ARMOR

The Magazine of Mobile Warfare

January - February 1984

United States Army Armor School

"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare, to promote professional improvement of the Armor Community, and to preserve and foster the spirit, the traditions, and the solidarity of Armor in the Army of the United States."

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ARMOR The Magazine of Mobile Warfare

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COVER

Urbanization, the spread of agriculture, and the growth of highway strip development have changed the terrain of Europe, bringing into question current armor doctrine about European land defense. Lieutenant Colonel Massimo Dal Piaz, Italian Army liaison officer at the Armor Center, describes the problems and outlines some remedies to overcome these limits on firepower and mobility on page 11.

LETTERS

ARMOR Managing Editor Retires

Royce Taylor, Managing Editor of *ARMOR* Magazine for over eight years, retired from government service on 8 January 1983. He came to *ARMOR* after a successful military career from which he retired as a lieutenant colonel of infantry. His experience in the publications business was instrumental in *ARMOR's* success as a highly rated authority in the armor field.

He resides in Radcliff, KY with his wife Loretta, and plans to write on a freelance basis.

ARMOR Subscribers Attention!

Individual subscribers to ARMOR Magazine who are active duty, retired, reservists, veterans or cadets are invited to forward to the U.S. Armor Association the numerical designation of the new **regimental** armor or cavalry unit they wish to affiliate with.

This information is for an unofficial data base only and does *not* commit one to such affiliation with a regiment through official MILPERCEN channels.

This information will enable the Armor Association to better serve its members through an expanded local chapter program, based on regimental affiliation. Subscribers may change or update this information when necessary.

Mail your replies to: U.S. Armor Association, P.O. Box 607, Fort Knox, KY, 40121.

New regimental units so far identified include: 37th Armor; 66th Armor; 68th Armor; 34th Armor; 73d Armor; 32d Armor; 64th Armor; 67th Armor; 69th Armor; 70th Armor; 77th Armor and 8th Cavalry.

Cavalry Regiments in the New Manning System will be identified at a later date.

Editor,
ARMOR Magazine

Questions 'Training Revolution'

Dear Sir,

I respectfully take exception to Colonel O'Meara's high praise of the *new* Army training methods that appeared in his article, "The Training Revolution" in the November-December 1983 *ARMOR* Magazine. Rather than praise, I believe the new training methods should be objectively criticized for their adverse effects on training in the U.S. Army.

I find the new training methods are unnecessarily complex, burdened with paperwork, impractical and generally ineffective. Whereas the *old* training methods were based on *mission* and *simplicity* in imparting instruction, the new methods are based on a multiplicity of *tasks* with a concurrent *complexity* of instruction to deal with this attempt to define all the tasks inherent in military activities.

The result of this new micro-management of training is a large military training bureaucracy which employs civilian research companies to help produce new training manuals which read like social science textbooks.

In essence, the "Training Revolution" has discarded the simple, practical, and effective training methods which were based upon long years of Army training experience and substituted an inexperienced "civilianized" system of training which is based on pseudo-social sciences and civilian managerial concepts.

Colonel O'Meara states that: "The revolution employed the analytical tools of the systems manager as well as the latest educational techniques from the civilian educational community in order to improve institutional and unit training. Earlier methods of army training were simple, built upon years of experience, and consisted of techniques of the trade passed from generation to generation through example in a manner best described as military art."

My question to Colonel O'Meara is: Do you really believe that civilian systems engineers and the civilian educational community know more about military training than experienced military leaders?

He apparently does, for he states: "As more complex weapons systems began to enter the Army's inventory, it became apparent that the Army was on the threshold of a period of profound change. The advanced tools of the systems analyst and of civilian educators offered better ways to master tasks, skills, and missions."

I don't believe civilian educators and systems analysts have better qualifications than experienced military leaders have in the art of military training. Indeed, I have never heard civilian educators profess such capabilities but, rather, they have always differentiated between the ends and means of civilian education from those of military training. I also take exception to the kudos that Colonel O'Meara attributes to the "Training Revolution" as: "Insistence upon performance-oriented training meant elimination of the former lecture techniques and required that each student be allowed the opportunity to demonstrate his performance of the task being taught."

The old Army training methods insisted on the same thing, except it was called simply the "Application Step" of military training.

Further, Colonel O'Meara claims credit for the "Training Revolution" for: "The need for a system of professional schools for our noncommissioned officers was also recognized." Indeed, the need for NCO professional schools was recognized by two highly experienced military leaders over 35 years ago when General I.D. White and General Bruce C. Clarke formed the first NCO Academy in the U.S. Constabulary during the occupation of Germany in 1948; and then similar NCO Academies were established throughout the U.S. Army largely as a result of the foresight and efforts of these two outstanding generals.

In summary, I believe the "Training Revolution" has converted the former simple and effective training methods into a highly complex and ineffective system of military training. To agree with the concepts of the "Training Revolution" is to disavow the U.S. Army's military experience of over 200 years and to enter into an "Alice-in-Wonderland" fantasy of pseudo-science.

The "Training Establishment" has reinvented the training wheel, but it has come out *square* instead of round! Military training is an *art* and *not* a science!

The Art of Instruction

Keep it simple.
Have but one main subject.
Stay on the course.
Remain cheerful.
Put it out as if the ideas were as interesting and novel to you as to your audience.
(Chapter 15, *The Armed Forces Officer*), DOD, 29 December 1960.

DUQUESNE A. WOLF
Colonel, Armor (Ret.)
Falls Church, VA

T95 Article Critiqued

Dear Sir,

I must applaud Captain Warford's choice of topics in his article "T95: A Gamble in High-Risk Technology" in the September-October 1983 issue of *ARMOR* Magazine. In my earlier article on the *T95* I also tried to draw attention to its many revolutionary features. *(See "The T-95 Tank," Jan-Feb 1976 issue ARMOR Magazine. Ed.)*

There were a number of experimental versions of the *T95*. I am afraid, however, that there is considerable confusion as to what exactly those variants were and how they were identified.

Captain Warford notes that the *T95E2* was fitted with the *"T140E1* 105-mm smoothbore gun." In fact, the *T95E2* consisted of the 90-mm *M48* turret system installed on the basic *T95* chassis. Further, I believe the *T140*-series 105-mm guns were rifled and, in several variants, mounted in the experimental *T54*-series of tank prototypes. The *T54E1* version used the *T140E2* gun mounted in an oscillating turret with auto-loading. The *T54* and *T54E2* were conventionally turreted. The turret assembly from the latter tank was also mounted on the *T95* chassis and given a *T95E*? designation. The smoothbore 105-mm gun was designated *T210* and was originally intended for an advanced tank designated *T96*. Following a (later) decision to make use of the *T95* chassis, the *T96* designation was dropped in favor of *T95E*-something.

The photo with the article shows the *T95E1*. It will be noted that the gun tube is

smoothly tapered. The T208 90-mm gun had a step in its barrel and was slightly shorter than the smoothly-tapered T210 105-mm smoothbore. Perhaps this 105-mm variant was the *T95E1*?

The *T95* system used in the *Shillelagh* missile development program was not a *T95E*-numbered variant. The *Shillelagh* used a *T95* turret shell fitted on an *M48* chassis. I came across this vehicle two years ago in the junkyard at the TERA test facility operated by the New Mexico Institute of Mining and Technology at Socorro, NM.

Captain Warford's description of siliceous armor testing was very interesting. I wonder, however, if the ". . . 36 siliceous-cored *T95* turrets and hulls" he refers to were not, in fact, simple ballistic test panels as opposed to actual "turrets and hulls."

The *T95* was not only advanced for its time, but for the present time, too. It would be interesting, indeed, to see a complete and authoritative description of the whole *T95* program with definitive identification of all its variants. Even the *T95* chronicle in Colonel Icks' "Encyclopedia of Tanks" is both incomplete and inaccurate. I am sure the information would be of interest to many armor buffs the world over. Many of us would also like to know more about the U.S. Army's past experience with oscillating and pod-turreted tanks.

NATHAN N. SHIOVITZ
Anaheim, CA

Query on Shoulder Patch

Dear Sir,

I am constantly being asked if I'm old enough to have been in WW II. At 34, I obviously am not.

I served in Vietnam with 2/1 Cavalry "1st Regiment of Dragoons," and wear a 2d Armored Division patch as a combat patch.

General Starry, in his book *ARMORED COMBAT IN VIETNAM,* stated that this patch was authorized for members of the 2-1 Cavalry, as well as the 1st Armored Division patch for members of the 1-1 Cavalry.

I'm sure there are other former members of these units that are being questioned about the wear of these patches. Please provide some information concerning the DA order etc., that officially authorized the wear of these armor division patches for combat duty in Vietnam.

DONALD E. CONYERS
First Lieutenant, Armor
Georgia ARNG

According to the Center for Military History, no DA Order was published specifically authorizing the wear of the Armored Division shoulder patch. Because the squadrons were assigned to the 1st and 2d Armored Divisions, personnel assigned to the squadrons at that time were automatically authorized to wear the armored division combat shoulder patch. Ed.

AirLand Concept Questioned

Dear Sir,

I refer to the article in the November-December *ARMOR* Magazine on the AirLand Battle.

Two years ago, I visited our son in HQ, USAREUR. The Commander-in-Chief laid on a briefing of the AirLand Battle for me by his staff. It took 2 hours. I was impressed that in the concept these things were weak:

1. It was too complicated.
2. The replacements for men and equipment were too problematical in time.
3. We faced an enormous risk in case it didn't work.
4. Would our NATO allies go along with it?

I don't want to be negative, but it did not seem to be an armor idea, but an airborne-infantry concept. The C-in-C was not Armor.

In 1976, General Haig asked the Chief of Staff to send me to Europe to confer with General Manteuffel, my opponent at St. Vith in WW II, and 80 NATO officers on how the tactics at St. Vith could be used in case of a Warsaw Pact attack on NATO. We recommended three steps in the defense:

1. Wear down the Russian attack and slow it down without losing our NATO troops.
2. Hold as best we could while waiting for reinforcements from the U.S.
3. Counterattack as soon as feasible and drive the Russians back.

We should remember that under President Reagan's military preparedness policy, USAREUR is at least 25 per cent stronger today than when I was there in 1976.

BRUCE C. CLARKE
General, USA (Ret.)
McLean, Virginia

"Eyes and Ears" Defended

Dear Sir,

After rereading "The Division Commander's Eyes and Ears" (September-October, 1983 *ARMOR* Magazine), I seriously question Colonel Campbell's reaction to that article in the November-December 1983 issue of *ARMOR.*

While the pros and cons of tanks was what the article was all about, the fact that they are in or out of the cavalry squadron, for whatever reason, is a moot point, give or take a few hundred Army aviators. The fact is, the decision to remove the tanks was equally as ill-advised as was the decision to replace the light tank with the main battle tank in the early sixties, because the light tank was believed no match for the heavier Soviet armor of the period. In other words, they just might (?) have to become decisively engaged to extract the reconnaissance elements.

The point we should all remember is the role of the tank in cavalry operations. That role is to protect the reconnaissance elements and ensure they are allowed to do the job for which they are trained and organized.

Lastly, there is the emotional issue of committing the cavalry when no other resource is left. This mission will come with or without tanks and when it does, the best thing to do is bite the bullet and realize that such missions come with the territory and cavalrymen should understand this and be prepared to explain this type of mission to the combat engineers, military police and army band members. Besides, has the Armor School discarded that age-old doctrine that 'when all else fails, COMMIT THE TRAINS!'

BOB E. SHAMBARGER
Lieutenant Colonel, Armor
Alma, Arkansas

Simplified Test Equipment

Dear Sir,

The simplified test equipment/internal combustion engine (STE/ICE), and the simplified test equipment-M1/fighting vehicle systems (STE-M1/FVS), are now in full use in both school and field environments for testing and troubleshooting procedures.

Any training problems concerning either of these pieces of test, measuring and diagnostic equipment may be directed in writing to: Director, Maintenance Department, U.S. Army Armor School, ATTN: ATSB-MAO-E (Mr. Cundiff), Fort Knox, KY 40121.

Or, you may call Mr. Cundiff on AV 464-4313/5438.

STE/ICE and STE-M1/FVS training updates will be published from time to time in *PS* Magazine, *ARMOR* Magazine and *THE HOT LOOP.*

DOUGLAS M. HARRIS
Major, Armor
Fort Knox, KY

Force Modernization Article Lauded

Dear Sir,

"The Challenge of Force Modernization" by Colonel Borgman and Major Wojciki in the September-October 1983 issue of *ARMOR* should be required reading for all armor officers, not just those who subscribe to *ARMOR* or who are working in force modernization positions at battalion, brigade/regiment, division, or corps headquarters.

For the past 2 years I have served as the 11th Armored Cavalry Regiment's force modernization development (FMD) officer and I have been waiting for an article such as this one.

Automated information systems have helped me with my work. Proper staffing and the "facilitator" approach outlined in the Fort Hood concept seemed also to work in the Blackhorse Regiment. Support from higher headquarters (specifically from the V Corps and USAREUR DCSOPS staffs) was at times invaluable. But a guide such as the "Commander's Transition Checklist" would have saved me hours, weeks, perhaps months of planning time as most FMD action officers have had little or no formal training in this field.

The total system fielding approach has become SOP for Blackhorse modernization, but there's still a lot of work to do. The results of concept evaluation programs (CEP) need to be placed in the hands of the field commanders. An example of where such concept evaluations would be helpful is in the 11th ACR's Artillery 86 force structure issue. The DA plan is to standardize all artillery battalions and give the ACR one. Howitzer batteries have been organic to armored cavalry squadrons for several years. The very nature of combined arms operations is found in existing and tested regimental armored cavalry squadron force structure. So the question is—do we fix a system that is not broken, or are there results from a CEP that might show measurable increases in operational capability by reorganizing and standardizing artillery assets in the cavalry?

I haven't seen any such study and, therefore, I remain skeptical, not because of traditional reasons, but because the Army might be executing an untested plan.

Another real world illustration of a force integration problem is the question of how to fight with a mixture of *M1s* and the *M113/M901*-equipped armored cavalry troops and/or squadrons. TRADOC has new organizational training teams (NOTT) for divisional units. Fort Knox has published several draft FMs and "How-To-Fight" pamphlets for tank-pure or fighting vehicle-pure units, but nowhere is there a guide for troop-level officers to react to situational training exercises while equipped and organized with both new and old weapons systems.

The "practical managers" referred to in the cited article are waiting for any sort of assistance that TRADOC, DARCOM, or any other DA agency can provide. This article will serve as a guide and reference for current and future force modernization action personnel.

Colonel Borgman and Major Wojcicki are right on target.

JOHN N. LESKO, JR.,
Captain, Armor
Bad Hersfeld, FRG

Platoon Article Recommended

Dear Sir,

I want to offer my congratulations to Captain Alan W. Watts for his article "Leading A Platoon On The Integrated Battlefield." (See November-December 1983 *ARMOR* Magazine.) He hit the nail right on the head and confirms the exact mind-set I have been trying to establish in our maneuver commanders. We simply cannot afford to ignore the existence of the combat multipliers as we conduct collective training.

The limited training days available to Reserve Component units demand that we take full advantage of every training hour. In Wisconsin, we have the terrain, weather, an A-10 Air National Guard unit, an attack helicopter unit, plus artillery, engineers, signal units, etc., to provide for a fully-integrated training scenario with our separate mechanized infantry brigade. We cannot allow our young commanders to train in an infantry-tank vacuum. They must include the supporting arms and services into every training exercise possible if we are to properly train them for combat.

I trust Captain Watts will have no objection if I reproduce his article, with appropriate credit to him and *ARMOR* Magazine, in order that I may provide it to our commanders in the field. I consider it an outstanding training aid. It is another example of the great articles we have come to expect in *ARMOR* Magazine.

BARRY W. YOUNG
Deputy AG, Army
WIANG

Stalingrad Recapped

Dear Sir:

I just received the September-October 1983 issue of *ARMOR*. You and your staff did an excellent job with my article on Stalingrad. I don't know whose fault it was, probably mine, but there was a typographical error on the last page of the article. Holding Stalingrad cost the Germans *300,000* men not 30,000. I am certain some nitpicker will call you on that one. The concept of having it in the same issue with Captain Noyes' article, "The Role of Disobedience in War," was good thinking.

I particularly liked Captain James Warford's article, "The T95: A Gamble in High-Risk Technology." It was most unfortunate that we did not push on with the *T-95*. We might have saved a few dollars in the design and development of the *MBT-70* and the *M1 Abrams*. Somehow I cannot help but wonder if, in developing the *M1* tank, all lessons of history, demographics, politics, and engineering principles were ignored, not to mention logistics.

Regarding Stalingrad and the War in the East, I have often wondered how anyone could think they could invade the Soviet Union and win. Even if you defeated Russia and took over, think of the headaches you would have! Well, nobody said Hitler was rational. It is sort of unfortunate that nobody believed such a madman could ever get to the top of Germany.

As you can well appreciate, the article only scratched the surface of the Stalingrad battle. One interesting aspect of Russian operations and why they did so poorly in the beginning was the emphasis on fighting for Communism. Most Russians looked upon the Germans as liberators, until Hitler's racial supremacy policies were applied and the Russians began to de-emphasize Communism. I think I would rather work on trying to get our South to forget the Civil War and get Texans to forget the Alamo, than try to get the Russians to forget WW II!

Again, thanks to you and the staff for such a fine job with my article.

WILLIAM L. HOWARD
Lieutenant Colonel, Armor, USAR
Spring Lake Heights, NJ

Lauds CSM Gillis And Stephens

Dear Sir,

Recently when I read that CSM Gillis was leaving as the CSM of the U.S. Army Armor Center I was disappointed in that I have always looked forward to the fine articles that he placed in the "Driver's Seat'" column.

CSM Gillis ensured that thought-provoking items appeared in his column and that there was a clear message for the reader. Many of his articles have been passed among the senior NCOs of the Field Artillery Battalion (3d Bn, 139th FA, INARNG) in which I am the fulltime administrative officer and adjutant.

Although I never served as an enlisted man, I believe that my twelve years in the service have given me the ability to appreciate the enlisted man and woman, and the outstanding articles by CSM Gillis have added to this ability.

His articles should have been read, and hopefully were, by all officers and enlisted personnel who desire to make the U.S. Army both professional and successful.

Having read CSM Stephen's first article in "Driver's Seat," I can proudly say that the U.S. Army Armor Center has another outstanding CSM who also believes strongly in the Army and its people. I used his "First Impressions" article as the kickoff for this organization's 1984 fulltime support personnel meeting and it was well received. *(See "Driver's Seat," November-December 1983 ARMOR. Ed.)* Thank you CSM Stephens.

I will continue to look forward to the "Driver's Seat."

SAMUEL R. YOUNG
Captain, FA
INARNG

Comments On A Cover

Dear Sir,

I would like to comment on the cover of the September-October 1983 issue of *ARMOR* Magazine depicting infantry fighting in the desert.

The photo [from which the cover was drawn] shows men of the 3d Brigade, 8th Infantry Division. It was part of the orientation material given to new members of the 8th Division.

I enjoy reading your magazine both as a former G.I. of WW II vintage and as a sometime armor buff. Also, it is helpful to me when I get together with my two captain sons, one who serves in armor and the other in the infantry.

NICK ALTEMORE
Fishkill, N.Y.

1983 *ARMOR* Index Available

The 1983 index for *ARMOR* Magazine is available. Those wishing a copy may write: *ARMOR* Magazine, ATTN: ATSB-DOTD-MAG, Fort Knox, KY 40121.

COMMANDER'S HATCH

MG Frederic J. Brown
Commanding General
U.S. Army Armor Center

Armor Support To Light Forces

The Army faces a variety of operational challenges for the remainder of the 1980's and beyond. We must be prepared to fight either in a mid-to high-intensity environment on a sophisticated battlefield against well-equipped heavy forces or in a low-intensity environment against enemy forces which can range from insurgent guerillas to Soviet surrogates. Recent events in Lebanon and Grenada are tangible evidence of this imperative. As Army modernization efforts continue, increased emphasis is being placed on developing flexible, combat-ready forces capable of deterring aggression and, should deterrance fail, of defeating the enemy across the full spectrum of conflict.

Recent efforts to modernize our forces to better meet the Soviet threat in armor-dominated central Europe have produced fighting organizations fully capable of meeting that challenge. However, the magnitude of the threat to NATO does not lessen the Army's requirement to be prepared to respond to other world-wide contingencies. To improve the Army's capability to meet security demands within a dynamic and volatile international environment, a smaller, lighter, more strategically responsive, flexible fighting force is being developed. The senior leadership of the Army is moving to provide a new Army force structure which meets this requirement, by revisiting some existing concepts for both heavy and light forces and by executing bold, new concepts for light forces.

As Chief of Armor, I have taken several initiatives to ensure that the role of armor and cavalry in these new force structures carries on the best traditions of mobility, firepower and shock effect while respecting the strategic imperatives imposed upon the Army. Although somewhat overlooked in recent years, the proud heritage of our light cavalry forces is returning to the forefront of our thinking.

Armor force support to our light division and corps organizations will continue in the best traditions of light cavalry. We are designing units that are small, flexible, and versatile fighting forces that maximize the inherent characteristics of mobile firepower and reconnaissance. These units will be organized, equipped and trained with light vehicles, and prepared for rapid strategic deployment to arrive in a contingency area in a ready-to-fight configuration. In keeping with the strategic and tactical imperatives of our new light forces, these light vehicles will not have the levels of armor protection found in heavier armor or cavalry units. This much lower level and, in some cases, absence of armor protection is a necessary tradeoff to provide the firepower and mobility required. Lack of protection is a risk, deliberately taken, but is in concert with the light force mission and expected employment. And lack of protection for rapid strategic and tactical deployment doesn't necessarily mean fighting unprotected. We are actually seeking capabilities to provide variable protection.

Through coordination with the Infantry and Combined Arms Centers, I have determined that the following should be key design principles for armor units supporting the light division and corps:

- **Similar Design.** Where feasible, light and heavy organizations should be similar in design to standardize Army-wide training, organization and doctrine.
- **Plug-in Capability.** Light division units must be provided with "plug-in" opportunities to ensure that peacetime training by light division units is realistic combined arms training employing the reinforcing armor/cavalry capabilities which will be provided in combat. These "plug-ins" also provide the organizational structure to accept, employ, and support additional light armor and cavalry units from the light corps, or, should the situation require it, heavier armor or cavalry units organic to the corps configured to fight the "heavy" battle. Combined arms training should be conducted habitually with infantry battalions employing the assault and support direct fires of the "plug-in" armor and cavalry forces from the corps.
- **Light Vehicles.** The light armor and cavalry units supporting the light force will be equipped with light vehicles that may be adapted from current or past U.S. Army vehicles or could be new vehicles currently in development or under consideration for development. Among the range of possible candidate vehicle chassis being considered are

the *M113*, the *M551*, the high mobility multipurpose wheeled vehicle (HMMWV) with 25-mm cannon or the TOW, the mobile protected gun system (MPGS), the fast attack vehicle (FAV) being tested by the 9th Division, and the light armored vehicle (LAV). Industry is now providing other innovative alternatives. A balanced mix of both kinetic energy (KE) and chemical energy (CE) armor-defeating weapons will be provided for the chassis which are finally selected. We are currently evaluating several different variations of 105-mm guns, 25-mm/30-mm automatic cannon, 40-mm automatic grenade launchers and antitank missiles to ensure a KE/CE weapons mix providing assured penetration of Russian armor.

The principles I have just outlined dictate a full range of armor and cavalry units for the Army, from the lightest cavalry reconnaissance type units to our cavalry and armor units now deployed in Western Europe. I envision several types of armor and cavalry organizations in support of light forces:

• **Reconnaissance Squadron.** The reconnaissance squadron will be employed in the light division in much the same manner as the cavalry squadrons in the armored and mechanized infantry divisions but with an even greater reconnaissance capability. It will be organized with a headquarters and headquarters troop, a light cavalry troop, two air cavalry troops, and a surveillance company.

The reconnaissance squadron is capable of performing traditional cavalry missions such as reconnaissance and surveillance, NBC reconnaissance, limited security of vital areas and lines of communication, screening, rear area combat operations (RACO), and assistance to command and control. In addition, the inclusion of the surveillance company enables the squadron to perform the missions of electronic surveillance and reconnaissance, electronic jamming, direction-finding, radio intercept, and radar observation. A long range patrol capability is organic to the headquarters and headquarters troop. These mission capabilities and the squadron organization dictate that we concentrate on the traditional reconnaissance role of cavalry — "sneak and peek" — with a greatly increased menu of capabilities for the aggressive cavalry leader and trooper.

• **Light Armor Regiment.** The corps light armor regiment counters increases in the enemy armor threat in potential contingency areas. It operates independently as a corps unit or is attached to or is under operational control of a division to concentrate combat power. It constitutes the light corps KE antiarmor and infantry direct and assault fire support capability. This KE armor-defeating capability complements the CE capability of the other light forces and prevents the enemy from optimizing the design of armor protection to defeat the CE capability.

The light armor regiment is totally deployable by *C141* aircraft and can move quickly to respond to global contingencies. Its proposed organization has a headquarters and headquarters company, a light cavalry squadron, three light armor battalions and a support battalion. The regiment is an ideal force to perform reconnaissance in force and economy of force missions in most low-intensity contingency areas. With the addition of combat support and combat service support, the regiment can be converted to a heavy armor force. The backbone of this strategically deployable regiment will be the light armor vehicles in it, which are essentially mobile and relatively unprotected firepower.

• **Light Cavalry Squadron.** The light cavalry squadron in the light armor regiment has a headquarters and headquarters troop and three light cavalry troops.

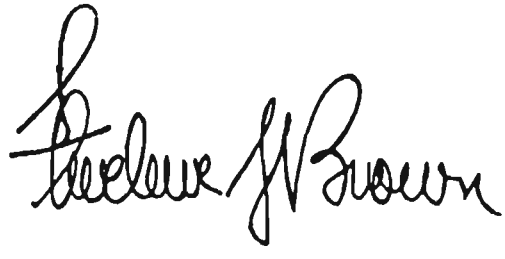
The squadron performs the traditional cavalry missions of reconnaissance and surveillance, security, command and control, screening, RACO, and economy of force. It also provides some offensive and defensive capabilities to the light force. The non-traditional cavalry missions of attack and defend are within the squadron's capability due to its greater firepower and mobility relative to that of the more lightly-equipped infantry forces it supports and in relation to the low-intensity contingency threat it is likely to face.

• **Light Armor Battalion.** The light armor battalion of the proposed light armor regiment is organized with a headquarters and headquarters company, a light armor company (missile), and three light armor companies (gun).

The light armor battalion performs normal armor-type missions, albeit with a modest level of armor protection. It provides the light force an enhanced KE capability and lethal direct-fire support. Its vehicles may be designed for some variable armor protection, using strap-on armor that can be applied in the contingency area to improve protection. Naturally, mobility will be reduced as armor protection is increased. The battalion normally operates in concert with infantry as part of a combined arms team.

The resurgence of the light forces dictates a mission to the armor community which is fully consistent with the traditions of light cavalry. While the above organizations may not be the only answer, I see them as effective responses to the problem of support to the rapidly deployable light force. The Armor Center will continue to work closely with our counterparts at the Infantry Center, the Combined Arms Center, and the Army Development and Employment Agency (ADEA) to determine how best to accomplish the mission of support to the light forces. Fort Knox now has a full-time liaison officer to ADEA, permanently assigned to Fort Lewis, WA to ensure that our concepts of how light armor units organize and fight are clearly represented and to coordinate joint Fort Knox/ADEA tests of their feasibility. I am confident that this joint effort will produce a better light force and that there will be many conceptual and technical spin-offs that greatly improve our other armor and cavalry forces as well as the entire U.S. Army.

My mission, "to field viable light armor and cavalry organizations as soon as practical," is quite clear. Beginning in early 1984, the Armor Center will start accelerated tests on candidate equipment for light armor and cavalry forces. At the same time, we will conduct tests and evaluations to flesh out the doctrine these new forces required. We will be major participants in a test of the reconnaissance squadron this summer, and at the moment this article is being prepared, the Armor School departments are planning the production of all the literature required to support the fielding of these new armor and cavalry units. Supporting the light forces is a demanding new opportunity for Armor, and the onset of a new phase in our evolution as the combat arm of decision. As always, the Armor force will meet the challenge — anytime, anyplace, anywhere. Forge the Thunderbolt.



DRIVER'S SEAT

CSM John M. Stephens
Command Sergeant Major
U.S. Army Armor Center

Combat Ready

We have concentrated in the last few years on combat skills that are common to all soldiers and job skills that are directly related to each Military Occupational Specialty (MOS). The Common Task Test (CTT) and the written Skill Qualification Test (SQT) are absolutely essential in our business if we are to maintain job proficiency. The results of these tests also provide a systems check to help the chain of command and chain of support measure the proficiency of the organization.

But we must go beyond the CTT and SQT if we are to be successful on the battlefield, where skills must include survivability.

When we talk about the enemy, we think of the enemy force, but there are other forces that require just as much attention if we are to survive. Caring for soldiers does not mean four-day passes every month, being off Monday through Friday at 1630, or never working on weekends. Caring for soldiers means making sure soldiers are proficient and confident enough to survive on the battlefield.

