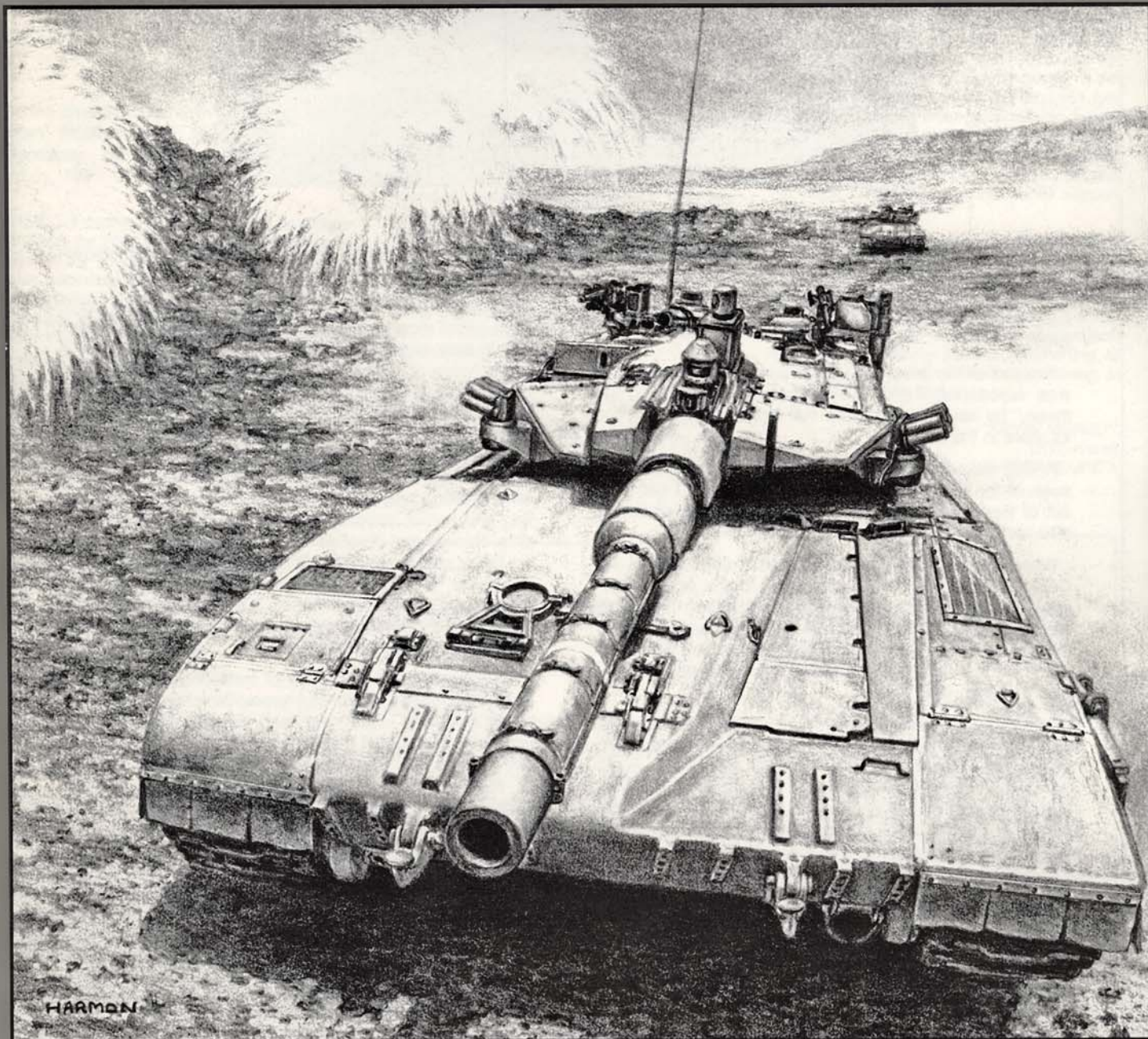


# ARMOR



## Active Protection Systems



About a year ago, an older man in civilian clothes brought his camper to a stop outside the *ARMOR* Magazine offices and walked in, carrying a large cardboard box. It was stuffed with old, dog-eared copies of *ARMOR*.

"I'm too old to keep up with this stuff anymore, and I was wondering if you people might have a use for these," he said, plopping the first box down. "There's a lot more in the truck."

A long-retired field grade officer, he had saved his issues of the magazine all through the years. "I got a lot out of these old magazines," he said. "Maybe someone else can..."

What brings this to mind is the recent news that the Air Defense Artillery Branch has decided to end paper publication of their branch journal and publish their articles in electronic form only. Driving the decision was cost, although some optimists see an up-side in the new, and much larger, potential audience the "publication" may now reach on-line.

Lately, at the *ARMOR* office, we've been gearing up to put the Armor Branch journal on-line, too, although there are no plans to eliminate the paper version. It might seem real high-speed and techno-modern to go on-line-only, but we have serious doubts about whether the two media are really interchangeable. True, reading is involved in both processes, but is the *learning* experience the same? Can reading three or four paragraphs at a time, on the screen, effectively transfer the same information as having a story spread out before you, where you can thumb back to the preceding page, check ahead to see where an argument is going, see pictures, captions, and maps in true relation to text, all in the glide of an eye? Will the server be up when you want to read *ARMOR ONLINE*? Will computers ever be as portable as a magazine? Will you have to put a modem line into

your bathroom in order to read *ARMOR* on your precariously balanced "kneetop"?

But what about cost? Ending paper publication would save some money, but in an era of thousand-dollar main gun bullets, is \$40,000 a year really *that much money* in the scheme of things? That's roughly *ARMOR*'s printing bill each year. About the cost of 20 mid-level computer systems or 40 main gun rounds. Actually, because of the impact of the personal computer, our cost has been dropping since the late 1980s, when *ARMOR* became one of the first periodicals in the nation to be produced on a desktop publishing system. Doing our own typesetting and layout radically reduced the cost of the magazine. Prior to that revolution, two issues cost as much as six today, and that's not factoring in the plunging value of the dollar. So, we're not against progress, and we're sure not against saving money, not these days. But you have to be sure that when you're buying an apple, you're not actually getting a pear.

Finally, there's this problem of tradition. It stares at us from the shelves of the big, green fire-proof safe in the *ARMOR* office, where we keep the old, leather-bound volumes of *ARMOR* and its predecessors — *The Cavalry Journal* and *The Armored Cavalry Journal* — going all the way back to the beginning, to 1888. Very few magazines in America, a handful, go back that far. Which gives you a new respect for those old cavalrymen who got together and decided, 110 years ago, that trading ideas in a branch journal might be a good way to enrich their knowledge and professionalize their careers. Of course, there were no computers then; hell, there weren't even telephones, but there were soldiers who needed to communicate across the frontier's dusty miles.

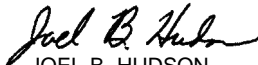
They had a good idea then. And it may still be.

— TAB

By Order of the Secretary of the Army:

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

Official:

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

04540

# ARMOR

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*ARMOR* Artist Jody Harmon's concept illustration shows an Israeli Merkava 3 fitted with a TAAS electro-optical warning device, laser warning receiver, POMALS launchers, and Violin electro-optical jammer. See Page 7.

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# LETTERS

## Major Checkpoint Hurdle: Not Enough Soldiers

Dear Sir:

In his article, "Force Protection for Checkpoint Operations" (Sep-Oct 97), 1LT Milligan addressed the TTP utilized by his unit during checkpoint operations in Bosnia-Herzegovina. I would like to add a few additional points about checkpoints overall that I encountered in 1996 as the commander of TM A/2-68 AR assigned to TF 2-6 IN (LA Pat, Tisca, Srpska) and TF 2-68 AR (LA Linda, Olovske-Luke, BH). As a team commander, I had three tank platoons and two Bradley platoons.

Checkpoint operations are extremely difficult for a tank company to undertake. I assigned checkpoint operations as platoon missions for 10 days duration, after which they rotated to a new mission. The platoons rotated missions between checkpoint operations, guarding the base camp, guarding the brigade HQ, providing a reaction force for Tuzla Airfield, and conducting other missions within the zone of separation. With the number of missions being conducted, I could not use a larger force than a platoon on the checkpoint. When available, I also rotated soldiers out of the headquarters platoon onto the checkpoint. Their normal job was manning the TOC within the base camp, performing maintenance, and doing details for the first sergeant, the "sheriff" of the base camp. My executive officer had the task of running the base camp.

Four tanks and eight men, as a minimum, were required to man a permanent checkpoint on a straight road; two men were dismounted on each entrance gate and one man was in a tank turret overwatching. Radio watch was established in one tank, and the platoon leader and platoon sergeant rotated as OIC of the checkpoint. The fourth tank was available to reinforce either gate should the need arise. This required that 50 percent of the strength of a fully manned tank platoon be on duty at any one time. If not augmented, this amounted to shifts of 12 hours on, 12 off. During those 12 hours "off," maintenance on personnel, equipment, and the checkpoint was performed. Filling sandbags was a never-ending task. Maintenance of the perimeter lighting was also a constant issue. We had a mixture of Army and Air Force floodlights which required different types of fuel. The one generator mechanic within the task force was kept busy giving classes and licensing soldiers to operate the varied lights.

A technique I used to give more resources to the platoon on the checkpoint was task-organizing within platoons, producing a platoon of two tanks, two Bradleys, 14 crewmembers, and a squad of infantry. The infantry squads provided the additional manpower needed at the checkpoints. They also added additional communications assets (PRC-126 radios) and individual firepower (a tank platoon has only four M16 rifles and no M203 grenade launchers). Though four tanks were on the checkpoint, their overall firepower was

mainly psychological. With only one person on board, the loader's M240 MG was the most responsive weapon to use.

Resupply of the checkpoint was accomplished during daily movements to the task force headquarters or by patrols passing through. We were very limited in options due to the rule of moving in four-vehicle convoys. With only two HMMWVs in the company, my convoys always included HEMTTs or the 5-ton tractor that moved the mine rollers. Another resupply COA was to have the civilian contractor, Brown and Root, deliver items for us. They made daily, predictable, and reliable stops in each base camp delivering supplies, picking up garbage, etc. The majority of these men were ex-military and were glad to help by dropping off spare parts, an extra can of mogas, or whatever was needed.

RANDALL L. KOEHLMOOS  
CPT, Armor  
Student at the Pakistani CGSC  
Quetta, Pakistan

## Who Is This OPFOR That We Plan to Fight?

Dear Sir:

In our current era of shrinking budgets I am struck by the level of training in evidence at our training centers. Our leadership is on Capital Hill explaining to Congress the training level of units in the field, but nearly half of the training we conduct at our training centers goes to "waste." I am referring to the training dollars, time and opportunities that are used by the OPFOR.

As an O/C, I watched as BLUEFOR units struggled through basic maneuvers that the OPFOR executed with ease. Changes of formation, changes of plan, fire and maneuver etc. are executed well by the OPFOR but the BLUEFOR had trouble with these basics. I remember that, as a lieutenant, my unit would deploy to the CMTC where we would serve as OPFOR. This was some of the best maneuver training that I have ever experienced. My unit would conduct the orders process and execute missions over and over again. After a month we were well honed on maneuver fundamentals. This was all done in a low stress environment where the focus was on getting better. Currently in USAREUR, 1/15 of the maneuver battalions/squadrons, the OPFOR, does 1/2 of the training. The OPFOR cannot and will not deploy to any hot spot anywhere in the world.

The arguments against using a "rental" OPFOR include a lack of a doctrinally correct force, if there is such a thing anymore. I would argue that no potential enemy in the world is capable of fighting with OPFOR "doctrine." We have become fixated on an OPFOR doctrine that is not executed by anyone but us. As a BLUEFOR unit LDs on a movement to contact, it looks a lot like an OPFOR MRB to me with the forward security element,

advance guard etc. BLUEFOR commanders even use OPFOR terms to describe their formations. The Russians were not using OPFOR doctrine when they floundered around in Chechnya. The Iraqi's used a combination of doctrines in their battles. The Chinese lack the level of mechanization, the Korean terrain precludes the use of OPFOR doctrine and many of the Middle Eastern countries use whatever makes sense. Who is this OPFOR that we plan to fight/train against?

Another argument against a non-permanent OPFOR is that they would lose as many battles as the BLUEFOR and the real training value would be lost. Speaking from experience, I can say that my brigade only lost one battle that I can remember during a three-task force rotation. The reasons are simple. The OPFOR is well rested. The OPFOR has more time for maintenance. The OPFOR has no supply problems. Bottom line, a well-rested OPFOR that is doing its orders process, maintenance, and logistics in the rear will have an advantage. Who knows, maybe more of our units will make it on to the objective against a non-permanent OPFOR and actually have an opportunity to train actions on the objective?

Some quick math shows that we could crew the vehicles of an MRR with a TF(-). Add an engineer company and an Active or Reserve Infantry company and you have an MRR. Some interesting missions could be devised which would attach an "OPFOR" MRB to the BLUEFOR as a combined force. This would allow brigade commanders to plan for and control three battalions. Consider the fratricide awareness which would have to go into the planning. Probably a good exercise for future fratricide prevention.

Another option is to go force-on-force. Lots of good training could occur that would benefit both sides. The side defending would have an advantage that could be mitigated with extra combat multipliers for the attacking force. This technique would result in 100 percent of the training being conducted by units that will deploy to fight and win America's wars with the equipment and personnel assigned.

These are just a few ideas to help maximize our training dollars and opportunities. I appreciate being able to discuss this in a professional forum.

MARK H. SALAS  
CPT, Armor  
Deputy Chief Plans and Exercises  
CMTC

## Armor/Cav "Generalists" Cannot Master Either Trade

Dear Sir:

I just finished re-reading COL Hertling's article on "Managing Career Progression in a Smaller, Higher Tempo Army" (which appeared in the Nov-Dec 97 issue) and have

some comments which I feel are worth sharing.

Let me start off by saying COL Hertling's comments provide valuable insight into the machinations of Army-think in general and PERSCOM in particular. It is always nice to know about what goes on in various Army agencies, especially those which have an impact on the careers of countless officers, and COL Hertling has done Armor branch a service by sharing his experiences.

However, I take issue to his comments about alternating assignments between Armor and Cav units. In his article, COL Hertling states, "One of the programs that is a priority concerns mixing the armor and cavalry experiences of young officers; we attempt to avoid 'single tracking'... If an officer had served in a Cavalry unit ... while a lieutenant, Branch attempts to ensure a tank assignment..." and concludes the paragraph by saying failure to do so (i.e. 'single tracking') "... hurts our branch and stunts the professional growth of the officer" (p. 48).

Well sir, I've "further analyzed" my "rationale" and I still disagree. Allow me to explain. The troop/company commander should (must!) be the subject matter expert on everything in his unit. By this I mean not just doctrine — although that's a good start — but the master of all technical and tactical subjects in his troop/company, to include but not limited to gunnery of the appropriate weapon(s) (small arms also), tactics, leadership, doctrinal and unconventional missions, and so on. While our current military schooling system gets officers on the right footing, it takes years of practice and hard work to make an officer the expert he needs to be before being given command. For these reasons, to take an officer with 3-4 years of being a tanker and then put him in charge of a cav outfit (or vice versa) is both unfair to the officer and the men he will command. By doing so, we fall into the trap of using soldiers as training aids in order to develop an officer who is a generalist. Having competent, confident company and battalion-level commanders is essential to success on the battlefield. This does not happen when officers are bounced around in "alternating assignments."

There is a larger issue here, and that is whether an officer should be a "generalist" or a "specialist." In the American Army, conventional wisdom is that officers should be generalists. That is, an officer should be a guy with some troop time, staff time in a TO&E unit, experience in a functional area assignment, time in a TDA unit, and so on. It is this rationale which generates the "priority" of avoiding "single-tracking." I seriously question the wisdom of this decision.

The complexity and tempo of the modern battlefield leave little room for generalists. Time spent performing "functional area" assignments, for example, is time that could be spent instead perfecting the officer's abilities in the art and science of warfare. The Army needs people for program management? Fine. Make it a civilian job and free up an officer who can attend a TO&E unit or training

school assignment instead. Is the problem that the Army has created administrative slots for officers out of an act of political patronage so that those not assigned to TO&E units can reach the 20-year mark, and now needs bodies to fill and justify these positions? Is the tail wagging the dog? I don't know. I do know that the Army needs officers to lead men in battle.

The best and most comprehensive solution I've seen to this devilish problem was one put forward by MAJ Vandergriff in the Mar/Apr 97 issue of *ARMOR*. In his article, MAJ Vandergriff identified the key techniques of success used by armies around the world with respect to how they grow and develop officers, and then put forward a number of excellent recommendations as to how we can adopt similar techniques in our Army. His proposal addresses many of the issues discussed by COL Hertling, and more. (I certainly think the article is worth a reprint!)

Allow me to conclude by saying this: If I was a tanker in a tank battalion, I wouldn't want to serve under a company commander whose practical experience was limited to doing recon in Hummers. Would you?

1LT ANDY GOLDIN  
1-158 Cav, 29ID (Lt)  
MDARNG

*(If this letter was of interest to you, we suggest you read 'Military Leadership into the 21st Century: Another "Bridge Too Far?"' by LTG (Ret.) Walter Ulmer in the Spring edition of PARAMETERS. - Ed.)*

### **Breaching Fix Is On the Way With Engineers' Grizzly Program**

Dear Sir:

The following addresses concerns expressed by MAJ Morningstar in his article, "Points of Attack: Lessons From the Breach" in the Jan-Feb 98 issue of *ARMOR*. The GRIZZLY (popular name), or M1 Breacher program, is designed to specifically address obstacle breaching with a single asset and crew. This new vehicle is influencing the thought process with Army digitization and updating of breaching doctrine via *FM 90-13-1 (Combined Arms Breaching Operations)*. Specifically, to allow GRIZZLY with its crew battle drills to replace what has been termed by Engineers and the maneuver force alike — "a ballet of farm implements" in the conduct of breaching operations. A Combined Arms breach will still be required. The breach fundamentals of Suppress, Obscure, Secure, "then" Reduce (SOSR) remain essential for success.

With GRIZZLY, command and control is simplified and time for breach training and rehearsals are reduced.

The doctrinal differences between a "deliberate breach" and a "hasty" or "in-stride" breach will diminish. In support of the Army's Digital Corps and Division, the U.S. Army En-

gineer School's GRIZZLY program is its number one priority and a major Army acquisition program. It is extremely important to the Corps of Engineers that it actively supports Army Vision 2010 with the means to exploit information dominance (i.e., operational mobility). Freedom of mobility and maneuverability on the future battlefield cannot be assured. The current deficiency in mobility capability, if left unchecked, will diminish maneuver force combat power and force projection. The Digital Corps and Division must be fielded as a "package" to ensure a holistic approach to execution of Army Vision 2010 and Force XXI. It is imperative that the Engineer piece of the Digital Force is fielded as close to the fielding sequence as the rest of the combat arms elements (i.e., M1A2 SEP, M2A3, C2V, PALADIN, CRUSADER, etc.) which will make-up this force. Details on the GRIZZLY program and what it will do for the Maneuver Force are in the February 1998 issue of *Engineer Magazine*, in an article titled "The Grizzly: Mobility Support for Force XXI" by LTC Kotchman, LTC Greene, and Mr. Glasow. *Engineer Magazine* and this article can be viewed on the Internet at:

[www.wood.army.mil/ENGRMAG/emag\\_hp.htm](http://www.wood.army.mil/ENGRMAG/emag_hp.htm)

ALAN LEE  
TSM-CMD

### **German Veteran Enters Debate On Vosges Campaign in WWII**

Dear Sir:

In 1992, when I started occupying myself with research on the last major German operation of World War II in the Western Theater, codenamed NORDWIND (in which I participated as a young German officer, equivalent to a U.S. battalion executive officer), my written American sources consisted of regimental and divisional histories of rather differing substantial value. Later on, my sources included "Riviera to the Rhine," the official U.S. Army history narrative by J.J. Clarke and R.R. Smith, and even more recently such primary source documents as de-classified operation and intelligence journals and reports by the participating U.S. Army divisions and regiments.

This was all I had to work with until 1995, when one of my American co-veterans of NORDWIND (Mr. Hyman Schorr of NYC) made me aware of a new publication: *When the Odds Were Even* by Keith E. Bonn. This book offered a scholarly approach to the issue, including in-depth studies comparing operational and tactical doctrine of both opposing forces, and an evaluation of how these forces adhered to their doctrine during the Vosges Campaign, ending with NORDWIND. This was much more than the usual chronology of events and roster of participants I was accustomed to deriving from reading American treatises on military history. To me, it proved also that the younger generation of

*Continued on Page 54*

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



## Observations on the Division AWE Now That the Smoke Has Cleared

The Division Advanced Warfighting Experiment of November is completed, and now that the smoke has cleared, it is appropriate to present my assessment. The final results for the TRADOC commander will be published by TRAC in the near future. This is only a 'quick look,' a warning order based upon emerging insights.

All in all, I believe this was a successful experiment that clearly demonstrated the increasing potential of many experimental and future digital systems and concepts. The 4ID displayed tactics, techniques, and procedures that will serve as a firm foundation for future doctrinal development. The experiment showed that we've made great leaps forward in a very short time, but that a lot of work is still needed in man-machine interfaces, systems integration, command post mobility, command platforms, and communication systems. Our continuing challenge today is to take these lessons learned, determine their impacts, and ensure that we incorporate the correct lessons into current and future training, tactics, and force development.

The Division AWE was conducted using a BCTP "Warfighter-like" scenario designed to exercise the 4ID commanders and staffs to brigade and separate battalion level. The strategic and tactical settings were developed and refined by

Joint Venture, BCTP, TRAC, and III Corps, with the 4ID command group and planners providing input as appropriate.

The hypothetical scenario had the 4ID deploying to the island of Lantica in September 2003, and employed under III Corps as part of the Combined Joint Task Force Lantica. The World Class OPFOR provided the enemy structure and doctrine. Missions for 4ID included deployment, approach march, limited counterattack, reconstitution, deliberate defense, hasty attack, and deliberate attack.

I am listing these insights with emphasis on DTLOMS impacts for the mounted force, brigade and below.

In regard to doctrine and the heavy brigade, the first insight was the amount of combat assets required for force protection. The requirement for providing security is valid, because most of the high-value assets are critically vulnerable and cannot protect themselves. The impact of this was BCTs fighting with six company teams, **or the equivalent of 1.5 task forces in the current structure.** These security missions were generally maintained during the close fight, to the maximum extent possible. When forced to, the brigade commanders committed the security forces to the close fight. In reality, this would have been a true challenge to execute — contacting units that

were generally beyond current communication ranges, moving them, and committing them to the fight when they had probably never seen the plan, inevitably resulting in a piecemeal commitment of forces. Given that these security requirements will probably not diminish in the near future, doctrine needs to address techniques for conducting these force protection missions, how to achieve security through positioning assets near combat forces, and related techniques. These types of missions should be incorporated into training scenarios at the CTCs.

The Division AWE Blue Force structure was based upon the three-company combat battalions, as found in the conservative heavy division redesign. This reduced size of the task force increased the significance of the brigade in constituting and committing a reserve, since task forces lack the assets to do so. The brigade role in breaching is also more significant, since the task forces lack the power to successfully execute a deliberate breach, and if successful, lack the assets to exploit it. Additionally, the reduced size increases the importance and reliance on aviation, artillery, and dynamic obstacles to shape the battlefield and set the conditions for, or complete, decisive operations. Avoiding the close

*Continued on Page 53*

## Selecting the Best — CY 98 MSG Board Review and Analysis

by CSM David L. Lady, Command Sergeant Major, U.S. Army Armor Center

While the selection list is not yet published, the CMF 19 panel has finished its review and analysis of the CY 98 Master Sergeants Board selection list. No details of the number selected can be released, nor of the specific criteria used to select the best of the fully qualified candidates. Having recently sat on a centralized board, and having studied all three CY 98 selection board reviews, I will highlight some common trends as I summarize the review and analysis.

### Primary Zone Selections

All selectees are certified as excellent platoon sergeants through multiple assignments and NCOERs. They have served successfully for at least 12-18 months as platoon sergeants; in most cases they have served much longer. An encouraging number of the selectees are or were serving as acting first sergeants in line units. *The best qualified are successful master gunners who have excelled as TOE armor and cavalry platoon sergeants and who have also succeeded in at least one staff (E8 or E9 authorization) or special assignment (E6, E7, or E8 authorization).* The only TDA PSG positions that were granted TOE equivalency were those PSGs in 1/16 Cavalry, Fort Knox.

Analysis also showed that many NCOs have repetitive special or staff assignments without leadership certification as sergeant first class PSGs. These NCOs are less competitive with their peers, and this includes some master gunners who have not served as PSGs. NCOs assigned to unauthorized non-troop leading positions (i.e., billeting manager and BDE financial advisor) are also not competitive.

Almost every SFC selected for promotion had more civilian education than a high school diploma/GED. Whether or not a degree was earned was less important than the fact that these NCOs were following DA guidance to develop themselves and to serve as good examples for

their soldiers. All selectees were AN-COC graduates. NCOES honors helped the board identify the best. Master gunner course graduates were very competitive. Battle Staff NCO Course graduates were competitive, provided they had served at least one tour as a battle staff NCO. Those graduates who had never served as battle staff NCOs were treated as ticket-punchers.

The selectees were all physically fit, many recognized on their NCOERs for APFT scores above 250. A gratifying number were scored on the extended APFT scale. Quantified bullets highlighting significant small-unit APFT score improvement due to an NCO's leadership were also viewed favorably. Inconsistent height, over several rating periods, especially when coupled with weight increase, hurt the NCO and the credibility of the rater.

NCOs selected as NCO or Drill Sergeant of the Quarter or Year, or who were members of the Audie Murphy or Sergeant Morales Clubs were competitive.

### Secondary Zone

Yes, there was a secondary zone selection list! Their performance and potential are as highly rated as the primary zone selectees. Many are/were serving as acting first sergeants. These NCOs have fought hard to lead soldiers; if selected for special assignment, they did very well and returned to platoon sergeant duty as soon as possible. They had some college credit hours and all the military education as the primary zone selectees. They possessed outstanding APFT fitness.

### Competition Criteria

Looking over three sets of reviews and analysis, the following areas had the most importance in competition for promotion:

- Successful TOE assignments as PSG or 1SG

- Outstanding performance in special and staff assignments, as long as they do not prevent leadership certification
- Outstanding NCOERs: identified as "the best" by different raters and senior raters, through clear, concise, quantified comments. Also, senior raters clearly identify potential for immediate promotion and increased responsibilities in leadership positions.
- Outstanding NCOERs: potential for immediate promotion and increased responsibilities in leadership positions
- Exceeding standards and earning honors in NCOES courses
- Master Gunner Course
- Battle Staff NCO Course
- NCO or DS of the Year/SGT Morales/Audie Murphy Club membership
- College credit (tankers/scouts don't need the PhD, but they must develop themselves)
- Physical fitness and deployability (good health, bearing, and attitude)

The most important document in a soldier's OMPF is the NCOER. The DA Form 2-1 is also important: especially the assignment, school, and award information. DA photos are important. If the last few NCOERs reflect a weight gain of ten pounds or more, a photo after the weight gain will be very useful.

There are more fully qualified sergeants than there are positions at MSG/1SG. Some fully qualified NCOs could not be selected for promotion. There are many competing demands for CMF 19 soldiers outside the branch: Drill Sergeant, EO Advisor, IG, Recruiting, AC/RC, and ROTC positions will be filled. NCOs who do well at these jobs and who gain leadership certification will stay competitive. The Armor Force is healthy, for assignment policies, when combined with concerned unit leadership and the desire of our best NCOs to lead, are ensuring that our sergeants first class have the opportunity to succeed.

"SERGEANT, TAKE THE LEAD"





Elements of the Arena Active Protection System include ring of explosive panels at lower margin of turret ring and radar on turret roof.

# Active Protective Systems:

## *Impregnable Armor or Simply Enhanced Survivability?*

by Captain Tom J. Meyer

### Why Develop Active Protective Systems (APS)?

*Your task force's mission is to attack along Axis Mustang to seize OBJ Patton and destroy elements of the 152nd MRR in order to gain depth for the defense and prevent the enemy from attacking into 2nd BCT's northern flank. Your company team attacks with steady momentum and sets its support-by-fire positions. You observe the enemy in his BPs that your S2 had accurately templated, and order your Bradleys to target their TOWs on the enemy T-80s at a range of 2.5 km. They engage, and impact with a cloud of fire and smoke, but to your amazement, they have no effect. The enemy BMP-3s and T-80s immediately engage your positions with their laser-guided AT-10 and AT-11 missiles. Your Bradleys and a few tanks are hit and your team is being attritted at an alarming rate. How is this possible? Why were the TOWs ineffective?*

Is this total fiction, or a real possibility in our not so distant future? Various types of active protection systems (APS)

are employed by many armies worldwide. They currently do not pose a significant threat to our forces, but as these systems proliferate and technology improves, this picture may change radically.

In the context of armored vehicles, active protection is a defensive system designed to intercept, destroy, or confuse attacking enemy munitions. Active protection systems can be broken into two categories, "active" or "hard kill" systems and "countermeasure" or "soft kill" systems. An active or hard kill system engages and destroys enemy missiles or projectiles before they impact their intended target. It is a close-in system of antimissile defense that creates an active fire zone of protection at a safe distance around the vehicle.<sup>1</sup> Countermeasure, or soft kill, systems confuse and divert the inbound enemy missile with the use of munitions (obscurants), jammers, decoys, and signature reduction measures.

Why develop APS when tank survivability, lethality and mobility have increased dramatically over the last decade? Consider the following reasons:

- Current active protective systems (APS) are designed to counter antitank guided missiles (ATGM), not high velocity, high explosive (HE) or kinetic en-

ergy (KE) tank-fired munitions. A system that can defeat modern antitank weapons increases survivability for tank-on-tank duels.

- ATGM production, lethality and proliferation has far outpaced armor protection. This, coupled with advances in top-attack ATGMs and munitions launched by aerial platforms at ranges that far exceed that of direct support (DS) air defense systems, have multiplied the threat to the armor force.

- Latest-generation main battle tanks (MBT) stand at around 60-70 tons, and this figure (mostly driven by armor protection) is perceived by many combat developers as the maximum tolerable limit.<sup>2</sup> The addition of explosive reactive armor (ERA) packages would possibly exceed maximum tolerable suspension limits, thus degrading performance. Moreover, latest generation shaped-charged antiarmor weapons have been purposely developed to overcome ERA, through either tandem or triple warheads, ballistic caps, or a change in the attack profile.<sup>3</sup>

- Awaiting a qualitative breakthrough in armor or ERA is not an option for armored forces that are already outclassed by modern weaponry.

• It is simply less expensive to increase survivability by adding an ERA and APS package than by buying or developing new tanks in sufficient quantity. This is more cost-effective to Middle Eastern and Eastern European countries because these packages are fitted to T-55s, T-62s, and T-72s during routine retrofits and are light enough not to degrade automotive performance.

• Furthermore, the future antitank threat will, by definition, be omnidirectional, forcing tank designers out of their cozy frontal arc fixation and into trying to provide virtually the same level of protection all around their vehicles.<sup>4</sup>

Although many countries have developed soft kill or countermeasure systems, only Russia has moved from the concept to production stage to create a truly hard kill, or active system. Current Russian active protection and countermeasure systems include: Drozd, Shtora-1, and Arena.

### Drozd

The first operational APS, named Drozd, was developed by the Soviet Union between 1977 and 1982. This system was installed on some 250 naval infantry T-55As (redesigned T-55ADs) in the early 1980s, and was designed for protection from ATGMs and antitank grenades.<sup>5</sup> It used primitive millimeter-wave radar sensors on each side of the turret to detect incoming rounds. A filter in the radar processor was intended to ensure that the system responded only to targets flying at speeds typical of ATGMs. These are engaged by one or more short-range rockets carrying fragmentation warheads (similar to mortar rounds), fired from four-round launchers (one on each side of the turret).<sup>6</sup> Drozd provides maximum overlap and protection only to the forward 60° portion of the turret, leaving the sides and rear vulnerable. The tank crew can change the orientation of the system by rotating the turret.



Drozd defensive launchers are visible at the outer edges of the turret, below and outside the smoke grenade launchers. Activated by a radar system that detects incoming rounds, the system's short-range self-defense rockets use fragmentation warheads. (All story photos taken at Omsk, Russia demonstration by Ron Dritelein of TACOM)

Drozd suffered from several shortcomings. Its radar was unable to determine threat elevation levels adequately, and the self-defense rockets would almost certainly have caused unacceptably high levels of collateral damage — particularly to accompanying dismounted infantry.<sup>7</sup> The system costs around \$30,000 and is reported to have been around 80 percent successful against rocket propelled grenades (RPGs) in Afghanistan.<sup>8</sup>

### Shtora-1

Shtora-1 is an electro-optical jammer that jams the enemy's semiautomatic command to line of sight (SACLOS) antitank guided missiles, laser rangefinders and target designators.<sup>9</sup> Shtora-1 is actually a soft kill, or countermeasures system. It is most effective when used in tandem with a hard kill system such as the Arena, which is discussed later.

During the International Defense Exposition (IDEX) held in Abu Dhabi in 1995, the system was shown fitted to a Russian T-80U and a Ukrainian T-84

MBT. The first known application of the system is the Russian T-90 MBT that entered service in the Russian Army in 1993.<sup>10</sup>

The Shtora-1 system comprises four key components, the electro-optical interface station, which includes a jammer, modulator, and control panel; a bank of forward-firing grenade dischargers mounted on either side of the turret that are capable of firing grenades dispensing an aerosol screen; a laser warning system with precision and coarse heads; and a control system comprising control panel, microprocessor, and manual screen-laying panel. This processes the information from the sensors and activates the aerosol screen-laying system.<sup>11</sup>

Shtora-1 has a field of view of 360-degrees horizontally and -5 to +25-degrees in elevation. It contains 12 aerosol screen launchers and weighs 400kg. The screening aerosol takes less than 3 seconds to form and lasts about 20 seconds. The screen laying range is between 50-70 meters.<sup>12</sup>



The Shtora system jammers are the two boxes at either side of the gun tube. Grenade dischargers are at the rear of the turret.

The system is activated when the laser warning system detects the threat laser system. The tank commander (TC) presses a button that automatically orients the turret in the direction of the threat. It then triggers the grenade launchers. The aerosol screen is effective over a frequency band of 0.4-14 Em. The composition of this cloud is claimed to screen the tank against laser rangefinders and designators and is also claimed to be sufficiently hot to seduce IR homing weapons away from the MBT. The electro-optical jammers, designated TShU1-7, introduce a spurious signal over the 0.7-2.5 Em band, into the guidance circuitry of the incoming ATGM through the use of a coded pulsed IR jamming signal. The jammers provide coverage over 20 degrees in azimuth on each side of the main armament and through 4 degrees of elevation, and is effective within 2 seconds of target identification. It is claimed to be effective against Western ATGMs such as TOW, HOT, MILAN and Dragon, as well as Eastern Bloc ATGMs such as the AT-3. The TShU1-7 has a specified life of 1,000 hours, a mean time between failures (MTBF) of 250 hours, and a radiation source of 50 hours.<sup>13</sup>

Shtora-1 has three methods of operation: fully automatic, semiautomatic/target designation, and manual and emergency mode. According to the manufacturer, the system reduces the hit probability by the following factors: TOW and Dragon, Maverick, Hellfire, and Copperhead laser seeker systems by a factor of 4-5:1; MILAN and HOT by 3:1; Artillery and tank projectiles fired from systems with laser rangefinders by 3:1.<sup>14</sup> There is no reference to success against the Russian AT-4 and AT-5 or cannon-launched laser beam riders like the AT-10 and AT-11.

Shtora-1 is currently installed on the T-80UK, T-80U, T-84 and T-90 MBTs and offered for installation on other armored

vehicles during retrofit. It is available for sale on the open market.

#### Arena

The Arena defense aid suite (DAS) was developed by Russia around 1993 and currently has no counterpart. The Russians have demonstrated the system to the Germans and French, and it is reported to have performed as advertised. The French were involved in further development of the system, as of 1997.<sup>15</sup>

Arena is intended to protect tanks from antitank grenades and ATGMs and top-attack munitions, including ATGMs launched from aerial platforms. When these threaten the MBT, the computer system automatically activates the active defense system with a reaction time of .05 seconds.<sup>16</sup> Arena is fully automatic and provides a very high degree of protection through 300° with a dead area to the rear of the turret.

The system is switched on from the commander's control panel, then operates automatically. On completion of the serviceability self-control check, the system operates in combat mode. All information on the modes of operation and status of the system and its integrated units is displayed on the control panel.

