ARMOR

Armor Turns to the City Fight

PB 17-00-3 *May-June 2000*

Saddle Up... Tonight We Ride

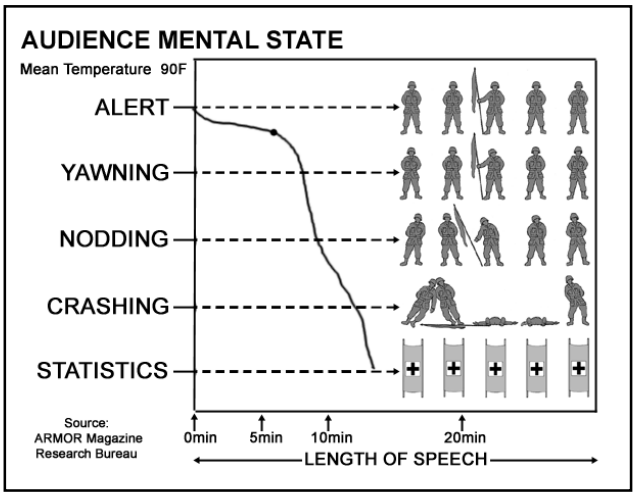
"Survey says..." According to my most recent survey, soldiers are getting sick and tired of being surveyed and reading survey results about why good people leave the service and why we're having trouble recruiting their replacements.

I wonder if we might conserve all the effort of these prestigious institutes and polling organizations with a simple one-question test. Ask those in uniform if they would encourage their sons or daughters to join the military. If a majority answers with a resounding "No!," then a tough recruiting mission is about to get a lot tougher down the road. This would not bode well for a mounted force requiring more crewman and scouts with the advent of Brigade Combat Teams, not to mention that we are also a force that places a premium on crew cohesion and retainability.

My father, an old tanker, sent two sons to the Army, one to the Air Force and another to the Navy. Ask those around you in uniform why they joined the Army and I'll wager a veteran father, uncle, or friend played a pivotal role in the decision. And yet, we may be losing this most precious recruiting resource. Increasingly veterans are feeling betrayed on the issue of health care. "In south Mississippi alone, I've got 14,000 military retirees who, on a daily basis, are telling kids not to join the service because they feel like they have been given the short stick when it comes to their health care," said Rep. Gene Taylor, D-Miss. During and appearance on Capitol Hill, Chairman Joint Chiefs of Staff, Gen. Henry H. Shelton echoed these sentiments in regard to fully paid health care for retirees: "It's not just the right thing to do; it is the smart thing to do, because it sends a very strong signal, not only to those serving today, but also those considering a career in our armed forces. And it keeps faith and keeps the commitment to those that have served and retired." We at ***ARMOR*** know well that retired tankers and cavalrymen do not go gently into that good night. We hear from them daily; they remain engaged and are a force to be reckoned with. It's my hope that those with the power to help veterans will do so, so that they will continue to take care of us.

Hot Air - The season of speeches is upon us. Have you ever wondered, as I do, why some generals and potentates begin a speech with the acknowledgement, "Soldiers, you look great out there! I know it's hot today, so I'll keep this speech short," then proceed to speak for 25 minutes or 'til a bunch of soldiers hit the ground? There ought to be a rule somewhere that says if it is 90 degrees or hotter, speechmakers must curtail their words of wisdom at the 10-minute mark. Trust me, no one is listening to the speech after 10 minutes or so because they are too busy thinking, "When is this guy gonna stop talking?" or "Damn, it's hot!".

— D2



By Order of the Secretary of the Army:

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LETTERS

An Outsider's Look
At Armor's Situation

Dear Sir:

Angels — and other experts — have rights to carp and crack wise when fools red dog into zones of which they have no direct experience. I have never had the honor of serving a day in the professional military, but have followed its twists and turns nearly 50 years in the course of a career teaching history. In the '60s, at the height of the student rebellion, it used to be said that war settles nothing. Yet all the major turning points in Western history, from Marathon in Ancient Greece to the Second World War, have been marked by war and battles lost and won.

It may not say much for the human race, but it says an enormous amount about what it takes to defend the legacy of civilization. Words, fine intentions, and concerned diplomacy are never enough. In the end, it is the presence of military force that determines the security of a nation's — or a civilization's — values and way of life. It certainly was not expressions of love of peace that won the Cold War, bringing an end to the Soviet threat to human freedom, but rather the strength of our military and the terminal cost to the Soviet Union of trying to match that strength. And in this, our time, the health of the U.S. armed forces is particularly critical since it is the existence of those forces that surely is the guarantor of the relative peace the world currently enjoys. In short, the debate over the Army's future — centered on the issue of doctrine in the November-December issue — goes beyond adjustments to an old and generally conservative institution struggling to come to terms with major technological change.