Beginning with the individual soldier, high standards must be applied as he is trained to be a member of a squad or crew. Through inspections, rifle marksmanship, guard mounts, D&C, military courtesy, etc., a soldier demonstrates the attention to detail needed to effectively become a part of a team. The soldier learns how to wear the proper uniform and to carry out orders.

The application of precise high standards by the soldier and the insistence on high standards by the leader become more important at the team level. As team members, soldiers apply the high standards they have been taught to those things they must do to survive. A soldier learns how his individual proficiency is a part of squad or crew proficiency. The confidence to be part of the team quickly develops camaraderie and pride.

The survivability of a squad or crew begins with the assurance of their first-line supervisors that they are proficient and that their personal and organizational clothing and equipment are combat ready. The appreciation and application of high standards really come to light as they move to their vehicle. The necessary attention to detail when performing pre-combat checks requires confident crewmen who believe in each other. As they perform their prepare-to-fire checks, a confident crew knows that each step must be done precisely, as the manual states. The loading plan is checked to ensure that every piece of equipment is where the SOP indicates it should be. Every crew member must know the loading plan so well he can follow it in total darkness. When the crew stands proudly, waiting for the platoon sergeant and platoon leader to spot check their vehicle, they will know they are ready for anything.

The crew's ability to perform its assigned mission becomes even more critical at the platoon level. The confidence that has been displayed by the crew must also exist in the platoon. Long hours of training must do more than produce a trained platoon. They must create confidence in each crewman. Crewmen must believe in each other if the tank tactical tables are going to be applied proficiently. The mutual confidence and belief will only materialize if every soldier feels like part of the platoon (*see "First Impressions," November-December 1983 ARMOR, ED).*

The standard operation of a proficient and confident platoon in the field can be a work of art. The SOP is their tool and they use it; they don't fight it. Communications are not a nightmare. Security is automatic, but checked. Tactical feeding and sleeping plans are effective. The platoon leader or platoon sergeant knows where crewmen are sleeping, and it's not along a roadway or in the vehicle, either. They are close by their vehicles, ready to react immediately. Stand-to is another precise, attention-to-detail operation that requires proficient crews. That's right, another inspection to ensure we are ready to fight.

These same tough requirements and precise inspections must also exist at company level. a company cannot condone a weak platoon. Company commanders and first sergeants must be constantly attentive to the capabilities of each platoon; if there is a platoon that cannot meet the high demands of combat readiness, they must fix it, and fix it fast.

Being really combat ready is nothing more than having the total training needed to destroy the enemy and survive. It is more than the combination of mechanical skills, gunnery skills and tactical skills. It is a highly disciplined unit with high morale and *esprit de corps* that demonstrates high standards of proficiency at all times—the indicators of an effective unit.

MASTER GUNNER'S CORNER

Captain David M. Schoenfeld and Mr. Donald Wooldridge
USAARMS, Fort Knox, KY

Tank Tactical Tables

The measurement of a tank crew or tank platoon's effectiveness in gunnery has always been determined by a readily "G2'd" live fire run down a safety-oriented range. Weapons are fired at stationary or predictably moving targets that bear little resemblance to real Threat vehicles. Additionally—because smart crews can often predict the sequence of target appearance—targets are too often unrealistically acquired. Nor do the targets fire back—not even with simulated fire as do targets on some of our allies' ranges. *(See "Allied Armor Training in Canada," July-August 1983 ARMOR, Ed).* And, finally, present day ranges do not adequately exercise the mobility, agility or survivability of our newest combat vehicles.

FM 17-12-1, "Tank Combat Training," will change all that.

We must train in the way that we expect to fight and we will seldom fight with the enemy appearing in a predictable manner in a narrowly-defined slice of the battlefield. We must train to fight an enemy who can be expected to appear in multiple arrays from any direction—including our rear.

Devices and Tables

New devices such as the Unit Conduct of Fire Trainer (U-COFT) *(See "Armor Training Simulators Are On The Way," May-June 1983 ARMOR, Ed),* and training products such as the new tank tactical tables included in FM 17-12-1, will permit us to better expand our tank gunnery training. Also, visual modification kit (VISMOD) and multiple integrated laser engagement system (MILES)—equipped vehicles will give the gunners and tank commanders (TCs) a much greater degree of training in target acquisition. All of which will lower costs by reducing the number of live rounds now required to maintain gunnery proficiency.

The development of tank tactical tables began with the premise that we should fully train in the way we expect to fight. Tank gunnery tables accomplish their purpose; i.e., train the individual through the platoon level to accurately put steel on target. Because of safety and range space restrictions, this meets only half of the requirement. However, the new field manual and its tank tactical tables will make possible the training that cannot be accomplished at present. The new tactical tables and the present gunnery tables are interrelated; what cannot be done on a gunnery range can be done with a tactical table, and what cannot be done with a tactical table has already been done on the gunnery tables.

Presently, we cannot practice such tasks as close-in coax firing behind or through a tank formation due to range safety constraints. Also, long-range multiple target engagement or mass target engagement exercises are precluded because of the expense of lifelike, expendable targets. The intent behind the new tank tactical tables is not only to rigidly control the opposing force (OPFOR) and develop the battle-training situation with tank-pure forces according to a scenario, but also to provide realistic VISMOD-equipped Threat targets. This highly desirable training situation will become reality when the provisions of the new FM 17-12-1 are fulfilled because when a unit goes on gunnery training it will also conduct tactical table training.

Tank tactical tables are similar in format to gunnery tables, but their focus is different. Gunnery tables train units to put steel on target and the new tactical tables use gunnery proficiency combined with MILES to train units to rapidly respond to enemy activity. Tank tactical tables exercise individual crews, tanks with wingmen, and platoons at the basic, intermediate and advanced levels in any terrain by day or night.

Progressive Training

The new tank tactical tables provide training progression through both the horizontal and vertical modes. Tables A,B,C are concerned only with the individual crew. Tables D,E,F apply to the tank and wingman and Tables G,H,I lay down the platoon's training requirements.

The progression, both horizontal and vertical, is from basic through intermediate to advanced. An integral part of the progressive tactical table training scenarios is the individual crew and group coordination required to assure mission accomplishment. Progression through the three stages is dependent upon the mastery of the preceding stage. Individual crew tasks must be mastered prior to advancing to the intermediate stage that involves a wingman tank. These two tables must be fully mastered before the platoon-level (advanced) table can be used. Each level is progressively more difficult. In Table C, the individual crew skills learned in Tables A and B are put to use.

So it is with the intermediate Tables D, E, and F, and with the advanced Tables G, H, and I.

As crews progress, more and more reliance is placed on tactical decision making and, if the tank weapons gunnery simulation system (TWGSS) or the full crew interaction simulator (FCIS), are available, they should be used in place of MILES to permit reinforcement of gunnery skills while training in tactical skills.

When the platoon achieves the tactical skills required at Table I, it is placed in a scenario that simulates combat as closely as possible and it will face a MILES-equipped OPFOR. This will separate the men from the boys and will emphasize those tactical tables that need more work.

Because gunnery skills decay fairly rapidly, it is important that new tank tactical tables be run concurrently with the gunnery tables. For example: Table XI, the qualification table for section gunnery, would be immediately followed by Table F of the new tactical tables (wingman reaction exercises). By training in this way, the unit will receive the maximum benefit from both sets of training tables and will come as near as possible to training in the way it can expect to fight.

This procedure will require more prior planning since the tactical course will have to be as physically close as possible to the gunnery range. The utopian solution would be the actual combining of the gunnery range and the tactical tables course. However, even the close physical relationship of the two courses will rarely be possible. Since this is the case that will prevail, the next best procedure would be to run the tactical tables immediately following gunnery training.

Currently, the method used to conduct tactical table training is limited only by the creativity and experience of the unit training officer. The tactical course should be similar to a leadership reaction course with the scenarios (tasks) set up as stations. The tactical tables should be run in any weather, day or night, based upon the commander's decision and the available equipment.

Evaluation

The primary means of evaluating performance on the tactical tables will be the after action review. The ultimate measure of success or failure in the tactical tables will be the same as in combat: If the unit accomplishes its mission and survives, it is successful. If the unit is destroyed, or is unable to achieve its objective, it is a failure.

If the tank crew, section, or platoon fails to make proper use of terrain movement they will probably not survive the mission. If they fail to give proper fire commands, or shoot a tank in their own platoon, they will not survive the mission. The tactical tables will show them their mistakes and they should not make those same mistakes in combat.

Hopefully, in the future (1985-1988?), the tactical tables can be fired on full-scale computer-generated simulators that will save significant ammunition and fuel.

Summary

In order to train to full combat readiness we need to complement the ever-essential steel on target devices (MILES, etc.) with devices that accurately simulate our weapons systems and are safe in our present restricted training areas. When these devices become available and when they are combined with the new tank tactical tables in FM 17-12-1, highly realistic training will result. Our armor crews will not only retain their gunnery proficiency skills, but will also attain an overall tactical proficiency based on training as they can expect to fight.

Finally, and far from least, the use of the new tank tactical tables will result in a higher level of readiness in our reserve units and will also provide a more suitable means of quickly providing trained individual and unit replacements in wartime.

M1 APU Feasibility Test

The AGT 1500 turbine engine which gives the M1 tank its speed and quickness is not economical to run at idle; the fuel consumption rate is much more favorable when the engine is at or near full throttle. But tanks typically spend a lot of time at idle, the engine running to keep batteries charged.

In June, 1983, Lieutenant General Walter F. Ulmer, Jr. III Corps commander at Fort Hood, pointed out to engineers at the *M1* program manager's office the need for an auxiliary power unit (APU) which could keep batteries charged when the tank isn't on the move. It seemed a viable way to reduce operating costs, especially in training. The concept also drew support from the Army's Vice Chief of Staff, General Maxwell R. Thurman.

The assignment was tackled by the Materiel Fielding Team, CONUS, at Fort Hood as an informal, unfunded concept and feasibility study.

Finally selected for testing was the APU used on the *M88A1* recovery vehicle, which cost $7,500 and burned only about a gallon an hour. The *M88A1* unit was also a readily available standard item in the current Army inventory, and it could be effectively muffled.

The solution the team came up with was to mount the APU in an enclosed box and hang the unit from the left rear fender suspended by the same hinges that support the tank's armor skirts. Originally, the team had hoped to route the electrical cables into the tank through the taillight housing, but this proved too small and too close to the fuel cells for safety. Instead, the electrical lines were routed along the side of the hull and covered with a protective shield. The electrical lines connect at the vehicle starter.

The attachment does not prevent removal of the tank's rear deck or replacement of the powerpack. Field testing confirmed that the tank could be driven at high speed over undulating terrain without knocking the unit lose. The hinged mounting allowed the unit to move when bumped or when mud built up on the rear sprocket. The mount also withstood the shock of main gun firing. Finally, the tests determined that the unit would supply sufficient power to keep all systems operating, including the tank thermal sight and the radios, with the main engine shut down.

In a decision brief to General Thurman, the PM-M1 engineers and the Armor Engineer Board at Fort Knox recommended the Army acquire a smaller, commercially available unit as an *M1* APU mounted in the same manner as the Fort Hood test configuration.

Major General Frederic J. Brown called the Fort Hood experiment innovative and highly practical. "The true importance of the work accomplished at Fort Hood was that the soldiers and civilian personnel involved took the concept described and evolved it into a working prototype. . . Again, as Chief of Armor I commend the efforts of both the military and civilian personnel involved in the development of this program."

LTC MICHAEL D. JACKSON
Fort Hood, TX

RECOGNITION QUIZ

This Recognition Quiz is designed to enable the reader to test his ability to identify armored vehicles, aircraft, and other equipment of armed forces throughout the world. *ARMOR* will only be able to sustain this feature through the help of our readers who can provide us with good photographs of vehicles and aircraft. Pictures furnished by our readers will be returned and appropriate credit lines will be used to identify the source of pictures used. Descriptive data concerning the vehicle or aircraft appearing in a picture should also be provided.

(Answers on page 49)

Armor in Europe — A New Perspective

by Lieutenant Colonel Massimo Dal Piaz

The employment of armored units is universally determined by several important factors. The high cost of armored vehicles requires a continuous and accurate evaluation of these fundamentals that, in turn, will lead to the most effective use of these weapon systems.

The most important factors that condition and, at times, limit, armored operations may be placed in two categories:

- Tactical. Essentially, this includes an accurate knowledge of the enemy situation, the composition, location, and disposition of his forces and how they relate to the friendly situation.
- Environmental. This category is based on the acquisition of knowledge of the following: Distinctive characteristics of the terrain; the negotiability of the terrain by tracked vehicles; and the presence of fields of fire and observation that permit the full use of all available weapon systems.

A lack of information in any of these areas may make a decisive difference in the effectiveness of a planned armored operation and may prevent the attainment of the desired tactical results.

In accordance with the above, it is evident that the employment of armored units is favored by wide-open, flat, or gently rolling terrain characterized by low-growing and sparse vegetation, and free of any elements that would interfere with maneuver, observation and target engagement.

The employment of armored forces is therefore ideal in desert-like terrain or in low, flat, plains such as the steppes; but the use of tank units is also quite possible in those areas which are moderately covered by vegetation or characterized by limited urbanization, provided that the terrain is negotiable, and that open areas (to allow room for maneuver and the engagement of targets at reasonable ranges) exist between the areas of vegetation and the built-up zones.

Briefly, because of the maneuver space required by armored units, and because of the need to maximize the capabilities of on-board weapons, the "long range" fields of fire and observation that characterize the desert are most desirable. Nevertheless, the effective employment of armor is also possible in terrain marked by "medium-range" fields of fire and observation, as long as the limitations of such terrain are not excessive.

The terrain of the principal theaters of operation in Western Europe (Germany and Italy in particular), differs significantly from either the desert, the steppes, or the low, flat, sparsely vegetated plains referred to above. Instead, it is characterized by conditions that include a high degree of urbanization and of agricultural use and these pose numerous difficulties in the use of armor.

Karl von Clausewitz in his treatise, "On War," did more than simply affirm that the nature of the terrain has a direct impact on maneuverability and on the possibility of good observation and fields of fire. He also concluded that the extensive employment of cavalry was useless on terrain that for various reasons, to include the presence of agricultural activity, was difficult to negotiate or maneuver on. Furthermore, on such terrain there have been no recent military operations characterized by the employment of tank formations on a large scale. Such operations, which are always a distinct possibility in view of international events, pose numerous questions regarding the methods of employment of armored units, their effectiveness, and the capabilities and effects of on-board weapons.

Recent conflicts in Vietnam and the Middle East have allowed us to draw some conclusions and learn some lessons on modern tank warfare, but the peculiar environmental and terrain characteristics of each of these situations are not comparable to the large, densely urbanized plains to be found in Western Europe. Nor is it possible, given merely the differences in topographical realities, to extrapolate rules or experiences or to simply look for adequate technical adaptations and modifications.

Presently, tank units conduct periodic training exercises on artificial firing ranges, the conditions and constraints of which differ significantly from those conditions likely to be encountered in combat. Consequently, many engagement techniques and scenarios drawn from this training—

as well as some tactical developments and, to an extent, the psychological climate fostered by these factors—may be ill-suited, or not suited at all, to those conditions which will probably characterize the European battlefield.

The European Environment

Aerial photographs and large-scale maps clearly show the high degree of urban European sprawl, which continues to spread with each passing year. As a result of this urbanization, the natural environment is becoming more and more transformed, either by residential and industrial construction or by the cultivation of the land for agricultural purposes. The terrain in its original state may be observed only in limited zones—usually along the banks of the numerous rivers and waterways. In many cases, cultivated stretches of land or built-up areas appear one after the other in an irregular pattern. Among the many different crops to be found, grain, which varies moderately in height from an average of about 2-1/2 meters, is dominant. Furthermore, agricultural techniques have led to the creation of a mosaic-like pattern of relatively small plots of land. These are separated by rows of trees (which tend to limit field of fire and observation), and by ditches and rivulets (which present serious obstacles to the free movement of tank formations). One also encounters endless rows of grapevines and numerous orchards which sometimes exceed three meters in height.

The built-up areas are characterized by small towns without clearly defined outlines, but having instead very extended, sometimes elongated, outskirts that tend to be concentrated along those roads linking them with similar towns. The effect of this pattern is the creation of long "curtains" of buildings and structures. The result, in turn, is a peculiar landscape in which the tactical considerations valid in wide-open, relatively flat, terrain become inapplicable.

This peculiar arrangement of urbanization and cultivation, together with Europe's dense network of rivers, canals and roads, makes for a class of terrain all its own. The adverse impact is not limited to long-range target acquisition and destruction (which modern tanks are technically capable of), but extends to the effects on maneuver.

Only with extreme difficulty, given the available space, is it possible to employ armor in large formations: An offensive operation conducted at higher than the company level would be seriously limited and confined even to the extent that the unit may not be able to deploy properly along a normal front. Also, it would be rare that such formations could develop in depth beyond 2-3 kilometers. The elements of the agri-urban environment described above, combined with the many forested areas, would eventually break up the formations and the visual contact on which they are based.

The obstacles appearing between tanks, platoons and companies would cause units to break up and become separated from adjacent units. Indeed, the many "curtains" formed by rows of trees, crops, wooded and built-up areas, would prevent even the individual tanks within one platoon from keeping the proper interval, maintaining visual contact and concentrating upon the same objective, transforming what should be a small unit operation by a simple formation into the sum of several uncoordinated operations by individual tanks, working alone.

In such cases, the modes of employment would bear more of a resemblance to the techniques used in an isolated ambush than to those of a conventional armored operation. Moreover, for each tank moving either alone or in formation, target acquisition and engagement at relatively long ranges would be permitted in only one or two directions at a time, and even then rarely at ranges beyond 1,000-1,500 meters. Such ranges might be attainable in conjunction with roads or certain fields, while the rest of the landscape would remain highly cluttered. The obstacles posed by the built-up areas and the terrain would compel each tank commander to fend for himself—seeking routes and passages around the obstacles and thus complicating the already significant problems of coordination at the platoon level.

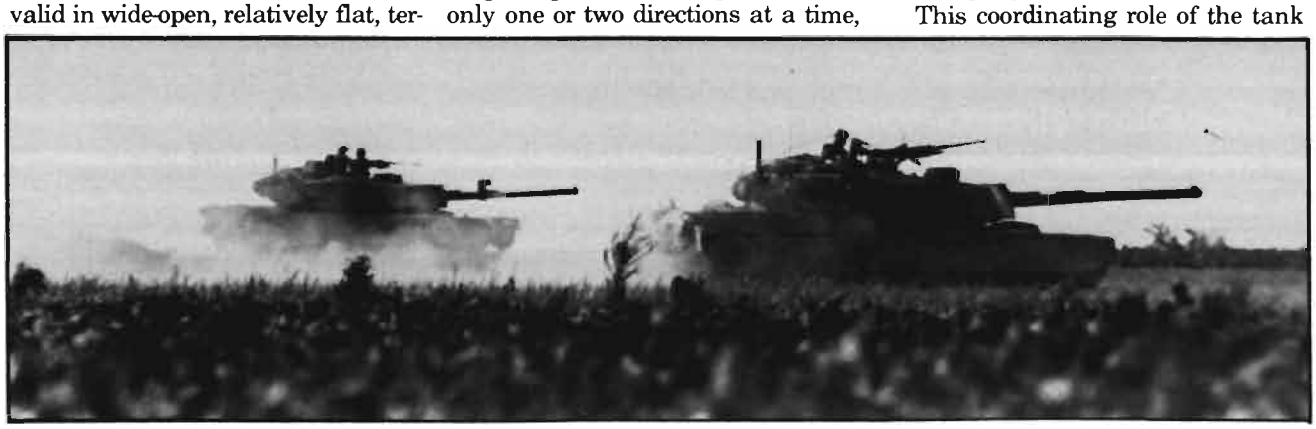
The urbanization and the natural terrain characteristics that dominate Western Europe tend to prevent the full use of fire and maneuver techniques that form the basis of current training. Within the tank itself, the limitations of the terrain directly affect the two crewmen who provide the vehicle with its mobility and firepower—the driver and the gunner.

The driver (due to limited vision) is incapable of accurately evaluating the various obstacles to be met. This is especially true of the many ditches and canals, whose exact depth and dimensions are often difficult to determine.The driver is also unable to pick out reliable routes that stretch beyond what is usually considerably less than 100 meters.

The gunner is limited in his ability to observe through his sights, which are linked to the gun tube. His field of vision depends directly on the lay of the gun, which is controlled by the tank commander.

It is the tank commander who must direct and coordinate the crew actions by simultaneously acquiring and evaluating targets for the gunner (and sometimes determining the ranges as well), while evaluating various terrain features and setting the direction of travel for the driver. He must, of course, be able to do all this in a hostile environment, characterized by lethal and rapidly changing situations and, above all, he must maintain communication with his platoon or company commander.

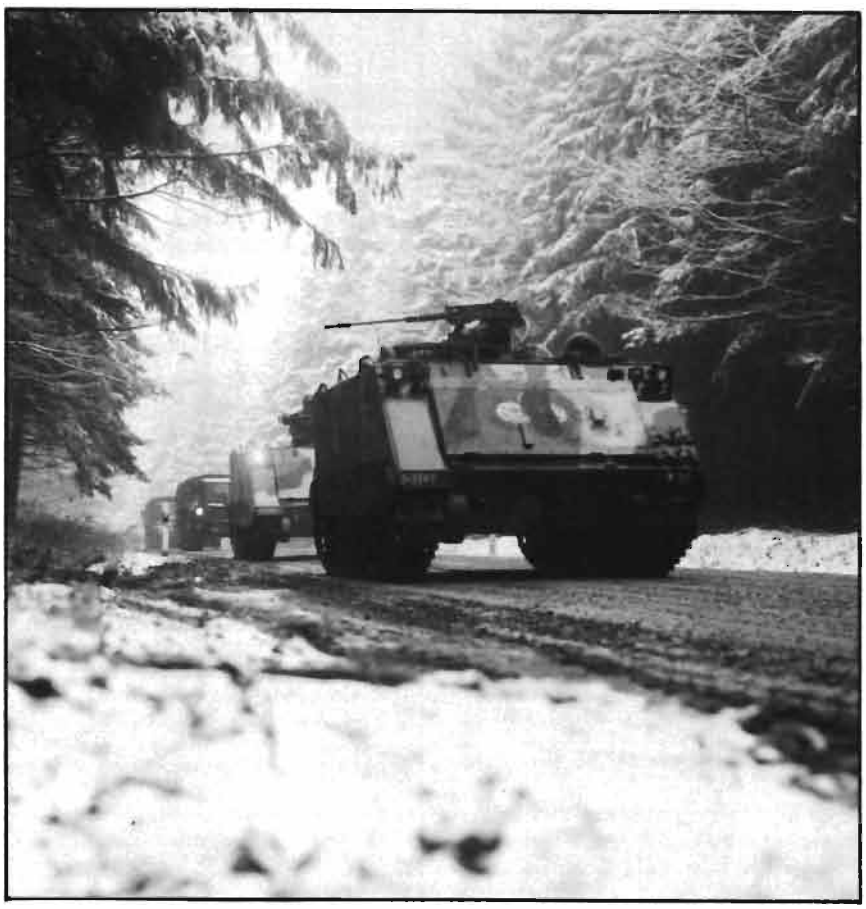
This coordinating role of the tank



commander is conceivable in open terrain, be it flat or moderately hilly, in which the presence of long-range fields of fire and of observation translates into the timely acquisition and thus rapid neutralization of targets as well as the easy identification of natural obstacles. But in terrain that is both highly urbanized and extensively cultivated, and with a high incidence of forested areas, the tank commander's task becomes extremely difficult. Without long-range fields of fire and observation, he cannot identify or react to targets or obstacles in a timely manner.

Tactical Remedies

In such an environment, one must abandon the traditional use of armor in massed formations. However, the renunciation of the principle of "mass" in this case occurs only at the most simplistic level. For mass, properly understood, is not an agglomeration of a particular weapons system—in this case the tank—but the concentration of combat power at the decisive point. The mass of an armored force is determined by the degree to which it concentrates its efforts and firepower on the objective. If placed in terrain that compartmentalizes efforts and prevents coordination, it loses a certain degree of power and may easily lose local superiority in the offense or the defense. An alternative method of concentrating combat power, therefore, becomes necessary. Given the characteristics of the European landscape, dominated by limited fields of observation and fire, it would do well to review several tactical remedies.



A larger role should be assigned to medium and long-range missiles (with effective ranges of 2,000-3,000 meters) mounted on a substantial number of attack helicopters. These weapons systems are not subject to the same limitations as ground systems and would play a decisive role in the timely application of firepower.

At shorter ranges (500-1,500 meters), the employment of armored units must be integrated with the mechanized infantry. When dismounted, the infantry can rely on their various light and medium antitank weapons, thereby compensating for their initial disdavantage on the ground. In addition, the mechanized infantry can act as the eyes and ears of the tanker, thus enabling him to deal with the limitations of the terrain described earlier. In fact, at short ranges, even attack helicopters may play a very significant role because of their capability of overcoming the confining aspects of terrain by overflying it. In any case, it is imperative that we all learn to operate in an environment dominated by short range fields of fire and observation.

Reaction times and target engagement times must be reduced to the absolute minimum by all available means. Technological developments, training exercises, and modifications in tactical doctrine must be driven by this priority. Furthermore, the role of cavalry units in reconnaissance and security operations needs to be reexamined.

Without downgrading the importance of joint armored, mechanized infantry and attack helicopter operations, armor must acquire an enhanced defensive capability *per se*—again with constant emphasis on the short-range European battlefield. This will be possible only after

initiating a research and development program aimed not at increasing the tank's maximum effective range, but rather at increasing the rate of fire and the velocity of the round itself while maintaining its lethality. This change in parameters is fundamental for effective combat operations at ranges of 1,000 meters or less.

Training Remedies

In the area of training, the time has also come to adopt techniques appropriate to the particular environment in which we will have to fight. Current training methods tend to give tankers the false assurance that they will operate in flat, open, terrain and imply the presence of all the favorable conditions for the employment of armor. The ability to operate in terrain that is both highly urbanized and cultivated must be gained by training that is tailored to this end, and that will be characterized by some of the following approaches:

- The study and application of methodologies and techniques appropriate for extremely limited fields of observation and fire.
- The use of a greater degree of operational decentralization extending down to the lowest echelons.
- A greater emphasis on combined operations of armor, mechanized infantry and air cavalry (attack helicopters) that would result in the most effective combination of surprise, shock, firepower and mobility.

"The urbanization and the natural terrain characteristics that dominate Western Europe tend to prevent the full use of fire and maneuver techniques that form the basis of current training. Within the tank itself, the limitations of the terrain directly affect the two crewmen who provide the vehicle with its mobility and firepower—the driver and the gunner."

- Exercises that better simulate the presence of both "moderately urbanized" terrain in which cropland is predominant over small built-up areas and in which fields of fire range from 500 to 1,000 meters, and "highly urbanized" terrain in which built-up areas predominate, characterized by fields of fire of 500 meters or less.
- Greater emphasis on training for the mechanized infantry in the execution of short-range reconnaissance operations, and on the use of infantry and armor in a combined arms mode to carry out rapid offensive and mop-up operations in built-up areas, small groups of buildings as well as isolated buildings.
- Development of a more specialized and technical kind of training in short-range reconnaissance operations in terrain that sharply limits visibility.

The almost treacherous nature of the terrain, as well as the extreme difficulty of determining the enemy location and disposition, makes it impossible for armor to be effective beyond the tank's limited field of fire at any one time. Thus, the closest cooperation between armor and mechanized infantry in combined arms operations is an indispensable prerequisite for the effective employment of armored units.

Conclusion

The above considerations still permit us to look with confidence to the armored force as the true protagonist of the modern defensive battle in all of its phases. Nevertheless, the armored vehicles of today are fully effective only in terrain characterized by wide, long-range fields of observation and fire, as in the desert-like terrain of the Middle East.

Looking into the future, then, it would do well to consider the introduction of a new kind of combat vehicle capable of an enhanced rate of fire and, therefore, more appropriate to engagements at short range. Such vehicles would operate together with conventional tanks and attack helicopters and thus play a key role in terrain that prevents the effective use of armor at long ranges.

LIEUTENANT COLONEL MASSIMO DAL PIAZ, a graduate of the Italian Military Academy, was commissioned in cavalry in 1965. He has served as scout platoon and tank platoon leader, *Leopard* company commander, and as executive officer in a scout helicopter battalion. He attended flight school and is also a graduate of the Italian Command and General Staff College and the Italian War School. He served as G3 and G4 on the Italian Army general staff prior to coming to Fort Knox, where he is currently the Italian liaison officer at the USAARMC.

Rethinking The Movement To Contact

By Captain William D. Hewitt

When commanders assign or receive a movement-to-contact mission, they must understand exactly what that mission involves.

The standards for conducting a movement to contact with a battalion task force (TF) state that the TF should move on multiple axes within the designated boundaries so as to gain contact with the smallest possible friendly element (a tank section or mechanized infantry squad) without being detected by the opposing force.[1,2]

By moving with two or more company teams forward in parallel columns the chances of accidentally bypassing substantial enemy forces is minimized. Furthermore, if this formation were not used, the TF might stretch out along a single axis in a 6-kilometer column.