In combat mode of operation, the multidirectional radar mounted on the roof of the MBT constantly scans for approaching ATGMs and locates any target approaching within 50 meters of the tank within the designated speed band. The

radar then operates in the target-tracking mode, locking onto the target at between 7.8 and 10.06 meters from the tank, and enters target data into the computer. After processing this data, the computer selects the countermunition (CM), one of the rounds of protective ammunition that are housed in 20 silos around the turret, and fires a small projectile (similar to a Claymore mine) into the path of the approaching ATGM. At the determined moment, the computer generates command signals via a converter unit to the selected ammunition. The ammunition detonates 1.3 to 3.9 meters from the target, generating a directed field of destructive elements, which destroy or disable the target to levels which are no longer dangerous. After .2-.4 seconds, the system is ready to repel the next target.<sup>17</sup>

Arena will not respond to false images or targets such as: small caliber projectiles, targets flying away from the tank, targets outside of the 50 meter envelope, or slow-flying objects, such as pieces of earth. Additionally, the system does not respond to shells or projectiles exploding around the tank, or targets whose trajectory does not cross a protected portion of the tank.<sup>18</sup> The concern for dismounted infantry is considered, with a danger zone identified 20-30 meters around the tank. Arena is day- and night-capable and operates in any climate or terrain. Arena is reportedly effective against TOW, HOT, MILAN and Hellfire, as well as man-portable AT-4 and LAW 80. Again, there is no reference to its effectiveness against Russian-designed

ground-launched ATGMs or cannon-launched ATGMs. By mid-1997, the Arena system remained at the prototype stage and is understood not to have completed its developmental phase.<sup>19</sup>

Arena is expensive, costing around \$300,000 per copy.<sup>20</sup>

Drozd and Shtora-1 are designed to be used with hull and turret ERA packages. Tanks equipped with Arena have ERA packages mounted on the hull. If the system's munitions are not effective in stopping the incoming projectile, the tank is still protected by ERA. Arena's ammunition panels, located around the turret, act as the turret's ERA, providing protection if the selected ammunition fails to function.

### IFVs versus Tanks

There are several possible reasons why the Russians have not mounted APS on BMPs or other IFVs. A hard kill system may not destroy the entire incoming projectile. Tank base armor and ERA provide protection against any residual fragments that may survive a hard kill detonation. BMPs do not have this level of protection, or the suspension systems capable of carrying additional armor plating and ERA. Additionally, the cost factor makes it more advantageous to protect tanks, rather than IFVs. The BMP-3 can be replaced for \$800,000, while a T-80U costs around \$2 million.

### Western "Countermeasure Systems"

It appears that the Russians developed Drozd to counter RPG and ATGM threats in Afghanistan. Shtora and Arena followed, with the hope of sales to former Soviet arms customers. While many nations have developed soft kill systems, few have shown any interest in hard kill systems until recently. Research and development costs, coupled with dwindling defense budgets and a perceived lack of an antiarmor threat to modern armor seems to account for this lack of interest.

Next-generation soft kill systems will include a laser warning receiver (LWR) that automatically cues the system to the incoming projectile. Currently, this is not a characteristic of all soft kill systems. The Japanese were actually the first to introduce laser warning receivers combined with a countermeasure system on first line AFVs. Their Type 90 tank includes a soft kill system. Sweden is currently developing a sensor-initiated hard kill system for its armored fighting vehi-

cles. France and Israel currently employ systems similar to Shtora-1 on their tanks. Poland has developed and employs soft kill systems on AFVs. The UK, Canada, Israel, and the U.S. are all researching hard and soft kill systems.

### The GALIX System

The French Galix countermeasure system mounted on the Leclerc MBT consists of an electrical control unit and launching tubes set into the rear of the turret. Galix is turret mounted and provides 360° protection. It can fire 80mm smoke rounds, anti-personnel rounds, or decoy rounds out to 30-50 meters, in single rounds or in salvos. The Galix system reaction time is less than one second and is reported to protect Leclerc against any known weapon on the battlefield.<sup>21</sup>

The Galix 13 smoke round can produce a smoke screen that includes visual and multi-band screening agents, over an arc of 120° to the front of the vehicle, that can last up to 30 seconds. This screen can blind any optically or IR-controlled weapon system. The IR decoy deviates the trajectory of antitank missiles controlled by an IR seeker. It is operated from the top of the vehicle and is efficient for more than 10 seconds.<sup>22</sup> A major shortfall of the Galix system is the lack of an LWR to alert the crew and automatically cue the system.

### Israeli Developments

The Merkava 3 MBT is fitted with the Laser Warning System 2 (LWS-2) advanced threat warning system. The system provides an alert whenever optical radiation is aimed at the vehicle from any direction and warns against a possible enemy presence and attack intentions in real time. The indication includes the type of radiation, such as IR searchlight, laser rangefinder, or laser designator. The Merkava 3 is believed to be the first MBT fitted with a threat warning system as part of its standard production.<sup>23</sup>

The Israeli POMALS system operates similarly to Shtora-1, and is designed as an add-on or retrofit package. It features the LWS-2 that identifies incoming radiation emitted by laser designators/rangefinders or IR sources. The 60mm launch tubes are mounted on the turret to fire a wide variety of munitions that produce countermeasure options, including visible or IR smoke grenades, chaff/flare decoys, HE and antipersonnel grenades, and special munitions. PO-

MALS can be upgraded to incorporate an IFF system.<sup>24</sup> POMALS is currently in its prototype stage.

The Third Eye laser warning system was designed for instantaneous detection of laser rangefinders, designators, and IR searchlights. It indicates the direction and type of threat on a display screen provided for the TC. An audio warning is also provided through the vehicle intercom net. It can differentiate between the various lasers and is insensitive to explosions, flashes, or smoke. According to the manufacturer, the Third Eye system has been in operational use with the Israeli Defense Forces (IDF) and has proven its performance and reliability under field conditions.<sup>25</sup> The effectiveness of these systems is unclear. It is also unclear whether the three Merkava Mk 3 MBTs recently destroyed by the Hezbollah with either AT-3s, AT-4s, or TOWs, were equipped with any countermeasure devices.<sup>26</sup>

### United Kingdom Developments

The UK Defense Research Agency is collaborating with British companies under the Ministry of Defense (MoD) and Industry Defensive Aids Systems (MIDAS) program of applied research into low-risk technology that could defeat current precision-guided weapons such as antitank missiles. An extensive trial of available equipment aboard an armored fighting vehicle in the autumn of 1995 successfully demonstrated all aspects, from warning to countermeasures, operating under a central controller architecture.<sup>27</sup>

MIDAS involves system and integration studies, together with investigations of sensor and countermeasure technologies. These include radar and laser warning receivers; electro-optical (IR and ultraviolet) and acoustic sensors for initial detection; confirmation devices such as pulse-Doppler radars; soft kill response (defensive maneuvering, decoys, jammers, and rapid-blooming multispectral obscurants); and hard kill weapons.<sup>28</sup>

Sanders Missile Countermeasures Device (MCD) AN/VLQ-8A jammers were developed in the U.S. at the time of the Gulf War, and 1,000 units were delivered to the Army. However, they were only fielded to the M2A2 ODS Bradley as of 1996. Last year, Lockheed Sanders took the development of IR jammers/decoys a step further by combining one with electro-optical detectors and successfully us-

*“Current generation APSs do not possess the capability to engage and destroy kinetic energy projectiles. However, as technological advances in fire control and detection increase, next generation APSs will most likely engage and destroy both ATGMs and kinetic energy projectiles.”*

ing it on a moving vehicle to decoy an attacking missile.<sup>29</sup>

Boeing, under contract with the Defense Advanced Research Projects Agency (DARPA), is developing a small, low-cost, fully self-contained active defense system for military vehicles and high value assets. The system, designated the “SLID,” for “small, low-cost interceptor device,” will provide protection from missile and artillery threats. Threats are defeated at stand-off ranges of up to 250 meters and include ATGMs, HEAT rounds, mortar rounds, and artillery shells. Boeing is also evaluating advanced SLID applications, including protection of assets from anti-radiation missiles, cruise missiles, and unmanned aerial vehicle threats.<sup>30</sup>

### Counter Active Protective Systems (CAPS)

The U.S. military is not sitting idly while APS technology improves and proliferates world-wide. The CAPS program is designed to counter this threat to our armor force. The purpose of the CAPS program is to demonstrate a suite of technologies that, when applied to current and future Army antitank missiles, will neutralize the effectiveness of threat tanks equipped with any one of a variety of APSs. Technology components of the CAPS suite are expected to include electronic countermeasures, advanced long-standoff warheads, decoys, ballistic hardening countermeasures, and RF electronic countermeasures. These will be demonstrated in a modular component form by FY 98 and in prototype by FY 99 and FY 00. A variety of long-standoff warhead technologies are to be demonstrated by FY 98. This effort is designed to neutralize the effectiveness of threat tanks equipped with any one of a variety of APSs. Funding for this program is around \$9.7 million over the next three years.<sup>31</sup>

The systems mentioned are not failure proof, nor do they provide 100 percent protection to all areas of the host tank against an ATGM threat. Hard and soft kill systems have not rendered ATGMs obsolete. It is unlikely they have been tested against the full range of ATGMs

available on the open market, especially TOW II, Hellfire, Maverick, or Javelin. Moreover, there is little reference to their ability to engage and destroy simultaneous threat engagements. There is also no reference to the employment, or effectiveness, of any of the Russian systems in Chechnya. Arena is not yet in its production stage and Drozd and Shtora-1 are abundant, but have not proliferated extensively. These are simply additional protection systems that enhance survivability.

Current generation APSs do not possess the capability to engage and destroy kinetic energy projectiles. However, as technological advances in fire control and detection increase, next generation APSs will most likely engage and destroy both ATGMs and kinetic energy projectiles. Technologically advanced countries will continue R&D into advanced APSs called defensive aid suites (DAS). DAS are a collection of hard and soft kill subsystems that operate together, providing an integrated defense against antiarmor precision weapons. ERA and base armor provide the last tier of a DAS. These advances will pose a significant threat to our ability to acquire, engage, and destroy threat armored vehicles.

Shtora-1 and Drozd performance video tapes are available at the Threat Office, Directorate of Force Development, USAARMC.

### Notes

<sup>1</sup>Kashin, Valery, “Arena: Active Protection System For Tanks,” *Military Parade*, May-June 1996, p. 2.

<sup>2</sup>Bonsignore, Ezio and Ian Bustin, Towards “Electronic Armour,” *Military Technology*, Dec. 1993, p. 10.

<sup>3</sup>Ibid, p. 10.

<sup>4</sup>Ibid, p. 11.

<sup>5, 6, 7</sup>Hewish, Mark and Leland Ness, “Shoot First, Ask Questions Later: Smart Tanks Learn To Fend For Themselves,” *Jane’s International Defense Review*, Mar. 1996, p. 34.

<sup>8</sup>Danussi, Gerry, Captain, U. S. Army, National Ground Intelligence Center (NGIC) Analysts. Personal Interview, 16 Jan 1998.

<sup>9</sup>Russian Armored Vehicle sales brochure, from the International Defense Exposition (IDEX) 97, Provided to the Threat Branch, Directorate of Force Development, USAARMC from the National Ground Intelligence Center (NGIC), July 1997.

<sup>10</sup>*Jane’s Armour and Artillery Upgrades 1997-1998*, p. 158.

<sup>11, 12, 13, 14</sup>Ibid, p. 159.

<sup>15, 16</sup>Ibid, p. 158.

<sup>17, 18</sup>Kashin, p. 3.

<sup>19</sup>*Jane’s Armour and Artillery*, p. 85.

<sup>20</sup>Danussi interview.

<sup>21</sup>Ferrard, Stéphane and Gérard Turbé, *The Leclerc System*, Quercy S.A: l’Imprimerie Tardy, 1992, p. 37.

<sup>22</sup>Ibid, p. 38.

<sup>24</sup>Bonsignore and Bustin, p. 12.

<sup>25</sup>*Jane’s Armour and Artillery*, p. 154.

<sup>26</sup>Blanche, Ed. “Hezbollah Turns Up the Heat on Israel,” *Jane’s Pointer*, Oct 1997, p. 6.

<sup>27</sup>*Jane’s Armour and Artillery*, p. 154

<sup>28</sup>Hewish and Ness, p. 35.

<sup>29</sup>Ogorkiewicz, R.M., “Transforming the Tank,” *Jane’s International Defense Review*, Oct 1997, p. 40.

<sup>30</sup><http://www.boeing.com/defense-space/missiles/slid/slid.htm>

<sup>31</sup>[http://www.fas.org/spp/military/docops/defense/dtap\\_dto/we\\_dto.htm#WE.13.02.A](http://www.fas.org/spp/military/docops/defense/dtap_dto/we_dto.htm#WE.13.02.A).

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# It's Not the Speed Of the Computer That Counts!

## *The Case for Rapid Battlefield Decision-making*

by Lieutenant Colonel John F. Antal

*"Speed is the essence of war."*<sup>1</sup> Sun Tzu

One hundred and sixteen M1A1 tanks and fifty-four Bradley Fighting Vehicles waited in position for the attack to begin. At 0730, on 26 February 1991, the "Tiger Brigade" of the U.S. 2d Armored Division, passed its final orders to its battalions. The brigade, which was attached to the Marine Central Command, had been given the mission to attack to secure the Al Mutla Pass, northwest of Kuwait City. Securing the pass would block the Basra-Kuwait City Highway and trap the Iraqi forces trying to escape to the north.

At 0730, the brigade commander issued an oral order over the FM radio to begin the attack at 0930. Between 0730 and 0930, the brigade's mission, boundaries and final objective changed five separate times!<sup>2</sup>

"The most important lesson from recent operations is that close combat operations remain violent, fast-paced, and hard to predict."<sup>3</sup> Time is the one quantity of the battlefield that can never be saved, slowed, or reversed. "Loss of time," Napoleon once said, "cannot be made good in war. Delays alone cause operations to fail."<sup>4</sup>

A major source of delay in combat operations is the vital need to decide, disseminate the plan, and issue the commander's intent to subordinate commanders and soldiers. A study of U.S. Army operations orders determined that the orders issued on seventy operations (eight divisions, thirty-two brigades and thirty battalions) were of such poor quality, fraught with redundant information and needless detail, that the order hin-

dered the units' ability to accomplish the assigned mission.<sup>5</sup>

A smaller, more agile Army XXI force cannot afford this type of command-staff ineffectiveness. If time is the common denominator of all military operations, then the side that can seize a time advantage gains a dominant benefit. Time is gained by thinking and acting faster than your opponent. Time is gained by making clear, reasonably correct decisions quickly. Time gained in making the decision, therefore, is time gained for combat.

The goal of the command-staff process for Army XXI must be to assist the commander in making correct decisions *in time*. The ability to act faster than the enemy, to gain agility over an opponent, is largely dependent upon rapid and correctly timed human decisions. In war, commanders and staffs must be experts at using all the available decision-making tools to accomplish successful battle command.<sup>6</sup>

How commanders make decisions, and how we teach generations of soldiers to make combat decisions, is crucial to how we will fight wars and what command and control equipment we buy. Previous versions of FM 100-5 emphasized "flexibility and speed, mission-type orders, initiative among commanders at all levels, and the spirit of the offense."<sup>7</sup> An effective tactical decision-making process must aid the commander to accomplish these goals.<sup>8</sup>

### **The Commander's Role**

The first demand in war is decisive action. Decisive action requires clear, succinct, and timely orders. The com-

mander's primary role is to make decisions. The commander's decisions are translated by his staff into plans for execution. The purpose of the command-staff process, therefore, must be to support the commander's ability to make decisive decisions **in time**. Muddled, confused, or late decisions produce combat orders that often set the stage for defeat.

In the past, the preparation of explicit plans to accomplish battlefield synchronization required lengthy staff interaction and extensive, detailed planning. In these procedures, particularly the procedures taught at all of the Army's staff schools, commanders often play a peripheral role in developing the tactical plan. Once the staff labored over various courses of action, the commander would magically appear and select one of the available options. The quality of the commander's decision, however, was often framed by the skill — or lack thereof — of the staff.

National Training Center [NTC] experiences are replete with examples where the staff has consumed the majority of the planning time on courses of action that are suddenly discarded by the commander, based on information either neglected or unknown by the staff prior to the decision briefing. Moltke's dictum that "no plan survives the first shot," reinforces this trend.

In the future, the tempo of Army XXI operations promises to be faster than ever before. Distributed information will stream to the commander in a process called data fusion. The side that can use this information to decide and issue orders faster than its opponent can generate a decisive, battle-winning advantage.

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To gain this time advantage, the tactical planner must create and transmit the minimum essential elements of the order within the limitations of the available planning time. To use the information provided by the information revolution to advantage, commanders will be required to decide rapidly. On the Army XXI battlefield, rapid decision-making will be an essential tactical skill.

### The Role of the Staff

Staff officers assist the commander. Staff officers provide information and analysis to assist the commander in making decisions. The staff also assists the transmission of the commander's decisions to subordinates and ensures the execution of the commander's decisions. The staff also identifies unforeseen opportunities or situations which might require more guidance. Throughout the decision-making process, the commander relies on his staff to provide technical expertise in their functional areas. The staff's primary role is to provide experienced judgments and analysis to the commander. These judgments are derived from their study of the available information and their experience, training, intellect, and intuition. An effective tactical staff provides the commander with a means to ensure that his decision and commands are timely and sound.

Traditionally, American military staffs employ a very deliberate orders process. This deliberate process is designed to decrease the risk of analysis conducted by inexperienced staffs. Using the logic that "two heads, or more, are better than one" the staff is expected to provide a series of educated options for the commander's selection. This process emphasizes detailed evaluation of options with a goal to provide explicit instructions to synchronize the force. This orders-intensive approach complements the traditional American style of attrition warfare.<sup>9</sup>

In the past, the traditional response to the chronic American weakness in command and control was to plan more thoroughly and leave as little to chance as possible. In their excellent book, *America's First Battles*, Charles E. Heller and William A. Stoft remarked that "thorough planning, with its natural de-emphasis of unexpected situations (beyond the scope of contingency plans), led to rigidity and, often, heavy losses. In other words, the command-and-control weakness and its chosen professional remedy were but two aspects of a single larger problem: inadequate preparation of commanders and staffs for the real world of combat."<sup>10</sup>

The effectiveness of the current command-staff process is an item of close scrutiny at the CTCs. Lessons learned from the NTC suggest that units have difficulty conducting time-critical tactical planning. This problem often develops because planners spend too much time trying to complete a detailed synchronization plan for a single course of action without enough information concerning the enemy.<sup>11</sup> The question that has yet to be proven is whether the input of more raw data from the new information systems we are fielding with Army XXI will increase human decision-making abilities. Recent Army Warfare Experiments (AWE) seem to show that too much information merely saturates the human decision-making system and freezes action.<sup>12</sup> If so, is this because we are wedded to an industrial age decision-making process?

In addition, even with new technology, most units practice inefficient and ineffective command-staff process techniques. The average staff arrives at the NTC poorly trained in time-critical orders techniques. Planners are told merely to work faster in these time-critical situations. The products (task and standard) of an order are seldom defined. The priority of orders products is seldom thought through. The results are that tactical planners often attempt too much planning in too little time.

The reason for these failures may lay in the chaotic nature of combat and its inability to conform to linear logic. Tactical decision-making is conducted in an environment of great uncertainty, unpredictability, and constant change, and has therefore been viewed by many as more an art than a science. Doctrine attempts to bridge this gap by providing commanders and staffs with pragmatic guidelines to accomplish planning in the chaotic environment of war.

War, however, is chaos. Detailed plans seek order in an environment that rejects order. The analytical decision-making approach is an attempt to bring order out of chaos by applying overwhelming mass. Current U.S. Army and Marine Corps doctrine on the command-staff process emphasizes this analytical approach to combat problem-solving.

Frequently, commanders must make decisions in combat without the benefit of a time-intensive, deliberate analysis. In combat, the commander may have to proceed through the decision-making process and issue oral orders based on his own knowledge of the situation, without taking the time to formally in-

clude the staff in the process. This suggests that commanders must possess a flexible set of decision-making strategies that can meet the demands of planning when there is plenty of time and during time-pressured situations. The commander must then choose the correct decision-making process, based on his assessment of the situation and upon the available planning time.<sup>13</sup>

It appears obvious that a doctrine that provides only one way to accomplish tactical planning, and a training system that emphasizes only **one way**, will lack the flexibility to meet the varied demands of war. It is not enough merely to teach and practice the deliberate decision-making method and expect commanders and staffs to improvise in time-pressured situations. Under such conditions, the deliberate process is truncated without rhyme or reason. It is as if a marathon racer was now asked to run the 50-yard dash using his normal pace. Against racers trained in the 50-yard dash he'd lose. An effective Army XXI command-staff process, therefore, should provide command and staff methods that will work in both deliberate and time-pressured situations.

Faced with two general situations — deliberate and rapid — the first commander should choose an appropriate decision-making approach. This choice can be simplified to two choices — the analytical and the recognition decision-making strategies.<sup>14</sup> A simple way to view this decision is the analogy of decision-making techniques as tools in a tool box. The tools in the box are designed to solve tactical planning problems. An effective command-staff process should provide the right kind of tools for each specific task.

### Analytical Decision-Making

The first tool in the decision-maker's tool box is analytical decision-making. The United States Army has taught analytical decision-making since World War II as a technique for making decisions based upon the review and comparison of available information. It is a systemic approach to arrive at the best possible solution to a given problem. A systematic approach to decision-making fosters effective analysis by enhancing application of professional knowledge, logic, and judgment. The best decision is determined from evaluation of sets of options, and then comparison of the options by a list of essential battlefield factors. It also creates a systems approach to decision-making easily taught in staff schools.

In analytical decision-making the staff plays the dominant role. The general approach is for the staff to “select a set of alternative decisions to evaluate subjectively the utility (or value to the decision-maker) of outcomes expected under each decision, and to select the decision maximizing the utility.”<sup>15</sup> The commander gives general guidance and the staff defines the problem, gathers the facts, and makes assumptions necessary to determine the scope of and the solution to the problem. The staff then develops several possible solutions, analyzes each solution through wargaming, records the wargaming results, and compares the outcome of each solution. Finally, the staff briefs the commander, and he selects the best solution.

In executing an analytical decision-making process, the staff follows a step-by-step approach to determine the **single best** solution. If conducted properly, several effective plans will be developed from which the commander will select only one. If the staff wargames each plan thoroughly, the analytical process will produce a series of workable options for the commander. The analytical process also double or triples the time needed to produce an effective plan. If the staff takes shortcuts, and does not completely wargame each set of options, it is not conducting analytical decision-making. “Jumping at a solution” because of a lack of planning time usurps the commander’s authority and presents him with a *fait accompli* — a flawed analytical result.

This situation typically occurs, however, when brigade and battalion staffs are hard-pressed to prepare plans in limited time using the analytical process. This practice typically presents the commander with one well-thought out plan, and several half-completed, straw-man plans. During the decision briefing, most commanders reject the straw-man plans out-of-hand and are forced to accept the decision of the staff because time is running out.

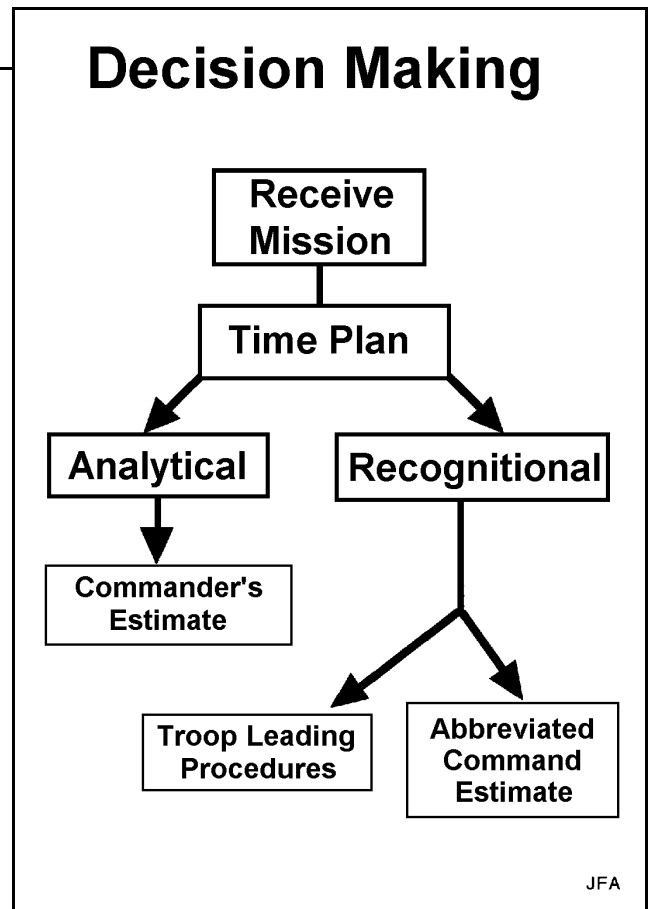
This analytical decision-making process, as established in the Command Estimate format, can be highly effective under certain circumstances. The analytical approach is the preferred approach when the information concerning the enemy is too abstract to recognize a discernible pattern, when justification is a prime requirement for the final decision (coalition planning for example), when the goal of the decision-making process is a single optimized solution, and, most importantly, when there is plenty of time to analyze all the facets that impact on the

solution to the tactical problem. The problem with the analytical process is that it requires a lot of time to develop, wargame, brief several workable courses of action, and then select the best. The emphasis is on finding the best solution, not in finding a workable solution within the constraints of the available planning time. Efficiencies can be gained by practice, but even the best staff runs out of time when they attempt to use analytical decision-making techniques, as represented by the Army’s Command Estimate, to develop tactical plans during time-sensitive tactical situations. The stories from the field, of subordinate unit commanders waiting at the brigade or battalion command post for the operations order to be completed, are legion.

In years of training experiences at the National Training Center, it is commonplace that the command-staff team seldom practices analytical decision-making much beyond the initial tactical plan at the beginning of the rotation. After the initial order, all subsequent planning and preparation periods seldom permit the full implementation of the analytical approach.<sup>16</sup>

This is particularly true because brigade and battalion staffs rarely have enough information on the enemy during planning to select a single best course of action. In most cases, the selection of the best course of action is based solely on the terrain and not the enemy.

Basing the scheme of maneuver solely on the terrain places the commander and his staff in a dangerous dilemma. With the decision made without adequate information to select a best approach, the commander either ignores the enemy and forces his synchronized plan to work, or ignores the plan and issues oral orders to change the scheme of maneuver. Commanders are, therefore, often forced to ignore the detailed decision-making doctrine in order to make the vast majority of time-pressured tactical decisions during training exercises.<sup>17</sup> The



bottom line is that the analytical decision-making process is a time-intensive staff process that is seldom useable in time-pressured situations.

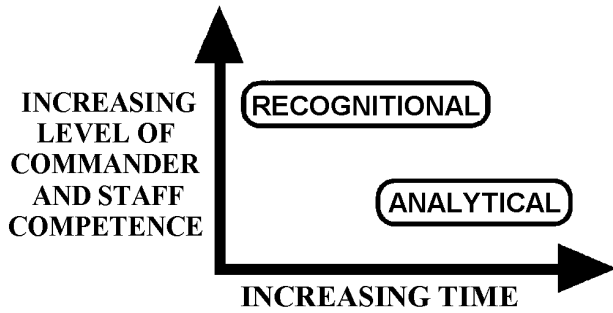
### Recognitional Decision-Making

The term recognitional decision-making (also known as: recognition prime decision-making) is a technique for making decisions based upon the intuitive knowledge or experience of the decision-maker. In recognitional decision-making, the commander plays a prominent role. This technique emphasizes the quick mental jumps at a solution to a problem and the wargaming of this solution and its branches. The recognitional decision-making strategy applies when a decision-maker recognizes a situation as typical, recognizes the typical reaction to the situation, evaluates the reaction for feasibility, and then either implements it, improves it, or rejects it for a branch plan.<sup>18</sup>

Recognitional decision-making focuses on the commander’s ability to recognize tactical patterns, decide the correct counter-pattern, and apply that solution rapidly to meet the demands of time-pressured situations. Staff work is still essential, it is merely focused on implementing the commander’s base plan and then developing one or two branch



## ANALYTICAL AND RECOGNITIONAL DECISION MAKING STRATEGIES



plans. Decision points suddenly become understandable — they are the points in time, space or event where the commander will execute branch plans. Experienced commanders frequently conduct this kind of decision-making.

Recognitional decision-making has the commander playing a major role in determining the course of action (decision), while his staff focuses its effort on implementing his decision. Rather than searching for a “single best solution,” and conducting thorough analyses of each promising course of action, the commander uses his knowledge of the situation and the latest reports to rapidly decide on one specific course of action. The commander decides upon this course of action based upon an assessment of the situation, the recognition of the patterns involved, and by applying his intuition and tactical judgment. The commander “hedges his bets” by executing branch plans that were triggered by “reconnaissance pull”<sup>19</sup> operations. To accomplish this effectively takes a commander and staff trained in a rapid decision-making process.

The recognitional strategy is **implied** by the Army’s tried and tested Abbreviated Command Estimate and the Troop Leading Procedures. In the abbreviated process, the commander issues specific guidance to his staff, and the staff implements the commander’s decision (rather than optimizing several possible solutions). The Troop Leading Procedures, in particular, were designed to aid the commander to apply his judgment to decide quickly a course of action when he did not have a staff.

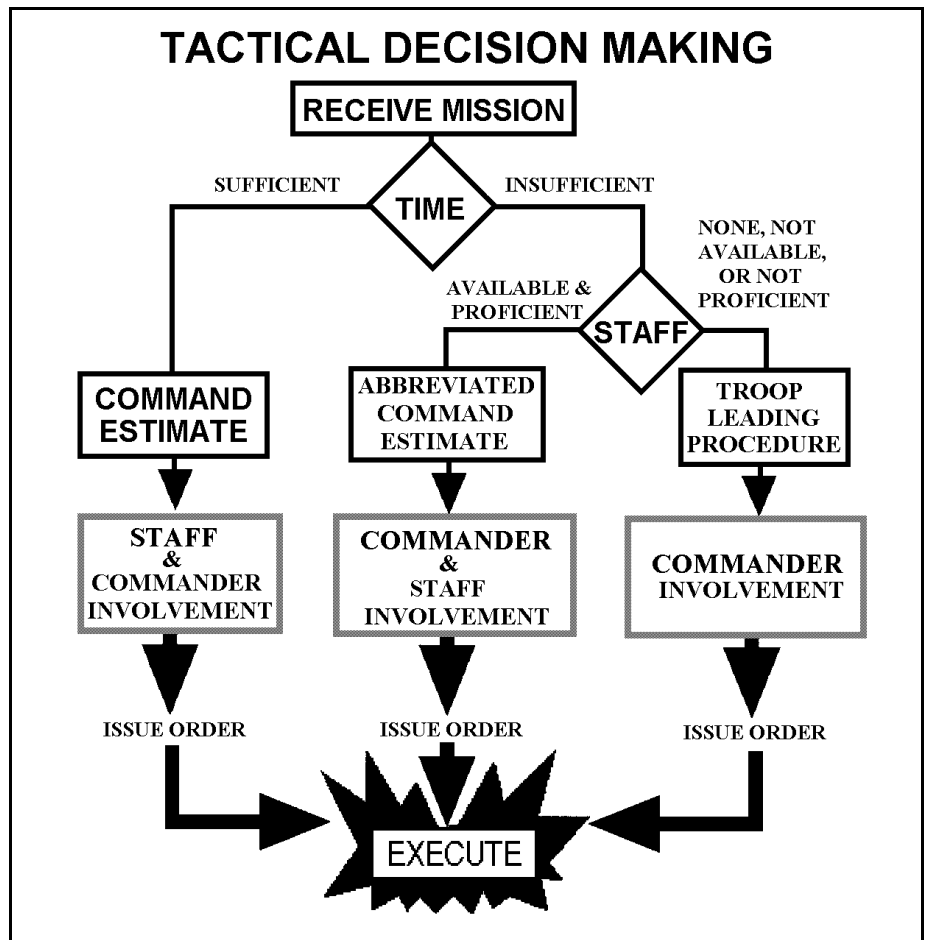
The analytical and recognitional methods should not be considered competing decision-making strategies. They are, instead, complimentary options for decision-making, designed to fit special conditions. The commander must decide which decision-making strategy to choose based upon his assessment of the

enemy and friendly situation. The ability to select either an analytical or recognitional approach provides commanders a flexibility that has not yet been institutionalized by the United States Army or Marine Corps.

Every tactical decision in war must be based on the enemy. Commanders who attempt to execute their plans, regardless of the enemy situation, open themselves up to fall into a trap. Commanders who determine their courses of action based solely on the terrain, likewise set themselves up for failure. “What is of supreme importance in war is to attack the enemy’s strategy.”<sup>20</sup> Commanders must, therefore, quickly analyze the enemy situation, estimate the time available for planning, and rapidly select the appropriate decision-making strategy.

Rapid decision-making is simply the ability of a commander to streamline the decision-making process by making a quick decision on the base plan and establishing guidelines for branch plans. This procedure focuses on the enemy, minimizes planning time, and maximizes preparation and execution time. The difference between the analytical and the recognitional approach is the level of commander involvement and the role of the staff. In the recognitional approach the commander makes the decision quickly, without the benefit of a lengthy decision briefing of several thoroughly wargamed courses of action. The staff then implements the commander’s decision, synchronizes the effort, develops at least one branch plan, and produces the operations order. By making the decision early, the commander streamlines the entire process and saves time.

If the commander has a staff, and has the time to conduct analytical decision-making, an analytical approach can be employed. If the commander has a staff, but does not have time to conduct the complete analytical decision-making process, a recognitional approach is ap-



*“If we do not discuss and improve the way we think about making decisions more rapidly, we may create a situation that **requires** automated decision-making....”*

appropriate. If the commander does not have a staff due to the combat situation, a recognitional approach is the only alternative.

## Conclusion

To paraphrase Sun Tzu, decision-making is too important not to be studied.<sup>21</sup> Today we are experiencing a rate of information exchange that is unprecedented in human history. Tomorrow, information will race across electronic hypernets at increasing speeds, making today's information exchanges look like a race between a message delivered by runners compared to a message delivered by computer modem. If we do not discuss and improve the way we think about making decisions more rapidly, we may create a situation that **requires** automated decision-making.

Military organizations now operate on a digital battlefield. In the information age, mental and physical agility will dominate the battlefield. Army XXI decision-making doctrine, therefore, must emphasize that **plans are a basis for changes**. Human decision-making will play a dominant role in fusing the power of information systems if decision-making can be done rapidly enough to take advantage of the promises of the information systems currently being deployed. “The mental agility of the commander, organizational agility of his staff, and physical agility of his units are vital to success.”<sup>22</sup> Those organizations that can process accelerated information and produce effective orders from their decision-making apparatus gain a decisive advantage. Those that cannot will be defeated while the staff officers in the tactical command post watch the battle lost on their computer screens.

Until the fateful day when someone decides to fully automate military decision-making, tactical decision-making will be executed by people. Information acceleration has not increased the speed of human decision-making — it has merely increased the time required to gather information. Rapid decision-making requires sharp commanders assisted by finely honed staffs. Understanding decision-making is an important key to unlocking rapid thinking. This ability — the critical, human, skill to decide rapidly — can be practiced and learned. Technology can assist rapid decision-making, but *how* we think is a specifically human capacity.

Army XXI envisions an agile, precision force that will require precision command as much as it will rely on precision fires. Army XXI will require an agile decision-making process that will permeate all three levels of war — strategy, operational art, and tactics. As these levels are compressed and blurred, the decision-making needs of the tactical commander become critical, for this level is the cutting edge of battle. In a smaller Army XXI, tactical operations will often have operational and strategic effects.

Rapid decision-making can assist the information age-equipped command-staff team to visualize decisive advantages **in time**. Decisive advantages that are visualized in time can be turned into victory. The key to accelerated agility, therefore, is still measured more by the thinking ability of our people — especially the command-staff team. As the example of the Tiger Brigade clearly illustrates, combat situations often require rapid decision-making. Recognitional decision-making enables the command-staff team to make rapid decisions on a rapid, fast paced 21st century battlefield. As with your personal computer, it is ultimately not the megahertz rating that determines how effectively you can use your computer, it is the speed of the operator.

## Notes

<sup>1</sup>Samuel B. Griffith, ed. and trans., *Sun Tzu, The Art of War*, (New York: Oxford University Press, 1963), p. 134.

<sup>2</sup>Notes from COL Robert M. Williams, who, then a major, was the S3 of the 1st Brigade, 2d Armored Division, assigned to Marine Central Command Control on 26 February 1991 during Operation Desert Storm.

<sup>3</sup>General William W. Hartzog, *Land Combat in the 21st Century*, (Fort Monroe, Virginia: U.S. Army Training and Doctrine Command, Dec. 1997), p. 3.

<sup>4</sup>Napoleon wrote to his brother Joseph on March 20, 1806. Henry Lachouque, *Napoleon's Battles, A History of his Campaigns*, trans. by: Roy Monkcom, E.P. Dutton & Co. Inc., New York 1967. p. 401.

<sup>5</sup>Major Edward J. Filiberti, *The Standard Operations Order Format: Is Its Current Form and Content Sufficient for Command and Control?* (Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, Kan., 1987), p. 70.

<sup>6</sup>Battle command is the “**art**” of decision making, leading, and motivating soldiers and their organi-

zations into action to accomplish the mission at least cost to soldiers.”

<sup>7</sup>U. S. Department of the Army, *FM 100-5 Operations*, (Washington, D.C.: U.S. Government Printing Office, 5 May, 1986), p. i.

<sup>8</sup>Roger Beaumont, *The Nerves of War, Emerging Issues in and References to Command and Control*, (Washington: D.C.: AFCEA International Press, 1986), p. 12.

Note: “While the command and staff process was described and analyzed from time to time, few practitioners, historians or theorists dealt with exactly how the increasingly complex systems were controlled — perhaps because it was incomprehensible. Military history and science focused on the general progress of battles and campaigns, embellished by anecdotes and descriptions of events, leaving the actual functions of headquarters and signal functions and those who worked them as far out of focus as field hospitals or quartermaster depots. At the same time, many command and staff techniques and practices remained in the military ‘shop culture’ procedures shaped by momentum, custom, word of mouth, adaptive informal practice and the inclination or whim of commanders and staffs.”

<sup>9</sup>Major George E. Orr, *Combat Operations C3I: Fundamentals and Interactions*, (Maxwell Air Force Base: Air University Press, Maxwell AFB Alabama, July 1983), p. 78.

