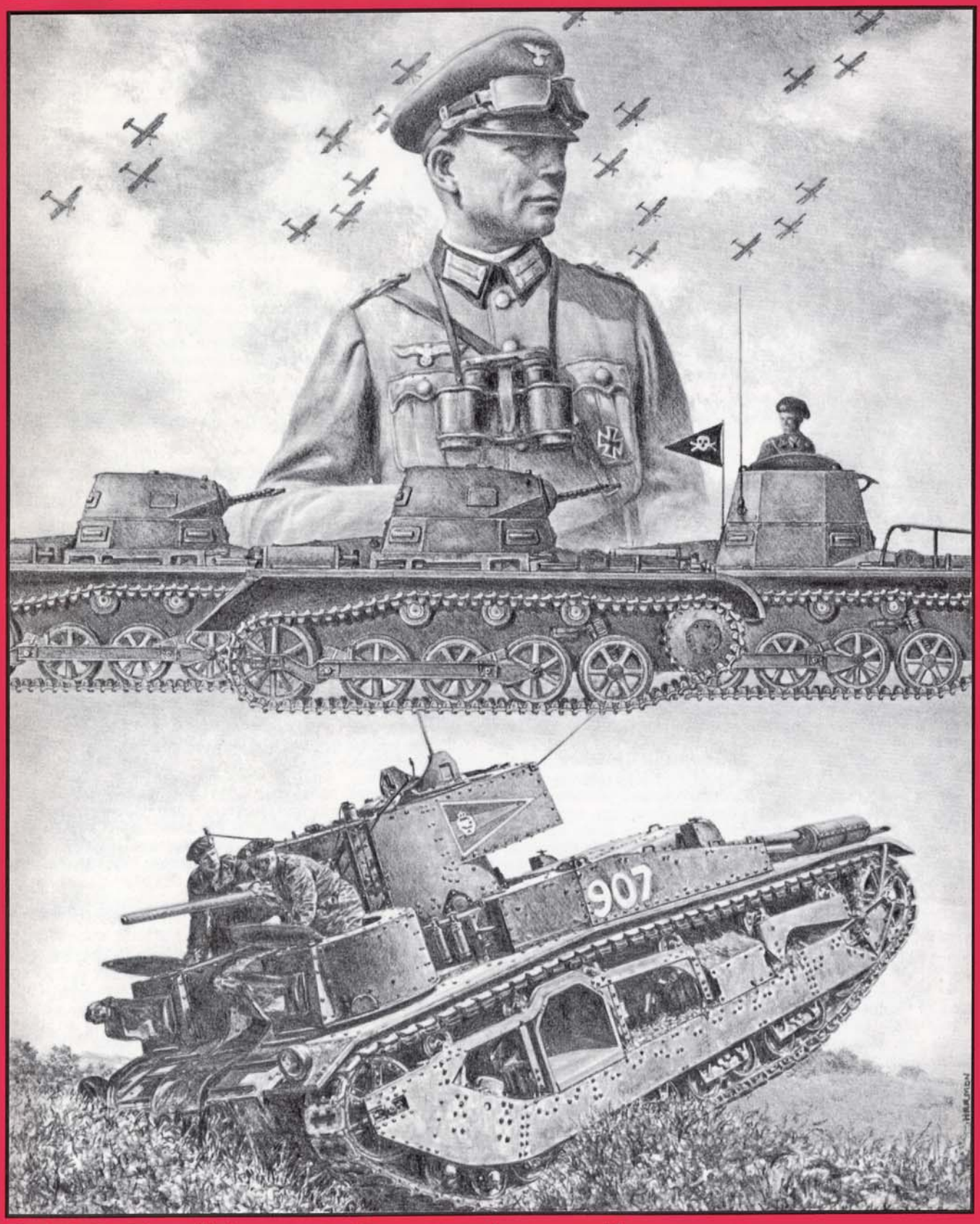
ARMOR



British Tradition vs. German Innovation - see Page 8

PB 17-97-2

March-April 1997

Readers ask a number of questions, several of which seem to be recurring. I thought it was appropriate to answer them now because *ARMOR* magazine math says, for every guy who asks, there are at least three others (or only two if you have a three-man crew) who have the very same question. I'll start out with the number one question by far.

Q: Why does my personal copy of *ARMOR* come to my house three or four weeks later than when I see a copy go through the unit distribution?

A: Hah! All *ARMOR* magazines are not alike. First, the two magazines, despite identical contents, come from different sources. The unit/agency/directorate copies come from the government, i.e., they are free. Your paid subscription magazines come from the U.S. Armor Association, a private organization. Before you get your NOMEX in a bunch and say that is the stupidest thing you ever heard, know that we are on firm legal ground here. In the mid-1980s, a legal decision determined that the association and government could not continue to run their copies off on the same press, by the same printer, as they had been doing for years. The determination was that this constituted an unfair advantage to the association, and necessitated a separation between public and private copies. Under what is called the Negative Loan Program, it was legal, however, for the Association to "borrow" the negatives and to reprint copies of the magazine once the official press run was complete, so the Association could offer reprints as part of its association membership. This drove up costs for both the government and the association, since both had to negotiate individual print contracts with separate printers, with neither benefiting from economies of scale. This also delays the second printing. Once the government run is complete, the association must get the negatives mailed back to Fort Knox; then mail them to the Association's printer, who then has to set up the issue for another run; and finally mail it back for approval. This process usually takes 3-4 weeks if there are no hiccups. That is why your personal copy always seems a month "late."

Q: What kinds of articles are you most likely to publish?

A: We are wary of asking for any "type" of article. A long line of Chiefs of Armor and *ARMOR* magazine Editors-in-Chief have believed over many decades that it is best to work with what people from the force think is important. We have resisted creating the M1A1 Fort Knox-approved discussion topic for each issue here at Fort Knox. We prefer not to have "theme" issues such as are found in other military journals. How often have you seen the theme, been instantly turned off, and then pitched the magazine onto the dead periodical pile? We want to avoid that. You all know what is important because you are living it every day. If you still want a little bit of guidance though, articles which could help others following in your training shoes, OPD/NCOPD suitable articles, are always in short supply.

Q: Do you take material from non-tankers/cavalrymen/scouts?

A: ABSOLUTELY! Anyone who has something to say about any facet of the heavy fight is a potential contributor to the dialogue in *ARMOR*.

Q: I just finished a great book, didn't see a review in *ARMOR* yet, and would like to do a review on it. Do you accept unsolicited reviews?

A: Yes, we do. Shorter reviews, less than 500 words, are better for our purposes than longish ones. If you want to ask us before you go to the trouble of doing the review, we will tell you if anyone has ever reviewed the book in *ARMOR* or if someone else is currently working on it for us. We are also interested in computer simulations that have something to offer both in training and entertainment to the professional warfighter.

Q: Do you accept article submissions and letters to the editor via electronic means?

A: Of course, however, a word of caution is in order here. Please be sure to include your name, address, and telephone number somewhere in the submission. People often don't. It is awfully difficult to determine who you are from a user ID, especially if it is one of the more creative ones, like a number.

Q: Why isn't there more stuff from enlisted men in the magazine?

A: There is no bias nor hidden agenda to limit the numbers of enlisted appearances. The simple fact is that currently we get few submissions from NCOs and enlisted soldiers. We are actively searching for material from that too-silent part of the force. If you have an idea for an article, run it by us. If you have a good idea in your TC or PLT SGT binder that others could use, recall SSG Krivitsky's back cover in the Sep-Oct 96 issue, and send it to us.

— TAB

By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
03093

ARMOR

The Professional Development Bulletin of the Armor Branch PB-17-97-2

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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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ISSUES IN ARMOR: Visit the *ARMOR* Web site at the following address: http://www.entelechy-inc.com/docs/knoxdoc/armormag/cover.htm.

LETTERS

The TWGSS/PGS System: One Unit's Experience

Dear Sir:

I found General Bolte's article, "TWGSS/PGS: Combat Vehicle Gunnery Training Takes a Great Leap Forward" (Nov-Dec 96), to be a very good description of the TWGSS system. The "Men of War" of the 1-33 Armor Battalion at Fort Lewis just completed an extensive TWGSS gunnery and platoon STX exercise in which we became thoroughly, and sometimes painfully, acquainted with TWGSS.

We conducted gunnery tables VII, VIII, and XII, as well as offense and defense STX lanes, with the TWGSS system. TWGSS enabled us to greatly improve the realism and intensity of our home station gunnery training program. Given that Fort Lewis does not have any ranges capable of supporting M1A1 Tank Tables, TWGSS allowed us to conduct mounted gunnery training during a period we were not scheduled to deploy to the Yakima Firing Center to conduct live-fire ranges.

The following paragraphs cover some of the lessons we learned during our extensive training.

First, on the issue of compatibility of TWGSS and MILES for either force-on-force or panel gunnery with LTIDS, TWGSS is only truly compatible with MILES equipment when the target panels or vehicles are outfitted with TWGSS retro-reflectors, a fact mentioned only once in the TWGSS operator's manual, but borne out in our training. TWGSS does indeed send out MILES-compatible firing information; however, if MILES-equipped vehicles aren't equipped with retro-reflectors, the TWGSS system cannot compute accurate ballistic data to send out an accurate laser beam. TWGSS relies on its initial laser pulse to determine the range to the target and lead required. It then determines a ballistic solution and then fires the TWGSS round. Occasionally, TWGSS-equipped vehicles can "kill" MILES-equipped vehicles just as a non-boresighted MILES tank can occasionally kill another vehicle. We tried manually inputting battlesight ranges with a minor increase in effectiveness. Also, when TWGSS vehicles shoot at MILES-equipped vehicles without retro-reflectors, the Training Data Retrieval System disk in the tank does not record the point of impact and other gunnery information because the TWGSS tank never computed a ballistic solution. So, the crew loses a great deal of the potential feedback they would have received had all vehicles either been TWGSS-equipped or MILES- and retro-reflector-equipped. For panel targets, we mounted the retro-reflector with Velcro® in the center of the panel with the LTIDs arranged in a tight circle around the retro. For MILES-equipped vehicles, we found that retro-reflectors must be mounted on all four sides of the MILES vehicles. Finding enough retro-reflectors to equip all vehicles like this is most likely not feasible.

Machine gun engagements with TWGSS are quite a challenge. First, the TWGSS system doesn't integrate the M2 .50 caliber machine gun into the system. We used a standard MILES transmitter on the .50 caliber machine gun for the "Simo" engagement. For the coax machine gun, we had a difficult time hitting troop targets composed of E-type silhouettes at Table VIII ranges (700-900 meters). We discussed the problem with a civilian technical representative from SAAB who was on-site during our Table VII, and he eventually shrugged his shoulders and wished us luck. He explained the TWGSS coax wasn't designed to hit that small of a target at the extended ranges required for Tank Table VIII.

The Training Data Retrieval System was an excellent tool in assisting tank crew evaluators in conducting after-action reviews. We found that hooking up a television set to the laptop computer better enabled us to display the information to the crew. For tank tables up to Table VIII, the TDRS system will show the location of the firing crew and the target, as well as point of impact and a variety of other data. However, for Table XII, when we used the "multiple card" function of loading data from four tanks, we found that the system wasn't designed to show the same gunnery data. Specifically, the system doesn't record point of impact and location of targets as it did for single disk operations. So, it was impossible to tell if the platoon was using correct fire distribution and control and hitting all of the targets with only the TDRS cards. The OC personnel had to watch targets go down as they were hit, a difficult if not impossible task at night. We worked around this decreased capability in our Tank Table XII AARs by loading single disks for representative crews, and then discussed their crew level gunnery.

Overall, the TWGSS system enabled us to conduct some outstanding training. Having a system that reinforces good gunnery techniques using the entire fire control system during force-on-force operations rather than MILES "gunnery" was definitely an advantage.

CPT KENNETH R. CASEY
Cdr, B/1-33 AR
Ft. Lewis, Wash.

Main Gun on Elevating Pedestal Doesn't Solve "Top Vision" Need

Dear Sir:

The purpose of this letter is to offer a better solution to a major issue raised in the article titled "From the External Gun to the Hybrid Tank" contained in the November/December 1996 issue of *ARMOR.*

In this article, the author, Robin Fletcher, attempts to make the case for a tank design that implements a main gun carried and reloaded while recessed in a cavity in the body of the vehicle hull. When brought into action, the main gun is to be raised above the top of the tank on a rotating pedestal in order to bear and fire on a target. Mr. Fletcher asserts in this article that by recessing the main gun within the tank body, the crew will regain the "top vision" lost in other future tank designs. Mr. Fletcher's assertion is in error.

The top vision that is lost when the manned rotating turret is eliminated can only be regained by giving the crew effective vision at an elevation equal to that achieved in the manned turret. Robin Fletcher's assertion that such top vision is essential to the effective operation of any armored vehicle is, of course, correct, but his proposed solution of lowering the main gun into the turret fails to provide the necessary elevation for a direct vision equivalent to (i.e. a replacement for) that which is found at the top of a manned rotating turret. Mr. Fletcher's hybrid tank concept neither solves the vision problem nor serves to simplify or improve operation, maintainability, or construction any more than a design implementing an external unmanned rotating gun turret.

A review of armored vehicle design literature over the past decade shows that no author has fully recognized the only possible solution to the conundrum posed by the need to more effectively protect the tank crew, while simultaneously reducing the overall size and weight of the vehicle, and equaling or bettering the combat effectiveness of current designs.

I believe that the only feasible way to retain or improve upon the vision system currently incorporated in today's main battle tank designs is to provide the commander and gunner vision from a point located on top of a rotating external gun. Current main battle tank designs incorporate very effective night vision and fire control, but only in the frontal arc of the tank chassis and turret. A limited 360° direct vision is normally provided to, at most, two crew members, and then only through the use of an arrangement of prisms located in hatch covers. The viewing angle obtained from such hatch prisms is very limited in the vertical plane, is unmagnified and not linked in any way to the vehicle's fire control system. There is no way to provide this type of 360° top vision when the gunner and commander are housed in the vehicle hull, as there is no practical way to physically position the commander's "Mk.1 eyeball" at the top surface of the main gun. The only possible solution available to designers today is to incorporate a "Virtual Reality" (VR) vision system that will give each crew member an independent 360° direct view at or

above the level of the top surface of the main gun.

We have available today both the computing power and solid state charge-coupled device (CCD) sensor technology to provide just such a vision system. In the past five years, advances in virtual reality software and associated electronics have been tremendous. By the year 2010, which appears to be the earliest date that the U.S. Army will be able or willing to field a new main battle tank, the then-available computing and sensors will be capable of producing VR vision which will be several orders of magnitude better than that which can be built today. It is clear that in the time period from 2000 through 2005, the U.S. Army will be able to obtain from commercial sources all of the components necessary to construct a military standard, combat survivable artificial vision system capable of presenting a substantially less limited 360° horizontal field of view equal to or better than what is currently possible in the M1A2. Additionally, by placing vision sensors on the top, front, sides, and rear of both the external armored main gun assembly and the vehicle hull, the designer can provide a fully computer-stabilized, lightweight, helmet-mounted, VR vision system giving each crew member an independent 360° hemispheric view. By implementing redundant sets of CCD sensors, sensitive to both visual light and thermal radiation, each crew member will have full day/night vision for automotive operations, target acquisition, and fire control. Further computer integration of the VR vision system with a fire control system and voice recognition may actually produce a main battle tank which can be operated and fought by a two-man crew. Another possibility of such a VR vision system would be synthetic vision enhancement (magnification) without the use of optical lenses.

Robin Fletcher, and virtually all other authors of articles on this subject, appear to be unaware of the current state of computing and visual reality technology and are perhaps unable to envision its use as a solution to some of the problems resulting from the elimination of a manned rotating turret. It should also be noted that these very same devices could easily be implemented on current M1A2 units or incorporated into future product improvement packages yielding at a minimum, significant increases in lethality.

I urge you to continue to publish the type of article represented by Mr. Fletcher's work. It is crucial that Armor personnel be exposed to discussions of not only the history and doctrine of armored warfare, but also of current and future armor technology.

JOSEPH F. MIGLIACCIO
President, Software Solutions Unlimited
Albuquerque, N.M.

Fostering Initiative In a Downsizing Force

Dear Sir:

Major Vandergriff's letter (Nov-Dec 96) is most interesting to me as he believes the Army must "encourage entrepreneurial soldiers as a revolutionary idea. Our Army must tolerate entrepreneurial officers — leaders, soldiers — as equally revolutionary," claiming the old system just doesn't work anymore. How right he is!

As a professor of entrepreneurship, and author of a book on the subject some time ago, I have long believed that with the changes in the battlefield environment, where small units are highly likely of being cut off and alone, unable to communicate with higher-ups, that more than ever we've got to identify, encourage, and willingly support entrepreneurially-inclined officers. This surely goes right up against the prevailing "brick wall" attitudes of senior officers where the emphasis has always been for junior officers to conform and obey. Those who challenge such a culture are doomed unless they happen to come under the protection of an influential senior willing to take a chance on them while they make mistakes during the learning period. Many senior leaders talk the talk about the importance of developing initiative, resourcefulness, and the like on the part of juniors, but they don't really believe in this, and they don't support it. Now, in today's Army, where seniors are looking for ways to weed out "undesirables" in meeting the continuing drawdown impositions, those juniors who dare to challenge are quickly spotted and as quickly riffed. Those who remain understand to follow orders.

Some years ago when I briefed the Chief of Field Artillery at Fort Sill, I urged him to consider requiring senior raters — LTCs and above — to show specifically how they had contributed to the development of their juniors, especially emphasizing the provision of opportunities for juniors to "show their stuff" without fear of condemnation for the type of mistakes that are inherent in this process. This does not mean that major careless or thoughtless errors should be tolerated. Seniors, in turn should not be pushed off the promotion track because some of their juniors make mistakes. There should not be penalties for honest and vigorous effort.

I did not achieve my objective on the OERs, but I still believe that what I proposed is most important. As best I can understand, current leaders — should we really call them that? — still practice the old ways and treat learning mistakes as unacceptable. We'll never develop juniors into competent seniors this way. How can we?

I believe that we still practice upper-level leadership in the manner of painting by the numbers.

Some years ago, I did a study on junior officer leadership shortly after Desert Storm, attempting to assess how juniors performed there, and how much latitude they had to demonstrate initiative in the command climate that prevailed. Did the leadership environment created by seniors encourage junior officers to forge ahead reasonably on their own? No. If you are interested in a brief summary of my study, I'll be happy to oblige.

DR. GEORGE G. EDDY
via E-mail

Counterreconaissance: What It Is, and Isn't

Dear Sir:

In reference to the article in the November-December 1996 issue titled "Counterreconnaissance," I feel obligated to make some observations. I fully appreciate the two captains' desire to see units do well at the NTC, however, they must make sure that what they advocate is within the bounds of our current doctrine.

In the opening portion of their article, they state, "the task of conducting a counterrecon fight incorporates a screen, hasty attack/defense, zone recon, and the unique execution of tactical logistics, to name a few." This is the description of a guard mission. As I read the article, I could not determine what kind of security mission this mythical unit was conducting. I came to the conclusion that it was a guard mission.

Counterreconnaissance is not a mission. Counterreconnaissance is a subset or enabling task of the security missions of cover, guard, or screen. The authors may not appreciate this, but it is a fact. The basic problem is that if you state that "A/1-999 is the counterrecon force," does this mean everywhere within the unit area or just in the security area? If the answer is everywhere, then there must be a security force forward to protect the security area. If the answer is only in the security area, then it is not a counterrecon force unless it is a sub-element of a larger formation.

The BCBST program comes up against this issue in almost every rotation, and invariably the use of the term counterrecon is misunderstood and generally applied incorrectly. We must understand our doctrine and stick to it. No one person in the field can change it on a whim; that is why it is called doctrine and not a suggestion.

JACK E. MUNDSTOCK
LTC, IN
Maneuver BOS Chief
OPS GRP C BCTP

Continued on Page 48

COMMANDER'S HATCH

MG George H. Harmeyer
Commanding General
U.S. Army Armor Center

Training the Mounted Force in Transition

The theme of the last TRADOC Commander's Conference at Fort Sill, OK was "Training the Force in Transition." We here at the Armor Center recommended this theme because training is our highest priority, training soldiers, leaders, and units to be successful on the battlefield and in any other mission they are asked to accomplish. Without tough, battle-focused training, no technology we acquire, no organization we develop, and no soldiers we enlist can be successful. Training is indeed the glue that holds this Army, particularly the Armor and Cavalry Force, together. We at the Armor Center have not forgotten that, and we are doing several things to ensure that our armor and cavalry units get the benefit of top-notch training as we modernize and change to enter the 21st Century.

Within the last year we have established the Directorate of Training and Doctrine Development. This new directorate — focused on the armor and cavalry units in the field — is responsible for writing all armor and cavalry doctrine and for doing all the task analysis for that doctrine and for new equipment. DTDD must then determine what we must train in armor and cavalry units. They are also charged with developing training devices and training support packages for our forces, and synchronizing training development with doctrine through the writing of the Soldier's Manuals and Mission Training Plans that we use to train armor and cavalry soldiers, leaders, and units in the field.

To make our doctrine more accessible to units in the field, we have established the Armor and Cavalry Doctrine Home Page on the Internet. Armor and cavalry soldiers, leaders, and units all around the world can get instant access to all of our mounted force doctrine through this web site. Additionally, they can comment on that doctrine directly with the authors who wrote it through electronic mail. That is extremely important to us at the Home of Armor and Cavalry. We want your good ideas and suggestions so we can improve our doctrine and training development efforts. Using our web site is an easy way to do that. Of course, good, old-fashioned letters and calls are always welcome too.

Over 10 years ago, the Armor Center became the home of the largest and most complete military virtual reality training facility in the world with the establishment of SIMNET. Now armor and cavalry units, from platoon to battalion task force, come here nearly every week of the year to train in this virtual training program on a variety of missions with an in-place and highly trained team of observer-controllers. While we cannot replace all training in the field, the training in the Virtual Training Program is structured, based in doctrine, and focused on the execution of armor and cavalry missions. The preponderance of these missions occur primarily in a terrain data base that duplicates the National Training Center. With special coordination, brigade-level training — using structured training support packages designed for use with the JANUS constructive training model — is also available here at the Home of Armor and Cavalry. The Armor Center isn't resting on its laurels though. We are also developing a number of projects for training soldiers, leaders, and units in the future.

Under the auspices of the Force XXI Training Program — an Army Chief of Staff directed program — the Armor Center is completing development of several training support packages that will benefit armored and mechanized units of our Army. The Battle Staff Training System (BSTS) is a computer-based training system that trains the staff officers, executive officer, and commander at both battalion and brigade echelons. Scheduled for completion this year, BSTS is an individual trainer that trains an officer in his or her individual tasks. The Staff Group Trainer (SGT) is another computer-based trainer that trains staff groups of

Continued on Page 7

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

ANCOC/BNCOC Scheduled Training For FY 97

Welcome to the Advanced Noncommissioned Officers Course (ANCOC)/Basic Noncommissioned Officers Course (BNCOC/CA). Congratulations on your selection for attendance, a significant milestone in your career development. The United States Army Noncommissioned Officers Academy at Fort Knox, Kentucky, is here to assist you to further your career by providing the finest career development training.

This fiscal year, approximately 195 staff sergeants and 686 sergeants should receive a letter that starts this way from the commandant of the Fort Knox Noncommissioned Officers Academy. However, a more realistic expectation for attendance has only 50% of that number attending and getting the letter. The reasons are always many and varied why those who should don't attend, but most of them boil down to our responsibility as NCOs to take care of our soldiers.

Course selection and attendance is a significant milestone in a soldier's career and directly couples to his promotion to the next grade, or not. Supervisors must take a long hard look at the career impact of deferring, or allowing a soldier to defer, his attendance. With the Army's increased competitiveness and promotions scarcity, the loss of a school seat is potentially devastating. When a soldier receives notification of his class date, the chain of command must make every effort to ensure he arrives on time and is prepared to negotiate the course.

We all know that the section sergeants, platoon sergeants, first sergeants, and command sergeants major are key players in preparing a soldier to attend ANCOC/BNCOC. Another key player, often unnoticed or under-utilized, is the Brigade Schools NCO. He is available to provide information and access to the Army Training Requirements and Resources System (ATRRS). ATRRS will provide the soldier with information necessary to ensure a smooth transition into the school environment, such as the names of prospective students and their class dates, a welcome letter from the commandant, equipment/clothing packing list, commercial and DSN telephone numbers for the Academy, and a list of subjects taught in the respective courses, just to name a few. Once the schools NCO has provided the soldier and his chain of command with information, the first line supervisor must take swift action.

The command must ensure the soldier meets the Army height and weight requirements and be able to pass an Army Physical Fitness Test. If the soldier has a permanent profile, the restrictions on physical activity must be indicated clearly on the appropriate form. Soldiers with temporary profiles may not attend the course until the profile and recovery periods are completed. Soldiers who do not meet these requirements will be returned to their respective unit.

Areas that are sometimes overlooked include The Adult Battery of Education (TABE). Presently, scoring in the 10.0 percentile or higher in reading and vocabulary on the TABE is not a requirement for attendance. But historically, those who have scored lower on the TABE have encountered difficulty in successful completion of the course. If the soldier is weak in either of these areas, provide him the opportunity to take courses at the local education center to improve his reading and vocabulary skills.

If a soldier has been detailed outside the CMF, or worked in a position that calls for his MOS but does not allow his involvement in the day-to-day MOS activities, he is at a disadvantage when he arrives at the course. A thorough knowledge of Common Leader Training (CLT) and how to apply it properly will go a long way toward the soldier's success. Finally, the chain of command must conduct a thorough interview with the attendee to cover subjects such as financial stability (adequate funds for the family left at present duty station, but also sufficient funds to defray the cost of BEQ living while attending ANCOC; the ideal solution would be the Government American Express Card); marital status (married, separated, divorced, divorce pending); child care arrangements; power of attorney for wife and child care provider; serviceman's group life insurance (SGLI) data updated; and Privately Owned Vehicle (POV) inspection. Any area not properly addressed could lead to a problem that causes additional stress for the student and prevents him from focusing on his school experience. The Academy environment is stressful enough without adding unnecessary or preventable problems.

Course	Class Number	Start Date
ANCOC (19K)	005	14 Sep 97
BNCOC (19D)	502	30 Mar 97
BNCOC (19D)	004	11 May 97
BNCOC (19D)	005	20 Jul 97
BNCOC (19D)	503	10 Aug 97
BNCOC (19K)	005	30 Mar 97
BNCOC (19K)	006	11 May 97
BNCOC (19K)	502	1 Jun 97
BNCOC (19K)	007	20 Jul 97
BNCOC (19K)	008	10 Aug 97

Ideally, the soldier should arrive at least 24 hours prior to the start of the course. He should have a copy of his DA Form 2A and 2-1, 10 copies of DD Form 1610, orders with any amendments, and a copy of his permanent profile or over-40 physical clearance if applicable.

The Academy environment will be a unique experience which requires an open mind and a commitment to learn. At all times, the soldier must conduct himself in a manner that will reflect credit upon himself, his unit, and the noncommissioned officer corps. All evaluations are situation-based and require the soldier to demonstrate how to think, rather than what to think. It will be a challenging and rewarding experience. Guaranteed.

The Fort Knox Noncommissioned Officers Academy, under the command of CSM Kevin P. Garvey and his instructors, is prepared and capable of providing high quality education to CMF 19 soldiers attending ANCOC or BNCOC. The academy is capable of handling an ANCOC class of 80 students in both the 19K or 19D MOS; with BNCOC capable of handling 60 students in both the 19K or 19D MOS. The class schedule for the remainder of FY 97 appears at left.

The Fort Knox Noncommissioned Officers Academy will provide each of your soldiers the necessary tools to make them successful and an asset to their unit and the United States Army. Remember, prepare your soldiers well, and you will set them up for success.

Forge the Thunderbolt!

COMMANDER'S HATCH

(Continued from Page 5)

both the battalion and brigade echelons. Containing over 100 training modules, this project will be completed in FY98. The Force XXI Training Program has also developed brigade-level, constructive training packages for use in the Brigade/Battalion Simulation. Called Combined Arms Operations at Brigade Level, Realistically Achieved Through Simulation (COBRAS), this training support package has been used with success by active component brigades at both Ft. Riley, Kansas and Ft. Lewis, Washington. More training support packages are scheduled for development in FY97 and in the future as the Force XXI Training Program continues to push the envelope for training units in the twenty-first century.

Within the next three years, the Armor Center will be the home of the first training facility designed specifically for training armored and mechanized units for Military Operations on Urban Terrain (MOUT). The Mounted Urban Combat Training Site, currently under construction, will permit training armor and mechanized platoons and company teams under realistic conditions in structured, live training exercises to prepare them for combat in built-up areas and restricted terrain. Featuring state-of-the-art targetry and battlefield effects, the Mounted Urban Combat Training Site will go far to prepare our armored and mech forces for this very difficult mission.

In this unstable and turbulent world, our Army, and particularly our armor and mechanized forces, will continually be called upon to defend our national interests. The bottom line is that when Abrams tanks and Bradley fighting vehicles arrive on the scene, our opponents — or potential opponents — understand that the United States of America is committed and, indeed, prepared to act, and to act decisively. However, that is only possible if the soldiers, the leaders, and the units with those Abrams tanks and Bradley fighting vehicles are trained to tough, high, and demanding standards. That is our challenge and our priority here at the Home of Armor and Cavalry, today and tomorrow.

Forge the Thunderbolt!

CLC and SPLC Course Dates

Course dates for the Cavalry Leaders Course (CLC) and the Scout Platoon Leaders Course (SPLC) for FY 97 and FY 98 are as follows:

CLC

Course Number	Start Date	End Date
97-02	31 Mar 97	18 Apr 97
97-03	29 May 97	18 Jun 97
97-04	4 Sep 97	24 Sep 97
98-01	3 Nov 97	21 Nov 97
98-02	23 Feb 98	13 Mar 98
98-03	1 Jun 98	19 Jun 98
98-04	20 Jul 98	7 Aug 98

SPLC

Course Number	Start Date	End Date
97-05	7 Apr 97	25 Apr 97
97-06	9 Jun 97	27 Jun 97
97-07	14 Jul 97	1 Aug 97
97-08	11 Aug 97	29 Aug 97
97-09	15 Sep 97	3 Oct 97
98-01	20 Oct 97	7 Nov 97
98-02	1 Dec 97	19 Dec 97
98-03	26 Jan 98	13 Feb 98
98-04	23 Feb 98	13 Mar 98
98-05	16 Mar 98	3 Apr 98
98-06	1 Jun 98	19 Jun 98
98-07	6 Jul 98	24 Jul 98
98-08	3 Aug 98	21 Aug 98

Note: Report Date - Day prior to Start Date

For further information concerning these courses, please contact Cavalry Branch at (502) 624-6235/3154 or DSN 464-6235/3154.

British Tradition vs. German Innovation:

The Continued Development of Mechanized Doctrine During the Inter-War Years

by Major David P. Cavaleri

"*...The tank proper was a freak. The circumstances which called it into existence were exceptional and are not likely to occur again. If they do, they can be dealt with by other means.*"

-MG Sir Louis Jackson, British Army

As the Armor Force prepares to enter the 21st century, some claim that there is no longer a need for a standing force of main battle tanks. These critics state that Operation Desert Storm was the last large-scale requirement for massed formations of armored vehicles, and that future conflicts will not need the services of our branch as it exists today.

The British Army, successful in developing, fielding, and employing armored vehicles during WWI, turned its back on mechanized doctrine during the inter-war years and paid the price for its narrow-minded outlook on the future of warfare. The study of mechanized doctrine development during the period 1919-1939 is valuable for several reasons: it can provide historical perspective concerning the development of our branch, and it can reassure us that the argument against the retention of a heavy tank force is neither new nor well-founded.

In his book, *The Tank*, Douglas Orgill stated that operations between July 1916 and August 1918 focused the British General Staff on the real value of tanks in the offensive. By using tanks massed in formations of hundreds, the British hoped to overcome the effects of the battlefield stalemate on wide fronts. Appearing simultaneously with this attitude was the need to provide what had been lacking in previous operations, namely "an effective reserve for the second, third, fourth, and fifth days of the battle, so that a breakthrough could be made through the whole depth of the front."[1]

Once the breakthrough occurred, then, "and only then," Orgill stated, "might the cavalry come into its own."[2] But by the end of 1918, the British Expeditionary Force viewed the tank not as a substitute for cavalry but as a wrecker of infantry morale. The British maintained the philosophy that the tank was auxiliary to both the infantry and the cavalry; useful for penetrating defensive belts but incapable of assuming the role of a primary combat arm. As subsequent events showed, few British military professionals during the inter-war period wanted to replace either the infantry or cavalry with a mechanical innovation.