When moving to contact with two teams forward, each leading team usually leads with a tank platoon because it has greater survivability. If only one leading team makes contact, the TF commander has at least one company team already on the flank, or ready to move to the flank, of the enemy. Even when the leading platoons of both leading teams make contact, the TF commander can still maneuver the remainder of his force.

However, some sharp conflicts between doctrine and application appear when we compare these statements with the following factors that are beyond friendly control.

- The size and strength of the enemy force the TF contacts (the commander hopes it is only an observation post (OP), reconnaissance element or enemy platoon-size unit).
- The enemy element's disposition and activity (again the commander hopes he is not firmly entrenched in defensive belts).
- The number of enemy elements that the friendly elements make simultaneous contact with (hopefully, only one).

How Many Teams Forward?

In a worst-case scenario, it's easy to imagine what would happen if a tank force, while moving along multiple axis, with two or three teams forward, had all its lead teams make contact simultaneously with enemy platoon-sized forces in well-prepared positions. With two teams forward and one or two trail teams, the commander then decides to commit his air, artillery, and trail team(s) to support one of the teams in an effort to gain the 6:1 superiority needed to win.[3] Here again, the TF commander hopes that the trail team(s) as it (they) maneuver(s) to the flank of the lead team, does (do) not encounter another enemy force. He also hopes that the enemy isn't bright enough to anticipate his actions, although, logically, the enemy commander has been considering his options while he awaits the contact.

If, however, this does occur, the TF commander could then easily find himself struggling to disengage his units. Each team would have at best a 3:1 superiority, and the TF commander would be unable to help any of them. On the other hand, even if the TF commander was able to effectively assist one team, he still would have one team in contact with no support, and this team would be trying to extract itself while keeping the

enemy force facing it from being reinforced or maneuvering.

Because authors and tacticians can explore the "what ifs" forevermore, some fundamental problems in application need to be discussed. But, if one or more teams make contact simultaneously, how does a TF commander maneuver with the *bulk* of his forces?

It is highly unlikely that company or team commanders with part of their unit in contact will want to give up platoons when they need those assets to assist the element in contact, particularly if they are to lose their assets to assist teams on the other side of the TF sector. A TF commander needs to understand that his team commanders have as much loyalty to their subordinates as they do to him. Command and control of this *ad hoc* force presents another problem. The maneuver elements would consist of a company or team and platoons from every other team. Who controls this? How? How effective are these elements going to be as a *unit?* These questions are not easily answerable and certainly not easily executable on the ground, because the TF commander either violates the *principle of unity of command* if he forms this *ad hoc* element, or the *principle of mass* if he leaves the platoons with the company and maneuvers with only one or two teams.

To sum up, the best outcome in this scenario with multiple teams forward is to double or triple the friendly casualties. In the worst case, the TF commander has piecemealed the teams into ineffective combat forces too weak to win, and too weak to continue. And at some point the TF commander must weigh violating at least one principle of war. *Some choice!*

But moving to contact with the smallest possible part of the task force and moving on multiple axes can also be achieved with one team forward. (figure 1). With one team forward, the TF commander reduces the chances of simultaneous contacts. If the lead team makes contact, the TF commander has more resources and more options available to react to the situation with the bulk of his unit, than if two lead teams make contact.

If one of the trail teams makes contact, then the TF commander has at least one company team on the flank, or ready to move to the flank, of the enemy.[4] Although inadvertently, the lead team has positioned itself to that flank, which in most cases would be a maneuver goal upon contact, and it has done so without suffering casualties. This seems to be a fortunate development, depending on the size of the enemy force. Substantial enemy force is a nebulous phrase that apparently covers anything above company level. If the enemy force is very substantial—a battalion or larger—the scouts, ground surveillance radar (GSR), or air assets, etc., should quite easily detect it. If it is less substantial—a company or battalion, thereby permitting it to slip by the security elements—the single lead team on the flank will create a greater distraction and cause more casualties by attacking that flank than it would as a single trail team.

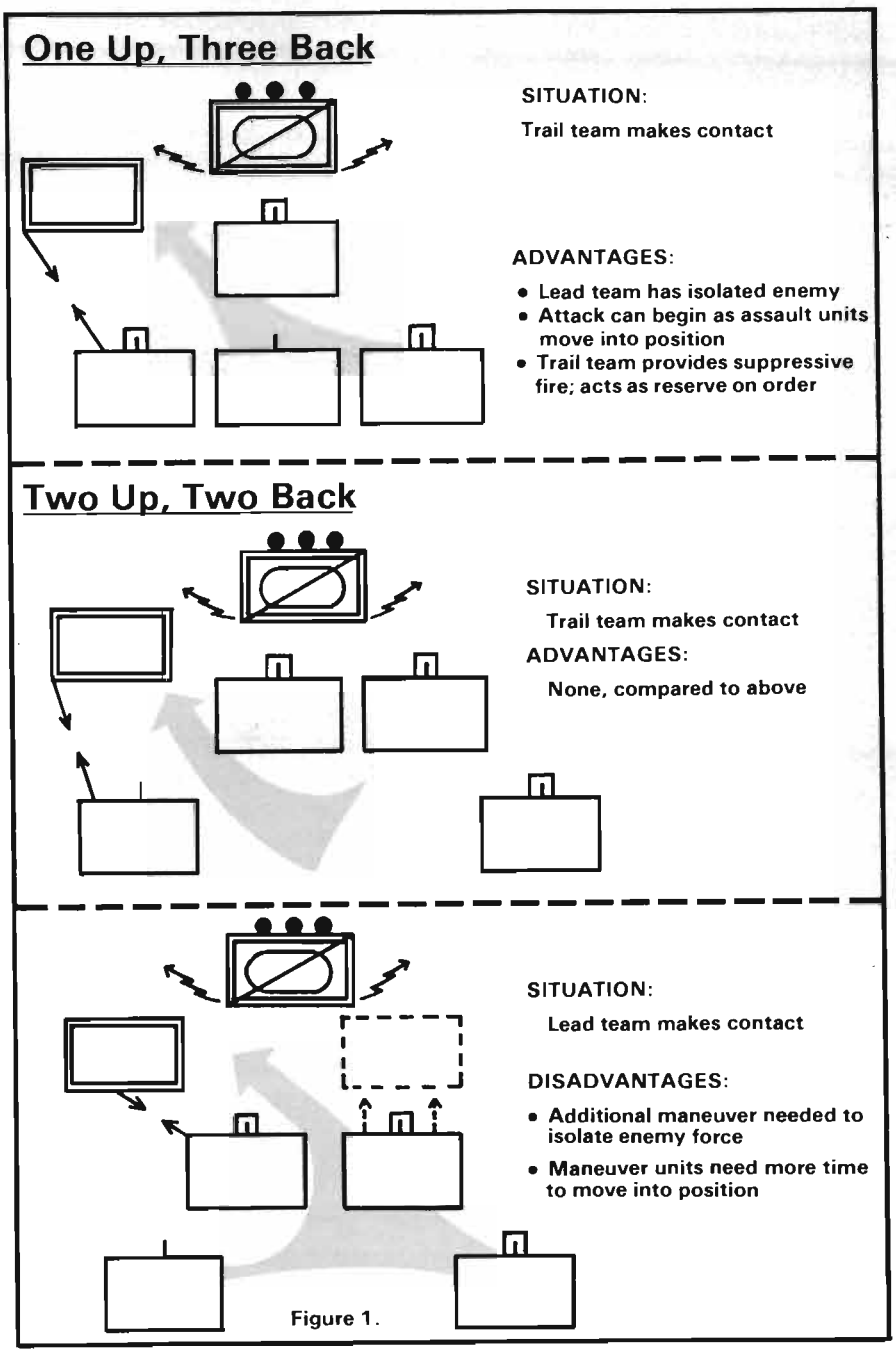


Figure 1.

Under no circumstances should commanders allow lead teams and trail teams to be separated by a distance that would divide the TF when contact is made. It is important to note that the depth of forces with one team forward and two or more trailing is the same as with two or more leading and one trailing. This would seldom, if ever, approach the six kilometer estimate in FM 71-2, Tank and Mechanized Infantry Battalion Task Force, (figure 1).

If, for some good reason, the TF commander decides to lead with more than one team forward, he must

insure that the axes of advance are mutually supporting (i.e., within direct fire range of each other) at *all* times. Diverging axes increase the chances of failure geometrically, not arithmetically! For the same reason, he cannot allow one of the lead teams to progress much faster or much slower than the other. It should also be apparent that having two teams forward does not necessarily mean that both must move simultaneously. Although FM 71-2, pp. 4-14, shows both lead teams moving, the TF commander should have his teams use bounding overwatch with one entire team in overwatch as the other moves. This is obviously more time consuming than having one lead team, but does comply with logic and the specified standards. For every 1,000 meters added to the direct fire range, it takes from 3 to 5 minutes to effectively respond, and in 5 minutes a team can be decisively engaged and destroyed. Yet it's not uncommon during training to see lead units separated by more than three kilometers and assigned diverging axes as they approach known or suspected enemy positions; or multiple teams leading with trail teams not positioned well to respond to contact.

Team Composition

Once the issue of how many teams will be forward is resolved, their composition must be determined. For mutual protection, the lead teams should never be pure tank or pure mechanized infantry. The infantry protects the tanks from dismounted enemy and antitank (AT) weapons, while the tanks provide the accurate, massive firepower that provides suppression for the infantry. Obviously, where good fields of fire exist, the lead team should be tank-heavy. Shorter fields of fire are advantageous to infantry. Remember that dead space (gullies and arroyos), creates shorter fields of fire. Careful map analysis by the S2/3 must be made to ensure proper unit selection.

Assigning a tank-heavy team to a sector *only* after considering the amount of vegetation is denying that team commander the resources that inflict enemy casualties. Just as the infantry dismounts to clear the next treeline, it also dismounts to clear the next gully or arroyo. So relief as well as vegetation must be considered!

TF commanders should not lead with an infantry-heavy team unless they anticipate dismounting them early and often. If firepower and survivability are needed, he should lead with tanks—not mounted infantry. With tanks and mechanized vehicles in overwatch, dismounted infantry in the movement to contact present quite a problem to the enemy; mounted infantry presents a lesser problem. Once the enemy slows down or halts the mounted infantry, he can use his own dismounted infantry and antitank guided missile (ATGM) teams to destroy the tanks. If the contact is made by mounted infantry, the TF commander is personally responsible for the friendly casualties. Dismounting and mounting is dictated by terrain and vegetation and may be done frequently. Dismounting too early is *always* better than dismounting too late.

All this drains soldiers physically and mentally, so plan to rotate the lead mechanized element every few hours to rest, and to rotate the type of teams from mechanized-heavy to tank-heavy and the reverse as the terrain and vegetation change.

". . . For every 1,000 meters added to the direct fire range, it takes from 3 to 5 minutes to effectively respond, and in 5 minutes, a team can be decisively engaged and destroyed. Yet it's not uncommon during training to see lead units separated by more than three kilometers and assigned diverging axes . . ."

Logically, if a mechanized-heavy team is leading, a mechanized platoon should usually be leading it, just as tank platoons should lead tank-heavy teams. This keeps more maneuver options available to the team commander. If a tank-heavy team has its only infantry platoon tied down, or eliminated, this equates to losing its security element. If a mechanized-heavy team has its only tank platoon tied down, or eliminated, its firepower and survivability are reduced. The primary combat goal of the defender is to separate tanks from infantry. Why assist him voluntarily?

Usually, trail teams should follow no closer than one checkpoint from the lead team(s) and not farther away than two checkpoints. This permits the lead units to back off their present checkpoint and move over a masked route without bumping into a trail unit. It also permits the trail unit to provide additional flank and rear security while the lead element focuses its efforts forward. Additionally, this movement technique facilitates quick reinforcement and response for the hasty attack or the defense.

Command and Control

Controlling company teams as part of the movement to contact is the function of checkpoints and target reference points (TRP). Checkpoints are predetermined points on the ground used as a means of controlling friendly movements.[5]

How many are enough? Is the measles sheet the right approach? If a checkpoint is a means of controlling movement, the question arises: How much land do you control by occupying a checkpoint? Given terrain and vegetation constraints you control only to the maximum effective range of the direct fire weapons system occupying that checkpoint. If only M-16 rifles are on a checkpoint, it would be useful to have checkpoints every 400 meters or so. If *TOWs* are occupying a checkpoint, checkpoints should be planned every 3,000 meters, provided that vegetation, hilltops, gullies, etc., don't obstruct or influence the line of sight. Such intermediate features are also considered as checkpoints.

In extensively wide open areas (desert, prairies, etc.) that lack any distinguishable features, the use of multiple phase lines every kilometer, together with the vehicle odometer, control movement (.62 mile = 1 kilometer for due north, east, south, and west movement, and .87 mile = 1.41 kilometer for moving diagonally across grid lines; i.e., northeast to southwest). Why these guidelines for checkpoints? If any feature is a possible checkpoint for you, it is logical to assume that it may have been considered as a checkpoint or defensive position by the enemy as well.

To control movement quickly, which of the following transmissions is easier, faster, and more accurate? (Consider that all checkpoints are also TRPs. Planning fires in front of, *on* or behind friendly positions is also a guideline.)

"THERE'S AN ENEMY OSCAR PAPA VICINITY ALFA ZERO ZERO ONE. ATTACK NOW."

Or after *properly* encoding the coordinates.

"THERE'S AN ENEMY OSCAR PAPA AT, 1 SET, ALFA ZULU ALFA BRAVO DELTA ECHO FOX-TROT. ATTACK NOW."

This is followed by a period of time while subordinate leaders, forward observers, etc., *properly* decode the coordinates. *Speed and accuracy!* But remember that TRP AO01 may now

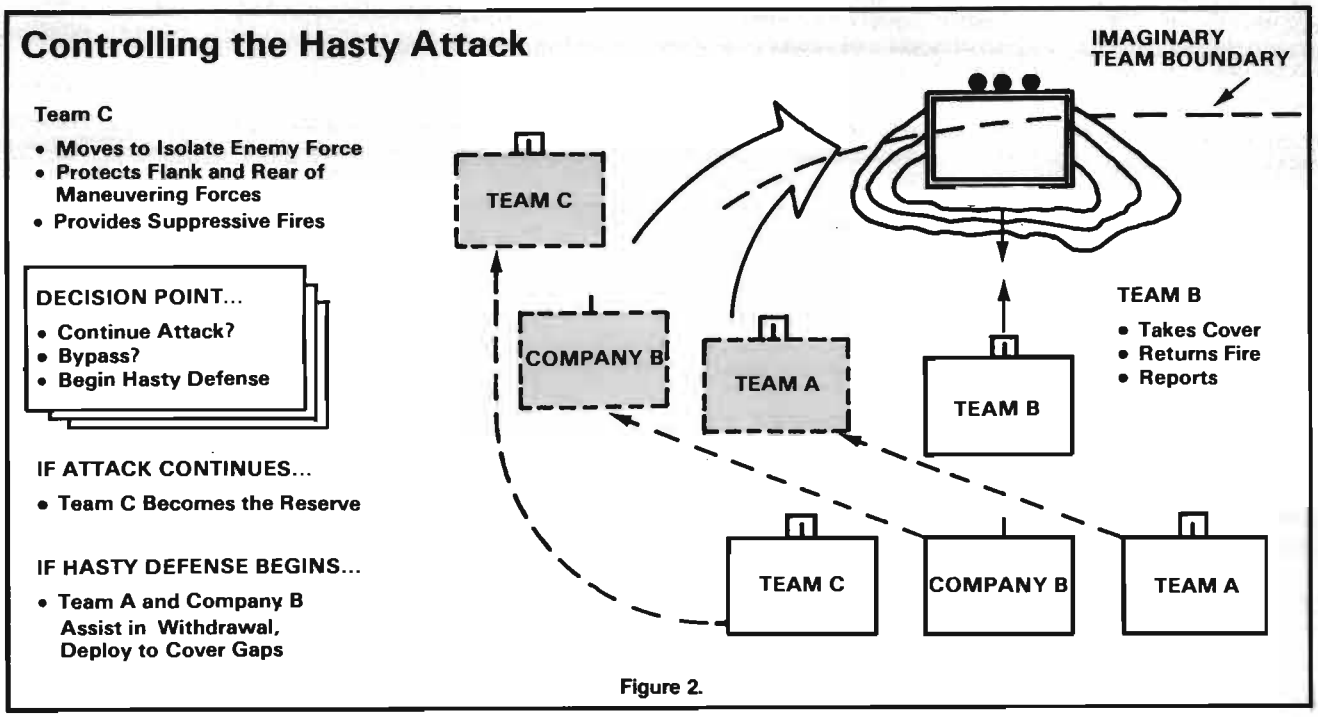


Figure 2.

be compromised. It should not be used again to control maneuver, however it can still be used to control indirect fires.

It has been suggested that because all checkpoints are also TRPs, checkpoints should be eliminated as a control graphic or term and all locations for controlling maneuver and fire should be referred to as TRPs. However, this would severely hamper quick response to the hasty attack.

TRPs are recognizable points on the ground and for identifying enemy targets or controlling direct fires . . . Once designated, TRPs also constitute indirect fire targets.[6]

Given the fact that TRPs control direct and indirect fires, the commander should consider planning TRPs around every checkpoint, if such recognizable points exist. Because movement laterally and to the rear is possible if the mission is changed to hasty defense or counterattack, the planner should keep in mind that four TRPs for every checkpoint is not excessive.

Planning checkpoints and TRPs in adjacent sectors is as important as planning them in your own sector. A few additional minutes spent during the planning phase saves friendly units from wasting valuable time encoding and decoding coordinates during the execution phase. There's no excuse for laxity in planning just because the adjacent sector temporarily belongs to someone else. After all, these actions complement lateral movement on the battlefield—a necessity for mobile warfare. The same holds true in the defense/delay.

Planning entails the prior action required to handle any foreseeable eventuality. This also includes exchanging operation orders (OPORDS) and overlays with adjacent units.

Any TF or team commander can control movement and fire with the order, "MOVE TO CHECKPOINT TWO AND ORIENT ON TANGO ROMEO PAPA ALFA ZERO ZERO ONE." Similar orders can control movement inside the battle positions for teams and platoons; for example, "REORIENT ON TANGO ROMEO PAPA ALFA ZERO ZERO TWO.

Security

This planning and execution can be very time consuming. The movement to contact can be a very fast-paced operation when moving across open areas with air assets, or a very slow-paced operation composed of tedious drills if the terrain is compartmentalized or heavily vegetated. Hence, the importance of drill discipline and rotating units to ensure freshness. There must be a balance between speed and security. These two aspects are not synonymous.

While many famous commanders have advocated speed at the expense of security, a balance was always sought, with speed being more important in the pursuit and security being more important in other operations. Close scrutiny of military history shows that even Patton slowed his pursuit in order to close gaps between units. Wise commanders do not force subordinates to move faster than they think is feasible because this hinders security and causes mistakes. Wise commanders assist subordinates by igniting their imagination and developing their intuition, so that the subordinate becomes confident in his ability to move faster than he previously felt he could.

Security is not sacrificed for speed. Commanders must realize that an excessive penchant for speed without adequate security drives lead units into enemy forces that may be superior and then compels trail units to follow into the rear of the lead units, hindering both elements' maneuver and causing unnecessary casualties. A quick trip to the lead *vehicle* by commanders should reinforce this lesson.

The scout platoon can be used to increase speed and security. Reinforcing this element with a couple of antitank (AT) sections, GSR teams, and even a mechanized infantry platoon can turn a movement to contact into a deliberate attack for the task force.

These *ad hoc* elements, if trained before the conflict, can be a valuable asset. The commander cannot expect his scout platoon leader and his team leaders to execute a demanding mission without this prior training. With it, the scout platoon remains the eyes and ears of the battalion. Scouts, with attachments, should begin their part of the mission as early as higher headquarters permits. Too often the reconnaissance experts are sent out

an hour or two before start point (SP) time and the maneuver teams catch up to them after a couple of kilometers. At this point they are either bypassed, pushed to one side, or forced into the enemy by lead teams, leaving them with no room for maneuver and unable to provide any security for the task force. The commander must give the scout platoon leader those additional assets, capabilities and time needed to provide intelligence, develop the situation within reason, provide early warning, and make the movement to contact easier. The scout platoon's mission should be to:

- Find the enemy's reconnaissance elements (OPs) and his main force (platoon defensive belt).
- Monitor enemy movement.
- Locate obstacles.
- Attempt to neutralize obstacles with infantry.
- Conduct dismounted and mounted patrols.

If the scout platoon accomplishes this, it has earned its pay. The goal of the scout element is to conduct a movement to contact, to conduct patrols, and to change the TF mission to a deliberate attack at best, or to increase the speed and security of the TF movement at worst.

The rest of the TF should remain close to the protection of the maneuver elements. A long (in space and time) movement to contact may allow an enemy force to move between the "teeth" and the "tail," easily destroying the "tail," thereby neutralizing the "teeth." The trains should be capable of and ready to rearm and refuel on order. Procedures should be established to accomplish this quickly and safely. The TF command and control element must follow close enough so they do not delay the forward movement of the maneuver teams. Mortars should move by split section to provide continuous support. Air defense artillery (ADA) elements must be positioned to engage enemy aircraft before they can attack friendly ground forces. Attached engineers should be placed behind the lead team with the priority of breaching obstacles and then assisting in breaching enemy positions.

Obstacles

Two closely related activities associated with the movement to contact are breaching obstacles and conducting the hasty attack. Because these activities can turn a well-executed movement into a bag of bloody bones, specific, detailed SOPs should be developed for each task.

If the security elements or the S2 have done their job, the TF should know, or at least be able to anticipate, where obstacles are likely to be located. These areas are known as chokepoints. As the TF approaches an obstacle, it should make every attempt to insure a mechanized-heavy team is leading. Tank-heavy units don't have enough infantry to complete the mission efficiently and expeditiously. The TF, and all Team OPORDS, or SOPs should identify a breaching force and a support force during all operations.

The breaching operation is a complex task, and the enemy will do everything he can to make it even more so. Therefore, the TF should approach the mission as it would a deliberate attack. The commander must find out as much as he can before the main force arrives. To accomplish this, the scouts occupy a series of OPs to create an umbrella to the front of the lead team(s), and to provide as much intelligence as possible. In the absence of complete intelligence, the commander should assume that the:

- Flanks of the obstacle are manned.
- Obstacle itself is mined, wired and ditched.
- Ditch may be manned with infantry and AT weapons.
- Obstacle is being overwatched by substantial enemy forces.
- Enemy will act prudently.

Considering that company-sized elements engage enemy OPs and battalion-sized elements engage enemy platoons, the TF should not try to accomplish more than is possible. The enemy has already decided, just by placing the obstacle, that he is committed to this particular piece of terrain and that he intends to make the attacker pay for it.

"Close scrutiny of military history shows that even Patton slowed his pursuit in order to close gaps between units. Wise commanders do not force subordinates to move faster than they think is feasible because this hinders security and causes mistakes . . ."

To secure both flanks and begin breaching operations simultaneously far exceeds a TF's capabilities. Protecting the breaching element requires securing the flanks, which usually requires dismounted infantry; hence, mechanized-heavy team leading. As the TF tank-heavy overwatch elements suppress one flank, the mechanized team clears the other flank. This allows friendly elements to move adjacent to the obstacle to:

- Provide suppression on enemy overwatch elements.
- Kill AT Teams in any ditch obstacle.
- Provide suppressive fire on the other flank of the obstacle while it is being secured.

Once the flanks are secured, and if bypassing is still not possible, the breaching force moves into position to begin activities. Smoke and suppressive fires continue to be placed on suspected enemy overwatch positions.

If time permits, more than one lane is breached for the TF. As the lead team moves through the lane, overwatch elements are already in place, so the lead team can move continuously through the lane toward the next checkpoint.

If the unit encounters an unanticipated obstacle, these immediate actions should occur:

- Smoke key terrain to the flanks and behind the obstacle.
- Crew-served weapons identify suspected enemy positions and provide suppressive fire.
- Vehicles in the obstacle back out using the same paths they used to enter.
- Begin breaching operations as described above.

Trying to accomplish the breaching tasks simultaneously may result in the lead teams making contact on both obstacle flanks and the engineer element making contact at the obstacle with dismounted infantry. All this would result in unnecessary casualties. Piecemealing forces at an obstacle can lead to disaster as quickly as piecemealing forces in an attack.

Hasty Attack

Contact with enemy forces usually terminates all movements to contact. Therefore, the actions upon contact should be very responsive. Standard procedures should be developed to include reporting, maneuver response, and fire response. Upon contact the team commander:

- Ensures that direct fire is returned.
- Ensures that units move to good firing positions.

• Calls for indirect fire.
• Directs suppressive fire on suspected enemy locations.
• Receives reports from subelements.
• Evaluates reports.
• Evaluates the person making the reports.
• Considers maneuver options.
• Reports to battalion.

Backup reporting systems in the teams should be encouraged to accomplish the notification of contact. Units in contact must immediately report the contact to prevent trail teams from maneuvering into the stopped lead team.

Until experience is gained, many of the commander's duties are sheer guesswork. The most critical decision is whether or not to conduct the hasty attack. Force ratios, enemy dispositions and possible enemy intentions must be determined in order to prevent the loss of the team because of incomplete reporting, overdeveloped ego, unit pride, or plain incompetence. The decision to conduct a hasty attack must be made quickly but judiciously. Teams usually have the forces to overcome an enemy observation post, while a larger part of the battalion TF is needed to overcome a platoon-size force or larger. The addition of two tank-killing weapons systems can easily impact on the success at team level.

". . . Although speed looks good to commanders as they fly over units during field exercises, security lessens friendly casualties and suppressive fire inflicts enemy casualties. Overemphasis of any one principle is dangerous. Commanders need options, not unnecessary casualties . . ."

While the decision to conduct a hasty attack is made judiciously, the attack must be quick, decisive, violent, and totally destructive. The do's and don'ts of the hasty attack are:

• Don't let the enemy fire at you without overpayment in return!
• Don't let him escape to fire again.
• Don't let him maneuver.
• Do give him the choice to surrender or die in place.

In conducting the hasty attack, commanders must realize that the "laws of time and space" cannot change. For example: if one team is in contact and other teams are moving to support that element, those elements will arrive at different times and under different conditions. Commanders must coordinate and focus their attack, just as they coordinate their defense. If the enemy is defensively deployed, the TF commander must expect minefields, bunkers, and trenches and he must approach the hasty attack much as he would the deliberate attack. The commander must avoid piecemealing his unit into the enemy.

Whether a team or a TF conducts the attack, establishment of a far base of fire by the overwatching element (at a least company (-)) is the immediate response. Orientation of the maneuver elements toward the enemy can be achieved by having a flare fired above the objective. Using the axis of advance for the maneuver unit and the flare create an imaginary line that divides the objective for maneuver units in the assault (figure 2). As the maneuver units begin to swing around the overwatching lead elements, continuous direct and indirect fire is directed at known enemy positions and suspected enemy positions. Smoke is used to isolate the enemy to protect the maneuver force.

As the maneuver force approaches the enemy, the need for accurate suppressive fire increases and, because of the enemy's fire, the ability to freely maneuver decreases. Providing increasing levels of accurate suppressive fire requires an increasingly higher percentage of the maneuver force to be committed to fire rather than maneuver. If the enemy is in well-prepared positions, or is substantial, a near base of fire might be established if the entire maneuver force has difficulty moving due to enemy fire.

Every maneuver element has the obligation to move as close to the enemy as possible until it can no longer maneuver and is still too far away to assault. Then, it becomes part of the support force, as other maneuver elements continue to move to the point of maximum friction.

If a leader finds all of his forces unable to maneuver because of enemy fire, additional forces are obviously needed. Thus a TF commander may find that he has only one platoon out of his entire force to conduct the assault or breach, with the rest in support. If the enemy is not substantial in size, nor in defense positions, a faster moving, mounted assault will still result because the entire maneuver force will be able to make the assault, as there is no need for additional support fire.

Just as the machinegun stopped headlong infantry assaults in trench warfare because it inflicted mass casualties, antiarmor weapons and intricate defenses require the TF commander to reevaluate headlong armor charges without due consideration and deliberation.

If history does indeed repeat itself, are we in the 1920-1932 time frame?

It is time to rethink our doctrine regarding the "two-up—one-back" or "two-up—two-back" mentality in movement to contact. In any event, it is time to clarify doctrine. Although speed looks good to commanders as they fly over units during field exercises, security lessens friendly casualties and suppressive fire inflicts enemy casualties. Overemphasis of any one principle is dangerous. Commanders need options, not unnecessary casualties. We simply don't have the forces to throw away in a high intensity conflict. Perhaps the loss of a single company or battalion may fall into the acceptable range to some commanders, but losing too many companies and task forces may well mean losing the war. Let's rethink the movement to contact.

Footnotes

[1] ARTEP 71-2, 3-862-863.
[2] FM 71-2, Tank and Mechanized Infantry Battalion Task Force, pp. 4-10.
[3] Ibid.
[4] FM 71-2
[5] FM 101-5-1, Operational Terms and Graphics, pp. 1-23.
[6] Ibid.

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Armor Technology Part V: Crew Survivability

by Joseph E. Backofen, Jr.