Note: “The traditional American approach to war attempts to emphasize the enemy decision process (deterrence), to complicate the enemy problem-solving structure (TRIAD), and to manage risk in conventional conflicts (attrition-based strategies).”

<sup>10</sup>Charles E. Heller and William A. Stoff, *America's First Battles, 1776-1965*. (Lawrence, Kansas: University of Kansas Press, 1965), p. 330.

<sup>11</sup>Author's notes from experience derived from observing over 96 brigade battles at the National Training Center, Fort Irwin, California as the Brigade Operations Observer Controller.

<sup>12</sup>“And even when commanders have the information, they believe that they have to wait for all the information so they can make a perfect decision. The result is inaction and ceding initiative to the enemy. This happened in AWE's rotation at the NTC last March [1997].” Quote from an observer of the March 1997 Army Warfighting Experiment at NTC.

<sup>13</sup>Unfortunately current U.S. Army doctrine does not explain how to accomplish this.

<sup>14</sup>Gary A. Klein, “Strategies of Decision-Making,” *Military Review*, (Command and General Staff College, Fort Leavenworth, Kansas, May 1989), p. 56.

<sup>15</sup>Orr, p. 39.

<sup>16</sup>Author's notes from experience derived from observing over 96 brigade battles at the National Training Center, Fort Irwin, California as the Brigade Operations Observer Controller.

See *DECISION*, Page 61

# From Cowpens to the California Desert: *Integrating Reserve Component Units Into Tactical Operations*

by Lieutenant Colonel Aaron R. Kenneston

In any major future conflict, the downsized active Army will depend heavily on what Army leaders like to call a seamless integration of active and reserve forces. But this is hardly new. Brigadier General Daniel Morgan, the Revolutionary War leader of colonial forces on the southern front, accomplished this feat more than 200 years ago, at the battle of Cowpens, defeating Tarleton's British regulars in a well-orchestrated battle that ended in a classic double envelopment.<sup>1</sup>

A recent rotation at the National Training Center (NTC) proved that this type of seamless integration is still possible. Soldiers from the Nevada Army National Guard's 1st Squadron, 221st Cavalry, served to augment the NTC's Opposing Force (OPFOR), just as they would if the Blackhorse went to war. In fact, the employment of the unit closely paralleled how Morgan used his citizen-soldiers at Cowpens two centuries ago. Fighting as an independent tank battalion for the feared Krasnovian OPFOR, and using visually-modified M1A1 tanks, the reservists were a major factor in the defeat of the visiting combat team.

Morgan would not have been surprised. In his classic battle, his small force of Continental infantry and cavalry, charged with defending a vast area of the American Southeast, were clearly outnumbered. Morgan realized that his success would depend on his wise use of citizen-soldier volunteers, yet there was a tremendous difference in the levels of training between the regulars and the militia. Knowing that he would be attacked, he planned a battle to maximize the strengths of different elements of his force.

The battle developed at Hannah's Cowpens, in rural South Carolina. Morgan's plan was to use three lines of defenders and a reserve. The first line of skirmishers included his best marksmen. The second line was his least experienced militia. His third line included experienced Continental infantry and his most experienced militia soldiers. And his reserve was the Continental cavalry.



Reserve unit's M1s were visually modified as Krasnovian Variant Tanks (KVTs).

As Tarleton's troops attacked, they took immediate casualties as the skirmishers fired, and as the first line drew back, Tarleton pressed the attack. The second line then fired two volleys, further attriting the British assault, before also falling back. Sure now that he had the colonial force on the run, he charged ahead. As he pursued the retreating militiamen, the third line took up the defense, stopping his force long enough for the cavalry reserve to begin its attack into Tarleton's right flank. Then the militia in the rear reorganized for a thrust into his left flank. Caught in a double envelopment, the British retreated from the field with high casualties.

Clever tactics and surprise were certainly major factors in Morgan's victory, but the real triumph was his preliminary training strategy that made the best of the different experience levels of his soldiers.

Much the same thing happened at the NTC last year.

The National Training Center at Fort Irwin, California, is the Army's premier maneuver proving grounds. The OPFOR mission for the NTC is performed by the vaunted 11th Armored Cavalry Regiment (ACR). They portray a Former Soviet Union (FSU) style force from the fictitious nation of Krasnovia. A recent RAND study verified the need for citi-

zen-soldiers to augment the 11th ACR. Additional OPFOR capability is required to validate the number of units scheduled to deploy for Major Regional Conflicts (MRCs). Since a highly proficient force will be needed quickly, OPFOR training must be a primary peacetime mission.<sup>2</sup> The unit chosen in September of 1994 to round-out the 11th ACR (Blackhorse) was the 1st Squadron, 221st Cavalry (Wildhorse) of the Nevada Army National Guard.

This placed the commander of the 11th ACR in a situation similar to that of Daniel Morgan, determining how best to employ the citizen-soldiers within his command. Although many of the militia that Morgan inherited were amateurs, he managed to fully integrate them into his force. He was able to develop them into competent, capable, and efficient soldiers. Morgan did this by using his Continentals as role models and teaching simple maneuver. He also assigned missions that matched their levels of proficiency. As the 1-221 Cavalry began its train-up at the NTC, the regimen was strikingly familiar. To achieve an "OPFOR level of proficiency,"<sup>3</sup> soldiers first attended the OPFOR academy. This is a basic three-day OPFOR soldiering course that provided a common point of reference between the Wildhorse soldiers and their Blackhorse brothers. To further ensure commonality between the 11th

ACR and 1-221 Cavalry, the State of Nevada purchased Desert BDUs, berets, and other accouterments of the Krasnovian OPFOR soldier.

The training progressed from individual tasks to crew drills. The Motorized Rifle Company (MRC) Handbook was used in conjunction with the OPFOR Tactical Standard Operating Procedures (TACSOP). These publications contain the essential collective, individual, and leader tasks that form the Krasnovian version of our Army's Mission Training Plans (MTPs). The 1-221 Cavalry began practicing simple OPFOR battle drills. Gunnery and maintenance were also emphasized. The focus began on section/platoon lanes, then shifted to troop-level operations. The 11th ACR provided like-sized elements to serve as sparring partners. The Wildhorse was then certified by Blackhorse evaluators on troop-level offensive and defensive operations. Now, the 1-221 Cavalry was able to fight with squadron-sized elements in the central corridor of the NTC. This validation had involved aggressive training from early 1995 to mid-1997. While Morgan had observed and trained his reservists for about four months prior to his amazing victory, the 11th ACR found that certification during peacetime was about a two-year process.

In the summer of 1997, the Wildhorse, with about 20 Blackhorse brothers, exported the NTC OPFOR experience to Gowen Field, Idaho. The exercise validated the 1-221 Cavalry as a viable training resource to prepare units for the NTC. The Wildhorse assisted the 116th Heavy Separate Brigade, Idaho National Guard, to get ready for their summer 1998 NTC rotation. The 1-221 Cavalry fought over 30 battles against various sized elements of the 116th Brigade. In true OPFOR tradition, the squadron was bested in only a couple of engagements during the entire two weeks. Daniel Morgan could have predicted the outcome. Citizen-soldiers given an active duty force to emulate, properly trained, well motivated, and doctrinally employed will always meet or exceed standards.

The 1-221 Cavalry was now ready for the final test — NTC Rotation 98-04. They would fight as part of the active duty OPFOR. Their opponent was an active duty brigade from Fort Stewart, Georgia. Just as Daniel Morgan wisely used his available time prior to the de-

struction of Tarleton's forces, the last six months leading up to the NTC rotation were carefully planned. Company lanes focused only on the most critical skills — obstacle breach, setting firing lines, and simple maneuver to positions of advantage. Boresighting MILES systems and target acquisition were constantly practiced. The squadron fought one last force-on-force battle against the uncoop-



erative, free thinking, 11th ACR. Training also included OPFOR ride-alongs, terrain walks, and continued study of "Decision Point Tactics."<sup>47</sup>

In January 1998, almost 217 years to the day of Morgan's model employment of his citizen-soldiers, the 1-221 Cavalry arrived at the NTC for the moment of truth. The squadron had applied Visual Modifications (VISMODs) to their M1A1 tanks, and the resulting vehicle became known as a Krasnovian Variant Tank (KVT). The 1-221 Cavalry was given the OPFOR designation of the 60th Guards Independent Tank Battalion (ITB). As an asset of the 60th Guards Motorized Rifle Division (GMRD), the 60th ITB would fight under the control of the 125th Guards Tank Regiment (GTR).

The day before the first battle, the laager site, or assembly area, was a beehive of activity. The squadron worked at all echelons to prepare for the upcoming fight. While squadron leaders attended the regimental orders brief, troop executive officers worked supply and maintenance issues. First sergeants pushed support forward as tank commanders fo-

cused on maintenance, boresight, weapons test fire, and other pre-combat tasks. Squadron orders were issued mid-day. Then, once the afternoon brief-back at regiment was complete, the squadron rehearsal was conducted at the laager. Every member of every tank crew attended this event. Each tank commander was required to possess a map with the mission graphics posted. The rehearsal occurred on a giant sandtable and focused on orders and actions at each phase of the battle. After several walk-throughs, crews were released for final preparations.

Before the battle of Cowpens, Daniel Morgan moved from campfire to campfire, explaining his plan, answering questions, while talking and joking with his men. He stressed to his militia that they owed him "at least two fires."<sup>48</sup> With the example of Morgan in mind, the squadron leadership moved from vehicle to vehicle late into the night talking with soldiers about the next day's battle, reviewing required actions and discussing the responsibility of each crew member. Every soldier knew that he was personally accountable for the destruction of at least two enemy vehicles. Every Wildhorse trooper understood that the success of the squadron rested directly on his individual actions.

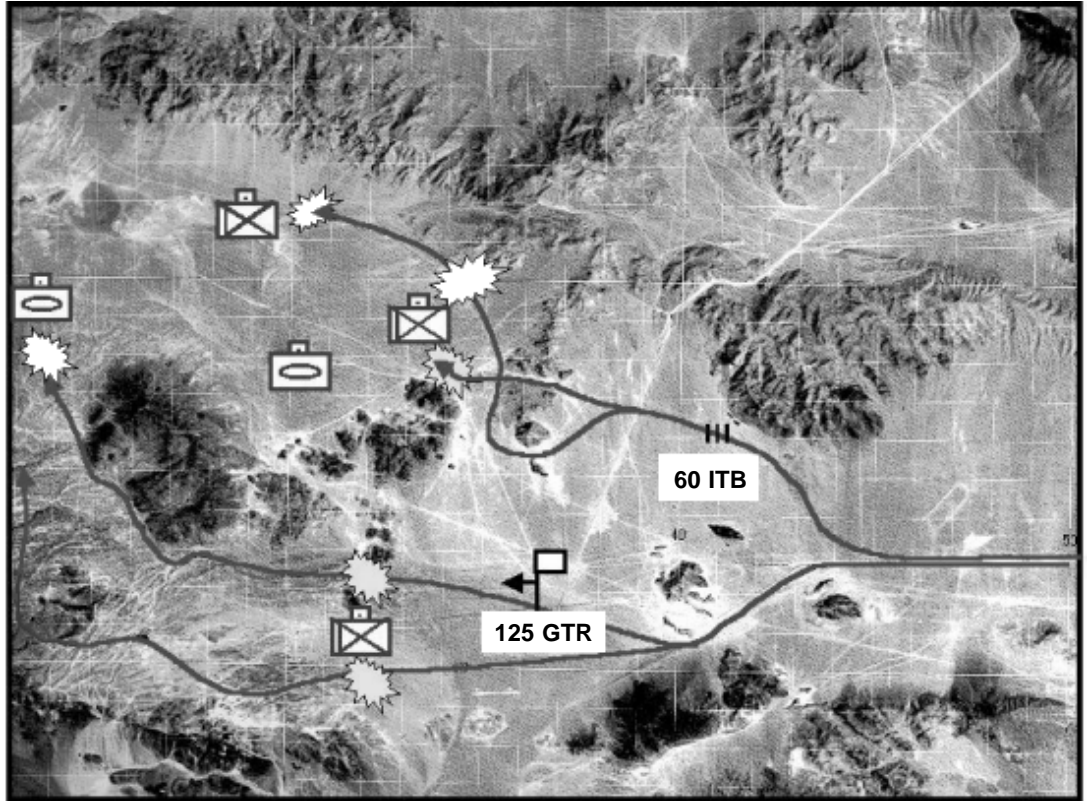
During the first fight, the 60th ITB was employed as an enveloping detachment for the regiment's attack against the defending Brigade Combat Team (BCT). *See figure 1.* The mission was to fix forces in the north, while the regiment attacked south. Just as Daniel Morgan discovered when his militia enveloped Tarleton's left flank, the citizen-soldier will rise to the occasion. When the squadron attacked, one tank threw a track near the Line of Departure (LD). The crew worked furiously to repair their vehicle. Once finished, they moved 25km to the sound of the guns, and aggressively entered the fray with the regiment. The Wildhorse soldiers accomplished their mission in good order. In fact, the enemy initially thought that the 60th ITB was the main effort. Their defenses were fixed, penetrated, and KVTs rolled into their Unit Maintenance Collection Point (UMCP).

For the second battle, similar preparations were made, and the results were just as impressive. The squadron was given another doctrinally correct mission that would surely have met with Mor-



*“The second echelon was committed almost immediately from the LD. Once the bulk of KVTs joined the battle, the tide began to turn, and the regiment reinforced success.”*

gan’s approval. Ten KVTs were detached to reinforce the Advance Guard (AG), then the “squadron minus” served as the second echelon for a regimental meeting battle. *See figure 2.* The enemy moved in a surprisingly aggressive manner, and the regiment’s Tactical Operations Center (TOC) was threatened. The second echelon was committed almost immediately from the LD. Once the bulk of KVTs joined the battle, the tide began to turn, and the regiment reinforced success. Because of lessons learned and confidence built during the first battle, the squadron experienced victory by a greater margin. By 0900 hours, the 60th ITB was poised with the rest of the

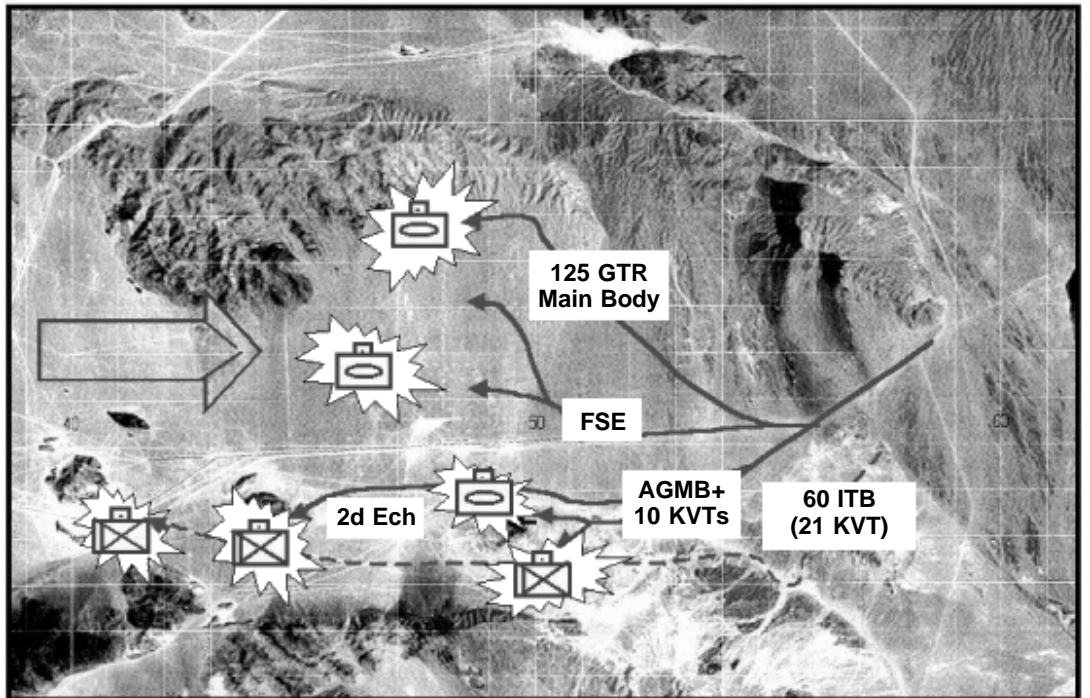


**Fig. 1**

regiment to send KVTs into the brigade TOC.

Much as Daniel Morgan reacted long ago, the 11th ACR commander, Colonel Guy C. Swan III, was very pleased. He said “The 1-221 Cavalry knew that they would have to fight as hard as the active duty OPFOR, and they did. They exceeded everybody’s expectations.” Like citizen-soldiers throughout history, after the battle the Wildhorse returned home to their families, communities, and civilian jobs. They were rightfully proud of their contribution to the Army’s readiness.

*Continued on Page 53*



**Fig. 2**

# The Principles of the Employment of Armor

*Recently, we received this from General (Retired) Robert J. Sunell with a short note pointing out how so many of the principles for employing armor in 1948 rang true today. We must agree. Since only the most senior of our readers have ever seen this, we reprint these principles from Special Text No. 28, "The Principles of The Employment of Armor," published for use in resident instruction at The Armored School, circa 1948. — Ed.*

## Introduction

The last ten years have seen great changes in the art of warfare. Air power has profoundly changed our military concepts, but it has not eliminated the need for ground forces. Rather, it has served to weld more closely together the several armed services into an overall balanced national defense team wherein each service aids and is in turn aided by the others in accomplishing a common mission.

On the ground, we have seen more open and fluid warfare, faster movements, more dispersion, more elastic defense formations, and the ability to concentrate great power at a particular point, thereby making the penetration a more commonly used maneuver. Armor has been responsible for much of this change. We have witnessed the employment of armored divisions, armored corps, and armored armies. The new type field army of the American Army is virtually an armored army. It has approximately 3,500 tanks plus much self-propelled artillery.

The ability to produce the mechanical means of warfare and to employ those means is an outstanding asset of the United States. We must develop and use this asset to offset the advantage of more manpower possessed by our possible opponents. The use of armor is in furtherance of that concept. It is also in furtherance of our efforts to reduce casualties on the battlefield.

Armor is the arm of mobility, armor-protected firepower, and decisive shock action. Armor is a vital and regular member in the ground team. Armor brings within reach of the field army commander decisive objectives. It provides on the modern battlefield the means by which the army commander can achieve the ultimate objective — destruction of the enemy's will to fight.

There are certain basic principles which govern the employment of armor — but they are no more than guides. As in the rules of bridge, there is no place in the principles of employment of armor for the words *always* and *never*. The successful application of the principles of armored employment is entirely dependent upon commanders and staffs being flexible in mind, progressive in thought, and liberal in imagination.

## Armor Plays the Historical Cavalry Role

Armor fulfills the role in modern warfare that Napoleonic cavalry fulfilled in the 19th century. It combines great mobility with overwhelming firepower. Cavalry of the later 19th century and the 20th century relied primarily on mobility. The firepower of armor must not be overlooked in a consideration of its characteristic of mobility.

For many years armies have sought light, fast-moving units that could upset the time-space factors of the opponents. They were willing to sacrifice some power in order to attain the mobility desired. The cavalry was developed into such a force. With the wide use of automatic small arms and other effective

weapons, and of automotive vehicles, the horse no longer was an effective weapon or an efficient means of transportation on the battlefield. Armor, which combines both high mobility and great firepower, has assumed the historic cavalry role in modern war.

## Armor Is a Strategic and Tactical Threat

Armor is a strategic and tactical weapon. Not only is the presence of armor locally a threat to any force, but its capabilities of long movements and prompt commitment make the presence of distant armored units a threat to any operation.

## Armor Uses Its Mobility

Armor has been described as "mobile, armor-protected firepower." Armor gains its ends through its ability to move and shoot, but above all, to move. An armored formation many miles away has the ability to intercede in a battle in from 10 to 20 percent less time than a formation geared to the foot soldier. Armor moves in a fighting formation. To its speed of movement, then, must be added its ability to be committed promptly from march formation. Mobility in armor is derived not only from tanks, armored personnel carriers, and self-propelled artillery, but also from the extensive organization of mobile service support at all echelons from company to division.

## Armor Uses Its Firepower to Close With the Enemy

Armor concentrates its power at the decisive point of action. Armored formations contain an overwhelming superiority of armor-protected machine guns and cannon. The tank cannon is essentially a weapon used against enemy tanks. It is not artillery. In the application of armor's fire and shock power, artillery and other supporting weapons provide the covering fires which enable the tank machine guns and armored infantry to close with and destroy the enemy.

## Armor in Strength Produces Decisive Shock Effect

The psychological shock effect which comes to troops on the receiving end of a massed armored assault is terrific. This effect radiates from the point of attack in concentric semicircles as do the waves from a stone dropped in the water near the edge of a millpond. If the attack is in strength, these shock waves reach to the enemy division, corps, and army headquarters. Shock effect gives armor part of its protection and hastens the disintegration of the enemy force attacked. The shock effect of the mass employment of armor varies as the square or cube of the number of tanks used. Attacking with armored strength too small to produce decisive shock effect often results in great losses and inconclusive results.

## Armored Formation Must Be Flexible

It is not given to many to be able to visualize all that can happen during a full day of armored action. Unforeseen contingencies occur. Situations as to terrain, weather, footing, obstacles, and enemy cannot be accurately predicted far into the future. A set formation for all situations is a dangerous oversimplification in armored tactics. The armored division is designed to fight in two flexibly-organized combat commands. Each is composed from time to time to perform most advantageously the job at hand. Each is commanded by a general officer who has a staff ade-

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quate for handling operations in fast-moving situations and trained to work under mission-type fragmentary orders.

### **Armor Is a Thrusting Weapon**

Armor is a weapon which should be thrust quickly through enemy opposition on a relatively narrow front. It is strong as long as it remains in depth. It should not fan out until the opposition has been reduced and powerful enemy counter-reaction is no longer probable.

### **Armor Stays in Column for Strength**

This does not mean that it necessarily moves on a narrow front or on only one road. It may advance on a broad front, but so long as the tactical formations of the division and combat commands are in column, the commanders are ready for any contingency, and prompt action can be taken without waiting for higher staff reaction and direction. Breaking through and out of an enemy defensive zone in a column of combat commands gives as much or even more effective power in the breakthrough, and at the same time saves an uncommitted tactical command to handle contingencies and to push on promptly in exploitation. Armor formations are organized in anticipation of success.

### **Armor Drives Deep, Assembles, and Destroys**

An armored unit commander must observe the principle of the objective. An engineer who wishes to blow down the face of a rock wall bores deep, assembles his charge, and blasts back. He does not place his charge on the face of the wall. Armored action is similar. What protects armor during this process? The answer is speed, mobility, flexibility, enemy command and staff inertia, and the time and space factors which control the ability to react to such a force. The shock effect of armor reaches even to commanders and staffs and adds to the inertia and the time it takes to react.

### **Armor Needs Mission-Type Orders**

Armor should be given a mission and the minimum essential restraining and coordinating directions. It should be given the ultimate and decisive objective of the next higher commander so it can take prompt advantage of breaks in order to make great gains.

### **Armored Action Calls For Combined Arms Teamwork in Lower Echelons**

Armored formations contain, in intimate association, tank, infantry, engineer and artillery elements. This may, and often does, extend down to the company level, where the tank company may have infantry and engineers as well as the ever-present artillery forward observers. Such a situation on the battalion level is usual. It should not be assumed that the tank unit commander is always in command. Often the armored infantry unit is the basic force to which tanks and engineers are attached, and artillery closely supports.

### **Once the Momentum of an Armored Attack is Attained It Should Be Allowed To Run Its Course**

An armored division has enormous momentum when it gets rolling. To dampen this by phase lines, limited objectives, and other factors that require high-level decisions in order to continue to advance, dissipates that momentum — often faster than does the enemy. Any restriction on movement may provide the enemy with time to react and will frequently result in loss of the initiative.

### **Successful Armored Action is Characterized By Deliberate Planning Followed By Violent Execution**

Armored action involves large road space, close timing, elaborate supply plans, and extensive plans for maintenance. It involves careful coordination and teamwork with all arms. Artillery, mortar, and air support must be tied in. Communications must be coordinated and perfectly established. To do all these requires thorough and deliberate planning.

Once the planning is done, the execution is the pay-off. It must be violent if the mobility, firepower, and shock effect desired are to be attained. Half-hearted execution is fatal to the results expected from armored action.

### **Armored Action Requires Supply and Maintenance**

Adequate plans and facilities for supply and maintenance are essential. It takes about 1,000 gallons of fuel to move an armored division a mile. An armored unit out of fuel is easily destroyed. Firepower means consumption of large quantities of ammunition. Food is necessary. In the typical armored action, supply routes may be cut by enemy action for several days. These contingencies must be foreseen and means provided to assure success. The combat command should carry with it the supplies necessary to reach the final objective and hold effectively.

Tanks and other armored vehicles require frequent and complicated maintenance. The means are available in the armored division; the time must be provided if a favorable balance of combat vehicles is to be kept in action against the enemy for sustained operations. The rotation of combat units through the reserve command and the infrequent employment of the reserve command as a combat command will provide the necessary time for maintenance.

### **Armored Defensive Action is Elastic**

Armor can conduct and has conducted very effective defenses. It does this by being elastic, by rolling with the punches, by counterattacks, and by anticipatory thrusts to upset an enemy attack forming up. It does not establish a brittle line. It disposes itself in considerable depth. While defense has not been the role normally associated with armor, its capabilities on defense in future warfare must not be overlooked.

### **Armor and Tactical Air Are Partners**

It is literally true that armor and tactical air, when working close together, form a team with enormous power. This partnership does not happen by chance. It takes close association, careful air-ground training, and an intimate understanding of each other's capabilities, limitations, and methods to attain the desired relationship. Armor is the one that needs the support. It must go far more than halfway, if necessary, to effect the partnership.

### **Conclusions**

The proper application of the principles of the employment of armor will produce outstanding results. They should be considered not as rules, but as guides after carefully estimating the situation. Deliberate planning is needed. Violent execution then pays the dividends. Flexibility of mind, concept, and formations is required of an armored commander and his staff. He must be willing to take coldly calculated risks. When he holds the cards he must back them up with all his chips, and often he must be willing to put in all his chips when he is not sure that he holds the winning hand.

## SAVING THE LIPPIZANERS

# American Cowboys Ride to the Rescue

by Lieutenant Colonel Renita Foster

*"We were so tired of death and destruction, we wanted to do something beautiful."*

COL Charles Hancock Reed, 2nd Cavalry Group (Mech.), Commander, 1945 explaining his decision to save the Lippizaner horses.

World War II, the world's worst armed conflict, was in its final weeks, and the men of the 2nd Cavalry Group (Mech) were feeling a great surge of pride and triumph. As soldiers immersed in the drama and tragedy of a global cataclysm involving 56 nations and lasting six years, they had not only helped end it, but had highly distinguished themselves in doing so.

They were the men who spent more days in combat, captured more ground, more prisoners-of-war, and survived with the lowest ratio of American casualties than any unit in Europe of equal size. But the 2nd Cavalry had one delicate, complicated mission left. One that would lead them on an extraordinary adventure and save an over-400-year-old enchanted culture.

It was around mid-April, 1945, when the 2nd Cavalry was ordered to the German/Czechoslovakian border to accept a surrender from a specialized German intelligence staff known as the Gruppe Gehlen.

The American location, however, violated the occupation boundaries designated by the Yalta Agreement, mandating that the mission be kept under a Top Secret classification.

When CPT Ferdinand Sperl, an interrogator, began questioning German officers, he made a startling discovery. In an attaché briefcase belonging to a Luft-

waffe colonel were several pictures of horses. Knowing that his boss was a passionate horse-lover, Sperl immediately notified COL Charles Hancock Reed. An accomplished horseman, who had just three years earlier exchanged his beloved horses for armored scout cars, Reed was fascinated with the photographs. He instantly recognized them as the world-famous Lippizaner Performing Stallions from the Spanish Riding School in Vienna, Austria, an institution dating back to 1572. These horses were known for proud bearing, elegant gait, superior intelligence, and strength; animals that delighted audiences the world over with their magnificent performances.

Reed also knew the Lippizaner was one of the purest breeds of horses in the world. Over breakfast with the Luftwaffe colonel, Reed learned that the performing stallions were still in Vienna, but that the rest of the Lippizaner breeding mares were transferred to Hostau, Czechoslovakia in 1942, a town just 35 miles down the road. The mares were now on the wrong side of the Yalta agreement boundary line and Russians units were approaching the area. Reed realized that without the safe return of the Lippizaner mares, the riding school in Vienna would not survive.

"This was not, as mythology has it, a direct order from Third Army commander GEN George Patton, but a field commander's decision to grab something directly in front of his nose," explained Louis Holz, chairman of the board of the 2nd Cavalry Association.

As a young second lieutenant who participated in the rescue over 50 years ago, Holz is clear on the fact that it was Reed who made the decision and ultimately devised a successful plan for the Lippi-

zaner liberation. "Patton didn't become involved in the issue until May 7 when COL Alois Podhajsky, the commandant of the Spanish Riding School, requested and was granted protection by Third Army. When Patton asked an aide to look into the status of the Lippizaner mares, they found out 2nd Cavalry had already taken care of it," Holz said.

It was the close proximity of Russian soldiers that made time a vital factor in planning what became appropriately known as "Operation Cowboy." Reed knew using American firepower to accomplish the delicate rescue could destroy the very prizes he wanted to save. Instead, CPT Thomas Stewart was chosen to negotiate a surrender from the Hostau German Commandant, LTC Hubert Rudofsky.

Crossing the German front lines at dark by motorcycle, Stewart approached the compound and asked to speak to the commanding officer. Rudofsky, however, determined to obey his orders until the end, refused. Stewart was immediately taken prisoner. "We were anxious and worried, of course," Holz said, "while waiting for word when Stewart didn't return right away. But what Tom and the rest of us didn't know was Rudofsky's staff, knowing the difference between surrendering to the Russians as opposed to the Americans, began a mini-mutiny and finally persuaded Rudofsky to accept the American terms."

Two days later, Reed received the answer to his proposition, in the only way worthy of a cavalry unit. Riding side-by-side on white Lippizaners, in full uniform, through the fighting lines, came Stewart and CPT Rudolph Lessing, a German veterinarian, no longer enemies, but comrades bonded by admiration and love for centuries-old-tradition.





Louis Holz, above, was a second lieutenant in April, 1945, and one of the members of the 2nd Cavalry who rode to the rescue of the Lippizaner breeding mares. He is now chairman of the Board of the 2nd Cavalry Association.

“It was an unbelievable sight, this American and German soldier, astride white horses and passing through our lines. The sentry on duty was so shocked he quickly roused the sergeant of the guards,” Holz beamed. “You don’t see this scene in the movie made by Walt Disney (*Miracle of the White Stallions*, 1961), depicting the Lippizaner rescue. I think Disney missed it!”

The next morning Alpha Troop, 42nd Cavalry Squadron, led by CPT Carter Catlett, arrived at Hostau. German soldiers stood at “Present Arms” and held rifles lining both sides of a long driveway leading into the camp’s gate. As Catlett led his soldiers in, they were saluted by the enemy and then greeted by Rudofsky without incident. “Operation Cowboy” was underway.

Transported first were newborn foals and horses that could not make the journey on foot and had to be loaded in trucks.

True to a cavalry unit, there were plenty of real-life cowboys to shepherd the rest of the horses westward to Bavaria. And though the horses numbered in the hundreds, all were accounted for. “Even three horses who got a little finicky and broke away and returned to the stables at Hostau,” Holz said. “They had to make a second trip.” A few months later, the entire Spanish Riding School was reunited in Wels, Austria.

Despite the fact that Holz was involved in a daring, wartime rescue to save such a sacred tradition, he didn’t realize its significance: “I remember walking around and looking at the horses, but un-



Lippizaner stallions perform at the Spanish Riding School in Vienna. The horses had been a tradition since the late 1500s.

til the explanations were made and seeing COL Reed’s excitement, I really didn’t appreciate the prizes we’d acquired,” he said. “Now, as the years have gone by and all the accolades are still descending upon us half a century later, I think it’s one of our proudest moments. This is truly unique. There’s been no parallel before or since. The United States Army literally put the war on hold for two days in order to save a sliver of culture for the world.”

Holz attributes the success of the Lippizaner rescue to Reed, due to his genuine love for horses, expert planning, and his ability to weigh the consequences. “I strongly feel this is a case of the right man being in the right place at the right time. If there had never been a Charles Reed, I don’t believe those horses would have survived,” Holz said. “Undoubtedly, he understood how much the outcome of this operation would affect the rest of the world.”

The same sentiment is shared by Dr. Rudolph Lessing, the German veterinarian who assisted the rescue and developed a lifelong friendship with the Lippizaner rescue veterans. “If it had not been for COL Reed, with his knowledge, compassion, and understanding, the Lippizaner horses would have been horse-burgers for the Russian soldiers,” Less-

ing said at a 2nd Cavalry Association reunion some years later.

The kind of admiration Holz and his fellow veterans feel for the late COL Charles Reed, both as a commander in war as well as the Lippizaner savior, has increased with time and is easily detected when Holz speaks of serving in Europe under him. “Every unit has its heroes. He’s ours. We call COL Reed ‘Frank Buck’ because he brought us back alive,” Holz said.

“He has his own corner at our regimental museum in Fort Polk, La., where his uniforms and medals are displayed, and all the highlights of the unit including the Lippizaner rescue can be seen. We do understand the unit didn’t fight a war to save horses. It was simply the icing on the cake. And I’m mighty glad we had that icing!”

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*Renita Foster is a Lieutenant Colonel in the U.S. Army Reserve assigned to Fort Monmouth. She currently works as a public affairs officer and feature writer for the Communications and Electronics Command. Her other assignments include the Far East Network, 1st Armored Division, and AFN Nurnberg.*

## TACTICAL VIGNETTE 98-3

# “Attack in Brandenburg”

WHAT'S  
YOUR  
NEXT  
MOVE??



### Situation

#### Enemy.

Remnants of an enemy force are defending the town of Brandenburg to prevent the seizure of the ferry site. Enemy forces have been cleared from PL Dismount to PL Sniper and are making a final stand along the south bank of the Ohio River north of PL Sniper. The level of enemy resistance indicates that the enemy remnants have created effective antiarmor kill zones, armed with SAGER missiles, RPGs, antitank grenades, Molotov cocktails, and sniper fire. The enemy force in OBJ White is reported to have a T-80 and 2 BMPs in support of the dismounted effort.

The most probable and most dangerous course of action is for the enemy remnants to courageously attempt to hold their defensive positions. They will attempt to destroy friendly units piecemeal as they move down the bottleneck streets of Brandenburg.

#### Friendly.

TF 3-37 AR attacks OBJ Bridge (Red, White, and Blue), 071300\_\_98, to seize crossing sites on the south bank of the Ohio River to enable follow-on forces to establish a bridge site at ET729065.

#### Scenario.

You are the commander of Delta Team (2 tank platoons and 1 mech platoon with 15 dismounts), TF 3-37. The TF consists of 2 tank-heavy teams and 2 mech-heavy teams. You are the TF reserve. The brigade commander wants the TF to seize OBJ Bridge in order to support an assault crossing of the Ohio River. TF 2-66 IN has already seized the southern half of Brandenburg (south of PL Sniper). Alpha Team, TF 3-37, has successfully seized OBJ Red and Charlie Team, TF 3-37, has successfully seized OBJ Blue. Both are currently set up in SBF positions oriented north.

In its haste to set up a SBF position, Bravo Team, TF 3-37, attacked its objective in column. A tank platoon was assigned to lead, and the attached infantry platoon was clearing buildings at the southern end of the team's column. While the infantry was clearing the first few buildings on Main Street (1, 2, 20, 21, 22), the team's column of vehicles continued down the street without the support of the infantry platoon. The column proceeded without incident until reaching the northern-most end of the town, where the vehicles were ambushed by antitank fire from the surrounding buildings. The attack destroyed the first two vehicles of the lead tank platoon and the second vehicle of the following mech platoon. Three other vehicles were trapped and eventually destroyed before any dismounted support could assist. Bravo Team recovered the majority of its wounded from Main Street. Bravo 6 reported sighting the following enemy positions: building 13, RPG team; buildings 10 and 16, SAPPER teams with small arms fire; building 4, a suspected sniper; a tank to the east of building 12; a BMP north of building 13. Bravo 6 believes there are other buildings that are occupied by enemy remnants armed with antitank and small arms weapons, but he cannot confirm this.



Looking north on Main Street from Broadway.

The TF commander has ordered Bravo Team to retain control of buildings it currently holds and to withdraw all remaining vehicles to CP 7 for consolidation. In addition, he has ordered you to assume the Bravo team mission (seize OBJ White) and has given you priority of artillery and mortar fires as soon as





The ambush site near the ferry landing.

you cross PL Sniper. The TF commander has attached an engineer squad to your company team; the 1SG is moving to make linkup at CP 4 in the next five minutes. You also receive reports that some soldiers from Bravo Team are pinned down within the kill zone. Division follow-on forces are rapidly approaching and are expected to reach Brandenburg in one hour. In order for the division to maintain tempo and successfully continue the attack, Brandenburg must be seized and a bridge site established. Your team is currently at CP 5. You must act now! What do you do!