In the years following WWI, the British Army remained steadfastly devoted to the infantry and cavalry as its primary battlefield combat branches, due in no small part to the opinion of senior military leaders like General Sir Douglas Haig. In December 1918, he recorded his thoughts on the effectiveness of the infantry, artillery, and cavalry, based on his experiences with operations like the Somme, Cambrai, and Hamel. With regard to the infantry, he wrote: "Despite the enormous development of mechanical invention... the infantry remains the backbone of defense and the spearhead of the attack."[3] He credited the increase in the number of artillery pieces and the amount of munitions, along with improved ranging techniques, with fostering "the intimate cooperation between artillery and infantry... which has been a marked feature of our operations."[4] The cavalry, whether used for shock effect, "under suitable conditions," or as mobile infantry, still had "an indispensable part to play in modern war." While he gave credit to the tanks for their role in breaking through defenses, he was adamant in his view that mechanical innovations were useful only for supporting the primary branches. These opinions are both unmistakably traditional and yet surprising, given the fact that Haig was the most supportive senior leader regarding the tanks and early mechanized doctrine during the war itself. The following quote portrays clearly Haig's opinion of the relationship between innovative mechanical weapons and the traditional combination of infantry and cavalry:

"It should never be forgotten however that weapons of this character [motor transport, heavy artillery, machine guns, aeroplanes, tanks] are incapable of effective independent action. They do not in themselves possess the power to obtain a decision, their real function being to assist the infantry to get to grips with their opponents."[5]

Clearly, Haig viewed the proper role of the tank as being auxiliary to the infantry. Because of opinions like these, post-WWI mechanized development in the British Army slowed dramatically in comparison to the period between 1916 and 1918. During the last three months of the war, the British employed tanks in large numbers along the tactical models established at Cambrai and Amiens, with great success. On August 21, 1918, they opened the Battle of Bapaume with 190 tanks; on September 27 the BEF launched a direct attack on the Hindenburg Line with 230 tanks, succeeding in advancing twenty miles in two weeks and capturing 48,000 prisoners and 630 guns.[6] And yet, in spite of the demonstrated success of these and other tank operations, by November 1918 roughly fifty percent of the almost 2,000 tanks used by the BEF since Amiens were sent to the salvage yards to be scrapped, and by Armistice Day only 204 tanks were operational and ready for duty.[7]

These statistics would indicate that the British War Office believed the need for tanks had arisen out of requirements peculiar to the WWI battle-

Post-WWI British neglect of tank development handicapped their armored force well into WWII. This Crusader, shown being tested at Fort Knox in 1942, weighed just 18 tons, mounted an ineffective 37mm cannon, and still employed riveted armor, which had been discredited because, when hit, the rivets flew around inside the fighting compartment.

field and saw no need to maintain high levels of tank production once the war was over. Because the tank had evolved in direct response to the problems posed by trench warfare, and because the likelihood of another war fought along the those same lines was deemed slim, the Treasury saw no need to invest the funds. In mid-November 1918 the Ministry of Munitions canceled all orders for the future production of 6,000 tanks. One senior officer, Major-General Sir Louis Jackson, went so far as to state, "The tank proper was a freak. The circumstances which called it into existence were exceptional and are not likely to occur again. If they do, they can be dealt with by other means."[8]

British tanks fell victim to a combination of variables, a combination which I submit is not terribly unlike that which we face today...

Despite the successes of 1918, by the end of 1919 the British Tank Corps consisted of only four battalions, down from a wartime level of twenty-five battalions in 1918.[9] British tanks fell victim to a combination of variables, a combination which I submit is not terribly unlike that which we face today, which came together at war's end to frame the British Army's inter-war philosophy concerning the role of the tanks and the need for standing tank units.

The inter-war period for the British Army was filled with debate over the changing roles of the infantry, cavalry, and mechanized arms. Historians Robert Larson, Charles Messenger, and Bryan Perret all devote significant time to discussions of this period; Larson because his central topic is primarily the development of British mechanized strategy after WWI, and Messenger and Perret because this period forms the foundation for their analyses of blitzkrieg operations. During the inter-war period, even though British tank production slowed dramatically and the Tank Corps remained numerically small, doctrinal development continued under visionaries like J.F.C. Fuller and B.H. Liddell Hart.

Fuller's work on the 1920 version of the British Army *Field Service Regulations* emphasized the tank's firepower and mobility and specified that the tanks' missions in the attack were to: assist the advance of the infantry; destroy hostile tanks; and exploit any success.[10] He also stressed the necessity for constant coordination between tanks and infantry: "Tanks must protect infantry from machine gun fire and the delay imposed by uncut wire; infantry must protect tanks from the close range fire of enemy field artillery and anti-tank guns."[11]

Despite this kind of recognition for the tanks and their potential, the *Field Service Regulations* maintained the traditional emphasis on the infantry and cavalry as the primary combat maneuver arms of the British Army. These regulations set the tone for the inter-war period of tactical development for the British, and that tone specified that traditional arms would retain the primary roles in offensive operations, while artillery and tanks performed support roles. By cutting through wire and destroying enemy strongpoints, tanks enabled the infantry to attack without sacrificing the element of surprise during preparatory artillery bombardments. As a result, the use of tanks reinforced the validity of the WWI strategy of attrition because it increased the effectiveness of that strategy. "This," said Larson, "was the contention that the theorists of armored warfare challenged and which forms the focus of the tank controversy in the British Army during the inter-war years."[12] Fuller's work on this and other writings continued theoretical doctrine development and helped keep the idea of mechanized offensive operations alive.

Liddell Hart was a British infantry officer and a keen student of military history who believed that future wars would be shaped by the combined employment of tanks, artillery, and aircraft. Forced to resign from the British Army in 1924 for health reasons, he turned to the full-time study of military operations from ancient Rome to 1918, writing for *Encyclopedia Britannica*. While researching this material, he developed a concept of strategic operations he termed the "strategy of indirect approach." This strategy, as he outlined in his work of the same title originally published in 1929, involved more than troop movement and supply routing on the battlefield. Hart proposed a departure from the traditional European frontal assault mindset to one circuitous in both spirit and execution.

He determined through his studies of various successful military leaders, such as Philip of Macedon, Alexander the Great, Hannibal, Cromwell, and Napoleon, that throughout history "decisive results in war have only been reached when the approach had been indirect. In strategy, the longest way

round is apt to be the shortest way home."[13]

Liddell Hart became convinced that in any major military operation, the opponent who pursued a "direct approach," that is, along the expected lines of attack, often experienced disappointing results. He stated that "to move along the line of natural expectation consolidates the opponent's equilibrium, and by stiffening it, augments his resisting power."[14] He claimed that his study of decisive military campaigns demonstrated that the dislocation of the enemy's psychological and physical balance was the vital prelude to a successful attempt at his overthrow.[15] One need only review the trench warfare practices of WWI to recognize the validity of the argument against a strictly "direct" approach to warfare. One can also imagine easily the resistance which Liddell Hart faced in his efforts to develop doctrine for the future.

The PzKwIII medium tank, seen here in Russia in 1942, was the backbone of Germany's Panzer Corps early in WWII. Its versatile design supported several generations of upgrade during the course of the war, including improved armor and more powerful armament. Coherent German armor doctrine maximized its effectiveness.

By 1933, the British Army was comprised of 136 infantry battalions, 20 regular cavalry regiments, 21 Indian cavalry regiments, 16 training regiments, and only four tank battalions.[16] These unit allocations represent the real areas of tactical emphasis for the British. The only real concession to the future of mechanization came when the War Office decided in 1937 that all the cavalry regiments would exchange their horses for light tanks. These tanks which, Orgill said, "if not horses, at least looked like they were the nearest thing available to a mechanized horse,"[17] enabled the cavalry to retain its spirit as well as its role as a primary combat arm. Yet, it is plain to see that the traditional combination of infantry and cavalry remained the backbone of the British Army during the inter-war period.

Liddell Hart's study is significant because he maintained that, with correct employment, the tank was admirably suited for much more than infantry support missions. The tank had not only demonstrated the potential for effective penetration of established defensive lines (the direct approach), but Liddell Hart insisted that tanks were capable of rear area exploitation operations against enemy command and logistics centers (the indirect approach.) By marrying historical examples with the demonstrated results of WWI tank operations, this study did much to focus the potential of mechanized operations at the doctrinal level. The British Army, distracted by the debate between traditionalists like Haig and visionaries like Fuller and Liddell Hart, and restricted by the post-war economic depression, took note of Hart's work, but made minimal progress towards preparing the Tank Corps for the future. While the British were thus stymied, the Germans devoted great energy and resources to developing a mechanized force with the tank as its foundation. In 1936, the British Army fielded 209 light tanks and 166 medium tanks in its four battalions. Out of this total, 140 of the light tanks and 164 of the medium tanks were obsolete. In contrast, the Germans at that time fielded 1,600 new light tanks and between 300 and 400 new medium tanks.[18] Perhaps more important than the sheer numerical superiority was the fact that German mechanized doctrine developers during the interwar period understood its potential and were dedicated to creating an offensive force based on the tank. General Heinz Guderian was among the foremost of those leaders.

Under Guderian's leadership, each division contained a mixture of heavy and light tanks, motorized infantry battalions, mechanized engineers, mechanized reconnaissance elements, field artillery units, and signal units.

Guderian was the first of the German generals to grasp fully the significance of the work done by Fuller and Liddell Hart. He credited both men with providing him with his initial motivation to pursue a working mechanized doctrine:

"It was principally the books and articles of the Englishmen, Fuller, Liddell Hart,...that excited my interest and gave me food for thought. They envisioned [the tank] in the relationship to the growing motorization of our age, and thus became the pioneers of a new type of warfare on the largest scale."[19]

Supported by the principles outlined in Fuller and Liddell Hart. and WWI experiences at the hands of the British tanks, Guderian succeeded in convincing Hitler of the potential success to be gained by organizing entire units of tanks and mechanized infantry under one command. In 1935, Hitler authorized the creation of the first three panzer divisions.[20] Under Guderian's leadership, each division contained a mixture of heavy and light tanks, motorized infantry battalions, mechanized engineers, mechanized reconnaissance elements, field artillery units, and signal units.[21] This type of organization is significant because Guderian designed each panzer division to be an inde-

pendent combined arms command, with a core of tanks to spearhead offensive operations, and capable of diverse missions.

For Guderian, the combined arms operation came to life in the "blitzkrieg." This concept of mechanized warfare combined the basic elements developed and revised during WWI, incorporated the principles espoused by Fuller and Liddell Hart, and added a spirit of ruthlessness and efficiency. The primary characteristics of blitzkrieg operations were speed, surprise, maneuver, and overwhelming firepower concentrated on a narrow front.[22] In its execution, reconnaissance units located enemy weaknesses and protected the advancing division's flank. Tanks with air support predominated in seizing vital objectives and held them until infantry units with antitank capabilities arrived to secure them against counterattack. Artillery supported all phases of the attack and temporary defense.

Guderian considered the key to offensive success to be movement. He believed that by attacking with tanks, he could sustain a higher rate of movement and that, once a breakthrough was made, the movement could be maintained by the combined arms division.[23] Since the tank had developed in response to the loss of battlefield mobility in 1916, and since it had demonstrated the capability to restore momentum to the BEF, Guderian's reliance on tanks to lead his assaults and maintain forward momentum seems logical. The doctrine of the blitzkrieg in many aspects represented the strategy of the indirect approach and traditional frontal maneuver taken to a higher level. When the Germans launched their assault into Poland in September, 1939, Guderian had at his disposal forty infantry, six panzer, four light and four mechanized divisions with a total strength of 2,977 tanks.[24] The Polish campaign proved the validity of Guderian's concept; he considered the campaign to have been the baptism of fire for both his armored formations as well as the overall philosophy of the blitzkrieg.[25]

This series of three articles in *ARMOR* (Nov-Dec 95, Nov-Dec 96, and Mar-Apr 97) has shown clearly that the tank was designed in the early stages of WWI as strictly an infantry support weapon, developed in direct response to the loss of mobility in the face of barbed wire, artillery barrages, and machine guns. Ernest Swinton surely never envisioned the tank as the primary offensive arm of an operation; for him, the tank was auxiliary to the infantry, who remained the premier maneuver force on the battlefield. As British tactical doctrine developed in the latter stages of the war, the tank took on an increasingly offensive role, but always remained secondary to the infantry and cavalry.

The immediate post-war reduction in British standing tank forces indicated a reluctance on the part of the military establishment to continue practical development of mechanized equipment or doctrine. It was the Germans under Guderian who expanded on the basic principles of tank operations and pursued the concept of large combined arms divisions and rapid, long-range offensive maneuver. To state that the German blitzkrieg is the logical result of the progression of WWI mechanized doctrine is to make an inaccurate analysis. Guderian built on the early work of men like Swinton, Fuller, and Liddell Hart, but also incorporated an offensive philosophy, a spirit of innovation, and the fiscal support to fund new vehicle production, none of which were present in the British Army during the inter-war period.

In the final analysis, the mechanized operations conducted by the BEF were innovative solutions to the problems posed by the battlefield stalemate. Tanks provided the means by which mobility was restored to the infantry, enabling them to penetrate defensive lines and fight the battle. The British Army ignored, for the most part, the offensive potential which existed in mechanized operations. During the inter-war years, the tank retained its original mission and purpose for the British, while under the Germans it assumed a new role as the primary offensive component of the blitzkrieg spearhead. It may very well be that the world will never again see the need for large armored formations along the lines of Operation Desert Storm; however, the alternative to striking a suitable balance between either standing down the heavy force or retaining excessive heavy capabilities is, to my mind, unacceptable given the historical precedent.

Notes

[1]Douglas Orgill, *The Tank: Studies in the Development and Use of a Weapon* (London: Heinemann Publishing Co., 1970), p. 83.

[2]Ibid.

[3]J.H. Boraston, *Sir Douglas Haig's Despatches, Dec. 1915 - April 1919* (New York: Charles Scribner's Sons, 1927), p. 300.

[4]Ibid.

[5]Ibid., p. 327.

[6]Robert H. Larson, *The British Army and the Theory of Armored Warfare, 1918-1940* (Newark: University of Delaware Press, 1984), p. 63.

[7]Ibid.

[8]B.H. Liddell Hart, *The Tanks: The History of the Royal Tank Regiment* (London: Cassell Publishing, 1959), vol. 1, p. 306; cited in Charles Messenger, *The Blitzkrieg Story* (New York: Charles Scribner's Sons, 1976), p. 36.

[9]Messenger, p. 37.

[10]Great Britain, War Office, *Field Service Regulations*, vol. 2: *Operations* (London: HMSO, 1920,) pp. 31-32; cited in Larson, p. 113.

[11]Ibid.

[12]Ibid., p. 67.

[13]Hart, p. 4.

[14]Ibid., p. 5.

[15]Ibid.

[16]Orgill, p. 98.

[17]Ibid.

[18]Messenger, p. 108.

[19]Heinz Guderian, *Panzer Leader* (New York: Dutton Publishing, 1952), p. 20.

[20]Ibid.

[21]Ibid., Appendix XXIV.

[22]Ferdinand O. Miksche, *Attack: A Study of Blitzkrieg Tactics* (New York: Random House, 1942), p. 10.

[23]Guderian, p. 42.

[24]Bryan Perret, *A History of Blitzkrieg* (New York: Stein and Day Publishers, 1983), p. 78.

[25]Guderian, p. 82.

Major David P. Cavaleri earned a BA from Eastern Nazarene College at Quincy, Massachusetts (1982), was commissioned an armor officer in 1983 through the Officer Candidate School, and after commanding a USAREUR-based tank company earned an MA in History from the University of Missouri at Columbia in 1993. He is a graduate of several Army schools and is currently attending the United States Army Command and General Staff College at Fort Leavenworth, Kansas. Major Cavaleri previously served as an Assistant Professor of History at the United States Military Academy.

Patton, seen at left as a pioneer in the U.S. Army's fledgling tank force during World War I, did not see horses versus tanks as an either-or proposition until the German Blitzkrieg in 1939. At right, Patton as a LTC at Fort Myer, Va., in 1934.

Patton Versus the "Motor Maniacs":

An Inter-War Defense of Horse Cavalry

by John Daley

Few American feats of arms have garnered more notoriety than George S. Patton, Jr.'s successful application of mechanized warfare during August 1944. The topic of numerous biographies, and later, an Academy Award-winning movie, "Blood and Guts" has become a part of our popular culture as well as our history. Aided by his voluminous correspondence and commentaries on the art of war, Patton's biographers have thoroughly explored his earlier years in order to identify the roots of his adaptability and inventiveness, characterized by the breakout from Avranches and subsequent events during that pivotal month.

The results of this search have, of course, been mixed. For every hint of farsightedness in the pre-World War II Patton, an equally prominent dash of retrospection seems to appear, leaving succeeding generations to discover a complex personality, mixed motives, and doubt, rather than the willingness to exchange all horses for tanks that some might have expected. Commissioned a cavalry officer, Patton transferred to the Tank Corps in 1917 and commanded a light tank brigade during the St. Mihiel and Meuse-Argonne operations. Having developed much of that new arm's tactics, he nevertheless returned to the horse cavalry and remained there until 1940. Faced with this puzzle, biographers wishing to underscore Patton's later mastery of combined arms warfare in the machine age emphasized that this apparent backslide had been at least partly motivated by an instinct for career preservation.[1]

Indeed, when Congress placed the Tank Corps under the Chief of Infantry's control in June of 1920, with the approval of no less than General John J. Pershing, the future practitioner of armored breakout and pursuit had ample cause to believe that he held a dead-end job. During the interwar years, most senior American infantry officers continued to regard the tank as an infantry support weapon, rather than the basis of a new combat arm capable of revolutionizing warfare. However, Patton's consequent return to the Cavalry in October of that year merely brought him into contact with other superiors who — like their fellow cavalryman, Pershing — argued that machine power was still an auxiliary to muscle power, at least at the tactical level. Patton's interwar critique of mechanization accented this theme: for the good of the service, machines and horses would have to coexist.

The principal motive behind his conclusion, however, remains problematic. Was Patton a tanker at heart who reluctantly hedged his bets by telling more conservative superiors what they wanted to hear during peacetime? Or was he a horse soldier who reluctantly gave in to full mechanization as war approached?

It is safest to argue that the truth lies somewhere between these two simplistic extremes, but the assurance that the innovator of 1944 had been an innovator all along nevertheless appears the more unlikely. When Guderian's panzers finally provided Patton with an unassailable excuse for returning to tanks, Patton was only beginning to look for one. His previous defense of the horse stemmed as much from a carefully considered professional opinion as from career designs. That the two dovetailed so neatly was — for an aging officer who so often despaired of making general in a peacetime army — the result of coincidence rather than cooperation.

The sincerity of Patton's interwar belief in the interoperability of mechanized and horsed formations is indicated by three considerations. First, and most obviously, he advocated — well before leaving the Tank Corps, when his career could have depended on such advocacy — that the Army retain horse cavalry for its central role in the exploitation of breakthroughs. Similarly, in May 1940, when newly appointed Chief of Staff George C. Marshall showed a kinder disposition to mechanization, and when peacetime budgetary constraints simultaneously disappeared, Patton nevertheless believed that, if properly equipped and led, a horse cavalry division was capable of repelling tanks.[2] An examination of the intervening years reveals the third indicator of Patton's sincerity: His opinions often evolved independently of guidance from the succession of chiefs of cavalry and others who controlled his career. Although his attack on "motor maniacs" who believed in the cavalry horse's obsolescence indeed placated superiors, it influenced them also.

Prior to the National Defense Act, Patton's official and unofficial commentaries on mechanization were probably no more or less affected by his career interests than was the case after his return to the cavalry. While belonging to an independent tank corps, he avidly urged *that* organization's retention. In the future, he argued, mobile armies would operate over vast expanses of poorly reconnoitered land where there were few reliable roads and, therefore, in tactical situations unlike those encountered in Western Europe during the Great War. Incomplete reconnaissance meant a need for armored protection, and the scarcity of paved roads and railroads promised to make irrelevant the massive supplies of artillery ammunition for equally massive barrages. More than before, the tank's armored protection and direct fire capability were essential for defeating machine guns and closing with the enemy.[3] But even while serving in the pre-National Defense Act Tank Corps and recommending its continuation, Patton made his reservations clear. The tank, he warned, had not replaced the cavalry, or any other extant combat arm. Nor could it be expected to effect strategically significant exploitations without horsed units, despite its durability and firepower. For Patton, the shock effect wielded by a division of cavalry, when aided by the fire of three battalions of light tanks, was the crucial factor.[4]

Upon his return to the cavalry, Patton continued to urge the adoption of an independent tank corps, but emphasized the horse's indispensability as well. Equally important, he was more willing than before to take issue with those who did not. In a July 1921 *Infantry Journal* article entitled "Cavalry Tanks," infantry tanker Bradford Chynoweth reasoned that, in future wars, horsed formations would be unable to penetrate enemy cavalry screens without tank support, particularly because those screens were likely to employ machine guns and tanks of their own. Despite numerous disclaimers — whether sincere or not — this evaluation of mechanization's potential left the horse's future open to question as far as Patton was concerned. Chynoweth, he complained, had depicted a "senile and impotent" horse cavalry without noting the contemporary tank's poor mobility over rough terrain.[5] Before his return to the cavalry, Patton had also cautioned that tank-less reconnaissance forces would prove inadequate, but an admission to this effect did not appear in his rebuttal of Chynoweth. Instead, he established the first of three themes that would come to characterize his own less optimistic assessment of mechanization during the next eighteen years.

That theme was the overspecialization of the tank; a machine more suited to penetration than envelopment. Since cavalry operations normally entailed the latter, Patton argued, cavalry tanks would be unnecessary in all but special circumstances. Similarly telling in his critique of Chynoweth was his reversal of an earlier proposal to use tanks as feed carriers for horsed units: He now contended that a cavalry equipped with automatic weapons was "wholly self-sufficient" because horses, unlike tanks, needed no lines of supply. Only then did Patton urge the re-establishment of an independent tank corps whose elements could be temporarily assigned to assist cavalry when needed. Fixated more than Chynoweth on the tank's present capabilities than its future potential, he no longer stressed the practicality of large mechanized forces outside of Europe. In Texas, Mexico, Canada, and the Philippines, he predicted, tank-heavy forces would likely suffer in the face of conventional opposition.[6]

If tanks were overspecialized, so, too, were tankers. In an April 1922 *Cavalry Journal* article entitled "What the World War Did for Cavalry," Patton asserted that, because horsed troops were not used extensively after 1914, they had avoided the negative side effects of technological innovation, tactical inflexibility, and rapid expansion of armies. Chief among these was the unduly short training period allotted individual soldiers, and tankers spent much of that period honing mechanical skills. As a result, they had become hastily trained semi-military technicians, rather than military professionals with a collective grasp of tasks other than their own. Only because trench warfare was as stereotyped as those who fought it had such a system survived until war's end. In the future, however, open warfare would require fully trained soldiers and leaders, as had been the case prior to World War I. Compounding the effects of artificially limited training was the technocentric arrogance with which the tankers viewed traditional arms such as horse cavalry. In Patton's estimation, many had become "overconfident of the effectiveness of their favorite weapon," whereas the cavalryman's more comprehensive training had preserved his adaptability.[7]

Once he had noted the practical limitations of cavalry tanks, Patton focused on armored cars — tactical vehicles that still fell within the boundaries set for cavalry by the National Defense Act. This change could be rationalized easily enough for, as Patton noted in his January 1924 article, "Armored Cars with Cavalry," no tank then in unit service could keep up with cavalry horses except under limited circumstances. Although the same was true of contemporary armored cars, at least a suitable model of the latter could be built using automotive components readily available during peacetime. Patton suggested that a standard commercial two-ton truck chassis be armored well enough to defeat rifle fire from beyond 100 yards and equipped with a .30 caliber machine gun capable of 360-degree traverse. Roof and floor armor were to be omitted so that a favorable horsepower-to-weight ratio could be obtained with engines already on hand. As for the crew's protection, use of one's weapons was the best defense in any case, and enemy efforts to engage a moving vehicle would usually fail. In short, Patton's ideal armored vehicle was as simple and unspecialized as possible; qualities which, he quipped, were sure to "arouse the ire of every inventor."[8]

For most of the 1920s, Patton's critique of mechanization centered on the premise that horses were still necessary for exploitation, screen, guard, and covering force missions because cur-

rent armored vehicles lacked the versatility to keep up with their muscle-powered counterparts. After May 1928, when he became plans and training officer for the Chief of Cavalry, Herbert B. Crosby, a second reservation appeared in his commentaries increasingly often: The extreme costs of development and production would prevent the tank's use in large numbers, no matter how nimble and durable the automotive engineers could make it. Six hundred dollars was enough to secure horses for a patrol of four men, but the simplest of wheeled armored cars cost $1,000.00 and offered far less cross-country mobility. The tank, while offering its crewmen better mobility and protection than the armored car, was not going to be had for less than $12,000. Moreover, Patton was still anticipating a conflict in Mexico or the Far East, where a lack of suitable roads would isolate mechanized elements from their fuel supplies.[9]

After warning of the steep costs associated with operating tanks in the more remote theaters of future wars, Patton admitted that armored fighting machines were "here to stay" and essential for securing horsed cavalry formations in the face of enemy armor. Moreover, in an April 1930 article co-written with fellow cavalry officer C. C. Benson, he now contended that a cavalry division should possess an organic tank element, rather than one temporarily detached from an independent corps. Lest such a view parallel Chynoweth's earlier one too closely, Patton again highlighted the machine's limitations: Horses could function effectively on half rations whereas tanks and armored cars, even when fully supplied with repair parts, continued to deteriorate.[10] Both authors had recommended compromises between horse and machine, but Patton was, for the moment, less willing to regard the latter as ascendant.

The following month, Patton expanded the scope of his critique still further. Having thus far focused mainly on the armored vehicle's technological and budgetary limitations, he now added a third theme — criticism of a proposed tank division table of organization. As in 1921, his foil was an Infantry tank officer rather than a fellow cavalryman. In a staff study dated 17 April 1930, Colonel James Kelly Parsons, the field development officer for the Army's current battalion-sized mechanized force, recommended that the Army organize six tank divisions "as soon as practicable" because mechanization was sure to play a prominent role in America's next war. Each of those divisions was to operate independently of other combat arms and be subject to the control of one of six field army commanders. Their 13,500 tanks and self-propelled artillery pieces, based on the Christie suspension, would cost 270 million dollars.[11]

Despite his role in leading tank units during WWI, Patton maintained his interest in horse cavalry until the eve of WWII. Third from left, he is seen here as part of the team that won the 1931 Argentine Cup in polo.

Compared with the tiny, poorly-equipped mechanized force with which the Army was then experimenting, Parsons' proposal was theoretically, as well as financially, radical. Had he recommended a much smaller outlay of money and equipment, the basic building block of the new division — the 16-ton Christie tank — would have remained a source of contention, for not even those officers in favor of more extensive mechanization agreed as to its suitability. Benson heralded its automotive features as "the best in the world." Parsons was also impressed with its convertible suspension and 70-mile-per-hour performance in several proving ground tests, and added that its 47mm main gun sacrificed no firepower in exchange for speed. Conversely, many of Patton's earlier complaints about the excessive cost and overspecialization of armored fighting vehicles had been aimed specifically in Christie's direction, including the lament that "unfortunately, inventors don't have to fight the things they make."[12]

Seen against a backdrop of budgetary constraint, Patton's view was bound to find favor with his branch chief and, given Parsons' determination that the tank divisions remain independent of conventional infantry and cavalry formations, this was doubly so. On 19 May, Patton laid out his objections to the Parsons plan in a memo to Crosby's successor, Guy V. Henry. Like the breakdown-prone Christie, he argued, a division built around 486 of them was of limited utility. And mechanical reliability was not the only problem; a shortage of cargo space would limit the size of future overseas deployments. For Western Europe, where roads and railroads were plentiful enough to facilitate the supply of larger forces, a maximum of two field armies and two tank divisions could be expected. Worse yet, if the next war took place at the end of a longer supply line — in Asia — the same amount of cargo space would prove inadequate for any more than one army and one of Parsons' divisions. Similar considerations faced any prospective invader of the United States.[13]

Logistics aside, Patton added that tanks were not tactically suited to operations in jungles or deserts, and that their employment in such situations against unmechanized opponents would be like "pursu[ing] a fly with a sledge hammer." Even in the event of another European war, the tank would probably prove less effective than its mechanically primitive ancestors because countermeasures had improved since 1918. And even if no enemy tanks, antitank guns, mines, or ditches were present, tanks needed infantry support that the proposed table of organization did not provide: Parsons had called instead for dismounted crewmen armed with Thompson submachine guns to defend as infantry while the tanks, like so many cavalry horses, were withdrawn to a secure position. Applying his overspecialization theme in its most farsighted mode to date, Patton asserted that the exclusion of infantry from a tank division table of organization was a "grave mistake." Not only was a tank-pure unit's organization poorly suited to the performance of infantry tasks, but once the dismounted crewmen had become decisively engaged elsewhere, their tanks would be effec-

tively immobilized and liable to capture whether faced by purpose-built antitank defenses or not.[14] This observation foreshadowed subsequent wartime reductions in tank-to-infantry ratios, including the reorganization of Hitler's panzer divisions after September 1939 and the formation of the U.S. Army's light armored divisions in September 1943.

Two of Patton's other 19 May 1930 recommendations also set significant precedents for interwar superiors then seeking to soften the effect of the National Defense Act's tank provision. When, on 30 October, Chief of Staff Charles P. Summerall directed that the Army's small independent mechanized force be made permanent, he was pursuing a course of action that Patton had recommended in his critique of the Parsons study. Similarly, Patton's suggestion that all existing branches experiment with mechanization surfaced in May 1931, when Summerall's successor, Douglas MacArthur, terminated the "permanent" mechanized force in favor of this latter option. Although a shortage of funds prevented both of Patton's recommendations from being applied simultaneously, they were applied in succession, and to the chagrin of a chief of infantry, who had hoped to protect his monopoly on tracked armored fighting vehicles. After the consequent establishment of the 7th Cavalry Brigade (Mechanized), this interbranch tension remained until the Infantry's tanks and the Cavalry's "combat cars" were subsumed into the quasi-independent Armored Force.[15]

In the meantime, many of Patton's reservations about currently available vehicle designs remained, and his doubts concerning the deployment of large armored formations overseas died hard. His own experiences at the Army's Desert Training Center during the spring of 1942 would remove many of his concerns regarding the practicality of armored operations in deserts, but this, too, was a late development. Until the spring of 1940, Patton's assessment of mechanization's potential remained a guarded one, but however distorted that assessment may appear with the aid of hindsight, there was a solid grain of truth in it. Not only did Patton's more mechanization-oriented colleagues in the cavalry also fail to solve the logistics riddle of armored warfare by the eve of the Armored Force's establishment, but a complete solution continued to elude American tankers throughout World War II, when budgetary constraints were less problematic. So, too, did some contemporary "motor maniacs" complain about the Christie tank's less practical features, and few mechanization enthusiasts, even those in the infantry, realized how heavily armed and armored their machines — and those of their opponents — would eventually become.

It is doubtful that even the most insightful planner, whether detractor or proponent, could have accurately projected mechanization's wartime course merely by observing America's small, poorly funded interwar experiments, and any assessment of Patton's efforts to do so must be tempered by this realization. Nor does that effort's partial failure make it any less significant; Patton's often unsteady, equivocating course between horse and machine is, after all, indicative of that taken by the U.S. Army as a whole. Equally to the point, his attacks on the technological, budgetary, and organizational problems of mechanization often came without prompting from more conservative, horse-oriented superiors — those superiors were as likely to follow *his* lead. They welcomed his opposition to the adoption of insufficiently tested machines and flawed schemes for their employment as a badly needed infusion of realism, and that infusion served their own defense against unlimited mechanization well. Convenient to those who wielded influence over Patton's career, his restraint was equally troublesome for many of those who did not. Nevertheless, it was mainly the product of a professional's carefully considered opinion rather than that of a careerist's instinct for self-preservation.

Notes

[1]Martin Blumenson, ed., *The Patton Papers*, Vol. I, (Boston: Houghton Mifflin, 1972), pp. 840-2; Blumenson, *Patton: The Man Behind the Legend, 1885-1945*, (New York: William Morrow, 1985), pp. 121-3; Ladislas Farago, *Patton: Ordeal and Triumph*, (New York: Ivan Obolensky, 1963), pp. 102-3; Carlo D'Este, *Patton: A Genius for War*, (New York: Harper Collins, 1995), pp. 301-303.

[2]Blumenson, pp. 946-50.

[3]Patton, "Tanks in Future Wars," *Infantry Journal* XVI no. 11 (May 1920), p. 961.

[4]Patton, "Further Notes on the Use of Tanks in Various Operations Including Open Warfare," April 1920, Box 11, George S. Patton, Jr. Collection, Library of Congress, Washington, D.C., p. 4; Patton, "Light Tanks in Exploitation," (Typescript of AEF General Staff College lecture), 5 Dec. 1918, ibid., p. 9.

[5]Bradford G. Chynoweth, "Cavalry Tanks," *Cavalry Journal* XXX no. 124 (July 1921), pp. 249-51; Patton, "Comments on 'Cavalry Tanks'," ibid., p. 251.

[6]Patton, "Light Tanks," p. 9; Patton, "Comments," pp. 251-2.

[7]Patton, "What the World War Did for Cavalry," *Cavalry Journal* XXXI no. 127 (April 1922), pp. 167-8.

[8]Patton, "Armored Cars with Cavalry," *Cavalry Journal* XXXIII no. 134 (January 1924), pp. 6-8.