This is the last article of the series on tanks and the technologies of armor penetration, armor, and survivability.

The U.S. and NATO have become very concerned with the cost of armored vehicles for land warfare, such as the *Abrams, Leopard II,* and the *Bradley.* This is an important concern because it is obvious that there will be a limited number of these vehicles and that many of them will be damaged in combat. Throughout this series of ARMOR articles the principal means of armor protection for these vehicles and armor penetration have been explored; but the true philosophy behind this exploration has not been fully disclosed. This latter is simply, *Only the Crew Counts.* Furthermore, this philosophy is apparently not such an extreme viewpoint because Sweden and Israel have taken the same approach in the design of the *S-Tank* and the *Merkava,* respectively.[1-3]

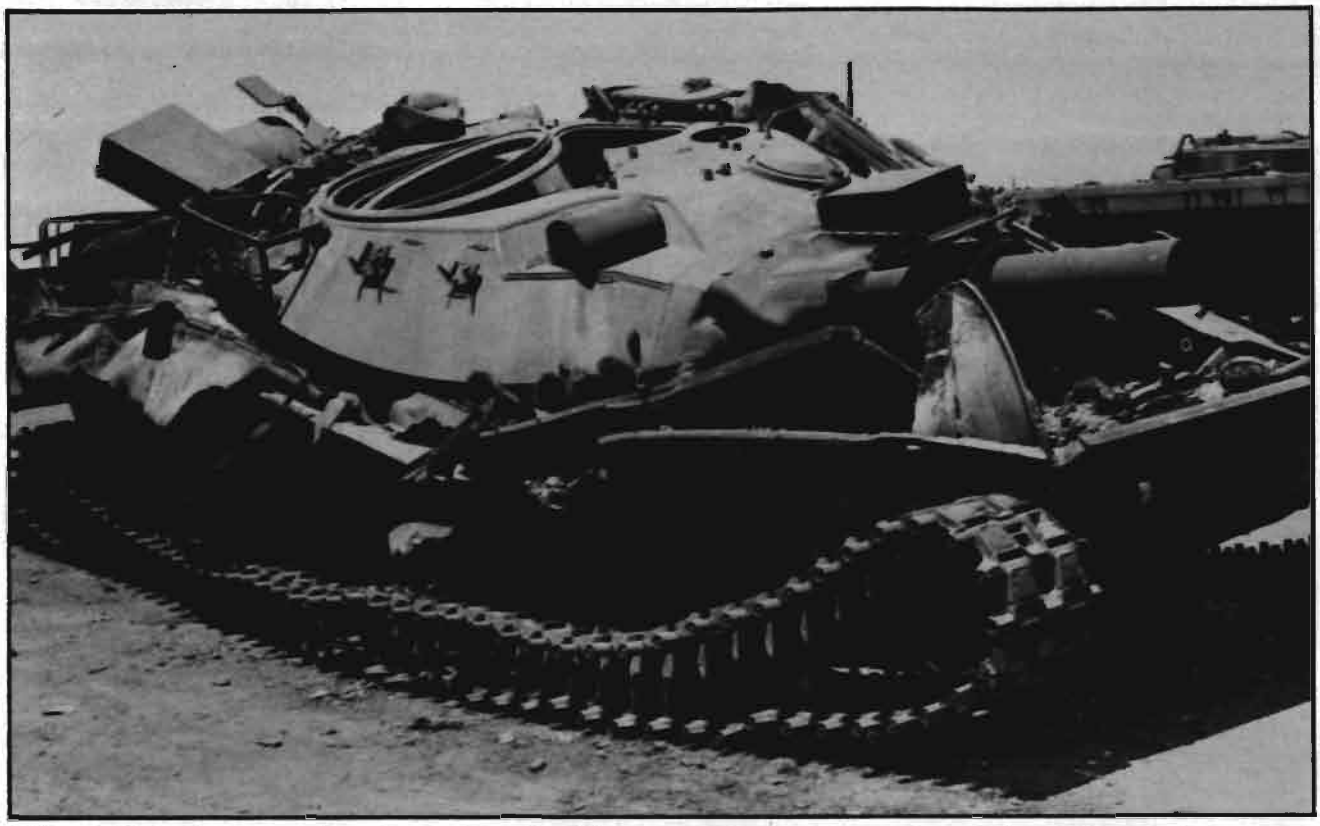
There are many reasons for placing the protection and survival of the crew above all materiel and its associated costs. On one hand, the easiest to understand are the feelings of those who have used armored vehicles in combat. Similarly, another easily understood point is that trained armor troops perform best when protected by stout armor[4] and are usually sacrificed carelessly when put out as infantry.[5] Furthermore, the costs of training and replacing personnel have also been well noted before considering the complexities of modern armored vehicles and their onboard equipment.[1, 6, 7]

Yet, on the other hand, one can note the attitude from the feelings of Israeli *Centurion* crews toward American-made *Pattons*[8] and the following quote from an Israeli infantry commander regarding armored personnel carriers[9] and the attitude troops have when they do not have confidence in the ability of their materiel to provide adequate protection.

> "In the first engagement we had trouble getting the troops to dismount from the protective womb of the APCs, but after witnessing the flaming destruction of entire squads in vehicles hit by antitank fire, we had trouble getting the troops back in."

The principal reason for the catastrophic loss of manned armored weapons platforms whether they be naval battle-cruisers such as the *Invincible, Indefatigable* or the *Hood,* or armored vehicles such as the *M-4, T-55, M60,* and *M113* is the destruction caused by intense ammunition and fuel fires inside the armored hull. [2, 10-13] However, before discussing these, it is important to remember the sequence—"don't be seen; if seen, don't be hit; if hit, survive." This sequence is most important because it is the exact opposite of that pronounced by the electronics and "the-tank-is-dead" lobbies that preach: "What can be seen can be acquired; acquired, hit; hit, penetrated and defeated."[14]

Camouflage, radiation suppression or absorption, and



hiding behind other materials, such as hills and buildings, are implied by "don't be seen".[14, 15] The results of numerous studies and practical experience have shown that camouflage is effective when you are stationary. However, it is not really meaningful to mobile armored forces unless they are either broken down (i.e., stopped) or hiding from the enemy. It is also not particularly effective if the enemy reconnoiters by fire using improved conventional munitions (bomblets) or denies potentially hostile areas by using rapidly emplaced mines. Still, a vehicle paint scheme is necessary and can at least be selected to blend into the local terrain so as to reduce the speed with which one is discovered and acquired.[16, 17]

The general trend toward running helter skelter or seeking "hit avoidance" has been discussed in *ARMOR* Magazine and has been associated with the rapid movement across or about the battlefield and was expresed as high mobility and agility. There are a few natural constraints that limit the usefulness of hit avoidance such as; fuel consumption and availability, mines, terrain, equipment failure and wear, and the buddy who has already moved forward to hide behind the lone rock on the battlefield. Bounding about on the battlefield will also not be conducive to camouflage.

The basic problem with "hit avoidance" advocates and the philosophy of the "hit-equals-kill" electronics community is that they are putting their money on armor being a fighter with a "glass jaw." The tables can be completely turned if armored vehicles become capable of absorbing some hits and still be capable of reaching out and punishing the enemy. The way to achieve this is to make them survivable. And in particular, the crew must be kept alive with the will and the means to fight.

The first major survivability problem to be tackled is that of the vulnerability of ammunition. Many years before the advent of tanks, it was noted that warships were mostly destroyed when a magazine was hit. Thus, the magazines were moved deep within the ship below the waterline so that they would not be exposed to enemy direct fire.[18] In tanks, a similar principle is to locate the ammunition as low as possible below the turret ring so that it will not be hit when a shaped-charge jet or kinetic-energy (KE) penetrator perforates the armor and passes through the interior. This principle has been given credit for the survivability rate of the Centurion[8] and has been applied in the *S-Tank*, *Chieftian*,[19] *Challenger*[20] and *T-72*.[21]

However, keeping the ammunition stowed low in a vehicle, and still requiring it to be manhandled into the gun during battle, generates the problem of ready rounds either stowed or temporarily located in the turret. In ships, it was noted that the rounds in the turret and these on the ammunition hoist could propagate an explosion and cause the magazine to explode.[22] The Germans used interlocking doors so that the ammunition was fully compartmentalized at all times preventing it being easily exploded and sinking the ship.[22]

In an armored land vehicle, any main gun round struck in either its high explosive or propellant charge by a shaped-charge jet or a KE penetrator is likely to cause the death of the crew.[23] Thus, it is important that all ammunition be compartmented with blast proof doors that separate the crew and the ammunition. Both the *M1 Abrams* and *Leopard II* have applied the technology of separate, explosion-proof compartmentation of ammunition in order to enhance the survivability of the crew and the vehicle.[24, 25]

It was long known that wet propellant was difficult to ignite or use in a gun. Aboard ships, magazines were flooded to keep them from being destroyed by fires. In armored vehicles, "wet stowage" was fielded in late-production, 76-mm armed *Shermans* in the form of water jackets[12, 16, 26] "so that any projectile or splinter which penetrated as far as the ammunition would puncture the water-jacket and release water over the ammunition so as to smother any possible fire."[11] Many of these vehicles were supplied to the Soviet Union or Great Britain.[26] Originally, the 90-mm ammunition for the *T-26E1* was also

stowed in water-protected bins in the floor of the fighting compartment.[27] However, this was sacrificed so that more ammunition could be squeezed into the tank and also so that the ammunition would be more accessible.[27] Later, when the British considered improving the survivability of their tanks during the development of the *Chieftain,* they consulted the Royal Navy about the vulnerability of bagged propellant charges versus those in metal cartridge cases.[2] They discovered that:

> "when cased charges were hit they usually disrupted on impact. This was attributed to a rapid rise of pressure when the hot projectile or fragment reached the cordite. When bagged charges were struck delays of several seconds were often noted whilst the cordite smoked before igniting; so experiments were made to see if fires could be prevented by water cooling the cordite during the delay period."[19]

This research led to the ammunition water jackets used in both the *Chieftian* and the new *Challenger.*[19, 20] Similar research has recently been conducted with the German 120-mm ammunition for the *Leopard II* and has used high-pressure water jackets.[28] This technique also uses the introduction of the water to quench the propellant by lowering the temperature and pressure thus minimizing the total reaction and its severity.[28, 29] However, water jackets increase each round of ammunition's volume, causing either the ammunition compartments to increase or the number of rounds carried to be reduced. If one truly believes in new fire control equipment that will make very efficient use of the ammunition, then decreasing the number of rounds carried to make the vehicle more survivable may now be acceptable design practice.

Since it is generally accepted that a properly designed ammunition compartment can save the crew from the effects of propellant charges being struck by shaped-charge jets and KE penetration debris, the natural question arises as to whether the effects of high explosive warheads could be similarly contained. Recent research has indicated that the vulnerability of the warheads themselves to impact can be reduced,[30] that fratricide between warheads can be controlled to some extent,[31] and that structures can be designed to successfully contain or vent high explosive events.[23] However, it is too early to predict for certain whether ammunition stowage could be engineered so as to sustain hits directly into high explosive-filled ammunition. In the interim, such ammunition could possibly be handled in jettisonable magazines such as has been investigated in Sweden.[32, 33]

The removal of ammunition into a stowage compartment separate from the crew compartment brings up the question of automatic loaders that could be used to make this removal complete, to increase the rate of fire of the gun, and to reduce the overall cubic volume of the weapon station. Automatic loaders for tanks were considered as early as late 1943 on the *T22E1,* firing 75-mm ammunition.[27] Automatic loaders have been considered and prototyped for numerous U.S. tanks such as the *M-4, T-90, T-92,* and *MBT-70,* as well as the recent test bed vehicles, such as *HIMAG* and *HSTVL.* Apparently, the ability of the U.S. to field an automatic loader for tanks is still being questioned as a critical issue in the latest test bed program "....do we have the technology to provide a safe, reliable automatic loader for a main tank gun?"[34] However, automatic loaders have been fielded in the French *AMX-13* light tank, the Swedish *S tank,* and the Soviet *T-64* and *T-72* tanks.[2, 13, 21, 24] Hopefully, the technology of autoloaders can be used in future U.S. tanks to complete the separation of the crew and the ammunition to enhance the survivability of both of them.

The second major survivability problem is associated with the vehicle's fuel and lubricants. In a sense, this problem is similar to the well-publicized problems involving Ford *Pintos* that were hit in the rear during auto accidents. The safety hazards associated with gasoline stowed in the tank's crew compartment were recognized very early in the 1930's and resulted in suggestions that diesel fuel and engines be used for reasons of both safety and fuel economy (which would result in less fuel being needed to be stowed for a specific range capability.)[6] The Soviets were the first to switch to diesel engines, using them in the production versions of *BT-7M* tanks from 1939 on so that they could take advantage of the increased range for a given weight and volume of fuel.[35, 36] However, it must be remembered that research on their engine had started as early as 1932.[36] Furthermore, they had recognized the survivability problems associated with using gasoline and the vapors from engines in the design of the *T-28* tank in 1932 by stowing the fuel in two armored compartments mounted on each side above the tracks and by using a fireproof bulkhead between the crew and engine compartment.[36] (An additional benefit of the Soviet engine research conducted with the "fast tanks" of the 1930's was the mobility and agility experimentation performed on test ranges and battlefields with test beds having horsepower-to-weight ratios of around 35:1).

During WWII, the Germans switched over from gasoline to diesel fuel while the U.S. and Britain used diesel engines in a few vehicles, mostly when gasoline engine production was insufficient.[11, 12, 35] This was greatly influenced by the War Department policy that U.S. troops would only be supplied with gasoline-powered tanks, which resulted in U.S.-manufactured, diesel-powered tanks being supplied to the Soviet Union and Great Britain under Lend-lease.[26] Furthermore, the decision to fully favor diesel in design practice appears to have occurred in Britain about 1956 and in the U.S. in late 1956 with the trial installation of an AVDS-1790-P in an *M-48* tank that led to the present *M60* series tanks.[24, 35]

The vulnerability or survivability of gasoline, diesel fuel, and hydraulic fluid are generally attributed to their flammability. However, burning pools of these and other materials release their energy over a long period of time and can usually be quenched by fire extinguishers. The real problem is associated with their vapors or with aerosols produced by weapon impact (shaped-charge jet or KE penetrator).[37-39] This is because the vapors and aerosols provide a very large surface that can "burn" so rapidly as to cause an explosion such as happens in the cylinders of an engine. The hazards of such explosions are well known in industries such as chemical manufacturing, oil refining, coal mining, grain silo storage, and spray painting.[40-43] Similarly, the methods of protecting personnel by means of proper equipment design, remote automatic operation, blast bulkheads, and automatic flame-spread suppression are well known to plant and industrial equipment builders.[40-43]

The difference between these industrial hazards and crew-killing explosions is that the conditions for their occurrence are deliberately caused by an enemy shooting through a fuel tank placed inside the crew compartment.

The best way to provide for crew and vehicle survivability from fuel fires appears to be by placing the fuel in lightly armored, self-sealing multiple fuel cells located outside the principal armored envelope as suggested by Brigadier Simpkin and practiced by some designers.[11, 13, 36, 44] This would remove the initial hazard from the crew and would also not subject them to the effects of a fire suppression system.[37-39] Additional technology adapted from the

aircraft industry which is concerned with crash-proof fuel tanks as well as battle damage assessments. could be used to provide fuel tank resistance to explosions and fire. For example, nitrogen-inerting of the empty portion of the fuel tank could be used to hold down the formation of fuel vapor.[44] Another method would be to use foams, foils, or powders within the fuel tank to soak up the shock wave generated by weapon penetration and to absorb the heat so that fuel is not raised to its ignition temperature.[45-48] Employing some of these methods may permit the use of the fuel as an integral part of the armor system as previously suggested in ARMOR Magazine.

If the primary destroyers of the crew and vehicle (ammunition and fuels) are removed from the crew compartment, then only the effects of the attacking weapon overmatching the armor are left as hazards to the crew. As previously discussed in ARMOR Magazine, the spall produced from the rear surface of metallic armors produces a significant hazard. However, spall liners, can very effectively reduce this hazard. (*See "Improving Combat Crew Survivability," by Donald R. Kennedy, ARMOR, July-August 1983. Ed.*) Furthermore, the hazard of very fine debris and larger fragments is not unlike that faced by the tankers of WWI where bullet splash entered through numerous cracks, crevices, etc. As protection, the tankers developed and wore safety goggles, helmets with a silk curtain that draped around their necks to their shoulders, and body protection.[49] More recently, Israeli tank crews have been provided with bulletproof goggles, light armor vests, fireproof gloves, and overalls.[50] The application of the modern technologies used in police vests, executive protective clothes, and lightweight helmets should be capable of comfortably providing enhanced ballistic protection while both inside and outside an armored vehicle.[51-53] There is little doubt that these protective measures will enhance survivability of individual crew members. They may also help to enhance crew effectiveness on the battlefield. Such an increase in effectiveness was obtained by the Mongol hordes of Genghis-Khan who wore tightly woven silk undergarments to capture and arrest arrows and other weapons that pierced their leather and metal outer armor.[54, 55] The ability of their Chinese doctors to remove the offending weapon, leaving a puncture wound treatable with the medicine and herbs of that period, significantly helped to return battle-trained soldiers to their ranks.[55] Another point that should not be overlooked by military planners is that logistically it is much more efficient and less expensive to provide for survival of personnel at the front than to collect, train, and transport replacements.[7]

Although body armor and protective suits can provide protection from spall and high speed debris, they do not yet necessarily provide safety from blast overpressures. These blast overpressures can be caused by the ignition of the ammunition and fuel, if they are within the crew compartment. However, they can also be caused by "vaporific" explosions from light metal armors. As previously discussed in ARMOR Magazine this can be caused by shaped charge-jet perforation of aluminum armor.[56, 57] However, it can occur with any finely divided reactive material that is

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flashed at elevated temperatures, such as: aluminum, magnesium, uranium, zinc, flour, grain, wood dust, paint, sugar, plastics, pharmaceutical drugs, hydraulic fluid,—even powdered milk![42] It is very simply an industrial hazard that commonly occurs in hammer-mills, machine shops, and powder manufacturing facilities.[42, 43, 58-61] The suppression of these effects by means of soft liners, relief valves, and other techniques are well known.

Even though armor materials, arrays, and equipment can be chosen and designed to minimize crew compartment blasts, there have been and are presently available weapons that attempt to produce their own crew compartment blasts so as to reach out sideways and kill the crew. Early versions of these were the KE armor-piercing ammunitions copied from naval projectiles having base charges consisting of aluminized (dust or flake) explosives. These were used by both Germany and the Soviet Union throughout WWII.[26, 62] The subcaliber uranium cores of German WWII ammunition were also noted to provide an incendiary effect. This has similarly been advertised for newly developed depleted uranium-cored projectiles and others having special materials.[63, 64]

Recent shaped-charge weapons have been developed to produce blasts and incendiary effects behind armor in order to kill the crew and destroy the vehicle.[65-67] However, the same effects were deliberately achieved by zinc, shaped-charge liners in hundreds of thousands of German WWII HL/C gun-fired antitank projectiles.[68] Similarly, blast effectiveness behind armor led to the selection of aluminum for use as the shaped-charge liner material for the U.S. *DART* during the 1950's. Means to suppress these weapons' effects will need to be incorporated within the arrays of future armored vehicles or the crew will have to be protected by blast-proof armor suits similar to those worn by the imperial storm troopers in Star Wars, which might be just as well when the chemical and biological threat from the Soviets is also considered.

The previous articles in this series discussing armor for armored vehicles have covered protection from nuclear radiation. An armored vehicle similarly provides good protection for the crew from other nuclear effects, such as blast, intense light, and thermal radiation.[70, 71] However, nuclear explosions can seriously affect the electronic eyes, ears, and brain of an armored vehicle through these effects as well as nuclear electromagnetic propogation and neutron interaction with solid-state circuitry.[71-74] A tank that has lost its fire control and its ability to communicate will be at a serious disadvantage on the modern, mobile battlefield.[75] In modern combat these devices have become extensions of the crew in order to accomplish their mission as much as the telephone has become both in the home and modern business. However, this equipment, too, may be sacrificed in order to keep the crew alive.

In summary, this article has completed the series on tanks and the technologies of armor penetration, armor, and survivability. It has explored the means for accomplishing the most important mission of peacetime military planners, program managers and materiel designers: *personnel survival.* If this goal is properly considered during periods of peace, it may greatly contribute to the factors that determine success on the battlefield through its use of and within the principles of war.[7]

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Polish cavalrymen who batt
panzers in 1939 were mount
obsolete tankettes, like the TK
upper left. Old Russian Putilov

Polish Cavalry Aga

By Steven J.

Tales of Polish cavalry charges against German tanks during the September 1939 campaign still remain widely believed even amongst serious historians who are otherwise skeptical of similar German propaganda excesses of the period.[1] The subject has been dealt with in extensive detail by Polish military historians, but most of this material is inaccessible to western historians due to the language barrier. The aim of this article is to briefly examine the evolution of the Polish cavalry's tactical antitank doctrine, and to examine its application in one of the actual tank-vs-cavalry engagements of 1939.

The anachronistic retention of a large cavalry arm, amounting to about 10 percent of the Polish Army, after 1920, stemmed from the dominant role played by mounted

alrymen who battled the German 1939 were mounted on horses or nkettes, like the TK-series vehicles at Old Russian Putilov field guns, above, rechambered for more modern French ammunition, were adequate against German light tanks, like the PzKpfw IB hit on the superstructure at upper right. Machinegun sections and reconnaissance troops, below, also depended on the horses. But lancer regiments, like those seen at lower left on maneuvers in 1938, had given up their lances prior to the German invasion.

ry Against the Panzers

By Steven J. Zaloga

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troops in the 1920 Russo-Polish War.[2] Although Polish army officers came to realize in the 1920's that widespread adoption of machineguns by the Red Army would drastically reduce the viability of mounted charges, in the absence of a mechanized counterpart the cavalry was still viewed as a vital mobile force in the vast reaches of the Ukraine and Eastern Poland. Mechanization of the Polish Army was slowed by the conservative traditionalism of the cavalry as well as by formidable economic barriers. Mounted charges had been frequently successful in the 1920 war, but cavalry doctrine after that war gradually turned to the employment of the cavalry in a dragoon fashion, using the horses for mobility, but attacking on foot. In 1934, the lance was officially dropped except for training, though the sabre was retained to supplement the standard arm of the cavalry, a 7.92-mm carbine of the Mauser pattern.

Polish field regulations of the 1920's did not seriously consider cavalry-tank configurations as the Red Army had even fewer tanks than the Polish Army, and the German Reichswehr, by law, had none.[3] The speedy growth of Soviet tank forces in the 1929-32 period prompted the Poles to issue new instructions for the cavalry in 1933 dealing with antitank combat.[4] Enemy tanks were to be dealt with by the new "P" armor piercing machinegun ammunition and by cavalry, armored cars, and tankettes at short ranges. At greater ranges, horse artillery batteries were to be used. What was not appreciated at the time was that

newer Soviet tanks were more heavily armored than their Polish counterparts and were largely invulnerable to heavy machinegun fire as the "P" type ammunition could only penetrate 9-mm of armor at 250 meters. Nevertheless, the 1933 instructions did not view antitank operations as a predominent concern of the cavalry, and foresaw no major difficulty in a direct tank-vs-cavalry engagement, if properly handled.

By 1936, this view had completely changed. The Cavalry Department was shocked when the German cavalry began to be mechanized following the Nazi rise to power, and both Germany and the Soviet Union embarked on massive tank production programs. The 1937, cavalry instructions offered a more sophisticated tactical approach to dealing with armor than the 1933 instructions. The new instructions covered the organization of opposing forces, the use of terrain in defeating armor, and the means available to a cavalry brigade in defending against tanks. The instructions pointed out the revolutionary tactical implications of armored divisions and acknowledged that "cavalry forces will continually face (armored forces) and must learn to deal with them if they (Cavalry) are to fulfill their assignments."[5] Several tactical modes were offered, mainly dealing with antitank defense against an attacking tank unit, and stressing the vulnerability of armored formations due to their long logistical trains and their supposed susceptibility to night attack by cavalry.

The 1937 instructions finally recognized the central role that armored formations would play in a future war, but misperceived both the striking power of armored divisions and the means necessary to defeat them. These misperceptions were based to some extent on Polish inexperience with armored formations larger than battalion size as well as internal controversy within the Polish Army over cavalry mechanization which made any objective evaluation of German or Soviet armored divisions very difficult.

Officers outside the cavalry were irritated by the generosity shown to the cavalry brigades in the annual Polish military budget, and were skeptical of the cavalry's reputed abilities in modern war. Polish cavalry brigades, though only 37-43 percent the size of infantry divisions on war footing, received 80 percent of the annual funding allotted to an infantry division due to the high cost of their mounts and their larger professional cadre during peacetime.[8] The Inspectors of the Army, such as General K. Fabrycy, were critical of the cavalry's obdurate resistance to mechanization. In the course of these debates, the cavalry advocates denigrated the utility of mechanized units and exaggerated their weaknesses. This partisan squabbling contaminated the evolution of tactical doctrine by politicizing assessments of the German and Soviet armored forces.

While the budgetary battles had an unfortunate impact on antitank doctrine, the cavalry's reactionary position would have been given less credence elsewhere in the army had it not been for Poland's own disappointing experience with tanks.

The Polish armored force, until 1936, was equipped almost entirely with tankettes and light armored cars. The cavalry was very familiar with these vehicles as each cavalry brigade had an armored troop equipped with 13 *TK* or *TKS* tankettes and seven Model 1934 armored cars. The tankettes were so lightly armored that they were vulnerable to heavy machine gun fire under 250 meters and were only armed with a single machinegun. Their mobility was very limited and they were extremely prone to mechanical breakdown. The armored cars were little better, though some were equipped with short barrelled 37-mm guns of WWI vintage. Poland eventually manufactured three battalions of excellent *7TP* light tanks based on a modified British Vickers design, but these units were not active in the summer manuevers until 1938 and 1939. Polish cavalry officers failed to display the imagination to realize that countries which enjoyed more extensive technological facilities could develop armored vehicles which transcended the technical and operational frailties of their own meager armored force.

7TP Light Tank

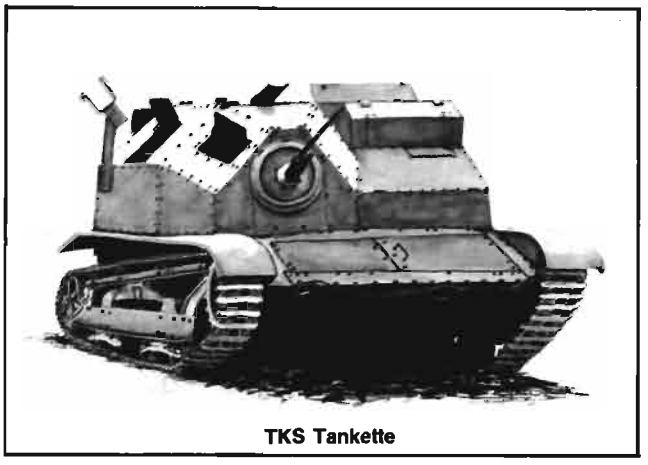
The 1927 instructions listed seven means for fighting enemy armored vehicles:

- antitank ammunition for rifles and machineguns
- hand grenades
- 37-mm antitank guns
- horse artillery
- brigade armored troops
- bombers
- engineer equipment

Antitank ammunition for rifles and machineguns, grenades, and brigade armor were all ineffective against German armor attacking frontally. Bombers would seldom be available and while valuable in attacking armored division trucks and transport, would not be very helpful against tanks due to the lack of shaped-charge bombs, rockets, or other dedicated antiarmor munitions. Mines were seldom available in quantities adequate to have any impact on ordinary tactical situations. This left only 37-mm antitank guns and artillery as the basis for antitank defense.

The 1936 Polish army modernization program resulted in only two cavalry brigades being mechanized before the war's outbreak, but it had dramatic results in increasing the antitank capabilities of the remaining cavalry brigades. Beginning in 1937, cavalry regiments each began receiving four 37-mm Model 36 antitank guns. These were license-produced guns of Swedish Bofors design and were the most effective guns of their size, capable of penetrating the armor of nearly any German tank of the period at ranges in excess of 1,000 meters.

The Polish army also adopted a 7.92-mm Ur Model 1935 antitank rifle in 1937. This weapon used a novel tungsten-carbide-cored bullet giving it effective armor penetration of most German tanks at 250 meters.[9] The 1936 modernization program added 66 antitank rifles and 18 antitank guns to each 3-regiment cavalry brigade, and up to 78 AT rifles and 22 AT guns to a 4-regiment cavalry brigade.[10] In addition to these weapons, each cavalry brigade had a horse artillery troop with 12-16 75-mm Model 02/26 field guns. These were old Russian Putilov 3-inchers with their barrels relined to chamber French 75-mm ammunition. Although the armor-piercing capabilities of such field guns were limited, the concussive effects of their high



TKS Tankette

explosive rounds against the thinly armored German tanks of the period were quite lethal.