The current debate seems clearly to have been triggered by the ambivalent performance of the Army in Operation Allied Force. Here I think the Army has been given a generally bad rap. Ralph Peters, a man whose commitment to a better Army is unquestionable, was guilty of something of a verbal low blow when he said on *The News Hour* — and I am paraphrasing here — that the "Army had found a perfect way to avoid casualties; it's obese; it can't move." The truth of the matter is that the Army was explicitly told at the outset of the Kosovo operation that no land forces were going to be committed — this was to be a bombing operation. And then, a month later, when the air campaign had not brought Milosevic and the Serbian Army to its knees, suddenly voices could be heard that land forces might be needed after all, and the European Command began to respond piecemeal, transferring a number of engineering, helicopter, and infantry companies to Albania. And the major news out of that effort was the slowness of the Apache companies to arrive and to achieve a level of combat readiness that would allow it to perform missions in Kosovo while losing two helicopters and crew in the training effort. The point to be made is that, had the Army been told at the outset in late March, it clearly could have had an effective fighting force in Albania by early June, at least at the brigade level. But it was simply not asked to do this. Even if contingency plans had been made, it would have taken an executive order to put them into effect by mobilizing the appropriate air and sea lift. So that to criticize the Army, after the fact, for not being there in force is an exercise in contradictory logic. It wasn't there with a combat ready force because it wasn't ordered to be there with such a force.

That issue aside, the Army — and its Armor branch especially — has a problem in what has been labeled Strategic Mobility. That problem has a direct effect on doctrine since what you bring to the battlefield directly affects what you can do and how you do it — the guts of doctrine. But a larger point should be made first; namely, of all the services, the Army is faced with the hardest decisions and the most difficult base from which to make those decisions. The heart of the problem is the enormous range of responsibilities with which the Army has been tasked and the rapidity which any one of those responsibilities can come front and center requiring immediate attention. The Army, in any given week, can be asked to do warfighting — and at any one of several different levels — or peacekeeping, or disaster relief, or diplomatic activity via its tutelage relationships with dozens of newly independent or emerging nation states around the world. None of the other services is forced to deal with that range of issues, and the Army has to do it on a budget that is perennially the smallest of the three major services. The Navy can concentrate on developing a force required to control the sea surface necessary to U.S. interests, a problem simplified by the collapse of the Soviet Union since the Navy now does not have to face a serious "blue water" challenge; it can concentrate on what it has termed "littoral warfare," dominating the coast lines of crisis areas. The Air Force has air superiority and precision bombing as its primary tasks, large tasks but straightforward in their structure and formulation. And both services have ancillary responsibilities of providing mobility to Army forces and that is the point; to the Navy and Air Force these are secondary to what both consider their first-line business. That leaves the Army as a kind of perpetual poor relation, drawing down on resources which its brother services would dearly love to spend on what they believe are their leading edge responsibilities. Life has been tough for the Army; it will continue to be. For the Army to do what has been asked of it is going to require some cool thought and some hard decisions. And mobility and quick reaction will be at the heart of that thought and those decisions. And more than anything that is going to mean thinking across branch lines to produce a doctrine that allows for a maximum amount of flexibility, and I doubt if there are going to be many school answers, as most of the school problems are changing before our eyes.

The two branches that seem to underpin everything are Intelligence and Logistics. A tough, no-nonsense list of probable crisis points around the world has to be prepared and a rough estimation of forces required to respond drawn up. I think it would begin with Korea, run through the Middle East, and then to the continuing drug and guerrilla warfare problems in South America. Western Europe seems a quiet front, at least for the immediate future. And then, once the list is compiled, no reaction force should be assigned to it that exceeds the logistics and transport capacity available to Army planners. I'm sure this has been done in the past; contingency plans made and locked up. What is necessary now is a kind of rolling contingency planning since the crisis of the month can arise with blinding speed. No one was talking major ground forces in Kosovo until suddenly it was upon us in May. I'll quietly suggest it could have been anticipated and that Albania would have been the place of entry.

The Armor branch is particularly affected by this debate over strategic mobility. As the physically heaviest of all the branches, it requires the greatest amount of lift and hence confronts the issue more directly of how to get to the fight in some of the farther corners of the world when the national interest demands that. The branch has been criticized for placing all its eggs in the basket of the M1A2 tank, at near 70 tons, one of the most difficult items of war to transport. Certainly the branch could have benefited from the addition of the M8 Armored Gun System to its arsenal and the decision to cancel that weapon system should be revisited. But in the interim, ways should be sought to make armored units deployable on relatively short notice. I think there are ways to do it, particularly if the branch is willing to think in terms of brigades rather than divisions.

The Navy's Military Sealift Command owns eight Fast Sealift Ships capable of sustained speeds in excess of 25 knots and with sufficient carrying capacity to load and transport a heavy division. If that bloc of ships were divided into two groups of four, each group could be preloaded with at least one heavy brigade. If one group was assigned to the East Coast and one to the West Coast, the Army would be in a position to put a heavy armored brigade into a crisis situation most likely within a week to 10 days of a national decision to do so. If one combines that capability with the capacity to airlift light forces to a crisis within several days, you come out with the ability to put a very creditable force on the ground in a matter of weeks instead of months. Light forces would not be asked to do more than seize and hold port facilities and landing strips; maneuver capacity would arrive with the heavy brigade, whose personnel would be flown in to link up with their incoming equipment. This is an expeditionary force concept and links up with a similar concept adopted last year by the Air Force. At a time when the Army can be called upon to establish a presence in areas where it doesn't have prepositioned brigade sets, it is an idea at least worth consideration. Is it workable? It is if the will is found at the DOD level to provide the shipping.