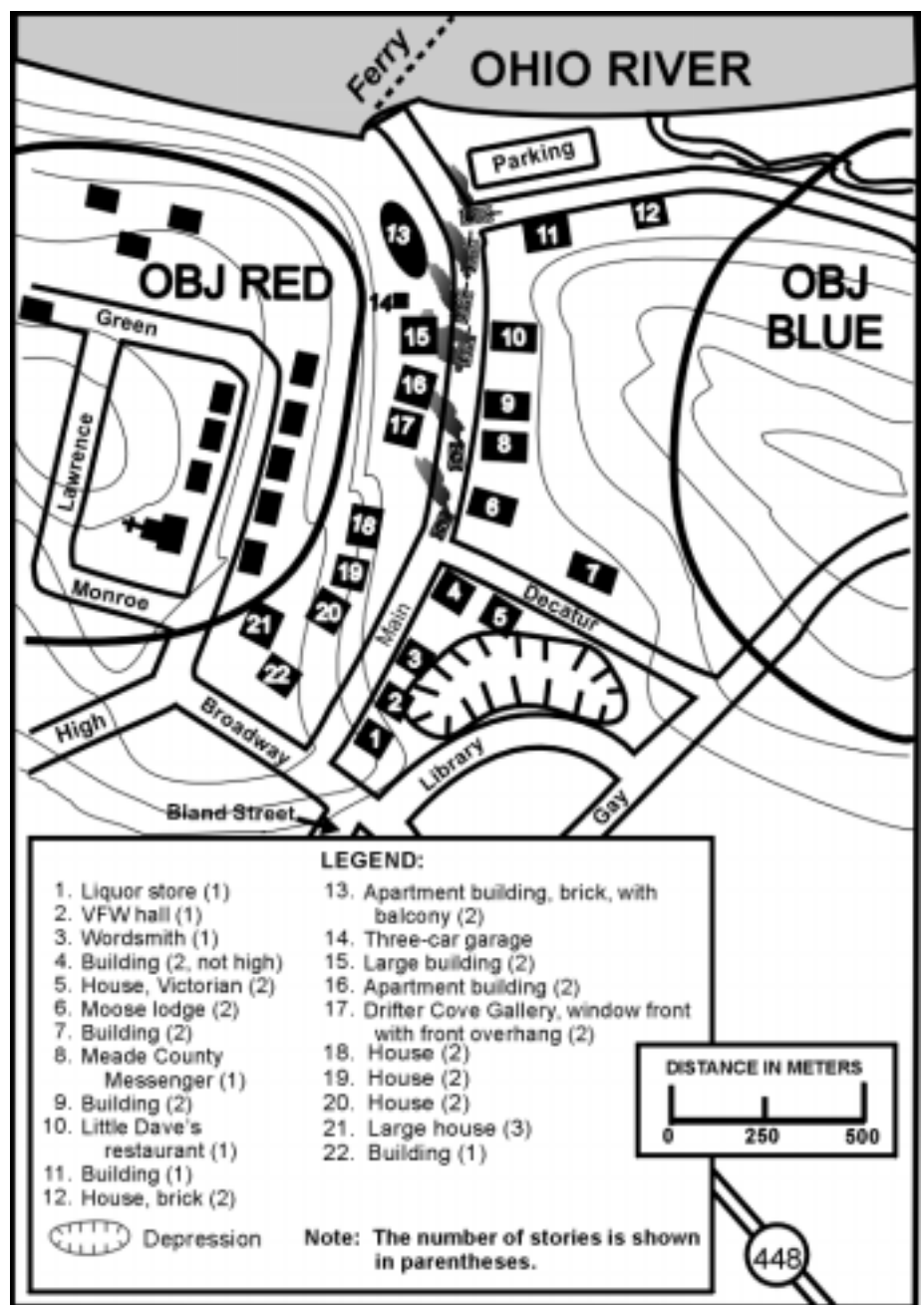
#### Requirement:

In 10 minutes or less, make your decision and issue your FRAGO and any other reports you would submit. Readers who submit their solutions to the scenario should provide the following: fragmentary order to the company team, the rationale behind your decision, and a sketch of your plan of action. E-mail your solution to ThompsonM@ftknox-dtdd-emh5.army.mil, or mail your solution to ARMOR, ATTN: ATZK-TDM, Fort Knox, KY 40121-5210.

## SOLUTIONS

*The author's solution, along with interesting alternative solutions, will appear in the September-October issue of ARMOR.*

*Several solutions to Tactical Vignette 98-1, "Screen at Croley Lake," which appeared in the January-February issue, are published in this issue on page 49.*



# A Cavalry Experience In Bosnia

by Captain Robert G. Ivy

On 6 October 1995, 3-4 Cavalry, 3rd Infantry Division, received its alert notice to be part of Operation Joint Endeavor. Prior to that time, we had no warning of a Bosnian deployment. In one day, we went from not being part of a deployment to being one of the two cavalry squadrons for Task Force Eagle, which was built around the 1st Armored Division. For the next 15 months, we became quite familiar with the Bosnian mission.

The squadron's initial training was in mine awareness in Grafenwoehr, unit certification in Hohenfels, and back to Grafenwoehr for gunnery. Our month-long training clearly showed our strengths and highlighted those tasks that we needed to practice. As we could not afford additional training time, we decided to focus on pushing down leadership and training programs to the lowest levels possible once we returned to Schweinfurt. The best example of this was the fielding and training of our new satellite navigation receivers. We put our NCOs in charge, and the entire squadron rotated through their program. In the span of a week, most of the squadron was proficient with the equipment.

Three weeks prior to the deployment it became clear that individual training and equipment fielding were distracters to our accurately closing property accounts and transferring equipment to the rear detachment. The rear detachment commander had to effectively inventory the entire squadron's installation property in less than 20 days, and during the Christmas season. Garrison staffs were a tremendous help, but they were not prepared for how quickly the unit needed to deploy. As a result, many property issues were not resolved until the squadron returned to Schweinfurt, over a year later. In addition, as part of the deployment, the squadron received new OH-58D Kiowa Warriors, complete with pilots, crews, and family members four weeks early. Because we were a new team, we had to conduct an Air-Ground Coordination Exercise, involving most of the squadron leadership. Fortunately, the depth of experience in leadership, both officer and NCO, allowed the squadron

to successfully deploy to Bosnia, in spite of these administrative and training hurdles. The squadron and troop executive officers were fundamentally responsible for pushing the unit out to Bosnia and deserve most of the credit.

The squadron deployed via ground, air, and rail. We left somewhat together, but arrived at the Sava River piecemeal. Once we arrived at the Sava River, we had to first receive and account for personnel and equipment that came through the "pipeline," and then assemble everyone and everything to cross the river into Bosnia combat-effective. The squadron's success was based on a movement plan that focused on troop-sized units, rather than one squadron-sized unit. Each ground troop was assigned a slice of the HHT, staff, and other support elements. Thus, the squadron became and moved as several equal mini-squadrons, allowing the squadron commander and his staff to attach to whichever troop was in their area and provide them with the support required to accomplish their missions.

Our first mission was to arrive in Tuzla with as much support as possible and as quickly as possible. With the *Ride of the Valkyries* blaring through our speakers, B Troop, 3-4 CAV conducted a night crossing of the Sava with 77 vehicles, stretching over two miles. About 90 kilometers later, we arrived in Tuzla and met our first opponents, an army of children! There was no school, and children were everywhere. They would routinely risk their lives diving under vehicles, moving or not, for food, candy, etc. These "infiltrators" became paramount concerns, both for our security and their safety.

Task Force Eagle assigned us to its southern sector. The United Nations Protection Forces (UNPROFOR) patrolled the sector during the civil war. Therefore, we planned a battle hand-over with the Nordic Battalion (NORBAT) unit of UNPROFOR. The planned hand-over with NORBAT, and how they interacted with the factions, greatly influenced how we conducted future operations. Once the hand-over was complete, we then

started missions, although we had not yet established a base camp.

We were told that we would be assigned, or directed to, a base camp; however, no one knew where it was or when this would take place. Thus, B Troop road-marched to the Zone of Separation (ZOS), hoping to find a place to spend the night. When we reached the former confrontation lines, the troop executive officer found some bombed out buildings nearby. Bosnian soldiers, who were waiting to go home, helped us clear what appeared to have been a farm complex. We spent most of that first night clearing our perimeter, improving positions in the rubble of buildings, and securing ourselves. In those first few days, we called our new home "Hotel Hell" but "The Dawgpound" quickly became the unofficial name, with Camp Alicia its official one. It would be our home for the next year. We spent the first two months at the Dawgpound living on our vehicles and awaiting our turn to receive the engineer base camp teams. Once the engineers arrived, construction happened quickly.

In addition to securing the camp, we had to accomplish missions. We continued joint patrols with the NORDBAT soldiers until they pulled out of sector. Coordinating with Serb forces for the IFOR takeover of Mount Vis quickly followed. Mount Vis is a mountain that juts out of the center of the Tuzla Valley, overlooking all of the southern Tuzla area, to include the single air base operated by Task Force Eagle. Whoever controlled Mt. Vis controlled the valley.

This was the first time that we relieved a factional element. Having no precedent, we decided to treat the mission as a doctrinal relief in place. We agreed with the Serb forces to move a scout section onto the mountain as they pulled a squad off. The scout section would jointly secure Serb positions, with the Serbs, for 24 hours. Then, the rest of the scout platoon would relieve the rest of the Serb forces. The relief went incredibly smoothly. The Serbs even showed us how to defend the mountain from the Muslims.



CPT Ivy, with members of a UN police team, talk with a group of Muslim men outside the village of Memici during Bosnian national elections. On their way to confront Serbs in the neighboring village of Kula, the Muslims were instead persuaded to go to the polls.

*Photo: 55th Sig. Co. (Cmbt Camera)*

Once Mt. Vis was secured, our priorities turned to documenting the removal of all land mines in our sector, while having both sides pull their forces back to distances agreed to under the Dayton Peace Accords. Unfortunately, both sides decided to deactivate units on the front line rather than pull them back. This left only a handful of soldiers on active duty who knew where the mines were, and minimal manpower to remove them. In many cases, we accompanied factional soldiers that had never seen the minefield they were assigned by their army to remove. Typically, these soldiers were only armed with a mine card and probe. Our engineers did the bulk of this observation work; however, we also participated on order to “backfill” our engineers so that they could do other assigned missions.

Mines were, by far, our biggest threat going into Bosnia. We trained hard in mine awareness and reaction drills. Our training paid off in the last week of January when we hit our first mine. It was a TMM-1 antitank mine, and it detonated as a Bradley ran over it, blowing off the Bradley’s right side Number 1 road wheel. Two days later, one of our engineers stepped on a PMA-1 antipersonnel mine in the same area. Sometimes mines are run over and do not detonate. In both of our minestrikes, the person or vehicle was atop another mine. Our Standard Operating Procedure (SOP) became: when a minefield is detected, find the leading edge of the minefield. This helps in the placement of equipment and evacuation points. Clear along the path followed by the individual or vehicle that first went into the

minefield. This builds a known cleared area. Clear around the individual or vehicle, so that you can work. Finally, clear an intermediate work area so that any work needed to get the person or vehicle out of the minefield can be done safely or equipment can be placed so that people do not have to step over it. Because the mined area was deep, we moved the person or vehicle to the intermediate cleared area, still in the minefield, to prep them to move out. In both cases, the intermediate area was a wide spot on the pathway into the minestrike.

Operationally, our peacekeeping mission required that the squadron break down to troop-sized elements. When the squadron first arrived, it patrolled most of 2nd Brigade sector, which was about one half of the Task Force Eagle sector. This caused commanders, at all levels, to be on missions, daily. Often, I would not go to the squadron TOC unless it was for the weekly command and staff. Likewise, the squadron staff was not able to visit the troops except once a week. Often, they were part of a convoy, which could only stay a short while before moving on. This lack of contact caused perceptions to develop as to what different elements of the squadron were, or were not, doing. Furthermore, communication between the TOC and the troops was difficult because radios could not reach each other without relay/retrans stations. MSE was not available until later. While our future MSE capability reduced the road time, a lot can be accomplished face to face. In hindsight, I should have physically met with the command group and staff at least twice a

week, not including the command and staff meetings.

One of our constant challenges was manning the troop TOC. Simply, company-and troop-size elements are not designed to man a TOC 24 hours a day, 7 days a week, for a year. Our answer was to have the commo NCO run the day-to-day operations with the assistance of the NBC NCO. Manpower usually consisted of command drivers, headquarters platoon drivers, and anyone that we had on profile. That way, the TOC was always manned with at least an NCO and soldier. During “crisis” operations, the executive officer and/or first sergeant would oversee the TOC, with the addition of a runner. We did not use NCOs and soldiers from the scout or tank platoons because of the need for these personnel to execute patrols and man our remote sites. At its peak, B Troop supported three remote sites that required a platoon-sized element conducting 24-hour operations.

In March, B Troop received orders to be the first unit in Task Force Eagle to go to Taborfalva, Hungary, for gunnery as part of the deployment. Therefore, we had to balance operational missions with figuring out how to train for gunnery. For example, how do we conduct TCPC/BCPC from a base camp in the Zone of Separation (ZOS), which was surrounded by minefields? Our answer was to coordinate with local authorities for a strip of road that was used only by IFOR. We then set up target pits in cleared areas next to the road. Finally, we evaluated the crews using jump radios and a chase vehicle, which carried

the TCE/BCE. We conducted the crew gunnery tests in our "motor pool" at Camp Alicia.

Our resources were stretched to the point that a broken vehicle caused undue havoc. The solution was preventive maintenance. Our mechanics were sheer geniuses, but even geniuses need a program. For us, it was assigning sections (two vehicles usually) to our motor pool for maintenance as a mission. Naturally, this did not happen daily, but it did happen regularly. Because of this program, our operational readiness rate was consistently 90 percent or higher throughout the deployment.

In August, we started working with the International Criminal Tribunal for the

base camp. Mahala was between us. I handed over the Mahala mission to my XO and started to withdraw the remains recovery team. For their own security, we brought them back to one of our remote sites. I was then able to link my forces with those of the XO. I believe that had we not had redundant command plans, we would have "dropped" one of these two missions. By the time I arrived at Mahala, the forces were separated and the Serb police forces detained. The senior NATO, Bosnian, and Serb officials were negotiating a peaceful closure to the incident. However during negotiations, the Serbs began bringing dozens of people into the ZOS by bus.

The squadron commander tasked me to stop the crowd of Serb civilians from in-

of the Serb police. I had my first sergeant send one of the police officers to the underpass to meet the crowd. The police officer assured the crowd that all was well and then returned back to my first sergeant. Once the crowd had met with the police officer, I was able to convince the leader that the best place to wait the incident out was outside the ZOS. He agreed to move back provided that I stayed with him and kept him informed. I agreed and the crowd moved out of the ZOS, back to the first delaying scout section.

Throughout our operations, we documented missions using video, instant pictures, and journals. Frequently, our most respected weapon was our camera. We were surprised by the power of the lens. Cameras caused crowds to disperse and factional police to behave. Typically, we only used cameras as a response to a lack of cooperation from the factions. The Serbs especially did not want to be documented because they felt it could bring about some sort of international retribution. Likewise, the cameras in our Kiowa Warriors proved exceptionally useful. During the incident in Mahala our pilots documented a biased journalist from Tuzla physically directing a Muslim crowd on where to engage Serb police forces. We were able to get his credentials revoked, making him useless as a newsman.

By late October, we received orders to withdraw. Throughout the withdrawal, we still had operational missions and training. For example, we had to secure a bridgehead over the Sava River and train for gunnery that we would conduct on the way home. Once we were relieved from the bridgehead, during the last week in November, we moved on to Hungary for gunnery and recovery. After which we headed home, riding back into Schweinfurt on 11 December 1996.

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At Camp Alicia, MG Nash, commanding Task Force Eagle, visits the author, at right, and two of his troop commanders, CPT Jeff Erron, at left, and CPT Simuel Shaw.

former Yugoslavia (ICTY). The remains recovery team was responsible for exhuming mass graves, and we were responsible for their local security. Because of the sensitivity of the mission, we tried to only maintain overwatch positions. Our guidance was not to be in the same "picture" with the ICTY. Still, we got a nose full.

At the same time we were supporting ICTY, the Bosnian Federation decided to push military-aged male refugees into a village named Mahala. Mahala was a Muslim village before the war and was now, due to the Dayton Accords, on the Serb side. Shortly afterward, the "families" followed. These "families" were formed around the military aged males and included women and children of all ages. The children would only stay with their "family" during daylight, when the possibility of press coverage was the greatest. The Serbs responded a few days later with their Interior Police. I was with the remains recovery team and my XO and first sergeant were at our

terfering with the negotiations. Upon seeing the crowd, I decided to try a delay of sorts. I placed a scout section immediately in front of the crowd and another 500 meters down the road the crowd was traveling. Behind these two scout sections I placed a Hungarian engineer unit equipped with dump trucks. Finally, I placed a third scout section at the mouth of a railroad underpass. To my amazement, the different points in the delay continued to slow and spread out the crowd, because they all stopped to talk or yell at our troops. By the time the lead part of the crowd arrived at our last point it was only 25 percent of its original size.

In addition to the delay, my soldiers and I had learned to watch crowds and find their leaders. There is always someone in the crowd that acts as a cheerleader or spokesperson, egging everyone else to move and act together. Once we found the leader, I talked with him as the crowd moved towards Mahala. He told me that his major concern was the safety

# Germany's Big Guns

*Leopard Family Becomes  
A European Standard  
In Various Versions*

by Gerard Van Oosbree (MDI)

Ever since World War II, the German defense industry has shown that it is among the best in the world. When the Tiger tanks appeared on the European battlefield, the Allied forces had nothing that could defeat them. Now, more than fifty years later, the Germans have developed two weapon systems that will prove more than a match to the other side, whomever that may be.

## Leopard 2A5

The Leopard 2 tanks in use with Germany, Netherlands, Switzerland, Austria, Sweden, and Spain are, like many Western tanks, based on '70s technology and are vulnerable to modern missiles and rockets. To compensate, new solutions and technologies have been developed all over the world to protect crewmen and vehicles. Israel came up with "Blazer" explosive reactive armor, the UK with Chobham armor, and the U.S. with depleted uranium armor. But the development of normal armor is also taking great leaps ahead. In 1989, three Leopard 2 user countries — Germany, the Netherlands, and Switzerland — signed a memorandum of understanding (MoU) for a study into the possibilities of upgrading their Leopard 2A4s. The study came up with a three-phase program. Phase 1 improves firepower with new kinetic energy (KE) ammunition like Rheinmetall's LKE II and a new 120mm smoothbore barrel which is 55 calibers long, 130cm longer than the current 42 caliber barrel. Phase 2 improves ballistic protection and fire control. Phase 3 consists of the Integrated Command and Information System (IFIS) and a 140mm cannon with autoloader.<sup>1</sup> In 1991, the three countries agreed to what has been called the "Mannheim configuration," consisting only of Phase 2. In operational service, this upgraded version is called the Leopard 2A5. Germany started upgrading 225 Leopards, while the Dutch started upgrading 180 tanks with an option for the other 150 A4s in service. Switzerland will not start upgrading before 2003.<sup>2</sup>



The most noticeable changes are the new add-on armor modules on the turret front and side. Made of laminated armor, these modules can be easily removed and replaced, either because they are damaged or if a new and better armor is developed.

The side modules are hinged at the front and the space behind them is used to store deep-wading equipment and

gun-cleaning rods. Armor sections of the original turret frontal-arc underneath the new modules are cut out and replaced by fixed pieces of new "third generation" composite armor.<sup>3</sup>

In addition, new, heavy side skirts are fitted over the idler and front two roadwheels. The old rubber sections of the side skirts are replaced by armor plates. The roadwheel hubs are also replaced by



ones made from armor. All the extra weight brings the vehicle into MLC 70 but will not decrease the performance of the tanks in the field.

The inside of the turret is also fitted with a 1-inch thick ballistic spall liner to reduce the amount of shrapnel in case of a hit.<sup>4</sup>

To enhance control, a 360-degree, fully stabilized periscope replaces the commander's periscope. It has its own independent Thermal Imaging Module (TIM), and the TC can switch to the gunner's image if need be. For navigation, the crew can rely on a hybrid system combining GPS and inertial navigation equipment.

To aid the driver during retrograde maneuvers, a small video camera is fitted on the rear hull, transmitting to a monitor inside the driver's compartment.

Removing all hydraulic systems from inside the tank and replacing them with electric drives further enhances crew safety by eliminating the possibility of a hydraulic fluid fire while also reducing noise considerably.

### **STRV122 (Leopard 2S)**

The Swedish army recently purchased 120 brand new Leopard 2s, next to a batch of ex-German army Leopard

2A4s. The new vehicles will have the same protection and control functions as the A5s and then some. The STRV122 can best be described as the most heavily armored and sophisticated Leopard to date. In addition to everything mentioned above, the STRV122 has add-on armor on the turret roof, new add-on armor on the frontal arc of the hull, and a ballistic spall liner on the inside of the driver and engine compartments. Also installed is the Swedish version of IFIS, called TCCS (Tank Command and Control System).<sup>5</sup>

### **PzH2000**

You might not expect to find information on an artillery system in the pages of *ARMOR*. Wegmann's PanzerHaubitze 2000 is, however, a bit different from all the others. It is meant to replace the existing self-propelled guns (SPGs), like the M109 series, that were introduced in the '60s.

It was developed by a consortium of German defense firms over the last six years, with battlefield survivability the big priority. For that reason, this SPG is built more like a tank. The hull and turret are made of welded armor, able to withstand 14.5mm AP-rounds and 155mm shrapnel. Most of the running gear uses parts from the Leopard 2-series

MBT mentioned above, meaning it can keep up with the front-line forces with a maximum speed of 60 km/h on roads and 45 km/h in terrain. It also means the beast weighs as much as a tank at MLC 60.

To further enhance crew protection, the turret top and driver's compartments take add-on armor plates. All movement of the turret and gun is done by electric motors instead of the conventional hydraulics. But that is not all; the system's automation almost allows it to fire from the hip. Within two minutes, it can stop, fire an eight-round burst, and drive off, so the crew does not have to worry about counter-battery fire. The crew can stay under armor during the whole sequence.

This compares with the 12 minutes that it takes for the latest model M109A3G in German service to accomplish the same thing. An on-board computer keeps track of the type and position of 60 combat-ready rounds in the gun system's magazine. The fuses are already fitted and set by an inductive fuse-setter when loaded into the tube. The autoloader brings the rounds to a pneumatic flick rammer under the breech. After the projectile is loaded, the flesh-and-blood loader loads the propellant charges needed. These are Rheinmetall's new Modular Propelling Charge System






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The Swedish Leopard 2S, at left, is the most heavily armored version, with added roof armor, thicker hull armor, and a heavier armor on the turret mantlet, compared to the German Leopard 2A5 version at right.

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(MTLS), which replace the old bag charges. MTLS consists of individual charges that look like cans. Up to six can be clicked together for maximum range. The turret magazine carries 288 MTLS charges. With its new 52 caliber barrel, developed by Rheinmetall, the gun system can fire conventional ammunition 30 kilometers and assisted projectiles up to 40 kilometers, compared with 18 and 24 respectively for the M109 and 24 and 30 for the new British AS90.

While the loading is in progress, the on-board computer receives the firing mission directly by radio link or from direct input by the crew. The computer, linked to a hybrid navigation system that combines inertial navigation with GPS, then automatically lays the gun on target.

Reloading does not require the gun tube to depress; the system can load while the turret is traversing and the tube is being elevated. This is an advantage when engaging moving targets. During testing at Ravlunda, Sweden for the Swedish coastal artillery, the PzH2000 showed that it could successfully engage targets moving at an angle from the gun. Multiple Rounds Simultaneous Impact (MRSI) would require only different software for the onboard MICMOS computer. All systems have semiautomatic and full manual backup, although

the rate of fire will be lower without automation.

Of particular importance to the U.S. Army is the possibility of firing 12 rounds per minute. Fitted with a 48-volt system instead of the normal 24-volt, the PzH2000 showed it could do this during trials held in October 1997 at Meppen proving grounds in Germany, proving it can fulfill the Crusader program requirements that will be introduced in 2005.<sup>6</sup> Fitted with the usual 24-volt system, as it will be delivered to the German Army, the PzH2000 can fire eight rounds per minute.

Reloading the gun with 60 rounds and 288 charges is done within 11 minutes by two crewmembers.<sup>7</sup>

Overall, it is estimated that the complete system will reduce operating costs by as much as fifty percent.<sup>8</sup>

The manufacturers have been trying to interest the U.S. in the PzH2000 system. Performance data from the initial testing by the German Ministry of Defense were handed over in 1996 to the Crusader program managers to be compared with the Crusader requirements.<sup>9</sup>

The German Army will take delivery of the first of 180 PzH2000s in 1998 and will equip the battalions of the Rapid Reaction Forces.

## Notes

<sup>1</sup>Owi. R. de Vos, *De Onderofficier*, an official Dutch army publication aimed at the NCO corps.

<sup>2</sup>Rainer Glass, "Euro-Leopard 2," brochure published by Report Verlag, Germany.

<sup>3</sup>Ibid.

<sup>4</sup>Ibid.

<sup>5</sup>Information supplied to the author by LTC Wahlgren, system manager MBT121/122, Swedish Armed Forces HQ.

<sup>6</sup>Wegmann press release, "PzH2000 News," 11/97.

<sup>7</sup>This and other performance data was taken from various Wegmann brochures and verified by LTC Arps, German DoD Armaments Division, in the brochure, "Panzerhaubitze PzH2000," published by Report Verlag, Germany.

<sup>8</sup>LTG Willmann, Chief of Staff of the German Army, in the brochure, "Panzerhaubitze PzH2000," published by Report Verlag, Germany.

<sup>9</sup>Wegmann press release, "PzH2000 News," 9/96.

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*Gerard van Oosbree is a free-lance photographer (Mildata Defence Images) and writer specializing in military matters based in the Netherlands. He is also the European correspondent for the American magazine "Journal of Military Ordnance," published by Darlington Productions Inc., and has reported on these two vehicles for the magazine.*

# The Grim Reaper

*This M48 may have been the most heavily gunned tank in Vietnam*

by Dave Decker

The year was 1969. I was a crew member on B35, a tank called "The Grim Reaper," serving with the 3rd Platoon, B Co., 2/34 Armor, OPCON to the 1st Infantry Division. This M48A3 was probably the most heavily gunned tank in Vietnam.

By various nefarious means, my crew had been able to acquire more machine guns and personal weapons than any other tank in the theater. Besides the 90mm cannon, the M73 coax, and the issue M2 HB .50 cal. machine gun, we mounted other crew-served guns to improve our firepower. During 1969, in III Corps, it was common practice to mount the TC's 50 cal. on an infantry tripod base, welded to the top of the cupola. This facilitated reloading and improved flexibility of fire. Another .50 cal. was mounted on



a tripod that had been welded in front of the loader's hatch. (Some crews did not mount any guns in that position; others mounted M60s.) Yet another 50 cal. was mounted on a modified infantry tripod welded in place near the tank's travel lock on the rear deck.

The accompanying photos show another arrangement, where the 7.62mm Minigun from a Cobra helicopter was adapted to mount in front of the loader's hatch. To my knowledge, this was the first and only time a Minigun was employed in this manner. Ammo fed from a former coax ammo box strapped to the side of the turret. However, after a night attack on the perimeter of the Rome Plow operation base we were assigned to guard, this Minigun was confiscated by an irate high-ranking officer.

An M60 with a ready pack was kept in the bustle rack, along with an M14E1 rifle, an M79 grenade launcher, a couple of M-16s, a few captured AK-47s, issued M3 .45 cal. submachine guns, hand flares, and radios. Most of the crew also carried .45 cal. pistols.



Above, at left, a 7.62mm Minigun salvaged from a helicopter was mounted in front of the loader's hatch... until the crew was ordered to remove it.



Visible at right are the .50 cal. machine gun mounted on the rear deck, near the travel lock, and another on a tripod in front of the TC's hatch.

*All photos by the author*

*Dave Decker enlisted in 1968, and after basic and advanced training at Fort Knox, and jump school at Fort Benning, served in cavalry and armor units at Fort Lewis, Wash., and the Republic of Vietnam. In Vietnam, he earned the Bronze Star, Air Medal with "V" device, Distinguished Flying Cross, and the Army Commendation Medal. In 1991, he was awarded full disability for the effects of exposure to Agent Orange.*

# “Arjun,” India’s Mythical Warrior, Is Nearing Reality

by 1LT Adam Geibel



An Arjun prototype during trials.

Relations between India and Pakistan have been in a state of simmering hostility since the 1971 War, which was characterized by some intense armor battles on both the Eastern and Western fronts.

While the United States had supplied M48 and M47 “Pattons” to Pakistan, the Soviet Union has been the primary supplier of MBTs to India since the ’60s. At that time, two armored divisions fielded about 900 T-55s. These served well in both the 1965 and 1971 wars with Pakistan, but both belligerents recognized the limitations of existing designs. This sparked the India-Pakistan MBT race.

In addition to sequential upgrades of models already in their inventories, both countries embarked on indigenous MBT designs. India’s “Arjun” and Pakistan’s “Al Khalid” have soaked up millions of defense dollars, with little more to show for the dual efforts than a handful of prototypes and pre-production models of both tanks.

## Arjun Development History

At the end of the 1971 war, the Indian army realized the limitations of their tank fleet in the harsh desert conditions of Rajasthan, a northwestern Indian state bordering Pakistan, so they initiated their own MBT design. The first “Arjun” (named after a mythical Hindu warrior prince) concept was laid out in 1974 by the Combat Vehicles Research and Development Establishment (CVRDE) of the Defence Research and Development Organization (DRDO). Based on 1971 battlefield experiences, the Arjun would have a locally-designed, rifled 120mm main gun, a German, MTU-based diesel powerplant (The Indians consider turbine engines fuel guzzlers), and a computerized fire control system with a laser rangefinder.

One of the early Arjun prototypes was unveiled to the public in April 1985 (though it was probably ready to roll at

some point in 1983-84), with a number of prototypes undergoing technical testing while desert trials were scheduled for that summer. Indian Army Chief of Staff GEN A.S. Vaidya and Dr. V.S. Arunachalam (Scientific Advisor to the Defence Minister) presided at the ceremony, announcing that they planned to have the Arjun in service by the end of the decade.

At the time, it was reported to have a 120mm smooth-bore main gun and would use a 1400-hp MTU-based diesel until an indigenous one was ready. Weight would be about 50 tons, and the tank would cost about \$1.6 million (U.S.), but development costs rose about 500 percent throughout the ’80s. Twenty-six years later, through a development process plagued with delays, the end product visually resembles the German Leopard II, however, unlike the German vehicle, its future is in doubt.

According to Indian Defense Minister Sharad Pawar, there were 12 prototype Arjun MBTs “in an advanced stage of development” as of October 1991. At that point, the first production Arjuns were projected to be in service by 1995. Years of firepower and tactical tests on the firing ranges in desert and semi-arid conditions followed, until the Indian Army considered the results “excellent.” Indications were that the Indians were ready for production decisions. Then the Pakistani’s announced in 1985 a deal with the Ukraine to purchase T-84s. This announcement caused another flurry of activity in the Indian tank development community.

On 9 January 1996, the Arjun was formally unveiled and cleared for mass production. According to Scientific Adviser to the Defence Minister, Dr. APJ Abdul Kalam, the Indians consider the Arjun comparable to the M1A2 Abrams, Leopard 2, and Leclerc.

However, Army Chief of Staff Gen. Shankar Roy Choudhury pointed out that, while some of the tank’s parameters needed to be “further fine-tuned,” they have enough confidence to plan Arjun variants — mobile assault guns, an observation post vehicle, an air defense (gun or missile) version, a recovery vehicle, an engineer vehicle, and bridgelayers. New bridgelayers and recovery vehicles were necessary, given the Arjun’s substantial weight increase over the T-72M1 series.

## Technical Background

The 59-ton 15th Variant can achieve a maximum speed of 70 kph (55 mph) and cross-country speed of 40 kph with its 1400-hp powerplant. The Arjun’s hydro-pneumatic suspension can be hardened or softened, according to the terrain, and the 1,610-liter fuel tank allows for a cruising range of 200 km (120 miles).

The semiautomatic transmission, hydrodynamic torque converter, retarder, and integral system are local designs (the designers seek to produce from 70 to 80 percent of the tank’s parts in-country.). The service brake consists of a hydraulically operated, high-performance brake disc that is incorporated into the final drive.

To ensure crew survivability, production versions will have the indigenously-researched and developed ‘Kanchan’ composite armor, an automatic fire detection and suppression system, and an NBC protection system designed and built by the Bhabha Atomic Research Center.

The tank exerts a ground pressure of .84 kg/cm square and can climb a gradient of 35 degrees (necessary for crossing Rajasthan sand dunes). Since the river-strewn Punjab area “ditch cum bund” defenses caused innumerable problems during the 1971 War, the Arjun can cross

1.4-meter-deep channels and 2.43-meter trenches.

The rifled 120mm gun, which includes a muzzle reference system, is made of ESR steel and is fitted with a thermal sleeve and fume extractor. All main gun rounds use a semi-combustible cartridge case with increased energy propellant for higher muzzle velocity and greater penetration characteristics. In addition to the usual suite of rounds, an anti-helicopter round is under development as well. On-board ammo is stowed in watertight containers (indicating possible wet-stowage).

The Arjun's fire control system includes a laser rangefinder, ballistic computer, thermal imaging night sight, stabilized panoramic sight for the tank commander, and a secondary telescopic sight. (One source had this system based

on the Vijayanta's Mk 1B FCS developed by Bharat Electronics, but this was probably an earlier prototype).

The gunner's main sight includes daylight, thermal sight, and laser rangefinder channels. The common sighting head mirror is stabilized in elevation and azimuth. The daylight sight has dual magnification while the thermal imager provides a night vision facility to the gunner and the commander.

The LRF (integral to the gunner's sight) has a range of nearly 10 km and a thermal imager (which can "see" at around 5.5 km, recognize a target at 3.1 km and identify targets at 2.5 km). The Arjun fire control system's ability to fire on the move during the night is a major step forward for Indian armored forces.

The commander's panoramic sight provides 360-degree surveillance without the TC moving his eyes from the sight and also without disturbing the lay of the turret. The field of view is stabilized with the help of a two-axis rate gyro mounted on the platform of the head mirror.

Apparently, improvements were deemed necessary even after the Arjun design profile was accepted again in July 1996, an acceptance which would have allowed production to commence when funding became available. However, some elements of the chosen version fell far short of army specifications.

On 27 August 1996, the Defense Production and Supplies Secretary ordered 15 pre-production tanks from the Heavy Vehicles Factory, Avadi (at which point, one Indian media estimate placed the project cost at \$112 million (U.S.)).

At least one Arjun fielded by the 43rd Armored Regiment participated in the 48th Republic Day parade on 27 January 1997. Field trials were again declared completed and series production was to start in early June '97.

As of mid-year, around 15 prototypes of the Arjun Mk.1 MBT had already been built, with the last being the basis for the production model.

However, the list of faults after 20 years of development was not encouraging. In addition to numerous technical modifications to its fire and gun control systems (the commander's periscope sight, the laser warning sight, and the muzzle reference sight have been found "unreliable"), the fire control system in particular has been found unable to perform in temperatures above 42 degrees Celsius (108° F). The DRDO has been considering scrapping the current Arjun

fire control system in favor of whatever is accepted for the T-72M1 upgrade program. Since the Arjun extends beyond the official width limit on either side of a standard Indian flatbed rail car, strategic transport would be extremely difficult. This would also require that India refurbish large sections of her rail network, as well as acquire new rolling stock. (This is nothing new in the annals of tank development, as the Germans had this same problem when fielding the 'Tiger' Mk VI during World War II.)

The MTU powerpack derates at high temperatures, and ammunition stowage had to be reduced in order to increase engine cooling, however, plans remained in place to acquire 1,500 engines up until mid-'97).

The problems with the hydropneumatic suspension can possibly be linked to the Arjun's difficulty in climbing sand dunes and other obstacles easily, with a sharp drop in speed in its attempt to do so.

Furthermore, the technology transfer of the imported engine, gun control system, and fire-control system have been tied up with most vendors (like MTU and Holland's Oldelft, which makes the LRS 5 fire control system) to produce components in India in a phased manner.

Defects noticed during the user trials of the Arjun Mk.1 MBT, including overheating of the engine in Rajasthan desert areas, had supposedly been "by and large overcome" while other complaints were being addressed. CVRDE has mostly rectified the other problems in the hydro-pneumatic suspension.

While the Heavy Vehicles Factory at Avadi will handle the actual manufacture, several Indian subcontractors are responsible for subsystems. The production of 100 Arjun Mk.1 MBTs is expected to start by late 1997 at an estimated cost of \$2.8 million (U.S.) each, although the Army feels that the 100-tank lot might take more than five years, given the capacity at the Avadi factory and its commitments to various sectors of the armed forces. The first production tank should be ready by 1998.