[9]Patton, "Notes for the Chief of Cavalry," memorandum to Chief of Cavalry Herbert B. Crosby, 1 August 1929, Box 56, Patton Collection, pp. 2-3.

[10]Patton and C.C. Benson, "Mechanization and Cavalry," *Cavalry Journal* XXXIX no. 159 (April 1930), pp. 238-9.

[11]James K. Parsons, "Mechanized Forces," study submitted to Adjutant General's Office, 17 April 1930, General Correspondence File, Entry 860, Record Group 407, National Archives, Washington, D.C. Commentary on the project's urgency is found on p. 1; Commentary on unit cost and number of vehicles required is from p. 9.

[12]Benson, "The New Christie 'Model 1940'," *Infantry Journal* XXXV no. 3 (September 1929), p. 261; Parsons, p. 4; Patton, "Armored Cars," p. 8.

[13]Patton, "Subject: Study of Mechanized Forces by Colonel James Kelly Parsons," memorandum for the Chief of Cavalry, 19 May 1930, Decimal File 537.3, RG 407, NA.

[14]Ibid., pp. 2, 5.

[15]C.P. Summerall, memorandum to Assistant Chief of Staff, G-3, 30 October 1930, Decimal File 537.3, RG 407, NA; Douglas MacArthur, "General Principles to govern in Extending Mechanization and Motorization throughout the Army," 1 May 1931, Decimal File 537.3, RG 407, NA; George C. Marshall, "Subject: Mechanization," memorandum to ACofS G-3, 5 June 1940, Decimal File 320.2, RG 407; "Subject: Organization of the Armored Force," 10 July 1940, Decimal File 320.2, RG 407, NA.

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Mine Resistant Tracks

Tracks that just roll over exploding mines?

Vietnam-era research proved it could be done

by Ralph Zumbro

Tank losses to mines in Vietnam spurred research on mine-resistant tracks. Above, troops repair a track on an M48 that struck a mine near Chu Lai in August, 1967.

The rocket-scarred tank, which with most of its crew, was a veteran of Operation Desert Storm, prowled through a battered, dreary, almost deserted Bosnia town as cautiously as an alley cat. The big landship was never meant for city combat, and she'd already lost a running mate to a new threat. The narrow Balkan streets were alive with fanatic, deadly tank hunting teams. Magnetic limpet mines, satchel charges, and Molotov cocktails were back in the tanker's vocabulary.

Slowly, all sensors at max, turbine whining softly, tracks thudding against the patched cobblestones, the big hull shouldered between two buildings... WHAM! A puff of dirty gray smoke belched from under the right track and the tank jerked to a stop as the driver slammed on the brakes to avoid rolling the track off the return rollers. Almost simultaneously, a sleet storm of machine gun fire raked the turret top.

"Goddamn, it Sarge," the driver yelled over the intercom. "The right track's busted...."

"Keep a lookout... Uh oh, we're boarded," the TC replied. The driver heard a twin thud as the TC and loader slammed their hatches shut and a call went out over the microlink. The driver could see dark shapes climbing the hull, carrying something roughly cylindrical. The TC barked on the radio, "Three-three, this is Four, we're boarded. Scratch my back and see if you can break some grunts outta their Bradleys, over... OMYGAWD, we're DEAD."

The tank, immobile and trapped between two buildings, had been boarded by two enemy soldiers carrying a homemade thirty-pound shaped charge that they clamped to the turret top with magnets. The LMG fire from the second story windows had ceased just long enough for the charge to be placed and the two men to leave. Then it started up again... covering yet another pair who slide from an alley with RPGs.

At that range, they couldn't miss, and two rockets slammed into the projectile trap between the turret bustle and the hull, shattering the traverse ring. In a hidden room, safe down the street, their controller pressed the switch of his radio detonator and three concentrated lances of explosive energy met in the center of the fighting compartment.

The platoon sergeant and his crew never had a chance. The explosion cremated them, setting off the rounds that, in defiance of regulation, the loader had resting against his knee. The blast blew the safety bulkhead from the inside, setting off the ammo supply for the main gun, which took the top off the turret and shattered the second stories of neighboring buildings.

As the tank rocked on its tracks from secondary explosions, the rest of the platoon and a pair of Bradleys arrived...but too late. The company commander would be writing more letters that night, because of an antiquated

track design that could have been replaced years ago.

The small wars of history have always bred desperate men. Stories of believers wired with explosives came out of Desert Storm. Somalis had swarmed the Marine tanks in Mogadishu. Japanese had charged Shermans with satchel charges in last-ditch stands on their Pacific islands. This sacrificial behavior in the face of certain death is a warrior's trait with a long history. Men inculcated with a belief in Paradise, or a divine Emperor, will die just as willingly as men who die for freedom and love of country, and one of the favorite weapons of desperate men is the land mine. It is available, cheap, and effective. Mines are also very unselective.

While a fragmenting style antipersonnel mine will kill a rifleman, or a little girl hunting for firewood, a simple blast type antitank mine rarely kills the tank's crew. It is what comes after the tank is immobilized that is lethal. Research confirms this. Mines don't usually kill tankers; they just hold them still for the next stage of the ambuscade.[1] Statistics indicate that, in Vietnam, 70% of the mobility kills of tanks were accomplished by mines.[2]

We are letting our tracks be blown off by little 5-lb. charges that couldn't penetrate anyplace else on the tank. It is high time that we hardened the tracks, too. It can be done.

The purpose of an AT mine is threefold. First, of course, it's to stop the tank force from participating in a battle. The opposing commander is not out for kills, he just doesn't want to be bothered by rude strangers with armor-protected cannons. The second and third purposes are to delay the tank so that it is vulnerable to weapons covering the mine obstacle or hunter teams who can swarm the tank when it is stopped. In European wars, mines have traditionally been placed so as to stop the tank in front of an antitank weapon, whether a German 88 or the latest Russian-made ATGW. Or when stopped, the tank can swarmed by men on foot. Robert Swackhamer, a tank repair officer on Iwo Jima in 1944, told me that the main Japanese use of mines was to stop the tank long enough for infantry with grenades or satchel charges to swarm aboard. In some cases, they stayed there long enough for the charges to go off, even if they had to be tamped by human flesh. Nearby Marines made short work of most of the swarmers.

American military forces are now entering on a period of small wars, like it or not, and we are going to have to solve the problem of the track-breaking mine. Fortunately, the task is already half-accomplished.

Antitank mines have an attractive economy: as early as WWII it was calculated that a very small investment in mines could kill a very expensive tank, and with tanks becoming ever more costly, the balance is getting worse.[3] It is now possible for a 5-lb. scatterable mine to break the track of any battle tank. This battlefield equation is unacceptable, but by picking up the threads of some research begun in the early 1970s (and abandoned nine years later), something might be done about it. In 1973, an Army-sponsored program was launched at Martin-Marietta's Orlando, Florida facility to develop a mine-resistant suspension system. Right at the start of the program, the engineering team built what they called the baseline track, using three basic and revolutionary design principles.

First, to end your suspense, they made it work. The baseline track would roll over a 5-lb. charge and keep on moving to the end of its run. That same track would also take a 25-lb. AT mine and retain at least enough tractive integrity to allow the driver to back out of the minefield and get behind some kind of defilade. That is historical fact and the research reports are available from Defense Technical Information Center (DTIC). Their document numbers are listed at the end of this article.

The men who designed this miracle track, however, were not experienced tankers and were after only one thing, track survival after mine explosions. The track they created would resist mines, but not high endurance, cross-country abuse. They had not been told that we also use the tracks to break things like stone walls. Also, due to financial problems, they were not able to complete the series of tests. Their designs and principles, though, are still valid, and we can pick up where they left off in 1982 when their funding died out.

The design team started with one basic assumption, that of jujitsu. Don't stand flat in the face of a punch; let it slide by you. Reasoning that the solid structure of the conventional tread soaks up all of the explosive force, with no give at all, until its breaking point is reached, they developed their three principles, creating two sacrificial track components — and one unbreakable one.

First, instead of a solid cast track link body, they would create a frangible pad which, rather than soaking up the blow, would sacrifice most of its mass going up and away. This required the use of some quite sophisticated plastics, and in their day, the plastics industry was nowhere nearly as advanced as it is today. The science of engineered materials also, was in its infancy, nor had advanced ceramics been fully developed.

Second, they engineered a fiberglass roadwheel which had circular epoxy-resin rings between the hub and the rim. The purpose of those rings was to flex and absorb some of the punishing blast which normally deforms or destroys a steel roadwheel. That worked from square one. Not one of those wheels ever completely failed an explosive test. The problem that they had was one of overheating on endurance runs and flexion tests. Also, it was then known that blast is trapped between conventional twinned roadwheels (this writer has seen one pair go ¼ mile from point of detonation). That fact is what caused them to use the single roadwheel.

Third, and most important, they created an almost unbreakable chain of tractive effort which, protected by the sacrificial track pads, would hold together through the explosion and allow the tank to either proceed with its mission or at least to back out of there to effect repairs. As Figure 1 shows, the design was, to say the least, unconventional.

You will note that the four strong steel links are the only steel parts of this experimental tread. They were designed as male-female links and could easily have been manufactured in a division ordnance shop. One of the most important concepts of this design is that they completely eliminated the full-width pin, replacing it with four large bolts. The reason for this is that, if the pin is broken, the whole track is broken. If the pin is bent, that joint won't hinge, and it breaks anyway. In effect, with four separate chains, the tank can still move. The sacrificial parts were the composition rubber tread and the composite body. There was a fiberglass reinforcement over the shoe, which was a silica filled epoxy, with an epoxy-resin grouser. Obviously, this design wouldn't take too much convoy duty. This, however, was the baseline. The next illustration is that of the fiberglass roadwheel (See Fig. 2).

This design, which would fit the roadwheel hub of an M-60 tank, was

originally a single wheel with a V-shaped rim to fit the groove in the experimental track. Throughout their experiments, the developers kept to the single roadwheel concept, thus putting way too much pressure and heat on their load-bearing surfaces. The circular rings, which flexed just enough to absorb blast, were wound by hand, out of fiberglass tape on a rotating mandrel, and finished on a lathe. Again, nothing that couldn't be done in a division level shop. The rim also was hand wound and then the seven rings and the rim were epoxy bonded to the aluminum hub. Next, they sheathed the assembly in Uralite 3121S plastic, thus ensuring that any heat generated by the flexion would be trapped. If you are an experienced track mechanic, you are already getting nervous, but bear with us. This system was almost mine-PROOF and it deserves to be revived.

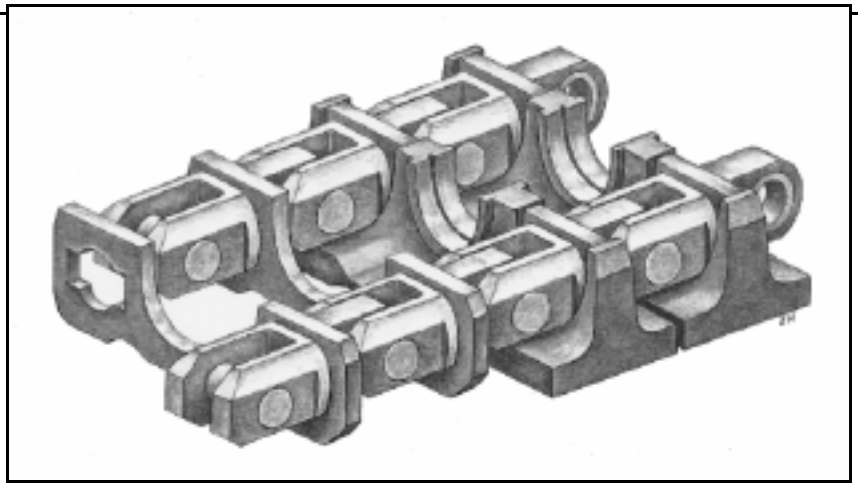

Fig. 1. Open-form track limited mine damage by allowing blast force to pass through the track sections. Even if the track pads were sacrificed, the track remained intact and usable.

You'll note that in Fig. 3, the ends of the male and female links are shown, and they were fastened by standard class 8 1.25" x 6" hexhead bolts. The drive sprocket was replaced by one designed to drive the track on the bolts, as this design totally eliminated end-connectors. They went through several versions of this, finally coming up with a system that might eliminate the dreaded end-connector halt in the middle of a battle. Figure 3 also shows the final cross-section of the roadwheel/track combination with which they went into mobility/blast testing. Notice that they've switched to a semi-circular wheel rim and a matching grooved slot in the track block which was supposed to allow rocking to give cross-country flexion. The two surfaces supporting the tank are now plastic to plastic, in contact. That's just 12 contact areas about the size of a human hand, to take 105,000 lbs. of weight. And that is just standing still. No wonder they had some friction problems.

One thing that should be brought out here is that for much of the testing, they had to manufacture only enough tread sections and roadwheels to test, as they hooked them up first to cement weights, and then, through adaptors, to existing tread on live tanks.

This procedure saved time and money. Lest there be some worry that this design might not be adaptable to the Abrams, rest assured. It was also fitted to the old 125,000 lb. M-103 heavy tank.

Once the research team had a final test configuration designed, they made up a mold for experimental track block materials and started casting. This mold, which could be tooled up by most plastics suppliers, was smooth-surfaced and water-cooled and could take a variety of plastics. Initially, the team started off with glass-filled polycarbonate and experimented through several mixes including Kevlar®-filled epoxy. Eventually, they settled on the glass-polycarbonate mixture and began their tests. As would be expected, there were problems.

The main stumbling point was, and still seems to be, the track block composition. At the end of the test series, four years later, the crew was still fighting the road wear problem. The excessive pad breakout during explosions had been solved by changing from the polycarbonate to a polyester plastic filled with ½" to ¾" glass fibers. A word is due here about polyester resins.

Polyesters are the familiar boat and auto building plastics which, when reinforced with any of dozens of available fibers from glass through Kevlar® to carbon, form many of the products we use in everyday life. If you have ever used Bondo to repair your auto, you have used a polyester filled with industrial talc. The principle is that the plastics take on some of the characteristics of the filler material. The resin can be bought from industrial suppliers in 55-gallon drums and the molds for experimental track blocks can be handmade from polished wooden or metal plugs. This writer has worked for years in the boating industry, and the technology is simple and available.

The problem with the track pads though, was excessive wear. They had effectively solved the breakout problem, reducing the damage to three pads for a 5-lb. scatterable mine and five to seven with a 25-lb. AT mine, leaving the drive chain intact. The balance between the ability to sacrifice to blast and still take extreme road wear was never quite solved, but much better plastics and ceramics are available today. It is perhaps time to resurrect the experiments. As the nightly news shows, the men who build the mines are not exactly sitting on their hands.

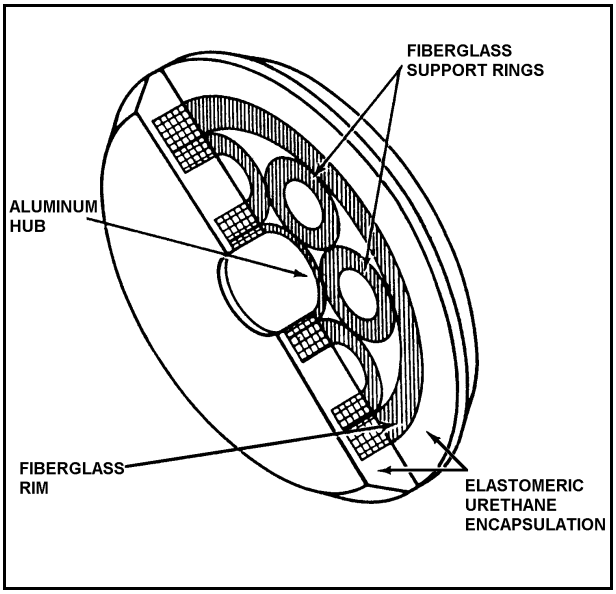

Fig 2. Composite, ring-supported roadwheel configuration.

The roadwheels never seemed to be destroyed, nor did the steel links, even when they went to a two-link instead of a four-link configuration. The chain was almost never disrupted in the static tests, which used only one roadwheel and eight track links. The main damage to the roadwheel seemed to be tearing of the plastic encapsulant. The single roadwheel also effectively vented the explosive force, instead of trapping it like our present configuration.

The only problem which showed up with the links was that, after several tests with the same links, the threads began to shear on the cross-bolts. Thread depth on those standard bolts was only .070" and thread depth and stress weakness starting at the thread groove would prove to be a problem until designed out.

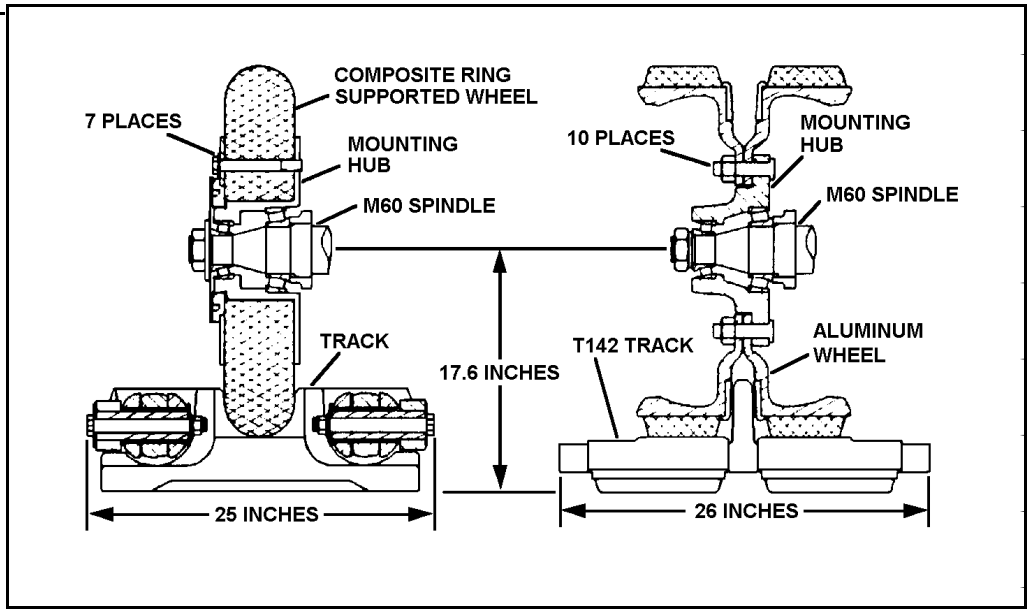

Fig. 3. Blast-resistant track, left, and M60 track are seen in cross-section for comparison.

So, now they had a tread design that would absorb a scatterable mine and keep on tracking, and at least stay together after a 25-lb. charge long enough to clear the area. When the team went to roadability tests though, they failed, partly due to material weakness and partly due to what this writer considers a basic design flaw. There is no way that a single roadwheel will take the weight of a main battle tank and transmit it to a track block with either full mobility or material durability. Even before actual road testing, static flexive tests showed that the wheel encapsulant, Uralite 3121S, would melt right where a tanker would expect: where the radius of the rounded wheel tried to flex in its single groove in that massive track block. A neutral steer on a hillside can put most of the weight of a tank on just the three center roadwheels, and the plastic couldn't take it.

It's probably better to keep our dual wheel, centerguide system, which has proven mobility and reliability, and adapt the Martin-Marietta system to existing equipment. Mr. Rene Gonzalez, of TACOM, recommends a frangible outer wheel and here, perhaps, is a use for those much-maligned aluminum roadwheels that wouldn't stand up to a mine anyway... Simply mount them as the outer roadwheel, paired with a steel wheel, and we've GOT a sacrificial roadwheel.

The other critical concept, that of the sacrificial track pad, was still giving trouble at the end of Test Series One, with from seven to eleven pads breaking out at the detonation of a 5-lb. charge of C4. The breakout mechanism, it was deduced, was differential motion between sets of links, and in the second series of tests, the team set out to cure that problem by installing a bracing yoke across the length of the track pad, to control the motions of the links under blast impetus (Fig. 5).

After several variations in yoke and connecting link design, the yoke shown in Fig. 5 was cast in the plastic track block. Note that it has a one-inch cross section and spans the full width of the block. The two slots in its ends are designed to take the massive track links which, by then, had been completely redesigned as shown in Fig. 6.

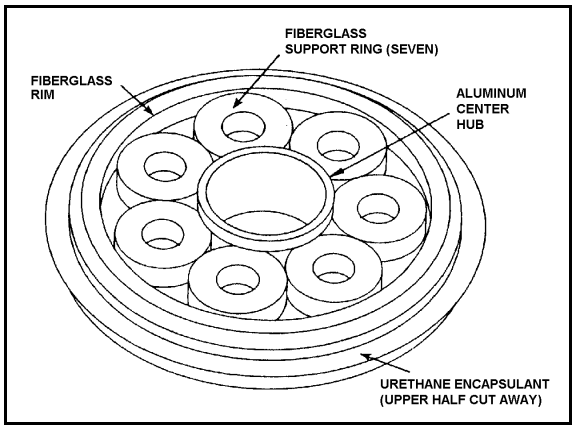

Fig. 4. Starting Point Roadwheel Configuration.

The link had by then reached what the team considered its final form. The separate male/female links had been replaced by a machined link with a female fork like a giant clevis on one end, and a matching male blade on the other. They were manufactured with a groove between the two so that the blade could be inserted into that keyed hole in the yoke and locked in place by rotating it 90 degrees. Then the whole assembly was inserted in the mold and the polyester casting resin injected around it.

You'll note that there is a lot of distance between the end of the male blade and the recess of the female clevis. This was done so that a sprocket could be designed which drove the tread through those holes, exactly as the M113 track is driven. When the tread was to be driven on an M-60, end connector adaptors were fabricated so that the track could be tested in comparison with the standard T-142 track.

The final component, the link pin, went through several versions, from the 1.25" standard bolt to the 1.5" pin shown with the track link. Held in place by the small locking bolt shown, and cushioned with a steel and rubber bushing, that design completely eliminates the end connector.

That heavy track, whose links are 4.75" across the horns, has just

taken a full 25-lb. blast, and in the past, has survived an M21 AT mine under number one roadwheel. The assembly is mounted on an M-103 heavy tank, which, after the explosion, was then started up and DRIVEN back to the motor pool under its own power. That, gentlemen, is a contribution to mobility.

CONCLUSIONS AND RECOMMENDATIONS: The Martin Marietta design team did a superlative job in negating the effect of mine blast. That track, as is, could be used as a mine field prover, or could be used to remove all the AP mines from a given area, but only for about a hundred miles at low speed, before the plastics used begin to melt or crack. When those tests were conducted, however, CAD-CAM had not been thought of, nor were the computers that we now all use available. There have also been some giant leaps in plastics, manufactured materials, and high strength ceramics, which would have to be plugged into the calculations.

It should be possible for someone with the full data available from the two reports — which contain full manufacturing info, including sources — to create a program which could simulate reality well enough to give us a test design which could be fabricated in ordnance shops. Then, instead of calling industry in, let's change the procedure a bit, and build an Army-designed pilot model.

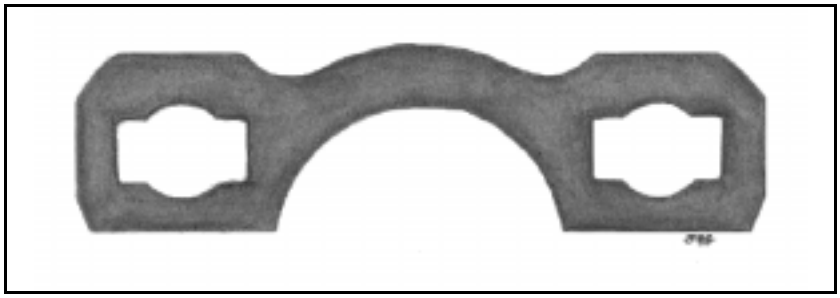

Fig. 5. Bracing Yoke formed from 1-in. steel plate.

First off, we ought to stick with the dual roadwheel and the centerguide. We are more than familiar with that configuration and know its capabilities. If the aluminum roadwheel doesn't protect the steel wheel, the design team can always switch to a fiberglass model. If that track yoke were fabricated flat instead of grooved, a centerguide segment could be welded to it. Better yet, a third chain could be added to the block, for the purpose of supporting the centerguides. This design change would allow a tread to be fabricated which would be compatible with existing suspension and drives.

Then, when the computer work is done, Ordnance could set up a soldier-operated, short-term assembly line and run off enough blocks to test a design concept. When they get to the point where a compatible design can resist a scatterable mine, it would be time enough to call industry in, but we really ought to do the preliminary work ourselves. History has shown that only tankers know what the iron is really going to do for a living.

Document I.D. numbers: "Hardening of Armored Vehicle Suspension System Components:"

Phase I USAMERADCOM 70-77-C-0060

Phase II USAMERADCOM 70-78-C-0015

(DTIC #ADB 069-394)

Notes

[1]Johns Hopkins University Operations Research Office, OEO-T-117, 31 Mar 51, Survey of Allied Tank Casualties in WWII.

[2]Southeast Asia Battle Damage Report. Surviac Tech Report #TR90-004, 7 Feb 94.

[3]Survey of Allied Tank Casualties in WWII.

Consultants

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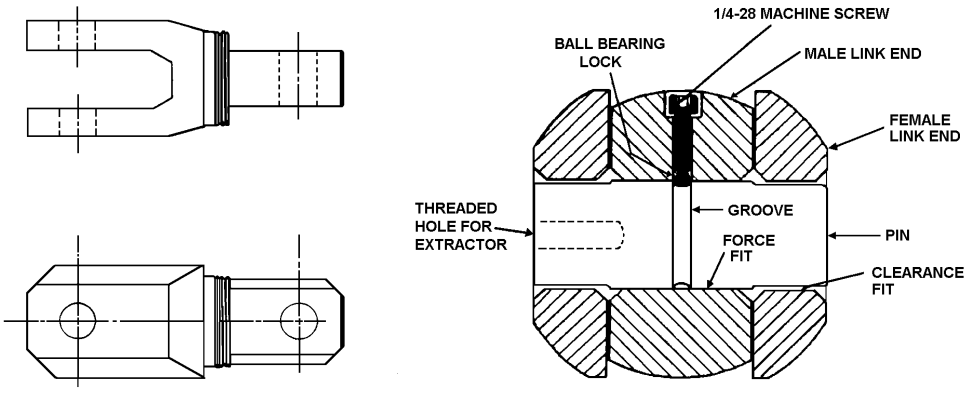


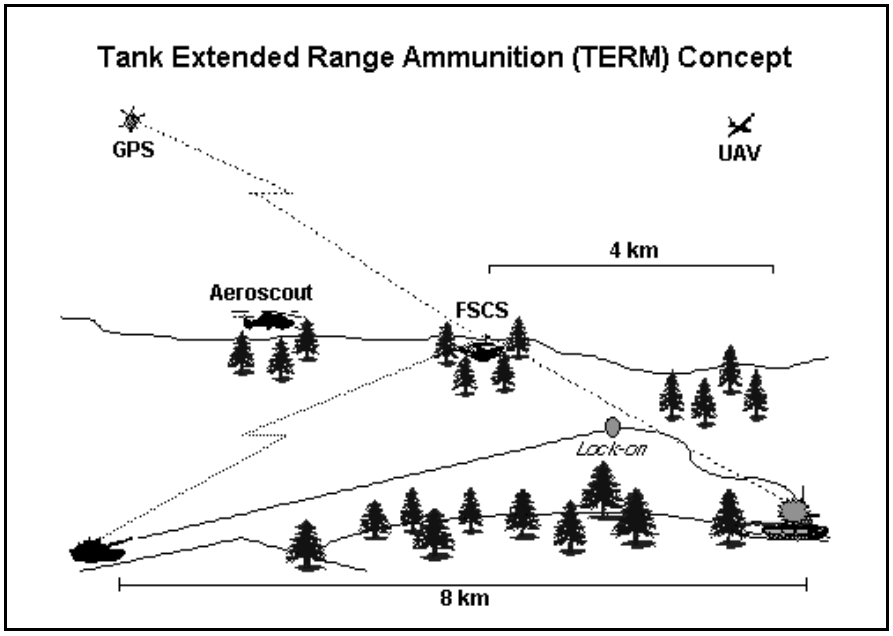
Fig. 6. Side, top, and end views of the final track link design.

Ralph Zumbro served as an NCO in each of the combat arms, including combat service in RVN. He has commanded tanks in Vietnam, USAREUR, and CONUS, and served as a gunnery and demolitions instructor. He has written articles for *ARMOR,* as well as several books, including *Tank Sergeant* and *Tank Aces.* He co-authored two novels, *Jungletracks* and *Puma Force,* with his former XO, James Walker.

TERM

The Tank Extended Range Munition

by LTC John C. Woznick



"Technical improvements in maneuver weapons systems, such as advanced optics, increased ranges, and digital electronics, will have a dramatic impact on tactical battlespace. Army maneuver forces — operating at an operational tempo controlled by the commander within a given battlespace — will use an expanded array of weapons systems to engage enemy forces at greater distances with assured accuracy. Based on enhanced situational awareness, the operating tempo of these forces will be such that they will be able to outpace any adversary in mounted warfighting environments."

-TRADOC Pamphlet 525-5

Force XXI operations present new paradigms for the employment of the Armor Force. The process began with the fielding of the M1A2 and its advanced digital capabilities. It continues with the development of Force XXI systems and doctrine. As the implementation of Force XXI continues, the volume, accuracy, and speed of information and targeting data available to commanders is growing, as is their ability to use this information to impact the battle in their area of influence. The development of the Smart Target Activated Fire and Forget Round (STAFF) also introduces the increased range and lethality of smart munitions to the Armor commander to extend his reach beyond the traditional ranges of close combat direct fire engagements. Improvements in target acquisition represented by the introduction of advanced Forward Looking Infrared (FLIR) sensors and other future target acquisition systems, integrated in both tank and scout platforms, provide the capacity to use tank extended range munitions to the maximum range of the commander's situational awareness. This may significantly impact the commander's ability to engage targets outside traditional close combat ranges but still within his close combat fight. The purpose of this article is to explain the concept of a tank extended range munition (TERM) and how this technology can support Armor's role in Force XXI Operations.

TERM

The Tank Extended Range Munition (TERM) concept proposes to combine emerging technologies in digitization, target acquisition, and warheads with advanced vehicle and tank main armament design to provide an enhanced engagement capability to the armored force. The focus is to provide an offensively-oriented close combat force with a lethal long-range engagement capability. This capability can engage "beyond line of sight" (BLOS) targets where the firing tank does not have intervisibility with the target. This "indirect" capability is analogous to the ability of attack helicopters to fire engagements initiated by their scout aircraft or other reconnaissance assets.

The concept would provide the tank with an extended range precision guided munition (several options, both missile- and projectile-based, are being considered). Target acquisition could be made by the combat vehicle itself or, more probably, by another asset (scout) linked in its digital architecture. The tank would be able to engage designated targets with the guided munition when beyond line of sight, engage with long-range guided direct fire when the tank achieves line of sight, and, finally, engage with conventional direct fire cannon ammunition if required.

The scout, possibly with an elevated platform or sensor package as envisaged by the Future Scout and Cavalry System (FSCS), improves the tank's probability of acquisition. Situational awareness/combat intelligence in a digitized force can cue the scout sensor platform where to search for targets, minimizing exposure time for both the scout and the firing platform. Once the scout platform acquires the target, it could hand off that target to the tank platform for beyond line-of-sight engagement. In this case, the scout would digitally identify the target before the tank fired the precision guided munition. The tank would then fire (in a fire-and-forget mode) relying on the munition sensor package or the scout's designation to complete the engagement. The capability would be integral to the close combat maneuver force, and **not** a fire support asset. The organic relationship and the ability to pass digital target information provide essential system responsiveness.

The system concept could use several different acquisition and guidance strategies to fire the long-range engagements. First, the scout could designate the target and pass the digital target data package to the tank. The tank's on-board computer and fire control system could then calculate the firing so-

lution to launch the round into the firing area, where the munition would then scan for the target designation. Once the munition was fired, the scout could then re-designate the target with a laser (or other low-probability-of-intercept designator) and the munition would home on the painted target. Second, the munition might be equipped with a terminal guidance package whose sensors would search for the target once it entered the target area. The scout would send the target data set to the tank which would compute the fire control solution that would put the munition in the best search aspect for acquiring the target. This scenario would then use the round's own sensors and guidance to maneuver to the target and complete the engagement.

The choice between target designation and munition terminal guidance offers different trade-offs in terms of cost, complexity, and operational impacts. These issues are being evaluated as part of a TERM concept study. Additionally, several possible kill mechanisms are being considered for the munition, including top-attack tandem HEAT, Kinetic Energy (KE) penetrators and Explosively Formed Projectile (EFP) warheads. The design is being optimized to maximize P(k) on a 2015 threat tank with explosive reactive armor cassettes, active protection systems (APS), and top-attack protection.

The TERM Concept Study

The TERM concept is currently being examined by a study group of research and development organizations as a lethality mechanism applicable to the Abrams or a Future Combat System (FCS). Both systems are currently being defined by TRADOC/USAARMC requirements Integrated Concept Teams (ICTs). The study team evaluated concepts, helped assess the operational payoff, and identified critical factors that must be considered in the design of a TERM system.