One of the implications of an expeditionary force is that it may have to be committed against a numerically superior enemy, at least at the outset of real or threatened hostilities. This was the potential condition in Kosovo. There were reported to be near or in Kosovo some 25,000 Serb troops. An expeditionary force, made up of a mix of light and heavy brigades, would probably number in the neighborhood of 10,000 soldiers. The question becomes, can a force of that size undertake offensive action against a defending force some two and half times greater? The answer is yes if one accepts the arguments that the Revolution in Military Affairs has brought advantages in reconnaissance, fire power, and communications that no other army can match. From this distance, that appears to be the hardest issue confronted by the drafters of the new version of *FM 100-5.* Do we embed the promise of the new technology of warfare in doctrine and begin to train for it? As uncomfortable as it is to say so from the standpoint of someone who would not have to be a part of it, it seems to me that this Rubicon should be crossed and that we should begin to think of sanctioning attack against a numerically superior defense. If we have the advantage of air supremacy, which I believe the Air Force can deliver, and deliver with increasing effectiveness given its heavy investment in precision guided weapons, offensive maneuver against larger defending units becomes a real possibility.

Finally, the problem of doctrine was glaringly highlighted in the back-to-back articles of General John Kirk, critical of just about everything the Army has attempted doctrinally in the past decade, and Col. Robin Swan, Director of the School of Advanced Military Studies. Col. Swan's essay, which was captioned as a reply to General Kirk's critique, seemed to confirm much of Kirk's complaints of the lack of focus in the current effort to rewrite doctrine. The Colonel met none of the General's specific criticisms and offered up an array of rather bland generalizations capped by the declaration that access to the working papers of doctrine writing group were and are "restricted" for fear they might be read by the Iraqis or the North Koreans. One has to wonder who benefits by the secrecy. If the doctrine is strong and successfully integrates the new weaponry in a clearly coherent and practical form, its availability to possible aggressors could serve a very useful deterrent function. Openness would also produce the double benefit of more deeply involving its ultimate consumers and thus in the end producing a more useful and workable *FM 100-5.*

ROBERT F. LIDDY
Binghamton, N.Y.

Why Don't We Demand That Leaders Know Our Doctrine?

Dear Sir:

I read the doctrinal articles by BG (Ret.) Kirk and COL Swan (Nov-Dec 99) with great interest. I found them very informative descriptions of how we do or should arrive at doctrine. I think there is a key point that has been missed. We as a army do not put a great deal of emphasis on knowing our doctrine and there is no real price to be paid for being technically ignorant in this area, at least among the officer corps.

When an officer graduates from CGSC, he or she should be as technically competent as one can be in one year's instruction and primed to go out and learn more and apply it in the field. Unfortunately, this does not happen. A graduate of the respective branches' advance courses should be in the same condition with regard to company- and battalion-level doctrine and tactics. What happens, of course, is that we learn very quickly that these areas are not very important. How can this be? At NTC and JRTC we learn about focused courses of action, which are of course contrary to the MDMP, but are after all what you "have" to do to win or at least do well. Who out there in your readership can explain the difference between a brigade and a brigade combat team? The short answer is they are the same thing, so why do we use BCT? The answer is that we ignore current perfectly good definitions and terms to "invent" new ones at no great benefit to the Army. This process further clutters our professional lexicon and undercuts the value of doctrine.

I spent five years as an observer trainer in BCTP and I have numerous examples of senior officers, both active and reserve component, who came up with "new" terms or in some cases actual doctrinal changes on their own, and their organization was the only one that knew what they meant. There are probably many of your readers who have heard the term "penetration box." If you try to find it in any doctrinal reference, it does not exist. "Counterreconnaissance" is probably the most used and misunderstood term ever invented (Hint: it is not a mission).

As a group, officers and senior NCOs are not students of our doctrine, nor do they feel compelled to master it. Every professional school should require a solid grasp of the appropriate doctrine and tactics prior to graduation and it should be expected to be used throughout the Army. The captain and majors who come out of BCTP are, for the most part, real subject matter experts in tactics and doctrine at the battalion and brigade level, but yet they are not used in that role in subsequent assignments.

Unfortunately, they disappear into the system and a real asset goes unused.

JACK E. MUNDSTOCK
LTC, IN
28th Field Training Group

Editor's Note: BG John Kirk's challenge to the readership to get more involved in the Army's doctrine development process drew letters to both the magazine and General Kirk's e-mail address, which he included in the article. Rather than reprint them here, he has agreed to make a summary of the comments addressed to his email available by writing him at jmkirk@wolfenet.com.

Thoughts on Doctrine and Equipment For the Brigade Combat Teams

Dear Sir:

I read with concern recent discussion of wheels versus tracks (March *Army, Army Times* 28 February); Colonel Coffey's [retired, of United Defense] letter in the 13 March *Army Times*; and General Abrams' explanation on the dulling down of the vehicle requirements for General Shinseki's Brigade Combat Teams (BCTs). I don't know whether this ongoing debate is a result of the opposition to the concept by the Armor community, some budget concerns, or something else. Suffice it to say that the Army is missing an opportunity! We don't need lightly armored and armed taxis to get soldiers onto the battlefield. We need highly responsive and flexible teams that can mass, when needed, deal with most Third World threats, and are easily deployable. General Abrams focuses on the latter and gives up everything else.

Many countries have armored car systems (Piranha, ROIKAT, Centauro, AMX-10RC) or light armored tracked vehicles with multiple variants that always include a large-caliber gun system to deal with direct fire against third world enemies hiding behind urban sprawl. The BCT needs overmatched firepower, not just digital commo to call for distant supporting arms.

The T-62 killing requirement is a "straw man" designed to make the 25mm chain gun look like a MGS tank killer, except there is a problem: no one in the Third World was supplied with T-62s. Most went from T-54/55s to T-72s. The BCT's MGS variant must be able to kill *actual* T-72s, not mythical T-62s.