The organization of Polish cavalry brigades was flexible and could consist of either three or four cavalry regiments, with or without a battalion of infantry, and supporting arms. The strength of a cavalry regiment was 842 men, slightly smaller than a Polish infantry battalion (941 men). The actual fighting strength of a cavalry regiment was somewhat less than an infantry battalion since a certain portion of the troops had to be assigned as horse handlers.

The tales of Polish cavalry charges against tanks stemmed from a small skirmish near the village of Krojanty on the evening of 1 September 1939. Two squadrons of the 18th Lancers, after executing a successful charge against a German infantry battalion in a wood's clearing, were suddenly attacked by two German armored cars, losing several dozen men before they could withdraw to a nearby copse.[11] Italian journalists visiting the scene the next day were told that the troopers had been killed while charging tanks, and German propaganda further embellished the tales. Even the Poles have promoted the tales, if only as a metaphor for the bravery of Polish troops in 1939, although the tales of actual charges against tanks are not literally correct. A more representative example of cavalry-vs-tank action occurred on 1 September 1939 near Mokra between the Wolynian Cavalry Brigade and the 4th Panzer Division.

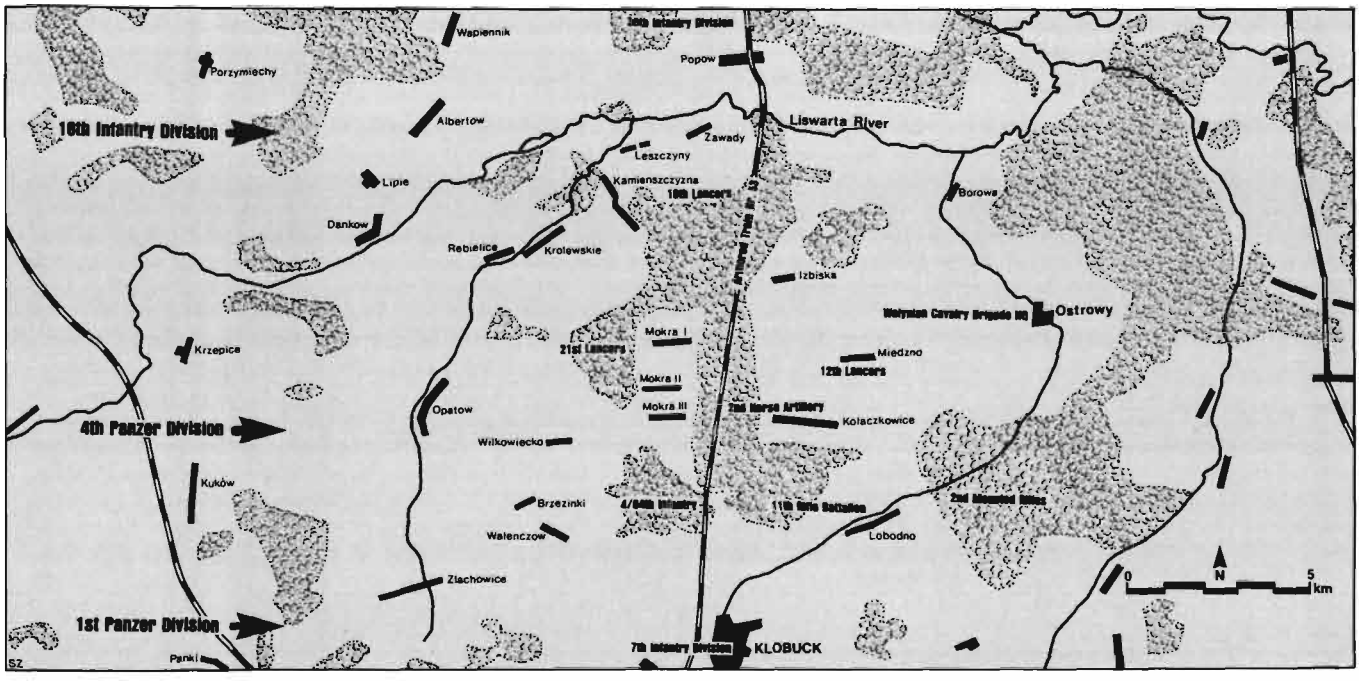
The order of battle of the Wolynian Cavalry Brigade on 1 September was:

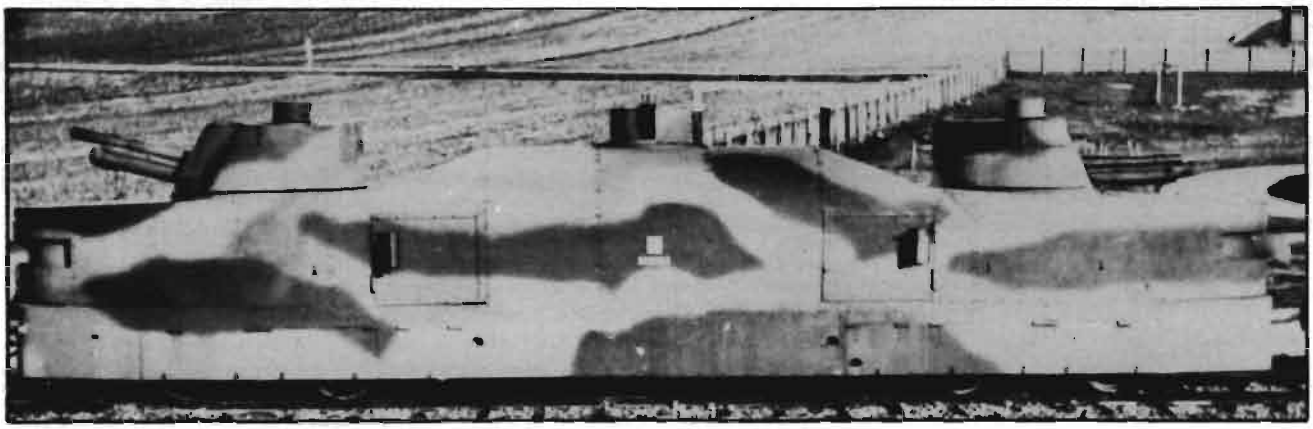
2nd Mounted Rifles	2nd Horse Artillery
12th Lancers	21st Armored Troop
19th Lancers	4/84th Infantry
21st Lancers	

In addition to these units, on 28 August 1939, the Nr. 53 armored train "Smialy" was subordinated to the brigade to provide further artillery support.[12] The Wolynian Cavalry Brigade, part of Army Lodz in 1939, was assigned to the Ostrowy region on the German border and formed a link between the southernmost element of Army Lodz, the 30th Infantry Division, and the northernmost element of Army Krakow, the 7th Infantry Division. The brigade was assigned a sector of the front in excess of 10 km which, according to Polish tactical doctrine, was greater than prudent for such a unit. Overextension of Polish units in the 1939 disposition was one of the primary shortcomings of the defense Plan Z. The main strength of the brigade was in the woods surrounding the village of Mokra which was made up of three hamlets.[13] The German border was 5-10 km to the west and interposed between the frontier and the brigade were screening elements of the 7th Infantry Division consisting of an infantry company, a divisional cavalry platoon (in Krzepice) and the remainder of the 7th Infantry's divisional cavalry in Wilkowiecko. The main strength of the 7th Infantry Division was in and around Klobuck to the south, and elements of the 30th Infantry Division held the line as far south as Popow.

The terrain available to the Wolynian Cavalry Brigade was very suitable for defense, with the Liswarta River to the north offering a measure of flank security, and woods extending across the whole length of the Brigade front. In addition there was Hill 268 near Opatow and Hill 258.6 near Rebielice-Krolewskie offering good vistas towards the German frontier. (see map 1.)

Colonel Filipowicz, Wolynian Cavalry Brigade CO., decided to adopt a typical "hedgehog" defense which





Armored Train No. 53 supported Polish cavalrymen during the Battle of Mokra.

meant concentrating the bulk of the forces, with reserves, in the center, with mounted squadrons scouting beyond the perimeter. The most difficult assignment went to the 21st Lancers which held the center near the forest opening leading into Mokra. A platoon of the 1st squadron was assigned to scout on horseback towards Krzepice, the 3d squadron with two-machinegun *taczankas* (tankettes) and a Bofors AT gun set up screening positions on Hill 268. The 2d Squadron held the north shoulder of the forest opening in shallow entrenchments, the 4th Squadron the south shoulder, and the remainder of 1st Squadron took up flank security duties on a hill near Rebielice-Krolewskie. The northern portion of the woods was held by the 19th Lancers with their scouting patrols out as far as Dankow.[14] The southern woods east of Brzezinki was held by the 4/84th Infantry and behind them, south of Kolaczkowice, was the 11th Rifle Battalion. The 2d Mounted Rifles held the woods east of Lobodno, and the 12th Lancers were held as brigade reserves in the fields near Miedzno. The brigade's fire support came from the 2d Horse Artillery, located in the woods behind Mokra, and from Nr. 53 armored train, riding the rails through the forest near Mokra. Brigade headquarters were located in Ostrowy and communication was by radio, field telephone and mounted courier. The cavalry troops had one day to dig in before the war's outbreak and except for the patrols and squadrons on observation duty, all the units were dismounted with their horses held about 1 km behind their positions.

Facing the Wolynian Cavalry Brigade was the 4th Panzer Division consisting of 2 tank regiments, a motorized rifle brigade and supporting units. The 4th Panzer Division was more than double the size of its opponent with about 13,000 men and had 324 tanks, 101 armored cars, 28 field artillery pieces, 48 37-mm antitank guns and 12 antiaircraft guns. The majority of the division's vehicles were light *PzKpfw I* and *PzKpfw II* tanks armed with twin machineguns and a 20-mm autocannon respectively. The boundary separating the 4th Panzer Division from the 18th Infantry Division to its north was roughly the Liswarta River, while its southern partner, the 1st Panzer Division, attacked Klobuck directly.

First blood was drawn around dawn on 1 September when a German Hs123 observation plane was brought down by machinegun fire. At 0600 the 21st Lancers received a mounted courier indicating that border positions near Krzepice had been overrun, and around 0630 a small German motorcycle scouting patrol was forced back by rifle fire from 4/83 Infantry. A serious problem began to develop when the Germans began machinegunning the small hamlets west of the Mokra positions. Civilians began fleeing in a wave towards the cavalry positions, and the commander of the 21st Lancers was afraid the Germans would take advantage of this situation and use the civilians as a screen. Patrols were sent out on horseback to break up the panicking mob. Polish scouting patrols began to return to brigade positions under German pressure, and while covering these withdrawals, the AT gun on Hill 268 destroyed one German tank. The main assault against the cavalry positions did not materialize until 0800.

About 25 tanks began an advance towards Wilkowiecki. The tanks took advantage of the buildings to hide from artillery fire from the 2d Horse Artillery, but eventually emerged from the hamlet, guns blazing. The heavy machinegun fire from the German tanks set the thatched roofs of several houses in Mokra on fire, but the Poles held fire until the German tanks were only 150 meters away. The 21st Lancers had three 37-mm AT guns which quickly claimed 4-6 tanks, forcing the Germans to withdraw. Although the German tanks were originally supported by a battalion of infantry, the infantry was driven off by machinegun and artillery fire before they were able to get within 400 meters of Polish lines. At the same time as the main thrust against the 21st Lancers, a three-pronged attack was launched against the 19th Lancers to the north. This attack, preceded by motorcycle scouts, was quickly broken up. In the wake of these attacks, Colonel Filipowicz decided to commit the reserves, and sent the 12th Lancers to take up position on the eastern side of the forest clearing behind Mokra and behind the rail line. A single squadron under Rittmeister (cavalry captain) Hollak mounted up to scout around Wilkowiecki after the Germans had withdrawn.

Around 1000, the Germans launched another attack against the center, directed mainly against the northern shoulder of the forest opening. Rittmeister Hollak's patrol met this attack near Wilkowiecki, and the Polish patrol quickly withdrew into the village, taking up positions in the abandoned buildings. This patrol would be cut off from the brigade for most of the day, fighting a savage battle with German infantry until dark. The attack on the woods was preceded by artillery and air strikes, but the tanks this time were more cautious than before, taking advantage of terrain to advance closer to the Polish positions. The tanks were brought under fire by Nr. 53 armored train and by the 2d Horse Artillery. Over a dozen tanks were disabled before the Germans withdrew. The Germans launched another two-pronged attack around 1100, with infantry against the wooded positions of the 19th Lancers in the north and with 15-20 tanks against Mokra. About half the tanks were disabled by artillery and antitank guns, although the repeated tank attacks and artillery fire were

beginning to take a serious toll of the 21st Lancers. The infantry attack in the north was somewhat more successful than the main attack against the 21st Lancers, forcing the 19th Lancers back to the rail line.

Around noon, there was a 1-hour respite in the fighting as both sides tended to the many wounded. Colonel Filipowicz had requested bomber support, only to be informed that none could be expected. Around 1300, the 4th Panzer Division launched its most vigorous attack of the day against the Mokra clearing using about 100 tanks in two waves. The first wave overran one of the antitank guns at the clearing opening, and the tanks burst into the Mokra hamlets. As more German tanks began to pour into the clearing, the situation became extremely confused with the Germans receiving fire from several directions. Several German tanks managed to approach the positions of the 2d Horse Artillery from the rear, nearly wiping out the 2d Battery, but the fire of Nr. 53 armored train was brought to bear.[15] This melee lasted about an hour with the Germans finally withdrawing. Both sides had suffered stiff casualties, and the Germans had left behind many prisoners and wounded tank crews. In view of the serious casualties among 21st Lancers, this regiment was pulled back from the western woods to the area behind the rail line in order to reinforce the 12th Lancer already stationed there.[16]

Anticipating a similar attack against the northern positions, Filipowicz sent Nr. 53 armored train to the Miedzno area around 1400 and it was damaged in transit by air attack.[17] Around 1500 an attack was launched from the Rebielice-Krolewskie area but was eventually pushed back. The Germans made the last attack of the day on Mokra at about 1600 with German tanks again entering the clearing and trying to overrun the Polish positions along the rail line. By this time, the Germans were taking more care to support the tanks with infantry, and heavy losses inflicted on the 12th Lancers prompted the regimental commander to telephone the brigade headquarters and request relief. Filipowicz told him that the rail line had to be held at all costs. Even though the 21st Armored Detachment had no armor-piercing ammunition for the machineguns of its tankettes, it was sent into action to bolster the morale of the Polish troops and to break up the German infantry.[18] Machinegun fire from the German tanks was so heavy that one Polish survivor of the battle recalled that shreds of leaves fell into the trenches like snow. Antitank rifle fire and artillery fire finally broke the back of the German attack, and the tanks began withdrawing in some confusion.[19] During attempts by Nr. 53 armored train to withdraw southward to support the Mokra positions, the train encountered a column of German tanks which had broken through the gaps between the 19th Lancers in the north and the 12th and 21st Lancers in the south. The tank column was destroyed by pointblank artillery fire and its supporting infantry badly mauled by machinegun fire. However, the train was unable to move southward as planned.

Following a frustrating and costly day of fighting, Major General von Hartlieb ordered the German 12th Rifle Regiment and the 49th Antitank Battalion to hold the terrain captured on the western side of Mokra. The patrol of Rittmeister Hollak broke out of its trap near Wilkowiecki late that night, and rejoined the brigade about 0700 on 2 September.

Polish losses from the Mokra battle were 8 officers killed and 19 wounded, 182 enlisted men killed and about 300 were wounded.[20] Three 75-mm guns and two 37-mm guns were destroyed as well as one tankette and four armored cars. Although continual air attacks on Polish positions had resulted in only modest personnel casualties, the *Stuka* dive bombers claimed about 300 horses and a number of supply carts. Precise German losses are not known due to the loss of 4th Panzer Division records in Berlin later in the war from a bombing attack. The division lost over 80 tanks during the September campaign, probably about half of which can be traced to the Mokra battle. There were at least an equal number of tanks knocked out but repairable at Mokra, and a significant number of trucks, motorcyles and armored cars were destroyed.

During the night of 1/2 September, the Poles withdrew to a second line of defense about 5 km to the east, and on 2 September, again succeeded in repulsing all attacks by the 4th Panzer Division. However, on 3 September, the Wolynian Cavalry Brigade was finally forced to retreat when the infantry divisions on its flanks were broken through. This allowed the 4th Panzer Division to make its famous dash to Warsaw.

The success of the Wolynian Cavalry Brigade on 1 and 2 September in repulsing the attacks of a force considerably larger and with far greater firepower than itself is illustrative of both the excellent training and tenacity of Polish cavalry in the 1939 fighting.

Footnotes

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[20] Jan Wroblewski, *Armia Lodz 1939*, (WMON: Warsaw, 1975), p. 69.

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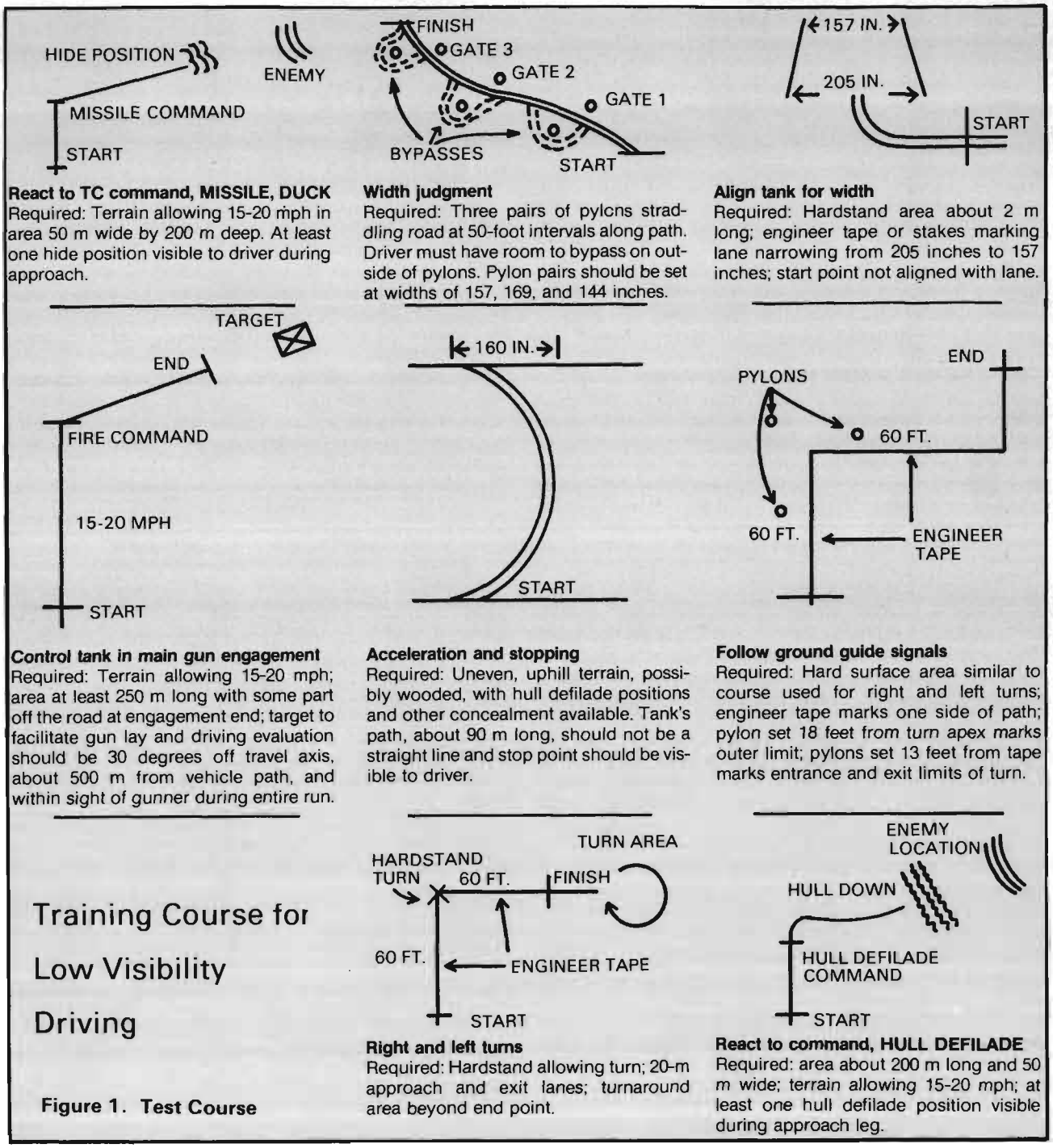

Figure 1. Test Course

Training for Low Visibility Driving

by Lieutenant Colonel Theodore R. Blasche

High-risk training is essential if tank crews are going to build their confidence and experience, but the commander who wants to push his crews to the limit faces a dilemma: how can he balance the need for realistic risk with the equally strong requirement that training be conducted safely?

The difficulty of teaching limited-visibility driving is a case in point. While it is imperative that tank commanders and drivers learn to cover ground rapidly at night, training a unit to navigate on a darkened battlefield risks unnecessary accidents, with a high probability of needless injury and expensive equipment repairs.

By training with Light Attenuating Devices (LAD) during daylight, crewmen *transitioning* to limited visibility operations can get the feel of night driving without the same degree of risk while trainers can maintain better control and provide better feedback to their soldiers.

This article explores the use of

LADs as a *supplement* or *alternative* to actual night training.

Background

In 1978, an Army Research Institute (ARI) project at Fort Knox, KY explored possible techniques of simulating night conditions with LADs. The researchers tested soldiers performing two typical tasks, night driving and assembly and disassembly of a machinegun. (See "Night Training Simulators," May-June 1979 *ARMOR* Magazine, Ed.). The results were ambiguous: while the tested soldiers did better on the machinegun task, actual night driving was still judged more effective than LAD-training in developing driving skills.

The LADs were not a final solution, having some distinct disadvantages. Of the three devices tested only one, the M17 protective mask, depicted simulated combat conditions. (The introduction of ballistic goggles will increase that number. As the driver's goggle becomes a mandatory item, the use of a driver's goggle LAD would be more realistic.)

The second problem with LADs is that they don't faithfully represent the true conditions of cross-country, night tank driving. Drivers use the *AN/VVS-2* (figure 3), while tank commanders use the *AN/PVS-5* (figure 2) night vision devices that provide a different type of view to the user than do the LADs.

One solution is to use the *AN/VVS-2* and the *AN/PVS-5* during daylight hours. The driver's night viewer can be covered with a piece of poster board or opaque plastic perforated with a pinhole. Opaque coverings are also placed over the vision blocks. The commander's *AN/PVS-5* does not have to be converted: there are pinholes in the stock lens caps so that aviators can use them to practice night flying during daylight.

Pinhole Problems

The pinhole conversion technique poses certain problems that must be overcome. The first is caused by bright sunlight, which creates sharp and distinct shadows not normally seen at night.

The second, also caused by bright sunlight, is that the light affects the viewing devices. Bright sunlight will cause an *AN/PVS-5* to "white out" or "bloom," whereas the *AN/VVS-2* will automatically cease to function when too much light strikes it. Moreover, the driver's vision device will distort his picture on very bright days because sunlight passing through the pinhole is diffracted.

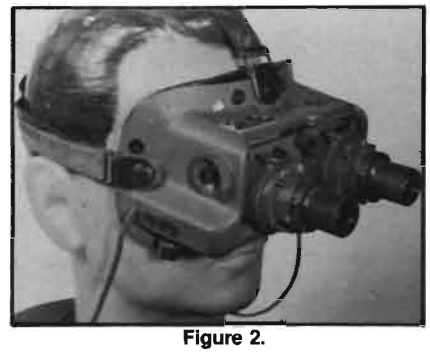

Figure 2.

The solution to these problems is to conduct such training on overcast days when shadows are indistinct. For example, training could begin in early evening with actual night driving conducted later.

Preparing to Train

Once the trainer obtains the materials to adapt the vision devices, the next step is to plan a driving course. This course does not require a great deal of space and should be characterized by its diversity and mission necessity rather than its length. One such program developed for the ARI is shown in figure 1. The course can be marked in advance with stakes or engineer tape and "in the cracks" training conducted as light conditions permit.

Training can be conducted at any echelon from individual crew through company level. The number of vehicles will be restricted by the size of the course. Each vehicle will move through the course several times under simulated night conditions. The purpose of simulating night driving is so that members of the crew can observe what happens. The effects of dust, fog, haze, etc., can be experienced. The training will reduce their surprise when they encounter actual limited visibility operations.

When an error or unsafe act takes place, the observer halts the vehicle. An immediate after-action review is held, with the driver or TC checking both daylight and simulated night conditions to become familiar with both conditions and their implications. When confident that his men are ready for the night run, the commander moves to a holding area to conduct other crew training while awaiting the evening nautical twilight (that period after sunset and before total darkness sets in).

This training program is not rigid and can be adapted to meet the specific needs of the trainer.

Conclusion

The simulated limited visibility movement program is *not a replacement* for an actual night training program. Rather, it is a way to reduce the risks associated with this type of movement by conducting a *transition* under more controlled conditions. It can be accomplished "in the cracks," particularly for the loader and TC, using the *AN/PVS-5* and it can be tailored to fit individual crew needs. While it's still impossible to turn night into day, a limited visibility program can give us more training at a lower risk and, therefore, at a lower cost.

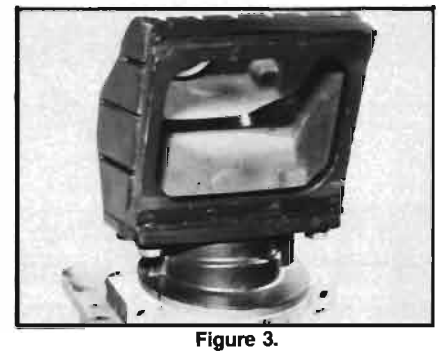

Figure 3.

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[2] Based on material developed in HumRRO Report, FR-TRD#KY-82-8, Dec 1982. "*M1* Tank Driver Tests." (ARI report by Dr. Susan Burroughs is now in publication.)

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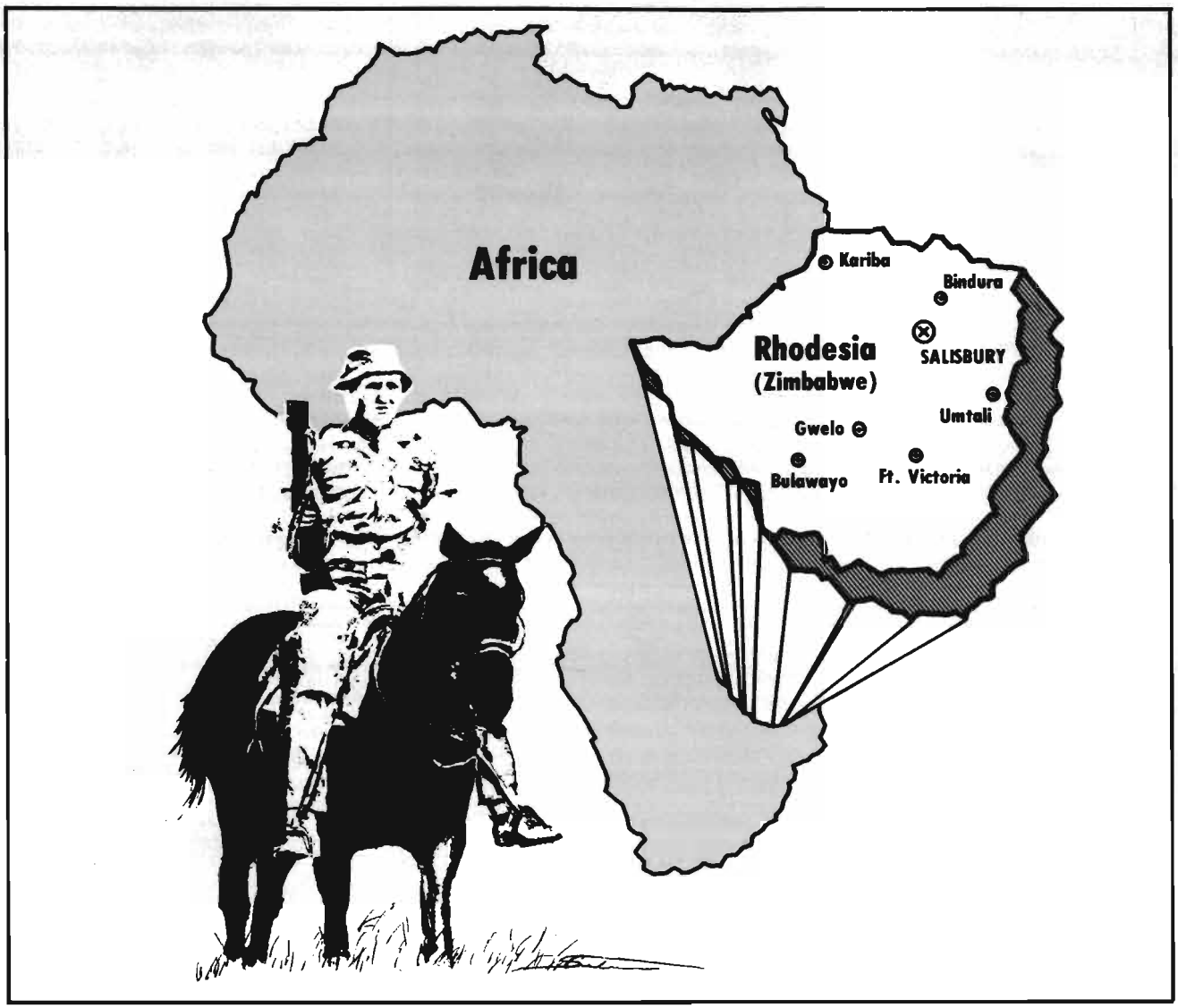

Greys Scouts in Rhodesia's Counterinsurgency

by Mark L. Urban

The most unusual and one of the most successful innovations of Rhodesia's late bush war was the formation of the Greys Scouts, an elite horse cavalry regiment. Enormous hurdles had to be overcome before the value of the concept became apparent. Many senior officers took the staff college view that cavalry had died in WW I and that sending horse soldiers against *Kalashnikovs* would result in the same pitiful slaughter that ensued by sending horse soldiers against the Germans' *Maxim* machineguns. These fears were unfounded, not because the cavalry had become less vulnerable, but because their employment in the bush did not involve mass charges against a dug-in, machinegun-armed enemy.