The Phase 1 TERM study considered seven concept alternatives provided by the Armament and Missile Research and Development Centers. These were:

- a tank-launched, precision guided mortar round with a tandem warhead
- a smart, long-range missile with a tandem warhead
- a smart top-attack multipurpose round with a unitary CE warhead
- a guided, smart, top-attack, fire-and-forget round (flyover shoot down)
- a LOS-only, tank-launched kinetic energy missile
- a LOS-only, guided, kinetic energy round
- a LOS/BLOS KE munition (either missile or bullet)

The study group examined the impacts of a TERM-capable tank through both technical and operational analysis. The technical analysis evaluated the feasibility of the concepts and assessed design challenges. The study included two LOS-only concepts that provided extended range but no BLOS capability. This provided a useful comparison of these capabilities. The tank-launched, precision-guided mortar round, fired in the BLOS mode only, provides another useful capability benchmark.

The analysis disclosed several important findings. First, operational tempo appears to be increased by TERM, allowing the battle to finish more quickly. Second, TERM promises logistical savings in ammunition expenditure, making a TERM-equipped Armor force more independent and flexible. Finally, TERM provides a significant operational payoff in increased combat effectiveness. This payoff was measured in both significant increases in lethality at extended range and a positive effect on survivability, reducing tank losses. All of these insights have implications on how Armor might fight on the future battlefield and will be examined in the next phase of the study.

In the scenario, TERM's BLOS usefulness was dependent on the nature of the terrain; it has a greater relative impact where the probability of LOS is rare. Where long-range line-of-sight exists, such as in the desert, TERM engagements were found to be more likely to be self-designated. Where the terrain is more broken, BLOS engagement becomes the norm and has a greater payoff. The ability of the scout to remain undetected, both through stealth and signature management, is critical to perform BLOS engagements. A Future Scout and Cavalry System (FSCS) could provide these key capabilities. UAVs and Aviation assets may also perform target acquisition/reconnaissance missions, provided the weather is good, these platforms are available, and threat anti-air assets have been neutralized.

TERM effectiveness is also affected by threat active protection systems (APS). Concepts that are slower-moving flyers or have a shallow angle of attack are affected by APS. Design of counteractive protection systems (CAPS) or trajectory shaping must be utilized to minimize the effect of APS on these systems. Flyover-shoot down concepts or fast-moving, guided, kinetic energy penetrators perform much better against likely threat APS systems. The exact capabilities of future threat APS systems are still a subject of study, and as further details and analysis are available, new strategies for their defeat can be developed.

The TERM concept, by offering a high probability of kill given a shot, also offers an opportunity to attack more vehicles with fewer rounds. TERM munitions, properly designed, will be very efficient from the point of view of stowed loads and the amount of ammunition to be transported. This will be critically important in a more amorphous, non-linear battlefield, enhancing the Armor unit's ability to range more freely and with a shorter logistics tail.

Armored forces equipped with TERM could simultaneously engage targets throughout their area of operations. This effect works to the advantage of both close combat and fire support systems. It allows fire support assets to concentrate on high-value targets and missions deeper in the battlespace, while allowing the close combat commander increased control over his battle. This could allow the Armor commander to dominate his expanded battlespace with a minimum number of systems and more completely impact his defined area of operations without calling on fire support systems.

In the model, what kind of operational impact did TERM make? The TERM-equipped FCS increased the force loss-exchange ratio (total red losses to blue losses) over the baseline between 17%-58%. The TERM-equipped tanks improved their system exchange ratio (red losses per blue tanks lost) 76%-263% (depending on the specific concept and scenario used). The findings showed a clear improvement in lethality over the base case. The blue tank exchange ratio for several concepts was better than 20 to 1. The use of TERM also impacted survivability, reducing blue tank losses between 11%-34%. TERM also reduced the average number of rounds per kill by as much as a factor of four. The results of the study clearly indicate that TERM provides the promise of a big payoff in both operational effectiveness and operational suitability.

Conclusion

Ultimately, an Armor Force equipped with TERM could increase the Force XXI Armor commander's ability to control an expanded battlespace and conduct rapid offensive operations in depth as indicated in Force XXI doctrine. If the Armor force is to remain relevant on the future battlefield it must integrate the Force XXI doctrine and architectures with advanced weapons and sensor systems to fully exploit the expansion of the maneuver commander's battlespace. A TERM can provide the digitally-equipped, scout-tank, hunter-killer team with a tool that could revolutionize how we fight and even how we organize an Armor force.

Lieutenant Colonel John Woznick is a 1976 graduate of the State University of New York at Geneseo with a bachelor's degree in biology. After OCS in 1977, he attended the Armor Officer Basic Course, served as a cavalry platoon leader and tank company XO in the 2d ACR. Following AOAC, he was assigned to the 194th AR BDE where he served as an operations and intelligence officer (S2/3), battalion motor officer, and tank company commander. He then served as a research and development coordinator at Benet Laboratories, U.S. Army Armament Research, Development, and Engineering Center (ARDEC). While there, he was admitted into the Acquisition Corps. After CGSC, he earned a masters degree in Materiel Acquisition Management from the Florida Institute of Technology. He served as branch chief for Command, Control, Communications, and Computers and later the Cavalry Branch Chief in the Directorate of Combat Developments, Ft. Knox. He attended the Defense Systems Management College's Program Manager's Course, at Ft. Belvoir, Va., and is currently Armor Technology Manager for the Army Research Laboratory.

BUSH BAR:

A South African Solution for Jungle Busting

by First Lieutenant Adam Geibel

TOP VIEW: Hollow blade is angled to push brush aside.

The South African National Defense Force's most recent armor combat experience was in Angola during 1987-88. There, they engaged Cuban T55s with Oliphants (Centurions re-engined and armed with a 105mm L7 cannon, similar to the Israeli upgrade package) and usually came out victorious. But the difficulties of moving through the jungle made an indelible impression on the veterans.

In addition to limiting mobility, the densely-packed trees played havoc on the Oliphant's fenders and side skirts, as well as knocking stowage and even troops off the upper hull. Even smaller trees were a nuisance, since a shaken branch might drop a snake onto the tank.

The South Africans' answer was the Bush Bar — a sort of Cullin Hedgerow Cutter for the jungle. In Vietnam, the U.S. Army had fitted bulldozer blades edges to the front of M48s to achieve the same effect. However, the Bush Bar lacks the sharp cutting edge of the U.S. version. Apparently, the sharp edge can get caught biting into trees, and it takes a lot less effort to bowl that much wood out of the way than slice it off a few feet from the ground. The Bush Bar also has a more pronounced 'V' shape, the better to push trees to the side. The total weight is one ton and the bar can be fitted in 15 minutes.

The mounting points are similar to those used for the Soviet BTU bulldozer blade and, like the Soviet BDD 'horse shoe' armor, the Bush Bar is hollow and can be filled with sand or water to increase its mass. In a pinch, the Bush Bar's reservoir could provide an emergency source of drinking water.

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South Africa's Border War, 19661989, Willem Steenkamp, Ashanti Publishing Ltd., Gibraltar, 1989.

"South African Oliphant, Pt 2," Helmoed Romer Heitman, *Museum Ordnance Magazine*, Sep. 94, p. 17.

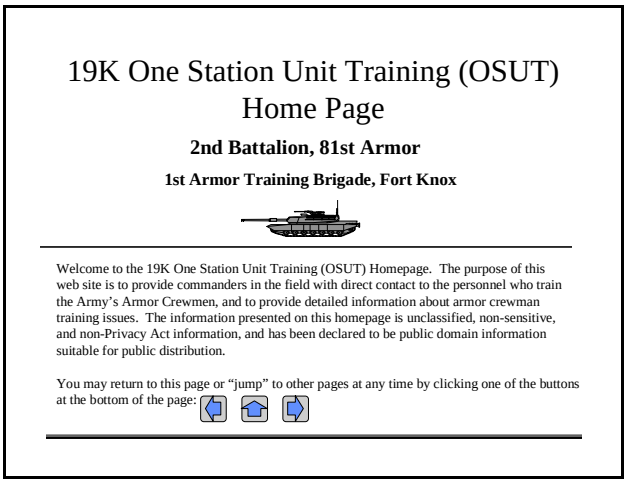
FRONT VIEW: Blade mounted on front slope shows anchoring points

19K One Station Unit Training Information On-line for All Armor Personnel

by Captain Brandon L. Zupancic

"What exactly is 19K One Station Unit Training?" "My unit is preparing to go to gunnery in a few weeks. Has my brand new loader taken a TCGST?" "What type of training do new 19KK4 soldiers receive on the M1A2?" The answers to these questions, and dozens of others relating to 19K Initial Entry Training, are available to everyone in the Armored Force on the 19K One Station Unit Training Internet web site.

According to LTC Paul C. Jussel, Commander of 2d Battalion, 81st Armor, "Our purpose in creating this web site was to provide armor leaders around the globe with a source of immediate information about the scope and quality of 19K skill level 10 training that all armor crewmen receive when they first enter the Army. It is also a forum for armor leaders at all levels to provide feedback and commentary directly to the tank commanders, drill sergeants, and officers who train their new 19Ks." The 19K One Station Unit Training (OSUT) web site is specifically designed to provide a two-way dialogue between 1st Armor Training Brigade's trainers and the units that receive new 19K armor crewmen. Because it is updated regularly, and has a dedicated e-mail address, the web site's author is able to provide detailed information and rapid response to questions or suggestions that would have been virtually impossible just a few months ago.



The 19K OSUT web site presently contains information about a number of topics, but a current comprehensive revision will organize the web site into a more detailed document, with more than 30 sub-pages, each of which will contain extensive information about various aspects of 19K OSUT. In addition, while the web site currently includes a handful of links to other related web sites that feature information about 19-series training, the revised page will include a number of special new links to even more sites of interest to armor leaders. Currently, users may find specific information about the following topics:

Answers to Frequently Asked Questions (FAQ). This section provides frank answers to important questions about soldier fitness, weapons training, maintenance, and "soldierization." Some of the current FAQ answers include information about whether all trainees have passed an APFT during OSUT; why trainees qualify with the M9, but not the M16; the difference between AR 40-501 and AR 600-9, and when each applies to a soldier; among others. The answers are provided in response to questions users post on the **Feedback** page, during video tele-conferences (VTC), from the Armor Hot Loop, and by soldiers returning to Fort Knox for additional training.

The 19K Program Of Instruction (POI). This section provides a specific breakdown of the entire 19K skill level 10 POI, to include subjects taught on both the M1A1 and the M1A2. Additionally, this section details the four phases of 19K OSUT training, as well as the type and scope of training soldiers receive during each phase. At the end of this section, users will find a "laundry list" of the more than 100 19K skill level 10 and common soldier tasks that every trainee completes, as well as the 19K skill level 20 (and even some skill level 30) tasks that every trainee completes prior to graduation.

The Feature Topic section details specific training initiatives underway to improve 19K OSUT. Previous topics have included the POI, and the Excellence In Armor program, while the next one will focus on current efforts to incorporate new M16A2 training and a Tank Crew Gunnery Skills Test (TCGST) into the POI. Comments and suggestions from users form the basis for the Feature Topic. In this respect, the Feature Topic is truly every Armor leader's asset. The Feature Topic reflects those critical questions and concerns from across the entire Armor Force.

A **Feedback** section poses questions from the trainers in the 1st Armor Training Brigade to leaders in the field about a variety of training topics. Moreover, this is the forum where visitors to the 19K OSUT web site may submit e-mail directly to the web author concerning suggestions, comments, questions, criticism, and praise of 19K OSUT. Because the web author maintains a separate e-mail address, frank discussion is highly encouraged, and timely responses to every e-mail posting are the norm.

For information purposes, the web site incorporates a **Directory of Key Personnel** assigned to 2d Battalion, 81st Armor. This site is updated regularly as personnel changes occur.

Users may access the 19K OSUT home page a variety of ways, the two simplest of which are to enter the following Uniform Resource Locator (URL) on a web browser:

http://147.238.100.101/1atb/19kosut.htm

Users should note the URL carefully, however, because the internet is case sensitive. In other words, "19kosut.htm" and "19KOSUT.HTM" are not the same address. The easiest way to access this web site without the URL is to access the Army Home Page at **http://www.army.mil** and enter "OSUT" into the "search by topic" box located near the top of the page. At present, the 19K OSUT web site is the only link that the Army Home Page search engine will present when executing this search.

The 19K OSUT web site is every armor leader's mouthpiece to the training that their soldiers initially receive upon entry into the United States Army. It is through this mechanism that each armor leader may help to improve the quality and scope of 19K skill level 10 training.

CPT Brandon L. Zupancic received his commission in Armor from ROTC in 1989 at Tulane University. He has served in Germany and Fort Knox, and his duty assignments include assistant S4, tank platoon leader, support platoon leader, battalion assistant S3, company commander, and battalion S3. A graduate of the Armor Officer Basic and Advanced Courses, he currently commands a company in 2d Battalion, 81st Armor at Fort Knox. He is also the 19K OSUT web site author.

Creating the Officer Corps of the Future to Execute Force XXI Blitzkrieg

by Major Donald E. Vandergriff

Adjusting Our Institutional Culture: The New Blitzkrieg

Operations will prove as decisive as the blitzkrieg of early World War II

TRADOC Pamphlet 525-5 Ch 3

What Must Occur First!

What has happened when armies do not change their culture? After victories in war, many armies fall into decay by dwelling on their past glories. It occurred with France after World War I. At the beginning of WWII, France possessed the most "modern" and technologically advanced army in Europe, yet, its leadership and personnel doctrine promoted the "politically correct," resulting in a military officer corps "whose military thought froze in a temporary Ice Age of the mind."[1] The French contributed as much to their own defeat as the Germans, because they possessed the wrong institutional culture for the new war they faced.

The United States suffered a similar fate after World War II and Korea, which led to our demise in Vietnam. The front-line officers and troops knew what needed to be done, but felt unable to voice their concerns without career reprisals. Afterwards, several young officers drastically improved the Army under the guidance and leadership of General Donn Starry, supported by the large budgets of the 1980s. Though great strides were made, such as the establishment of the combat training center system, the institutional culture did not change with the doctrinal and technological changes.[2] The military institutional culture must again adjust its course so the Army can successfully execute the intense maneuver doctrine called for in *TRADOC Pamphlet 525-5, Force XXI Operations.*[3]

Organizations as large as the Army inherently resist change, but now is the time for the Army to be dauntless and adapt the reforms which will vault us into the next century. Though an Army is a reflection of the society it serves, we must shed the "me-first" syndrome that now infects our country. The Army should lead America with innovative leadership reforms, reforms which will provide a beginning to successfully implement the type of warfare envisioned in the next century.

Force XXI

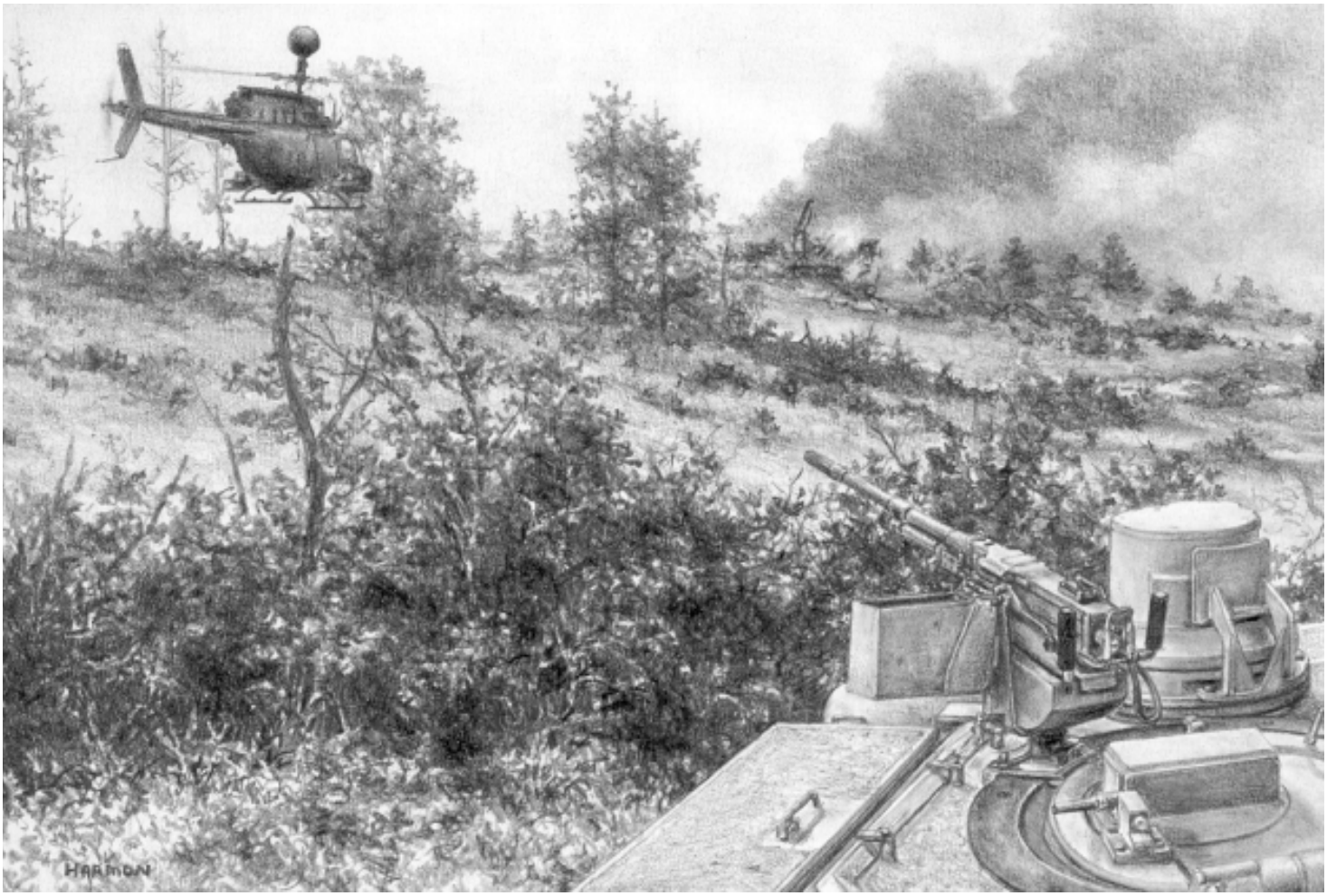
TRADOC Pamphlet 525-5 (known herein as 525-5) is the guidebook for the Army's future doctrine. Its goal is to redefine the Army, creating a smaller, yet agile and powerful force. The centerpiece of Force XXI has been new technology, particularly the digital delivery of information, precision guided munitions, and surveillance equipment. Thus, as in our previous wars, technology appears to be the solution in countering our potential enemies' tactical abilities and preparing us for the battlefields of tomorrow.[4]

The recent drawdown has brought out the worst in our cultural institution.[5] The words "careerism," "self-promotion, " and "zero-defects" continually appear in professional journals and papers. There is an effort already underway to correct these deficiencies. The Chief of Staff of the Army, General Dennis J. Reimer, is attacking several of these ills, such as the zero-defects mentality and careerism.[6] A task force, called the Officer Professional Management System (OPMS) XXI and led by Major General David Ohle, is currently examining future personnel policies.[7]

Cultural Revolution

The Army's ongoing attempts at change are a positive move toward creating a solid foundation from which to build the Force XXI army. However, we must ensure that we do not take old policies and simply place new names on them. This could spell disaster when we begin implementing Force XXI. The culture must place the development and importance of strong and honorable character as its number one priority. Those who possess strong characters are not afraid to make decisions and stand by them.[8]

AR 525-5 describes the characteristics of the officers the U.S. Army will need to execute future American "blitzkrieg." It says we will need officers who possess the ability in "planning and executing independent operations within the commander's intent — characterized by showing versatility and initiative, taking calculated risks, and exploiting opportunities." 525-5 emphasizes a leader who "senses, learns, and responds with innovative tactics, techniques, and procedures."[9] We need officers of character who decide and act. A wide range of recent articles written by senior leaders describe a similar officer.[10] They also point to a need to restructure our military culture to allow the above traits to flourish prior to the first unit executing an operation under Force XXI.



Over a century before the first blitzkrieg, the Prussian army developed an officer corps with characteristics strikingly similar to those in the previous paragraph.[11] The Germans were able to execute blitzkrieg, with its rapid tempo and inherent complexity, not because it was taught in the classroom as a set of procedures, but because they possessed a military culture that created leaders able to understand and employ it.[12]

While the Army is defining its vision in well-meaning terms and acronyms, and experimenting with several new technological wonders, there is a missing aspect. What type of institutional culture is required to develop the officers to lead the Army of Force XXI? To create a suitable culture, we need to admit it's time to change and assimilate new and different values.

When the first storm troopers climbed over the trenches on the Western Front in World War I to execute "infiltration tactics," and 21 years later, when combined arms units drove into Poland to initiate blitzkrieg, a strong institutional culture defined the way leaders made decisions. Key military concepts, such as *Auftragstaktik* (mission tactics) and *Schwerpunkt* (the focus of effort), were already in place and practiced by leaders at all levels (our translations are actually poor ones in regards to culture).[13]

If we are going to be as bold with our doctrine and technology as Force XXI will require, we need to take a calculated risk and create an institutional culture different from the one we have now. We cannot continue to write glowing documents advocating "agile" officers, yet subtly support peacetime practices that uphold bureaucratic qualities, rather than battlefield qualities, when officers come up for promotion.[14]

To dramatically raise the Army's ability to win on the high tempo, chaotic battlefields of the future, we must:

- Reduce the Army's bureaucracy by significantly reducing the officer corps at the middle and senior levels.
- Eliminate the up-or-out promotion system and replace it with a track or category system at the O-3 or O-4 level. In addition, we need to revise the evaluation system to involve an OER with a periodic exam.
- Channel officers at the captain and major level into distinct categories to promote their abilities, using multiple tracks that acknowledge their abilities and allow them to gain experience.
- Adopt a true combined arms regimental system.
- Do away with the all-or-nothing 20-year retirement.

The purpose of all of these reforms is to change the incentive system to reward strength of character, especially as manifested in a willingness to make decisions and take action, and penalize those who just get by and do nothing controversial.[15] It does no good to call for promoting the risk-takers when the incentives all work the other way.[16]

The Evolution of Tactics and the Required Leaders

Before addressing the specifics of the reforms required to build the officer corps of the future, we must consider the type of enemy we are likely to combat. Tomorrow's world is likely to be as volatile as any in the history of mankind. Massive overpopulation will be the breeding ground of tomorrow's conflicts. This underlying problem will be greatly exacerbated by the availability of weapons and "quick course"

training programs on how to operate and employ these systems.[17] Many enemies will be well armed with "strap-on" technologies, which have become the number one export of a number of countries.[18] These unavoidable and unfavorable factors will be aggravated by the wide spectrum of ways in which opponents may conduct warfare.

Operations in the future will not be easily divided into conventional conflicts, such as Iraq or Korea, or lower intensity operations such as Bosnia or Somalia. We must instead be prepared to fight an enemy capable of warfare beyond what we expect. We must look beyond their lack of technology.[19]

Linear tactics reflect the era of Napoleonic warfare, of column and line against the smoothbore musket and cannon. Fire and movement tactics were a reaction to the rifle, machine gun, and quick-firing artillery, relying on tactics of fire and movement and massed supporting fires. The tactics of fire and movement warfare remain largely linear, and are French in origin.[20] Our Army currently practices fire and movement warfare, with its focus on tying in flanks and adhering to detailed graphics, with nearly every aspect of the operation centrally controlled in order to be "synchronized."[21]

The revolution in warfare developed by the German Army during WWI was an idea-based reaction to the Allies' technological and economic superiority. The Germans moved from fire and movement to infiltration techniques, but as mentioned earlier, tactical doctrine, techniques, and a professional officer corps were already in place for a half century. This allowed the Germans to adjust the way they waged war while in the middle of fighting one.

Infiltration tactics were maneuver-oriented, rather than attrition-focused, and were truly non-linear. With the addition of the tank and the airplane, infiltration warfare became what we know as blitzkrieg. This concept was focused at great depths, and battlespace took on new meaning because time was more essential than space.[22]

The warfare of the future is a continuation of many elements of infiltration tactics, amplified by technology. It is possible that the Force XXI battlefield will encompass everything and be limited by nothing. Future opponents will use infiltration in combination with deep raids on once-safe havens, such as airfields and ports. Engagements, skirmishes, raids, and ambushes can and will occur simultaneously, erupting viciously, then quickly concluding. The purpose is to cave the enemy from within. It calls for a precise assessment of the enemy's true intent, and rapid decisions employing the Boyd cycle, or OODA Loop (Orient, Observe, Decide and Act).[23] This means an institutional culture that selects and places officers early on in their specialties, where they can make mistakes and learn from them.

The institutional culture needed to create the right leaders is one which contains an air of autonomy in the atmosphere. The type of officers that will fight and win a future war must be experienced in assessing massive amounts of information without losing the focus of their particular operation. Gathering the essential information, these leaders must make rapid decisions with little or no oversight. The current bureaucratic culture, in the name of good management and perfection, diminishes and destroys these traits. Leaders of Force XXI units must be able to make rapid decisions to leverage high tempo. Winning in a future

fight is about being a step ahead of the enemy.[24]

Slimming Down in the Right Places

The first reform necessary to prepare the officer corps for Force XXI is to change the ratio of senior to junior officers. A gradual reduction of the officer corps at major and above, by around 50%, is necessary to reduce bureaucratization and centralization. Thus, existing officers would gain more experience in their duties, and could take more time to learn the art of war.[25]

The current "up or out" system of promotion, and the idea of a large officer corps, has evolved from historical experience with the problem of maintaining a force ready in peacetime to respond adequately to the unique demands of war.[26] This system rests on two principles. First, if the system works properly, there will always be more officers qualified for promotion than there are vacancies available, permitting selectivity, the selection of the "best qualified." Secondly, the theory holds that exposure to numerous jobs applies in a meaningful way to senior leadership positions.[27]

OPMS was fine when we thought we would fight World War III against the Soviet Union and its allies. The command of organizations focused on tying responsibility to numbers of personnel (the reason we continue to keep outdated organizations such as the division). The future Army will relate responsibility and experience to the ability and functions of the future unit on the battlefield. The 21st century company/team size unit will possess as much firepower and mobility as the battalion/task forces of yesteryear. Thus, future officers will need far more experience at a lower rank than they do now if they are going to effectively employ these future organizations. Responsibility aligns not with numbers, but with combat power. The seasoning of experience cannot develop if there is a long line of officers waiting to get "qualified" at the few jobs necessary for retention and promotion.[28]

Reducing the size of the officer corps would vastly extend an officer's time as a platoon leader, company and battalion commander, or primary staff officer.[29] Today, the combat arms officer may have as little as 54 months of troop time upon taking a battalion command during his 15th year. This may include only 12 to 18 months of total platoon leader time (if he gets a specialty platoon) and the same amount of company command time (unless he gets a Headquarters Company (HHC) which gives him 24 months), plus a year as a battalion executive officer or operations officer. This equates to 24 to 36 months of time in a position of authority and experience at decision-making.

The current up-or-out promotion system minimizes the probability that officers will have the time to develop these abilities. An officer currently spends his career on a "treadmill."

In past environments, such as the one Saddam Hussein offered us, we were allowed months to deploy, train, and rehearse our actions up to the division level in a relatively secure area. This made acceptable the World War II and Vietnam war "assembly line" policy generated by the OPMS emphasis of "fairness" and the goal of producing as many "branch qualified" officers as possible. But the only way the new culture can achieve a decision as quickly as possible is through more specialized and experienced officers.[30]

Therefore, the new culture's personnel system calls for increased time in key positions. Leader and primary staff positions should be three- to five-year assignments. This would allow officers time to learn their positions instead of filling up a resume. Additionally, lower turnover will reduce the current negative impact on units at all levels. We must reverse the trend of units returning from important, yet rare maneuver training events and immediately turning over officers in key positions.[31]

Another disadvantage of our current policies is the inability of commanders to build effective teams.[32] A battalion commander today, with two years in his position, will see, at the most, thirteen different company commanders (given that two of the commanders he knows take HHCs), and at the least, nine new company commanders (if all commanders change in the beginning and half way through his command tour, and one of these commanders he is already comfortable with, takes HHC).[33] This, too, can only change if command tours are lengthened.

Since we will ask even more of our platoon leaders in Force XXI, we must give them more experience in one position; yet, the current management of these key leaders is even more turbulent. It is driven by the current policy of giving them a brief exposure to several positions so they become "well-rounded," or by the need to be "fair."[34]

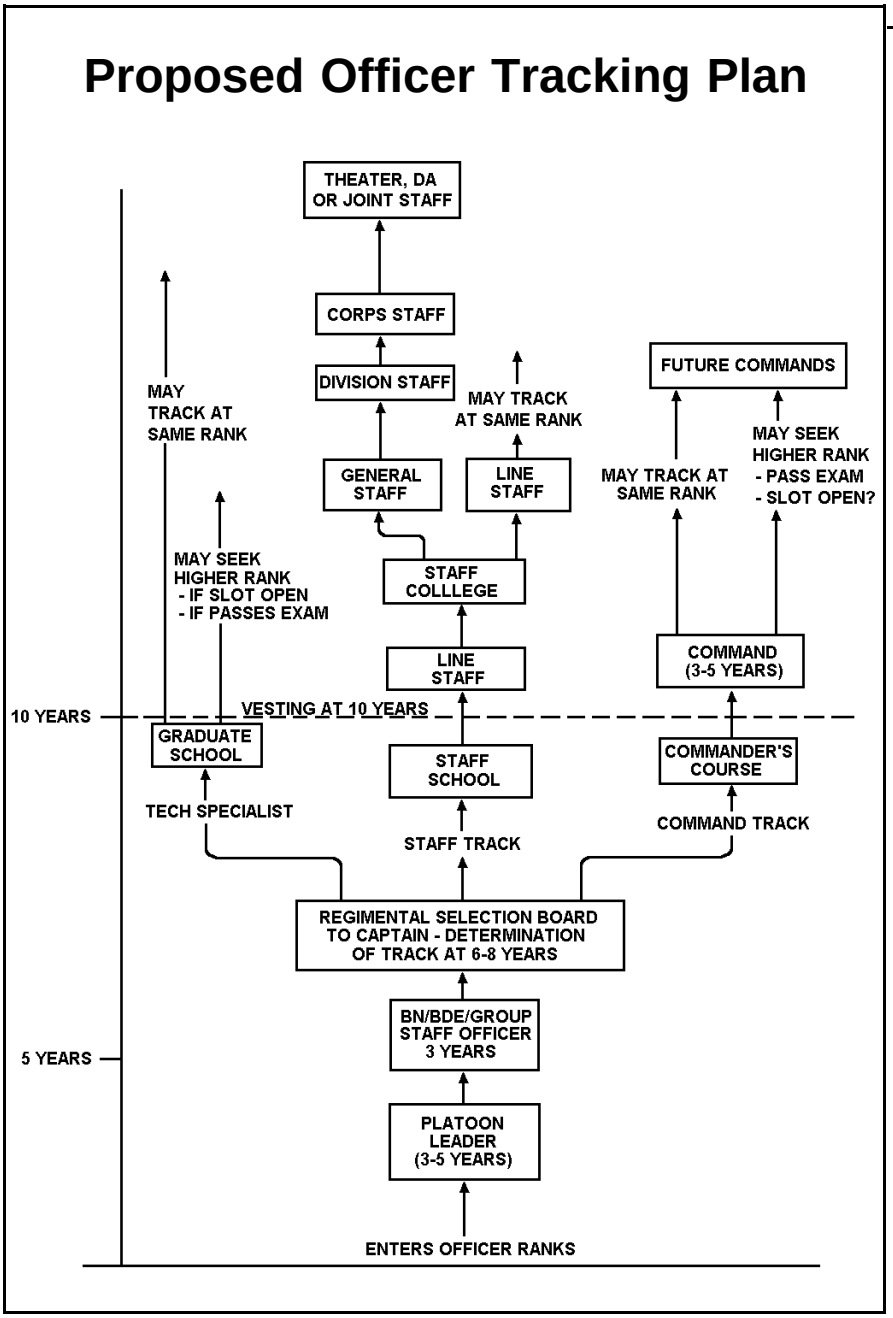
Under the current personnel system, driven by a multitude of laws (DOPMA) focused on programs outside line units, it is more important to get officers into nominative assignments than maintain cohesion in combat units. If the current trend continues, tomorrow's leaders/commanders will find themselves with little experience employing our emerging technologies and doctrine. Imagine what will happen when officers are ordered to conduct the independent missions called for by 525-5, equipped with the latest in lethal weapons systems loaded with live ammunition. This scenario spells disaster at the hands of an experienced enemy.

Eliminate Up-or-Out

To be successful in combat under Force XXI, the officer will have to possess several qualities that only a changed institutional culture can create. The peacetime environment must champion leaders who "rapidly grasp changes in situations and conditions," and "exercise initiative by independently planning."[35]

The current up-or-out promotion system minimizes the probability that officers will have the time to develop these abilities. An officer currently spends his career on a "treadmill."[36] It also develops promotion anxiety in officers, forcing them to become competitive against their peers.