Whatever platform vehicle (medium wheels or tracked) is chosen by the Army, it should be able to be upgraded quickly because almost all of these systems mount large caliber guns in allied forces.

Each of these variants then can be combined into a combined arms team capable of dealing with all but the most sophisticated opponents. The basic organization could be built around a modification of the U.S. cavalry platoon of the 1960s.

Each platoon would have four infantry carriers with an infantry squad, a platoon leader's carrier with C2 capability, a 120mm mortar carrier, two gun platforms (either 90mm or 105mm, but able to destroy a T-72 and bust buildings/bunkers), and two elevated ATGM (TOW or HELLFIRE) platforms. The mixture of missiles and guns are required to provide overwatch in depth and to deal with situations in urban terrain where only a large caliber gun will suffice.

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The Armor Center's Proponency Includes Three Vehicles For the New Interim Brigades

Major General B. B. Bell, Commanding General, U.S. Army Armor Center

The Armor Center continues to spearhead the Army's campaign to transform itself, concurrent with developing an integrated mounted force modernization plan. The most observable benchmark in the transformation will be fielding of the first Initial Brigade Combat Teams to Fort Lewis, Washington, no later than December 2001. These brigades and the interim brigades that follow will be a bridge to the future objective force.

The objective force will potentially be fielded starting as soon as 2012. It must be imbued with all the best qualities of both heavy and light forces. It must be a full-spectrum force that is strategically responsive and dominant at every point on the operational spectrum. The Army will assess, in about 2003, whether science and technology will enable us to get to an objective force equipped with a lethal, agile, survivable, and highly deployable common platform family that we call the Future Combat System. The Future Combat System, its variants and configurations, will be the backbone of the objective force.

As part of the Army transformation process, the Armor Center is concurrently assisting in developing the Operational & Organizational (O&O) Plan for the Interim Brigade Combat Team (IBCT), and the Operational Requirements Document (ORD) for the Interim Armored Vehicle (IAV). While TRADOC maintains proponency for the base platform requirements of the ORD, each proponent school is responsible for developing specific requirements for certain platforms. The Armor Center is the proponent for the Mobile Gun System (MGS), the Reconnaissance Vehicle (RV), and the Commander's Vehicle (CV).

Mobile Gun System (MGS). The principal function of the MGS is to provide rapid and lethal direct fires to support dismounted, assaulting infantry. The MGS is the key weapons platform to ensure mission success and provide lethal overmatch for the combined arms company in the IBCT. One critical aspect of the MGS is its ability to defeat both conventional infantry bunkers and wall-type fortifications; this desired capability is a Key Performance Parameter (KPP) for the platform that must be demonstrated and achieved prior to the final selection of a particular candidate. To facilitate and ensure successful decisive combat operations, the MGS will have the capability to provide overwhelming precision firepower with a full solution fire control system, eye-safe laser rangefinder, stabilized platform, the capability to operate in degraded modes, and the ability to precisely fire at least six rounds per minute. The primary armament will elevate and depress sufficiently to support the infantry in complex and urban terrain. Additionally, the MGS will mount both a coaxial machine gun and an independently mounted anti-personnel machine gun. Given the broad range of targets the MGS will likely engage in its role of supporting infantry assault in a combined arms company, the MGS will employ bunker-defeating munitions, high explosive munitions in an anti-personnel mode, and canister munitions to defeat enemy infantry. While the primary anti-armor capability in the IBCT rests with a superb, robust, and lethal ATGM capability, the MGS will have the capability to defend itself against a wide range of mounted enemy platforms, including the full range of enemy Level II armor threats. Finally, to enhance this platform's survivability capabilities, given its lighter weight, the MGS will separate the primary armament ammunition from the crew, and be capable of mounting scaleable armor packages to defeat 14.5mm and RPG-7 fires. The MGS is essential in setting and maintaining the tactical conditions for collective overmatch by providing the capability to rapidly engage and destroy a variety of stationary and mobile threat personnel, infrastructure, and materiel targets.

Reconnaissance Vehicle (RV). The principal function of the RV is to provide an effective platform to enable the Reconnaissance, Surveillance, and Target Acquisition (RSTA) Squadron and battalion scouts to perform mounted and dismounted reconnaissance and surveillance operations. The platform is a key enabler for both sensor- and HUMINT-focused surveillance and intelligence operations throughout the IBCT area of operations, ranging anywhere from 50km x 50km to 100km x 100km. As a configuration of the Infantry Carrier Vehicle (ICV), the RV will possess the same deployability, mobility, lethality, survivability, and sustainability requirements. The primary armament envisioned for the RV will ensure the platform can effectively defend itself. It will have the capability to identify and defeat enemy troops and light armored vehicles out to 1500m. For target acquisition, the Long Range Advanced Scout Surveillance System (LRAS3) will be integrated with the platform, providing the battalion scouts and RSTA Squadron with unprecedented visual optics overmatch, both day and night. The far-target

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A New Armor Center CSM Checks Into the Net

CSM Carl E. Christian, Command Sergeant Major, U.S. Army Armor Center

The Army has always been about change, and now is no exception. There is yet another change in the "Driver's Seat" as CSM Dave Lady moves on to take over the position of CSM at USAREUR and I take over the controls at the Armor Center and Fort Knox.