Meanwhile, cost estimates continue to increase. DRDO later stated that the 120 tanks to be built over the next five years would cost \$4.2 million (U.S.) each, representing about a 2,000 percent increase in project cost since 1974. Another cost estimate places the figure at \$5.6 million each per tank by 2001, given a purchase of 124 tanks to equip two regiments. This escalating estimate does not include the cost of ammunition, spare parts, and engineering support for the Arjun's in-

### ARJUN Mk 1 (15th Prototype Model)

**Weight:** 59 tons (58.5 tonnes)  
**Length (gun forwards):** 10.19m  
**Width (w/ skirts):** 3.85m  
**Height (w/o 12.7mm AAMG):** 2.32m

**Engine:** 1400 HP MTU 838 Ka 501 Diesel  
(some reports of 1500 HP)  
**Transmission:** Semi-automatic with 4 forward and 2 reverse gears.  
(also reported as ZF automatic)  
**Fuel:** 1610 ltrs

#### PERFORMANCE

**Max Speed:** 72-70 kph (55 mph)  
**Cross Country Speed:** 40 kph  
**Cruising Range:** 200 km (120 miles)  
**Ground Pressure:** .84 kg/cm Square  
**Ground Clearance:** .45m  
**Slide Slope:** 60%  
**Climbing Gradient:** 35x  
**Trench:** 2.43 m (also given as 3m)  
**Vertical Obstacle:** .9m  
**Ford:** 1.4 m

#### ARMAMENT

**Main Gun:** 120mm, stabilized w/MRS  
(APFSDS, HE, HEAT, HESH and smoke)  
12.7mm AA Gun  
7.62mm Coax  
2 x 9 Smoke Grenade Launchers  
**LRF Range:** 10 km  
**Sights:** Thermal (Max Rng 5.5 km)  
**Active and Passive Defensive Systems:**  
"Arena" a possibility, probable Laser  
Warning System

## Updating India's T-72 MBT Fleet



*Upgrades, Retrofits  
Are Preparing India's  
Large T-72 Force  
For the Next Century*

duction into the army. One reported government-sanctioned figure for Arjun development and the upgrade of the nation's T-72M1s (with most going to the Arjun) at \$1.12 billion (U.S.), spread out over the next three to five years.

Despite promises made by the Finance Minister, Mr. P. Chidambaram, that lack of funds would not come in the way of India's defense needs, some officials were skeptical over deadlines being maintained by the factory and subcontractors. The result would be not only a cost escalation due to the effects of inflation but also an adverse impact on defense preparedness. Detractors think that (barring drastic changes) the country's progressively shrinking defense budget, coupled with the persistent technical problems, would delay any serious Arjun serial production until 2002/2004.

In early August, General Choudhury promised officers and soldiers of the 13th Armored Regiment that the Arjun would enter production soon. Less than two months later, DRDO was shaken by the desertion of scores of military scientists and engineers lured to the more lucrative private sector, thus jeopardizing the Arjun project's success.

As of 18 September, the Indian Parliament approved a 250 billion Rupee (\$6.9 Billion) Five-Year Defense Budget. In this 1997-2002 budget, some 40 Billion has been allocated for the Ajeya rebuild program, and another 1 Billion Rupees for the first 100 Arjuns.

### Footnotes

The Soviet Union has been the primary supplier of MBT's to India since the '60s, but since 1990 the supply of spare parts from Russia has been questionable (the Indian Air Force's MiG fleet is also suffering from this problem). Local production started in 1979 as a response to the Arjun's slow development and to stimulate supporting industries in India's economy. The DRDO has also produced versions of the BMP-2 and the "Ajeya" (a T-72M1). There have been plans to retrofit India's "Ajeya" fleet with the "Arjun's" updated FCS as time and funds permit, starting in 1986-87.

Furthermore, in May 1997 the Russians offered the "Arena" active defense system to India. Presumably, the Arjun could be fitted with this suite as well.

\* One source claims that, as of 1997, there exists a total of 17 prototypes and 20 pre-production vehicles, with the first pre-production vehicle delivered in 1988.

The Indian Army fields nearly 2,000 T-72M1s (Ajeya), most of them indigenously manufactured. By 1986, the limitations of the Soviet design became apparent and the Indians embarked on the first stage of "Operation Rhino," primarily to update the fire control system. The first 50 tanks came off the assembly line in 1987 at \$835,000 apiece, but budgetary limitations delayed continuation of this project until 1990. The shortcomings of the ARJUN project have renewed emphasis on the Ajeya upgrade program.

Military sources say that one third of the Ajeyas in service will be completely

retrofitted, with the remainder receiving partial upgrades, depending on their condition and serviceability. The fully upgraded Ajeyas will receive modern fire control systems and 840-hp diesel engines, as well as reactive armor, which is claimed to reduce ATGM effectiveness up to 80 percent, and a gyro-stabilized land navigation system. Night fighting capabilities will also be improved.

Apparently, a select group of Rhinos will receive thermal imaging systems and will be capable of firing the SS B 119M "Svir" ATGM. The 1993 "Svir" cost of \$45,000 made 30 rounds equivalent in cost to an entire T-72. While the Russian basic load of "Svir" is four rounds, the Indians appear ready to issue six.

In late April 97, Russia also publicly offered India the Arena active defense system for its Ajeya fleet. The Russians claimed the system would double the tank's survival rate against Pakistan's planned purchase of 320 T-80UD tanks, though retrofitting of the system would increase the cost of the ongoing T-72 tank upgrade project by 10 to 25 percent. Other Russian sources figure the Arena's cost to be 20 percent of a T-80's export price (or \$400,000 U.S. in '95-'96). The current plan is to fit an initial 500 T-72M1s (nine regiments) with the system, with the remaining 1,500 equipped if and when funds become available.

Since the cancellation of the 1996 Winter Firing Exercises, the Indian Army has acquired 250 Simfire training systems for Ajeya gunnery and tactical training.

### 'AJEYA' T-72M1

**Crew:** 3  
**Combat Weight:** 44,500 kg.  
**Ground Pressure:** 0.90kg/cm<sup>2</sup>  
**Engine:** V-12 MFI, 840 hp @ 2000 RPM  
**Fuel Capacity:** 1000 ltr  
**Maximum Speed:** 60 km/h  
**Range:** 480 km w/o long range fuel tanks, 550 km w/long range fuel tanks.  
**Transmission:** Synchromesh, hydraulically assisted, w/7 forward and 1 reverse gear.  
**Steering:** Clutch and brake  
**Suspension:** Torsion bar  
**Electrical System:** 24V  
**Gradient:** 60%  
**Side Slope:** 40%  
**Vertical Obstacle:** 0.85m.  
**Trench Crossing:** 2.28m wide.  
**Armament:** 125mm gun w/45 rounds (6 ATGM)  
7.62mm Coax w/2000 rounds  
12.7 mm AAMG w/300 rounds  
**Gun Elevation/Depression:** -6 to + 14x  
**Smoke Grenade Launchers:** 4 x 2

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*Dragões* link up with a helicopter for supply and liaison on a long mission.

## *Dragões de Angola*

# Fighting Insurgency from Horseback

by Captain Miguel Freire

### Introduction

While Portugal itself is a small country, it for many years possessed the world's third largest empire. It was the first and the last of Europe's colonial powers, and its involvement in Africa lasted almost five centuries.

The Portuguese armed forces also have a long and proud history, which is relatively little known outside Portugal. Portugal drove out the Moors during the Middle Ages, defeated the Spaniards to restore their country's independence during the 17th century, and fought valiantly and effectively with British General Wellington against Napoleon's troops during the Peninsular War in the early 1800's.

Portugal saw action in three different continents, Africa, Asia, and South-America, with the last combat action occurring in Africa. During 1961-1974, and in three different theaters of operation — Angola, Mozambique, and Guinea-Bissau — Portuguese armed forces fought against liberation movements.

The Portuguese cavalry had always been a part of these conflicts and has written proud pages in Portuguese military history. Most of the decorations fly-

ing from the standards of some cavalry units were earned in Africa during WWI, when Germany invaded northern Mozambique and southern Angola.

During the 1961-1974 period, and in each of the three different theaters of operation, Portuguese cavalry were employed in four different ways: as light infantry in battalion-size units (*Batalhão de Cavalaria*); as armored reconnaissance units of company size (*Esquadrão de Reconhecimento*); as military police<sup>1</sup> in company-size units (*Companhia de Polícia Militar*); and as horse cavalry units of battalion size in Angola (*Grupo de Dragões*).

This article is about the *Dragões de Angola*,<sup>2</sup> one of the last horse cavalry units in the world to see action.

### General Overview

The Angolan insurgency, an unsuccessful bid for independence, began in 1961, followed by unrest in Guinea-Bissau in 1963 and Mozambique in 1964.

Angola covers 1,246,314 square kilometers, an area about 14 times the size of Portugal, or as large as the combined areas of Spain, France, and Italy. It borders with the former Belgian Congo (now Zaire), Northern Rhodesia (now Zambia), and South-West Africa (now Namibia), extend 4,837 kilometers. Par-

ticularly important was the vulnerable frontier between Angola and the Belgian Congo to the north, over 2,000 kilometers of mountain, swamp, jungle and elephant grass. The Congo River, which comprises part of the border, flows around many thickly wooded islands that provided excellent cover for guerrillas. They could make crossings undetected at virtually any point they chose. The few roads were beaten earth, and were little better than tracks in a limitless ocean of elephant grass; in short, it was an ideal environment for guerrillas and a difficult one for security forces.

Angola's soil composition varies from clay soil in the northern regions to soft and sandy soils in the south and southeast. Forest cover also varies, with thick woods in the northern Cabinda and Dembos regions, medium vegetation south of Luanda, and very light forestation in the south.

The best terrain for horse cavalry units is as soft as possible, allowing the horses to be used without horseshoes, which represents a great logistical advantage. The degree of forest cover also affects horse units; it should allow mobility and at the same time some concealment. According to the army's study of the Angolan terrain, horse cavalry units would best be employed on the central plain, given its soft soils and medium forest cover.

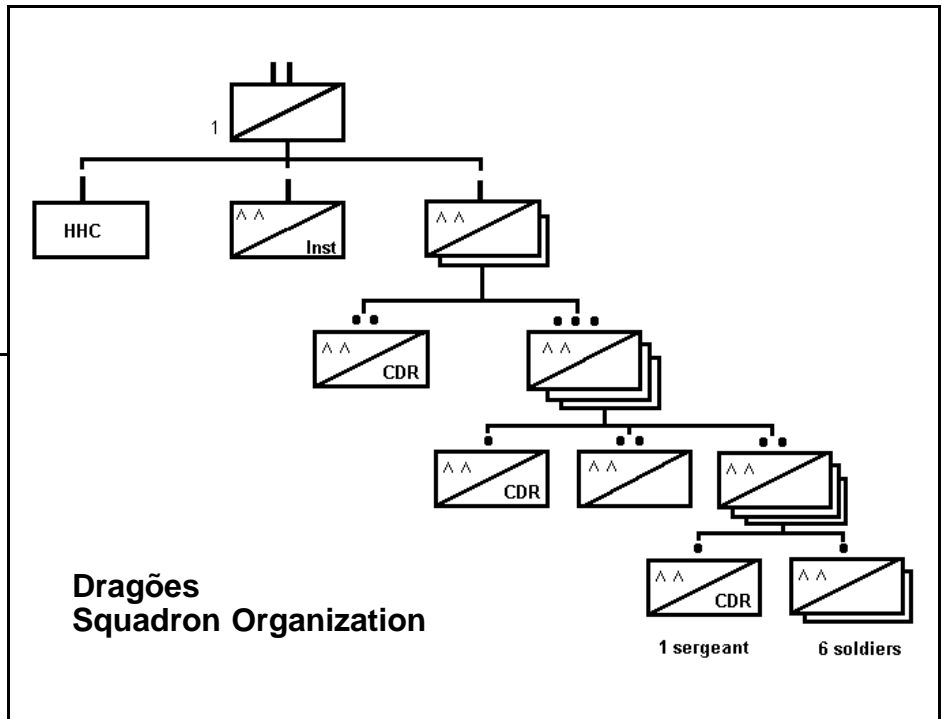
## The Liberation Movements

The guerrillas belonged to the armed groups of the three main liberation movements:

- MPLA (*Movimento Popular de Libertação de Angola*) “was very much a movement of radical intellectuals, with its main strength divided between the urbanized Angolans and the Ovimbundu people.”<sup>3</sup> MPLA units were small, and up to 1970 at least, equipped with a hodge-podge of weapons, many dating from WWII. The MPLA leader, Agostinho Neto, met Che Guevara in 1965, and subsequently the MPLA began to receive Cuban instructors and Soviet and East German help. It also received some Chinese aid after 1970. The MPLA guerrillas were present in all Angolan territory, but their main efforts were in the Dembos region near Luanda.

- FNLA (*Frente Nacional de Libertação de Angola*, earlier UPA) “had begun life as a nationalist organization for the important Kongo people, who straddled the border between Angola and the Belgian Congo. When Congo became independent in 1960, its government began to give the movement leader practical assistance, including permission to set up a radio station and a training camp.”<sup>4</sup> In addition to Congolese and Algerian support, it also received covert supplies of funds and arms from the Americans, who were anxious to encourage non-communist African nationalist movements as a counter-weight to the Marxists. FNLA’s main effort was also in the Dembos region.

- UNITA (*União Nacional para a Independência Total de Angola*). Disenchantment with FNLA’s leader had led his “foreign minister,” Jonas Savimbi, to leave and found his own movement in 1966. UNITA received some Chinese equipment and operated from Zambia until 1968. “Jonas Savimbi, who believed that a nationalist movement should operate from bases inside Angola, was soon isolated and by 1969 counted fewer than 1,500 followers. In order to survive in defeat, he and his force came to an accommodation with the Portu-



guese, and between 1971 and 1973 UNITA and its activities were restricted to a prescribed zone. In return, UNITA would cease operations against the Portuguese. As part of this understanding, UNITA also received arms and medical support. This development left primarily the MPLA to address.”<sup>5</sup>

### Fighting the counterinsurgency war in Angola

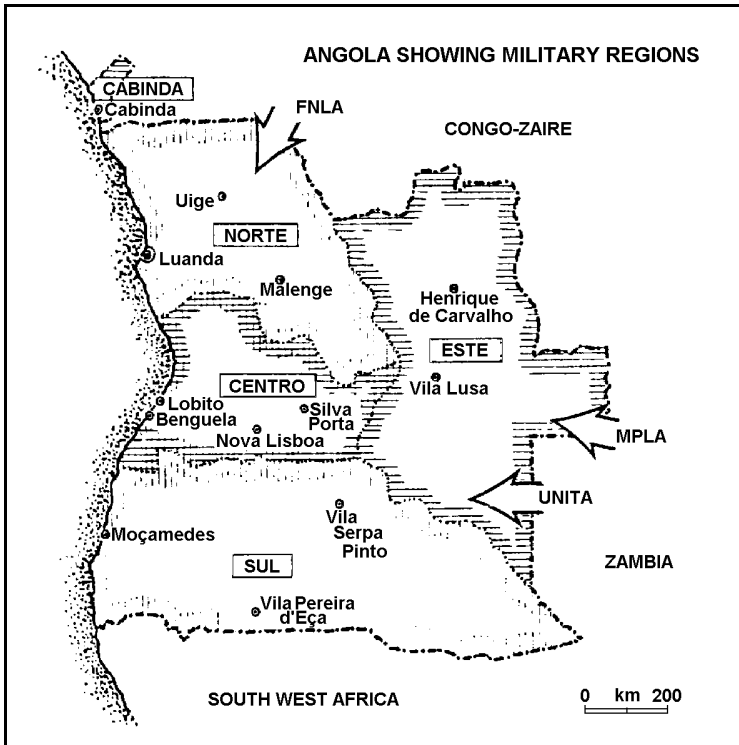
When the counterinsurgency war began in 1961, Portugal’s initial actions were accomplished without any experience, doctrine, or demonstrated competence in the field of either power projection or counterinsurgency warfare, and thus without the benefit of any instructors who were competent in these specialties. Then Portugal began to develop its own doctrine after having assiduously studied French and British experiences and gleaned the lessons that they held.

Foot-slogging by infantry was seen as the best method of addressing an insurgency, not only to hunt the enemy but also to keep contact with the population. This was a problem in Angola, however, because of the vast area and limited numbers of troops available. The expansive savanna of central Angola was too costly to patrol on foot, particularly with Portugal’s manpower limitations, and unsuited for wheeled vehicles, because of the tall elephant grass and frequent rivers. The helicopter was a possible solution, but they were in short supply and had operational limitations. They had a tendency to fly over the populations of those areas where it was vital to commu-

nicate with the people and secure their loyalty. In addition to their high initial cost, there was the extraordinarily high maintenance and operating expense, particularly in a tropical environment unfriendly to precision machinery. “Because of these limited resources, Portugal never fell into the trap of having its troops carried in helicopters so frequently that they lost contact with the population and lived in a different world from the enemy. Moreover, the use of armed helicopters was carefully controlled, so damage and casualties in the population were avoided through any indiscriminate use of firepower. Helicopter assault operations were executed away from populated areas.”<sup>6</sup>

In 1966, the MPLA opened its eastern front, which became a priority. The Portuguese needed a force that would combine mobility over rough terrain with the ability to engage insurgents and maintain strong links with the population. They also wanted to isolate the guerrillas in the area’s vast tracts of wilderness. The partial solution to this new challenge was found in history. In 1967, the Portuguese Army decided to create an experimental horse cavalry platoon around Silva Porto in Eastern Angola.

It was a small unit, and although the test was brief, it was enough to conclude that this specific region in Angola was suitable for horse cavalry units. The horses adapted well to the weather in the central plain as well as the south. They had better mobility than a foot unit; they were less expensive to operate than a mech unit. And finally, the army noted



A *Dragão* patrolling with his G3 rifle at the ready.

that the employment of horse cavalry units had great psychological effect.

After this successful experience, a larger unit was formed in 1968, the three-squadron<sup>7</sup> *Grupo de Cavalaria N.1*. The term *DRAGÕES*, which was unofficial but widely used, indicated that the troopers could operate mounted or as infantry.

**How a *Dragão* was born**

The cavalry squadrons were, for the most part, local troops, except for the officers and sergeants. The troopers would come from local recruitment in Angola to do their compulsory two year military service. There were few horses in Angola, so it was very difficult for many of the early recruits to adapt to an animal that they had never seen before. Because of this, the recruiting effort focused on certain native people in Southwestern Angola who were very fierce and had a history of cattle-raising. Familiar with cattle, they adapted easily and quickly to the horse and proved to be excellent riders. Officers who led these men in combat noticed the affectionate relationship that developed between the men and their horses. Although the horse was not native to the soldiers' habitat and culture, they adopted it as a fellow brother-in-arms for whom they would take great care and concern. Many incidents testified to this, including one of a young soldier who was wounded in action. One of his first worries was his horse. After knowing the horse was fine, he asked his commander not to let it be ridden by

anyone but the commander. In another incident, some soldiers almost got killed trying to save their horses from a straw fire in a stable.

It took three months to make a recruit combat-ready. The first six weeks were basic military instruction and riding lessons. The following six weeks focused on horsemanship and ended with a 80-100 km battle course to test and also to improve the skills of both horse and rider. This battle course took one week, presenting all the major situations that

were likely to develop during operations. The Portuguese dragoons were trained equally for cavalry or infantry service, just like their historical predecessors.

The dragoon's basic armament was the Walther P-38 pistol and the G-3 rifle, a license-built copy of the Bundeswehr's G-3. Early doctrine called for using the rifle both on horseback and on foot, but later, in order to get a faster response capability, the pistols were drawn and carried, ready to be used. At the first shots of an ambush, they would charge in full gallop, attacking with drawn pistols.

**Organization and tactics of *Dragões***

The dragoons' basic organization was the platoon, consisting of three sections of 13 mounted troops each, plus a support section of one machine gunner and three rifle grenadiers, an orderly, a bugler, and a farrier (blacksmith).<sup>8</sup> Three platoons comprised a squadron, and

**Forces Comparison**

| Type of Unit                                | Advantages   | Disadvantages   |
|---|--|---|
| Light infantry (foot and truck transported) | -Least expensive.  | -High possibility of being ambushed or stepping on a mine.<br>-Poor flexibility to concentrate or disperse forces.  |
| Heliborne                                   | -Fastest way to reach the area of operation.<br>-Surprise.<br>-Good observation of the area of operations.<br>-Good concentration of fire (helicopter gunship with a 20mm cannon). | -No contact with the populations.<br>-Very expensive.<br>-Require high level of maintenance.<br>-When on the ground, the troops move as slowly as light infantry. |
| <i>Dragões</i>                              | -Less possibility of encountering mines. <sup>12</sup><br>-Keep the contact with the population.<br>-Good mobility over rough terrain.   | -Restricted to tsetse-free areas.<br>-Low accurate fire when mounted.<br>-Big target.<br>-Incapable of operating during the night.                                |



*"Tests found that horses were a confusing target, and difficult to hit when charging head-on. These observations were not new, but only confirmed the consistent durability of horses in combat over the centuries...."*

three squadrons a group. At the beginning, each section was divided into two three-man squads, with one man to guard the three horses and the other two free to maneuver on foot as light infantry when the situation required it. Later, the basic concept changed and six-man squads were adopted, with one guarding the horses and the other five forming a team.

In a typical cavalry patrol, a platoon advanced in a double echelon or in a wedge formation that could be between 200 and 500 meters wide. The wedge could be changed to a single echelon, a line abreast, or a rank formation, depending on the terrain.

When operating as a squadron (with two platoons, the third would be resting), the preferred formation was a wedge with the platoons abreast. The headquarters section was to the back and in the center maintaining visual contact within the squadron. Another well-used movement technique had one platoon forward traveling and another platoon a few kilometers back, patrolling in detail, and prepared to surprise those insurgents who were pursuing the platoon in the front.

The *Dragões* could see over the vegetation and undergrowth and identify insurgents readily from this vantage point. It was very difficult for the insurgents to ambush a patrol, as they were on foot and unable to see the horsemen well enough through the tall elephant grass. If the patrol was ambushed, the formation would execute a wheeling movement toward the attack and surround the insurgents.

A normal operation would take four to five days, and the normal speed of advance would be eight to thirteen kilometers per hour, or about fifty kilometers per day. The cavalry squadron could be transported in trucks or by train to the patrol area prior to beginning the actual patrol.

#### Missions of *Dragões*

- Screening and interdiction of the border.
- Area reconnaissance with the purpose of preventing the seduction and coercion of the population by the insurgents.
- Guaranteeing the Portuguese presence even in remote and inaccessible areas.

- Escorting and protecting the population avoiding the insurgent coercion.

- Scouting in areas where the enemy was seen temporarily.

- Conducting an exploitation to pursue enemy forces spotted by other forces (usually heliborne).

#### Horses

As noted, horses are not native to Angola, so the first and second remount came from South Africa and the third from Argentina. When the horse cavalry units were first formed, some officers feared that the cavalryman and his horse would become a large target vulnerable in a firefight. But tests found that horses were a confusing target, and difficult to hit when charging head-on. These observations were not new, but only confirmed the consistent durability of horses in combat over the centuries. "During the final campaigns of the American Civil War, Union Cavalry was extremely employed; the horses were ridden hard and afforded little or no shelter. Medical attention was rudimentary in those days, but, in spite of that, and the rigors of combat, official records show a rather high survival rate on horse battle casualties."<sup>9</sup> In 1864, a captain of the British 15th Hussars wrote "saddles will be emptied, horses killed and wounded, but no horse, unless he is shot through the brain, or his legs broken, will fall; though stricken to the death, he will struggle through the charge."<sup>10</sup> According to a former Commander of *Grupo de Dragões de Angola* between 1973 and 1974, the normal loss rate of a cavalry squadron of 130 to 150 mounted troops was one horse per month.

Through research (with a lot of help from South Africa) and experience, feeding was reduced to a formula of 4.5 kilograms of ground corn and oats per day. As the normal patrol was four to five days, each horse carried 18 to 22.5 kilograms of feed packed in individual plastic ration sacks. The horses were able to eat local fodder as well.<sup>11</sup>

#### Operation "Eolo" (December 1972)

Operation "Eolo" depicts a successful combined arms operation. The mission was to attack known enemy bases in order to destroy them and capture guerrillas and equipment. It was a combined arms operation between the *Dragões* (a squadron of two-platoon strength) and

the paratroopers carried by helicopter. The area of operation was separated into different slices. The paratroopers conducted an air assault in a specific slice, while the *Dragões* waited in the other closest slice. While the paratroopers conducted the air assault, that zone was considered red. As soon as the slice was secure, it was considered green and the *Dragões* conducted a pursuit in order to capture those guerrillas that were able to escape. This was a 35-day long operation. The cavalry squadron took one day to rest for each five days of operation. As mentioned before, the normal speed of advance was 8 to 13 kilometers per hour or about 50 kilometers per day. This meant almost 1,400 kilometers at the end of the operation. The cavalry squadron was resupplied on each day of rest — every five days — by helicopter or by truck.

#### Lessons Learned

There were a lot of lessons learned at platoon and company level. The doctrine of this special unit was developed in combat. For the purposes of this article, we'll consider those lessons learned that are timeless:

**Creativeness.** All possible solutions to a military problem must be considered, even those that at first sight look out of time. For many officers, the military use of the horse looked useless, not to say silly. But when people made a reasonable study about what specific things could be done by the horse cavalry units, when they were aware of their vulnerabilities but employed the unit in a way to reduce the disadvantages and maximize the advantages, things began to make sense. What seemed a useless, out-of-date tool became a worthwhile investment.<sup>13</sup>

**Combined arms spirit.** It is well known today that two or more different types of units, employed together, can add up to more than the sum of their parts. When well-led and organized, the advantages of one can reduce the disadvantages of the others. This is what happened with the *Dragões*, who filled a gap in fighting a counterinsurgency war. They could accomplish tasks that the light infantry and the heliborne units could not.

**Surprise.** By rapidly advancing, using the terrain to provide the best concealment, the *Dragões* could take the enemy

totally by surprise, or at least quickly enough to prevent him from reacting effectively.

**Economy of force.** Using a small unit like the *Dragões de Angola* accomplished the tasks in a specific large portion of Angola, allowing other units to be used in the most effective way where they were best suited.

### Epilogue I

*Dragões de Angola* was one of the last horse cavalry units in combat. But there were others. In Rhodesia, the horse-mounted Grey's Scouts, formed in 1976, fought a counterinsurgency campaign using horse cavalry as a solution to mobility requirements in the same way that the Portuguese did. The South African Defense Forces also used horse cavalry (and scrambler motorcycles) to pursue guerrillas in its border war with SWAPO (the South-West African People's Organization).<sup>14</sup> "Another good example of the military use of the horse occurred in the final battle of Dien Bien Phu, when the guerrillas moved large amounts of artillery in pieces on the backs of horses to unassailable positions. The same thing happened when the Americans were fighting in Vietnam. Their elusive and rarely seen enemy made great use of horse transport to bring supplies through dense jungle where no machine could go."<sup>15</sup>

As Frederick Hooper says in his book, *The Military Horse*, "Horses can still be used all over the world in a military context, principally in situations where the terrain is too difficult to allow machines to make their way. Machines do not have the adaptability of horses. In this respect, the horse will never be really eclipsed."

The five hundred years that the Portuguese lived together with Angolans were much stronger than the last thirteen years of counterinsurgency war. The insurgents stated that they were not fighting the Portuguese, they were fighting the Portuguese colonial system. Today, Portugal and Angola have a very good relationship and Portugal did a great effort to end the civil war in Angola. Now may the Angolans live in peace.<sup>16</sup>

### Notes

<sup>1</sup>As in other armies, the cavalry had been converted to armor, but the Lancers had been turned into military police in 1953, and still are.



At left, during a training exercise, a *Dragão* descends into a gully.

Above, a horse is being extricated from a swamp. Swampy areas were the most serious challenges to the horse's mobility in Angola's central zone.

<sup>2</sup>This article is dedicated to Col. Cav (ret) Ferrand d'Almeida, a former Commander of Grupo de Cavalaria N.1 and a truly cavalryman at heart. Cor Ferrand d'Almeida passed away last October, losing a battle with cancer.

<sup>3</sup>Peter Abbot and Manuel Ribeiro Rodrigues, *Modern African Wars (2): Angola and Moçambique 1961-1974*, (London:Osprey, 1988), 8.

<sup>4</sup>*Ibid.*

<sup>5</sup>John P. Cann, *Counterinsurgency in Africa, The Portuguese Way of War, 1961-1974*, (London: Greenwood Press, 1997), 135.

<sup>6</sup>*Ibid.*, 133.

<sup>7</sup>Squadron (*esquadrão*) is the military term for a company of a cavalry unit, and group (*grupo*) the same as battalion.

<sup>8</sup>The horses did not use horseshoes but a farrier was needed to keep the horses' feet in good shape.

<sup>9</sup>Maj. L. McCoskey, "Horsepower for Vietnam," *Military Review*, (May 1969), 91.

<sup>10</sup>Cap. L. E. Nolan, *Cavalry: Its History and Tactics* (Columbia, S.C.: Evans and Cogswell, 1864), 173.

<sup>11</sup>Ferrand d'Almeida, *Recordações de um Dragão de Angola*, *Revista Militar* (Oct-Nov 85), 705.

<sup>12</sup>When a horse did step on a mine, it was inevitably killed, although the rider generally survived.

<sup>13</sup>There is an interesting article about the possible use of horse cavalry by the Americans in Vietnam in *Military Magazine*, May 1969.

<sup>14</sup>John P. Cann, 139.

<sup>15</sup>Frederick Hooper, *The Military Horse*, (New Jersey: A.S. Barnes and Company, 1976), 102.

<sup>16</sup>The author wishes to thank Col. Cav (ret) Faia (a former squadron commander of Grupo de Cavalaria N.1) for their helpful support and patient answering of my curious questions, Mark Casey, Maj. (USMC) Williams and Cpt. (USMC) McLean for their assistance reading the article.

*Captain Miguel Freire, a graduate of the Portuguese Military Academy, served as a tank platoon leader, scout platoon leader, tank company XO, recruit company commander, and commander of an M60A3 tank company, his current assignment. He is a graduate of the AOAC (97-4), and has previously published articles in "Jornal do Exército," the Portuguese Army magazine.*

# What Makes Our 120mm Tank Ammo The Best on the Battlefield?

by Master Sergeant Wakeland K. Kuamoo

Since the mid-1980s, U.S. tankers have been firing 120mm ammunition from the M1A1 and more recently the M1A2 tanks. Many armor soldiers, Cavalry troopers, and Marines will tell you that their success on Tank Tables VIII (individual crew qualification), XII (platoon qualification), and numerous other live-fire exercises is directly linked to high quality main gun ammunition. Still others will tell you that their very lives and survivability during the Gulf War depended on how well the ammunition performed.

But what makes our 120mm tank ammunition the best?"

Last year, several master gunners from Ft. Knox had an opportunity to learn first-hand how our 120mm tank ammunition is produced. At each site, we learned about the company's overall mission and toured the facility. At the end of each tour, we briefed the management, production, and support personnel. We explained tank gunnery training in our units and the success achieved by our tankers in Operation Desert Storm. Our intent was to tell these folks how we use their products.

Our visits took us to several different locations because so many firms manufacture the components for the Army's tank rounds (See chart, next page).

As you can imagine, there is a lot of work required to produce a main gun round. During our visits we saw much of this work. We viewed component production at the facility and how the pieces were put together. We observed a metal forge that transformed a steel ingot into a case base assembly (the "aft cap"). We saw primers assembled, to include the nearly invisible bridge wire and benite explosives, and the making of our combustible cartridge cases and the actual explosive propellants that went into these cases. It was fascinating to watch

the M829A2 Depleted Uranium penetrators prepared for assembly. People, not machines on the production lines, put together the new composite sabot pedals that will be used during the assembly of the M829A2 projectile. A technician showed us the M744 fuze's electronic components which is part of the M830A1 MPAT round. Ever see an M865 Sabot or M831A1 Heat Target Practice Training round assembled? Let me tell you that it is a remarkable process.

At the Iowa Army Ammunition Plant we observed the load, assemble, and packout process (LAP). Here the sub-components are united to produce the complete round you see in the field. They assemble both training and service rounds at the Iowa plant. Once assembled, they are loaded into metal shipping containers. A sample of the rounds from each lot is shipped to a live-fire proving ground for testing, either at Aberdeen Proving Grounds, Maryland, or Yuma, Arizona. Our prime contractors also have range test facilities; Alliant Techsystems has a range in Socorro, New Mexico, and Primex has a range test facility in Camden, Arkansas. The professional personnel that work at these sites ensure the bullets we use are safe and meet all strict Army and Marine Corps requirements. These people are yet another key element in ensuring we have top quality ammunition.

It was a great experience to be able to view this work, which most other armor soldiers and Marines may never have the opportunity to see. Throughout all of our visits, no matter where we went, several factors were very evident.

First, the management people at each site showed a genuine concern for their workers and were actively involved in the entire production process.

Secondly, all along the assembly lines, we could see various testing stations.



Somewhere during its assembly on the production line, rigorous testing of the round by humans and specialized machines and instruments occurs. Devices similar to X-ray machines look for nearly invisible cracks in our aft caps. Each round of 120mm ammunition is physically put through a chamber gage test. This test simulates the loading of a round into a main gun breach.

If a component fails a critical test, an entire assembly line may be shut down until the fault is analyzed and fully corrected. Time was never the major factor in these delays. This vast improvement in ammunition production ensures that only top quality ammunition goes to the field. The emphasis was always on the quality of the product.

At the conclusion of every visit, we felt a greater sense of confidence in our ammunition. Certainly, much of this confidence came from being able to actually see the amount of effort and dedication put forth during the production cycles. This confidence not only gave us personal satisfaction but, for the master gunners who are instructors, doctrine

*"Sophisticated technology is certainly a big part of production excellence and our technology in the field of tank ammunition is second to none. But we also believe that the most important factors are the people..."*



writers, and developers, we can see this confidence in their jobs here at Ft. Knox. The new information which we gained on our visits will be transferred to students as well as the doctrine and equipment development programs here.

Another important contributor needs to be mentioned here because it is also a part of ensuring that we are getting and using top quality ammunition. The 120mm team from the Industrial Operations Command (IOC), Rock Island, Illinois, is responsible for ensuring that fielded ammunition works properly. This team, working with civilians in your local ammunition agencies, continuously monitors how well the ammunition is working. Report any problems that you may encounter with your ammunition in the field to your local quality assurance personnel who will forward the information to the 120mm team. Two other agencies that also make major contributions to ensure we get and use quality 120mm ammunition are the Office of the Program Manager for Tank Main Armament Systems (OPM-TMAS) and the Armament, Research, Development, and Evaluation Command (ARDEC). Through previous experience with these groups, I can assure you that their response towards investigating possible problems will be very swift. These agencies strongly support the needs of the soldier.

Back to the original question, "What Makes Our 120mm Tank Ammunition The Best?" The answer is quite simple. Sophisticated technology is certainly a big part of production excellence and our technology in the field of tank ammunition is second to none. But we also believe that the most important factors are the people who manage, produce, assemble, test, and monitor our tank ammunition.

The next time you break out a 120mm round, stop and take a close look at it. The next time you score a first round hit on Tank Table VIII, take a second to think about that round. Real people produced it, real people that care about us,

the soldiers and Marines whose lives may one day again depend upon their products.

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### ***They Forge the Thunderbolts...***

- Primex Technologies, St. Petersburg, Florida; Headquarters of the Systems Contractor
- Alliant Techsystems, Minneapolis, Minnesota Headquarters of the Systems Contractor
- Ver-Sa-Til Associates Inc., Chanhassen, Minnesota M830A1 Fin and Sabot Pedals
- Wiltec Industries, New Hope, Minnesota Primer Body
- NB 502 Inc., New Brighton, Minnesota M830A1 Shaped Charge Liner
- Motorola Inc., Scottsdale, Arizona M830A1 Proximity Sensor
- Armtec Defense Products, Coachella, California Combustible Cartridge Case
- Nuclear Metals Inc., Concord, Massachusetts 829A2 Penetrator
- Conco Inc., Louisville, Kentucky PA116 Metal Containers
- Ferrulmatic Operations, Totowa, New Jersey Case Base, M830A1/M865 Components
- Aerojet Ordnance, Jonesboro, Tennessee M829A2 Penetrator
- Bulova Technologies, Lancaster, Pennsylvania M830A1 Fuze
- Flinchbaugh Technologies, Red Lion, Pennsylvania Case Base, M829A2, M865, and M831A1 components
- Radford Army Ammunition Plant, Radford, Virginia Explosive Propellant
- Day and Zimmerman Operations, Camden, Arkansas Primers
- National Ordnance and Ballistic Test Center, Camden, Arkansas, Live Fire Range Testing
- Kilgore Operations, Toone, Tennessee Primers
- Eagle Pitcher Industries, Joplin, Missouri Thermal Battery for the M830A1
- Thyssen Precision Forge Inc., Garner, North Carolina Case Base Forgings
- Iowa Army Ammunition Plant, Middletown, Iowa Load, Assemble, and Packout of Tank Ammunition

# TRENDS in Mounted Warfare

*A sampling of the employment  
of mounted combat units in  
land campaigns*

by Lieutenant Colonel Kris P. Thompson



## Introduction

Think back to 1977. Many of us were in our formative years. Some of us were already in the Army or were cadets. Think for a moment about the then-existing concepts of conducting land warfare. Think about the weapons we had for mounted combat. Think about the combat unit organizations we had at that time. Now reflect on the concepts, weapons, and organizations of today. It is simply amazing how much the nature of land warfare has changed in the last 20 years.

We are at the threshold of the “new millennium.” We are also in the midst of a transition in mounted warfare. Literally thousands of years passed with only incidental changes in mounted warfare — how many ways are there to use a horse? But in the last century there has been a fundamental change in mounted warfare with the advent of the tank, infantry fighting vehicle, and helicopter. Because these weapons are still being improved, changed, and developed, we are still in this transitional period. How will it play out? In 1815, at the close of the Napoleonic Wars, no one wondered whether the horse was going to change in the next 20 years. Yet, we have all

come to expect dynamic changes in mounted warfare in every decade.