During the 1970s, Rhodesia's war escalated to major proportions and large tracts of the countryside became infiltrated by guerillas. To combat this situation, the army divided the country into four major operational areas:

Hurricane (northeast), units of the 2d Brigade with headquarters at Bindura; *Thrasher* (east), units of the 3rd Brigade with headquarters at Umtali; *Repulse* (southeast), units of the 4th Brigade with headquarters at Ft. Victoria; and *Tangent* (west), units of the 1st Brigade with headquarters at Bulawayo.

Three smaller defense zones were also organized. *Grapple* (Midlands) with headquarters at Gwelo; *Splinter* (Zambezi) with headquarters at Kariba, and *(SALOPS),* in the Salisbury Area.

The joint operations centres (JOC) in each of these zones were the key counterguerilla bases, each having army, air force, and police resources. The JOCs were also the home of the Fire Force, which was constantly ready to move at once to points of contact. Fire Force became highly efficient at trapping and eliminating guerilla elements, but was dependent on other branches to provide intelligence as the need to trace the infiltrators became more paramount.

There were a number of approaches to the problem and while some, like the manning of rural observation posts,

were conventional, others were not. The Selous Scouts used black troopers, often ex-guerillas, to form "pseudo-gangs" that impersonated ZIPRA (the Nkoma faction) and ZANLA (Mugabe) fighters. The Greys Scouts, in common with other units, stayed out of "frozen areas" in which the pseudo gangs were operating.

Engineers involved in the construction of the *cordon sanitaire* on the northern border rediscovered the use of the horse for tracking. They were building a barrier of minefields intended to stop Mugabe's ZANLA men from crossing the border from newly-independent Mozambique. The sappers decided to use their mules and horses for mounted inspections of the wire and discovered that they were able to find intruders much quicker than when on foot.

Police and other elements also saw the utility of horses for rural patrols. One advantage was that the greater height of a mounted man gave him a significant advantage when following tracks. There were also the more obvious benefits of speed and the ability to cover great distances without unduly tiring the rider.

Tony Stephens, a Rhodesian, began to collect men and horses to form an experimental group known as the Mounted Infantry Unit. In 1975, its name was changed to the "Greys Scouts," an altogether more suitable title which harked back to a British cavalry regiment used in Matabeleland in the late nineteenth century.

In the beginning, the regiment had a somewhat anomalous status as it was not officially recognized by Army headquarters. Stephens used his considerable charm and influence to win recognition for the regiment and in January 1977, it shed its experimental status and became a full-fledged element of the Rhodesian Army.

Initially, the regiment consisted of just one 90-man squadron. "A" Squadron, as it was known, was subdivided into three sabre troops; one of regulars (i.e. professionals), one of national servicemen (draftees) and one of territorials (similar to the U.S. National Guard). Each troop was based on the British infantry platoon structure of three 8-man sections with a platoon commander and a platoon sergeant. Squadron headquarters contained about 22 men; the commanding officer, his second in command, two signallers, two mechanics, two clerks, two farriers (blacksmiths), two stablemen, a veterinarian and his assistant, and eight vehicle drivers. The latter drove specially converted Mercedes 7.5-ton trucks, each of which carried an 8-man section and its animals. Some experiments were conducted with mortars when it was believed that the squadron might have a mortar troop equipped with two Hotchkiss 60-mm weapons, but this idea did not progress beyond limited trials.

The Greys were based at Enkomo garrison near Salisbury where they shared the camp with the Selous Scouts. In common with the Selous Scouts, the Greys mixed black and white soldiers as well as national servicemen and territorials. Most of the original members of the regiment had been trained as infantry and 8-week riding courses were held at Enkomo to help them adjust to this novel form of warfare.

In 1977, Tony Stephens was replaced by a new CO, Mick MacKenna, who was Sandhurst (the British West Point) trained. MacKenna was determined to mould the Greys into a properly disciplined unit. Stephens, in his attempts to gain recognition for the regiment, had taken in a number of "foreign adventurers" many of whom had been rejected by the SAS and the Selous Scouts. MacKenna wanted to impose uniform standards of training and drill on the Greys and organized a major series of exercises for "A" Squadron in Northern Rhodesia in the autumn of 1977. He was also unsatisfied with the basic training of new soldiers and by the end of 1978 the Greys had started their own 5-month training course for new recruits at Enkomo garrison. At the same time, the territorial troop was expanded into a full squadron ("B" Squadron).

"B" Squadron became a highly efficient force even though its men only served 6-week tours. Many of its troopers were professional men in civilian life with considerable personal wealth and responsibilities. The regiment retained this two-squadron structure and never exceeded 250 men. The squadrons were deployed under the JOC commanders and served in all the operational areas and individual troops were often placed under JOC control. Although the sabre elements of the Scouts roamed throughout the bush during the war, regimental headquarters (RHQ) remained at Enkomo. Most of the Greys combat actions took place at section and troop level across the entire breadth of the country, so it is difficult to report on their movements and actions in a logical or chronological manner.

Most patrols were undertaken by 8-man sections divided into two groups of four. One half-section was normally responsible for supporting the other and they remained a kilometer or so apart. Both half-sections normally carried the same weaponry. General purpose machineguns were too heavy for most troopers to control with one hand (the other being required to hold the reins), but were, nevertheless, sometimes used. The standard weapon was the FN FAL assault rifle, although some troopers found AK-47s with folding stocks easier to handle. Each half-section commander was an experienced tracker; the importance of these men led many to describe the Greys Scouts as an "NCO outfit."

Communications often caused problems. Each section commander normally carried two very high frequency and one shortwave set in order to reach both his supporting half-section and the parent troop. Aircraft were often used as relays when communications became difficult due to the topography.

Most of the guerilla groups encountered numbered 10 or so men, so the sections often faced an enemy of equal size. As the war progressed, the Scouts modified their tactics. Initially, they had dismounted on contact, but they soon realized the value of staying mounted for as long as possible. This enabled them to pursue an enemy who might quickly change direction. Firing from the saddle remained highly inaccurate, and when half-sections acted as a fire-base they invariably dismounted. Movements to the attack start line were made on horseback and the Scouts only dismounted to fight on foot to the objective. Battle experiences showed that it was during this final phase of the attack that remaining on horseback (and thus presenting a much larger target) became hazardous.

Often the enemy groups were too large to handle. During a deployment in Operation Tangent in 1978 the Scouts encountered ZIPRA groups that were 40 strong. These were believed to be training units on their final exercises from camps in Zambia. In these circumstances, the Fire Force was called in for support.

The Greys Scouts really excelled in tracking and pursuit. One often-used technique was "cross-graining." This involved the tracking unit warning others along the contact's expected line of movement. They would then cross this line and take up the tracks if they found them, saving a considerable amount of time and distance. Whilst cross-graining by foot units was rarely successful farther than 5 miles from the original contact, the Greys used their superior mobility to discover tracks up to 15 miles away and this same mobility made pursuit easier.

During 1979, the Rhodesians refined their tracking

operations and clandestinely purchased 16 foxhounds in England, half of which were given to the Greys. They were flown by helicopter to points of contact and were particularly successful in these grisly manhunts. The other eight dogs were given to the Selous Scouts who often attached radio beepers to them and followed the pack by helicopter.

Indeed, the Greys became so efficient at tracking that the guerillas sometimes took desperate measures. They normally carried a spare pair of shoes so that they might be able to change their tracks. The use of horses also had a psychological effect since many tribesmen believed that causing the death of a horse would incur the wrath of evil spirits. One group of ZANLA men were pursued dragging a *ZPU* quad 14.5-mm antiaircraft gun through the bush. They finally decided to break the weapon into its man-pack loads and scatter in all directions. The ZANLA men were widely dispersed and the security forces never saw the *ZPU* again.

The horses often caused problems. During contacts they often became startled and bolted, but were usually to be found back at the previous night's camp. If, however, the animal was injured in a firefight or became lame the section was usually forced to abandon its mission. If one rider had to continue on foot the entire section could only proceed at walking pace. The problem remained a serious one for the Greys throughout the war.

One of the most interesting aspects of the Greys operations was their unique logistic demands. We have already seen that the squadron headquarters troop was roughly twice the size of an infantry company headquarters because of the additional specialists required. Horses were obtained from a number of interesting sources. The majority were apparently outright gifts from charitable associations in South Africa. Some territorial men brought their own horses on their 6-week attachments, and, indeed, there was some consternation at army headquarters when troopers from Rhodesia's uppercrust demanded the army insure their valuable polo ponies.

Troops normally spent 14-day patrols in the field, but interestingly, the length of operations was often determined by logistic considerations. During the winter when there was less fodder to be found in the bush, patrols were often as short as a week. The troopers, who each carried 200 rounds of ammunition, 2 grenades, 2 weeks' supply of dried rations and saddlebags full of their own kit, could carry little food for their mounts.

The horses often required a great deal of attention. In the Wankie area they were particularly prone to losing shoes. During a tour there by "A" Squadron every horse had been reshod within 5 weeks.

During the war, the Greys Scouts obtained a fearsome reputation among their adversaries as they were capable of enormous speed through the bush. When combined with their superb tracking skills, this often gave them total surprise.

However, the concept was not without its problems. Principal among these was the cost of raising and maintaining the unit. Training men for this bizarre form of combat also created peculiar difficulties. In the field, the Greys' patrols could often be ruined by one horse becoming lame. For all of these problems, however, it is clear that the idea of using cavalry in the bush was a completely sound one.

The Greys won the respect of their adversaries and did not share the fate of the Selous Scouts who were disbanded. The South Africans have also kept the concept alive, using mounted units on the border between Namibia and Angola. Indeed, even the British Army has now found a place for horses in its defensive arrangements on the Falklands.

The spectacular results achieved by the Greys Scouts show that even in the missile age there is still a place for the horse in warfare.

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Planning for Air-Ground Operations

by Captain Craig B. Hanford

This article will address some of the considerations in planning air-ground operations and list some of the ground unit's responsibilities to the supporting aviation unit. Since there is no single reference for such information, most ground unit commanders and staffs try to "wing it," or just assume that the supporting aviation unit will manage once they are given a mission.

To help correct current false assumptions and haphazardness about using aviation assets, two simple checklists are provided for use by the ground unit. One lists the information that must be provided to and by the supporting unit. The other lists planning considerations peculiar to employing aviation assets in general. No attempt will be made to address all of the different types of aviation support on an individual basis.

The Problem. What type of aircraft will I have? How many of each type? What are their weapon systems? What will I do with them? How long will they be OPCON to me? Where will I employ them?

These questions, and many others, are often asked by ground commanders when told that they will be given aviation assets. Most ground commanders and operations officers are not familiar with the specific practices and the technical aspects of aviation units. As a result, this valuable combined arms team member and combat multiplier is often not fully used.

The ground commander must develop a full appreciation of the missions, capabilities, and technical characteristics of available aviation assets. The Vietnam-era sim-

Table 1. Ground Unit Checklist for Aviation Support

Part A: Ground unit provides:

Enemy situation; identified units (incl: vehicle types); disposition; possible courses of action; air defense artillery capability; avenue of approach; friendly situation; last-known positions; planned maneuver of all friendly units; indirect fire plan; obstacle plan, friendly situation ADA plan; weapon status; air corridors; call signs and frequencies; close air support plan; operation orders with overlays and annexes; subordinate unit's call signs and frequencies; special requirements and requests; logistical support (if aviation unit is attached) and, weather update.

Part B: Aviation unit provides:

Aircraft status; type; number available; weapon systems and ordnances; air mission commander, call signs and frequencies; forward arming and refueling point coordination; location; FARP operation time; logistical support (if aviation unit is attached); aerial photos (if available); actual combat load data; planning assistance; tactical advice; and ground security requirements.

Table 2. Ground Unit Checklist for Air Support Planning Considerations

Technical

Payload weight (normal mission), fuel capacity for type aircraft and fuel type, normal cruise speed, maximum external load, cargo down dimensions, cargo compartment length, width, height and maximum space, and weapon system characteristics.

Mission

Endurance time (cruise speed), operational status of aircraft, weather, altitude, ambient temperature, maximum cargo and maximum troop load, weapon system requirements, type, ordnance, target type, crew rest, reaction time, critical personnel status, air defense artillery (enemy and friendly); and tactical employment.

Support

Forward arming and refueling point location, operation time, capability to refuel, rearm. Security. Maintenance: recovery, parts, time. Indirect fires: close air support. Intelligence. Medical, other logistical requirements.

plicity of employing aviation assets is gone; the high- and mid-intensity battlefields of the future will require more complicated coordination. The failure of ground commanders to understand aviation capabilities could result in faulty planning and a needless loss of lives and aircraft.

All too often, the supporting aviation unit is given too little information; i.e, an unrealistic mission to defend a sector or a piece of terrain, or is employed in a manner that is not the most tactically effective. Fortunately, this had not happened in combat, only in training. That it is happening at all is the problem.

Responsiblities. When aviation assets are allocated to a ground unit, firm liaison must be set up between the ground unit commander and the aviation unit commander. Normally, an aviation liaison officer (ALO), either a first lieutenant or chief warrant officer, will be provided by the supporting aviation unit to the supported ground unit. This ALO is the vital communication link between the two units. However, his effectiveness will be minimized if the ground unit does not do certain things.

The first is to provide the ALO with information that is required by the supporting unit. Table 1, part A, lists items of information that the ground unit commander is responsible for providing to the ALO to enable the supporting aviation unit to properly plan adequate support. The lack of this information could result in ineffective execution of the ground commander's plan. Since the supporting aviation unit is being committed in a new environment, information that will acquaint that unit with this environment must flow from the ground unit. Vital elements will not be left out if table 1, part A, is followed.

Conversely, it is essential for the ALO to provide the ground unit with the information that is needed to completely integrate the aviation assets into the ground tactical plan and ensure their proper and effective use. Table 1, part B, contains a checklist for providing this vital information.

Considerations. When planning combat operations with aviation units, the ground commander and his staff must know the units' capabilities and limitations. Such knowledge is based on various considerations such as the technical, mission, and support requirements that must be incorporated into the planning process by the ground unit. Table 2 contains a checklist for the ground commander and his staff that can be used to ensure that planning for employing aviation support is complete. Specific and detailed information concerning any area of consideration on the checklist can be obtained from a number of sources, but the single most important and convenient source is the ALO.

The S3 Air's Role. Up to this point the importance of the ALO as the vital communication link between ground and aviation units has been emphasized, but the role of the S3 Air has not.

The S3 Air is responsible for being highly knowledgeable of Army and Air Force air support. As such, he is a valuable source of information and advice for the ground commander. When planning for an operation begins, and aviation assets have not been requested or allocated, the S3 Air, in the absence of an ALO, can advise and assist in planning air support. Then, when the S3 Air is teamed with the ALO, the communication link between air and ground elements is complete, and combined arms effectiveness is enhanced.

Unfortunately, the manpower requirements for the tactical operations center cause the S3 Air in many ground units to become another assistant S3. In these instances, the S3 Air's training in air-ground operations is either forgotten or is not used because commanders and their staffs are not familiar with employing aviation support in combined arms operations. This should not happen. The S3 Air is an important staff member and should be used in his primary role when aviation support is to be part of an operation.

Conclusion. Since army aviation is an integral part of the combined arms team, a ground commander and his staff will find themselves frequently involved in air-ground operations and they must develop a professional appreciation of aviation missions, capabilities and technical aspects. Air-ground planning and coordination will not be complete unless the ground unit carries out its responsibilities and takes into account unique aviation considertions. The checklists presented, if properly used, will assist the ground commander and his staff in accomplishing their mission.

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Fighting With A 3-Man Crew

By Lieutenant Colonel Richard E. O'Brien, USA (Ret.)

Training interruptions have become almost routine in garrison life. On any given day, soldiers are going on annual leave, recovering from illness, getting their teeth fixed, learning about fire safety, taking mini-courses, and being levied for post details.

When is there time to train a full tank crew?

These demands impact especially heavily on armor training, where the basic unit of combat effectiveness is the crew, not the individual. How can we train groups of four men into smooth, efficient fighting teams when, on many days, only three are present for duty? It has become a common question at staff meetings.

But if the balloon goes up, will the situation *really* be any different?

Probably not. We will lose crewmen in combat. New men will be delayed in sluggish replacement pipelines. And through it all, crews will have to make do, fighting their tanks one man down if they have to.

If we're going to have to live with this situation, we'd better be prepared by training for it. By accepting daily absences from training as a fact of life, we can make a virtue of necessity, training to fight as three-man crews.

Goals and Ground Rules

Before attempting to work out the content and details of a three-man-crew training program, commanders should set some goals and ground rules. The first four can be established by changes to the battalion SOP:

- At the end of each training day, commanders will designate the crews that will train "one-down" the following day.
- Tank commanders will not move out on tactical training exercises or on alerts with less than three-man crews.
- All soldiers drawn for tactical details (observation posts, road guards, quartering parties, etc.) will be provided from four-man crews.
- If a crew is training "one-down," it will be the duty of the senior crewman (crew position; i.e., TC, gunner driver, loader, not necessarily rank) present to organize remaining crewmembers into a three-man crew.

Other training goals include:

- All tank commanders and gunners will be thoroughly familiar with three-man-crew operation.
- All gunners, loaders, and drivers will be cross-trained.
- Live-fire exercises will be conducted by three-man crews after the above requirements are met.
- Three-man crews will be spot-checked during training exercises and alerts to make sure that they are organized and prepared to fight.

Developing a Program

There are no comprehensive sources of information on three-man-crew operation, but these three publications may contribute some useful ideas:

Table 1. Priority Task List for 3-Man Crew Operations.

TASK	DV as DV	LD as LD	GN as DV	GN as LD	GN as TC	TC as TC
Index battlesight ammunition into ballistic computer.					x	x
Place TURRET POWER, MAIN GUN and MACHINEGUN switches in the ON position.					x	x
Place turret in STABILIZED MODE.					x	x
Remove backrest from gunner's seat.					x	x
Alert crew to modified fire commands.					x	x
Alert driver to added responsibility for target acquisition and sensing rounds.					x	x
Place coax mechanical safety in SAFE position.				x		
Move to TC station.					x	
Move to LD station.				x		
Move to DV station.			x			
Coax engagement, moving to a halt, moving target.					x	
Coax engagement, moving tank, area target.					x	
Caliber .50 engagement, moving to a halt, stationary target.					x	
Caliber .50 engagement, moving to a halt, moving target.					x	
Caliber .50 engagement, moving tank, area target.					x	
Adjust fire and subsequent round on target.					x	
Acquire targets.			x		x	

(Note: First 10 tasks listed are pre-operations tasks.)

• FM 17-12-1, "Tank Gunnery *M1*," (Draft, 20 October 1982)—Contains some information on fire control preparation, crew duties, and a crew-duty matrix for precision and battlesight engagements, but does not include crew drills and live-fire exercises for three-man crews.

• ARI Research Product 79-13, "Tank Crewman Readiness Tests (*M60A1*)," November 1979—Includes a battery of diagnostic tests of individual crewman duty tasks and tells how to conduct diagnostic tests.

• ARI Research Product 79-14, "Tank Crewman Training Modules (*M60A1*)," November 1979—Includes remedial training modules for individual crewman tasks and also provides information on how to conduct remedial training. This publication also includes a comprehensive explanation of a three-man crew training program.

The two ARI publications are aimed at *M60A1* crewmen, but many of the ideas and procedures translate well to *M1* crew training.

Capabilities and Restraints

Three men cannot perform as efficiently as four in a tank designed for a four-man crew because of the engineering configuration and the location of fire control instruments. So, in order to develop a training program to heighten the efficiency of three-man crews, the trainer must know not only what a four-man crew can do, but also the constraints on a three-man crew. He must also know what crew and vehicle preparations are required for three-man-crew operations.

Four-Man-Crew Capabilities. A four-man crew can engage stationary, moving, point, and area targets during daylight or darkness. A four-man crew can engage multiple targets and conduct simultaneous engagements. The TC can place fire on a target by using the main gun, the coax machinegun, or the caliber .50 machinegun. The gunner can engage targets with either the main gun or the coax machinegun. Various types of engagements include:

• Main gun battlesight.
• Main gun precision.
• Coax machinegun battlesight.
• Coax machinegun nonprecision.
• Caliber .50 machinegun nonprecision.
• Range card.
• Range card lay to direct fire.

Three-Man-Crew Constraints. Some types of gunnery engagements cannot be performed by a three-man crew while other engagements can only be performed at such a slow pace as to make them ineffective and the crew vulnerable to enemy fire. These constraints include:

• Simultaneous engagements (impossible).
• Main gun precision engagements with HEP ammunition beyond 1,200 meters (slow pace).
• Range card engagements (slow pace).
• Range card lay to direct fire engagements (slow pace).

Three-Man-Crew Capabilities. Although some gunnery engagements are not practical for a three-man crew, the TC's fire controls allow these engagements:

• Main gun battlesight.
• Main gun precision with SABOT or HEAT.
• Coax machinegun.
• Caliber .50 machinegun.

Three-Man Crew Operations

Preparation for Three-Man Crew Operations. Whenever circumstances dictate a three-man crew, the actions of the TC or surviving senior crewmember should be automatic, following a prescribed SOP.

After action, if the tank is operable,

Table 2. Conditional Task Cluster.

Condition:	Loader becomes casualty.
Decision:	Gunner becomes loader.
Action:	Move tank to defilade. Reorganize crew. Prepare tank for 3-man operation.

TASK	TC	GN	LD	DV
Index battlesight ammunition into ballistic computer.	x			
Place TURRET POWER, MAIN GUN, and MACHINEGUN switches in ON position.	x			
Place turret in STABILIZED MODE.	x			
Remove backrest from gunner's seat.	x			
Alert crew to modified fire commands.	x			
Alert driver to added responsibilities for target acquisition and sensing rounds.	x			
Place coax mechanical safety in SAFE position.		x		
Move to loader station.		x		
Issue modified fire commands.	x			
Respond to modified fire commands.		x		x
Respond to regular fire commands.		x		
Operate tank radios.		x		
Index ammunition into ballistic computer.	x			
Load main gun.		x		
Load coax.		x		
Reduce coax stoppage.		x		
Determine corrective action required by replenisher tape.		x		
Conduct main gun misfire procedures.		x		
Identify ammunition by type and location.		x		

it should be moved into defilade where casualties can be treated and evacuated, the crew reorganized, fire control equipment preset for future operations, and modified fire commands reviewed.

Crew Reorganization. Three crew positions must be filled: the tank commander, loader, and driver. When the crew is reduced to three, the gunner's position is always eliminated and his duties are assumed by the TC through use of the tank's redundant fire-control equipment.

There are four possible casualty situations. If the gunner is a casualty, the crew continues to fight the tank with the remaining three crewmembers at their normal positions.

In the other three cases, if the TC, driver, or loader are casualties, the gunner is designated to replace the missing crewmember.

Tank Preparation. After the crew has been reorganized, the following actions must be taken to prepare the tank:

- Index battlesight ammunition into the ballistic computer.
- Place machinegun mechanical safety in SAFE position.
- Remove backrest from gunner's seat.
- Place TURRET POWER, MAIN GUN, and MACHINEGUN switches in the ON position.
- Place turret in the stabilized mode.

Review Modified Fire Commands. In final preparation and before moving out of defilade, the TC must review modified fire commands with the crew.

The word GUNNER is deleted and the word BATTLESIGHT becomes the alert element in main gun battlesight engagements.

The word LOAD, followed by the type of ammunition, becomes the alert element in main gun precision engagements.

Fire commands for caliber .50 machinegun engagements are unchanged.

The word COAX becomes the alert element for coaxial machinegun engagements.

Table 4. Sequential Crew Duty Matrix.

Tank Commander	Loader	Driver
Announce LOAD, SABOT (or HEAT).	Unlock ammunition ready rack.	Maintain steady rate of speed.
Announce TANK and lay main gun for direction.	Select sabot (or HEAT).	Drive to defilade firing position.
Range to target.	Load main gun.	Bring tank to a smooth, gradual halt.
Lay crosshair at center of target.	Place main gun safety at FIRE position, announce UP.	Lock brake.
Announce ON THE WAY.		
Fire main gun.	Brace.	
Observe for strike of the round.	Load second round; announce UP.	Sense round.
Announce TARGET.	Place main gun safety in SAFE position.	Unlock brakes.

Note: Announcing LOAD alerts crew of main gun engagement.

Developing a Training Program

The next steps in developing a three-man-crew program include identifying new tasks for each crew position, clustering tasks to fit varying conditions, structuring modified fire commands, developing sequential crew duty matrices, and preparing standard operating procedures, three-man crew drills, Finally, a three-man-crew live-fire exercise is fired. (The following tables are extracts from the ARI research cited.)

Priority Task Lists. Table 1 lists tasks which are required for three-man-crew operation and which are new to a crewmember moving to a new crew position. The table lists the tasks for each crew position under varying conditions. (Tasks which a crewmember performs during normal four-man-crew operations are not included.)

Conditional Task Clusters. Table 2 is the priority task cluster for a loader vacancy. The tasks are from the priority task list.

Structuring Modified Fire Commands. The modifications of fire commands required for battlesight, precision and coax engagements are shown in table 3.

Sequential Crew Duty Matrix. After priority tasks are identified and clustered for each condition, a matrix is developed to indicate sequential crew duties for each three-man-crew engagement (table 4). By showing task performances in sequence, crewmen know what is to be performed—and by whom. Table 4 is a matrix for a main gun precision engagement after moving to a halt, against a stationary target. It is one of eleven sequential crew duty matrices.

SOPs for Three-Man-Crew Operations. When battlefield conditions require three-man-crew operations, the change-over process must be automatic. The rapid transition from a four-man to a three-man-crew configuration can be accomplished by a training program in which the process is outlined in the unit's SOP and is practiced by crew drills and live-fire exercises.

Three-Man-Crew Drills. After completing preparation of SOPs for three-

man-crew operations, a series of crew drills is developed to cover various casualties. The drill should carry out the SOP and prepare the crew to react automatically when a casualty occurs.

Operational Testing. The final development in the three-man-crew program is the crew operational test. This live-fire exercise covers all four crewmember casualty situations. The engagements are:

- Condition: Tank commander casualty.

Engagement: Main gun, battlesight, moving target.

- Condition: Loader casualty.

Engagement: Main gun, precision, stationary target.

- Condition: Driver casualty.

Engagement: Coax, area target.

The three-man-crew operational test course begins with a four-man crew. After each engagement, the scorer will direct the tank commander to reorganize his crew back to a four-man configuration and to place weapons, fire control, and other equipment back to their original positions.

The three-man-crew operational test scorer's instructions and scoresheet is divided into two parts: response—what the senior surviving crewmember does when a casualty occurs, and engagement—the scoring of the three-man-crew engagement.

Table 3. Modified Fire Commands.

Engagement	Regular Fire Command	Modified Fire Command	Remarks
Battlesight	GUNNER-BATTLESIGHT-TANK-FIRE	BATTLESIGHT-TANK	Delete words GUNNER and FIRE. BATTLESIGHT is new alert element.
Precision	GUNNER-SABOT-(or HEAT) TANK-FIRE	LOAD SABOT (or HEAT)-TANK	Delete words GUNNER and FIRE. LOAD is new alert element.
Coax	GUNNER-COAX-TROOPS-FIRE	COAX-TROOPS	Delete words GUNNER and FIRE. COAX is new alert element.

Note: Prior to firing, TC will announce ON THE WAY.

Training Management

Managing three-man-crew training includes administering diagnostic readiness tests, remedial training modules, crew drills, and the operational test.

Diagnostic Readiness Tests. Two types of readiness tests are used to determine three-man-crew training requirements. The SOP item, "Prepare tank for three-man-crew operations" is used as a readiness test to determine the tank commander's and gunner's proficiency in three-man-crew operation. The individual duty position readiness tests, in ARI Research Product 79-13, are used to determine gunner, loader, and driver cross-training proficiency.

Remedial Training Modules. After readiness tests have been given, training modules, as shown in ARI Research Product 79-14, are given to correct deficiencies. If a training module has not been developed for a task; e.g., reorganize crew, etc., corrective training for the task can be done by one-on-one, instructor-controlled training.