I have taken up residence in the "driver's seat" and have already completed the before-operations checks; the engine is running and in gear. I look forward to working with all the leaders and soldiers throughout the force to continue to make Armor and Cavalry a branch for which we can all be proud. CSM Lady did an exceptional job for the Armor and Cavalry force in his time as its senior enlisted person. He has left the Armor Center and the Armor force in great shape. As I come on board, I will try to expand on the directions he was taking the Armor force and add some of my own direction in an attempt to make it still even better.

I would be remiss if I did not take time here to thank all the leaders I have worked for who instilled in me the Army's standards and developed me to where I am able to perform in this position. I also want to thank all the soldiers who have worked for me over the years, whose hard work and excellence have helped me achieve the recognition to get where I am today. You have proven to be our country's greatest assets.

MG B. B. Bell is a great leader to have in the TC hatch during these times of change. He knows what we need to do and how we need to get there. I feel very fortunate to have been selected by MG Bell to be his Armor Center and Fort Knox CSM. Sir, thank you for the chance to be part of a great team at a great time in our Army.

The Army is always in a state of change, but nowadays it seems like change is coming ten times as fast. This is not all bad, even though it may seem we are moving too fast, or we are not looking closely enough before the leadership decides on our direction. Having seen the process and been part of the process, I can reassure everyone that the decisions our leadership are making are going to make us a much better force. It is being done with measured steps to ensure success. As I talk to young soldiers and NCOs, some of them are not sure of what the future holds for them. Some of these soldiers were converted from 19K tankers to 19D scouts. They, and many more like them, thought that the 19K MOS and the tank are going away. I can say for certain that this is as far from the truth as you can get. The tank and the 19K tanker will still be around when today's most recent PLDC graduate takes his first battalion as a CSM.

There are some things that I do not see changing too much in the near future. The Armor Enlisted Career Map is one of them. This map is a guide that allows soldiers in our branch to better prepare for advancement and job selection. It is a super tool. We owe many thanks to CSM Lady for taking the lead on this, and for having the vision to refine a model to help guide our enlisted force. This is a key reference when writing the board guidance for the DA-level selection boards.

Other programs for enlisted Armor senior NCOs, such as Excellence In Armor (EIA) and Project Warrior, will see small changes to adjust to our changing force and the needs of the Army. These are two programs that help us identify and reward excellence in some of our top soldiers and NCOs, and steer them toward challenging assignments. These programs offer both soldiers and leaders a chance to effect the advancement and assignment opportunities of the soldier and NCO.

The new millenium is already forcing us to seek changes in the way we do business, how we man the force, and even how we organize the force. The Chief of Staff of the Army has given us a new direction of march and we are well past the start point. The Intermediate Brigade Combat Team has drawn a lot of attention and if you keep up with MG Bell's updates to the force you should be able to see Armor's new role in that, and how we are doing. This is the cutting edge of the change in the Armor force and the Army, along with the Division XXI restructure. The Armor force is modernizing, and as we bring on new equipment, we must reorganize to take advantage of the new equipment's capabilities.

There are many more and exciting changes happening to our Army and to the Armor and Cavalry branch. Some item of new equipment is being fielded almost daily to someone in one of our Armor or Cavalry units. Some units are receiving more people than anyone can remember, while others are losing some. Everyone is being asked to look at ways to reduce manning and gain efficiencies, while at the same time increasing effectiveness.

The Army is about to enter times of the greatest challenge and change since the transition from horse to machine. Armor and Cavalry will be a very big part of the changing Army. We will have to break some paradigms and build new ones.

It's natural to be cautious about change simply because no one can predict the results with 100 percent accuracy. But the Army has always been about change; now it is our turn to make some of those changes in our force. I am very pleased to be working *with* you, and more importantly, *for* you as we make these changes happen. Together, all things are possible.

"TODAY IS THE BEST DAY
TO BE A SOLDIER!"

Facing Up to the Urban Fight

Armor's Role In Future U.S. MOUT Doctrine

by Captain J. P. Klug

Over the past ten years, there has been a trend towards conflicts involving MOUT battlefield conditions.[1] U.S. forces fought on urban terrain to capture the Panamanian dictator Manuel Noriega.[2] Our forces also paid a heavy price for fighting in the urban sprawl of Mogadishu during Operation Restore Hope.[3] And the Russian Army sustained heavy casualties in two campaigns to destroy rebel Chechens in the city of Grozny.[4] Because of these developments, MOUT is receiving renewed command emphasis.

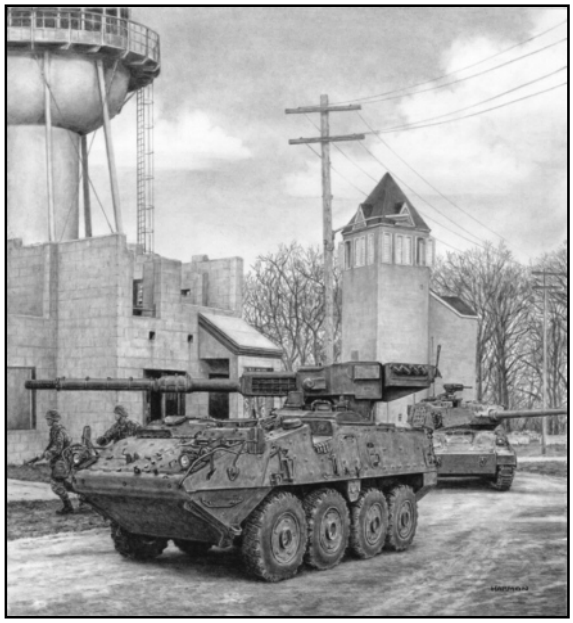
Another reason for this command emphasis is the rapid growth of urban areas worldwide. The United Nations estimates that the population of urban areas in developing countries increases by 150,000 people every day and this increase may exacerbate ethnic and poverty-related tensions.[5] Urban areas are also the economic and political centers of the world and will probably continue to increase in importance as the world urbanizes.[6] Consequently, cities may often be a military objective as well as the center of gravity for both our allies and opponents.