This article will describe some key trends in the use of mounted units during this transitional period. Since the article will focus on land armies, I will concentrate on the operational setting. This is where campaigns are won and lost. This article will illustrate examples of how mounted forces have been used to win campaigns. I do not pretend to make this a detailed presentation of all mobile combat in the last century — obviously, such a project would be a multi-volume work. I have selected events and combat leaders as subjects of discussion which seem particularly appropriate as examples of key aspects of this transition. Analyzing these examples, I will identify trends, develop several theses or principles which are key indicators of successful uses of mounted combat units, and provide recommendations.

## Mounted Forces in a “Down-sized” Army — the U.S. Cavalry before the Civil War

On March 3, 1855, the federal government of the United States authorized the fielding of two “cavalry” regiments, thus

establishing the first active component mounted units in our history.<sup>1</sup> Spread around the nation in small detachments, these units were little more than a mounted territorial police for the frontier and western regions of the country. The officers in these detachments, kept busy with frequent deployments and widely divergent “peace-keeping” operations, could not have had training or even a thought process which considered anything above small unit combat. Even the manual on cavalry tactics then in use devoted a scant three pages to maneuver of a cavalry division.

With appreciation but detachment, these officers probably listened to stories from Europe about the huge legions of cavalry employed in the Napoleonic Wars, not being able to conceive of how such formations would be relevant or practical in the future. (Perhaps in the same way we today look back on World War II.)

At the outbreak of the Civil War, the Union Army’s mounted arm remained muted because of a belief that rifled cannon would trump cavalry off any battlefield,<sup>2</sup> and that American terrain was uniquely unsuited for cavalry. The first two mobilization efforts in the North

*“Sheridan wanted to free his Cavalry Corps from being tied to the maneuver and pace of the infantry corps. Meade protested, and argued the cavalry was the only available force for security of the infantry, trains, and artillery.”*



called for only one cavalry regiment. How much this was to change! By the end of the war, only four years later, the Union raised 272 regiments of cavalry, and the Confederacy raised over 137 regiments.<sup>3</sup>

The overall use of cavalry by the belligerents in the early years of the War is well known. The South used cavalry in mass, and with more sophistication and aggressiveness. The North fragmented its cavalry, employing it for guarding logistics sites, picketing encampments, and providing reconnaissance patrols.

#### **Overcoming Prejudice — New Concepts under “Fighting Joe” Hooker**

After two years of disaster, disappointment, and finger-pointing concerning the deplorable state of the Union cavalry, senior leaders in the Army of the Potomac reluctantly realized the current system was not working. On February 5, 1863, the new commander of the Army of the Potomac — Major General Joseph “Fighting Joe” Hooker — put all cavalry in his army into a Cavalry Corps.<sup>4</sup> The new commander of this unit, Brigadier General George Stoneman, organized it into three cavalry divisions.

For the next 14 months, the Cavalry Corps launched a series of attacks and raids which were of a magnitude unheard of on the Union side up to that time. This period was a bloodletting of the North’s mounted arm, attempting to play catch-up after nearly three years of misuse. With each hard lesson learned, Union leaders became bolder and bolder in using larger cavalry formations. Finally, the much awaited clash between opposing mounted main bodies (on the flanks of their respective armies) took place at Brandy Station in June 1863. The battle was a hard fought, face-to-face brawl. The Union cavalry had arrived. While the Southern cavalry leader, J.E.B. Stuart, claimed victory based on the Northern cavalry’s retreat from the battlefield,

all present realized the Northerners had achieved parity.

Hooker’s reorganization was a landmark event, no doubt, but Stoneman and his successor — Brigadier Alfred Pleasonton — were not the personalities to complete the evolutionary process of the Union cavalry.

#### **Coming of Age — The Union Cavalry under Sheridan**

In the spring of 1864, Lieutenant General U.S. Grant took charge of the entire land force of the Union. Grant put Major General Philip Sheridan in charge of the Cavalry Corps. At the time he took over, he was five feet, five inches in height and weighed one hundred fifteen pounds.<sup>5</sup> Despite his size, however, Sheridan had tons of fight in him and has been described as:

*“...a short, bandy-legged, quick tempered, foul mouthed Irish bantam, with a massive torso, dangling arms and an infinite capacity for making men want to fight.”<sup>6</sup>*

Sheridan had an immediate run-in with his new commander, Lieutenant General George Meade, who was still nominally in charge of the Army of the Potomac. Sheridan was insistent on two fundamental changes in the employment of the cavalry. First, he wanted to emulate the Southern enemy who “had organized his mounted force into compact masses... husbanding the strength of his horses by keeping them to the rear...”<sup>7</sup> This philosophy was in stark contrast to the Union philosophy of using cavalry to continually “cordon” the infantry corps with cavalry pickets. This constant deployment caused the horseflesh to go thin and wear down.

Secondly, Sheridan refused to be a martinet stationed at Meade’s Headquarters, as had his predecessors. They had

been “an adjunct at army headquarters — a sort of chief of cavalry...”<sup>8</sup> Because of this, and the outpost duty, he felt the Cavalry Corps was a corps “in name only.”

Sheridan wanted to free his Cavalry Corps from being tied to the maneuver and pace of the infantry corps. Meade protested, and argued the cavalry was the only available force for security of the infantry, trains, and artillery. Sheridan explained to Meade his philosophy:

*“I told him that if he would let me use the cavalry as I contemplated, he need have little solicitude in these respects, for, with a mass of ten thousand men, it was my belief that I could make it so lively for the enemy’s cavalry that, so far as attacks from it were concerned, the flanks and rear of the Army of the Potomac would require little or no defense, and claimed, further, that moving columns of infantry should take care of their own fronts. I also told him that it was my object to defeat the enemy’s cavalry in a general combat... that would enable us after a while to march where we pleased, for the purpose of breaking General Lee’s communications and destroying the resources from which his army was supplied.”<sup>9</sup> (emphasis added)*

Initially, Sheridan did not get his way. In early May 1864, Grant tried to outflank Lee’s position on the Rapidan River by moving around the position on the weakly-held East side. The Rapidan is an east-west waterway about halfway between the Potomac River and Richmond. Sheridan’s cavalry led the way, but was still tied to the main body of infantry. While the infantry corps slogged it out in the Wilderness, the cavalry sparred with the Confederate cavalry and outposts. The tight linkage between the Cavalry Corps and the infantry caused a number of problems in movement — intermingling during night road marches,

lost opportunities for snatching key terrain, and general confusion.

Sheridan was irritated, and his quick Irish temper soon got the better of him. After Meade chastised him for impeding the progress of an infantry corps, Sheridan lashed out:

*"...I told him that I could whip Stuart if he (Meade) would only let me..."*<sup>10</sup>

At the end of his rope, Sheridan finally told Meade to command the cavalry himself. Meade then went to Grant's Headquarters and complained about his insubordinate cavalryman. The story goes that Grant (a friend of Sheridan's) then asked if Sheridan really said he could whip Stuart. After being assured that he did, Grant replied "then let him go out and do it."

Sheridan then did exactly what he said he would do. Grant's official order was simple — "proceed against the enemy cavalry..."<sup>11</sup> Sheridan then explained his plan:

*"...Moving in one column around the right flank of Lee's army to get in its rear...it was my intention to fight Stuart wherever he presented himself... Our move would be a challenge to Stuart for a cavalry duel behind Lee's lines..."*<sup>12</sup> (emphasis added)

There is no doubt the defeat of the enemy mounted arm was the "principal object" of the raid.<sup>13</sup> The formation was three cavalry divisions in a column of "fours," thirteen miles long.

Stuart rose to the bait. In the resulting battle of Yellow Tavern, Stuart was killed by a Michigan cavalry trooper under George Armstrong Custer, and the Confederate cavalry was "badly broken up." Thereafter, Sheridan's cavalry caused disruption and great alarm in the heart of Confederate Virginia. The "most intense excitement" stirred in Richmond with Sheridan running loose. The Cavalry corps tore up miles upon miles of Virginia railroad, burned several railroad bridges, captured and destroyed two million rations and other commissary stores, and overran small rear garrisons.

This success led to further employment of the Cavalry Corps to rip apart Lee's

communications network. It was now much easier to convince Meade and Grant's staff of the advantages of having the cavalry "cut loose"<sup>14</sup> from the main body. The raid to Trevillian Station again had the double goal of drawing out the enemy cavalry and tearing up railroad lines. In a replay of Yellow Tavern, Sheridan's cavalry defeated cavalry under General Wade Hampton and disabled more stretches of railway (Wilson alone accounted for 60 miles of destroyed railroads and rolling stock). Sheridan, of course, was then sent to a larger command in the Shenandoah Valley and the remainder of the war, as they say, is history.

What lessons did the Union cavalrymen learn at the birth of the mounted arm in the United States? The major points on the employment of mounted units from Sheridan's standpoint were:

- The cavalry of an army **must be employed as a distinct, separate, completely mounted entity.**
- It must be "cut loose" from other branches which would slow its maneuver.
- Its first object should be to gain **superiority over the enemy's mounted arm**, and the secondary object is to **disrupt his communications and destroy resources** upon which the enemy army depends.
- It should be **moved around the enemy army's flank and meet the enemy cavalry in the enemy's rear area.**

These were important lessons, as they surely made their way into the minds of the future American mounted leaders of World War II. George Patton, Jr. for instance, was born in 1885. As he grew up and listened attentively to stories about the Civil War, it seemed as close to him as the Korean War and World War II did to all of us growing up. He read text upon text about the Civil War. By 1910, at the age of 25, he owned at least seven volumes of *Battles and Leaders of the Civil War*.<sup>15</sup> In 1926, at the age of 41, he read and inscribed Charles D. Rhodes' *History of the Cavalry of the Army of the Potomac*.<sup>16</sup> In 1938, at the age of 53, he read a new publication by a little known

German officer over and over until he knew it by heart — Heinz Guderian's *Achtung Panzer!*<sup>17</sup> This takes us to the heart of the transitional period of mounted warfare.

## Notes

<sup>1</sup>Urwin, *The United States Cavalry, An Illustrated History* (Blandford Books Ltd., 1983) p. 96.

<sup>2</sup>Stackpole, *Sheridan in the Shenandoah Valley* (2d ed. Stackpole Books, 1992) p. 117.

<sup>3</sup>Urwin, p. 108.

<sup>4</sup>*Ibid.*, p. 118.

<sup>5</sup>Sheridan, *Civil War Memoirs* (Bantam Books, 1991) p. 140.

<sup>6</sup>Urwin, p. 124. Lincoln claimed jokingly that Sheridan could "scratch his shins without having to stoop over..." (Stackpole, p. 121).

<sup>7</sup>Sheridan, p. 145.

<sup>8</sup>*Ibid.*, p. 146.

<sup>9</sup>*Ibid.*

<sup>10</sup>*Ibid.*, p. 155.

<sup>11</sup>*Ibid.*

<sup>12</sup>*Ibid.*, p. 156.

<sup>13</sup>Rodenbough, "Sheridan's Richmond Raid," *Battles and Leaders of the Civil War, Vol. IV* (Castle) p. 189.

<sup>14</sup>Rodenbough, "Sheridan's Trevillian Raid," *Battles and Leaders of the Civil War, Vol. IV* (Castle), p. 233.

<sup>15</sup>Nye, *The Patton Mind* (Avery Pub. Group, 1993) p. 28.

<sup>16</sup>*Ibid.*, p. 71.

<sup>17</sup>*Ibid.*, p. 119.

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# Commander's Intent — Theory and Practice

by Lieutenant Colonel Walter N. Anderson

The publication of the new *FM 101-5, Staff Organizations and Operations*, passed last year with hardly an acknowledgment from commanders in the field. Significantly, the new FM disposes of the multiple decision-making processes provided for in previous editions in favor of a single military decision-making process (MDMP), which the commander may adjust to the tactical situation (METT-T). Most importantly in my view, the new FM revises substantively a concept we've been trying to get our arms around for years — commander's intent. Just when we believe we've come to grips with purpose, method, and end state, we're turned on our doctrinal ear by the May 1997 edition of *FM 101-5*.

The new FM describes the commander's intent as, "A clear, concise statement of what the force must do to succeed with respect to the enemy and the terrain and to the desired end state. It provides the link between the mission and the concept of operations by stating the key tasks that, along with the mission, are the basis for subordinates to exercise initiative when unanticipated opportunities arise or when the original concept of operations no longer applies."

If the commander wishes to explain a broader purpose beyond that of the mission statement, he may do so. Intent is normally expressed in four or five sentences and is mandatory for all orders. The mission and commander's intent must be understood two levels down.

**Key tasks** are those that must be performed by the force, or the conditions that must be met, to achieve the stated purpose of the operation (paragraph 2 of the OPORD or OPLAN). **Key tasks** are not tied to a specific course of action; rather, they identify that which is fundamental to the force's success. In changed circumstances, when significant opportunities present themselves, or the course of action no longer applies, subordinates use these tasks to keep their efforts sup-

porting the commander's intent. *The operation's tempo, duration, effect on the enemy, and terrain that must be controlled are examples of key tasks.*

The commander's intent does not include the method by which the force will get from its current state to the end state. The method is the concept of operations. Nor does the intent include acceptable risk. Risk is stated in the commander's guidance and is addressed in all courses of action. If the purpose is addressed in the intent statement, it does not restate the "why" (purpose) of the mission statement. Rather, it is a broader purpose that looks beyond the why of the immediate operation to the broader operational context of the mission.

Commanders from company level up prepare an intent statement for each OPORD or OPLAN. The intent statement at any level must support the intent of the next higher commander. For any OPORD or OPLAN, there is only one commander's intent — that of the commander. Annexes (and their subordinate appendixes, tabs, and enclosures) to the OPORD or OPLAN do not contain an intent statement; they contain a concept of support. For example, the fire support annex to the OPORD will contain a concept of support, but not an intent statement.

After the commander approves the restated mission and states his intent, he provides the staff with enough additional guidance (preliminary decisions) to focus staff activities in planning the operation.

If, during the estimate process, the commander has identified one or more decisive points, or an action he considers decisive, he should convey this to his staff when he issues his planning guidance. This should be a point where enemy weakness allows maximum combat power to be applied, leading to mission accomplishment. This point can be a location on the ground, a time, or an event.

It is not an end state, but a point where decisive results can be achieved. The commander can describe it verbally, with a sketch, or on a map. It should explain how he visualizes the array of forces at the decisive point, what effects he sees it having on the enemy, and how these effects will lead to mission accomplishment.<sup>1</sup> The decisive point "conveys to subordinates a potential point of decision that the commander has identified through his estimate process to apply overwhelming combat power."<sup>2</sup>

I don't propose to offer a judgment as to whether the new doctrinal description of commander's intent is correct. Rather, I would assert that, unless we commit ourselves fully to the study and application of commander's intent, our new version of intent will be no better understood or, more importantly, no better practiced, than was our old rendering. I would offer further that, while doctrine offers a conceptual framework for intent, field solutions may vary dramatically in form, yet be equally effective. Thus, my purpose is to stimulate thought and discussion of commander's intent among professional soldiers by offering some practical considerations for achieving an effective commander's intent. The end state is commanders and leaders who are better able to apply our doctrine in combat — that is, put the theory into practice. The focus of this discussion is commander's intent as it applies at the brigade level and below — armies win battles with companies and platoons.

Most commanders have a good idea of what they want their intent to achieve. Indeed, the desired effect of the commander's intent is a concise expression of the commander's vision of the operation that focuses subordinates on a common goal.<sup>3</sup> It's probably safe to say, then, that ideally, the commander's intent would define mission success in a way that provides commonality of purpose/unity of effort and unleashes subordinate leader initiative when either the



original plan no longer applies or unexpected opportunities arise. The problem is that few commanders achieve this effect with their intent. Either the intent is so vague as to be useless or so detailed as to be a rehash of the scheme of maneuver — both cases requiring subordinates to sift through and determine for themselves what the commander really wants. In few cases is the commander's intent truly understood one echelon below, let alone two.

While there are many schools of thought on commander's intent, two stand out in my recent experience as a CMTC trainer. The first is the task and purpose line of thinking. This involves specifying to subordinates their key responsibilities for an operation and why (purpose) that task is important. The second — and less preferable, in my opinion — school of thought is the "keys to success" method of expressing intent. This method tends to lack specificity with regard to who is going to do what, when and why, and is open to broader interpretation by subordinates. In either case, an effort is normally made to "nest" intent with higher levels of command. Ideally, this nesting would provide the "horizontal and vertical links" to ensure mutual support throughout echelons of command and *synchronization* at each level. In reality, at least as they are applied to the CMTC battlefield, neither method is achieving the effect that commanders desire. Confusion about what the boss really wants generally exists throughout units, which stifles rather than enables subordinate leader initiative.

How do we address this? How do we train commanders to render an intent statement that actually achieves the required effect and contributes to mission accomplishment? We start with a formal, doctrinal acknowledgment that this business of commander's intent is *not* a one-size-fits-all proposition. Intent is as unique as a commander's personality, as well as a function of the levels of cohesion and training of individual units. We *can*, however, prescribe some of those factors the commander should take into account when developing his intent statement.

The commander must seriously study the concept of intent before he ever puts pen to paper for his first OPORD. He must come to grips with the notion of intent in his own mind before he ever tries to convey it to subordinates. When that's done, he must continue the study and discussions with his subordinate leaders. This accomplishes two purposes. First, it allows him the opportunity to

convey first-hand, before the first fight, what his intent is going to look, feel, and smell like. Second, and equally important, it gives subordinate leaders the chance to provide the commander feedback on his intent — too long, too short, poor format, ambiguous terminology, too detailed, etc. Then, armed with a common vision of what the intent should achieve and will look like, the commander and his subordinates practice, practice, and practice. Whether in a garrison-type order (units should replace memoranda of instruction with OPORDs and FRAGOs), in simulation, or in the field, commanders at all levels should never, ever pass up a chance to convey personally their intent for a mission.

#### Considerations for an Effective Commander's Intent Statement.

- Commander's intent starts with the commander's personal estimate of the situation and his visualization of how an engagement will flow.

**Battlefield visualization** is the process whereby the commander develops a clear understanding of the current state with relation to the enemy and environment, envisions a desired end state which represents mission accomplishment, and then subsequently visualizes the sequence of activity that moves the commander's force from its current state to the end state. The commander articulates his battlefield vision through his intent statement, which guides the development of the concept for the operation and subsequent execution of the mission.<sup>4</sup>

TRADOC's battle command concept states further that "seeing the enemy, friendly forces, and terrain in terms of time, space, and purpose form the basis of the commander's estimate."<sup>5</sup> The intent statement does not *include* the commander's visualization of the fight *per se*, but certainly is a *result* of that process.

- The format of the commander's intent statement should be that which is determined to be most effective by and for the unit. Regardless of the format, however, the intent statement should adhere to the following standards for effective communication:

- **Clear**, so as to be easily understandable at least two levels below.

- **Concise**, so as to eliminate verbiage which leads to ambiguity and misinterpretation; ensure priorities are defined; and use precise, commonly understood doctrinal terms whenever possible.

- **Compelling**, so as to cause subordinate leaders to **act** when the situation dictates or opportunities arise.

- **Complete**, so as to tell subordinates what they must do and why (task and purpose), as well as define success for the unit in terms that are *executable*.

Ultimately, the commander must remember that he is providing his intent for leaders two levels below, leaders with whom he is very unlikely to have face-to-face contact to ensure an understanding of his intent.

- The commander's intent must **define success** for the mission. This definition of success is normally the **end state** of the operation and is the commander's expression of the final desired relationship between friendly forces or "self," the enemy, and terrain.<sup>6</sup> Again, the end state must be expressed in *executable* terms. Expressions like "restore the international boundary with 70 percent combat power remaining for follow-on missions" might be acceptable at the operational level, but leave us hanging at the tactical level. Perhaps, at brigade level and below, we would do better by saying that we want "the bridge over the Danube River secure, with Alpha and Bravo companies defending avenues of approach on the far side vicinity battle positions 1 and 2, scouts screening in front of them, and Charlie and Delta companies providing flank and near side security from battle positions 3 and 4."

- Based on the commander's definition of success, his intent should specify clearly to subordinates the **mission essential** (vice "key") **tasks** that must be accomplished to achieve success, and why (**purpose**) they are essential. After all, one indisputable effect we want to achieve with the intent statement is to express what the commander wants subordinates to **do** if all else fails ("secure the bridge over the Danube" or "defeat the security zone MRC").

Depending on the mission, the commander may want to specify in his intent the operation's main effort and how supporting efforts relate to it. I'll take this opportunity to digress a bit, to a topic that I believe is vitally important to our overall discussion. This is a true story. Several months ago, during a post-battle huddle of senior trainers at the CMTC, a visiting senior officer made the comment that "Brigades *synchronize* operations, task forces *integrate* them." Intrigued, I did some research and have since concluded that I disagree with the assertion. While we often use the terms *synchronization* and *integration* interchangeably, there is a distinct difference between the

two. Synchronization is “the arrangement of military actions in space, time, and purpose to produce the maximum relative combat power at the decisive place and time.”<sup>7</sup> I can find no doctrinal definition for the term integration, though it’s critical at all echelons, particularly among members of a staff. I prefer Webster’s definition of integrate, which is “to form, coordinate, or blend into a functioning or unified whole; unite.” Ultimately, it’s important that we understand the difference between the two terms to ensure that we do both. Clearly, we desire to both integrate and synchronize operations at the brigade, task force, and arguably, company levels. Why this digression? Simply, I have seen too many operations that include a supporting effort without the commander specifying how it relates to the main effort in time, space, and purpose; the supporting effort is totally unrelated to the main effort and is, therefore, no supporting effort at all. For example, if we’re going to use a supporting attack, we should define when, where, and why we want that attack to occur with respect to our main effort — so that we can get the enemy to fight in two different directions at once, if that’s our purpose, or deceive him as to our main effort, if that’s what we want. Without this specified linkage, we merely piecemeal our forces into combat ineffectiveness. The upshot of this digression is that an effective commander’s intent should contribute significantly to the synchronization of an operation.

- Further, it is entirely possible that the intent statement might lay out mission essential tasks **by phase of the operation**, if the commander deems this appropriate. This simply provides subordi-

nates greater clarity and a logical, sequential focus for their efforts.

- If the commander has identified a **decisive point** in the operation, he should convey that to subordinates in his intent statement. Doctrinally defined, the decisive point is “a point, usually geographical in nature, that, when retained, provides the commander with a marked advantage over his opponent. Decisive points could also include other physical elements such as enemy formations, command posts, and communications nodes.”<sup>8</sup> The commander must be able to express how the subordinate’s task and purpose relates to the decisive point(s) in the fight.

- If the commander deems it sufficiently critical to mission success, he should include mission essential tasks for other members of the combined arms team (fire support, engineers, scouts, etc.). The commander must think in terms of the combined arms and how he wants them to operate in time, space, and purpose to ensure *synchronization* (there’s that word again). For example, the accomplishment of a critical fire support task at a certain time and place on the battlefield might be so important that the overall success of the mission depends on it. Should that be the case, it would be worthy of note in the commander’s intent — less so for the fire supporter, perhaps, than for the subordinate maneuver commander who has to execute the task.

- Our new doctrine specifies that the commander’s intent does *not* include “acceptable risk.” Nevertheless, his **intent should, when appropriate, include the result of his personal mission risk assessment**. During his estimate, the commander must make a conscious ef-

fort to ask himself several questions regarding the operation: What’s the worst thing that can happen to my unit at critical points in the fight? What if the unit or a subordinate unit fails to accomplish a mission essential task? What opportunities for quick or unexpected success might present themselves during the fight? The commander must consider both sides of the coin *before* the mission, failure and success, and judge whether the answers to these questions are worthy of mention in his intent. By including the result of his personal risk assessment the commander does *not* want to address every possible branch or sequel to the operation. He *does*, however, want to address any that are absolutely critical to mission success. The result of this effort might be the inclusion of a specific **on order** task and purpose to a subordinate leader.

#### The Acid Test

Some or all of the considerations discussed above may be applicable to a given mission. Regardless of what style the commander uses for his intent, he should be able to answer affirmatively the following questions:

Does the intent

- specify for subordinate units and appropriate combat functions mission-essential tasks and purpose in terms that are *executable* (who, what, when, why)?<sup>9</sup>
- specify mission-essential tasks and purpose by phase of the operation, if applicable?
- define success in executable terms for the parent unit and its subordinates, that

See *INTENT*, Page 52

| Mission-essential Task(s) | Who?                      | What? | When? | Why? |
|---------------------------|---------------------------|-------|-------|------|
|                           | Division                  |       |       |      |
|                           | Brigade                   |       |       |      |
|                           | Task Force                |       |       |      |
|                           | Co/Tm 1                   |       |       |      |
|                           | Co/Tm 2                   |       |       |      |
|                           | Co/Tm 3                   |       |       |      |
|                           | Co/Tm 4                   |       |       |      |
|                           | Fire Support              |       |       |      |
|                           | Engineer                  |       |       |      |
|                           | Scouts (Recon & Security) |       |       |      |

# THE PROBLEM:

"Screen at Croley Lake" from the January-February 1998 issue of *ARMOR*

## Situation:

**Terrain.** The area around Croley Lake favors the defense. It is a mixture of wooded and open areas with undulating hills. The open areas contain farmland with several one-kilometer-square towns. There are numerous two-lane roads and intermittent streams in the area. Maximum visibility is no more than eight kilometers for ground vehicles, but can be limited to 500 meters due to the undulating terrain. The squadron's sector contains three north-to-south, regimental-sized avenues of approach (AA): AA 1, which runs west of Croley Lake in B Troop's sector; AA 2, which runs east of Croley Lake in A Troop's sector; and AA 3, which runs east of Redwood Forest in C Troop's sector. The weather is expected to be sunny and clear with a low temperature of 45 degrees and a high of 78. Winds will be out of the east at 5 mph. Sunrise is at 0530 and sunset is at 2030.

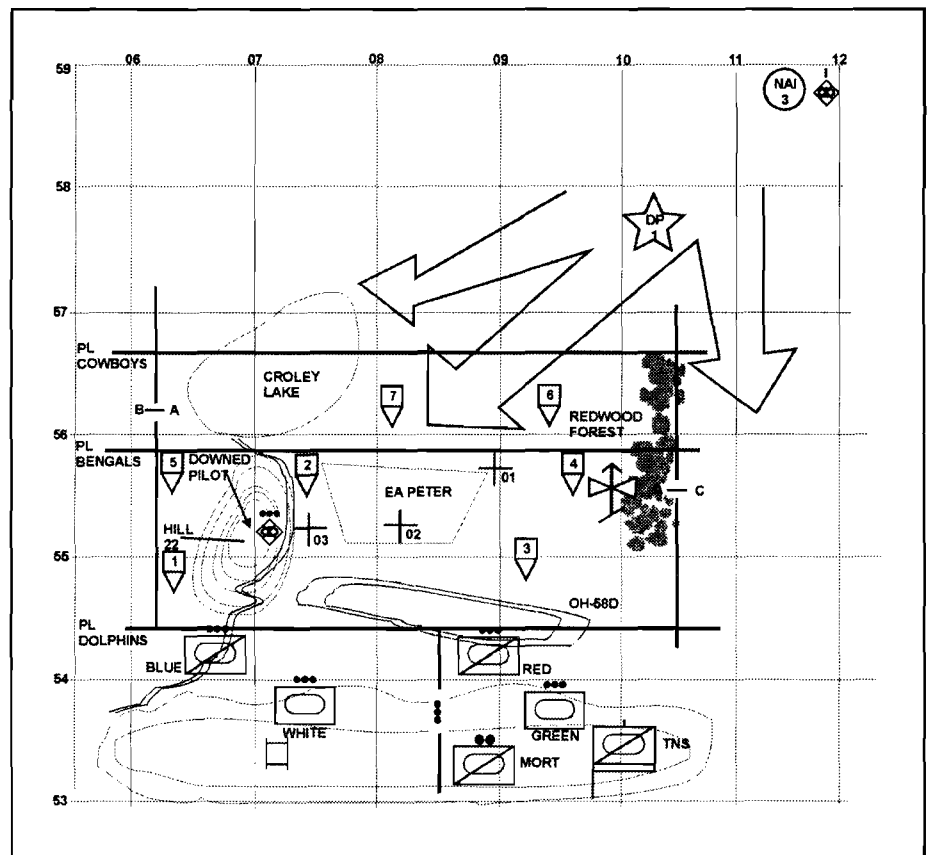
**Enemy.** The sovereign nation of Greenpieceland had its international border with Kevorkia violated by first echelon divisions of the Kevorkian Combined Arms Army. The 5th Kevorkian Division is expected to continue the attack to the south into the 52nd Armored Division's (AD) sector. The Kevorkians will attack in standard Soviet-style regimental organization/formations to secure a long-sought-after seaport in southern Greenpieceland. The most likely course of action is that the 5th Kevorkian Division will conduct a deliberate attack in the 52nd AD's sector down AA 1 and 2 with two motorized rifle regiments (MRR) forward and one MRR and the tank regiment in the division's second echelon. The lead regiments will utilize an advance guard main body (AGMB) formation for security. The second echelon will reinforce the most successful lead regiment.

**Friendly.** The 52nd AD was deployed to Greenpieceland to defeat the Kevorkian advance and to provide time for the deployment of more Coalition forces. 1-23 Cavalry conducts a guard along Phase Line (PL) DOLPHINS to destroy enemy reconnaissance forces and to fix or repel the enemy main body before it can engage the division with direct fire weapons. The division commander's intent is to destroy the 5th Kevorkian Division's reconnaissance assets and force its main body to deploy at PL DOLPHINS. He expects to accomplish this with direct fires from 1-23 Cavalry, combined with close air support (CAS) and indirect fires. The 1-23 Squadron commander intends to deploy three cavalry

troops abreast in sector, screening along PL DOLPHINS with the two air cavalry troops (ACT) conducting a screen along PL BENGALS. He expects to use Hellfire missiles from the ACTs and TOW missiles from the ground scout platoons to destroy enemy reconnaissance forces out of enemy direct-fire range in Engagement Areas (EA) PETER, PAUL, and MARY. He also expects to use the ACTs to trigger a CAS strike on the AGMB in EAs PETER and PAUL. The squadron commander's end state is all enemy reconnaissance assets destroyed north of PL DOLPHINS and all AGMBs fixed in specified engagement areas north of PL DOLPHINS.

**Troop Situation.** You are the commander of A Troop, 1-23 Cavalry. Your troop is conducting a screen along PL DOLPHINS. It is 0545, and your troop had successfully destroyed division and regimental reconnaissance elements that entered your sector at 1800 yesterday. A Troop's task is to destroy the enemy's reconnaissance assets, and the forward security element (FSE) in EA PETER, then conduct a rearward passage of lines through elements of the 52nd AD (FSE destruction is trigger for RPOL). D Troop, screening along PL BENGALS, will identify the follow-on AGMB and

trigger a CAS mission to strike them in EA PETER. Your purpose is to provide the 52nd AD with three hours of advanced early warning of an MRR attack through your sector. At 0600, D Troop reports a platoon-sized element consisting of three BMPs and an SA-9 moving south vic CP 2. D Troop reports that the platoon went to ground from CP 2, South 0.5, West 0.3. Your Blue Platoon reports they are taking direct fire from an enemy element in the vic of D Troop's last spot report. D Troop continues to report that one of their OH-58Ds was shot down from CP 2, South 0.4, West 0.7. The pilots are wounded and immobile and the squadron commander orders your troop to conduct downed aircrew recovery and extraction (DARE) operations, and destroy the SA-9 vic CP 2. At 0635, the remaining D Troop OH-58s operating in the western part of your sector report that a company-sized element is entering your sector vic of NAI 3 (Grid 119589), heading southwest in march formation at 15 kilometers per hour. Your Blue Platoon reports that one of his Bradleys has been destroyed by the enemy platoon in the vic of CP 2. You have the normal complement of support assets for a heavy division cavalry troop. D Troop has priority of indirect fires.



# Solutions to Tactical Vignette 98-1: "Screen at Croley Lake"

## Author's solution:

### FRAGO

Guidons this is Black 6, Frago follows:

**Situation:** D troop reports 3 BMPs and one SA 9 gone to ground vicinity grid 073556 and a company-sized element (FSE) moving southwest in march formation vicinity 119589, and reports a downed aircraft located vicinity 067556. FSE should enter EA Peter in 15-20 minutes.

**BLUE:** Maintain contact and fix the enemy by conducting SBF, orient from Hill-top 22 to TRP 03. As White begins their assault, shift fires east orienting on TRP 03 to 02. Adjust mortar fires to provide good obscuration for White's assault on the CRP. BPT assist the destruction of the FSE in EA Peter.

**WHITE:** Conduct hasty attack to destroy CRP. Assault through CP 1 and secure crash site for Band-Aid. When site is secure, signal Band-Aid to begin evac, then continue the attack to destroy the CRP. LOAs: north is PL Bengals and east is CP 2. When the enemy is destroyed, conduct hasty defense west of TRP 03. Orient east into EA Peter between TRP 01-02. BPT assist the destruction of the FSE in EA Peter.

**BAND-AID:** Follow White. Once White 1 reports crash site secure, evac pilots to AXP.

**RED:** Maintain position. Orient from TRP 02 to 03. BPT assist the destruction of the FSE in EA Peter.

**GREEN:** Maintain position. Orient from TRP 01 to 02. BPT maneuver to my location in order to reinforce Blue, orienting from TRP 01 to 03. BPT assist the destruction of the FSE in EA Peter. BPT destroy dismounted CATKs east, vicinity Redwood forest.

**FIST:** Fire immediate smoke-mortars vicinity grid TRP 3 (074552). BPT fire immediate suppression TRP 03. When D troop reports FSE vicinity CP 7, fire immediate suppression TRP 02.

**Rationale:** Speed is essential in this operation due to the arrival of the FSE within 30 minutes. With Blue in contact, they have the ability to place effective direct fires on the CRP to fix them, allowing White to assault. Blue is also in the best location to adjust mortar fires, providing good obscuration from the enemy as White conducts their attack. White assaults through CP 1 using the terrain to mask movement and

assist them in locating and securing the crash site. Band-Aid follows behind White and when the area is reported secure, conducts evacuation. White continues the attack east and destroys the CRP using fire and maneuver. Upon destruction of the enemy, establishes hasty defense and prepares to destroy FSE in EA Peter.

Red maintains its position and orientation into the EA and prepares to assist destruction of the FSE. Green also maintains its position but has a BPT mission to maneuver to reinforce Blue's support by fire onto the CRP. Without knowing the exact location of the downed aircraft and personnel, the risk of fratricide is great. The use of indirect fires to neutralize or suppress the CRP may increase that risk. By firing smoke east of TRP 03 to provide obscuration, the risk of endangering the downed air crew is lessened. At the same time, it provides White with some concealment as they conduct the assault.

The swift execution of this plan allows for the successful completion of the DARE mission, destruction of the CRP, and the array of forces to destroy the FSE in EA Peter.

## SOLUTION A

*(From 1-10 Cavalry, 4th ID, Fort Hood, Texas)*

### FRAGO

#### SITUATION

a. Enemy - Outlaw 15 has just reported the FSE at NAI3; that's 3.5 km out of direct fire range (12-15 minutes). They are still in march formation. There are three BMPs and one SA-9 remaining (vic 072551) from the CRP that Blue was engaging. This CRP has shot down Outlaw 11 and Outlaw 24 (in the same helicopter). The FSE consists of 8 BMPs, 3 T-80s, 2 engineer vehicles, and a chem recon BRDM. They are travelling at 15 kph. They are heading south and will pass to the east of Croley Lake and of Hill 22 and are expected to try to shoot the gap at 0755.

b. Friendly - B Troop on the left is still screening along DOLPHIN as is C Troop on our right. They have reported similar contact with CRPs in their sectors.

**MISSION** - A/1-23 CAV conducts DARE operations vic 070552 to rescue Outlaw 11 and 24.

### EXECUTION

a. Commander's Intent - **Purpose:** rescue Outlaw 11/24 while still executing original mission in OPORD. **Critical tasks:** Use massed tank fires to destroy the CRP and SA-9 vic CP2. Outlaw 15 will provide intel and o/o call fires on FSE. One scout platoon will rescue the downed crew while the other scout platoon provides supporting fires and observation across PETER. **End-state:** 11/24 rescued and transferred to 1SG for medevac, CRP and SA-9 destroyed, nine tanks alive and positioned in hide, three M3s screening to the NW behind Hill 22, and five M3s providing supporting fires from the south.

b. Concept of the Operation - Three major events must happen simultaneously and quickly: 1) White and Green w/A66 will move rapidly west to the 07 N-S and then violently assault the SA-9 and three BMPs, destroying all enemy to allow Blue to complete the rescue; 2) Blue will move immediately behind the tanks to rescue 11/24; 3) Red will provide overwatch and supporting fires to allow the tanks to destroy the CRP and SA-9. Outlaw 15 will maintain observation of the FSE and o/o call fires to allow White and Green to destroy the CRP and SA-9. Once the CRP and SA-9 have been destroyed, the tanks will move rapidly around the north side of Hill 22 to a hide position vic CP1. Once Blue has picked up 11/24, one section will screen to the NW, providing early warning to the tanks; the other section will prepare to assist in the assault on the FSE from the west. o/o, Red will initiate direct fire against the FSE from the south, NET 555 E-W, diverting attention away from the west. o/o, White and Green will assault from the west in to the FSE, destroying all enemy. Blue will SBF. Red will SBF. o/o, Outlaw 15 will call indirect on the FSE.

c. Tasks to Maneuver Units:

#### Red

Overwatch tanks  
Assist in directing White and Green to CRP, SA-9  
Deceive as to the location of the defense  
Maintain comms with Outlaw 15  
B/P to call arty fires  
Call Mortar fires  
B/P to call mortar smoke vic CP7  
Initiate direct fires  
Kill far right (east) tank with TOW

#### Blue

Conduct rescue  
Transfer 11/24 to 1SG for medevac  
Screen to NW  
B/P to guide tanks into hide position

Coordinate with B Troop for screen to NW  
Secure helicopter; be prepared to destroy (need CG approval)

#### White

Kill two BMPs in CRP  
Kill SA-9  
Kill left (east) tank in FSE  
Kill east four BMPs in FSE

#### Green

Kill one BMP in CRP  
Kill two middle tanks in FSE  
Kill four middle BMPs in FSE

#### Outlaw

o/o call arty fires on FSE  
B/P to kill select targets w/HELLFIRE

#### d. Coordinating Instructions:

Speed is essential!!  
All vehicles transfer ammo from semi-ready to ready racks whenever time permits  
Accepting risk in NW  
Short depth engagement area - violence and speed is essential in assault  
Medics travel with Blue

#### SERVICE SUPPORT - n/c

**COMMAND AND SIGNAL** - CDR with tanks

Assumptions made:

- 1) Initial OPORD has been given and issued.
- 2) Initial Mission Statement: A/1-23 CAV will screen along DOLPHIN NLT XX1600JAN98, destroying all division and regimental recon and the FSE in order to provide three hours of advanced warning to 52nd AD.
- 3) Enemy situation has not changed significantly from initial OPORD.
- 4) The terrain will allow tank movement forward of PL DOLPHIN.