Crew Drills. After tank commanders and gunners have demonstrated proficiency in three-man-crew operations, and gunners, loaders, and drivers have demonstrated proficiency in duty-position cross-training, each tank commander assembles his crew and walks them through the three-man-crew drill steps for each crew vacancy. When the crew becomes proficient, an independent scorer administers the battery of drills to determine crew proficiency. If the scorer notes any deficiencies, the crewmember is referred to the appropriate training module for remedial training.

Operational Test. The three-man-crew training program ends with the operational test and scoring of the test.

Conclusion

During tactical training, alerts, and combat, some tanks will be short of crewmembers. To enhance and sustain the firepower of each tank during combat, crews must be trained in peacetime to organize and function as three-man units. This training will ultimately save lives and enhance mission success. The procedures for such training are available and such training should be incorporated in each tank battalion's annual training program.

It is imperative that our tank crews train to fight in the three-man configuration. Crew, squad and platoon survival may well hinge on such training as casualties reduce four-man crews to the three-man minimum. Train now and don't have regrets at a later date.

LIEUTENANT COLONEL RICHARD E. O'BRIEN was commissioned in armored cavalry from OCS in 1949. He served in the 101st Airborne Division in WW II and later commanded armored cavalry platoons, tank companies and an armored cavalry squadron. He has served on the faculty of USAARMS; as senior advisor to the 107th Armored Cavalry Regiment, OHARNG; as general staff officer, force developments, HQ, USAREUR; as operations officer, HQ V Corps, and as chief of Doctrine Division, CDC Armor Agency. He is a graduate of AOB, AOAC, and AC&GSC. He retired in 1979 and is employed with the Human Resources Research Organization.

PROFESSIONAL THOUGHTS

A Yearly Overhaul Improves Readiness

This is a proposed system for combining a normal maintenance function with a system designed to extend the operational life of vehicles at a lower than present cost.

Under the present system, our vehicles are required to operate several thousands of miles over long periods of time with services that are similar to service station checkups, or, in the case of breakdowns, a symptomatic relief through broken parts replacement. The only organized procedure for inspecting and rebuilding vehicles is to turn the vehicle in to a depot for rebuild. This is a costly, time-consuming process that involves large amounts of paperwork, extra vehicles in the system, and is usually accomplished at a point in a vehicle's life cycle close to or beyond utter exhaustion. Perhaps a better system would be to periodically rebuild a vehicle at the unit level. Thus, the vehicle would remain in the unit for more miles and would be at a higher availability rate.

This rebuild could be accomplished once a year in conjunction with the vehicle's annual service. The method would involve several modifications to existing maintenance procedures:

- The work would be done at the supporting direct-support unit's (DSU) maintenance facility if possible, but as a minimum, at a consolidated maintenance facility such as at squadron or battalion level.
- The maintenance personnel involved would be a combination of squadron or battalion mechanics and DSU mechanics. They would supply know-how which would be combined under the direction of experienced maintenance supervisors to accomplish the operation.
- The vehicle undergoing rebuild would have only one function during this period—maintenance under the control of the maintenance supervisors.
- The funding for this system would have to result from an arrangement directed by the major command.

The following is a suggested sequence for accomplishing this yearly rebuild program. It is aimed primarily at a tank-like vehicle but, with revisions, it could be used for any type of vehicle.

Previous Training Week

The platoon members download all ammunition, sensitive items, basic issue items (BII), and on-vehicle materiel (OVM). These items are cleaned, serviced, and directly exchanged (DX) while the entire vehicle is washed thoroughly inside and out. A thorough preventive maintenance checks and services (PMCS) routine is completed and the results are noted in duplicate. This PMCS should include additional operations such as a recoil exercise, engine load test, and radio and intercom output test to check the entire range of vehicle problem areas. The vehicle, with crew, will then report on the first day of the following week to the maintenance facility with all deferred maintenance repair parts and without BII, OVM, or other equipment. This will ensure that only the serviceable tools of the maintenance facility are used and that there is no "transferring" of tools during the operation.

First Day

0700 to 0730—The maintenance bay for each vehicle has a complete issue of BII, OVM tools (clearly marked and hung on a shadow board) and access to necessary components of common tool sets. The bay is signed for and operated under the supervision of a maintenance member. He functions as the supervisor of the operation, with the assistance by the unit chain-of-command. The crews are briefed by the maintenance supervisor on schedules, rules, and procedures of the operation.

0730 to 1200—The vehicles are moved into the maintenance facility and powerpacks are removed. While the crew, supervised by a maintenance facility member, cleans the powerpack and compartment (preferably with steam), a technical inspection (TI) team begins a complete TI of the hull and turret. This team should consist of a thoroughly trained inspector mechanic and an assistant (preferably a prescribed load list (PLL) clerk.) They should have -20P and -35P manuals for the vehicle, the crew's PMCS results, and their TI should include the quantity, stock number, if available, and location of all broken, damaged, missing, or unserviceable parts of the vehicle. As the crew finishes cleaning, the TI team completes its inspection of the powerpack and compartment. The TI should be completed in two parts, hull and turret, and the TI forms should be made out in three copies—one for end-of-operation verification, one for work purposes, and one for requisition purposes.

1300 to 1700—The crew combines the results of their PMCS with those of the TI and begin work on areas within their purview such as engine filter replacement, replacement of deferred maintenance parts they have brought with them, and removal of damaged parts. The TI team submits their requisition copy of the TI to a pool of consolidated PLL clerks who prepare requisition and quick service store (QSS) DX document register and file the report paperwork on the vehicles. This continues until all documents are prepared, but should be complete by 1700. During this time, turret mechanics are in the turrets conducting a more detailed inspection, and adjustment or repair on the armament system.

1800 to 0600—A night crew of the DSU supply section processes the requisitions, DX, and QSS actions and fill these as much as possible (in preparation for this operation, the DSU will have to stock virtually every line item pertaining to this type of vehicle). A consolidated listing of shortage items is prepared for submission to the maintenance battalion materiel officer's (MATO) office the next day. The maintenance personnel of the unit (who have been off during the day) report for work and perform the repair work reserved for their echelon (welding, powerpack splitting, ammunition rack removal, etc.). As this work is completed, it is initialed on the work copy of the TI to ensure that those working during the day understand what has been accomplished.

Second Day

0700 to 1700—The consolidated listing of unfilled requests is used by the maintenance battalion MATO to complete cross-level procurement actions between DSU companies and units outside the battalion to obtain parts as quickly as possible. Those requisitions that have been

filled are given to the PLL clerks for logging in, and then are moved to the vehicles. The crew members begin replacing parts and annotating the TI form. The turret mechanics continue testing, purging, adjusting, and replacing components on the armament system. The radio mechanics remove and repair, replace and adjust the vehicle's communication equipment. The vehicle's small arms are moved from the arms room to the small arms repair facility and given a TI, adjusted, and repaired.

1800 to 0600—The night shift reports and continues their functions, having received repair and DX parts. The supply personnel prepare their documentation to complete the requisition chain to support the ongoing operation, and reconcile their records. This includes converting previous requisitions for these parts for these vehicles into replenishment requests for the maintenance unit stockage.

Third and Fourth Day

These days are spent in the same manner as the second day, with the amount of support needed diminishing, and the emphasis switching to repair and replacement.

Fifth Day

0700 to 1200—The TI team returns and conducts a verification and quality control inspection of the repairs. This includes ground hopping the engine, and armament subsystem checks. Corrections are made when discrepancies are found. Once the job is certified as complete, the powerpack is replaced with all fluid levels checked a final time.

1300 to 1700—The vehicles are uploaded with their basic loads, BII and OVM and parked.

This schedule can, of course, be adjusted to fit the needs of the vehicles concerned. Those in better condition will not require as long to service as those having many problems. The primary advantage of the program is the increased number of trained mechanics devoting a large number of hours to the vehicles, combined with a ready access to the necessary repair parts. This system not only corrects many small maintenance problems; it can prevent them from becoming large ones. I have supervised similar operations, which did not include the DS unit nor the night shift. These operations did, however, take junkyard rejects and convert them into productive, low maintenance-worry vehicles.

JACKIE R. HAMILTON
Captain, Armor
Bowling Green, KY

The Scout Platoon Revisited

The search for the ultimate scout vehicle has probably caused the scout platoon to undergo more equipment transitions in the last 30 years than any other combat arms platoon with the exception of the cavalry platoon. The fielding of the *M3* cavalry fighting vehicle, coupled with the Division 86 cavalry concept, will provide the biggest-ever change in equipment and organization.

The Division 86 cavalry doctrine reduces the platoon from ten to 6 vehicles and increases crews from 3 to 5 per vehicle. This action raises many questions, such as: Why do the platoon leader and platoon sergeant need 5-man crews when the 3-man crews in the headquarters and 4-man crews in the scout sections will provide manning for an additional two crews?

My purpose is not to hold an inquisition on decisions already made but, rather, to surface issues not yet addressed. Not all of the problems are new; some are present and should become even more evident with the overall reduction in platoon assets. I have grouped these issues into the areas of external deployment, internal deployment and training.

External Deployment. Scout platoons are often misused. More than likely, this is a result of a failure to understand scout platoon missions and a failure of battalion commanders and their staffs to properly use scout platoons in performing troop-leading procedures. Specifically, the reconnaissance step is abused. Exercises at the National Training Center have surfaced commanders' failures to perform contingency planning. Planning requires information. I suggest that the failures in planning are a direct result of a lack of time for commanders to perform a reconnaissance to gather the necessary information. Their time is spent in fighting their unit, which is as it should be. However, the commander has at his disposal a platoon whose primary purpose is to serve as his "eyes and ears."

The purpose of reconnaissance is to gather information. How many times have you seen the scout platoon assigned a zone reconnaissance (or any other reconnaissance mission) after the plan is already complete? In reality, the platoon has been assigned a frontal, moving-screen role to locate enemy forces. Had the commander deployed the scout platoon on a zone reconnaissance *prior* to completing his plan, he would already know enemy locations and could compensate for them in his plan. In addition, the scouts could maintain contact with those enemy forces, call for and adjust long-range fires, and report enemy reactions to detection of the friendly advanced and main body elements. Until recently combat battalions operated an operations and intelligence radio net. I believe the failure to understand the difference between a zone reconnaissance and a moving screen is one of the reasons why this net was eliminated. It would be my guess that when the command net becomes cluttered with stream crossings, tunnel and spot reports (CROSSREPs, TUNNELREPSs, and SPOTREPs), containing terrain and other information, commanders will not be long in demanding a radio net on which to pass this traffic.

A final issue in external deployment involves the commander's control of the platoon. A commander would not think of moving a company from point A to point B, or to a line of departure without designating a route. Commanders must also provide adequate control measures when deploying the scout platoon. Orders must be clear, and the objectives understood.

Internal Deployment. This action requires better use of graphic control measures within the platoon. These measures must be used to facilitate movement with a

minimum of confusion and provide the flexibility needed for changes in mission or situations. Crews must be proficient in using hand and arm signals in order to keep the platoon net clear for reporting. (*See "The Platoon on the Integrated Battlefield," November-December 1983 ARMOR. Ed.*)

A final issue is the availability of Communication Electronic Operation Instructions (CEOI). The scout platoon is usually required to operate in wide sectors. The platoon leader is totally dependent upon his radio and graphics to control platoon deployment, yet the platoon will, at most, possess only two CEOIs. Both the governing field manuals and soldier's manuals require the scouts to use the CEOI for encoding coordinates, sending change of missions, sending status reports, and authenticating fire missions. The failure to issue the required number of CEOIs is a result of the Signal Corps' policies of not issuing CEOIs to elements in forward areas that might result in compromise. This policy should be reevaluated in its application to scout platoons. When a security measure severely restricts operational capabilities, then the security measure needs to be modified, or the operation scrapped. The CEOI is a support item and should not dictate operational capabilities and should be provided in the necessary quantities to satisfy operational requirements.

Training. There are several points that must be brought out. The first directly relates to external deployment. If a scout platoon is consistently assigned false reconnaissance missions, it is doubtful that the platoon will be able to perform a true reconnaissance mission. Current training doctrine stresses realism in troop training. This doctrine must also be applied to commanders and their staffs. In combat, they will not be allowed to drive or fly over terrain weeks or months ahead of time. They will have to work on the limited information provided by higher and lateral headquarters plus that provided by their own unit's assets. A battalion that trains itself to function in this manner will not only enhance training at its lower echelons, but will also enhance unit survivability and mission accomplishment on the battlefield.

Scout platoons do not have a field manual to refer to when planning and conducting operations. They have to extract information from cavalry manuals. The interpretations of manuals is always varied and can become distorted when units must extract information from combined operations manuals. Under the Division 86 cavalry concept, the combined arms cavalry platoon is eliminated. This has, at last, generated action for a scout platoon manual. The manual that is being written will, hopefully, distinguish between divisional cavalry platoon operations *vis-a-vis* battalion scout platoon operations. Hopefully, better guidance will be provided to commanders for use of their scout platoons.

Better references must also be made available for individual soldiers. Current 19D Soldier's Manuals (SMs) do not provide for the required tasks involved in performing a reconnaissance mission. The only tasks in the SMs require soldiers to measure roadway width and determine the number of traffic lanes. The SMs must be expanded to cover all reconnaissance symbols and the field expedient methods illustrated in FM 5036 for gathering information to be used with those symbols. SMs should also include reporting procedures, using the reports contained in the reporting appendix of the new FM 17-95, especially the use of the SPOTREP. The current use of SALUTE (size, activity, location, unit, time, and equipment) is totally unsatisfactory for reporting information. It cannot be used to send terrain reports and is inadequate for reporting Threat forces. It should be remembered that SALUTE is not a report but is an aid for helping the individual soldier to remember what information should be included in a SPOTREP.

Reporting information is critical to mission accomplishment. Overlays should be made within the platoon headquarters element as the information is received. In turn, the information should be passed to battalion and followed with the hard copy, if possible. I say "possible" because the platoon now possesses only six vehicles. Although the platoon leader and platoon sergeant still form a headquarters, they must also work as a squad. In this role, the headquarters section should take a more narrow sector than the two scout sections, thus allowing for the emphasis on command and control of the platoon. This requirement reduces the capability of the platoon to dispatch a messenger to the battalion tactical operations center (it may be years before the units actually possess the oncoming motorcycle messengers and further supports the need for two more crews).

These three issues, I believe, are absolutely critical to the scout platoon's ability to function on the battlefield. We must have uniformity of understanding as to what the missions of a scout platoon are, and how and when they should be used. This will not detract from a commander's flexibility, but will ensure better understanding of what is to be accomplished.

History has consistently proven that the force that possesses the most current information has controlled the battlefield. The maneuver battalion's best asset to provide battlefield information is the scout platoon. But for the platoon to be effective, it must be properly trained and employed.

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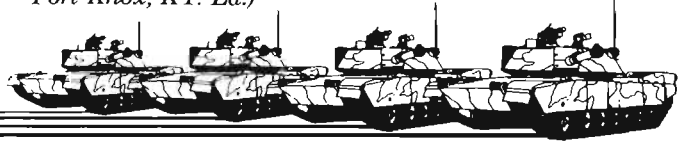
(Coordinating draft of FM 17-98 (TEST), "The Army 86 Scout Platoon," was printed and distributed to field units for review and comments in September. POC is Major Bush, AUTOVON 464-3154 or commercial 502-624-3154, Fort Knox, KY. Ed.)



Task of the Day

The Battalion Training Management System (BTMS) is designed to simplify the training of every soldier, from his individual skills through his part in the unit's Army Training Evaluation Program (ARTEP) exercises. The BTMS employs a multitiered system of teaching with the immediate supervisor being responsible for training his subordinates.

Soldier's manual tasks can be divided into two broad

categories: common and MOS-specific skills. Time was the major stumbling block I encountered in attempting to ensure that training in both took place. I had no doubt that my soldiers spent a full duty day working on their jobs and receiving MOS training in the process. Convincing the heads of staff sections to take time to ensure that specific soldier's manual tasks relating to the individual's daily duties was easy. Two hours each week were dedicated to that end, with the tasks for each section to be determined by the section heads. Each section provided my training NCO with a quarterly training schedule delineating the tasks, by MOS and skill level, to be taught during the quarter. There was enough flexibility in this arrangement for changes if necessary.

However, my efforts to set aside duty time for training the soldiers in *common* skills were met with less than total enthusiasm. Mandatory training, formations, equipment maintenance periods, and weapons qualifications disrupted the day-to-day functioning of the staff sections, causing a great deal of overtime. This situation was totally unacceptable. I found by studying FMs 21-2 and 21-3, that the majority of the tasks were simple to teach, and easy to learn and many could be self-taught by the soldier himself so I came up with a training plan I called the Task of the Day.

The idea behind the Task of the Day was simple. Each soldier would study the common task selected for his skill level on any given day, and demonstrate proficiency in the task to his immediate supervisor before the close of business. My first sergeant and I would quiz soldiers and their supervisors on the subject matter to ensure compliance. After 6 months of training with this system, the troop conducted a test, in which the soldiers had to demonstrate proficiency in previously scheduled tasks at different stations in the round-robin event.

After I was satisfied that the majority of the soldiers could accomplish the assigned tasks, the training moved to a more structured, 1-hour-per-week demonstration of tasks that required greater preparation. This became known as the Task of the Week and was intended to evaluate the soldier's performance as well as his first line supervisor's abilities to ensure satisfactory performance. Each of 13 staff agencies had a specified 1-hour block during which time the section as a whole demonstrated their knowledge of the subject matter to my first sergeant or myself. The soldiers would already have been taught the associated subtasks, and the session was designed as the diagnostic "hands-on" evaluation of performance.

After having been instructed on the major task and associated sub-tasks, the troops, would demonstrate proficiency in those tasks during the session. As commander, I would evaluate not only the soldier, but also the supervisor in his performance of his leader tasks. The scenario itself was real-world, complete with a mission and situation, enabling the soldier to understand how each task was required to accomplish the mission.

As with any system, the proof of its success or failure lies in the performance of duties under actual conditions. The performance of the soldiers on their Skill Qualification Tests and the performance of the troop during three field training exercises indicated to both the soldier and his chain of command that the Task of the Day was a success. The training objective was met using realistic, hands-on training, while not robbing the staff agencies of valuable time and energy.

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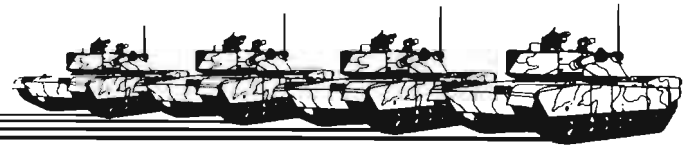

A New Concept for Combined Arms

The infantry fighting vehicle (IFV) with its rapid fire cannon and TOW launcher, gives mechanized infantry a marked increase in mobility, suppressive firepower, survivability, and long range tank-killing capability. Consequently, these IFV capabilities have the potential to significantly change our doctrine for tank-infantry integration.

Mechanized infantry has two principal battlefield functions and both require coordination with tanks. First is the protection and support of tank forces. Without infantry to provide security and to clear tank-proof terrain, tanks could not survive on the modern battlefield. Mechanized infantry's second function is the traditional infantry role of taking and holding ground. Despite the number of short-range antitank rockets and long-range antitank missiles, the tank is still considered the best tank killer. This, and the need to use tanks for defense, has led to the integration of tanks into the infantry force. While providing the infantry with a means of responsive, heavy-caliber fire support, this solution sacrifices the mobility and shock action that has made the tank such a decisive weapon system, and the tanks become "mobile pillboxes."

The active or dynamic defense concept stresses engaging targets with maximum firepower forward. Little room is left for an uncommitted armor reserve that can be committed at the right time and place to win the battle. Previously, the need to keep all assets forward made an armor reserve so much wishful thinking. Now, the IFV gives properly-deployed mechanized infantry the capability to fight the enemy toe-to-toe without tanks. The doctrine which accompanies Division 86 partially recognizes this by stating that companies will now fight pure most of the time. Why can't this be taken a step further? Let IFV-mounted infantry fight the main defensive battle and leave self-contained armor units in reserve. This maneuver would wear the enemy down and force him to show his intentions. Then, the armor reserve could attack a flank or conduct a meeting engagement on a major avenue of approach. U.S. doctrine stresses an offensive-defense, based on rapid maneuvering and vigorous counterattacks. In actuality, while we attrite the enemy in the covering force and main battle areas, he will be attriting us, too, and we will have no viable counterattack force.

The proposed reserve not only provides a viable counterattack force, it also stresses the advantages of the tank so that when on the defense, U.S. forces will act rather than react. the defensive battle will become more fluid, a situation which favors our force's advantages in flexibility and initiative.

This modification of combined arms coordination would also be effective on the offensive. If our advance is blocked by restrictive terrain, mechanized infantry could advance, take and hold the terrain, and fix the enemy while the armor finds maneuver space. Even in good tank country, mechanized infantry forces could be used to fix the enemy, allowing the armor freedom of maneuver. This would follow Patton's dictum of "grab the enemy by the nose and kick him in the pants."

Organizational changes are needed if we are to adopt this new concept. We must recognize the dual function of mechanized infantry. Instead of adding an additional tank company to each Division 86 tank battalion, a mechanized infantry company could be added. Thus, present tank units would become self-contained combined arms units. Mechanized infantry battalions would remain pure, allowing tank assets to be used in mass to fight the main battle. The new stress on armored reserves and independent infantry makes it desirable to transform armored divisions back to mobile strike forces, and use mechanized infantry divisions to hold the line. The formation of a specific armored and mechanized brigade headquarters to control the separate functions should be considered. The mechanized division would have two mechanized brigades, and an armored brigade that would control the division's counterattack forces. An antitank battalion would be added to "thicken" the battlefield. An additional tank battalion would be held at division to serve as the commander's general support reaction force. The overall ratio of infantry to armor is roughly 2:1, which is adequate, considering the mission and capabilities of the division. The armored division would act as the corps' counterattack force and the vanguard during offensive operations. Its two armored brigades are the mobile strike forces and the mechanized brigade gives the division a fixing force, and the capability to breach obstacles such as rivers. The infantry-unit-to-tank unit ratio is about 1:1, the ratio shown to be the best for an armored division. A three-division corps could defend with all its infantry forward, each division retaining an armored brigade in reserve along the most likely enemy avenue of approach. The armored division would be held to the rear of the mechanized divisions, ready to counterattack.

Critics may argue that this concept puts too much in reserve and does not allow for maximum killing along the FEBA. However, two factors need to be considered:

- The Soviets attack in echelons. If we put our maximum force forward, we will suffer maximum attrition and the enemy may fix us into position before he has committed all of his forces.
- The tank is an offensive weapon. Nothing is gained and much is lost by turning it into a pillbox. It is best used in a situation that capitalizes on its mobility, shock action, and firepower.

In a notional offensive maneuver by the proposed armored division, the lead armored brigade encounters heavy enemy opposition in tank-proof terrain—a grouping of villages and forests. The opposition is too much for the armored brigade's three mechanized infantry companies to handle, so the mechanized brigade fixes the enemy and the division's two armored brigades maneuver around him. If the situation permits, the enemy will be attacked from the flank or rear. If he is still too strong, the mechanized brigade will keep him fixed until the follow-on mechanized division arrives. Then the mechanized brigade will follow the armored brigades and continue the advance. If the possibility exists that contact will be lost between the mechanized brigade and the rest of the division, the division commander can attach his general support armor battalion to the mechanized brigade to act as its vanguard.

A possible solution to the dilemma of tank employment on the defensive has been given. While it involves a change in our way of thinking, and a reshuffling of our existing resources, this is not a new solution. The Germans in WW II continually used their infantry to block Russian threats and used mobile reserves to counterattack and seal off the advance. The increased modernization of armored forces, along with the decline of antitank guns and tank destroyers, has resulted in the infantry-support role for the tank. Therefore the introduction of the IFV is not only a boon to the infantry, but it also will enable the tanks to be released to do what tanks do best.

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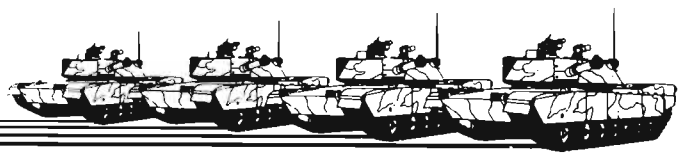


Three Simple Combat Leadership Principles

As we acquire higher rank and greater responsibilities, the Army exposes us to increasing levels of leadership training. Among the staples offered in our service schools are the 11 principles of leadership and the 14 leadership traits. Also included are liberal helpings from a host of managerial principles, theorems, and formulas that include transactional analysis, Maslow's hierarchy-of-needs theory, and Macgregor's Theory X-Theory Y.

Unfortunately, while this training may be good for *managing* soldiers in garrison, it offers little to the officer or NCO who must *lead* soldiers in battle. A committee will not capture the high ground. The decision-making process is certain to become clouded in the fog of battle. Precious time, and possibly lives, will be wasted by the squad leader who concerns himself with what ego state he should be in when issuing orders to knock out a machinegun position.

After wading through reams of material gathered from hundreds of hours spent in service school leadership classes—and drawing from my own combat experience in Vietnam—I would like to suggest that the key to becoming a successful leader in combat can be boiled down to three simple principles:

- Show genuine concern for your soldiers.
- Make hard choices quickly when necessary.
- Allow time for planning.

Let's examine these fundamentals in more detail.

Showing Genuine Concern. In Vietnam, a distasteful word crept into the soldier's vocabulary: "fragging." Troopers who perceived that their lives were threatened by leaders who were either incompetent or "ticket punchers"

sought unorthodox ways of shortening command tours—often with "extreme prejudice." Had the offending leaders paid more than lip service to the old maxim, "mission, men, me," they would have gotten the respect they sought—and that which many of their contemporaries earned.

Part and parcel of "showing genuine concern" is the need to lead by example, to share your soldiers' hardships and never ask something of them you aren't willing to do yourself. General Bruce C. Clarke relates the following as a case in point:

"While serving as a corps commander during the Korean War, I offered a quantity of candy bars and other sundry items to the first platoon to bring in a prisoner who was in good enough condition to be interrogated. Not long after making the offer, I received word that one of our forward elements had captured a Chinese soldier who could talk.

"When I met the young lieutenant who had commanded the patrol on which the soldier was captured, I asked him if the task had been difficult. His commander interrupted him to tell me that the lieutenant had provided the prisoner his own steel pot and flak jacket when the patrol was taken under fire while returning to our lines. I asked the young officer why he'd done that, and he replied, 'Sir, I wasn't taking any chances on my men losing out on getting that sundry pack!'

"I was deeply impressed by the lieutenant's selfless concern for his soldiers. He could easily have ordered one of his soldiers to give the prisoner his helmet and protective vest. Instead, he used his own. That act communicated an important message to his men, and I'm convinced they would have followed him anywhere."

Making Hard Choices. Although it's impossible to recreate the mind-numbing confusion of combat, service schools attempt to induce mental stress in various ways. In OCS, candidates are given seemingly impossible time limits in which to accomplish missions. Then, when confronted with tough decisions, they must contend with hordes of tactical officers loudly taunting them to "make a decision, candidate!" While some perceive it as harassment, there is sound logic behind the pressure to quickly choose a course of action. Take, for example, what happened to Brigadier General William S. Carpenter when he was a captain commanding Company C, 2d Battalion, 502d Infantry in Vietnam:

On the afternoon of 8 June 1966, Captain Carpenter found himself "between a rock and a hard place." His company, while moving through thick jungle to take up blocking positions, had come within earshot of a North Vietnamese Army (NVA) force of indeterminate size without being discovered. Unfortunately, while two of his platoons were preparing to assault the enemy force, a trigger-happy NCO blew the element of surprise by firing on an unsuspecting NVA soldier caught in the act of relieving himself. The gunfire alerted the main body of the enemy force, which responded almost immediately with flanking machinegun fire that pinned down the 1st and 2d platoons and the company CP.

Lying in thick brush, immobilized by effective fires from several light and heavy machineguns, and surrounded by wounded men in the CP, Captain Carpenter was unable to see how the battle was developing—despite the fact he was located slightly to the left of the 1st platoon and barely 25 meters to the rear of the 3d platoon's closest flank. But, while he couldn't see, the reports he was getting on the radio painted a grim picture, indeed.

An anonymous, panic-stricken report came from the 3d platoon identifying the caller as the sole survivor. Even more ominous, Captain Carpenter had lost contact with the 1st platoon. On the surface, the situation appeared desperate, especially after an attempt by the 4th (heavy weapons) platoon to flank the enemy machineguns was stopped cold.

Based on available information, Captain Carpenter decided his position was untenable. He'd been in contact with battalion on and off since the fight started. ("Be sure to police the field of all weapons when it's over," the commander had optimistically told him.) He finally made an urgent plea for help: "They're right in among us. We're being overrun. I've got to have napalm dropped right on my position."

Luckily, air support was already on station. Captain Carpenter popped yellow smoke to mark his position and in less than a minute, flaming droplets of jellied gasoline were splashing through the bamboo tops, spilling forward into enemy-held ground in the wake of the jet that delivered them.

Although Captain Carpenter later said he thought he'd lost at least half of his men, many by his own order, things were not as bad as they seemed. His desperate gamble paid off. The napalm forced the NVA to break contact, causing an undetermined number of enemy casualties. Only 12 Americans were burned. (Two became stretcher cases; one later died.) In the mop-up that followed, the toll of Charlie Company casualties was found to be 15 dead, 16 missing and 25 seriously wounded.