Because of the increasing importance of urban areas and the number of recent conflicts involving urban combat, our military needs to be able to fight and win on a MOUT battlefield. To meet this challenge, the Armor Center is currently rewriting armor offensive and defensive MOUT doctrine. This article will examine the direction of U.S. MOUT doctrine, explore the direction of the Armor branch's niche in this doctrine, and show the need for Armor forces to train more in this area.

Evaluation of MOUT Doctrine

Recent conflicts pointed out that U.S. MOUT doctrine and training at all levels are inadequate. The most recent, painful, and poignant example was the U.S. involvement in Somalia. The Department of Defense chose to take a close look at how its forces operate in MOUT conditions, especially in light of Operation Restore Hope. Four agencies and authors have completed documents that merit mention:

- The *1996 Joint Strategy Review Report* stated that all military services must accept the likelihood of operating on urban terrain as routine. This report also stated that as urban areas increase in size and number, our adversaries would attempt to use these areas to negate our current advantages in equipment capabilities and training proficiency.[7] Thus, armor may have to work closely with infantry in urban areas. This necessitates that we must dedicate more training time and effort to this area. Similarly, armor units need to train for MOUT conditions, as we have not emphasized training of this type since the Korean War.



On the Cover: Two vehicles negotiate the narrow streets of the Fort Knox urban training site as part of the Platform Performance Demonstration.

- *Joint Vision 2010, 1996* pointed out that the advantages of new technologies would have a smaller impact in cities,[8] due largely to degraded communications in urban terrain. Urban fighting also precludes dispersion of forces; instead, there is a need for mass in urban fighting, and this nullifies one of the primary advantages that new equipment, such as the M1A2 digital system, is attempting to exploit. We cannot rely on the next generation of equipment to be decisive in MOUT battles. In other words, urban combat will probably remain a deadly struggle of hand grenades, entrenching tools, and 120mm door-knockers for the foreseeable future.

- The *1997 National Defense Panel* reviewed the two previous documents and identified several aspects of future urban operations that will require more preparation. First, the inherent defensive advantages cities provide impact our ability to project power and mount military operations. This fact may result in our adversaries moving the fight to urban areas in order to negate our strengths. Because of this potential situation, we cannot avoid preparing for urban combat situations as we have in the past. Second, we will have to operate and organize differently to seize and control urban terrain. In other words, we cannot task organize our units for a fight in a city the same way as we do for a fight on the Northern European Plain. Third, we must prepare now to conduct urban control, urban defense, eviction operations, and urban targeting and strike.[9]

- A 1998 RAND Corporation study, *Marching Under Darkening Skies: The American Military and the Impending Urban Operations Threat,* identified several areas of urban combat that the U.S. military community needs to address. First, there is a lack of joint MOUT doctrine, and this deficiency makes any single service MOUT doctrine a work in progress.[10] Another problem is that the Army's *FM 90-10, Military Operations on Urbanized Terrain,* was completed in 1979 and needs updating. Third, there is a lack of doctrine in the way we deal with noncombatants.[11] The emphasis on training for offensive MOUT combat, as opposed to a more balanced approach, is yet another problem.[12] Next, current MOUT

doctrine focuses on urban patterns not likely to be encountered in the Third World cities, which are very likely to be the battlefields of the near future.[13] A final problem is the lack of an armor companion manual to *FM 90-10-1, An Infantryman's Guide to Combat in Built-up Areas*.[14]

These four documents clearly point out that MOUT will very likely be a part of future U.S. deployments. These documents also clearly show the need for further thought on how to conduct future military operations in urbanized terrain. The potential violence of urban combat, however, begs the question of how to employ our current equipment in cities in the near term. The answers for both the near and long term must start with doctrine.

DOD MOUT Doctrine

Although all services are involved in developing their capabilities to fight on a MOUT battlefield, the Joint Chiefs of Staff made the U.S. Marine Corps the main proponent for MOUT training and fighting. The JCS assigned this task to the Marine Corps, because analysts expect that 85 percent of the world's population will live in coastal cities by 2020.[15] Coastal cities are, by definition, located on the littoral and this area is clearly the realm of the Marine Corps. To this end, the Marine Corps has been in the process of developing and refining MOUT doctrine for some time. They have significantly improved their MOUT training and doctrine, and the Corps will continue to create and refine doctrine in this area. The Army is benefiting from the Marines' efforts as they share information and lessons learned. Once Army doctrine is completed, this diffusion of knowledge should continue and both services will benefit from the other's efforts.

As world instability grows and the likelihood of joint operations continues to increase, we should know how to work with the Marines and what their capabilities and limitations are. A plausible future scenario is an Army medium weight brigade augmenting a Marine Expeditionary Unit already in theater and possibly fighting for an urban center. This example may be a very common occurrence, and will require both services to be familiar with the other's *modus operandi* — clearly a clarion call for us to understand the Corps.