**Rationale for Plan** - The main effort is to Blue Platoon (rescue). Secondary effort is to the tanks because they will kill the CRP which is preventing the rescue effort. Red will provide supporting fires to allow tanks to kill CRP and SA-9. Time is critically short because the real threat is the FSE that is at NAI3 (about 12-15 minutes out of [the FSE's] direct fire range. There is not enough time to execute a complex plan. Given the armor protection of an M1A1, especially against a BMP, there is little reason not to conduct a frontal assault with all nine tanks to kill the CRP, especially when we consider how little time we have before the FSE is within direct fire range. Green Platoon will have to travel a maximum of 3.5 km to kill the CRP; White only 2 km.

This entire movement should take not more than 10 minutes. Red will have to call mortar or artillery smoke in order to conceal the movement of the tanks behind Hill 22 to ensure surprise for the remainder of the mission. Whereas effective artillery fires by Outlaw north of PL COWBOYS would slow down the FSE, it would also cause them to deploy into battle formation, which I do not want; I want mass enemy confusion once Red opens the direct fire fight. Red will initiate direct fires to draw attention to the direct south. It is important that Red kill the far right (in battle formation) or the front tank (in march) with TOW. The tanks will assault directly into the flank of the FSE. Given the superior armor protection, fire control, surprise, numerical superiority (9 to 3), and armament of the M1 to the T-80, added to the shock effect of nine M1A1s rolling at you at 25 mph, the odds are heavily stacked in favor of A Troop. Add to that supporting fires from Red, Blue, and Outlaw 15, the fight will be quick.

### SOLUTION B

*(From Task Force Eagle Heavy Reserve, A/1-37th AR, TF 1-36th Infantry, Bosnia)*

#### FRAGO

"GUIDONS, this is BLACK 6, FRAGO follows. **Situation:** 3 BMPs with SA-9 support located vicinity 072552. Downed OH-58D air crew vicinity 069554. Suspected FSE vicinity 119588, moving into sector. ETA to EA PETER is 20 minutes."

"BLUE, maintain contact with enemy. Fix the MRP by conducting support by fire, oriented from Hill Top 22 to TRP 03. Adjust mortar fire on MRP. Adjust smoke to vicinity 086560 when WHITE begins its attack. Lift or shift fires on my order. Once MRP is destroyed, orient fires from TRP 03 to TRP 02. Prepare to destroy FSE in EA PETER."

"WHITE, Conduct hasty attack on MRP. Move north-west through CP1. Locate and secure crash site of OH-58D on Hill 22. Once site is secure, continue to attack east in order to destroy MRP vicinity 086560. Priority is destroying air defense assets. Do not cross PL BENGALS. LOA is tree line on Hill 22. Initiate smoke mission vicinity 086560 in order to obscure your attack. Trigger is continuing your attack east from crash site. Once MRP is destroyed, conduct hasty defense vicinity tree line west of TRP 03. Orient from TRP 02 to CP2 and prepare to destroy FSE in EA PETER. Move now."

"BAND-AID, move behind WHITE. Once site is secure, treat and evacuate

downed air crew to ambulance exchange point. Move now."

"RED, hold in place. Orient from TRP 03 to TRP 02. Do not engage targets on Hill 22. RED 1, personally verify all targets due to WHITE's attack. Prepare to destroy FSE in EA PETER."

"GREEN, hold in place. Orient from TRP 02 to TRP 01. Prepare to destroy FSE in EA PETER. BPT to reposition to my location in order to reinforce BLUE, orienting from TRP 03 to TRP 01. BPT orient east towards Redwood Forest to counter a dismounted attack."

"FIST/THUNDER, Immediate suppression 072552, BMPs/SA-9 in the open. BPT fire WP smoke at 086560 during WHITE's attack in order to obscure observation from the north-east."

"End State: NLT 0655, air crew evacuated to AXP. SA-9 and MRP destroyed. All elements prepared to destroy the FSE in EA PETER."

### RATIONALE

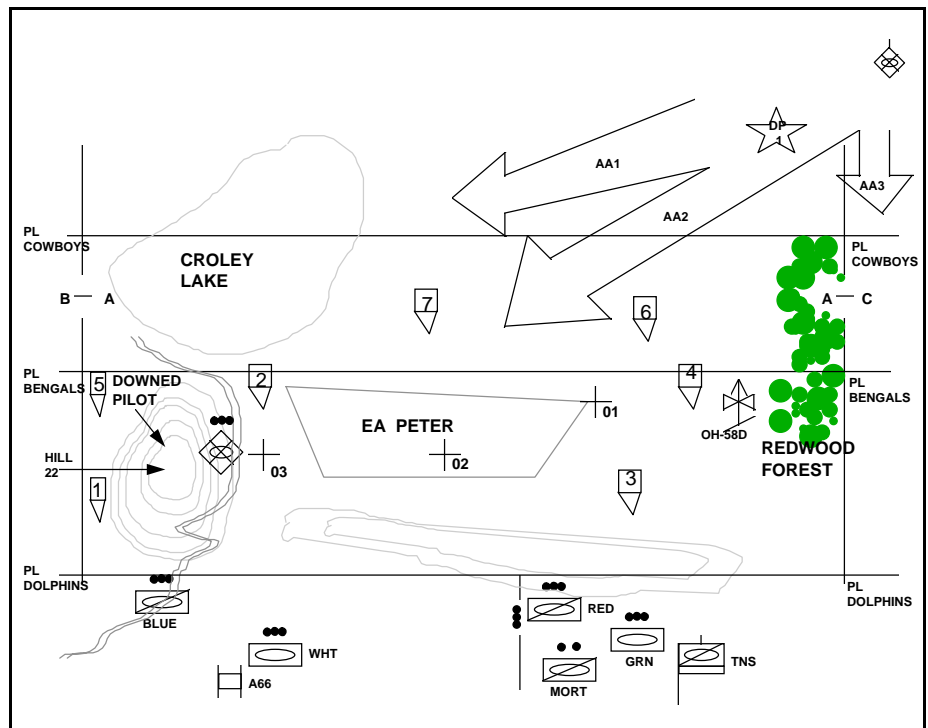
With the impending arrival of the FSE in under one half an hour, speed is imperative. BLUE is in contact, and can place effective direct and indirect fire on the MRP, fixing it. The nearest unit out of contact is WHITE. The tanks are the best choice due to the speed and firepower necessary to make the hasty attack as quick and devastating as possible. With BLUE fixing the MRP, the mortar section pounding them with HE, and WHITE conducting a flanking maneuver, we should be able to destroy it within ten to fifteen minutes, giving WHITE time to set up its hasty defense. There will be a five-minute delay between the tanks and the medics due to their position. That five-minute buffer allows the tank platoon to react to contingencies, such as a crash site occupied by the enemy, without exposing the medics to danger. We accept risk in that once WHITE 1 decides the area is clear, he will continue with his attack, leaving the medics with no security. WHITE's objective is not far away, however, and could react to any contact on the crash site within minutes.

We will keep RED and GREEN in their prepared positions in order to provide cover over EA PETER while the other two platoons destroy the MRP, and to keep the enemy confused as to what is in front of him. There is no doubt that the MRP has spotted BLUE and has called their position to the FSE. The longer we can keep the enemy thinking that they are facing one scout platoon in this sector the better. By the time they realize they are taking fire from a tank platoon on their flank, they

will be dead with no time to inform the FSE. If BLUE continues to take casualties we will reinforce them with GREEN to help finish off the MRP, and help with the destruction of the FSE.

The most complex part of the operation will be coordinating the indirect fire. In order to confuse and fix the MRP, we will hit it with HE from the beginning. BLUE has the best position to adjust the fire, and will do so until WHITE continues from securing the crash site. WHITE must cancel the HE mission and begin the WP smoke in order to obscure their actions from the FSE. Only they will know when they continue their move east. They will not be able to observe the smoke however, and BLUE must adjust the smoke accordingly until WHITE has completed the attack.

This plan allows for the securing and evacuation of the downed air crew, the destruction of the SA-9 and MRP, and the destruction of the follow-on company-sized element in EA PETER.



## INTENT, from Page 48

is, describe the operation's end state in terms of the relationship between friendly forces, the enemy, and terrain?

- identify the commander's appreciation of the decisive point(s) in the engagement, if possible?

- reflect the commander's mission risk assessment, when appropriate, by specifying mission-essential **on order** tasks and purpose to subordinates?

- meet the standards of communication (clear, concise, compelling, and complete) so as to be understood two levels below?

- enable subordinate leader initiative in the event that the original plan no longer applies or an unexpected opportunity presents itself? In other words, **will the intent make a difference during mission execution and contribute to mission success?**

Finally, though the last thing we might need is another matrix, I'd like to offer a tool to allow commanders and/or their staffs to do a quick cross-check to ensure that the intent achieves the standards discussed above. A task force might use a simple matrix like the one on Page 48.

This matrix is not meant to replace or duplicate the unit's synchronization matrix. Rather, it's a quick quality control check to ensure that the commander's

intent includes the critical information subordinates need to execute an operation and achieve the commander's desired end state.

Once the commander has arrived at his intent statement, he should **review it periodically** as new information becomes available or as the situation evolves to ensure that it is still relevant. And, throughout the planning and preparation phases of an operation, **the commander must never miss an opportunity to convey personally his intent to subordinates.** Opportunities to do this present themselves at orders briefs, during confirmation and back-briefs, during unit and subordinate unit rehearsals, and during informal discussions with subordinates around the battlefield prior to execution.

In the end, the commander's intent, in terms of form and substance, is likely as unique as the commander himself. Doctrine offers a framework and the comments above offer additional suggestions the commander may want to take into consideration as he wrestles this issue to ground. The reader may not agree with some or any of the thoughts expressed above, which is fine. The challenge is for the commander to think and work it through to come up with what works for him and his unit. The real acid test of the effectiveness of the commander's intent

doesn't come in an AAR van, but rather, in combat.

### Notes

<sup>1</sup>FM 101-5, pp. 5-9 - 5-10. Emphasis, both bold print and underlined words, are the author's.

<sup>2</sup>FM 101-5-1, p. 1-47.

<sup>3</sup>Battle Command Concept, CG, TRADOC, 22 Feb 93, p.2-28. Emphasis added.

<sup>4</sup>TRADOC Pamphlet 525-70, 1 October 1995, pp. 2, 4.

<sup>5</sup>Battle Command Concept, p.2-18.

<sup>6</sup>One Fort Knox Small Group Instructor teaches the acronym SET, for Self, Enemy, and Terrain.

<sup>7</sup>FM 101-5-1, p. 1-155

<sup>8</sup>FM 100-5, June 1993, Glossary 2.

<sup>9</sup>Since, on the fluid modern battlefield the "where" is the most likely piece of the equation to change, I've intentionally omitted it.

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

fight until favorable conditions exist is increasingly important. In a larger context, the Division AWE has shown the BCTs operating with a higher degree of independence, guided more by the commander's intent than precise control. These expanded battlespace operations, as envisioned by Force XXI patterns of operations, have shown BCTs acquiring and attacking enemy formations at distances beyond 100 kilometers.

At task force level, tactics became simpler. In the offense or defense, the options are two up, one back; one up, two back; or three on line. But although the options are simpler, this does not mean that executing operations became easier. The reverse was true. No reserve was created at task force level, and usually not at brigade level. Because the task force lacked a reserve, the tempo of the task force suffered. On more than one occasion, the brigades could not capitalize on opportunities to seize the initiative. Further evaluation of this issue is needed and will be conducted in constructive, virtual, and live training.

On the training side, we are seeing the need to develop a digital "classroom" for the leader and a COFT-like trainer for staffs in order to sustain individual and collective skills. Time-perishable skills and initial training of new personnel

mandate the continual "drill square" approach for future FBCB2, ATCCS, and related communication systems/tactical internet.

During the Division AWE, the current manning levels in various TOCs were inadequate, especially for the division cavalry squadron. Machine operators cannot be expected to sustain intense operations for 12-hour shifts for days at a time. High-use systems like the S2 section's ASAS and the FSE's AFATDS may require three operators to sustain continuous operations. This issue will require further analysis before a solution is resolved.

A key item is the increased importance of LNO teams, in both transferring information from C2 node to C2 node and as a bridge for those adjacent units that are not digitized. In a digitized unit, the LNO would require a vehicle with two FM radios, TACSAT, MSRT, EPLRS, and FBCB2 in order to act as that bridge. Brigades would require two such teams of two to three individuals, tasks forces at least one.

In materiel developments, the human-machine interfaces have gotten better, but still require significant improvement. The technology must make the soldier's job easier, not harder. This is an ongoing

experiment and as long as we do not lose sight of the end objective, the soldier, the products will only improve.

Soldiers in the TOCs are being asked to do more than was ever envisioned. We "older generation" soldiers have often commented on the "Video Game Youth" that account for many of our entry level soldiers. However, in such experiments as the Division AWE, it is becoming clear that these Nintendo Warriors have many of the skills that we might be screening for in Basic/AIT. It may soon be the norm for computer-literate soldiers to be identified for digital units and add-on courses on digital systems. Is this a wake-up call for those leaders that still consider computers a non-essential tool for the warfighter? You better believe it.

Finally, I cannot over-praise the efforts of the 4th Infantry Division throughout the DAWE. This organization worked tirelessly to ensure the successful execution of the DAWE and has established a high standard for performance by any unit. The leaders and soldiers of this talented organization deserve all the accolades they have received for their key role in the DAWE.

FORGE THE THUNDERBOLT!

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## COWPENS, from Page 19

The goal of Nevada's 1-221 Cavalry is: "to add value to both the 11th ACR and America's Army." While it takes a commitment of Blackhorse assets to work with the Wildhorse, the 11th ACR does receive training benefits in return. During occasional NTC rotations, the 11th ACR now also has improved force ratios for difficult missions against the visiting "Blue Forces" (BLUFOR). This is always within the Combat Battle Instructions (CBI) established in advance by the NTC. There are two factors that enhance this unique AC/RC partnership. Geography and the 11th ACR's CONUS sustaining force mission. The 1-221 Cavalry troopers are desert dwellers who live nearby in the Las Vegas area, and the 11th ACR has time to train with them since it does not have to deal with frequent deployments.

In conclusion, the spirit of Daniel Morgan certainly is alive at the NTC. Citi-

zen-soldiers are being provided with active duty role models, and given realistic training as part of a world class OPFOR. They are employed in a manner that complements and strengthens their abilities; thus, their motivation level is high. The Blackhorse/Wildhorse relationship is influenced by Morgan's historic precedent, and is historic in its own right. Thanks to the visionary leadership of the 11th ACR, Nevada senior officers, and Fort Irwin, seamless integration is a reality. An effective, mutually beneficial AC/RC relationship has been achieved. Daniel Morgan would be proud.

### Notes

<sup>1</sup>Don Higginbotham, *Daniel Morgan, Revolutionary Rifleman*, (Chapel Hill: The University of North Carolina Press, 1961) pp. 133-141.

<sup>2</sup>Lippiatt, Crowley, Dey, and Sollinger, *Postmobilization Training Resource Requirements; Army*

*National Guard Heavy Enhanced Brigades*, (Arroyo Center: RAND, 1996) p. 85.

<sup>3</sup>LTC Jim Zanol, *Combat Training Center (CTC) Quarterly Bulletin No. 97-20*, "Training to Achieve an OPFOR Level of Proficiency" (Ft. Leavenworth, Kan., Dec 97) p. 57.

<sup>4</sup>LTC Pete Palmer, *Combat Training Center (CTC) Quarterly Bulletin No. 97-4*, "Decision Point Tactics (Fighting the Enemy, Not the Plan!)," (Ft. Leavenworth, Kan., Apr 97).

<sup>5</sup>Higginbotham, p. 134.

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*Lieutenant Colonel Aaron R. Kenneston is a career Nevada Army National Guard officer commissioned through the Nevada Military Academy. He has served as a platoon leader in tank, mortar, and support units, commanded Co. A, 1/82nd Cav., and has served as an armor battalion XO, and brigade assistant S3. He is currently commander, 1st Squadron, 221st Cavalry.*

## LETTERS (Continued from Page 4)

American military historians was willing and capable of making exhaustive use of German primary source documents, which for Lieutenant Colonel Bonn was not difficult: I soon learned that he has a full command of the German language. In short, I gained much from studying *When the Odds Were Even*, and in a way more than from many other titles: it offered my studies new avenues of approach, making my understanding much more comprehensive.

After reading the review by Captain K. W. Farrell, I must admit being fully unprepared for his negative verdicts; for a while, I even suspected we had read different books.

Bonn is certainly outspoken, but I fail to detect "emotionally charged rhetoric," a "shrill tone," or "spite" in his writing — and that is not because of a low level of linguistic comprehension on my part: I pride myself of being capable of reading and understanding English well enough to fully appreciate the fine points of your language.

Also, I am at a loss to understand why it should be a sacrilege to criticize historians for their theories only because they are dead, or because they are university professors. And as to "amateurish": I had not known that the famous University of Chicago was notorious for accepting amateurish Ph.D. theses.

Finally, I must disagree strongly with the reviewer that the Volksgrenadier-Divisions (VGDs) were "the brainchild of Heinrich Himmler." This is quite impossible as they were conceived long before Himmler became Befehlshaber des Ersatzheeres (Supreme Commander of the Replacement Troops) in the wake of the 20 July 1944 assassination plot, the last attempt to assassinate Hitler.

Actually, it was Hitler's would-be assassin, Colonel Claus Graf Schenk von Stauffenberg, who should rightly be called the "architect" of the VGs: it was this function that gave him access to Hitler, where he appeared at the conference table on that fateful day to brief him on the progress of his mission: to form the new VGs.

WOLF T. ZOEPF  
formerly of 3rd Battalion,  
SS-Mountain Infantry Regiment  
12 "Michael Gaissmair"  
6th SS-Mountain Division NORD

### Author Replies to Review Of WWII Campaign Account

Dear Sir:

I have waited a long time — almost four years — for someone to negatively review *When the Odds Were Even* in writing. Its premise is, after all, somewhat inconsistent with what many believe to be gospel about the comparative fighting qualities of the American and German armies in WWII. Further, as reviewer Farrell points out, the book has indeed "received favorable coverage within military history circles," so I've waited for the other boot to fall. Admittedly, I was

hoping that whomever chose to criticize the book in a public forum would demonstrate a firm grasp of the book's argument, and be able to debate the facts. Unfortunately, the reviewer did neither.

First, the reviewer somehow missed the premise of the book — made clear in each chapter, but perhaps most succinctly stated in the conclusion. In the Vosges Mountains, between 15 October 1944 and 15 January 1945, under conditions of numerical parity, the U.S. Seventh Army prevailed due to "Superior training, organization and execution of doctrine." (p. 229) It would have been useful to debate this, rather than be forced to point out the fallacy of the tangential issues he chose to conjure.

Hopefully, many of Farrell's misrepresentations stem from a dim or incomplete comprehension of the text. The alternative explanations are pure intellectual dishonesty or worse. For example, on pages 1 and 2, I expressed alarm at the tendency of "certain military reformers to justify recommendations that the contemporary U.S. Army should discard its own uniquely evolved institutions and doctrines and instead simply imitate the Wehrmacht. Not only is such abuse of history invalid from an academic standpoint, it is also dangerous from a political and philosophical standpoint." So, if you are one of the military reformers who believes this — perhaps one who makes your officers sing songs to the tune of *Panzerlied* at dinings-in, or makes your men wear SS Death's Heads on their unit PT shirts, or wants to do away with divisions and call their replacements "combat groups" (a precise English translation of the German term *Kampfgruppen*) then I believe that you are doing something that is dangerous... and wrong and disgusting, too. All of these things have been done by certain officers in the Regular Army within the last five years, and you know who you are.

Neither the late Colonel Trevor Dupuy nor Professor Martin van Creveld do these sorts of things, however, **nor did I say they did**. What I said on page 3 was, "The ammunition supplied to these reformers sometimes takes the form of perfectly valid historical work, used in an obtuse and biased manner, but more often consists of shoddy comparative historical efforts." Later (pages 6 and 7), as an example of the former instance, I cite the logic problem from which some of Dupuy's work suffers (this was actually originally pointed out in a SAMS paper by a currently serving colonel, and I documented it accordingly on page 7.). This does not amount to "castigating" Colonel Dupuy, nor does it constitute "shrillness" about his *post hoc ergo propter hoc* logic error, nor does his death somehow make his ideas sacrosanct. On page 7, I point out the historically invalid nature of Martin van Creveld's *Fighting Power*; I refer to his historical assertions (not him personally) as "bizarre," as indeed they are. I provide a specific example, i.e. that, contrary to van Creveld's insistence, "no U.S. combat divisions used pigs, bees, monkeys, centipedes or belligerent dogs" for their unit insignia. Van Creveld says they did on page 46 of *Fighting Power*, and he is completely wrong

— weirdly so — hence they are *bizarre*. I could choose any one of dozens, perhaps hundreds, of examples of categorical untruths from this book, but I chose to only mention one — this is hardly "shrill." Thus, I do **not** "admonish [Dupuy and van Creveld] of the dangers of their political and philosophical perspectives," as Farrell insists, but rather **do** admonish those who use their faulty arguments as a basis to recommend reform of the U.S. Army... like the guys with the Death's Heads, or the singers of ze old songs, or the Phalanx breakers mentioned above. This is certainly not "outrageous."

"Outrageous" **is** when an officer on the faculty of the citadel of "respect for others" refers to the style of another officer's book as "spiteful and amateurish," and then proffers a near-lie to justify this harsh criticism. The reviewer refers to my "simplistic and sloppy repeated references to foreigners serving in the Wehrmacht as 'turncoats'" to support this insult. First, it is only a near-lie rather than an outright one, because I did indeed use "turncoat" repeatedly — exactly **twice** in 294 pages. On page 50, I referred to Ukrainian and other Russian prisoners who voluntarily served in the Waffen SS as turncoats — what else were they? They fought against the Germans in the defense of their country, and then volunteered to serve the very nation that conquered their country and whose minions murdered thousands of their citizens in the process. (Even in this instance, I qualified my assertion with the word "most," as I recognize that some may have been forced to serve.) On page 222, I used the expression again, as part of my conclusion.

The closest I came to using "turncoat" anywhere else in the text was on page 192, when I referred to Norwegians who served in the 6th SS Mountain Division as "traitors." Interestingly, the only other person who has criticized this usage (and he had the courtesy to do it in writing, to me personally) was a German ex-SS NCO, who expressed the (literal) Party line that these men were not traitors, but actually the far-sighted *avant garde* of the modern pan-European cultural and political movement. Perhaps this is closer to the reviewer's opinion.

The assertion is also close to a lie because anyone who actually read all of *When the Odds Were Even* knows that I extensively discussed the issue of foreigners in the *Wehrmacht*, and absolutely **did not** characterize them all as "turncoats." In fact, on pages 50 and 51, I discuss in detail the cultural, language and political problems associated with attempts to integrate *Volksdeutsche* soldiers into other units with *Reichsdeutsche* cadres.

The reviewer states that I "undercut my own position" with the "notion that the opposing units in the Vosges were comparable in morale and capability." Since I specifically and repeatedly insist that American morale was generally better than that of the Germans, and that American doctrine and practice was far more effective in the maintenance of appropriate morale, it is difficult to understand this assertion. Further, one of the main points



of the book is that, due to better organization and training, U.S. units were *more* capable — the only German unit in the Vosges I assessed as highly capable was the 6th SS Mountain Division. Rather than “undercutting” my position, these are, in fact, integral to my argument.

The reviewer disputes my assertions of logistical parity by citing the materiel superiority of the U.S. Army overall, in the world. On page 3, I *grant* that such superiority existed in most parts of the ETO, most of the time. **But it didn't exist in the Vosges between 15 October 1944 and 15 January 1945.** The bases of this evidence are examined and documented extensively, throughout the book.

The reviewer sank to pure hypocrisy when he called my work “shoddy,” yet promptly chose the “grab bag of history” approach to support his condemnations. He writes about the background of three carefully selected German units that fought in the Vosges, and gives us a great deal of information about their activities elsewhere — most of it completely irrelevant to the campaign in the Vosges. (The stuff he mentions that *is* relevant is covered in far greater detail in *When the Odds Were Even*.) He conveniently ignores units such as the 708th Volksgrenadier Division, which entered into battle fresh from training and at full strength, and the 6th SS Mountain Division, which was the most effective, most robust German infantry unit on the Western Front at the time. He states that I provide no support for my assertion that by November, 1944, the 21st Panzer Division “was in the best shape it had been in since the Normandy campaign,” and then promptly contradicts himself by identifying the primary intelligence document on which my estimate is based. Besides, the 21st was coming out of a rest and refit period when it moved into the Vosges — most units that have been replenished and reconstituted are in better shape afterwards (in this case, November of 1944) than they were before (in this case, the summer of 1944), and the 21st Panzer was no exception.

Worse than this embarrassing contradiction, the reviewer is disingenuous when he states that, “the list of units comprising the Allied forces in the October and November campaigns reads like a ‘who’s who’ of great American units,” and then describes fewer than half of them, i.e., the 3d, 36th and 45th Infantry Divisions and the 442d RCT. Actually, I am sure that the veterans of the American 44th, 79th, 100th and 103d Infantry Divisions and 14th Armored Division will be happy to hear that they made this “who’s who” list... but they may also wonder why Captain Farrell doesn't *mention* them specifically, or explain *their* backgrounds.

These divisions, with the exception of the 79th Infantry, were completely green outfits, straight from the States, the infantry echelons of which consisted mostly of retrained anti-aircraft gunners, medium bomber crewmen, and soldiers in low-density MOSs being trained in the Army Specialized Training Program (ASTP), which was abandoned in 1944 to provide more men to the infantry. That these

units could be thrown into the attack in the midst of the most ferocious winter of the century to date, and pry a firmly entrenched, generally more experienced foe from prepared positions in a mountain range which had never before been penetrated by any attacker, ever, would be, well, *inconvenient* for Captain Farrell's purposes. So he does what the editors of *Signal* magazine and the *Völkischer Beobachter* did so well — he purposely ignores them, and hopes potential readers will, too.

The reviewer moves beyond obscuration and near-lies to an abject untruth in his assertions about my silence on the nature of Volksgrenadier divisions. With excruciating condescension, he states that “he is confident that Keith Bonn is aware of the significance of the Volksgrenadier designation,” but then states that I do not point out its significance to the reader. In fact, I took great pains to do just this, on pages 46-48. I also point out their organizational limitations again and again thereafter, as they became apparent in each battle.

With his “final word about sources,” the reviewer adds a concluding twist to the reality of this book. Stating that I admitted having “difficulty in obtaining sufficient German primary source material” (which I never did), he goes on to write that when I did find them, I dismissed those which expressed a different perspective than the “one I was looking for.” This is untrue in every regard. I examined, in person, every single German primary source document about the campaign in the Vosges available, at the German Military Archives, and at the National Archives' Captured Documents Section. Therefore, it is not true that I had difficulty in obtaining German primary source documents. Moreover, here again, the reviewer inaccurately reproduced what I wrote; the German sources to which I was referring in the introduction to the book were *not* primary source German documents, but published histories, most of which, I noted, were published (largely for the German veterans' benefit) after 1970. In fact, as I note on page 11, some wartime, i.e., primary source, documents, express “more respect for U.S. tactical fighting abilities” than do the writers of their post-war histories.

Contrary to the reviewer's implication, I did *not* rely on U.S. unit histories for the critical facts of this study. I used post-war U.S. histories (which are NOT primary source documents, by the way) primarily as sources for simple, non-controversial facts, such as dates and times, names and places. As the notes indicate, the historical evidence on which my arguments rest appear overwhelmingly in primary source documents such as German and American unit operations and intelligence journals, field manuals, and American company morning reports. They are supplemented, in the Germans' case, with information volunteered by German officers in captivity immediately after the war — information that was purposely gathered by the U.S. Army to 1) fill the historical hole left by the destruction of most German unit *Kriegstagebücher* below the corps level, and 2) to learn

what lessons could be derived from a competent and brave foe.

More disappointing than missing the point and premise, and even sadder than the insults, near-lies and obfuscations, is that the reviewer *never addressed the facts present in this book*. Exactly which of the 499 footnotes (174 of them from either contemporaneous German military documents or immediately postwar interviews with German officers) does he dispute? Were the numerical odds even, or not? Were the American units that participated in the Vosges Mountains better trained than their German opponents, or not? Were they more cohesive, or not? Were they more appropriately organized for the execution of their doctrine, or not? Far from a “They won, so they must have been better” argument — which I never made — *When the Odds Were Even* presents a detailed analysis of the reasons why the Americans won and the Germans lost at the operational level, as well as what each side did well and poorly. In the Vosges Mountains, between 15 October 1944 and 15 January 1945, there were very few things that the elements of Army Group G did better than the U.S. Seventh Army — thus the recommendations to build on our own doctrine and heritage, and eschew that of the less effective, less successful (but ever so much more snappily dressed) Germans. Neither this, nor *anything* in the book, in any way denigrates the valor of the German soldiers who fought in the Vosges. It simply de-glorifies the German Army in this campaign, and explains why they came in second.

Because the reviewer chose to sidestep these issues, “Were the Odds Really Even?” was a misnomer for the title of his review. When someone is ready to really ask this question, and discuss it in view of the *facts*, I welcome his or her arguments and criticism. This book was *not* perfect; Vosges veterans have, for example, corrected me on details of the battle for Wingen-sur-Moder, details that did not survive in several primary source documents. Interestingly, one correction, from a former Waffen-SS battalion adjutant, tipped the numerical odds slightly further in favor of the *German*s during the NORDWIND offensive; a former American rifleman (later a colonel of infantry) pointed out the success of an incompletely trained American unit (a battalion of the 274th Infantry) that had been falsely claimed in primary source documents by another — one of Farrell's ‘who’s who’ outfits, in fact. I was happy to correct these in the second printing of *When the Odds Were Even*, and I remain completely open to factual disputation of all types. It is unfortunate that the reviewer chose to do otherwise.

LTC (Ret.) KIT BONN

### WWII GIs Faced Shortages Despite Record Production

Dear Sir:

I must take exception to some of CPT Kevin Farrell's contentions in his very detailed review of Keith E. Bonn, *When the Odds Were*

Even (Jan-Feb 98). While you may not normally print comments on reviews, please bear with me.

I do not know author Bonn, nor do I know Farrell. However, as an author (*A Dark and Bloody Ground — the Hürtgen Forest and Roer River Dams 1944-1945*, Texas A&M University Press, 1995), former Armor officer, and ASI 5X (Military Historian), I believe I am qualified to present some additional information on the U.S. Army of 1944-45 to your readers. What follows is not a defense of anyone or anything, especially the faults of the ETO Army. Rather, I want to balance the assertions of both writer and reviewer in the never-ending argument over who was 'best.'

It is troubling that many officers know so much about the German Army of WWII, and so few bother to learn in detail about their own. CPT Farrell's conclusion that the "U.S. Army could stand to learn a few lessons" from the Germans is probably valid, though I wish he'd mentioned a few of the lessons.

For two decades officers have cited historians Martin van Creveld and the late T.N. Dupuy as sources of comparative analysis of the U.S. and German armies. However, these historians present arguments every bit as "shrill" (to use CPT Farrell's words) as Bonn's. Simply put, their conclusions are often weak. They rely too heavily on secondary sources. Van Creveld, especially, presents broad-based generalities not backed by thorough analysis. For example, in *Fighting Power*, he states that the Army's officer corps was "less than mediocre." He based this conclusion (and many others) on documentation taken out of context. Another source to support a statement about formation of battalion-sized TFs is the index of a volume of the "Greenbook" official histories.

Dupuy's famous mathematical model "proved" the Germans were, man to man, +/- 1.5 times "better" than the GIs. However, he included many engagements in which the GIs (88th ID, 45th ID, 26th ID, and others) were in their first days and weeks of battle — no veterans here — not to mention including the U.S. 31st ID in the list. The 31st fought in the Pacific — a typo, one hopes. BG John S. Brown (*Draftee Division*, University Press of Kentucky, 1986) offers an incisive analysis of the shortcomings of Dupuy's Quantified Judgment Model.

When the Germans took on the Americans, they were out of their league. The GI infantryman won the war, but America's ability to generate, deploy and sustain (usually barely sustain) combat power around the world was an accomplishment on a scale incomprehensible to a continental power like Germany. What most American fans of the Wehrmacht do not grasp is that victory was not a 'sure thing,' and that the front-line GI often received barely the materiel he needed. Richard Overy, *Why the Allies Won* (Norton, 1995) presents a strategic-level argument worth considering.

But the story lies in the details of just what resources the GI had at his disposal. Let's take a look at what CPT Farrell calls America's "extravagant" logistical situation in the

ETO. No one can argue that the basic U.S. strategic decision of WWII was to outproduce the enemy. However, only a fraction of that production reached the foxholes of the ETO. GIs were well supplied; unfortunately, much of the extravagance was in ships off France.

CPT Farrell cites "a seemingly inexhaustible supply of M-4 based armored platforms (over 100,000)" as an example. I don't know what his source was, but R.P. Hunnicut's definitive *Sherman* lists acceptances of no more than 59,000 "M-4 based" platforms including TDs and SP artillery. Lend Lease additions to this account for no more than 21,000 more "M-4 based" combat vehicles. Not quite 100,000; in fact, total U.S. production between 1 July 1940 and 31 December 1945 was about 88,000 tanks of *all* types.

Take Sherman tanks: about 50,000 produced. Subtract Lend Lease (about 23,000); those used in the Pacific, Stateside training, for R&D, the Mediterranean; and other models not used by the Army, and one gets a conservative figure of about 8,000 Shermans in U.S. hands in the ETO, including theater reserves. Of these, First Army in April 1945 (at its peak tank strength) reported a daily tank count (including maintenance deadlines) of 1,555. Also, less than half of 1944 U.S. M4 tank production was allocated to the U.S. military. My point here is not to lecture, but to demonstrate the pitfalls of such broad statements by historians unfamiliar with the details of production and logistics.

Critical shortages of mortar and artillery ammunition plagued the Army throughout 1944 and into early 1945. It doesn't matter that much of the required ammunition was in ships off the Norman coast. What matters is that it was not in the hands of the firing batteries. For every 20 battalion TOT which saved a GI, there was another soldier who prayed for fire and received a round or two in support. For example, a 24 October 1944 TOT fired by XX Corps artillery included tanks, TDs, captured German guns, Soviet 76.2mm pieces and 90 mm AA guns. Why? There was not enough howitzer ammunition to fire the mission. On 16 October, *all of Third Army fired 794 rounds*. First Army's 155mm guns between 15-21 October 1944 (the battle for Aachen), fired an average of only 10 rounds per gun per day. The rate for 155mm howitzers was 15 rounds per gun per day. Only through such conservation did First Army build reserves for its November attack toward the Roer River. Ninth Army data for the October period is incomplete and Third Army fired even fewer rounds — about 1 round per 105mm tube per day. During the November offensive, First Army, was authorized only 36 155mm SP guns, and a single battery of 8 in. guns to reinforce its 105mm and 155mm medium artillery. Finally, documentation, dry reading though it is, abounds on critical shortages of mortar ammunition during the battle of Normandy.

I won't detail the effects of weather on close air support, especially during the stalemate along the Westwall in 1944-45, but I recommend a look at the XX Corps situation during its operations in the Saar-Moselle Triangle in

January 1945 for a good snapshot of how much CAS the GIs received on a day-to-day basis.

The Army was hampered by perennial shortages of replacement tank track and engines, truck engines, anti-freeze, tires, medical instruments, overshoes, a 77% operationally readiness rate of his wheeled vehicles in by January 1945, and the list goes on. The ETO failed to provide the GI with adequate winter clothing. Add to this the moral effect of the replacement system and problems with transportation, distribution and port clearance, and one begins to get an appreciation of the conditions facing the GI. Again, this is not to say the Germans had it better than they really did — but the GI's war was not as easy as many believe.

Dig into U.S. PW interrogation reports and G-2 periodic reports to see the state of the German forces through the German's eyes themselves. Historian Omer Bartov offers interesting concepts in *Hitler's Army* (Oxford, 1992). Certainly, anyone would conclude that the German army's successful rebuilding effort and stand at the Westwall indicate that it was a capable force, despite the attrition in the Soviet Union. Many German units, such as the 116th Panzer Division, 11th Panzer Division, Panzer Lehr, 12th Infantry, parachute units, and SS were as formidable in 1944 as any German unit was in 1941.