The up-or-out system also fosters the Peter Principle, where individuals tend to get promoted to their level of incompetence. Officers then get stuck in jobs because there is no possible way to advance. That job will undoubtedly be unfulfilling. Unfortunately, the Army does not generally take steps to move personnel back to a level where they can function effectively. Where the Army runs into problems is when it uses promotion to reward performance and minimize potential. These two concepts, performance or competence and potential for leadership, need to be separated somehow in the promotion



system. The Army has already conducted several studies of our officer corps regarding the "up-or-out" promotion system, and has found that this system has contributed significantly to much of the undesirable and unethical conduct of its officers.[37]

The Leader of Force XXI

Another problem is that the type of officer suited to Force XXI leadership has many qualities that cause uneasiness among superiors. A leader with strong character and imagination will always focus his unit on training for war and not waste time in the diversions called for by the up-or-out system.[38] Thus, the very officer Force XXI is calling for usually gets out early.

In 1991, the Air Force conducted a study of personalities (using the Myers Briggs Type Indicator — MBTI) and how they changed in relationship to rank. Air Force Academy cadets had a wide variety of personality types, but when an analysis of personalities was conducted of Army O-5s and Air Force O-5s, it showed very similar personality groupings — there was no statistically significant difference. When the O-5s were compared to the cadets, there was significant difference (using the Chi-Square statistic Chi-Square = 59.57 at the p=.05 level). When a group of 161 Army generals was studied, compared to the Army and Air Force O-5s, there was no statistical difference. When the group of O-7s was compared to Air Force cadets, there was statistically significant difference (Chi-Square=73.04 at the p=.05 level). Some 56% of the O-7s were of two personality types — ISTJ and ESTJ! These types have a preference for stability and avoiding organizational conflict. In other words, they tend to be bureaucrats, with a "don't-rock-the-boat attitude."

Psychologist Otto Kroger has been holding seminars on the Myers-Briggs at the National Defense University since 1979. Kroger states that. if his students switched uniforms for business suits, it would be impossible to distinguish them from the corporate executives he also tests. Somewhere between the O-3 and O-5 levels, it is postulated that there is a significant shift toward these preferences; some are either weeded out by the up-or-out system or they get out because they do not want to conform to the bureaucratic mindset of "playing the game."[39]

This is the very reason to rid the Army of the up-or-out system, which drives officers to transform, a result particularly troubling if we are to have the type of military required to execute Force XXI warfare. We invariably lose far too many of our warrior-leaders and innovators, which will lead to disaster as the first units move to combat, rather than providing stability in peacetime.

Responsibility of Getting Promoted

Under a revised system, if an officer wants to be promoted, he will ask for it.[40] Officers who did not want to be promoted would not automatically be obligated to leave the service. Rather, the Army would test and evaluate their performance yearly, ensuring they continue to gain proficiency at their current work.

Additionally, all commanders would have to participate in objective force-on-force evaluations. Staff officers would be given timed exams in which they would have to solve tactical, operational, or logistical problems. After their third to fifth year in command or primary staff position, officers would rotate to instructor assignments. They could have the option of returning to command or staff positions as long as

they pass yearly comprehensive boards and tests.[41]

Under this system, the Army would be able to spend substantial time on the development, assessment, and evaluation of its officers, instead of the "minute-and-a-half" look-over that officers currently receive on promotion and selection boards, or the search by officer personal managers for one "discriminator" when deciding on assignments.[42] An officer's entire file would be weighted objectively, versus looking at "mere stacks of perfect performance ratings." At the same time, due to the three-tier evaluation and testing system, the Army could be far more objective in its personnel decisions.

Highlighting an Officer's Abilities

Currently, an officer's career exposes him to several aspects of the Army. He moves from leader positions to staff positions, and then back again, with intervals in management, as an aide-de-camp, or as an instructor.[43] Only officers in medicine and law are allowed to " single track," and since law and medicine generally do not demand the ultimate sacrifice of death, they are professions of a different order.

As noted earlier, the Army inefficiently places talented officers in a multitude of jobs for brief periods with little time to apply whatever level of expertise they achieve at each position. The first serious test of an officer's ability to pass on to the next rank in the up-or-out system is company command. Talented staff officers may be cast aside by this process because of an inability to command. Likewise, great commanders are forced to serve in roles that require staff skills. Many succeed in both areas, but this may be due more to the very inflated nature of the evaluation system than to their mastery of the art of war.[44]

The new personnel system would divide officers into a multitude of categories after their initial 3-5 years in their respective branches. These specialties would highlight an officer's strength as a commander, a staff officer, a teacher, a technician, etc.

The immediate response under current cultural thought will be, "but everyone will want to be in the operational track." The new culture will stress each category's importance, by redefining success within that respective track.

An officer would serve his initial three to five years as a platoon leader, and then as a senior lieutenant/junior captain, doing three years with a battalion or brigade staff or a nominative assignment. During his fifth to seventh year of service, he would request a track in one of the above specialties, and he would be placed in a specialty by a board. The board would examine his efficiency reports, the result of "stiff examinations," which include the results of a Myers-Briggs Type Indicator or other personality test.[45] Again, the responsibility would rest with the officer himself in choosing which path to take, assisted by tools which accent his strengths and disclose his weaknesses early.

As noted earlier, the Army inefficiently places talented officers in a multitude of jobs for brief periods with little time to apply whatever level of expertise they achieve at that position.

The first category, the operational track, would be with most troop assignments (it includes more than just combat arms). After selection to the operations track, an officer will attend a tactical course which focuses on decision-making and how to think about tactics. It will consist of a general course for all commanders and branch courses for their specialized fields. His success at this initial command would be based on objective, free play, force-on-force tests, or, for combat support and combat service support companies, several objective-based missions accomplished in force-on-force environments. The officer would then move on, as an instructor or perhaps a reserve advisor, then seek another company and serve out his time as a captain with pro-rated pay.

He may opt for promotion to major. As a major, he will serve as either a commander of a larger company, such as a headquarters company, or advance to an operations officer or executive officer position of a task force. Promotions and remaining in the operations track, will largely depend on performance in free play force-on-force evaluations or comprehensive exams.[46]

Officers scoring well on exams and noted by superiors as possessing the necessary traits, may seek advancement to the Army and National Staff after their initial tours at battalion and brigade level staff positions as personnel, operations, and logistical officers. These officers will become operational and logistical experts. The Army and National Staff will consist of only a small percentage of the officer corps. They will occupy plans and operations cells at the division level and higher, or serve as chiefs of staff at division and higher. These officers ensure adept performance in all types of operations.

Admission to the Army and National Staff will require recommendations, rigorous testing on the operational art of war, and foreign language skills. After three years of graduate study in the art of war, these officers will then rotate back and forth from divisions, corps, and theater level commands to the Army or Joint Staff.[47]

Other categories relate to the inherent technical abilities associated with the technologies employed by Force XXI units and the management of the supporting base Army. In addition to the medical and legal branches, the field includes positions which require graduate-level, civilian-related education, or technical training in such areas as acquisition, academic instruction, operations research, finance, computer programming, communications, and facilities management.

Officers in this category would remain captains — again, with pro-rated pay — but would have to demonstrate their proficiency with periodic examinations, combined with reviews of their efficiency reports. Promotions to higher rank would follow the same guidelines as other specialties: the officers would ask to get promoted into vacated or available positions. Majors would serve as the technical experts at division level, while the appropriate higher ranks would correspond with higher headquarters and responsibilities.

Cohesive Units — The True Regimental System

Adoption of a Combined Arms Regimental System will promote unit cohesion, which will become a must when executing Force XXI blitzkrieg. The intense tempo of operations executed by Force XXI units will necessitate a remarkable level of teamwork. Unit cohesion will be of vital significance. The present personnel policies, with their emphasis on short-term rotation be-

tween jobs, were first adopted under General Maxwell Taylor, strengthened by Secretary of Defense McNamara, and finalized in the OPMS studies of the '70s. They make the conduct of Force XXI warfare impossible. Constant job rotation prevents the teamwork necessary to execute Force XXI warfare, and is the principal reason the Army has remained with attrition/firepower-based fire and maneuver tactics.[48]

Shape the Environment Around COHORT

To organize and build cohesive combat units, our Army will have to institutionalize a program in conjunction with the new personnel policies. The program will be similar to the original version of the Cohesion, Operations, Readiness, and Training (COHORT) program and the British Regimental system. Each unit, at task force level, will be stabilized so it is together for three to five years without an influx of new personnel. Soldiers who leave the unit for various reasons will not be replaced.

This stability must include officers; it is important that unit leaders remain with the units with which they have formed cohesive bonds. An officer or NCO who is promoted will keep his position, serving in it at his new grade. Staffs of these units will also be stabilized. More emphasis will be placed on unit-level staffs. Soldiers in task forces must come to know and trust their staffs, just as they do their commanders. The first consideration in assignment policy will be cohesion and the personnel stability that cohesion requires.[49]

The COHORT cycle will determine a unit's deployment pattern and its readiness. Units early in their cycle will be exempted from major deployments and exercises. Units that are in the latter stages of their cycle will be considered at the highest state of readiness and will deploy to fulfill operational requirements. Only units *with cohesion, quality, esprit,* and *high morale* can remain effective in future warfare, especially as called for by the writers of 525-5.[50]

All or Nothing

The last element in forming a strong foundation for the building of Force XXI is to change the retirement system. The current system, with its focus on all or nothing at 20 years, undercuts moral courage in those with 12 to 20 years of service. Moral courage requires daily practice. Instead of the 20-year all-or-nothing concept, we should adopt a retirement system which allows an officer to retire at 10 years with benefits beginning at age 55.

The policy of vest-in-10, with benefits at 55, would allow officers to focus entirely on warfighting skills. They could retire anytime after 10 years as long as they remained competent in their fields. Retirement pay would increase for each year the officer remains after ten.

There are several reasons to change the Army's retirement system. The first is cost. Retirement allotments paid to retired officers in 1995 totaled 5.1 billion dollars.[51]

The second reason is that, with almost one fourth of officers retiring in their late thirties to early forties, the Army loses a lot of experienced talent. This will have an impact on units in Force XXI, which can only be led by seasoned officers. Officers naturally use their last years to prepare for a second career. Instead, officers could be continually concentrating on and studying war as it continues to evolve.[52]

Conclusion: People Make the Difference

Effectiveness for the Army is not an option — it is imperative. The officer corps of the future needs to execute the type of tempo Force XXI writers envision. Many officers and civilian leaders believe technology makes the difference, but it is the people that make the difference, especially when there is effective leadership. The personnel system is the linchpin that will directly affect combat effectiveness, doctrine, and a host of other critical issues pertaining to the Army of the future. The culture must adjust its course before the Army can execute the high tempo and rapid changing warfare of the future.

Notes

[1]Brian Bond and Martin Alexander, "Liddel Hart and De Gaulle: The Doctrines of Limited Liability and Mobile Defense," in *Makers of Modern Strategy from Machiavelli to the Nuclear Age,* edited by Peter Paret (Princeton: Princeton University Press, 1986), p. 604.

[2]James F. Dunnigan and Raymond M. Macedonia, *American Military Reforms after Vietnam to the Gulf War and Beyond* (New York: William Morrow and Company, Inc., 1993), pp. 261-279.

[3]U.S. Department of the Army, *TRADOC Pamphlet 525-5: Force XXI Operations* (Headquarters, U.S. Army Training and Doctrine Command, Ft. Monroe, Va., U.S. Government Printing Office, August 1994), p. 3-2.

[4]Colonel John C. Johnston, "The Journey to Force XXI's Mounted Component," *ARMOR* (Ft. Knox, Ky., U.S. Army Armor Center, March-April 1994), pp. 14-16.

[5]Captain Andrew J. Bacevich, Jr., "Progressivism, Professionalism, and Reform," in *Military Review* (Ft. Leavenworth, Kan.: U.S. Command and General Staff College, Jun-July 86), pp. 59-60. The author does a complete analysis of OPMS and its contradictory objectives.

[6]General Dennis J. Reimer, "Empowerment, Environment, and the Golden Rule," *Military Review,* Jan-Feb 1996.

[7]Jim Tice, "New Personnel Task Force Takes Shape," *Army Times* (Springfield, Va.: Army Times Publishing Co., July 1996), p. 4; Also see several articles on "zero defects" and careerism in *Army Times* published in 1995-96.

[8]Lieutenant General Theodore G. Stroup, "Leadership and Organizational Culture: Actions Speak Louder than Words," *Military Review,* Jan-Feb 1996.

[9]*TRADOC Pamphlet 525-5,* p. 4-3.

[10]The author downloaded a number of articles dealing with leadership and battle command in Force XXI from the Internet home pages of *Parameters* and *Military Review* 1994-1996. See for example, Colonel Philip M. Jones, "Developing Army Leaders for the 21st Century;" Lieutenant Colonel Douglas A. Gilbert, "Leader XXI Plan;" Lieutenant Colonel Tim Challans, "Autonomy and Leadership."

[11]David N. Spires, *Image and Reality: The Making of the German Officer, 1921-1933* (Westport, Conn.: Greenwood Press, 1984) shows how the German officer corps actually increased its competence during a "drawdown;" Martin van Creveld, *Fighting Power: German and U.S. Performance, 1939-45* (Greenwood Press, 1983), pp.12-23, 31-33, 44-47. Provides some relevance to support why U.S. divisions could not match the fighting ability of German divisions.

[12]Richard T. Burke, "The German Panzerwaffe, 1920-1939: A Study in Institutional Change," unpublished Ph.D. dissertation, Northwestern University, Evanston, Ill., 1969, pp. 223-228; Blitzkrieg had its desired result of the annihilation of an enemy army, versus our Force XXI doctrine of focusing on the enemy command and control "nodes," and thus, it did not consist of tenets nor checklists; Hajo Holborn, "The Prusso-German School: Moltke and the Rise of the General Staff," *Makers of Modern Strategy from Machiavelli to the Nuclear Age,* edited by Peter Paret (Princeton: Princeton University Press, 1986), pp. 287-297. This text gives an excellent description of the command techniques of Helmuth von Moltke and how they assisted in developing the Prussian/German Army's officer corps; also see Michael Geyer, "German Strategy in the Age of Machine Warfare, 1914-1945," in above text. This essay provides explanation of a culture which enabled a revolution to change German doctrine during World War I.

[13]CPT Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine during the First World War* (Ft. Leavenworth, Kan.: U.S. Army Command and General Staff College, July 1981) pp. 20-29.

[14]Bacevich, p. 61.

[15]Dr. Donald D. Chipman, "The Military Courtier and the Illusion of Competence," *Air University Review* (Maxwell AFB, Ala.: The Air Force Air University, March 1993), pp. 15-24.

[16]Robert A. Doughty, *The Seeds of Disaster* (Hamden Conn.: Archon, 1985), pp. 7-12, 33-41, 56-57, 113-117. A detailed examination of how the French contributed more to their 1940 defeat than the Germans. This book covers poor French planning, doctrine, and training, especially pertaining to the preparation and promotion of officers; Bacevich, pp. 61-62.

[17]Ralph Peters, "The Culture of Future Conflict" *Parameters* (Carlisle Barracks, Pa.: U.S. Army War College, Winter 1995-96), pp 18-27.

[18]*TRADOC Pamphlet 525-5*, p. 2-4.

[19]Ralph Peters, "The New Warrior Class," *Parameters*, Summer 1994.

[20]Doughty, *Seeds of Disaster*, pp. 66-67, 77, 90-101. Our doctrine is similar to the French use of graphics-oriented warfare developed during the operations at Verdun where "the artillery conquered and the infantry occupied," and solidified under Marshal Philippe Petain, who favored the systematic suppression of tactical initiative in favor of centralized command and control and promoted the watchword, "Le feu tue (firepower kills)."

[21]William S. Lind, Keith Nightengale, John Schmitt, and Joseph W. Sutton, "Fourth Generation Warfare," *Military Review*, Sep-Oct 1986.

[22]Ibid; Ralph Peters, "The Culture of Future Conflict," *Parameters*, Winter 1995-96.

[23]Ibid; John Boyd, "Patterns of Conflict," (Ohio: Battelle Columbus Laboratories, 1979).

[24]Nick Kotz, "Where have All the Warriors Gone?", *Washingtonian* (Washington, D.C.: Kurtz and Able, July 1984), p. 25.

[25]Gary Hart and William S. Lind, *America Can Win: The Case For Military Reform* (Maryland: Adler & Adler Publishers, 1986) pp. 181-182.

[26]In 1981, Chief of Staff of the Army, General Edward C. Meyer, implemented reforms toward strengthening cohesion and mission readiness by lengthening command tours to three years and the development of COHORT (cohesive) companies. These programs were killed by Meyer's successor, General John Wickham Jr., due to institutional pressures within the Army to keep tours short in order to give all officers a chance at varied assignments needed for promotion.

[27]Lieutenant Colonel Kent Thomas, "Proposed Changes to Officer Development and Schooling as Part of the Army's Transition to Force XXI," Force XXI Elective Research Paper (Carlisle Barracks, Pa.: U.S. Army War College, 1994-1995); Bacevich, p. 61; Kotz, p. 27.

[28]Lieutenant Colonel John D. Rosenberger, "The Burden Our Soldiers Bear, Observations of a Senior Trainer (OC)," Unpublished paper, U.S. Army War College, 1 March 1995. The paper provides insight into why the "elite" of the Army, its battalion commanders, have trouble maneuvering their battalions at the National Training Center.

[29]Major Donald E. Vandergriff, personal notes. Author has kept detailed notes as an observer controller, chief of OPFOR reconnaissance, and BLUFOR company commander, staff officer, and brigade commander's assistant, participating in 52 rotations as recently as December 1995 at both NTC and CMTC; Rosenberger.

[30]Lieutenant Colonel James E. Sikes, Jr., "Battle Command and Beyond: Leading at the Speed of Change in the 21st Century," *Parameters*, Spring 1995, downloaded from the Internet; Bacevich, p. 61.

[31]Rosenberger.

[32]Hart, Lind, pp. 182-183.

[33]Vandergriff notes.

[34]Major Carl D. Rehberg, Unpublished Masters' Thesis "An Exploratory Study of Psychological Type With Respect to Rank in the USAF," (University of South Dakota, March 1991).

[35]*TRADOC Pamphlet 525-5*, pp. 3-4, 5.

[36]Kotz, pp. 27-30.

[37]Rehberg, p. 18; Lieutenant Colonel K.E. Hamburger, "Leadership in Combat: An Historical Appraisal," (West Point, N.Y.: History Department, United States Military Academy, 1994).

[38]William S. Lind, "The Case for Maneuver Doctrine," *The Defense Reform Debate*, Eds., Clark, Chiarelli, McKitrick and Reed (Baltimore, Md.: The Johns Hopkins University Press, 1984), pp. 95-100.

[39]Rehberg; To make such an assertion is not to suggest the existence of a sinister institutional conspiracy. Army bureaucrats are as much the system's victims as they are its agents. The organization's needs must be served.

[40]Chipman, p. 34.

[41]Ibid.

[42]Bacevich.

[43]Kotz, in "Where Have All the Warriors Gone," quotes Colonel Harry Summers, regarding the promotion system, "What you need to do is create an environment where careerism serves the needs of the nation. You want people to be ambitious. You want people to seek out difficult jobs. What you need to bring out is that the jobs that enhance their careers are the most difficult to do. If being a general's aide enhances your promotability, that's dumb!"

[44]In the British, German, and Israeli armies, an officer may spend his entire career as an infantry captain or staff officer. They emphasize the need for "specialization" due to the complexities of both the art of war and technology in modern times.

[45]Hart, Lind, p.182.

[46]Cincinnatus, *Self-Destruction, The Disintegration and Decay of the United States Army During the Vietnam Era* (New York: W.W. Norton & Company, 1981), p. 133.

[47]Gunther E. Rothenberg, "Moltke, Schlieffen, and the Doctrine of Strategic Envelopment," p. 301-302. For a review of how the Prussians managed and empowered their General Staff officers.

[48]The author has attended briefings and discussed with personnel officers the reasons behind the high turnover rates of officers due to the extreme demands to fill nominative assignments outside troop units.

[49]Cincinnatus, pp. 84, 132-37, 142, 143, and 182; Lieutenant Colonel John D. Rosenberger, "Coaching the Art of Battle Command" *Military Review*, May-June 1996, from the Internet. Lieutenant Colonel Rosenberger points out the vast experience needed to conduct current complex operations and how the current personnel policies are inadequate to fill these requirements.

[50]Major Don T. Riley, "Serve Your Soldiers to Win" *Military Review*, November 1986, pp. 10-19; *TRADOC Pam 525-5*, Ch 2.

[51]Department of the Army, Office of the Actuary, Total includes Army obligations and expenditures for military retirees for FY 1995 thru September 30, 1995.

[52]Hart & Lind, pp. 187-188; John McNeil, Pedro Lecca, and Roosevelt Wright Jr., *Military Retirement Social, Economic, and Mental Health Issues* (New York: Rowman and Allanheld, 1983), pp. 7-31.

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An Engagement Area Primer

by Lieutenant Colonel Ben Santos

"Command means visualizing the current and future state of friendly and enemy forces and then formulating concepts of operations to accomplish the mission." – FM 100-5

While the the weapon systems of the Armored Force become increasingly sophisticated, the art and science of war still boils down to simply synchronizing all we have against the attacking hordes.

Building an engagement area is a critical component of synchronizing the maneuver battlefield during a defense. However, engagement areas too often tend to be developed by drawing goose eggs on maps or by digging fighting positions before we have decided where we plan to kill the enemy. Developing the engagement area should be a logical sequence used to mass and synchronize combat power at a decisive point on the ground. It melds art and science by combining the commander's vision with "Battlefield Calculus."

While it is easy enough to state that building an engagement area is a seven-step process, each step presumes that commanders have an in-depth knowledge of friendly and enemy capabilities and can read terrain. The seven steps discussed below are a method to develop an engagement area:[1]

- Visualize where the enemy will attack
- Select where to kill the enemy
- Position direct fire systems
- Position obstacles to support direct fire
- Plan fires to support direct fire and obstacles
- Drive the engagement area
- Rehearse

Visualize where the enemy will attack. The commander must visualize how the enemy will attack, but to do this, he must know his enemy, know the terrain he is to fight on, and finally, know his units' capabilities. It is not enough for a commander to picture a doctrinal template in his mind; he must envision a situational template. Remember that the enemy can think too, and he will know your capabilities and probably will not come driving through the middle of an obvious engagement area in perfect march formation.

For instance, if a battalion task force is defending a sector six kilometers wide and an opposing force regiment can attack on a frontage of about three to eight kilometers, how many avenues of approach does that present into the sector? Which avenues will the enemy take? Get into the enemy's head. If you were him, where would you go?

Select where to kill the enemy. Once the commander visualizes where the enemy will go, then he can do the second and most critical step in developing an engagement area – he must decide where to kill the enemy.

Deciding where to kill the enemy is not a matter of placing tanks and infantry into a half circle oriented on the enemy's avenue of approach. Find terrain that negates the enemy's stand-off range. In order to lessen the effects of range superiority, find areas in the sector that afford you maximum range advantage. Generally, there are intervisibility lines (IVL) which provide a defender or an attacker an advantage. Find the IVLs that provide the defender an advantage and see if a reverse slope defense will maximize your weapons' capabilities and minimize his. The enemy may have AT-5s or AT-8s with a range of 4,000m or AT-10/11s with a range of 5,000m.[2] Besides IVLs there are choke points, defiles, and other folds of terrain that will provide the astute commander a significant advantage.

Position direct fire systems. Once the commander determines where to kill the enemy, he must do some math. It's called "Battlefield Calculus" – or, determining how many weapon systems are needed in an engagement area to kill the enemy. It goes a little beyond just stating that the defender can defeat an attacker three times its size or that a company should kill a battalion.

Building an engagement area entails knowing how many vehicles can physically fit into the EA. Can an attacking regiment fit into the EA drawn on the map? Do you want a regiment to fit into that EA? If so, does the defender have enough combat power to mass against the attacking force? Given the width, depth, and speed of the attacker, how many rounds will it take to destroy/defeat a regiment if you are a defending task force?

Knowing that an M1A1 carries 40 rounds is not enough. You need to know that only 17 rounds are available before the crew needs to redistribute ammunition to get to the rest of the rounds. Or, that although the Bradley carries 900 rounds, the crew can only fire 300 rounds before they have to reload, i.e., disassemble the Chain Gun.

Is the EA too large, too long? Can all your weapon systems range the EA? Are there mutually supporting fires between companies? How many defending companies can shoot into the engagement area if each company occupies about a kilometer of space with about 400 meters between companies?

Following is an example of Battlefield Calculus. The calculations are done with direct fire to determine the obstacle and/or indirect fires needed to enhance fire power and increase force protection. While the staff may have to crunch the numbers, the commander should be able to visualize the calculus in his mind's eye.

A balanced task force is defending a sector that is approximately 6km wide bordered on the north and south with steep terrain. The task force commander has visualized that the enemy will probably not want to come straight down the middle but will opt to hug the north wall or the south wall. He has found two IVLs in sector that are approximately 2,800 meters apart.

The regiment will probably attack with two motorized rifle battalions abreast and one MRB trailing. This will mean that the regiment will have about a 3km frontage. Knowing enemy doctrine, the commander knows that the enemy regiment will normally go into battalion pre-battle formation approximately 6km from the defender, into company pre-battle approximately

	Start	Loss/1min	Remaining after 1min		Loss/2min	Remaining after 2 min	
Blue	42	13	29	70%	7	22	52%
Red	101	38	63	63%	26	37	36%
		Loss/3min	Remaining after 3min		Loss/4min	Remaining after 4min	
Blue		3	19	44%	0	19	44%
Red		20	17	17%	17	0	0%

Assumptions:
a. PK for Blue is 90%
b. PK for Red is 20%
c. Attacker continues to move unimpeded

Figure 1. Losses over time when 3 companies defend against 2 MRBs attacking abreast before commitment of reserve or the trail MRB entering the EA.

	Start	Loss/1min	Remaining after 1min		Loss/2min	Remaining after 2 min	
Blue	58	24	34	59%	18	17	29%
Red	171	52	119	69%	31	88	51%
		Loss/3min	Remaining after 3min				
Blue		15	2	4%			
Red		15	73	43%			

Assumptions:
a. PK for Blue is 90%
b. PK for Red is 20%
c. Attacker continues to move unimpeded

Figure 2. Losses over time when a battalion defends against an MRR without combat multipliers such as obstacles, fires, and smoke.

3km, and finally into attack formation up to 1km from the defender.[3]

If the engagement area is 2800m in depth, the enemy regiment will probably be in company pre-battle formation the first time the defender could engage. In company pre-battle, the regiment is in platoon columns. If the regiment is attacking with two battalions up/one back, then there could be a maximum of 24 platoons in column. Each column is about 150m in depth with the entire frontage being about 3km (approximately 100 combat vehicles). The normal march speed is 20-25kph or 1km/3min. If the defender fires at the edge of the EA, he will be able to kill the lead vehicles but not the trail. If the defender waits one minute, the formation will travel 300m farther into the engagement area, allowing the defender to engage the entire depth of the formation.

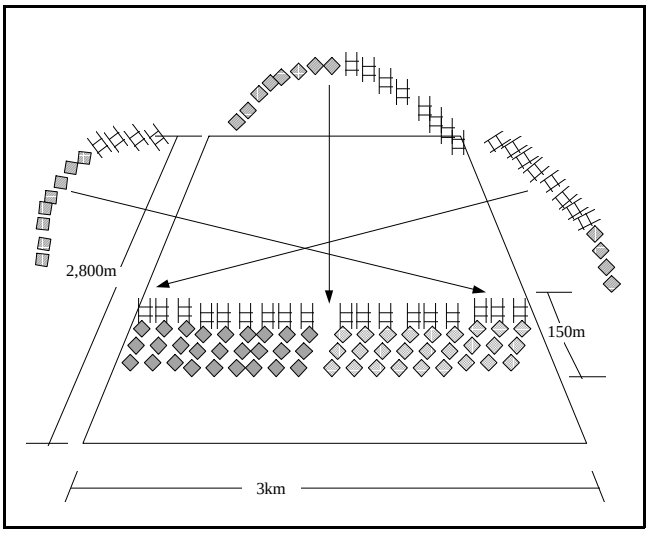
A friendly company/team normally occupies about 1km with a separation of about 400m between teams.[4] Space-wise, not more than about three teams could occupy the regimental avenue of approach. If the three teams are at 100%, then available systems could be 42. (For purposes of this example, we will assume two mechanized teams and one armor team with the second armor team as a reserve or out of position: 14 tanks, 28 BFVs). Each tank can fire approximately 6 rounds per minute and can fire 17 rounds before having to redistribute rounds into the ready rack. Each BFV can fire either TOW or 25mm; it will take approximately 8-9 seconds time-of-flight for the TOW and the 25mm can fire 300 rounds before having to reload. Historically, destroyed vehicles have had multiple tank holes in them, so those 17 rounds per tank you were counting on are halved to 8. Have you considered resupply?

Now the math. In a perfect world, 42 defenders could fire and kill 42 attackers in the first volley. However, the 14 tanks would fire and 8 seconds later the TOWs would impact. If the first volley has a 90% success, that still leaves 64 combat vehicles [(42x.90) - 102 = 64] in the first echelon to return fire. Surprise is now gone. If the attacker is really terrible at gunnery and can only hit 20% of the time that means now 13 defenders are destroyed but more importantly many of the defenders are suppressed. If the remaining 29 defenders fire and kill with a 90% hit rate that leaves 38 attackers to return fire. During this time the attacker has probably moved about 500m bringing it to within 2000m of the defender. In another minute, the trail MRB will enter the engagement area and be able to engage with approximately 51 combat vehicles.

If the remaining 38 attackers fire with a 20% hit rate, they will destroy 8 defenders leaving 21. The 21 defenders fire with 90% PK (Probability of Kill) that leaves 19 attackers; the attackers return fire with 20% PK destroying 4. Another 500m has been traveled and 51 combat vehicles from the trail MRB enter the engagement area and fire with a 20% PK, destroying 10 defenders and leaving 11 (Figure 1). The commitment of the reserve may not halt the enemy's advance. However, if the defender is successful, it will still only have less than 30% combat power remaining. 30% is not exactly the MTP standard[5] and is far below the American public's expectation for casualties.

Battlefield calculus will help the commander visualize what assets he needs to use in order to increase his firepower and force protection. He needs to fight the regiment one small bite at a time. If the commander does not know the enemy, then he may try to build a very large EA with all four teams shooting into the EA without mutually supporting fires. The attacking regiment could then use its small attack frontage to isolate one or two teams. An MRR attacking a battalion that wasn't using any of its available combat multipliers could easily destroy that battalion (Figure 2).

As you do the calculus, either during the Commander's Estimate or during



Visualizing "Battlefield Calculus"

the staff's Course of Action development, it will also help determine when, where, and for what purpose the reserve should be committed to reinforce, counterattack, or otherwise stop a penetration.

Proper planning of obstacles, indirect fires, and smoke can disrupt the movement of the regiment, allowing the task force commander to engage only one battalion at a time. While one of the lead battalions is negotiating an obstacle, it can receive indirect fires as well as direct fire that would further increase the attacker-to-defender ratio.

Position obstacles to support direct fire. Obstacles need to be emplaced after weapons systems are positioned. This may sound overly simple. However, too often, maneuver commanders tend to do two things when planning obstacles: draw them on a map and then let the engineer site in the obstacle; and either not know the intent for a particular obstacle or not convey the intent for an obstacle to his subordinates.

Obstacles do not have to kill the enemy to be successful. Many times, the only needed effect is to make the enemy change his direction of attack, or pause long enough to suffer the effects of direct or indirect fire. As the following paragraph will illustrate, your plan may require fixing an enemy unit in place long enough for combined direct and indirect fires to destroy it. The obstacle plan can disrupt the enemy formation by slowing one unit long enough to engage the other unit piecemeal.

Planning for obstacles should have four intents: fix, disrupt, block, or turn.[6] Proper planning of obstacles will be critical in enhancing the direct fire fight and enhancing force protection.

Siting the obstacles is a commander's business. If the commander decides where to kill the enemy, he should site in the obstacles. The commander may have his S3 or a company commander site the obstacle but only after the task force commander has personnally walked the ground. This of course means that time management is critical to the commander in order to allow him to get to the battle positions.

Plan fires to support direct fire and obstacles. Once the direct fire fight has been planned and supported with obstacles, indirect fire planning can occur to enhance the force protection, increase the firepower, and assist in the attacking force's destruction. "Within the EA, fires should be planned to reinforce obstacles, to provide better shots for direct-fire weapon systems, and to cover dead space."[7]

When you plan fires in the engagement area, don't assume away any part of the problem. If you need to destroy an MRC, how long must you hold it in place for the destruction to take place?

What does it take to destroy an MRC? Apply some more "Battlefield Calculus." At the NTC, it would take 396 rounds to destroy the MRC. (54 rounds DPICM per tank + 18 rounds per BMP = 396rds). A DS FA battalion can fire a sustained rate of 24 rounds per minute. 396/24 = 17 minutes. What will you have to do to keep that MRC in place 17 minutes?

Make sure the intent for fires is clear.

Drive the engagement area. It does not help to have a perfect plan on paper if the maneuver systems cannot "see" into the EA. Have someone drive through the engagement area — before emplacing the obstacles. This will help in positioning the direct fire systems to kill the attacker, in siting in the obstacles, and in identifying the dead space that needs covering with direct and indirect fires.