Allow Planning Time. No combat action can be expected to succeed without at least some prior planning. Even a poorly-developed plan is better than no plan at all—at least you will have some basis upon which to base fragmentary orders.

An excellent illustration of how careful planning can lead to success in battle comes from an action on 29 April 1943. On that date, Captain Robert D. Gwin, commander of Company I, 1st Armored Regiment, received orders to report to Major General Charles S. Ryder, commander of the 34th Infantry Division. But, let Captain Gwin explain what happened:

"April 29th—Received orders from commanding general, 1st Armored Division, to report to commanding general 34th Infantry Division to plan tank attack on a hill in this sector. I reported to the 34th Infantry Division CP with Lieutenants Adams and Ruppert, saw Major General Ryder, reconnoitered the area, and planned the attack. We then returned to the company, which had been alerted, assembled all tank commanders and explained the situation to them. After platoon assignments were given and understood, the men were told to rest until 2330, when we would move to our assembly area behind Djebel el Kerh.

"April 30th—Company arrived at assembly area behind Djebel el Kerh at 0230. In order to get to our defilade positions, we had to descend a very steep hill, go cross-country and cross a wadi at the bottom. This would have been difficult but Jerry very obligingly shot up an illuminating flare which made our job much easier. We got into our defilade assembly area, arranged stand-to for 0400, and then the men got some sleep while the officers talked over the attack, arranging details with the artillery forward observer who was to ride in the staff tank. At 0415, we jumped off, after contacting our supporting infantry, the 2/135th Infantry, 34th Infantry Division. Lieutenant Adams was to move the 1st platoon forward and gain a position on a rimrock to the company's left, from which we could cover the entire operation of the company by fire. Upon reaching the vicinity of his objective, he found that it was inaccessible due to terrain, but Lieutenant Adams took his platoon to an alternative covering position. The

other two platoons then advanced rapidly, leap-frogging after they neared the objective. Quite near the objective, Hill 609, the terrain narrowed so that there was a maneuver possibility for only one platoon. Lieutenant Riggsby led the 2d platoon into defilade covering positions while Lieutenant Ruppert continued the forward advance with the 3d platoon. Thus, although the entire company was under rather heavy fire, Lieutenant Ruppert was protected on both flanks from hostile tank counterattack, although his front was the main threat, as it turned out later.

"The infantry was advancing with our tanks, and on several occasions they tried to designate targets, as they had been instructed to, but amid the noise, this was hopeless.

"About this time, the CP, just forward of the 1st platoon came under direct antitank fire from the right. Before the antitank gun was able to do any damage, Lieutenant Adams located it, a ground-mounted 75-mm, and knocked it out by fire from his own tank. The 2d platoon was also having difficulty. Lieutenant Riggsby's tank was knocked out by shell fire, and the platoon sergeant, Sergeant Neal, took charge of the platoon. He covered Lieutenant Ruppert. At this time one of the 3d platoon's tanks, Sergeant Kaschak's, was knocked out and set afire by an enemy antitank gun, a 50-mm, which scored five penetrations out of six rounds at about 300 yards.

Lieutenant Ruppert withdrew his platoon about 10 yards to defilade, instructed them to continue the fire fight, and dismounted from his tank to administer first aid to the wounded crew. He evacuated the wounded on the back deck of one of his tanks, and with the remaining three tanks fired at enemy infantry and self-propelled guns that were withdrawing to his front and right front.

The enemy effectively cut off further advance of Lieutenant Ruppert's platoon by antitank fire from the front and right flank, and, since the mission was accomplished, with the infantry in possession of the hill, Lieutenant Ruppert was ordered to withdraw to the original assembly area under cover of the 2d platoon. A message was then received that the company had accomplished its mission and directed us to assemble in the harbor area. Our losses were two tanks completely inoperative and two which could be repaired in 2 or 3 days. We were unable to use our supporting artillery because of lack of communications."

As a footnote to Captain Gwin's report, the battalion commander, Lieutenant Colonel Lydon B. Cole, added the following comments:

"The officers of Company I found Major General Ryder at a forward OP from which he could plainly see the hill held by the enemy and which was holding up his advance on Hill 609.

"After the officers reported to him, he explained fully the situation confronting his infantry and pointed out accurately on the map and on the ground the locations of his own troops and the enemy troops. He then told the tank officers that since he was not accustomed to operating with tank support, he would simply give them a mission to accomplish, let them present their own solution and would use his infantry to support them and drive the enemy from the hill.

"Leaving Major General Ryder's observation post, the tank officers went forward to the friendly infantry weapons pits and made a thorough study of the terrain. A plan was decided on and taken back to Major General Ryder, who had assembled his artillery and infantry commanders to coordinate the details. The smallest details of the attack were worked out, from the construction of a crossing of a wadi to identification signals between friendly troops. After the time of attack was agreed upon, Captain Gwin and his officers returned to their company and explained in detail to the men the job they were to do.

"The above is added to Captain Gwin's report to show that the success of his attack on Hill 609 was a result of thorough planning and an intimate knowledge of the job he was to perform. The German, not *time,* was his enemy; *he was not rushed."*

This last illustration, while focusing on the positive effects of prior planning, also highlights the other two principles I've discussed. The leaders involved showed concern for their troops by keeping them informed, looking out for their men's physical needs before their own, and, in one instance, the platoon leader exposing himself to enemy fire to aid the wounded in one of his crews. They also demonstrated the ability to make quick decisions and drive on when things didn't go exactly as planned.

Today, it's easy to grow fat on the diet of managerial minutiae offered in our service schools. I'm convinced, however, that our success as leaders on future battlefields will require a little belt-tightening and careful application of these three simple principles.

DALE E. WILSON
Captain, Armor
Fort Carson, CO

Recognition Quiz Answers

1. **T-62 (USSR).** 115-mm main gun with a 3-5 round per-minute rate of fire; maximum effective gun range, 1,600 meters; crew, 4; basic ammunition load, 40 rounds; maximum road speed, 50 km/hr; maximum road range, 450 km.

2. **T-55 (USSR).** 100-mm main gun with 5-7 round-per-minute rate of fire; maximum effective gun range, 1,500 meters; crew, 4; basic ammunition load, 34 rounds; maximum road speed, 50 km/hr; maximum road range, 500 km.

3. **T-72 (modified) (USSR).** 125-mm main gun with a 6-8 round-per-minute rate of fire; maximum effective gun range, 2,000 meters; basic load of ammunition, 40 rounds; crew, 3; maximum road speed, 50 km/hr; maximum road range, 450 km.

4. **T-64 (USSR).** 125-mm main gun with 6-8 round-per-minute rate of fire; maximum effective gun range, 2,000 meters; basic load of ammunition, 40 rounds; crew, 3; maximum road speed, 50 km/hr; maximum road range, 450 km.

5. **M-1973 152-mm SP Gun/Howitzer (USSR).** Crew, 5; maximum road speed, 50 km/hr; maximum road range, 500 km; powered by 500-hp diesel; armament: 152.4-mm main gun, 7.62-mm antiaircraft machinegun.

6. **SX 60 Mortar Carrier (Japan).** Crew, 5; maximum road speed, 45 km/hr; maximum road range, 230 km; powered by V-8 220-hp diesel; armament: 107-mm mortar, 12.7-mm machinegun.

(Prepared by Threat Branch, DCD, USAARMC, Fort Knox, KY.

REGIMENTAL REVIEW

66th Armored Activated

The 66th Armored Regiment (Iron Knights) was formally activated in the U.S. Army's new regimental system at Fort Hood, Texas, on 2 December 1983. Colonel Herbert S. Long, Jr., USA (Ret.) was named the 66th's Honorary Colonel of the Regiment.

The 66th Armored Regiment is the oldest armored unit in the Army, tracing its history back to the Heavy Tank Service of 1918. The unit distinguished itself in WWI and underwent several numerical designation changes until 15 July 1940, when it was designated the 66th Armored Regiment and assigned to the 2d Armored Division at Fort Benning, Georgia.

During World War II, the 66th fought in North Africa, Sicily, Normandy, Northern France, Rhineland, Ardennes-Alsace, and Central Europe and followed these actions with eight campaigns in the Korean War, when it was redesignated the 6th Tank Battalion assigned to the 24th Infantry Division.

Currently, the 1st and 3d Battalions are assigned to the 2d Armored Division, Fort Hood, and the 2d Battalion is assigned to the 2d Armored Division (Forward) at Garlstedt, West Germany.

The battalion commanders are: 1st Battalion, Lieutenant Colonel James R. Joy; 2d Battalion, Lieutenant Colonel Michael A. Andrews; 3d Battalion Lieutenant Colonel Philip D. Riley.

Colonel Long, the 66th's Honorary Colonel, was commissioned in cavalry in 1935 and was assigned to the 66th Armored Regiment at Fort Benning in 1940. He served with the unit throughout World War II and as a major commanded the 2d Battalion during the Roer River and Ardennes campaigns. Colonel Long is a graduate of the Advanced Armor Officer Course at Fort Knox and the Army Command and General Staff College. Following a tour at GHQ, Far East Command, Tokyo, Colonel Long served at the Armor Combat Training Center (now the National Training Center) at Fort Irwin, California as commander of the resident tank battalion and later as the Center's chief of staff.

Scouts Fulfill Many Important Battle Roles

They're the eyes and ears of the battalion, and the mechanized scout platoon of Headquarters Company, 1-36th Infantry, 3rd Armored Division are fast, silent, elusive and invaluable.

"We follow the first two brigades," said SFC Terry R. Smith, "and keep enough maneuver space so that if one brigade gets heavy resistance we can thicken them up or plunge through to the front. Or we can draw the battle down through the center sector. Or we can loop behind . . . where the enemy is positioned, and set up a defensive position and attack them in the rear."

"Morale is very high," Smith said. "A scout platoon is kind of an elite group." SSG Thomas Porter said, "It is not unusual for scouts to be used in guarding, screening, and for harassment." The average "Spearhead" scout is trained in cavalry, mechanized infantry, armor and reconnaissance.

"The mission is different all the time. It's often lonely, but it's exciting. It takes a special kind of soldier, but it's the only way to fight," Porter said. *(From SPEARHEAD).*

Colonel Leach Named Honorary Colonel of 37th Armor

Colonel James H. Leach, USA (Ret.) has been appointed Honorary Colonel of the 37th Armor Regiment.

Colonel Leach began his military career as a private tank crewman in the 36th Tank Company, TXANG, in 1938. In 1942, he received his commission in armored infantry from OCS. During World War II he served 15 months in the 37th Tank Battalion as a platoon leader and company commander under LTC Creighton B. Abrams. He was instrumental in the successful breakthrough by the 37th Division surrounded at Bastogne, Belgium in 1944. He was wounded in action five times during World War II.

He served in many critical staff assignments after the war and commanded the 3d Reconnaissance Squadron, 12th Cavalry, and later the 1st and 2d Brigades of the 1st Armored Division.

In Vietnam, he succeeded Colonel George S. Patton, III to become the 40th commander of the 11th Armored Cavalry Regiment. He was Armor Branch chief from 1970 to 1972.

Colonel Leach is a graduate of the Armor School, the Command and General Staff College, and the Army War College. He received his Master of Science degree in International Relations from George Washington University. His military awards include the Distinguished Service Cross, the Silver Star with two oak leaf clusters (OLC), the Legion of Merit with OLC, the Bronze Star with V device with OLC, the Air Medal with 21 OLC, as well as numerous foreign awards. He retired in September 1972, after 34 years of distinguished service to armor. Colonel Leach has been an active member of the Armor Association since 1942.

Battlebook is Bible for 1st Armored Division Training

Unit "battlebooks," the collective work of everybody in the unit from privates to lieutenants, provide the plan that, when executed, will train everybody to be ready, and train them to win, said Major T. J. Desiderio, former chief of the Training Branch of the 1st Armored Division's G3 section.

The sergeants and lieutenants, in key roles as trainers, provide the real training, the article said. They study, analyze and plan the battlebook, and produce a plan for training.

"It is imperative that the private, the specialist, the sergeant and the lieutenant understand where they are going; that they are being given the best, and that we demand the best," the major said.

Cavalry Medics Get Realistic Practice During Maneuvers

Operating in the adverse desert climate in the Great Salt Lake Desert, four medics from Headquarters and Headquarters Troop, 1st Squadron, 4th Cavalry, recently learned a lot about their specialty.

Led by CW02 Physician Assistant Dennis Wood, the team kept an eye on run-of-the-mill injuries met by soldiers in training and also got plenty of practice in setting up and breaking down their field clinic.

"Everywhere we go it's our mission to set up quickly. It's important for us to be ready for whatever happens," said Specialist 5 Patrick Petray, clinic NCOIC. "In the field, we're the first to set up and the first to move. . ." he said.

Wood also praised the support given by the Dugway Health Clinic. "The people at the Dugway Health Clinic have been terrific," he said.

The action on Grenada brought to light Soviet-made arms and ammuniton. Shown above is a Soviet *BTR-60* *PBS* (armored personnel carrier) put out of action by U.S. forces on the Caribbean island.

NG Unit Uses Third Week for Tank Gunnery Training

The 1st Battalion, 195th Armor, Nebraska National Guard has come up with a new training schedule for qualifying tank gunners. It involves an additional week of training at sometime during the year other than the normal 2 weeks of active duty for training.

Lieutenant Colonel William Smets, 195th commander, said, "Due to the tactical aspects of our annual training period, we have to satisfy the tank gunnery qualifications at some other time. It takes a week of day and night, good, hard, solid training to satisfy this requirement," he said.

Trying to qualify tank crews during weekend training assemblies proved unsatisfactory because of movements and start-up at training sites. Also, a weekend is not enough time to zero the guns and fire the table.

Colonel Smets proposed the additional week of training and the idea was adopted by the Nebraska Guard command and by Lieutenant General David Grange, Sixth U.S. Army commander. Colonel Smets said that he also considered the Guard members' civilian employees when suggesting that the extra week be held at a different time than in conjunction with the usual 2 weeks summer training.

"This is the first time in the U.S. that a Reserve Component has used an additional annual training period to qualify tank gunners," he said. *(From MOUNTAINEER.)*

1-37th Armor NCOs Calibrate Backup Tanks

When 1-37th Armor's commander, Lietuenant Colonel Jim Noles, was given the task of calibrating all of the division's backup tanks he turned the job over to his NCOs.

"I told CSM Joe T. Hill to take the mission and do it. And he did," the colonel said. "Our NCOs are so technically qualified, and their leadership ability is of such a nature that I had no doubt in my mind they could perform this mission very well," he added.

SFC Johnnie Lightsey, battalion master gunner, said, "We've been in charge from the start, and haven't been told what to do. We set up the range and are handling everything involved in firing the tanks."

Calibrating tanks isn't the only thing NCOs are doing. SFC Dennis Benjamin, a platoon sergeant, said, "We're also training a lot of new soldiers while we're here. And, besides the new arrivals, we have about 35 soldiers to train on new positions from loader to gunner."

Horse Cavalrymen Meet

Some wore three-piece business suits, others had squeezed into their olive drab wool shirts, riding breeches and boots of yesteryear, and some wore the dress blues of today's Army. But, they all had one thing in common—they were old cavalrymen or modern horsemen who have known the smell of horse sweat and the distinctive sound of creaking saddles and the hoofbeats of mounts at the walk, canter, trot, and gallop.

They gathered recently at Fort Riley, KS for the second annual U.S. Horse Cavalry Association convention to see old friends, talk about old times and old mounts, and to reflect on events of a bygone era.

During the convention they attended a formal banquet and dinner dance, participated in a fence jumping contest, the blessing of the hounds, and a fox hunt.

The convention ended with a memorial service for members who died during the past year and a rendition of Taps.

Persons interested in joining the U.S. Horse Cavalry Association should mail their applications to:

U.S. Horse Cavalry Association
PO Box 6253
Fort Bliss, TX 79901

(From the Fort Riley Post)

BOOKS

A GENERAL'S LIFE by Omar N. Bradley and Clay Blair. Simon & Schuster, N.Y., 1983. 752 pages. $19.95.

General of the Army Omar N. Bradley died in 1981, at the age of 88, before his autobiography was completed and the work was completed by Clay Blair.

The book is remarkably readable and covers Bradley's life and military career from his birth to the end of his service in 1953. It is divided into five main parts: Early Years, Overseas to War (North Africa), The War on the Continent, Washington, and the Korean War.

Throughout the book, Bradley's relationship with other major military and political figures of his day will hold the reader's interest. Included are such personages as Eisenhower, Patton, Montgomery, Truman, and MacArthur.

Bradley's succinct words on the above persons will add greatly to the reader's overall understanding of what went on "behind the scenes" during many phases of WW II and the postwar world in which Bradley served so well. He was head of the Veteran's Administration and completed his military career as Chairman of the Joint Chiefs of Staff.

Although the book is large, the reader should not be intimidated. The chapters are short, well arranged, and carry one easily through the end. Extensive chapter notes and an index add much to the readability of this work. It is highly recommended.

JAMES F. GEBHARDT
Captain Armor
Fort Ord, CA

THE DESERT GENERALS by Corelli Barnett. Indiana University Press, Bloomington, IN. 1982. 352 pages. $17.95.

In this revised edition, Mr. Barnett has added to the original diaries, memoirs, and other sources made public since the original publication date.

The principle thesis is that general, later Field Marshal, Montgomery's military genius at El Alamein in 1942 was in reality a myth, promulgated by Montgomery himself, as well as others.

The author describes in detail the generalship of the British Army in the Western Desert from 1940 to 1942 and the reader is carried back and forth across the desert with Generals O'Connor, Cunningham, Ritchie, Auchinleck, and Montgomery on the British side and Field Marshal Rommel and Generals von Arnim, Bayerlein, Bergonzoli, Graziani and others on the opposing side.

The text is highly readable and well supported with sketch maps. This book is excellent reading, particularly for Americans who payed scant attention to North Africa before the Torch landings.

Also clearly depicted is the frustration of both British and German generals with their political bosses. In particular, Prime Minister Churchill's unrelenting pressure on his generals to conduct offensive war, regardless of whether it was desireable or practical, is well documented.

This book is invaluable to the student of the war in the North African Western Desert.

JAMES F. GEBHARDT
Captain, Armor
Fort Ord, CA

THINKING ABOUT NATIONAL SECURITY: DEFENSE AND FOREIGN POLICY IN A DANGEROUS WORLD, by Dr. Harold Brown. Westview Press, Boulder, CO., 1983. 278 pages, $17.95.

Dr. Brown is eminently qualified to analyze the full sweep of defense policy for he has served as Director of Defense Research and Engineering, Secretary of the Air Force and as Secretary of Defense.

He does not stridently postulate any easy formulae for enhancing our defense stance and notes that we live in not only "a dangerous world" but one where the U.S. role is no longer one of unquestioned preeminence. He points out the interdependence of economic, sociological, psychological, political, technological and military factors in the total national security equation.

ARMOR Magazine readers will be particularly interested in Dr. Brown's views on how to redress the unfavorable Warsaw Pact-NATO tank imbalance in Central Europe. He believes that adding 30,000 tanks and 300,000-400,000 soldiers to the U.S. holdings is not feasible from a resources standpoint and that the West must look to "innovative tactics and technology" to counter the Pact's numerical advantage. He does not discuss tactics, but notes that the Soviets generally match the U.S. in ground force technology and that the Soviets produce "new variations of armored vehicles at about twice the frequency of NATO."

Thus, Dr. Brown looks to total NATO air-ground antitank capability (antitank guided missiles, laser-guided bombs and shells, infrared imaging systems, etc.) to compensate for the West's numerical inferiority in tanks, but he does not spell out two major needs:

- Developing and implementing a coordinated, integrated air-ground antitank warfare concept.
- Upgrading the lethality, accuracy, range and reliability of infantry-type individual and crew-served antitank weapons.

This volume is a *must* source book for the professional.

JOHN A. HURLEY
Lieutenant Colonel, USAFR
HQ USAF

HIT HARD by David J. Williams. Bantam Press, NY., 293 pages, $2.95.

This is they story of a two-pronged attack against racial prejudice and the German Army in World War II.

Williams was assigned to the 758th Tank Battalion, 5th Tank Group, one of the few black combat arms units in WW II. As a white officer, he had to learn to work with black soldiers who were less than thrilled at being led by white officers as well as a group of officers who were unwilling to accept his unbiased "get the job done" approach to his assignment.

Eventually, Williams was assigned to the 761st Tank Battalion that went into battle following the Normandy invasion in 1944. The unit saw much heavy combat and Williams' recounting of the many individual acts of bravery in his troops is inspiring.

The 761st fought through the European campaign and was, 30 years after the war, awarded a Presidential Unit Citation.

GEORGE A. CRANE
Captain, Armor
Phoenix, AR

THE FINAL COLLAPSE by General Cao Van Vien, Center of Military History, U.S. Army, Washington, D.C., 20314. 184 pages, $5.50.

General Vien, chairman of the Republic of Vietnam's Joint General Staff, offers a unique, personal and poignant view of the events that lead to the surrender to Communist North Vietnam in 1975.

He states his country was unprepared to assume the burden of war left to it by the Paris Agreement of 1973; that the loss of American support weighed against South Vietnam and gave North Vietnam the opportunity to rebuild its forces and devise new strategies for conquering the South.

General Vien came to the U.S. in 1974 seeking more aid for his country, but was unsuccessful in his attempts.

ARMOR Staff
Fort Knox, KY

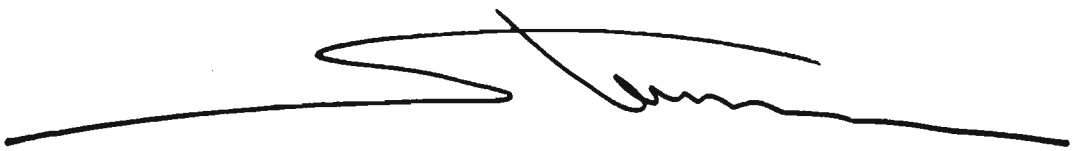
STEEL ON TARGET

Today's armor leader, from tank to battalion commander, functions in a climate unique to our branch because the scope of his leadership responsibility extends in many directions at once. For example, a platoon leader or battalion commander, like all armor leaders, is a fighter-leader. Broadly speaking, he focuses the efforts of all the soldiers in his organization toward mission accomplishment. But to effect that function, he is a crew-leader as well, and must integrate his fighting vehicle and its crew into the overall scheme while simultaneously leading the larger unit. And, as a fighter, he is responsible for carrying out his duties as an integral part of the vehicle crew. He must carry out each of these functions as skillfully as though each were his only concern. Consequently, an armor leader must couple a broad perspective and far-sightedness with the meticulous attention to detail required to squeeze the most from himself, his crew, and his fighting vehicle, and his unit overall. That is why our branch emphasizes technical expertise to the same degree as organizational and interpersonal leadership.

Some have said that the infantry equips the man and armor mans the equipment. That over-simplification obscures the link that exists between man and machine, for the hearts of our vehicle systems are our crewmen. The fighting vehicles are, in effect, extensions of those who man them. Therefore, leaders who pay less attention to their leadership styles or neglect their leadership responsibilities in favor of refining only the technical aspects of their professional skills miss the mark. Both are vitally important. Our soldiers are our most valuable asset and when properly trained and motivated will, on their own initiative, take care of themselves and their equipment, and will seek out and destroy the enemy. Today, the issue of personal and organizational leadership has become more complex and demands closer attention as modernization continues, because the unmatched sophistication of our equipment will require more, not less, emphasis on leadership skills. Our fighting vehicles move faster, requiring quicker thinking on the part of all leaders. Units and crews will fight independent actions more frequently, requiring individual initiative. To wrest the full measure of capability from our vehicles requires a degree of teamwork normally associated with flight crews operating in high-speed, high-intensity, and highly-hostile environments.

So, while our leaders must continue to expand their technical expertise, they must also apply that knowledge to increasing their efficiency as individual crewmen, as crew leaders and as unit leaders. In so doing, they will begin to unleash the pent-up potential in our newest generation of armored fighting vehicles.

Good Shooting!



Symbolism

Organized in 1901, the regiment saw service in the Philippines, which is indicated by the crossed bolos with red blades and blue hilts. The regiment's excellent service on the Mexican border in 1916 is represented by the cactus. The regimental colors, black and yellow, are shown by the shield and the black border within the edge and by the color of the crest.

Distinctive Insignia

The distinctive insignia is the shield, crest, and motto of the coat of arms.

11th Armored Cavalry

Lineage and Honors

Constituted 2 February 1901 in the Regular Army as 11th Cavalry. Organized 11 March 1901 at Fort Myer, Virginia. Assigned to 3d Cavalry Division August 1927-March 1933. Assigned to 2d Cavalry Division October 1933-October 1940. Inactivated 15 July 1942 at Fort Benning, Georgia; personnel and equipment transferred to 11th Armored Regiment (see Annex 1).

Headquarters and Headquarters Troop, 11th Cavalry, redesignated 19 April 1943 as Headquarters and Headquarters Troop, 11th Cavalry Group, Mechanized. Activated 5 May 1943 at Camp Anza, California. (Remainder of 11th Cavalry disbanded 26 October 1944.) Headquarters and Headquarters Troop, 11th Cavalry Group, Mechanized, converted and redesignated 1 May 1946 as Headquarters and Headquarters Troop, 11th Constabulary Regiment. Reorganized and redesignated 2 February 1948 as Headquarters and Headquarters and Service Troop, 11th Constabulary Regiment. Converted and redesignated 30 November 1948 as Headquarters and Headquarters Company, 11th Armored Cavalry; concurrently, inactivated in Germany.

Organization of 11th Armored Cavalry (inactive) completed 30 November 1948 by reconstitution and/or redesignation of elements of the 11th Cavalry and Headquarters and Headquarters Troop, 1st Constabulary Regiment (see Annex 2). 11th Tank Battalion (see Annex 1) consolidated 8 January 1951 with 11th Armored Cavalry. 11th Armored Cavalry activated 1 August 1951 at Camp Carson, Colorado. 95th Tank Battalion (see Annex 1) consolidated 1 October 1958 with 3d Battalion, 11th Armored Cavalry. (Battalions and Companies redesignated 15 May 1960 as Squadrons and Troops.)

Annex 1

11th Armored Regiment constituted 11 July 1942 in the Army of the United States and assigned to 10th Armored Division. Activated 15 July 1942 at Fort Benning, Georgia, with personnel and equipment from 11th Cavalry.

Regiment broken up 20 September 1943 and its elements reorganized and redesignated as follows: 11th Armored Regiment (less 3d Battalion, Band, and Maintenance, Service, and Reconnaissance Companies) as 11th Tank Battalion; 3d Battalion as 712th Tank Battalion and relieved from assignment to 10th Armored Division; Reconnaissance Company as Troop E, 90th Cavalry Reconnaissance Squadron, Mechanized (separate lineage); Maintenance and Service Companies and Band disbanded.

11th Tank Battalion inactivated 13 October 1945 at Camp Patrick Henry, Virginia. Relieved from assignment to 10th Armored Division and consolidated 8 January 1951 with 11th Armored Cavalry.

712th Tank Battalion inactivated 27 October 1945 at Camp Kilmer, New Jersey. Reorganized and redesignated 1 September 1948 as 525th Medium Tank Battalion and allotted to the Regular Army. Activated 10 September 1948 at Fort Lewis, Washington. Inactivated 15 December 1948 at Fort Lewis, Washington. Redesignated 4 February 1950 as 95th Tank Battalion and assigned to 7th Armored Division. Activated 24 November 1950 at Camp Roberts, California. Inactivated 15 November 1953 at Camp Roberts, California. Consolidated 1 October 1958 with 3d Battalion, 11th Armored Cavalry.

Annex 2

Headquarters and Headquarters Detachment, 11th Tank Group, constituted 19 July 1943 in the Army of the United States. Activated 28 July 1943 at Camp Campbell, Kentucky. Reorganized and redesignated 5 December 1943 as Headquarters and Headquarters Company, 11th Armored Group. Converted and redesignated 1 May 1946 as Headquarters and Headquarters Troop, 1st Constabulary Regiment. Inactivated 20 September 1947 in Germany. Converted and redesignated 30 November 1948 as Headquarters and Headquarters Company, 3d Battalion, 11th Armored Cavalry.

Campaign Participation Credit

Philippine Insurrection
Samar 1902

Mexican Expedition
Mexico 1916-1917

World War II
Normandy
Northern France
Rhineland
Ardennes-Alsace
Central Europe

Vietnam
Counteroffensive, Phase II
Counteroffensive, Phase III
Tet Counteroffensive
Counteroffensive, Phase IV
Counteroffensive, Phase V
Counteroffensive, Phase VI
TET '69 Counteroffensive
Summer-Fall 1969
Winter-Spring 1970
Sanctuary Counteroffensive
Counteroffensive, Phase VII

Decorations

Valorous Unit Award, Streamer embroidered BINH LONG-BIN HOA
2d Valorous Unit Award, Streamer embroidered FISHHOOK.
2d Republic of Vietnam Cross of Gallantry w/Palm, Streamer embroidered VIETNAM 1966-1968.
3d Republic of Vietnam Cross of Gallantry w/Palm, Streamer embroidered VIETNAM 1970.