Again, my point here has been to give your readers something to think about, not to defend the details of a particular point of view. No one would argue with CPT Farrell's discussion of the importance of the Soviet front. However, it's time for rigorous analysis of the U.S. situation as well. Unfortunately, few well-known historians have done it.

EDWARD G. MILLER  
LTC, Ordnance  
The Pentagon

### Combat Development: Consider the Trade-offs

Dear Sir:

As a former combat developer at Fort Knox, I feel I must correct what appear to be several misconceptions about tank and armored vehicle design I've seen in recent Armor articles. In particular, I've seen a trend of authors describing either the need for, or conceptual descriptions of very small systems that can do many of the things we ask of our tanks today. Unfortunately, the laws of physics conspire to make many of these ideas less than feasible.

To design a future system, you must first identify its mission — what it must do on the battlefield. These requirements come about through the Integrated Concept Team (ICT) process that involves the combat developers, material developers, industry, and others. Once defined, these requirements drive the actual parameters of the materiel solution. In no particular order:

**Lethality:** What do you want the system to kill? Contrary to some skeptics among us, there are many potential adversaries with large fleets of sophisticated armored vehicles. Ask your S2 for the details, or stop by the DFD Threat Booth at the Armor Conference. If you want a system that can kill a heavily armored target at extended ranges, you need a weapon system capable of generating sufficient energies at the target, with enough accuracy to hit it. Energy requires propellant, either in the form of solids (like we use today), or fuel if using an electric gun, combined with a kill mechanism to do the job at the target. With a suitable basic load of stored shots (or kills, depending on your preference), lethality can be a major vehicle size driver.

**Survivability:** What do you want the system to be survivable against? If you wish to defeat heavy kinetic or chemical energy munitions, you need either a large amount of heavy armor (like we use today), or some combination of sensors, countermeasures, and armor backup. Remember that your system must be able to catch the residue from whatever other survivability systems you use. To defeat hand held weapons, such as RPGs, you must remember that they are fired from very short ranges, and therefore your system would have only a tiny amount of time to react. All of this adds weight and size to the system.

**Mobility:** In what environments do you plan on operating? How fast must you go? How long must you go between refueling stops? Long duration operations require large amounts of fuel, regardless of type. High cross country speeds demand heavier suspensions and more powerful engines.

**Fightability:** What do you require the crew to do? For how long? In what environments? All of these contribute to the crew size and crew station requirements. Even a highly automated two-man crew requires a certain amount of habitable space inside the vehicle, which must be protected. Access to weapons or electronics for repairs or degraded mode operations also drives the crew's space needs.

**Deployability:** How will you get to the fight? In what quantities? With how much sustainment? This requirement is usually seen as a cap on vehicle size and weight. But, consider the requirement to deploy a force, capable of executing certain missions over a defined period of time. This force may have a large number of small vehicles and a large logistical tail, or perhaps a smaller number of larger vehicles that can go longer without sustainment can do the same job, over the same time period — and require fewer sorties to arrive in theater.

**Sustainability:** How will you support the system? Who repairs it? How is it resupplied? How often? These questions help define the reliability, availability, and maintainability requirements of your system.

**Cost:** We cannot ignore the question of cost. How much can we afford to pay for the system? How much for a force armed with the system? What about the munitions? Spares? Training devices? The optimum solu-

tion to all the requirements may end up being unaffordable, so some lesser solution may be more desirable if it actually has a chance of surviving the budget process.

These and many other questions are asked, answered, debated, studied, and traded off between the combat developers, design engineers at the Tank-Automotive and Armament Research and Development Command (TARDEC), and other members of the ICT before the actual decision to embark on a specific system design. But in the end, the key to what ends up in the motor pool is the answer to the question "What must this system do on the battlefield?" Technology and innovation help give us the right system to do the job, but they cannot suspend the laws of physics in the process.

MONROE HARDEN  
MAJ, Armor  
U.S. Army Safety Center  
Ft. Rucker, Ala.

### TERM-like Munitions And Battlefield Roles

Dear Sir:

This letter contains a few comments on COL Kojro's letter in the Nov-Dec 97 issue, "TERM-like Munitions Detract From Tanks' Direct Fire Role." His suggestion is a worthwhile one: "For study purposes, I suggest computer modeling the battalion heavy mortar platoon. ... You will very quickly be able to quantify any combat multiplier effects of TERM ..." However, there can be pitfalls in computer modeling: Is there a reasonably effective model that can be run without great expense? Is that model acceptable to the general military modeling community? Are experts in such modeling techniques available to do the study? How knowledgeable are they in the weaponry being studied? Are these experts unbiased? Will the results be such that mere mortals can understand them? Anyway, modeling would be a good idea if it could be done right. Field experimentation, after the modeling, would be even better, if we could get the Army to spend the money on hardware for evaluation.

Now a few words about the roles of artillery and tanks, and their unique characteristics. Artillery, in the past, was not considered to be very effective against tanks. Tanks needed a direct hit, or nearly so (depending on caliber of artillery), and obtaining such hits on not only moving, but armored, targets was usually too wasteful of artillery ammo. The specific characteristics of tanks were such that, as each generation of tanks became more heavily armored, more powerful weapons were installed, thus driving the armor vs. weapon contest into more weight and volume for guns and armor. The increasing power of guns meant that engagement ranges tended to increase. The guns needed ever higher velocities to get the flat trajectories necessary to get hits on hostile tanks, and the high striking

velocity gave increased assurance that the armor could be perforated. The evolution of tanks resulted in a situation that almost the only other battlefield weapon the tank had to fear was another tank — only another tank had the weapon and armor needed to defeat it. The armor suite was designed to **defeat line-of-sight cannon fire** from other tanks, and was much thicker on the front which normally faced the enemy, with lesser amounts on the sides, and even less on the rear and top.

That has all changed. The (very short range, not very accurate) bazooka didn't change things much when it was introduced in 1942, but later, when its shaped charge was put on the front of a guided missile, the equation began to change. Yes, the missile advocates tend to be 20 years, or so, ahead of themselves in matching performance to hype, but they are introducing real technology advances. We now have a fire-and-forget, top attack capability, not just in missiles like Javelin, but in gun-fired projectiles such as STAFF. [At least, we did until STAFF was canceled after a very successful firing demo in September, 1997. I am relieved to note that more worthwhile causes for our money have been found — such as over \$1 billion to overhaul the Pentagon.]

The artillery, too, has changed. GPS, and other technologies, now allow the artillery to be far more accurate in knowing where it, and its targets, are located. The M483 ICM 155mm projectile has bomblet grenades in it which can put a hole in the top of a tank, and even a tanker's skull. [For some reason, the ability to defeat top armor is underplayed, in my opinion.] 155mm SADARM can defeat not just lightly armored vehicles [another case of understatement], but tanks.

Thus, I now see a major change coming in the dynamics of battlefield engagement. It **will be** [note future tense] possible, someday in the not-too distant future, for tanks to be decimated long before they ever get **the line-of-sight needed** to use their high-velocity, flat-trajectory cannons. This decimation can be by a combination of artillery fire, guided mortar rounds, crew-served missiles, aerially-delivered munitions, and even tank guns fired by those smart enough to demand tank cannons which can fire both smart munitions **and** high-KE penetrators. So I don't see "...questioning the fundamental role of the main battle tank..." as being one of "...countless distracters..." I believe it may well be necessary for the survival of the 'tank,' even if its appearance, weapon suite, and specific battlefield role do change. The military likes to believe that tactics and strategy drive technology. Sometimes they do, sometimes they don't. What has happened is that long-in-the-works developments have finally matured, and there are very real threats to tanks that didn't exist before. Armor needs to both accept the changes and learn how to exploit them. Survival is at stake.

DONALD J. LOUGHLIN  
Bellingham, Wash.

# REVIEWS

**SGT York: His Life, Legend and Legacy** by John Perry, Broadman and Holman Publishers, 1997. 349 pages. \$16.99, hardcover.

Often our most enduring military heroes are the most unlikely men. Sergeant Alvin C. York, an uneducated Tennessee mountain boy, became America's most famous and most popular war hero of World War I. He was also a conscientious objector. This latest book by Tennessee author John Perry explores in painstaking detail every aspect of York's life before, during, and after The Great War.

Perry has written numerous books on sports, politics, and religion. Here he takes on the saga of Alvin York, immortalized for many Americans by Gary Cooper, the star of the 1941 hit movie, "Sergeant York." Perry, however, is less interested in York's wartime exploits than he is in York the man, before and after the war.

In just over three hours of combat during the Battle of Argonne Forest in October 1918, Sergeant York earned the Medal of Honor and the Distinguished Service Cross, and he captured the hearts of patriotic Americans for decades after.

As an NCO, York was quiet, soft-spoken, and a crack shot. Friction and bad luck put York and his platoon behind German lines on a flanking maneuver where enemy machine guns chopped up the Yanks. With the survivors pinned down, York returned fire with his rifle and pistol, killing over two dozen German soldiers. Six of the enemy fell to pistol shots as they charged York with fixed bayonets. He also captured 132 Germans, including three officers and a battalion commander.

But, as Perry points out, York's greatest enemies were not the Germans. Before the war, York was a wild, hard-drinking, fighting mountain boy with little regard for the future. His sudden devotion to his church changed all that. The church prohibited war and killing, so York faced a real dilemma when drafted in 1917. He actually sought to avoid service by his genuine claim as a conscientious objector, but finally reconciled that this war was justified because its goal was peace.

After the war, honors, praise, and money were heaped on the war hero, providing a great opportunity for this kind of simple man. He devoted his life to a dream — to build a school in the Tennessee mountains, so poor, rural children could get the education he was denied as a youngster.

Sadly, his fame after the war brought out legions of unexpected enemies. As money poured in for his project, the naive, trusting York found himself surrounded by sharks, shyster businessmen, self-serving politicians, and greedy friends and strangers. Despite his grand intentions and untiring determination, York made many mistakes, finally losing the school and nearly losing his farm to creditors and the IRS. Even his wartime buddies grew jealous of him and began to circulate rumors, trying to discredit his heroism and smear his reputation.

Through it all, York retained the quiet dignity of a hero and the American public never lost faith in "the greatest civilian soldier of the war." Perry devotes only 15 pages to York's fight against the Germans in 1918; the rest of the book tells of his moral and financial battles before and after he won the Medal of Honor. York was a great military hero for his battlefield courage, but he was also an exemplary civilian hero for his generosity and unselfish efforts to bring education to children in desperate need. Perry's skillful work here proves that "true stories, well-written, are the best stories of all."

COL WILLIAM D. BUSHNELL  
USMC, Retired  
Sebascodegan Island, Maine

**Inside the Great Tanks** by Hans Halberstadt, Windrow & Greene Ltd., 5 Gerrard Street, London W1V 7LJ, England. 128 pages, hardback. Price £25.00, U.K.; \$39.95, U.S. (From publisher direct, including postage, credit cards accepted) ISBN 1 85915 014 4.

Few people outside the armor community have the opportunity to examine armored vehicles in detail. There are some, however, who have, and a select few even own their own collections of historic tanks. One such person is Jacques Littlefield, and he has allowed some of his vehicles to be photographed for the rest of us.

This book is very much a celebration of tanks and tankers. Some idea of what it is like to be a modern crewman on an M1 Abrams and an account of tank layout and design, illustrated by close-ups of suspension systems and engines, forms an introduction to the main business. In that, a dozen vehicles from World War II up to almost the current date are depicted, outside and in. The presentation is rounded out with two modern tanks not (yet!) in the Littlefield collection. Many of the subjects will be familiar to *ARMOR* readers, from WWII-era M4A1 Sherman and M5A1 Stuart tanks, M3A1 scout car and the M2A1 and M16 half-tracks, post-war M37 Howitzer Motor Carriage, late 1960s M551 Sheridan, and the two still-serving 'guests,' the M60A3 Patton and the M1 Abrams. Balancing these are the wartime British Matilda, Czech/German Hetzer tank destroyer, and Russia's T-34-85, plus the latter's more recent T-55 and T-72.

The main features are explained, with road tests showing how each performs. The book also includes veterans' accounts of their use in combat. The main coverage is photographic, with superb color photos throughout, showing each tank outside and in, all shown in a state which will gladden the heart of any top sergeant. Take care to read the captions and the text; there is much to be learned there, and the balance of words and images is well done. For an outsider, this is a good introduction to the enclosed world of the tanker. For the veteran, there's a chance for nostalgia, and for

the serving crewman a depiction of their world contrasted with that of an earlier generation. Presentation is second to none, and while some subjects are not strictly tanks, they are all classic armor. Well worth seeking out.

PETER BROWN  
Dorset, England

**Kursk: Hitler's Gamble, 1943** by Walter S. Dunn, Praeger Publishers, Westport, Conn., 1997. 216 pages, \$57.95.

While many of us are well-read in the military history of World War II, few of us know much about the war fought on the Eastern Front between the Germans and the Soviet Red Army. What we did know was derived from Western, mostly German, sources. The fall of the Soviet Union lifted the veil of secrecy on Soviet archives, and we can expect in the future a more balanced, more informed treatment of this part of the war's history.

Walter S. Dunn's *Kursk: Hitler's Gamble, 1943* is a new contribution to our understanding of the vicious war fought between the Wehrmacht and Red Army. Dunn specifically chronicles the Kursk campaign in the summer of 1943, which was the last major offensive undertaken by the Germans on the Russian Front. This campaign is of special interest to Armor soldiers because of the central role played by armor on both sides. Although frequently referred to as a "battle," Dunn points out that Kursk was really several distinct battles fought over a huge area, involving several armies on both sides, over several days. An operational history of the campaign, Dunn's book is the first to make extensive use of Russian archival material.

Operation Citadel, the German operations plan, was designed to simultaneously attack both shoulders of the large Soviet salient centered on Kursk. The Germans hoped to pinch off and destroy a large part of the Red Army, shorten their lines and regain the initiative after their debacle at Stalingrad. Dunn points out that this plan was in danger from the beginning for a number of reasons, not least of which was superior Soviet intelligence of German intentions. While other Western historians have argued that the Germans failed in part because of Hitler's refusal to release reserves (this supposedly related to the Allied attack in Sicily), Dunn argues that the Germans failed principally for other reasons. Hitler interfered, but to postpone the operation, to allow more time for new German tanks and replacements to reach the field, and to allow the transfer of several divisions from France. While this greatly strengthened the Wehrmacht, the Red Army overmatched these efforts with its own massive reinforcement and rebuilding efforts. Dunn gives appropriate credit to the Lend-lease program, in helping the Soviet build-up, but the lion's share belongs to Soviet industry and organization. The end result of the delay was a German Army actually weaker relative to the Soviets.

Particular strengths of Dunn's work are his discussion of the strategic situation following Stalingrad and leading up to Kursk, and his detailed order of battle for both sides. Dunn also explains the Soviet system of defense, which played such a crucial role in slowing the Germans' initial assault. Despite their early successes, the Germans never succeeded in penetrating the Soviets' series of defensive lines quickly enough to cut off the Red Army units in the Kursk salient. These units fell back in good order to the next defensive line and had the advantage of interior lines of communication that permitted rapid reinforcement. The German reinforcement of their successes never kept pace.

While Dunn's account of these battles is commendable from an operational perspective, the human element is noticeably lacking. Readers will not find much human drama or pathos of war in these pages. As a result, we are given the facts, and many new bits of information at that, but not much insight into or appreciation for what the participants were thinking or feeling at the time.

Dunn's work suffers from two other serious flaws: the lack of photos and the lack of maps. This may be related to the cost of the book, as either or both of these would have significantly added to an already high cost. While we are all supposed to be too sophisticated to need pictures, a small visual gallery would have added to this book, especially when the pictures (even of the Eastern Front) are readily available. The total absence of maps is more serious; Dunn's narrative is filled with unfamiliar place names and readers can easily lose track of units and their movements. Many soldiers, who want to understand the terrain and the flow of the battle, will miss those maps.

Dunn has contributed significantly to the history of World War II by tapping new sources and reexamining the operations of this important, but unfamiliar campaign. Serious military scholars and wargamers interested in the Eastern Front will revel in the amount of detail here. However, more casual professional readers (and that includes most of us), looking for an understanding of the battles of Kursk, may do better by reading a more accessible work, such as Martin Caidin's dated, but still interesting *The Tigers Are Burning*.

LTC STEVEN C. GRAVLIN  
Inspector General, USA TACOM  
Detroit Arsenal, Warren, Mich.

**To Hasten the Homecoming: How Americans Fought World War II Through the Media** by Jordan Braverman, Madison Books, Lanham, Md. 1996. 276 pages, \$24.95 (hard cover).

Much has been written about World War II: the battles, the generals, the various theaters of operations, and the requisite summary of equipment used. So another book about World War II would not necessarily pique

someone's interest. But, this is not another book about World War II, and it is not a book about the battles. Nor is it a book for those looking for answers to strategic or tactical questions. Clausewitzians can search elsewhere for their cup of "On War."

No, this is a book about the other theater of operations — the home front, fought in a global information environment of vacuum tubes, newsprint, and newsreels.

Jordan Braverman takes a unique look at how Americans fought World War II at home. How did America live through those tumultuous years? While the conflagration was raging in the Far East, while the V2s were buzzing over London, what was Smallville, U.S.A. doing?

Braverman's Smallville setting is Lorna Road, Mattapan, Massachusetts.

Lorna Road could be any road in any town in America. But, it was the author's road for this war. He provides insightful information about the attitudes of those at home and what people were doing to help the war effort. He notes that, in 1944, our schools financed 2,900 planes, 33,000 jeeps, 600 amphibious jeeps, and 11,600 parachutes, the financing coming from the sale of stamps and bonds to school children across the country.

Braverman describes the different aspects of the media and how that media transmitted information to its various publics. He describes the fighting, not in the foxholes but within struggling government agencies such as the Office of War Information in a country struggling to determine how or what information to provide the public.

A 1942 poll revealed that Americans knew very little about the war. Almost fifty percent said they did not know why the war was being fought, and nearly a third would negotiate peace with Germany. It was through the radio, music, theater, books, cartoons, and advertising that America lived the experience of World War II. It was through these media that the U.S. government brought the war to the home front and informed that fifty percent.

*To Hasten the Homecoming*, is a book worth reading, a book worth keeping.

BENJAMIN B. SANTOS  
LTC, Armor  
Public Affairs Officer  
III Corps and Fort Hood

**Patton's Ghost Corps: Cracking the Siegfried Line** by Nathan N. Prefer. Presidio Press, Novato, Calif., 1998. 233 pages, \$24.95.

An appropriate subtitle for this book could be "Lest We Forget," as readers are reminded once again of the unparalleled heroism of American troops in World War II Europe. In the midst of an ongoing debate among historians concerning the fighting ability of WWII American soldiers, military historian Nathan N.

Prefer recounts, in vivid detail, the success of American G.I.s.

The author's mission is twofold, on the one hand challenging historians — Europeans mainly, but not exclusively — for their tendency to concentrate on the most popular and costly battles or campaigns of the war. However, Prefer concedes that these studies are valuable in learning the abilities of soldiers. Secondly, he warns historians that to focus only on the major battles gives rise to an inherent danger of writing that the Americans fought well only when they had overwhelming materiel superiority. In fact, there were other, lesser known battles, not as well studied, covering actions when American G.I.s fought on relatively equal terms with the enemy and prevailed. The Saar-Moselle triangle is a case in point.

In December, 1944, General George S. Patton turned the Third Army north to attack the massive Nazi advance through the Ardennes in what has come to be called the Battle of the Bulge. Left behind was a single corps, MG Walton H. Walker's XXth ("Ghost") Corps, which was immediately faced with the daunting task of defending what had been the entire Third Army front line. The "Ghost Corps" was then called upon to attack and dislodge the Germans from their strongly prepared positions along the fortified Siegfried Line, ultimately opening the door into Germany for the Allies.

The XX Corps manned the line with only a minimum of troops and equipment to perform its mission. The part of the line they faced was known to the Germans as the Orschotz Switchline, while the Americans called it the Saar-Moselle Triangle, the title given for military purposes to that strip of Germany lying between the Saar and the Moselle rivers.

The top of the triangle was formed by the juncture of the two rivers. The western line of the triangle was the Moselle; the eastern line the Saar. Extending 19 miles from top to bottom, the triangle was 10 miles wide at the base. The terrain enclosed within the area was rugged and heavily wooded. The elevation at one point at the base of the triangle was 1,300 feet, and there were few roads suitable for the offensive use of armored columns. This uninviting area, however, was of great military importance in the plans of XX Corps. The Saar-Moselle Triangle was Germany's main line of resistance. Above the triangle lay the city of Trier, a key communications center. Trier guarded the Moselle Corridor, an important pathway to the Rhine River.

The author draws extensively on primary and secondary accounts of the action to take the reader down to squad, and often individual, level. The accounts tell of those men who distinguished themselves and fought under indescribable hardships, not only against the enemy, but against the record-breaking cold and other adverse weather conditions, which also restricted air support in addition to causing many non-battle casualties.

The XX Corps' struggle in the Triangle and its success in piercing the Siegfried defense is

in itself a compelling argument that the American soldier was the equal of his opponent, with or without the materiel advantage so often cited as the reason for his victories.

Prefer's *Patton's Ghost Corps* makes a valuable contribution with other books that reexamine the roots of American victory in Europe in 1945, not to the discredit of a valiant opponent, but rather to the recognition of the dedication, determination, motivation, and intestinal fortitude of the trained American soldier. Prefer has worked the less-plowed ground which is fertile territory for additional studies of the lesser-known battles that display different conditions than those most commonly studied.

DENVER FUGATE  
Radcliff, Ky.

**The View from the Turret: The 743d Tank Battalion During World War II** by William B. Folkestad, Burd Street Press, Shippensburg, Pa., 1996. 146 pages, \$24.95 hardcover.

While many of us are familiar with the exploits of the tank battalions organized within armored divisions in World War II, less known are the sacrifices of the men of National Guard tank battalions that supported the infantry divisions. The 743d Tank Battalion was one such National Guard battalion. It supported the 1st, 29th, and 30th Infantry Divisions at different times during World War II. It was the first tank battalion to land on Omaha Beach on June 6, 1944. In fact, the 743d was the only full-strength tank battalion to land on the beach that day. Throughout those crucial first days, the companies of the 743d supported both the 1st and 29th Infantry Divisions.

Although Mr. Folkestad has not previously published a work of military history, he provides an insightful view into the lives of the men in this tank battalion from their training in England before the D-Day assault, to the police actions that followed the war.

*The View from the Turret* is an extremely well documented book that includes personal recollections from over fifteen 743d survivors, as well as official after-action reviews.

The author skillfully weaves the stories of the men into each chapter. Mr. Folkestad developed each chapter from the major actions and battles that the 743d fought, and the chapters frame each of the personal accounts. The major drawback to the book is that without a good personal or historical perspective of the battles about which Mr. Folkestad writes, readers can get somewhat confused. One of the book's few inadequacies is the lack of maps. There are only two maps that aid the reader in maintaining his bearings in the 743d's fight across Europe. It was extremely distracting to turn to one of these maps to find where the town of Masta was in relation to the town Stavelot, only to find that the map didn't have a "Masta" on it. I quickly resorted to my *U.S. Army in Action* series books for a better overview of the campaign.

*The View from the Turret* is an easy read. It took me two days of late-night reading to get

through this well-written work, but I'll warn you: the book is hard to put down. In the end, the personal accounts of the 743d survivors made me feel very fortunate to have recently commanded an Abrams company. I now fully realize that my predecessors of 1942-45 in their Grants, Chaffees, and Shermans fought in significantly outgunned and under-armored tanks.

CPT JOSEPH C. HOLLAND  
Ft. Knox, Ky.

**The Trophies of the Red Army During the Great Patriotic War 1941-1945; Volume 1- Antitank rifle, Aircraft machine Guns and Assault Rifles** by Yu. A. Natzvaladze, translated by Igor F. Naftulett, Land O'Sun Printers, Inc., for the Champlin Fighter Museum, 4636 Fighter Aces Drive, Mesa, AZ 85215. 223 pages, \$49.50.

The Fighter Aces Museum has published what it hopes will become the first volume of a series of books on the contents of the collection of historical weapons of the Museum of Artillery, Engineer and Signal Troops in St. Petersburg, Russia. The majority of weapons in the book were collected on battlefields, shortly after the shooting stopped, by teams from the museum. Countries with weapons in the collection include Russia, Germany, the Soviet Union, Finland, Japan, the United Kingdom, Italy, Japan, and the United States.

This initial volume has three chapters covering antitank weapons, aircraft machine guns, and assault rifles. Future volumes (if the first is successful) will cover magazine rifles and carbines, semi-automatic pistols, sub-machine guns, semi-automatic rifles, light machine guns, heavy machine guns, unified machine guns (guns that can be used as light or heavy machine guns), hand grenades, combat pyrotechnics, revolvers, and protective equipment. For most weapons there are both photographs and illustrations with explanatory notes. At the end of each chapter is a short description of each weapon covered. The body of the text describes the weapons and lists the operating characteristics, such as weight, length, range, and armor penetration (where applicable) in both the metric and English systems of measurement.

The coverage of antitank weapons begins with the 13.35mm Mauser 1918 turnbolt rifle and extends to the X-7, the first antitank guided missile, ready for production in late 1945. Included are rifles, antitank hand and rifle grenades, recoilless guns, antitank rockets, tapered-bore cannons, remote-controlled tracked vehicles and incendiary bottles. Particularly impressive is the detailed information on mass production of the incendiary bottles, known in the West as Molotov cocktails. Equally as good is the chapter on aircraft machine guns. The ingenuity of weapons designers is noteworthy, but not as relevant to readers of *ARMOR*.

The chapter on assault rifles begins with a discussion of the 1916 6.5mm Fedorov "ma-

chine" rifle, the first assault rifle used in combat. In 1919 the Fedorov was first called the "avtomat," the Russian term for assault rifle. The Fedorov avtomat was withdrawn from service in 1928, when the decision was made to standardize on 7.62mm rifles. Coverage of assault rifles used or experimented with in World War II is very extensive and useful to a historian of assault rifles. Since the AK-47 is a post-war weapon, it is not covered, although some competitors of the AK-47 are.

Overall, while the extent of the detail is excellent, possibly the most exhaustive in a single volume currently available, there are a few translation problems. Readers should know that a "cumulative" projectile is a shaped charge projectile. A "propulsion" projectile has a rocket, while a "dynamic propulsion" weapon is a recoilless gun. This book should be purchased by all libraries serving a military clientele. Individuals aspiring to serious knowledge of weapons development should also purchase this book.

GERALD A. HALBERT  
Earlsville, Va.

**Panzerjäger: Tank Hunter** by William B. Folkestad, Burd Street Press, Shippensburg, Pa., 1997. xi + 117 pages, maps, photographs, \$24.95.

Of the 145 divisions earmarked for Hitler's invasion of the Soviet Union in June 1941, a full 112 were neither mechanized nor motorized. For them, towed antitank guns, or *panzerabwehr kanonen*, provided the principal organic direct fire defense against enemy tanks. In *Panzerjäger: Tank Hunter*, William B. Folkestad (Central Washington University) relates the experiences of Bernhard Averbek, who served as a *PaK* crewman and gun commander in the East from February 1942 to October 1944 and, later, on the Western Front.

For readers whose understanding of German doctrine is limited to its innovations — *auftragstaktik*, *schwerpunkt und aufrollen*, and the like — Averbek's tale supplies a badly needed glimpse of the German Army's less innovative aspects: linear tactics, inflexible command and control, obsolescent weapons, and small unit leaders who are unwilling to exercise initiative. When Averbek arrives at the front, the only available trucks are captured ones and, even when adequately supported, the *panzerjäger kompanie's* six firing sections can rarely be used to their best advantage because only the company commander has a radio.

Several shortcomings detract from an otherwise engaging story. The narrative, based entirely on oral and taped interviews, is transcribed without the benefit of an editor's explanatory remarks or footnotes; this format may prove problematic for readers less familiar with the "big picture" in Army Group Center's area of operations. A more comprehensive map, an index of place names, and a brief list of more broadly focused related works — those of Ziemke, Glantz, and Carell for instance—would have helped set the context as

well. The reader will also notice some technical and copy editing errors, e.g., a German infantry battalion with thirteen companies (p. 20), "Nissan huts" (p. 103), Soviet "222 mm guns" (p. 49), and a "railway station teaming with soldiers" (p. 45).

Its flaws notwithstanding, *Panzerjäger* should prove an eye opener for anyone whose understanding of the Russian Campaign begins with Guderian and ends with Manstein.

JOHN DALEY  
Pittsburg, Kan.

**Strike Swiftly! The 70th Tank Battalion from North Africa to Normandy to Germany**, by Marvin Jensen. Presidio Press, 1997. 368 pages, \$24.95.

Tank combat in northwest Europe continues to attract the interest of past and current members of the Armored Force. Perhaps we remain fascinated by how brave men in desperate situations, using second-rate equipment, managed to win and survive while fighting an army that wrote the book on armored warfare.

This book helps fill the gap which exists in our understanding of the missions and utilization of American separate tank battalions during WWII. That gap exists primarily because of the focus on division and regimental combat — separate tank battalions, crucial to many in-

fantry fights, were by their very nature and utilization a different breed of cat. Their operations are usually buried deep in the details.

The author served as a cook in the 70th, and this lends an interesting perspective to the book. He unabashedly admits to being glad that he was not a tanker, and he acknowledges the hardship and danger for those who were. In his admission, he provides a vehicle for realizing that in modern armored combat, it's not just the tankers and accompanying infantry who are at risk. The soldiers who drive the LOGPACs forward and those who recover damaged tracks under fire (usually without a FIST team or any direct fire support handy), also take risks and share the dangers on the modern battlefield.

The 70th Tank Battalion is a great unit about which to write, a memoir writer's dream. Founded in 1940, simultaneously with the creation of the Armored Force, this separate battalion saw action in all the great campaigns in Africa and Europe, save Italy. These tankers fought in Tunisia, Sicily, Normandy, the Huertgen Forest, the Bulge, and Germany. A review of this battalion's history is a walk through the great American battles against the *Wehrmacht*.

For those tankers who cringe at the thought of cross attachment to an infantry battalion within their own brigade combat team, imagine the dilemmas faced by the leaders of the 70th. These armor leaders were required to some-

how control and support a tank battalion which had its companies dispersed across an entire infantry division sector, generally operating with one tank company attached to each infantry regiment. The role of tanks in the direct fire support of infantry, a frequently overlooked though crucial task in wooded and urban terrain, jumps out of this book. AGS anyone?

At a time when we measure our deployments in six month blocks, and spend incredible amounts on supporting our families and communities, the reader will think about a battalion which deployed in early 1942 and returned when the war in Europe ended, a period of over 3 years. While the turnover rate was high, many of those soldiers who initially deployed with the battalion remained with it throughout the war. In recognition of how our Army has changed in that regard, you will find no large sections discussing family support groups here.

This book is a good read, but do not expect a scholarly history on separate tank battalions or tank doctrine. The maps are sketchy, and the sources fairly general. What this memoir does provide, however, is a wealth of anecdotes and a gut feel for the stresses, dangers, and costs of heavy combat, something at which the after action-reviews and training at our CTCs can only hint.

KEVIN MCKEDY  
LTC, Armor  
USAREUR/7A

## DECISION, from Page 16

<sup>17</sup>Paraphrased from Klein Associates Inc., *A Knowledge Elicitation Study of Military Planning*, p. 62. Hereafter listed as Klein.

<sup>18</sup>Paraphrased from Klein, p. 23.

<sup>19</sup>"Recon pull" operations require a rapid decision-making command-staff process. An example of "reconnaissance pull" operations was provided in a monograph produced by the U.S. Army Armor Center titled *Tanking in the Desert* (Fort Knox: U.S. Army Armor Center, August 1990), p. 7-40:

Note: "Recon Pull is a technique used by commanders to identify and maneuver against an enemy weak point and to exploit success. Leaders at every level — from scout squad leader to regimental commander — may use this technique. In a force-oriented attack, the commander should maneuver his main effort against the enemy weak point. By attacking the weak point of the enemy, the commander enhances the ability of the unit to destroy the enemy; the commander enhances the ability of the unit to destroy the enemy because it can generate tremendous local superiority in firepower.

Commanders normally identify a weak point during IPB. Often, however, the commander will not know ahead of time the exact location of the weak point with absolute certainty. Reconnaissance during the execution of the attack will often disclose that the suspected weak point is not present, and that there is a weak point elsewhere. The commander should then attempt to shift his

main effort to attack the newly discovered weak point." p. 7-40.

<sup>20</sup>Sun Tzu, p. 77.

<sup>21</sup>Sun Tzu, p. 63.

<sup>22</sup>FM 100-5, 1993, p. 6-15.

*LTC John F. Antal is an Armor officer currently a student at the U.S. Army War College at Carlisle, Pa. He has written several books on armored and infantry combat and numerous articles in military magazines and professional journals. He has served in a wide variety of command and staff positions, including duty as a tank company commander [C/3-32 Armor and A/1-72 Armor], a tank battalion operations officer [1-72 Armor and 2-8 Cavalry], battalion XO [1-63 Armor OP-FOR], brigade XO [NTC Operations Group and 1st Brigade, 1st ID] and as the commander of the "Dragon Force," 2-72 Armor in the Republic of Korea.*

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The Battalion Maintenance Officer Course (BMOC) is now available as a multimedia CD-ROM! Recognizing that both the Active and Reserve Components need and want exportable instruction, Armor School training developers have produced a comprehensive course that is designed to prepare company grade officers of all branches for assignment to positions requiring unit maintenance management skills. Students can enroll in the CD-ROM version of BMOC by submitting an approved DA Form 145 (Army Correspondence Course Application) or register via the World Wide Web at [www.atsc-army.org/atdl/register/acop\\_top.htm](http://www.atsc-army.org/atdl/register/acop_top.htm). Each student will receive a preformatted 3-1/2 inch diskette with the BMOC CD-ROM for recording test results which are automatically scored by the program itself. The course consists of 14 individual lessons, with special emphasis given to Unit Level Logistics System-Ground (ULLS-G) procedures.

For more information about BMOC CD-ROM, call CW3 Wenstrand or SFC(P) Boles at (502) 624-2509/8119 or DSN 464-2509/8119, fax to (502) 624-5743 or send e-mail to:

wenstrk@ftknox16cav-emh12.army.mil.

# Introducing the M240 Dismount Kit

by Larry T. Hasty

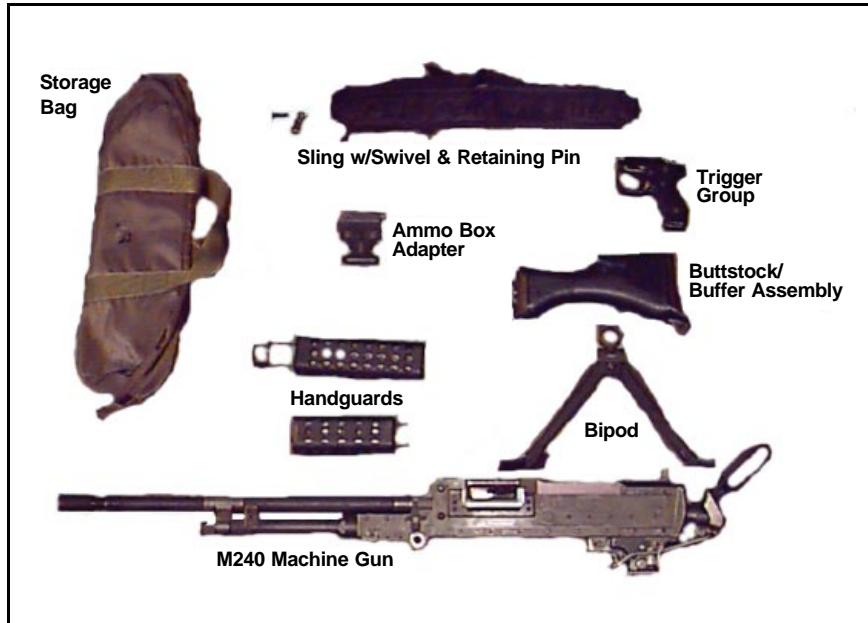
As a tanker, have you ever performed observation post tasks, escape and evasion operations, or checkpoint missions and wished that you had more firepower available?

In the near future, tank crews will have that increased capability. Crews will be able to dismount the loader's M240 machine gun and quickly modify it for ground operations with the new M240 Dismount Kit. The kit consists of a bipod, buttstock/buffer assembly, trigger group, two piece handguard with heat-shield, a sling with swivel and retaining pin, an adapter to hold the ammo box, and a bag in which to store the kit.

These components were successfully tested as a system by both the Infantry Center and the U.S. Marine Corps. The kit does not include a sight, due to cost, but testing has shown that even without the sight, the weapon provides effective killing fire and area suppression. Components of the kit are shown in the photo above.

The Commanding General of the U.S. Army Armor Center has requested that the Project Manager Small Arms establish a program for the M240 Dismount Kit and begin fielding as soon as possible. Funding is now identified and initial fielding should begin 3d Quarter FY99.

Questions or requests for additional information can be directed to Mr. Larry T. Hasty or SSG Ray



Ainsworth at the Directorate of Force Development, DSN 464-3662, or commercial (502) 624-4794.

*Larry Hasty is the team chief of the Soldier Systems Team assigned to the Directorate of Force Development.*

PFC Marco A. Vazquez of HHC, 3-81 Armor, mans an M240 fitted with new dismount kit. A bipod, buttstock, and trigger group adapt this effective tank machine gun to ground use.