USIPECT Table[26]

Understand	Mission Analysis and IPB for MOUT fighting Analyzing how to set the conditions for mission success
Shape	Deployment of forces in the proper sequence Movement and maneuver of combat arms Establishment of intelligence, surveillance, and reconnaissance elements Establishment of refugee camps Creation and build-up of a logistical base
Isolate	Isolating the city externally Isolating enemy combat forces inside the city from mutual support, non-combatant support, communications support, psychological support, reinforcements, and counterattack Essentially fixing the enemy forces to allow their defeat in detail
Penetrate	Seizing control of critical locations Shattering the enemy's defense
Exploit	The exploitation phase after a successful engagement with emphasis on maintaining momentum, gaining control of city facilities, and gaining control of urban key terrain
Consolidate	Protecting gains and establishing security Reducing pockets of resistance Repairing damaged infrastructure Facilitation of humanitarian relief Reestablishment of local government
Transition	The transfer of routine control and responsibility to another organization with the preferred endstate of local government autonomy

Marine MOUT Doctrine

The Marine Corps emphasis on MOUT comes from the highest levels. The 31st Commandant of the Marine Corps, General Charles C. Krulak, stressed the importance of MOUT in his article "The Strategic Corporal: Leadership in the Three Block War." In this article, he envisioned three types of operations within future MOUT. The three types of operations, or "blocks" as he referred to them, are humanitarian assistance, peacekeeping operations, and combat.[16] Thus, U.S. forces could be battling in a part of a city, feeding refugees in another, and separating belligerents in a third. Further complicating this mission is the potential for two or three types of operations occurring simultaneously. There is also the potential for rapid reversion from one type of operation to other types, for example if U.S. forces were conducting humanitarian aid in a secured area, and enemy infantry infiltrated and attacked.

In his article, General Krulak also stressed the importance of the "Strategic Corporal," his term for the junior leader on the ground in urban environments. His point is that a lapse in good judgment by one of these junior leaders could have a significant strategic impact, especially if the ubiquitous media is covering their actions live on television.[17] For example, if a Marine corporal shows favoritism towards a Serb in Kosovo and the media covers this, his favoritism will alienate Albanians. It may even bring censure from the world community. Thus, it is easy to see how a junior leader's actions can quickly have massive political repercussions. Because of the potential fallout, all services must continue to develop junior leaders that can succeed in such an environment. The Marine Corps prepares its junior leaders by emphasizing individual character, fostering lifelong professional development, and consistently empowering junior leaders to exercise initiative.[18]

Due to senior leader emphasis on MOUT, the Marine Corps responded with several improvements in MOUT doctrine and training. First, the Corps sought advice from those who have experience in these types of operations. The British Army has conducted extensive urban operations in Northern Ireland and has developed battle-tested MOUT doctrine. To take advantage of this experience, the Corps sent Marines to the British Army's Copehill Down MOUT training facility. Marines also received instruction from a variety of U.S. law en-

forcement agencies and fire departments, although law enforcement techniques cannot always be used in high-intensity conflict. The Marines who were trained by the British Army and U.S. law enforcement community returned to the Corps with a greater understanding of MOUT, and the Corps established the Marine Expeditionary Force MOUT Instructors Course located at Camp Pendleton. The course is two weeks of intensive MOUT training for squad and team leaders. The establishment of this school emphasizes the Marine Corps focus on MOUT and provides trained junior leaders who can improve MOUT training proficiency at the squad level.[19] As MOUT doctrine is improved and disseminated, the benefits of this school will continue to pay dividends.

The Marine Corps conducted "Operation Urban Warrior" as a MOUT litmus test. Two thousand Marines trained for two days on a closed 183-acre Navy hospital campus. The exercise included role players simulating both citizens of a third-world city and members of two feuding warrior bands. This exercise provided valuable individual tactical training as well as bringing out areas of MOUT doctrine that need more refinement. One large problem area was dealing with civilians during crowd control situations and during actual combat. This is clearly an area that needs to be addressed in future Army and Marine Corps doctrine.[20]

The Marine Corps is also examining how to integrate its organic close air support into MOUT operations. In the summer of 1999, the Marine Corps completed construction of its first urban bombing range. This range is 35 miles southeast of Marine Corps Air Station Yuma and is named "Yodaville," after the call sign of one of the Marine pilots responsible for its construction. In June, the Marines conducted a Limited Technical Assessment on this range, resulting in two initial conclusions: the TACP experienced difficulties in marking targets with lasers due to urban clutter, and inert practice bombs were inconsistently hitting laser-designated targets (two of eight targets were hit).[21] This clearly shows the need for more doctrinal development, training, and technological improvements in CAS.

Future Publications

The Department of Defense is preparing a Joint Urban Handbook to provide joint force commanders, their staffs, and other interested parties with a primer on joint urban operation.[22] It will also act as an interim fix until the new *Joint Publication 3-06* is approved. *Joint Publication 3-06, Doctrine for Urban Operations* will be the overarching document that will drive MOUT doctrine and combat operations. The purpose for this document is to provide the doctrinal foundations for the conduct of joint and combined MOUT at the operational level. It will cover fundamentals, operational tasks, dealing with noncombatants, infrastructure considerations, and training considerations. It is scheduled for completion and distribution in May 2001.[23]

By having this document completed, DOD will have created the overarching doctrine that ties all of the military service's MOUT doctrines together. It may also delineate each service's role in MOUT as well.