Rehearse. Rehearse. Rehearse! The last piece in synchronizing the engagement area is rehearsing the plan. There are many rehearsal techniques available, from map rehearsal to full dress rehearsal.[8] Determine the best technique by the amount of time available and what the commander intends to accomplish with the rehearsal.

It is important that the rehearsal is planned. Someone has to be in charge – the executive officer/S3 or a trusted agent needs to run the show and not waste valuable time. The rehearsal is not a wargame, nor is it time to develop a course of action. If new courses of action result from a rehearsal, then the Deliberate Decision Making Process was not completed properly. Know before the rehearsal the critical tasks that need rehearsing. Establish a time limit, and stick to it.

In summary, developing the engagement area requires a logical sequence in order to synchronize firepower at a decisive point on the commander's chosen ground. The seven steps depend on the competence of the commander in visualizing the fight and deciding where to kill the enemy. In order to kill the enemy, the commander must have an in-depth knowledge of his units' capabilities, the enemy's doctrine and capabilities, and he must be able to see how the terrain can become a combat multiplier for the unit.

It also takes a little "Battlefield Calculus" to ensure you have plenty of firepower and fires focused into the engagement area.

Additional information on developing engagement areas is available at the Center for Army Lessons Learned, Fort Leavenworth, Kansas.

Notes

[1]CALL videotape, *Engagement Area Development*, April 1995.

[2]FM 100-2-3, *The Soviet Army: Troops, Organization, and Equipment*, June 1991.

[3]FM 71-123, *Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company Team*, September 1992, p. 4-44. (These are approximations. Battalion pre-battle is 4-6 km; company pre-battle is 2-3km; and attack formation is 300m-1km).

[4]ST101-3, *Battle Book*, U.S. Army Command and Staff College, June 1996, pp. 2-103, 2-104.

[5]ARTEP 71-2, *Mission Training Plan for Tank and Mechanized Battalion Task Force*, Oct 1988, p. 5-33.

[6]FM 71-123, p. 4-32.

[7]FM 71-123, p. 4-65.

[8]CALL Newsletter, *Rehearsals*, April 1991.

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Canada's combined arms share this impressive building at the Gagetown Combat Training Center.

GAGETOWN

Training Combined Arms in Canada

by Sergeant Major Charles C. Hayhurst

Located near the city of Fredericton, 140 kilometers east of the Maine/New Brunswick border, is Canada's Combat Training Centre (CTC) at Canadian Forces Base (CFB) Gagetown. Encompassing over 1,100 square kilometers, this base is the primary training institution for Canada's combat arms troops. What makes this base different from other Canadian Army bases is that it's also home to all of the Combat Arms Schools (Armor, Artillery, Infantry, and Engineers) in Canada — Forts Knox, Sill, Benning, and Leonard Wood all rolled into one.

In addition to the various arms schools, CTC Gagetown is also home to the Canadian Army's Tactics School, which is the center of excellence for training junior Army officers in combined arms operations and tactics at the combat team level. The school teaches combined arms tactics within a battle group context to both regular and reserve officers of the Canadian Army. It also plays a major role in developing and monitoring Canada's combined arms doctrine.

Instruction is given in both of Canada's official languages, English and French. In addition to the usual training aids, the school employs simulations such as JANUS. In 1997, the Interim Tactical Information System (ITIS) will be introduced to the school, which will enhance not only local training but that of other units in Land Forces Atlantic Area (LFAA). The Maine National Guard is also exploring the possibility of using these systems to enhance their training.

Currently, the Tactics School staff consists of 19 regulars, three reservists, and two civilians. The Directing Staff (DS) at Tactics School is comprised of at least one major from each branch of the Army. Two members of the DS are exchange positions, one being a British Army major, the other a U.S. Army sergeant major, who also acts as the school's regimental sergeant major. Also filling in two roles is a major in the Intelligence branch, who serves both as an instructor and as the CTC commander's G2.

The following is a summary of the nine major courses taught by Tactics School staff:

- Intermediate Tactics Course Part 1 (ITC 1)
- Intermediate Tactics Course Part 2 (ITC 2)
- Intermediate Tactics Course Militia (ITC M)
- Combat Team Commander's Course (CTCC)
- Advanced Classification Training Infantry (ACT Inf)
- Advanced Classification Training Cougar (ACT Cougar)
- Advanced Classification Training Recce (reconnaissance) (ACT Recce)
- Battery Commander's Fire Planning Course (BCFPC)
- Jamaican Junior Command and Staff College Course (JJCSCS)

In addition to these, the staff also supports courses and training for other base/area schools and units.

The principal course of instruction within Tactics School is the Intermediate Tactics Course Part 2 (ITC 2) of which five to six classes are conducted each year. The aim of this course is to teach senior lieutenants and junior captains combined arms tactics, administration, and training at the combat team level. It is a 20-day course with an average course load of 40 students per class.

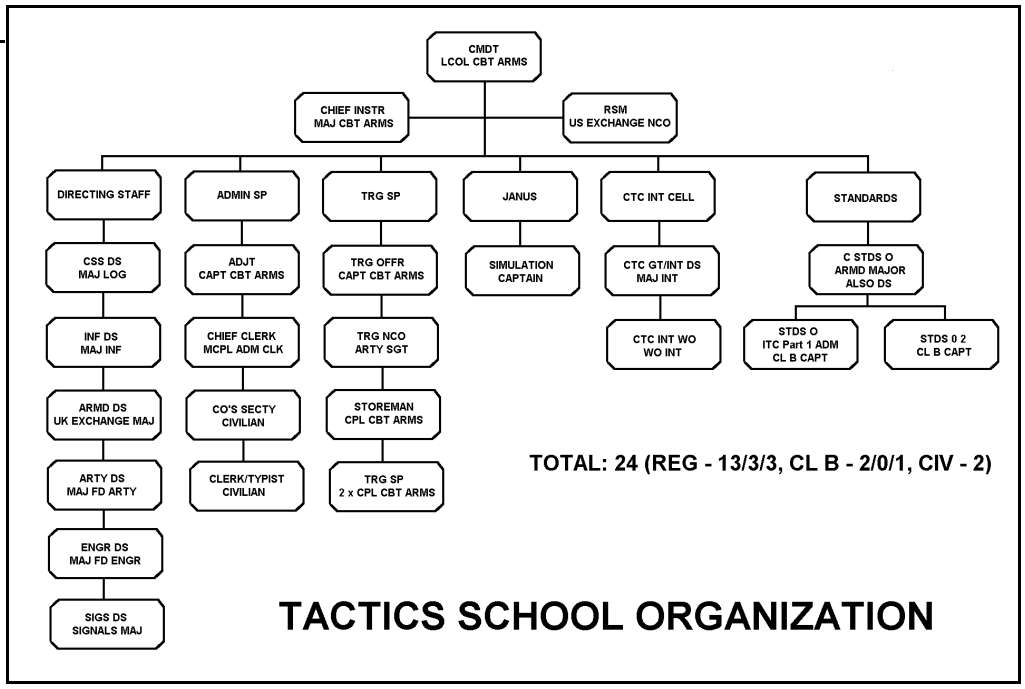
The course is described as intermediate because each officer arrives with some knowledge and background in at least one combat arm, combat support arm, or combat service support branch. The course material focuses on the operations and command of company group-size military forces in actual contact with the enemy. The course isn't intended to produce combat team commanders, but to ensure that all army officers have an understanding of the conduct of tactical combined arms operations and can plan training and administration for these operations.

Aside from lectures, ten separate exercises are used on the ITC 2 to teach officers how to plan and execute combat team operations. One noteworthy exercise is Exercise Fort York (a Battle Group defense focused at the Combat Team level). During this exercise, students produce defense plans which are then programmed into JANUS. The

system wargames their plans against a Fantasian attack. JANUS provides excellent AAR capabilities, not only for the student, but for the training cadre as well.

The Militia (Canada's Reserve Army force) conducts a 14-day version of ITC 2 once each year. Known as the ITC(M), this course is based on the regular force version.

Before any officer, regular or reserve, can take the ITC 2 course, he must first pass ITC 1, a self-study package completed at home units on their own time, then pass a 100-question, multiple choice exam, which is administered twice annually.



TACTICS SCHOOL ORGANIZATION

The most high profile course at Tactics School is the Combat Team Commander's Course (CTCC). This course aims to prepare selected combat arms captains and majors in combat team operations prior to assuming command of a company or squadron. Prerequisites include completion of ITC 2 or equivalent training, selection for command, and successful completion of the LFC physical fitness test for combat arms within the previous year. The CTCC admits a maximum of 20 students and is 14 days long. Most of it takes place at Camp Petersville, a semi-permanent camp 20 km south of CFB Gagetown. The CTCC is a non-graded course.

Each year, 20 militia captains or majors slated for company command arrive at Camp Blue Mountain in the Gagetown training area for the 14-day Advanced Classification Training Infantry (ACT INF) course (also referred to as the Dismounted Company Commanders Course), designed to provide light infantry battalions with commanders who can conduct dismounted company group operations. The course is performance-oriented. Instruction is a combination of home study, demonstration, TEWT, and FTX. The main subject areas include offensive, defensive, and common operations by a dismounted company group. Students spend only a few days in the classroom, mainly working through TEWTS. Ninety percent of their time is spent in the training area commanding a light infantry rifle company under operational conditions. Students must hold the minimum rank of captain, have completed ITC(M), have recent experience as a rifle company 2IC (XO) and be selected for command of a company.

Similar to the ACT (Inf) course are the ACT (Cougar) and ACT (Recce) courses, 14-day courses conducted in alternate years. They prepare senior Militia captains and majors for command of a Cougar Squadron (Company) or Reconnaissance Squadron (Troop). Students must have completed ITC, hold a minimum rank of captain and have at least a year of experience as a battle captain (squadron 3IC).

Militia armored units are equipped with the Cougar armored car as their primary AFV. The Cougar Armoured Vehicle General Purpose (AVGP) 6x6, which started life as a tank trainer, has now come to operate as an armored car in armored/reconnaissance units in Canada and on UN peacekeeping missions. As with all other courses, students must develop their plans and orders, back brief them to instructors, and then execute those plans.

The Battery Commander's Fire Planning Course (BCFPC) is a year-long course conducted by the Royal Canadian Artillery School, and is aimed at training future artillery battery commanders and instructors of gunnery (IGs). Tactics School teaches the tactics portion of this course, stressing combined arms tactics at the brigade (battle group) level. Students prepare operations orders and brief them to the instructor during TEWTs. While the tactics portion of this course is not formally graded, letters of assessment are sent to the Commandant, Royal Canadian Artillery School on each student's performance.

The final course listed, the Jamaican Junior Command and Staff College (JJCSC) is conducted once each year, from mid-August to mid-December, and is divided into two parts. Part One is seven weeks and is based on the curriculum of the Canadian Forces Staff School. Part Two is eight weeks long and is based on the ITC 2 taught at Tactics School. The aim of the course is to produce a level 3 staff officer in a formation HQ or a unit Ops/Tng Officer. Because the curriculum is based on Canadian courses, two instructors from Tactics School are sent to Jamaica TDY from end-September to mid-December to instruct on JJCSC Part Two.

Sergeant Major Charles Hayhurst is an American exchange NCO with the Canadian Army's Tactics School. He is a graduate of the Sergeants Major Academy and Battle Staff NCO Course. He has served with the 3rd Infantry Division, Berlin Brigade, 1st Armored Division, and "Cobra" Armor Team at the National Training Center.

Leclerc

New French Tank, Like the M1A2, Uses Digital Architecture

by Lieutenant Colonel John Moncure

They call it the first tank of the 3rd generation.[1] The new French main battle tank, the AMX-Leclerc, designed around its central computer system, incorporates many of the latest technologies in armored vehicle design.[2] For the French, the adoption of this new tank is an extraordinary leap from its predecessor, the 1960s vintage AMX-30, the equivalent of transitioning directly from an M60 to the M1A2.[3] Its characteristics set it apart in the community of modern armor as it reflects uniquely French cultural and psychological preferences. From its conceptual phase, the designers of this tank saw it from a new perspective, likening it to a fighter aircraft more than to a traditional tank.[4] As the "master work" of the French armaments industry and the latest symbol of French national pride, it is a "protected species" in an army that has just announced 40 percent cuts in strength. Evolving French conventional doctrine is revolving around this new weapon system as their army prepares for the 21st century.

The most striking difference of the Leclerc from other modern Western tanks is its size. In the perennial debate over mobility vs. protection, the French have always opted for the former. The AMX-30 weighed 20 tons less than its NATO contemporaries. Likewise, the Leclerc weighs only 56 tons in comparison with the tendency toward 70 tons for its cousins. The French have achieved this feat by replacing the human loader with a chain-driven loading system and by a most judicious placement of special armor. Thus, while the tank has roughly the same height as other modern systems, it is considerably shorter. Its weight gives it two advantages over its contemporaries: it is strategically more easily deployed, and it is more agile.

Agility, rather than silhouette, was the critical value for the French designers. The Leclerc power plant consists of an 8-cylinder, 1,500-horsepower "Hyperbar" engine, manufactured by the firm of Wärtsilä, married to an SESM automatic transmission.[5] This remarkable system, with its integrated turbine, provides instant pressure into the cylinders, up to 7½ atmospheres (as compared with about 3 atmospheres in conventional engines), on demand. From a dead stop to 32 kmph requires fewer than 6 seconds. In all gears, it accelerates quickly and smoothly. From this aspect, the Leclerc matches perfectly the French armored gospel of mobility.

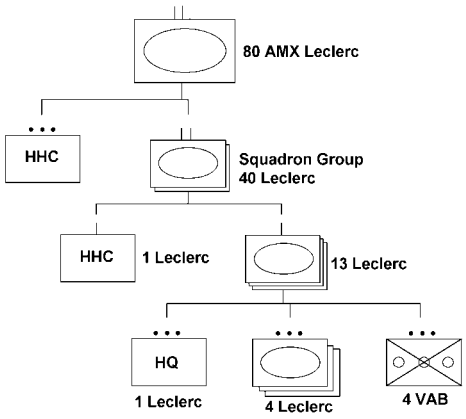
In designing the Leclerc, the French began from the inside. The digital architecture preceded the design of the tank, and ensures a complete harmony of fire control, navigation, mechanics, and communications. The Conduct of Fire Calculator directs the 15 other computers, receiving wind speed, temperature, atmospheric pressure, apparent target motion, and range data, as well as ballistic characteristics of the round. The result is routine first-round hits on targets at ranges in excess of 2,500 meters. The tank has achieved a remarkably soft recoil, a combination of the 42cm recoil travel and the hydro-pneumatic suspension. Wrapped around this fire control system, as tightly as possible, are ergonomic crew positions and controls. The TC, gunner, and driver can reach virtually all their controls with little motion. Indeed, motion is almost impossible in this form-fitted tank. Crew members have no visual contact with each other. The TC and gunner are so well fitted in their positions, in fact, that they cannot operate the turret standing up. These characteristics are a function of the original concept of the tank.

While the Leclerc has all the attributes of a modern tank, the French perception of it differs, sometimes dramatically. Because of its design, a crew can operate it only for a relatively short period of time — 6 hours is generally seen as the optimum — after which the unit must be replaced in the line, or replacement crews called up. Currently, 15 crews are being trained for each 13-tank company going through transition. Few maintenance responsibilities belong to the crew. The tank has a number of access plates along the sides from which mechanics can interrogate the tank, replace filters, etc., without

AMX-Leclerc Main Battle Tank Data and Organization

Item	Leclerc
Crew	3
Weight	55.6 t
Power to wt ratio	26.97 hp/ton
Ground pressure	0.9 kg/cm (12.8psi)
Length (hull)	6.88 m
Length (gun front)	9.87 m
Width (overall)	3.71 m
Width (over track)	3.31 m
Height (turret)	2.53 m
(overall)	2.92 m
Ground clearance	500 mm
Track width	0.635 m
Track base	4.32 m
Engine type	Uni-Diesel UD V8V, 8 cyl, diesel
Engine power	1500 HP/1100kW
Gearbox type	SESM ESM 500
No. of Gears	5/2
Max speed (road)	71 kmph (41 mph)
Range	550 km (344 mi) 700 km w/external tanks
Fuel consumption	1.07 mpg cruising 15.79 gal/hr idle
Trench	3.0 m
Step	3.0 m
Databus	Digibus
Fire Control Computer	Dassault Electronique CCT
Commander Sight	SFIM HL-70 360° panoramic Day Image Intensifier
Gunner Sight	SAGEM HL60 Day TI Nd YAG laser

Item	Leclerc
Main gun	GIAT 120 mm smoothbore 52 caliber
Ammunition type	1 piece fixed combustible case stub metal
Ammunition nature	APFSDS APFSDS-TPT HEAT HEAT-TPT
Loading	autoloader
Max rate of fire	6 rds per m
Ammunition stowed	22 rds ready 40 rds total
Coax	12.7 mm
Commander MG	7.62 mm
Grenades	GALIX smoke AP



the crew dismounting. Likewise, maintenance and logistics troops in Leclerc units will be trained to conduct rearming and refueling operations. The active Leclerc unit is experimenting with an examination which, once refined, may be used to select gunner or driver candidates with desirable Leclerc-specific characteristics. Leclerc is a specialized system. In the threat-rich environment of 21st century wars, French doctrinal thinkers see it being accompanied by other vehicles to protect it. In many ways, this vehicle is viewed less like a tank and more like an aircraft.

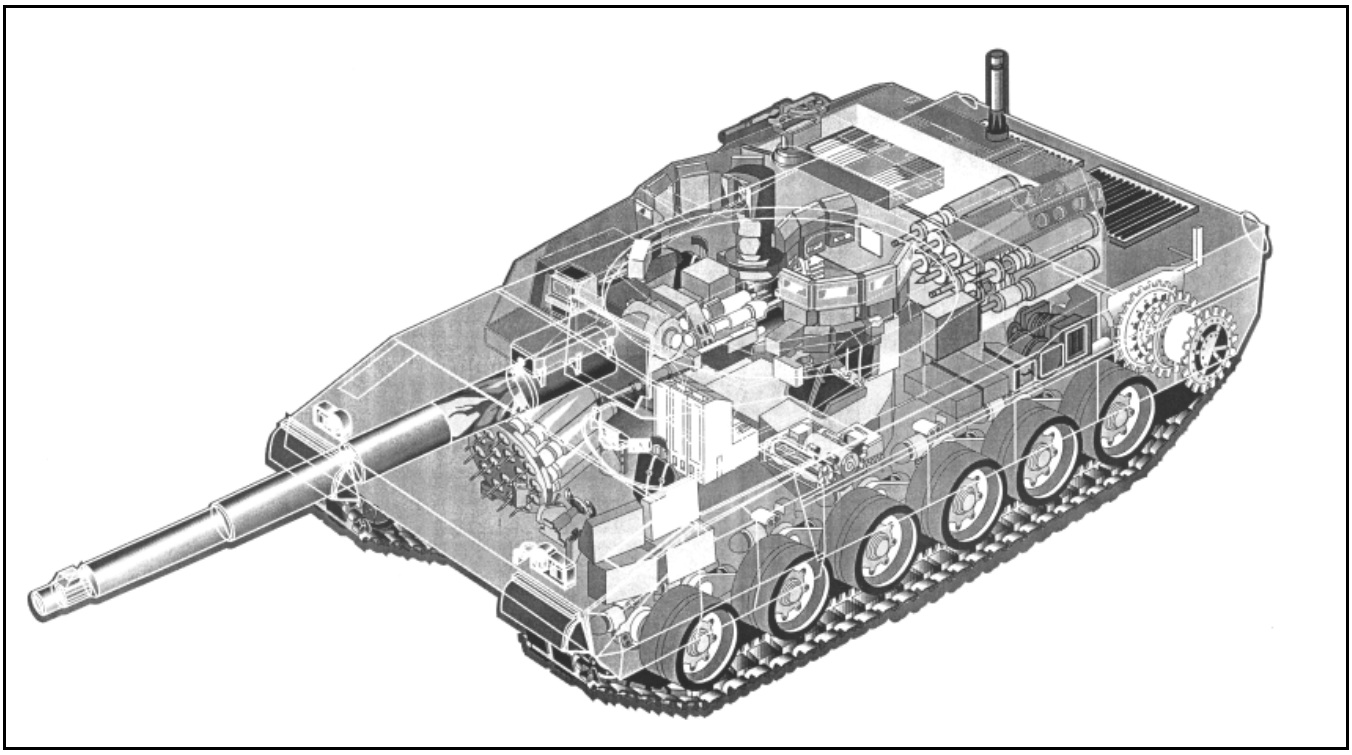
Like its American and German counterparts, the Leclerc includes a digital communication system. The French have developed a three-tiered architecture, of which the Command Information System (or SIC, at division level) and Regimental Information System (SIR) have been developed, and the Terminal Information System (SIT) is under study. Leclerc platoon leaders communicate with their company and battalion commanders using SIR. At present, the platoon sergeant and the two wingman tanks can transmit only current location, logistics data, and the locations of three designated targets. SIT will add graphics and various message sets. Recognizing the international environment, the French participate in a panel to develop protocols to translate IVIS and the German GeFüSys. The communication system of the tank, like its other high-performance characteristics, also ensures that it must be viewed differently from its predecessor.

The French Army has created a new organization for the Leclerc. Previously, tank regiments consisted of 52 or 70 AMX-30s, depending upon the number of companies. Leclerc regiments have 80 tanks divided into two 40-tank battalions (GEs, or groupe d'escadrons). The first such unit, the 501st/503rd Tank Regiment (each GE carrying the colors of a historic tank regiment), stationed at Mourmelon in eastern France, is in the process of drawing its Leclerc tanks. It will be followed next year by the 6th/12th Cuirassier Regiment. In combat, the GEs, which in peacetime share the logistics and administrative assets of the regiment, become completely independent.

Operational concepts for this tank have not been written. French doctrine writers correctly realize that some experience with a shoot-on-the-move high performance system is necessary before they commit themselves. However, some innovative ideas have surfaced.[6] Given the performance possibilities of the Leclerc, the French believe it is best suited for highly mobile operations, rapid concentration and dispersion of force, pursuit and decisive action, in depth. They believe that the tank should operate in a mixture of patrols (2 tanks) and platoons (4 tanks) depending upon the situation.

Infantry, artillery units, logistics, and planning processes will have to adapt to the new tempo of combat that the Leclerc will afford. With the new instrument at their disposal, French cavalry commanders will again be able to operate in a manner consistent with their history of élan. Whatever doctrine emerges from the field trials and think tanks, we can expect the new French armor force to perform aggressively.

The Leclerc is causing a revolution in French military thinking. While the machine is only appropriate to its generation — having some advantages and some disadvantages compared to other modern tanks — it has liberated the French perspective of mid- to high-intensity warfare. Anchored to older systems and sidelined for 30 years from NATO cross-pollination, the French focused their innovative energies on other subjects. The Leclerc has changed all that. Paradoxically, France's relative isolation permits it greater freedom of thought. Unfettered by the evolutionary development of doctrine in NATO, and armed with a high performance tank, we can expect the French to develop unusual solutions to the challanges that the new technologies pose.



Notes

[1]I wish to thank Engineur-Principal Marie-France t'Kint de Roodenbeke, for her patience in answering my questions, Captain Richard Coleman for our frequent discussions on the Leclerc, and M. Laurent Charrault of the Etablissement Technique d'Angers for his photography.

[2]The Leclerc is named after Philippe de Hautecloque who, using the pseudonym Jacques Leclerc to protect his family in occupied France, commanded the French 2nd Armored Division which liberated Paris in 1944.

[3]To be sure, the AMX-30 has been upgraded over the years, adding a laser rangefinder and reactive armor. But the 105mm-gun tank could not fire on the move.

[4]While this seems a radical idea today, early armor doctrine borrowed much of its tactical doctrine — as well as terminology — from the navy.

[5]This in itself is a departure for the French. Previous French tanks had manual transmissions, and no self-respecting Frenchman would own an automobile with an automatic.

[6]Preliminary thought papers include: "Guide Provisoire d'Emploi des RC 40 Leclerc," December 1994, and "L'Accompagnement des Unités Leclerc," 11 July 1995.

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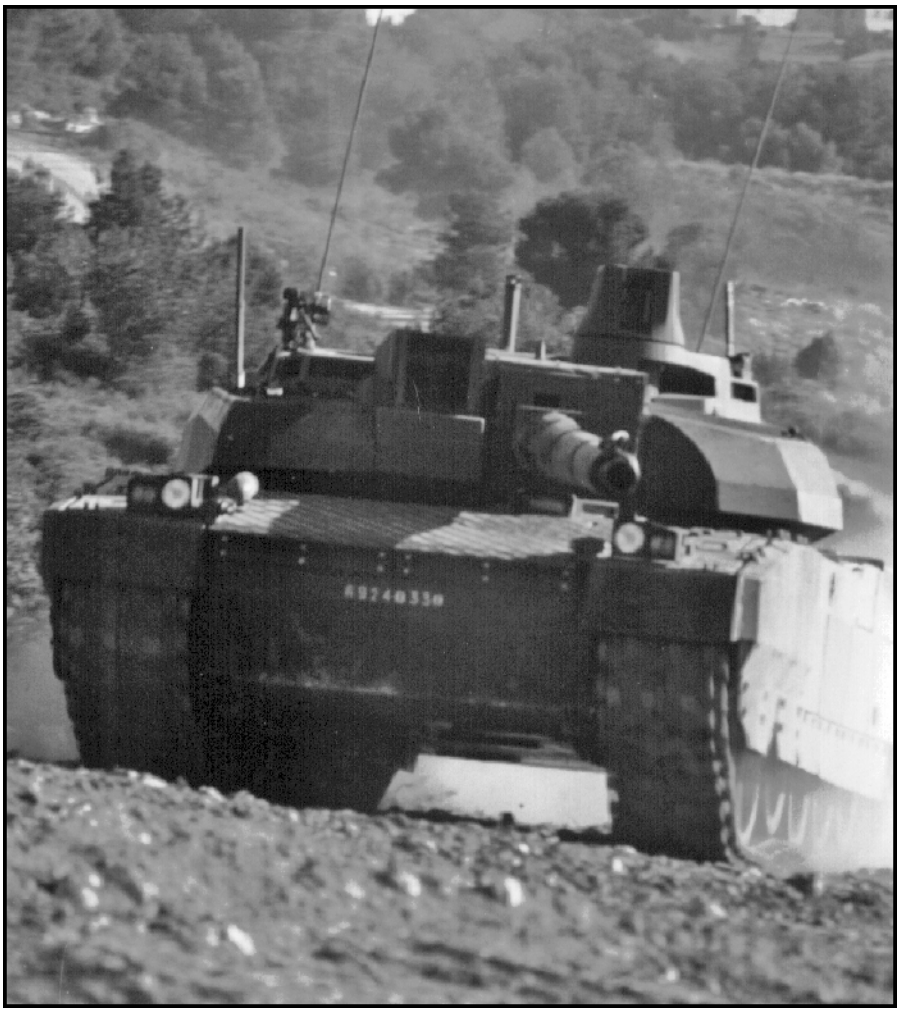


Capabilities of the new Leclerc MBT have changed the pace of French military operations and spurred thought on how best to exploit the new tank's advantages. At page top, an X-ray view.

It's a State of Mind

by Captain Charles H. Benson III

It's amazing how much we take for granted sometimes. You just don't notice how good you got it 'til you don't got it anymore. After a year away from the old squadron, and deep into a functional area assignment in Staff Weenie Land, I realize that I have indeed been guilty of taking what I had for granted. I began to realize this the other day when an officer in the MI Brigade where I'm now assigned asked me how I get away with wearing my cav brass. I shrugged the question off at the time, because I thought he may have assumed that I'm an MI officer, and soon forgot all about it. Then, a couple of days later, when my neighbor in the BOQ asked me the same thing, it got me thinking. "How do you get away with wearing that cav brass, ...is that stuff authorized?" It reminded me of something that I heard a few years ago.

It all began while I was assigned to Ft. Polk and the mighty 5ID(M) "Red Devils." Like so many FORSCOM units these days, our squadron's OPTEMPO was pretty intense, and the air and ground cav troops of our squadron were deployed all over the country. My armored cav troop was wrapping up a series of back-to-back deployments. We'd supported JTF-6 in New Mexico, returned to Ft. Polk for Bradley gunnery, and were at Ft. Hood as SINCGARS testing augmentees. I received a call from the squadron XO, who told me that our troop had been tasked to replace an infantry company in Honduras in support of JTF-B. Though we weren't thrilled with the prospect of another deployment, it looked like it had the potential to be an exciting mission.

Shortly after our return to Ft. Hood, we conducted a leaders' recon to Soto Cano and were briefed on our mission by the JTF-B staff and the leadership of the company that we were going to replace. The mission was to provide reconnaissance and security for remote sites for which the JTF was responsible. There were two sites, and the standard rotation cycle called for one platoon to occupy each site while the third remained in Soto Cano to train, provide soldiers for the base reaction force, and conduct R&R.

The unit we replaced did a great job of orienting us to the area and the mission. They provided us with detailed continuity books for each of the sites, which greatly assisted in making the transition a smooth one. Each of their platoon leaders walked his counterpart through a platoon relief in place at his site, and briefed him on the details of that site's operation. Their efforts later paid off in an exceptionally smooth "battle handover" of each site to our platoons. During the leader recon we were often asked "why did they send an armored cavalry troop here to do this?" We weren't able to tell them why, and hadn't given that question much thought ourselves. But we were confident that we could get the job done, and briefed the staff on how we would do it.

We arrived in Honduras and set about the task of assuming our new mission. We occupied what is known on Soto Cano AFB as Infantry Village; a small cluster of hooches occupied by the infantry companies when they are not deployed on missions. Over the years, the infantry companies had decorated the area with all sorts of cool infantry stuff. They'd painted their regimental crests and mottoes on rocks, and put "infantry tabs" over all the entrances to the paths leading into the area. We happened to replace an airborne infantry company, so they had lots of airborne stuff all over the place, too.

While becoming acclimated and conducting the training necessary to prepare the unit for its new mission, our troopers set about the task of converting Infantry Village into Cavalry Village. They kept the old regimental crests and mottoes, but moved them to a new and more visible place of honor. They tore down the "infantry tabs" and replaced them with red and white "cavalry tabs." They replaced all the old black and gold signs in the compound with red and white ones. They even went so far as to replace all the navigation point markers on the land navigation course with red and white markers. Of course, our mortarmen ensured that an ember of the infantry spirit was kept alive in their area. They made new "infantry tabs" and placed them over the entrances to their hooch.

Not all of these changes received a warm reception. We were the first cavalry troop assigned to that mission, at least that anyone could remember, and infantry companies had become a familiar fixture. Everyone knew how an infantry company, especially a light infantry company, was organized and equipped, and the missions it was best suited for. The ARFOR commander, our temporary boss, was an infantryman, and a Green Beret to boot. The JTF-B commander was an infantryman with a long and proud association with the 82nd Abn. Many of the support personnel on the JTF staff were on loan from the 82nd Abn. Those who weren't were so enamored of their peers' berets that they swore they'd fight to be assigned there next. Some folks on the staff told me that they were surprised that an armored cavalry troop had been sent to perform this mission. They thought that we might lack the personnel, training, and equipment to do the job.

We knew that many of the changes we wanted to make might not please everyone, and were careful to bring them about gradually and gracefully. We wanted to demonstrate to our new community the style and traditions that have been a hallmark of cavalry outfits since their earliest days. The soldiers of the unit we replaced had done a magnificent job and had set some high standards, but our troopers rose to the challenge. Our goal was not to change our surroundings to make them more cavalry or less infantry; we wanted to make the place better as we left our mark on it...period.

Most important though, we also wanted to make our unit better during our time there. One of our challenges was to maximize training in as many home station METL-related tasks as possible while performing our real world mission. While we were able to train some Bradley gunnery skills, the real payoff came in honing our dismounted patrolling and reconnaissance. We trained our troopers to proficiency on dozens of tasks that our scouts normally didn't get to focus on, like demolitions, rifle marksmanship, signaling techniques, combat lifesaving, and ambush TTPs. Everyone became

more skilled in the use of our communications gear — AM and FM — and in the use of navigation and night vision devices. Because we had virtually no distracters, we were able to ratchet up our standards of physical fitness and demonstrate that cav troopers are every bit as rough and tough as anyone else.

When the relief was complete and the infantry company began heading home, my troopers settled into the routine of training, mission execution, resupply, and R&R that became their life for the next four months. With the ARFOR commander, I made my rounds between the remote sites and home base and witnessed what I think is the best work I've ever seen soldiers perform anywhere. Platoon leaders and platoon sergeants began cleaning, painting, and improving the facilities at the remote sites. They improved the reaction drills and base defense SOPs at each of the sites, and relentlessly trained their troopers to ever-higher standards in executing these drills. They planned and executed countless day and night patrols of the surrounding countryside.

Each remote site had its own dining facility and aid station. The platoon leadership ensured that our attached medics and cooks set about the task of improving their areas and services. The dining facilities got facelifts, and the aid stations thorough cleaning and restockings. Our medics taught field sanitation classes, conducted sick call, and began instructing and certifying every member of the troop as a combat lifesaver. The cooks repaired broken ice and ice cream machines, and took turns patrolling with the scouts. The platoons also continued the humanitarian assistance projects which the previous units had established. These included providing donated clothing to local villagers, and assisting a local schoolmaster with repairs to the village school.

Back at Soto Cano, our mechanics went to work repairing the HMMWVs, CUCVs, and deuce and a half we were assigned, and healing the wounds caused by rough roads. The mechanics also became experts in the craft of sling-loading. They took charge of nearly all of the aerial resupply operations to our remote sites. The mortars and FIST planned a series of live-fire exercises, and conducted EIB training. They also assisted the maintenance platoon with resupply operations, and took turns going on patrol with the scouts.

The troop XO and first sergeant worked long hours. They had already done yeoman work planning and orchestrating the deployment at home station and preparing facilities in Honduras for our arrival as members of the advanced party. Now, they made coordination with the various staff sections for food, fuel, supplies, and services of all types, and the all-important air missions needed to ferry people and equipment back and forth. They established our orderly room and administrative services, and made sure that personnel actions continued without interruption throughout the deployment. They planned recreational trips and tours for the platoons' R&R cycles. All of this was planned and executed by lieutenants and sergeants with very little direct involvement by me.

One day, as we were making our flight out to inspect one of the remote sites, the ARFOR commander told me that the JTF commander wanted to visit each of the remote sites with me in a week or so. The companies that had preceded us had all found the mission difficult. He was concerned about the suitability of the mission for a cavalry troop, since it was not a mission he believed that we were normally tasked with. He told me that the JTF commander, a tough soldier with demanding standards, had often left the company commanders a little sore in the hindquarters after his visits. Like a good commander, I told the boss that we'd be ready, and we went about our business.

The day the JTF commander arrived for the inspection, I was a little nervous because I hadn't spent that much time with the man since my arrival, and remembered the stories the outgoing company commander had told. We flew from Soto Cano to our first site in a UH-1. It was a beautiful sunny morning, and we flew with doors open. As we made our approach, we could see a hint of mist around the mountaintop site, and the forest below seemed lush and wild.

It seemed that some distant memory was awakened in the colonel as the Huey got close enough to the site for him to see the compound guard tower. The platoon at that site had painted the roof of the tower red and white, and turned it into a large cavalry flash. We could see troopers hurrying to secure windows to lock out the prop wash, and running with weapons to man the perimeter. Every movement seemed planned and executed with a sense of urgency and purpose. The colonel looked at me, smiled, relaxed in his seat, and enjoyed the rest of the ride in. Once on the ground, he strolled around the compound, talking with the platoon leader and platoon sergeant, and chatting with individual troopers as they went about their duties.

The scenario repeated itself when we visited our second site. There was none of the shouting or butt chewing that I'd been told to expect. There was just an old soldier obviously enjoying the company of some young troopers who were working hard and serving their country far from home.

As we were walking around, the colonel stopped and turned to me and said "You know, Chuck, I was a bit concerned when I heard they were sending me a cav troop to do this job. But, after seeing your guys and their work, and just watching how they work, I think that we got the right unit for the job. This mission seems like a perfect cavalry mission to me now. And the troopers... you know they're your troopers just by the way they carry themselves. They don't have berets, or the most modern equipment, but the way they walk radiates a sense of pride and confidence in who they are... they're just regular soldiers who give a damn about their job, and it shows. I haven't seen anything like them in a long time, and am proud to have had the opportunity to serve with them."

Later in the visit, the colonel was talking with one of the platoon sergeants, and he asked the NCO what he thought set his platoon apart from the others. "It's their cavalry state of mind, sir," he replied. The colonel didn't seem to worry about the remote sites from that day on.

I changed command half way through this mission to assume a second command. During the flight home, I thought about what I wanted to take with me to my next troop, based on the lessons learned in good old Alpha. Of the many things I listed in my solo AAR, the one that stuck and that keeps coming back is that cavalry is a state of mind. This state of mind was what sets us apart from our peers, and inspired us to call out the old "if you ain't cav, you ain't..."cadence during our morning PT runs.

A couple of years have passed since that day, and I've had a lot of time to reflect upon what that platoon sergeant said, and why it has taken on a special significance for me. He was not boast-

Continued on Page 45

The Race

by LTC Walter F. Ulmer III

— James Shane

It was either November or December 1987 — I can't recall exactly when — that 2LT Eric Hartsell, United States Army Chemical Corps, reported to the battalion S3 shop. I had been the S3 for about ten months and, like most S3s, was on the threshold of learning the job a few months before I was scheduled to depart.

Hartsell was not unlike any other brand-new chemical lieutenant reporting to his first unit: he would have been just as comfortable reporting to a battalion stationed on the planet Mars. And, as a chemical officer, he was in a particularly alien world. Instead of being surrounded by talk about radiac meters and lethal doses, he was about to be inundated with discussions on boresighting, maintenance, and tank gunnery at fabled Grafenwohr. To make things worse, the battalion chemical NCO billet in the shop was vacant. Hartsell was a brand new special staff officer in a tank battalion with no NCO to keep an eye on him. At least the other 2LTs reporting to the battalion that month had platoon sergeants and fellow platoon leaders to help them sort things out.

I recall my inbrief with LT Hartsell. (I liked to talk with all incoming officers about their job, the unit, and expectations.) We spoke about the battalion, the duties he would assume as the battalion chemical officer, the training calendar, and the challenges associated with being an unmarried lieutenant stationed in Germany. I told him, as I did all my new officers, that I was certain he'd do fine if he followed three rules:

-Always tell the truth, no matter how hard it might be, or how much heat you might end up taking for it (honesty).

-Mistakes are authorized, as long as you are trying to do your best and are being a team player. Just don't make the same mistake too many times.

-Try to have some fun. Despite his jet lag, LT Hartsell seemed to be absorbing most of the message.

We spent some time discussing the nature of his duties as chemical officer. As the primary advisor to the battalion commander on chemical matters, he would be responsible for tracking the status of chemical equipment and training in the battalion, as well as assisting the battalion commander in ensuring the commander's chemical-related intent was understood by the company commanders. His would be a tough job for a new officer. While the company commanders were ultimately responsible for all chemical-related training within their units, he was to assist them in any way he could, whenever they asked.

Also, as the most junior officer in the shop, he had automatically "volunteered" to perform various "special duties." For example, he would have the pleasure of collecting money for dinings-in, taking roll of S3 shop officers at battalion training events, and other sundry (and mostly unwanted) tasks. The shop had a tradition that the junior officer carried out these duties. One day, if the Soviets didn't attack soon, Hartsell would pass on these duties to another newly assigned junior officer.

Hartsell didn't know it that day, but his first special duty would be a doozey. Division 10K runs were a big deal those days in Germany. About every six months, a battalion would be chosen to host a race. These 10Ks were not to be taken lightly; the corps commander was a marathoner and enjoyed being "invited" to these semi-annual events. A few months back, at a weekly brigade S3 meeting, a battalion S3, figuring it was his battalion's turn to host the event, had experienced a moment of unconsciousness and volunteered his battalion to host the next 10K run. Unfortunately, the battalion commander didn't see it that way, but it was too late. Due to the battalion S3's lack of judgment in signing up for the 10K, the battalion commander designated him to be the project officer. The assistant project officer, the S3 was now happy to announce to the new lieutenant, would be the chemical officer.

The enthusiasm with which LT Hartsell had initially reported, filled with visions of NBC stakes, MOPP gear runs, and decontamination exercises, had just been dealt a blow. Of course, these important training events would go on as scheduled, but so would the division 10K. Hartsell, early in his tenure, faced the reality of "doing all that other stuff," a challenge which occurs in every unit. I'm sure there was no course of instruction on planning a division 10K at the Chemical Officer Basic Course.

I gave him my initial planning guidance. I instructed him to contact the battalion that had hosted the last 10K and get its After Action Report (AAR). I instructed him to give me an update on his progress the following week. Off he went, probably to get some sleep.

A week passed and there was no sign of Hartsell. I dropped a few hints with the other officers in the shop. Finally, three days later, he knocked on my door.

"Sir, LT Hartsell reporting for division 10K update."

"Eric, sit down. You don't have to be so formal."

He sat down.

"How's your inprocessing going?"

"Great, sir. I ordered my first schnitzel last night at a local Gasthaus."

"Great, Eric. Now, how about that 10K?"

"Sir, I have nothing to report, sir."

"What?"

"Sir, I could not find the last battalion that hosted the 10K."

I had a mental picture of Eric driving around the German countryside in search of the 1-36 Infantry "Spartans."

"Why not?"

"Sir, I really don't know where to begin."

The division 10K was still two months away. When I had given Eric the mission, I had purposely programmed some flexibility in the planning timeline, anticipating a few bumps in the road with the new lieutenant.

"OK, Eric. The first place you start is...," and we proceeded to talk about how one obtains information in a tank battalion. He took notes. Then, I went down a laundry list of items that he would likely need for the event, including those folks with whom he would have to coordinate. The list included everything from course markings to trophies for the winners. Contacts included everyone from the division action officer to the local Polizei. I instructed him to brief me the following week.

A week passed. This time he was prompt.

"Sir, LT Hartsell reporting for division 10K update."

"Eric, again, no need to report. Just knock, make sure I'm not on the phone or talking to someone, come in, and sit down."

"OK, sir."

"OK. What have you got laid on?"

"Well, sir, I have the engineer tape for the finish line."

"That's it?"

"Yes, sir."

"OK. Who have you coordinated with?"

"I know where the Polizei station is in Friedburg."

"Eric, on April 15, the entire division, along with its commander and maybe even the corps commander, is going to show up at the old Friedburg airport and expect to run a ten kilometer road race. The last thing they want to see is one-each 2LT standing there with a roll of engineer tape and directions to the police station."

Eric gave me that blank look that many new lieutenants give their bosses, signaling cluelessness.

"OK, Eric, what we need is an MOI."

"A what, sir."

The next class was about how to write a Memorandum of Instruction (MOI). We talked about what should be in it, how it should be staffed with all the key players, who should review it, and how soon prior to the event it should be published.

Then Eric looked at me.

"Sir, I don't think I can do this."

"Why not?"

"Sir, there's just too much to do."

"Come on, Eric. You were selected for assignment to a forward-deployed tank battalion in Europe. As such, you were judged to be one of the chemical corps' most promising young officers. Are you telling me you can't accomplish the mission?"

"Sir, I don't know, sir."

Bingo. Eric was learning. He had reached his saturation point and had the guts to say so. While I wanted Eric to develop a "can do" attitude, I didn't want him to develop it at the expense of his integrity.

"OK, Eric."

And we continued our discussion, which now involved delegation of responsibility by the S3 shop. I explained to Eric that even if he and I spent the next two months doing nothing but 10K stuff, we could never do what was required to get the event off the ground. Therefore, we "tasked" subordinate units in the battalion to execute our plans. We were only planners, I told him, and wore no green tabs which signified command. We planned and commanders executed. Then, we proceeded to designate units for various tasks associated with the 10K. One company would be responsible for the course. Another would be responsible for the finish line and the awards. Another would be responsible for refreshments. And on it went. Eric left with enough guidance to plan the New York Marathon.

The weeks passed. Gradually, the 10K seemed to be taking shape. Now and then I'd see Eric walking down the hall with various items that one would associate with a road race: runners' numbers, bottles of Gatorade, more engineer tape, etc. He even came up with one of those wheel things that marks off course distance, pushing it around the shop with obvious pride. Eric also began to learn to balance his 10K duties with those required in his primary role as chemical officer. And, as a new lieutenant in the battalion, he went through those changes which occurred with most new lieutenants. He became friends with the other single lieutenants in the units and they "hung out" together when off duty. Letters from his girlfriend at home became less frequent. He showed up with a local German fraulein at a battalion hail and farewell. He was invited to married officers' quarters for dinner. He was even assigned a chemical NCO. He was beginning to fit in to his new home.

The weekly updates continued. But now, instead of reporting, it was a knock on the door and a plunk down on the sofa to wait until I was done doing whatever I was doing. We were now two weeks away. The division commander RSVP'd that he'd attend and would bring the corps commander with him as his "guest." The battalion commander was now requiring daily 10K progress reports from the S3. Word amongst soldiers in the battalion was that the commander was running twice daily.

"Sir, we've got a problem."

"What is it?"

Eric was learning to bring information to me by default, only those things he could not fix himself. He was learning my nuances, one of which was that everything was going OK unless brought to my attention. The other was that bad news gets worse with time.

"The flatbed scheduled to be positioned for the awards ceremony is nonoperational. It won't be fixed in time for the race."

"Great, Eric. Just great. What's the matter with it?"

"Flat tires, sir."

"Flat tires!?"

I had just been informed by the brigade S3 that our ammo allocation for the upcoming tank gunnery rotation at Graf had been cut; I was in no cordial mood.

"Yes, sir."

"Eric, this is not good. I know you don't own that flatbed, and there's not much you can do about it. Go ahead and execute your back-up plan."

"Sir?"

"Your contingency plan. Whatever you did to ensure there would be an awards platform on site, in case the flatbed is unavailable. Go ahead and execute."

Pause.

"Sir, I don't have one."

Another lesson.

"OK Eric. I get the picture. Sergeant Major!"

The battalion operations sergeant major sauntered in.

"Sir?"

"Sergeant Major, we have a problem. Flatbed for awards platform for 10K is broke. The lieutenant doesn't have a back-up. See what you can do."

"No problem, sir. C'mon, lieutenant."

The sergeant major eased out of the office, allowing only me to see the grin on his face. His S3 wasn't having a good day in the first place and the new lieutenant wasn't helping any.

"Eric."

He stopped on his way out the door.

"Yes, sir."

"First, always have a back-up plan. Second, it's wise to check with the operations sergeant major during a crisis before coming to me. He might be able to pull something out of his hat."

"Yes, sir."

"And Eric..."

"Sir?"

"If this 10K doesn't go as scheduled, you and I will be driving a "honey-wagon" in some small town in Germany for the rest of our lives. You'll be driver, I'll be vehicle commander."

"Yes, sir."

He got the picture.

As the 10K approached, Eric's anxiety increased. While I was confident everything was OK, the young lieutenant was in the shop early in the morning and was going home after everyone else had left. Still too new to appreciate what was about to be the culmination of a fairly complicated staff action, I'm sure he tossed and turned on more than one night during the weeks prior to the big day.

The morning of the 10K was bona fide German. Drizzle the night before, ending in the morning with light fog and a chill in the air. Start time for the race was scheduled for 10 a.m. The division commander had approved a division training holiday immediately following the awards ceremony. A great way to end the week.

At 0630, I showed up and had my driver park my jeep at the end of the runway, out of the way of the impending action. I hopped out, zipped up my Graf jacket, poured a cup of coffee... and watched.

In a few minutes, things began to happen. The company in charge of traffic control arrived and began marking off designated parking areas. The company in charge of the course showed up and started mixing Gatorade for the water stops. The medical platoon set up a tent for the aid station. Wives began showing up and started placing their pies, cookies, juices and other items they'd sell in booths which had been positioned the night before. The porta-pottie guy dropped off his wares. And, almost miraculously, a flatbed truck appeared and positioned itself precisely where it was supposed to go, as depicted by the diagram in the MOI.

In the middle of all this stood a lieutenant. He had been there for over an hour. He had a clipboard in his hand. As items for the race appeared on the scene, the respective person in charge would approach the lieutenant for final instructions. With a wave of his hand or a reference to his clipboard, the lieutenant would point out a location or provide clarification. Between instructions, he would survey the scene, seemingly astonished that his plan was coming together. As more items showed up, he began to smile. As things were placed in position, his smile grew. His astonishment turned into pride.

I hopped in my jeep and drove over to the lieutenant. By this time, 2LT Eric Hartsell, Chemical Officer, 4th Battalion, 67th Armor, was beaming. He saluted. I returned it. He said nothing. I smiled and said nothing. I didn't have to. He knew he'd done good.

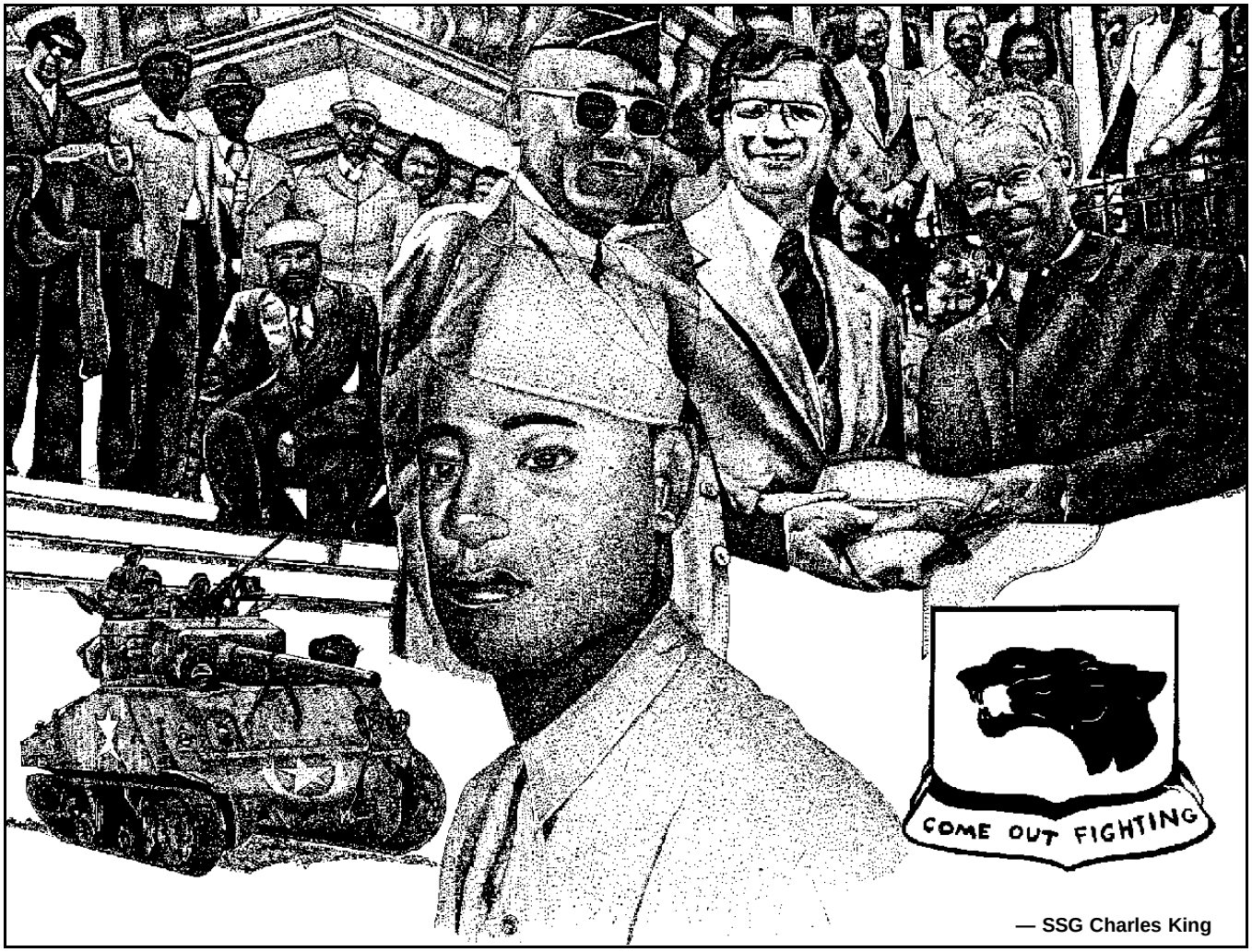
Lieutenant Colonel Walter F. Ulmer III is currently stationed in the Federal Republic of Germany.

STATE OF MIND - from Page 42

ing about his platoon; it was a tribute to his troopers' spirit, and the way they went about their job. Those troopers didn't do what they did so well because of me. Lord knows, they often did well in spite of me. They didn't do their job well because they were glad to be in a strange country far away, with few of the comforts of home. Like it does for most of us, that stuff got old for them real fast. I think that those troopers did well, and made the great impression that they did, because of what they had inside. Their "state of mind" permeated almost every thought, and was reflected in nearly all of their deeds. They weren't perfect, but they were close enough.

It's the lean-forward-in-the-saddle attitude, the ability to innovate and adapt quickly to new and challenging situations, and the pride in the unit that those troopers possessed that I'll always remember. And it's the gratitude that I owe to each and every member of that unit for their loyalty and unwavering high standards of mission accomplishment. That's why I'm still wearing my cavalry brass.

Captain Charles H. Benson III, commissioned in Armor from OCS in 1986, has served as a tank platoon leader, HHC XO, and adjutant in 3/8 Cav, 3AD, FRG; and as squadron motor officer, Troop A Cdr, and HHT Cdr, 3/1 Cav, 5ID (M), Ft. Polk and 2/1 Cav, 2AD, Ft. Polk/Ft. Hood. He is currently assigned to A/532 MI Bn, 501 MI Bde in Korea, as Automation Management Officer CJ2/3. He holds a BA from the University of Alaska, Anchorage, and an MA from Case Western Reserve University, Cleveland, Ohio.



— SSG Charles King

Above and Beyond

Fort Knox Auditorium Renamed in Honor of Black Sergeant Who Died of Wounds After Heroism in France

by Private First Class Darryl M. Metcalf

On January 13th, President Clinton awarded the Congressional Medal of Honor to seven African-American soldiers of the Second World War, six of whom had died. These men of color had risked their lives above and beyond the call of duty, fighting for the very freedoms they were often denied by their own countrymen back home. Because of their skin color, their heroic deeds went largely unrecognized at the time. But now, seven of our nation's bravest sons are members of this small fraternity, a fraternity whose only requirement for admittance is selfless service to the nation. One of these heroic few, Staff Sergeant Ruben Rivers, was honored in a memorial ceremony at the United States Armor School headquarters building, and on February 13th, MG George H. Harmeyer, Commanding General of the U.S. Army Armor Center and Fort Knox, dedicated the Gaffey II Auditorium of Gaffey Hall to SSG Rivers' memory.

SSG Rivers' valiant actions and total disregard for personal safety in the face of enemy fire are the stuff of which legends are made. It is the simple story of a man who answered the call of his nation.

In November 1944, the 761st Tank Battalion, in support of the 2nd Battalion, 101st Regiment of the 26th Infantry "Yankee" Division, Third Army, launched an attack to seize the French railroad towns of Guebling and Bougaltroff and the high ground beyond. Earlier, elements of the 4th Armored Division had tried to break through the enemy forces in the area without success. As the lead element of the "Yankee" Division, it was up to the 761st, the first black combat unit to see action in WW II, to capture the critical crossroads towns. Able Company, under the command of Captain D.J. Williams,

was chosen to lead the attack, and leading CPT Williams' most forward platoon was a young and audacious staff sergeant named Ruben Rivers.

On November 7th, 1944, while advancing towards Guebling, SSG Rivers' unit encountered a roadblock that impeded its advance. Without thought for his own life or safety, SSG Rivers dismounted his vehicle under heavy direct fire, attached a cable, and dragged the roadblock out of the way, in order for the unit to continue with its mission. For this action, he received the Silver Star. Ten days later, on November 17th, following SSG Rivers' lead, Able Company continued its attack. As the company moved across a railroad crossing, SSG Rivers' Sherman tank hit an antitank mine, sending shrapnel into the turret and slashing Rivers' thigh to the bone. Refusing evacuation and morphine for the excruciating pain, SSG Rivers took control of his section after the section commander was killed and directed the movement towards the enemy strongholds. When the Engineers began constructing a bridge over the river into Guebling, the company commander, CPT David J. Williams, came over to SSG Rivers tank to check on him. It was then that he realized that while SSG Rivers was in unbearable pain, he said nothing of it. Again, the commander told him to administer the morphine and evacuate to the rear. SSG Rivers once more refused both the morphine and the evacuation. For the next three days SSG Rivers went about his duties despite extreme pain, all the while leading the company towards Bougaltroff. As they were entering the town, SSG Rivers encountered extremely heavy enemy resistance and was ordered to pull back. SSG Rivers reported that he had spotted enemy positions and was advancing on them, saying, "I see 'em. We'll fight em." As he entered the city, SSG Rivers destroyed three tanks and their crews before the turret of his Sherman was hit by an 88mm armor-piercing round, killing both Rivers and his gunner. As a result of these heroic actions and SSG Rivers' expertise with the .50 caliber machine gun, he was credited with over 200 enemy deaths. It was this series of events that led his company commander to recommend SSG Rivers for the Congressional Medal of Honor.

After SSG Rivers' death on November 19, CPT Williams went to the battalion commander and told him that he was going to recommend SSG Rivers for the Medal of Honor. Four days later, he turned in the written recommendation to the battalion commander, but because it was then misplaced or lost, it would be the last time he would see it. For the next fifty years, CPT Williams would spend considerable amounts of time in the pursuit of SSG Rivers' Medal of Honor. Unfortunately, there was one catch that CPT Williams was unaware of. The time limit in which the medal could be bestowed on SSG Rivers had run out in 1952. Finally, in June of 1990, there was a breakthrough. CPT Williams, with the help of sworn affidavits from many of the soldiers who were in France that day, was able to influence Congressman James M. Inhofe (R-OK.) to propose a resolution to Congress to waive the time limitation on the recommendation for SSG Rivers' Medal of Honor. On 6 June 1990, Congressman Inhofe went to the floor of the House of Representatives and told the story of SSG Rivers and why he deserved the award. The house granted the waiver of time limits to SSG Rivers and he was finally awarded his Medal of Honor.

Williams, the company commander, was the guest speaker at the February 13th ceremony naming the auditorium in honor of SSG Rivers. Williams was drafted into the Army while in his third year at Yale, and served for eleven months, reaching the rank of corporal before being selected for OCS. After graduating from OCS, CPT Williams was sent to Camp Clairborne, La., where he thought he would wait out the war. He just could not see the Army sending an all-black unit into battle. But, midway through the war, the black GIs started demanding the chance to fight for their country instead of being assigned menial jobs at Camp Clairborne. The 761st, an all-black battalion, finally received its chance in 1944. Sent to Europe, they landed on Normandy beach in the early fall. During the next several months, they distinguished themselves as one of the best tank battalions in World War II. But, like all black soldiers of the era, the battalion never received its due recognition. Finally, in 1978, at the urging of Williams, the 761st Tank Battalion received the Presidential Unit Citation that it so greatly deserved.

The families, friends, and comrades of the soldiers have spent the last 50 years waiting in anxious anticipation for the honors recently bestowed by President Clinton. A special Army Senior Officer Awards Board chose the seven men according to facts accumulated by a panel of military historians over a 15-month study. The study included written works from the National Archives, as well as recollections from soldiers who had served with the men on the battlefield during World War II. Two of SSG Rivers' sisters, Grace Rivers Woodsfork and Mae Rivers Hills, attended the ceremony at Fort Knox. Mrs. Woodsfork's son, a former mayor of Richmond, California, also attended. There were local politicians present, as well as members of the area's chapter of the NAACP. During the ceremony SSG Rivers was knighted into the U.S. Armor Association's Order of St. George for extraordinary leadership qualities on the battlefield.

After 53 years, a great wrong has been righted with the honoring of the seven men who received the Medal of Honor, but as a nation and as soldiers, there is an inherent duty to ensure that such injustice never happens again. Soldiers should feel honored in serving in the same Army as these great men. SSG Rivers and the men who served in the 761st unswervingly demonstrated their unique pride in America — a pride that can be shared and should be remembered. They fought for freedom on the battlefields of Europe without the benefits of full freedom at home and in doing so, taught America and the Army a lesson not easily learned. A sense of duty, honor and courage is not dependent on one's skin color, but rather from deep within one's soul.

Private First Class Darryl M. Metcalf has been in the U.S. Army for two years. He is currently the driver for the Director of the Armor School. His previous assignments include M1A1 crewman in 1/72 AR in the ROK, and as an M1A2 crewman in 4/16 CAV. He is currently competing for the Army's Green to Gold program, and plans on enrolling in the ROTC Department at the University of Louisville in the fall of 1997.

LETTERS *(Continued from Page 4)*

Tank Modernization Plans Still in Formative Stage

Dear Sir:

This letter to the editor corrects some of the misperceptions found in CPT Todd Tolson's "Building Tanks at Lima" article in the November-December issue.

The Army Science Board Tank Modernization Study recommendations matched the independent Armor Integrated Concept Teams' recommendations in nearly every area. Neither recommended an evolutionary approach to a Future Tank. Both recommended (using the Abrams) the same set of high pay-off improvements to the Abrams. The Army Science Board, which did not consider affordability, recommended buying additional M1A2 tanks. The Abrams Integrated Concept Team stated that the Army's current procurement objective of 1,079 M1A2s was not based on an operational need and recommended that the Army Staff conduct a study to determine the right/affordable number.

The "Leap-Ahead Strategy" to a Future Combat System was decided by Senior Army Leaders (not Fort Knox). The Integrated Concept Team is in the process of providing definition to that decision.

Future Combat System operational requirements are far from being determined. Initial performance goals have been crafted to guide science and technology efforts. We will seek approval of a Mission Needs Statement in Fiscal Year 1997. Our timeline requires Operational Requirements Document approval no later than 2005. Future Combat System fielding is targeted to begin sometime between 2015 and 2020. The Program Executive Officer, Ground Combat and Support Systems, and the Chief of Armor jointly signed a tank modernization plan which provides the details of this strategy. The plan was recently mailed to senior leaders across the Force. We will publish excerpts of the Tank Modernization Plan in future issues of *ARMOR* so that all may understand and contribute.

JOHN F. KALB
COL, Armor
Director, Force Development
Ft. Knox, Ky.

You Can't Mothball Human Skills At Army Tank Plants

Dear Sir:

CPT Tolson's excellent article in the November-December issue, "Building Tanks at Lima" refers to a CBO study which recommended that the tank production facilities be mothballed to save money. My comment on that study is that it is an extremely short-sighted approach. The most important capabilities to save are the human resources, not the machinery, and we can only do that by keeping open some limited production capability.

I go into this at some length in an article that I hope *ARMOR* will publish in the near future. (This article is in the early stages of production. -Ed.)

Robin Fletcher has done his usual, well-reasoned work in his article in the November-December issue, "From the External Gun to the Hybrid Tank," but I have several comments:

It is not correct to say that my article in the January-February 1996 issue, "The External Gun Turret: Often a Bridesmaid, Never a Bride," attributed the failure of the EGT concept to be adopted principally because of the absence of commander's direct "top vision." However important it is, it is only one of four reasons that I mentioned, the other three being: elevated gun position decreases survivability due to high silhouette and exposed mechanisms, excessive complexity due to the need to remote the operation of subsystems, and the loss of interior volume and mounting surface area. All are important, but the last is certainly the most under-appreciated.

I just don't believe that an advanced "tank," or any advanced combat system, will result from fooling around with how the gun is mounted. The horse cavalry was at the logical end of its development when it was replaced by the airplane and the armored, tracked vehicle; which were **real** new technology, not just a rearrangement of components. If I may resort to *reductio ad absurdum,* there was no possibility of a then-year "AHCS" (Advanced Horse Cavalry System) to result from fooling around with rearranging how the cavalryman was mounted — say by mounting the saddle under the horse's belly and forcing the rider to ride upside down. Such a system, which makes about as much sense to me as the EGT, would have the theoretical advantages of both reduced silhouette and "decreased crew vulnerability" because the rider is under the horse and less likely to be shot. Direct "top" vision would be missing because of the rider's position, but since it doesn't now bother the advocates of the EGT, it shouldn't have been a handicap for the AHCS. We can just assume that, like the FCS, the technologists will solve the problem, given enough time and money — which they will be glad to do; that is, use the time and money. Results are another thing.

Focusing on the gun mounting is looking through the wrong end of the telescope. What we need to concentrate on is how to achieve the improved lethality at the target end of the engagement. Speaking of that subject, I also believe that all the concepts being considered for the next generation system may well be wrong in that they concentrate on a heavy, high-velocity, high muzzle energy, high recoil force, flat trajectory, humongously long telephone pole of a weapon. CPT Pryor has written two fine articles ("M1A2s, Smart Ammunition, and Time and Space Theory," January-Feburary 1996; and "Part II, The Offense," November-December 1996) for *ARMOR* about the potential for the use of the Smart, Target Activated Fire and Forget round (STAFF). Is anyone listening? STAFF doesn't need a very high velocity launch to work; and with a reduced need for a high muzzle velocity, the projectile trajectory can be curved enough to fire from a turret defilade position, making the vehicle much less vulnerable to flat-trajectory fire. Wouldn't this be a good way to reduce the weight of the armor? I hasten to add that, yes, since the target is moving, STAFF needs enough muzzle velocity to still have a high hit probability. My only point of disagreement with CPT Pryor is that the firing vehicle he discusses is always a currently-configured tank, specifically the M1A2. STAFF doesn't need to be fired from a tank to be effective.

The variety of gun mountings shown would need both space allocation design work and some thought given to how the structural loads will be reacted. Complying with both sets of needs can result in unanticipated weight, volume, complexity, and cost growth.

DON LOUGHLIN
Bellingham, Wash.

Clarifying the TF Commander's Role in Fire Support

Dear Sir:

I have read the September-October 1996 issue of *ARMOR* with great interest. I was struck by several of the articles and will respond to each in turn. My first target of opportunity is LTC Leiferman's piece, "The Task Force Commander's Role in Fire Support Planning."

LTC Leiferman almost has it right. Indirect fires are too important to be left solely to the artillerymen. What he doesn't pay close enough attention to is:

- The absolute need to assign someone to execute the brigade commander's targets,

- The use of a sequence of fires to assist in the synchronization of the direct and indirect fire battles,

- The true limits of indirect fires in a 30-minute fight

- The criticality of patience and discipline to the entire execution phase of the fight.

COL (Ret.) BRUCE B.G. CLARKE
MGDL, Tabuk, KSA

Downsizing of Heavy Force Isn't Over Yet

Dear Sir:

I need to take a little bit of issue with your editorial in the November-December 1996 issue.

- **Downsizing** is not, I say again, not "near the last step." Point in process aside, the "heavy force" is going to get smaller by at least a division if not by two by the end of FY00. That is a lot of 19Ks, Ds, and 12-series AOCs from an already reduced number. Not to mention the 11 and 13 MOS types. Fighting the war of "diminishing returns" may be tougher than any probably short- or near-term enemy. We will reach a point where training devices and weapon systems (remember the AGS) costs will outweigh their benefit because of our small number — not need. Remember what bean-counters count; it is not soldiers, regardless of what they say. They, too, have careers, and focus is awfully hard to maintain when you're sitting on the flag pole, wherever it is planted — especially when bullets are not flying.

- **Leadership/Competency** at all levels cannot be measured by the Persian Gulf episode. For those who were there, it was war, and there are always individual benefits from combat, regardless of how many participated, for how long, or who the enemy was in the fight. However, as an Army, those benefits are not that great because of those same factors when compared to other wars (declared or not) we have fought. The experience factor I think you are talking about is based on the training done before the action — wherever, whenever, or whoever. Therefore, based on our most recent use, as true individual soldiers, our training methods and leadership development programs are serving us very well, as best can be judged, based on that operation. Again, we cannot let economics reduce that by even 1 percent.

Having made these points, your final analysis is correct. We break things real good. That is our prime objective. We need to make sure that is understood, not only for the Armor Force, but the whole U.S. Army.

JOSEPH C. KOPACZ
COL, AR, USAR (Ret.)

Filling Needs Quickly With Foreign Equipment

Dear Sir:

I read with some interest Stanley C. Crist's letter, "Peacekeeping Vehicles" (Nov-Dec 96), referencing COL Charles Lehner's "Bosnia Report" (May-June 96). I believe a few things need further clarification. Since the BV-206 is already in the Army inventory as the M973A1 SUSV, using the vehicle in Bosnia should not pose a maintenance and supply challenge over any other vehicle. The BV-206S uses many of the same components as the older vehicle, so that vehicle should not present a greater challenge either. As the Army's IPOC for the Foreign Comparative Testing (FCT) Program, we are looking at emerging requirements to use the BV-206S in Korea and Bosnia. At the present, we have a proposal to conduct a FCT project with limited tests in the 10th Mountain and 2nd Armored divisions to verify the vehicle's use for their peacekeeping and/or wartime requirements.

In reference to Tom Buonaugurio's comment, "If a requirement for the (armored) BV-206S does emerge," yes, I agree with Mr. Crist's statement, that vehicles in a scouting and patrolling role need armor protection, and while this is obvious, it does not make it official. That requirement needs to be in writing at an Army level such as a CINC Mission Needs Statement or a TRADOC Operational Requirements Document. Even that sometimes does not always ensure that, once tested successfully, the Army will procure it. I can refer to a recent FCT project for the 25mm Breakup Ammunition manufactured by NWM De Kruithoorn B.V. of the Netherlands. This cartridge allows the live firing of the 25mm Bushmaster on a much reduced live-fire range, offering some new opportunities for training, especially at the National Training Center, and check firing the Chain Gun.

This project began with a signed requirement from the 24th Infantry Division. As the project progressed to testing, sponsorship of the requirement was withdrawn. The project proceeded, considering that much of the cost was not recoverable, and a new user could be solicited. The cartridge completed the testing successfully, and has a lot to offer the Army and Bradley Fighting Vehicle users, but there have been many stone walls encountered in the search for an alternate user. The problem right now is generating an interest in the user community to procure this cartridge, especially when the user has so many other things to worry about, one of them being the funding of their ammunition budgets. That problem has already been resolved at the Deputy Chief of Staff-Ammunition level. Funding to procure the cartridge is guaranteed for the user who comes forth with a written requirement justifying the need for this cartridge. The user will benefit from the capabilities gained from this item, and the United States will gain on the political front from the foreign purchase.

We will continue to work the issue with the BV-206S. Funding will always be an issue in these austere times. Mr. Crist is correct: we should provide our soldiers in the role of international policemen in peacekeeping operations the right tools for the job, and do it now. The user community can help do that with justified and supported requirements, and the FCT program can help by providing equipment, albeit foreign non-developmental items, that meet those requirements in the shortest time possible.

ROBERT J. LEPITO
Aberdeen Proving Ground, Md.

Clarifying the Components Of Bosnia's TF Eagle

Dear Sir:

In the May-June 1996 issue of *ARMOR,* you published an article written by Colonel Charles Lehner (Ret.) entitled "Task Force Eagle's Armor and Cavalry in Bosnia." The article was very interesting, but there were some mistakes, which we would like you to correct.

It was mentioned that the Swedish Battalion is responsible for the NW sector of the Task Force Eagle AOR. However, this is not true. In fact, the Nordic-Polish Brigade, to which the Swedish Battalion belongs, operates in this area. The NORDPOLBDE is a multi-national brigade containing approximately 3,500 soldiers from 10 different nations (Denmark, Finland, Norway, Sweden, Poland, Estonia, Latvia, Lithuania, Iceland, and the USA).

The brigade consists of:

- A multinational HQ

- A multinational HQ company (M113 and SISU XA-186 APCs)

- A multinational MP company (M113 APCs)

- A Danish mechanized infantry battalion (M113 APCs, Leopard 1A3 MBTs)

- A Polish paratroop battalion (BMP-1 CIFVs and BRDM-2 recce vehicles)

- A Swedish mechanized infantry battalion (PBV302 and SISU XA-180 APCs, BV-206 SUSVs)

- A Finnish construction battalion (SISU XA-180 APCXs, NASU SUSVs)

- A Norwegian logistic battalion (SISU XA-186 APCs)

- A Norwegian medical company (SISU XA-186 APCs)

The Danish Leopard tank squadron was attached to a Swedish UN battalion in the area prior to 1996, but during Operation Joint Endeavor, the squadron has been part of the Danish battalion.

M. KOLBJORNSEN
LTC, ACoS G2
NORDPOLBDE

Maneuver Warfare Initiatives Are Still at Risk

Dear Sir:

CPT Bateman, in his article, "Force XXI and the Death of Auftragstaktik" (from *Issues in ARMOR* homepage), raises a very critical concern to the maneuver warfare community. We may soon lose the one thing that truly sets us apart from those on the attrition side of the table: independence of action by the subordinate commander.

It would appear that the wealth of information available to the battalion and brigade commanders would allow them to make better, safer, more effective decisions and place the forces necessary to defeat the enemy where they are needed most without the input of the company commander. This, on the surface, is a great leap forward in tightening the OODA loop. However, if we are not institutionally careful, it may prove to become our Achilles' heel.

The captain is correct in assuming that the dimension of independent leadership at the front line will atrophy, much like old-style land navigation skills have as the broad use of GPS has become more popular. We must be very careful to exercise the competence and self-esteem of the junior leadership so we do not lose this valuable resource.

We must not pooh-pooh the idea that battalion and brigade commanders will indeed leave their subordinates in the lurch and become directive micromanagers. I have seen by my own account that battalion and brigade commanders have little time, energy, or patience as it is to nurture and train junior leaders to thrive in a maneuver warfare environment, even before the advent of Force XXI technology. They just have little or no trust. Rare are the commanders today who give a mission, an intent, and allow their finely trained subordinate leaders to run with the ball. Force XXI will kill that notion outright.

If we surrender the independence of action for subordinate leaders completely, and develop them into nothing more than so many robots waiting on the next program from the master operator, what will happen when General Murphy and the Gremlin brigade descend upon U.S. Force XXI elements in the next hot conflict? What will happen when the comlinks fail? What will happen when the enemy turns our high-speed technology into expensive junk via his REC assets? Where will the LT Rommels and CPT Pattons be? They will be sitting in their turrets with their ears pressed firmly to the radio awaiting the next commandment from a battalion commander whose plan went out the window when his 30-inch color LCD screen went belly up. Their entire OODA loop will be shot to hell and we will probably be handed our next Task Force Smith.

We must now, more than ever, strive as an institution and as individuals to develop junior leadership that will lead from the front, with or without orders. We must slap the wrists of the commanders who lapse into micromanagement in garrison and in the field. We must not only pay lip service anymore to maneuver warfare tenets and truly practice them. If we do not, the death of Auftragstaktik may prove to be our death.

JOHN S. WILSON
CPT, IN
Arkansas ARNG

Correction

A caption on page 15 of the January-February issue incorrectly identified the M60A3 tank as using the Shillelagh missile system. The M60A2 tank used this system, not the A3.

— Ed.

Cavalry Branch Update

As a result of the recent revision and publication of *FM 17-95, Cavalry Operations,* Cavalry Branch, Directorate of Training and Doctrine Development, in coordination with 16th Cavalry Regiment will begin to revise the Mission Training Plans (MTPs) of cavalry units from troop through regimental level. We request your input in developing these important training manuals. The Armored Cavalry Troop and the Divisional Cavalry Squadron MTPs are under revision at this time and Cavalry Branch solicits your specific comments or suggestions for improving these manuals. The timeline for these and other Cavalry Branch publications is as follows:

MANUAL	TITLE	SD	OL	ID	AFD	CRC
ARTEP 17-487-30-MTP	Armored Cavalry Troop MTP	Nov 96	Feb 97	Jun 97	Dec 97	Mar 98
ARTEP 17-385-MTP	Divisional Cavalry Squadron MTP	Jan 97	Apr 97	Sep 97	Mar 98	Jun 98
ARTEP 17-485-MTP	Armored Cavalry Squadron (Regt) MTP	Mar 97	Jun 97	Nov 97	Jun 98	Aug 98
ARTEP 17-442-MTP	Armored Cavalry Regiment (CMD GRP) MTP	Jul 97	Sep 97	Feb 98	Aug 98	Oct 98
FM 17-97	Armored Cavalry Troop	Sep 97	Dec 97	Jun 98	Dec 98	Feb 99

Note: SD=Start Date, OL=Outline, ID=Initial Draft, AFD=Approved Final Draft, CRC=Camera Ready Copy

The current MTPs and the initial drafts when published can be viewed by accessing the Cavalry Branch Home page on the Internet at http://www.entelechy-inc.com/docs/knoxdoc/cavdiv.htm. In addition, any comments can be e-mailed directly to Cavalry Branch by accessing this page or through the following e-mail address: CAVBRANC@Knox-emh1.army.mil.

Additionally, Cavalry Branch recently sponsored the Cavalry Symposium 28-29 February 1996 and the Reconnaissance Symposium October 1996. Both of these symposiums were hosted by Ft. Knox and the resulting After Action Reviews are accessible at the Internet site listed above.

For further information concerning Cavalry Doctrine and Training Development, please contact Cavalry Branch at (502) 624-6235/3154 or DSN 464-6235/3154.

BOOKS

Great Photos Enrich New Book on WWII Vehicles

World War Two Armoured Fighting Vehicles & Self-Propelled Artillery by George Forty, London: Osprey Books, 1996. ISBN: 1-85532-582-9. 208 pages, 230 black and white illustrations, 30 color illustrations. 8"x11" hardbound. $29.95.

This book by military historian and author George Forty is certain to please hobbyists, re-enactors, and students of World War II who are interested in a concise, generously-illustrated survey of WWII fighting vehicles. The book's strength lies in its nearly 300 photographs, many of which are color presentations of vehicles that have been lovingly preserved in museums. To complement this visual collection, Colonel Forty, a specialist in armored warfare and ex-curator of the Tank Museum in Dorset, England, has written succinct, coherent text for this volume, one of three in a series covering WWII military vehicles. Forty discusses AFVs by country of origin, thus dividing the book into nine chapters that adequately cover both Allied and Axis powers. Unlike many books about military hardware, this one is unencumbered by technical jargon. Vehicle specifications are here, but collected in brief tables that do not interfere with the text. An index arranged by vehicle nomenclature easily guides readers interested in a specific vehicle to the proper page.

There is little here that is novel or new to the military historian. Yet beyond the expected collection of reconnaissance cars, self-propelled artillery, and tank destroyers, Forty includes unique vehicles such as Russian armored trains, complete with tank turrets from T-34 and KV-1 tanks; or the Bison, a rolling, concrete pillbox that saw (deservedly) limited service with British forces. Throughout, Forty's narrative reminds readers of the diversity of military vehicles that saw wartime service.

Forty achieves here in breadth what he does not attempt to accomplish in depth. This is not the last word on WWII military vehicles, but neither is it intended to be. Rather, this book is an able survey that is greatly enhanced by the high quality of its photographs.

CPT BRADLEY T. GERICKE
United States Military Academy
West Point, N.Y.

They Were All Young Kids by Aaron C. Elson, Chi Chi Press, Hackensack, N.J. 1996. Softcover, 160 pages, $10.00.

Subtitled, "The story of Lieutenant Jim Flowers and the first platoon, Company C, 712th Tank Battalion, on Hill 122," this book is a gripping account of one tank platoon's actions on July 10, 1944, on the Cotentin Peninsula in Normandy, France. Lieutenant Flowers' platoon, attached to the 3rd Battalion, 358th Infantry Regiment, 90th Infantry Division, was given the mission of rescuing the 1st Battalion, 359th Infantry, cut off on Hill 122. After attacking through the German lines and linking up with the battalion, 1st platoon breached the German lines again to allow the battalion to break out. All four of the platoon's tanks were destroyed in an anti-armor ambush. Nine of the 20 crewmen were killed. This book is the story as told to the author by the survivors. This book should be in every tanker's professional library, especially the new platoon leader's.

Mr. Elson is a former newspaper editor and author of another book on the exploits of the 712th Tank Battalion, *Tanks for the Memories.* He has spent ten years compiling an oral history of the 712th, motivated by his father's WWII service in the battalion. His father's story is not part of this book, so there is no bias on the author's part.

The book opens with a brief history of the 712th Tank Battalion. Part I is the author's compilation of the story of the fight on Hill 122, based on the interviews with the survivors, which are often contradictory. This brief story is not well-organized and sometimes difficult to follow, especially without an accompanying map at a scale large enough to show the individual tanks (this map is hidden on page 154, in one of the interviews. Mark it; it will help immensely in visualizing the battle). Part II is the heart of the book: the transcripts of interviews with six of the survivors, as well as interviews with a tank commander who was wounded prior to the battle and not present, the brother of one the soldiers killed, the company motor sergeant, and one of the infantrymen rescued by the platoon. These interviews are gems of information, not only on the battle itself, but on the nature of men in combat, the history of the fledgling armored force, and of lessons learned at the lowest level of tactical combat. Part III contains additional transcripts of interviews with a wardmate of Lieutenant Flowers in England, the battalion surgeon who first treated Lieutenant Flowers, who lost parts of both legs, and the text of Lieutenant Flowers' original account of the battle in support of his recommendation for the Congressional Medal of Honor.

There are minor mistakes, such as the author defining "TOE" as Table of Operation. A photo which allegedly illustrates the story of how some soldiers ate under their tank under mortar fire is actually a photo of a T-34, and the unorganized first chapter don't detract fatally from the survivors' gripping stories. Books on armored warfare at the platoon level are difficult to find. This one is worth grabbing while you can.

They Were All Young Kids is self-published and available for $10 plus $2.50 postage and handling from Mr. Elson at 1-800-807-8265.

CPT JERRY A. HALL
Fort Knox, Ky.

Follow Me I: the Human Element in Leadership by MG Aubrey "Red" Newman, USA (Ret.), ISBN: 0-89141-612-9, Copyright 1981, Presidio Press. 1997 edition, $15.95, softcover.

Follow Me II: More on the Human Element in Leadership by MG Aubrey "Red" Newman, USA (Ret.), ISBN: 0-89141-613-7, Copyright 1992, Presidio Press. 1997 edition, $15.95, softcover.

Follow Me III: Lessons on the Art and Science of High Command by MG Aubrey "Red" Newman, USA (Ret.), ISBN: 0-89141-614-5, Copyright 1987, Presidio Press. 1997 edition. $15.95, softcover.

"Get the hell off the beach!... get up and get moving — Follow me!" commanded Colonel Aubrey "Red" Newman as he led the soldiers of the 34th Infantry Regiment across Leyte's Red Beach on October 20, 1944. That moment in time, captured in the famous "Follow Me" statue, has stood for the past 53 years as the representation of the essence of leadership. This year, Presidio Press has reprinted *Follow Me I, II*, and *III*, three books previously written by

MG Newman which capture his thoughts on the art and science of leading soldiers — thoughts based upon a career of nearly 40 years that included three company commands, three regimental commands, and division command. These books deserve a place in every leader's professional library.

When MG Newman entered West Point July 1st, 1921, Douglas MacArthur served as Superintendent of the Military Academy. The Army has changed during the last few years, and in many ways it is a very different Army than the one about which Newman writes. The impact of technological advances upon military affairs, downsizing and budget constraints, the advent of an all volunteer force, changes in organizational design, the conduct of peace operations, the expanding role of women in the Army, a new world order, shorter careers, fewer opportunities for command, unknown threats, and a host of other topics that occupy today's professional journals and discussions would seem to render the advice of a leader who served long ago — just a bit after WWI, during WWII, and the Korean War to the early sixties — quite dated and of marginal utility. In fact, the opposite is true, for two reasons. First, the focus of these books is the unchanging nature of the human dimension in leadership. Soldiers remain soldiers. Second, Newman's early military experience was, in many ways, quite like that of a lieutenant in 1997. He also served during cycles of buildup, drawdown, technological revolution, peace, war, and societal change.

Each book in the "Follow Me" series is made up of short chapters that teach specific lessons regarding the human element in leadership and lessons about other facets in the life of a professional soldier. MG Newman, drawing on his personal experience, uses anecdotes, both humorous and serious, with great skill to prepare the reader for learning points which conclude each chapter. His writing style is clear and conversational, giving each book the coaching tone of a mentor, rather than that of a teacher presenting a lecture. Many of the observations in "Follow Me" will be familiar to military readers as they are collected from the hundreds of articles MG Newman published in *Army Magazine, Infantry Journal* and *Armed Forces Journal* over the years.

The three primary topics covered in *Follow Me I* are: command presence, command techniques, and command in battle. *Follow Me II,* also divided into three major sections, details: company level topics, principles for all levels of command, and reflections on combat situations. The final volume, *Follow Me III* is organized with a section covering company grade officers, a section about field grade officers, and a third discussing general officers.

General Newman's counsel regarding the nature of the military profession and the requirement to always regard duty, honor, and country as the motivating force of service remains valid today. He emphasizes the necessity for commanders to earn the trust and confidence of soldiers by personal exemplification of compassion, competence, and dedication to the core values of the profession of arms. He provides valuable insight regarding the skills required of an officer to achieve a successful career and the common pitfalls that a leader can avoid along the way. His discussion of preparation for command is excellent. Newman outlines his deliberate process of self-assessment and reflection on past experience and the duties at hand, which allowed him to determine, in advance, the goals, objectives and leadership style that would prepare him to assume command with absolute confidence.

Every new leader entering the profession of arms will benefit from Newman's observations and can put his advice to good use throughout a lifetime of service. More experienced leaders will enjoy the series as well, and will find General Newman's insight and steadfast focus on the human dimension of leadership on the mark.

LTC CHIP WENTZ
Ft. Knox, Ky.

The Battles of the Somme by Martin Marix Evans, Motorbooks International Publishers, Osceola, Wis., 1996. 95 pages. $19.95 (hardcover).

On July 1, 1916, elements of the British Expeditionary Force under the command of General Sir Douglas Haig went "over the top" and began the ground attack phase of the Battle of the Somme. By day's end, the estimated losses to the BEF totaled approximately 60,000, prompting Winston Churchill to subsequently refer to this action as "the greatest loss and slaughter sustained in a single day in the whole history of the British Army." There is no question that there exists already a plethora of studies regarding military operations on the Western Front. One could rightfully ask why we should welcome yet another to the collection. I submit, however, that Martin Evans' work is a welcome addition to the historiography for two reasons. First, by reviewing the actions of multiple units in several locations, he reminds us that the carnage was not limited to just the first day, but extended over a period of time and a series of battles. Secondly, and to my mind most importantly, his objective is not to present a new interpretation of already recognized and accepted data (his narrative lacks citations of any type and his bibliography is admittedly "a personal one,") but rather the depiction of the human side of this battle to a level that I have not seen in previous studies. His inclusion of contemporary photographs, maps, and eyewitness accounts serves to remind the reader that each and every one of the thousands of casualties was a real human being, and the sense of humanity and reality that the author brings to his telling of this tragic story is the essence of the value of this work. In sum, Martin Evans has succeeded in that most difficult of historical endeavors: he has added to our understanding of a timeworn topic by telling the story of the Somme with a balance of statistical accuracy leavened with vivid photographs and poignant eyewitness accounts. This book will prove a valuable addition to the collection of beginning students of WWI as well as for those who find themselves in a position to lead discussions or teach on the topic of WWI operational maneuver stalemate on the Western Front.

MAJ DAVID P. CAVALERI
Ft. Leavenworth, Kan.

Fight or Flight, An Inspiring History of Courage Under Fire – True Battlefield Accounts of Extraordinary Acts at the Moment of Truth by Geoffrey Regan, Avon Books, New York, N.Y. 1996, 277 pp. $12.50 (paperback).

Nearly all soldiers are afraid in battle. Only the good ones can control their fear. In *Fight or Flight,* Geoffrey Regan explains how this control, or lack of it, causes some men to fight and others to flee in combat. If this sounds interesting, this book is for you.

The first section explains why soldiers fight when the consuming passion is to "lie in a ditch and stay there until it is all over." This part is reminiscent of Marshall's *Men Against Fire* and Keegan's *The Face of Battle* in its earnest attempt to get at the core of why men fight or flee.

Regan writes with great understanding of those soldiers "who could never get out of the ditch" and join their comrades in battle. A large portion is devoted to explaining why PVT Eddie Slovik and others failed when placed under fire. Either because of lack of discipline, training, or even individual personality flaws, these soldiers should never have been put in harm's way.

Seventeen historical vignettes of men in combat make up the book's second section. This is where *Fight or Flight* is at its best. First-hand battlefield accounts from the lowest ranks are fascinating for their sincerity and horrific detail. Unfortunately, only about half of the vignettes include substantial personal observations from the soldiers involved, and the ones on the British Army appear more thoroughly researched than the rest. Still, each one offers a different lesson and reinforces the author's earlier conclusions.

Fight or Flight is easy reading and offers many useful lessons – and warnings – to those interested in why soldiers choose to fight rather than flee.

CPT CRAIG A. COLLIER
Ft. Irwin, Calif.

Additional Armor Conference Information

Armor Conference

The 1997 Armor Conference and the 107th meeting of the United States Armor Association will focus on Armor's role as a full spectrum force of decision. The intent is to highlight challenges to the mounted force in training for a diversity of missions while honing its high-intensity warfighting edge. Speakers will cover such topics as the EXFOR, operations in Bosnia and Kuwait, and many others. As in the past, there will be a meeting for all attending brigade and regimental commanders to discuss personnel issues affecting the force, along with a gathering of the honorary colonels of the regiments to provide them with a force update and review the HCOR program. In conjunction with this year's conference, the USAARMC Command Sergeant Major will be conducting an Armor Update on Monday, 2 June. Throughout the conference, displays will show the newest military equipment being offered to and planned for the force. Also, there will be a golf scramble and numerous other social events to enjoy.

Armor Trainer Update

The 1997 Armor Trainer Update (ATU) will be 31 May - 2 June, in conjunction with the Fort Knox G3/DPTM annual External Scheduling Conference. The theme for this year's ATU is "The Armored Force: *A Full Spectrum Force of Decision*." Registration for the ATU and Armor Conference will begin on Saturday, 31 May at Gaffey Hall, Bldg 2369, from 1500-1900 and will resume on Sunday morning, 1 June from 0630-0930.

This year's presentations will focus on what is going on across the armor force in the ARNG and USAR. Speakers will include the Vermont ARNG, which fired a TT XII during annual training at Ft. Knox utilizing Yano Range. The Texas Guard will present on the division MOBEX they conducted, and the 116th CAV will address their train-up and preparation for an NTC rotation. The National Guard Bureau will brief on the Quadrennial Defense Review (formerly the bottom-up review), current force structure, and equipment modernization.

As in the past, the displays of emerging technology and new systems will be set up at Skidgel Hall beginning on Monday. Additionally, a no-host social at the Brick Mess on Sunday night from 1830-2200, an event which was a huge success last year, will provide a chance to see old friends and renew acquaintances.

External Unit Scheduling Conference

The G3/Directorate of Plans, Training, and Mobilization will conduct the 5th Annual External Unit Scheduling Conference on 2 June 1997.

During this conference, Ft. Knox will continue to offer available resources to USAR, ARNG, Active Army, and other branches. Our goal is to provide resources that will give the unit commander a wide range of training options and integrate simulation technology into the mounted force training strategy.

Due to the increasing demand for Ft. Knox resources, we have instituted a new scheduling policy for this year's conference which establishes the basic priorities and timelines for scheduling training resources at the Armor Center. The intent of this policy is to optimize utilization of training resources while affording external units both a measure of predictability and assurance in scheduling the training they require. For details on the new scheduling policy and how to submit training requests, contact Mr. Jim Hornback/Ms. Ruby Evans at DSN 464-3555, commercial (502) 642-3555, or access the External Unit Scheduling Conference website via the 1997 Armor Conference and ATU homepage at:

http:\\147.238.100.101\arconf

Training is and remains our number one priority. With over $50M of range, simulation and other training modernization in the past 10 years, Ft. Knox is an ideal location to "Train to Standard." This opinion is rapidly being realized by much of the "Total Army," as evidenced by the FY96 External Unit Scheduling Conference. This conference grew last year to 237 attendees, representing 23 states and Canada. Training from external units coming to train at Ft. Knox exceeded 270,000 man-training days during FY96 and encompassed all components of the Army and contingents from the Marine, Navy, Air Force, and Special Operations.

This year's conference will be located again in the Armor Inn next to the Patton Museum. Some of the major resources available, but not limited, to external units at this year's conference are: MWSTC (SIMNET) and JANUS with Observer Controller support, Tank Driver Simulator, Conduct of Fire Trainers, Maintenance Trainers, ranges and training areas. Also available this year, in limited quantity, are the Thru Site Video and Bn/Bde Staff Trainer. Our most recent addition is another state-of-the-art Table VIII range with more modernization scheduled in the coming years. Resource availability can be identified and scheduled through September 1998. Reserve Component units should submit their requests to Commander, USAARMC, ATTN: ATZK-PTE-U, Chief, Coordination Support Branch, Reserve Component Support Division, Ft. Knox, KY 40121-5000, DSN 464-3137. All Active Components should submit their requests to Commander, USAARMC, ATTN: ATZK-PTP-S, Chief, Schools/Scheduling Branch, Plans, Operations, and Training Division, Ft. Knox, KY 40121-5000, DSN 464-1288. As in the past, Ft. Knox will continue to make every effort to ensure units receive the training and resources as scheduled.

- Overall POCs for the Armor Conference: Ms. Nancy Probus, DSN 464-6782, commercial (502) 624-6782, email probusn@ftknox-dtdd-emh5.army.mil and CPT Kevin Banks, DSN 464-7699, commercial (502) 624-7699, email banksc@ftknox-dtdd-emh5.army.mil.
- POC for ATU: SACG, MAJ Mike Belew, DSN 464-1960, commerical (502) 624-1960, email belewm@knox-emh1.army.mil.
- POC for equipment displays: DFD, CPT Scott Pulford, DSN 464-3962, commercial (502) 624-3962, email pulfords@ftknoxdfd-emh13.army.mil and SFC William Robinson, DSN 464-3377, commercial (502) 624-3377, email robinsow@ftknoxdfd-emh13.army.mil.
- POC for USAARMC Sergeant Major Update is: SGT(P) Derrick Parmley, DSN 464-4952, commercial (502) 624-4952.
- POC for the Brigade and Regimental Commanders' Meeting and Honorary Colonels of the Regiments Meeting is: OCOA, MSG Belfiore, DSN 464-1439, commercial (502) 624-1439, email belfiora@knox-emh1.army.mil.
- POC for general officer billeting: Protocol Office, DSN 464-6180/6951, commercial (502) 624-6180/6951.
- Limited on-post billeting is available for other personnel. Reservations will be accepted starting April 30th. Contact Ms. Burton, DSN 464-3491, commercial (502) 943-1000.
- Use of individual government fleet vehicles will be limited to 3 and 4-star general officers. Shuttle buses will be available to assist all other attendees with their transportation needs for conference events.
- Conference uniform is battle dress uniform (BDU); Armor Association banquet is casual; Garden Party is casual, BDU, golf attire, or Class B w/short sleeve and open collar; all other social events are casual.
- 2d Annual Armor Classic Golf Scramble - $40 entry fee covers complimentary Pre-Golf Scramble Social (Monday night), green fees, half a cart, club rental (limited), logo shirt, and favor packet. Prizes galore! POCs for more info: Mr. Barry Bonifield, DSN 464-1548, commercial (502) 624-1548 and MSG Steve Gratton, DSN 464-2784, commercial (502) 624-2784, email grattons@ftknoxrce-emh4.army.mil.
- Tickets are required for all social events and will be sold during registration (estimated cost to attend all social events is $75).
- Visit requests for foreign nationals must be submitted through their embassies in time to allow for normal processing.
- For more up-to-date information, visit our website thru the Fort Knox Home page at http:\\147.238.100.101\arconf.

1997 Armor Conference and Armor Trainer Update

Tentative Agenda

31 May - 5 June 1997

The Armored Force: A FULL SPECTRUM FORCE of Decision

DATE	TIME	EVENT	LOCATION
Saturday, 31 May	1500-1900	Registration for ATU/Armor Conference	Gaffey Hall, Bldg 2369
Sunday, 1 June	0630-0930	Registration for ATU/Armor Conference	Gaffey Hall, Bldg 2369
	0800-1200	Administrative Info/Presentations	Haszard Auditorium
	1200-1330	Lunch	
	1330-1630	Presentations	Haszard Auditorium
	1830-2200	No Host Social for ATU	Brick Mess Community Club
Monday, 2 June	0800-1700	Armor Conference Early Registration	Brick Mess Community Club
	0800-1700	External Scheduling Conference	Armor Inn
	0800-1700	Contractors' Displays	Skidgel Hall, Bldg 1724
	0800-1200	ATU Administrative Info/Presentations	Haszard Auditorium
	1300-1700	USAARMC Sergeant Major Armor Update	Rivers Auditorium*
	1730-UTC	Pre-Golf Classic Social	Gallotta's
Tuesday, 3 June	0700-1600	Registration	Brick Mess Community Club
	0800-1700	Contractors' Displays	Skidgel Hall
	0800-1200	External Scheduling Conference (if required)	Armor Inn
	0800-0900	Brigade and Regimental Commanders' Meeting	Rivers Auditorium*
	0800-0900	Honorary Colonels of the Regiment	Gaffey Hall, Rm 219
	0800-1800	Subject Matter Expert Briefs	(see info packet)
	0930-1630	2d Annual Armor Golf Classic Scramble	Lindsey/Anderson Golf Courses
	1630-1830	CG's Garden Party	Quarters One
	1830-2130	Regimental Buffet and Assemblies	Brick Mess Community Club
Wednesday, 4 June	0730-1000	Late Registration	Gaffey Hall (Message Center)
	0800-1700	Contractors' Displays	Skidgel Hall
	0800-0815	Welcome/Admin Announcements	Haszard Auditorium
	0815-1000	Presentations	Haszard Auditorium
	1000-1030	Break	
	1030-1130	Presentation	Haszard Auditorium
	1130-1200	Armor Association Meeting	Haszard Auditorium
	1200-1400	Lunch/Visit Contractors Displays	Skidgel Hall
	1400-1700	Presentations	Haszard Auditorium
	1830-UTC	Cocktails/Armor Association Banquet	Patton Museum/Armor Inn
Thursday, 5 June	0800-1200	Contractors' Displays	Skidgel Hall
	0800-0810	Administrative Remarks	Haszard Auditorium
	0810-0900	Presentation	Haszard Auditorium
	0900-0910	Present Franks Award	Haszard Auditorium
	0910-1000	Presentation	Haszard Auditorium
	1000-1030	Break	
	1030-1230	Presentations	Haszard Auditorium
	1230-1400	Chief of Armor Luncheon	Brick Mess Community Club

*** Previously Gaffey II**

Note: For additional information about the Armor Conference, Armor Trainer Update, and G3 External Scheduling Conference, see Inside Back Cover.

PIN: 075246-000