Four upcoming Army manuals, however, will affect Armor's part of MOUT even more. There will be a new version of *FM 90-10, Military Operations on Urbanized Terrain*, which will cover the tenets of Army MOUT doctrine. This manual, combined with *Joint Pub. 3-06,* will lay the foundation for MOUT. *FM 90-10-1, A Guide To Combat In Built-up Areas*, will cover Armor's role in Army MOUT doctrine. *FM 90-10-X, MOUT MTP,* will provide the tasks, conditions, and standards for training.

These documents will provide the basis of how armor may be employed in urban areas; however, we must be cognizant of evolving tactics, techniques, and procedures within that doctrine. To this end, the Armor Center is producing a manual of TTPs to act as a starting point until units conduct more MOUT training exercises and make future refinements.[24]

USIPECT Concept

Several MOUT concepts are currently under review. The most important and fundamental is how to conduct offensive operations. Formerly, there were four phases for offensive operations in MOUT: reconnoiter the objective, isolate the objective, secure a foothold, and clear the built-up area. USIPECT may replace these four phases.

USIPECT is an acronym for the following essential elements of a successful offensive MOUT operation: Understand, Shape, Isolate, Penetrate, Exploit, Consolidate, and Transition (see the table below). It's also important to note that the steps of USIPECT may be conducted simultaneously if the situation permits.[25]

Medium Brigades in MOUT

The medium weight brigades will be lethal combat formations that have the capability to replace or augment initial light forces on a force projection mission. For this type of mission, the medium brigades will be in theater within 96 hours of the initial deployment of combat forces. These brigades will be capable of fighting in all forms of natural and man-made terrain in order to accomplish their mission. In the area of urban terrain, I see them used in three possible scenarios. First, they may have to defend an urban center of gravity from a hostile force. Second, they may have to attack a rogue government's forces located in an urban area and reestablish a previous legitimate government. Third, they may have to isolate a large urban area and then wait for additional forces to move into theater and conduct offensive operations. Moreover, the medium brigades may conduct operations on one or more of the three levels of war within these three scenarios. To be successful in these situations, the medium brigades will be well versed in operating in urban areas, as they will be for all three levels of war and on all forms of terrain. In order to train the first two medium brigades for urban operations, the U.S. Army is constructing three MOUT sites. Two of these sites will be built on Fort Lewis and one will be built in the Yakima Training Area.[27]

Unmanned Aerial and Ground Vehicles in MOUT

Unmanned aerial vehicles, or UAVs, are beginning to have a large impact on military operations across the world. They may also play a vital role in future MOUT operations. UAVs could do this in several ways.

First, they are able to conduct detailed reconnaissance operations with no danger to human life while supplying real-time information. Reconnaissance is one of the most important and potentially decisive factors in MOUT combat.[28] The use of UAV information allows attacking forces to avoid potential danger areas, adds to general force protection, and allows superior use of the tenets of Army operations. Unit staffs may also be able to the use these products to conduct a more comprehensive and effective MDMP.

Second, UAVs are able to act as forward observers, either by visual means for regular indirect munitions or, in the very near future, by laser designation for precision guided munitions.[29] UAVs could also aid close air support by identifying enemy air defense assets and presenting the pilots a clear picture of what is happening on the ground. Similarly, unmanned ground vehicles may be able

to accomplish the UAV's missions in MOUT as they are developed.

The Air Force's MOUT Role

The Air Force has also begun to refine its doctrine for support of MOUT combat. The week following the 1999 Marine "Operation Urban Warrior," the Air Force conducted a conference aimed at exploring the role of aircraft in urban battles.[30] Precision guided munitions, or PGMs, had a tremendous impact on the Gulf War, including inside Baghdad. These weapons will continue to have an impact on future operations due to their more precise control. In MOUT conditions, this control may enable CAS to destroy enemy strongpoints while reducing collateral damage and danger to ground troops. PGMs may also make combat in and refurbishment of cities less difficult as they create less rubble, fewer flying fragments, and fewer fires that make MOUT fighting and urban repair difficult. However, all agencies involved in close air support must look at the Russian close air support problems in Grozny. PGM technology may need further refinement so aircraft can maintain a safe standoff distance while retaining weapons systems' accuracy.

MOUT Combat Support and Combat Service Support Issues

"MOUT situations present a succession of mixed civil engineering and close combat problems," which are both engineer branch specialties.[31] Consequently, combat engineers will play a vital role in MOUT. They are equipped and trained to deal with obstacles of all kinds. Furthermore, urban aggressors may extensively use obstacles and tie them into the existing built-up areas. Engineer support is especially important for clearing CASEVAC routes and helicopter landing zones.[32] Engineer demolition skills could also be employed to open new entrances into buildings and, if necessary, to completely destroy buildings.[33] Construction engineers are also important to urban SASO as they can rebuild infrastructure. Additionally, engineers' knowledge of civil engineering (such as electrical, water, and transportation infrastructure) is invaluable in planning MOUT offensive operations, defensive operations, and SASO.

Smoke support is an important asset for high-intensity combat in urban terrain. Most of the casualties that occur in urban combat are from movement through large danger areas, such as a square, or from moving from building to building. In either of these situations, obscuration of soldier movement can provide additional protection. This obscuring smoke may come from smoke grenades, smoke pots, indirect smoke munitions, or from smoke platoons. Smoke vehicles can screen infantry and armor as they move through larger areas. They could also be used defensively to screen maneuvering units or for casualty evacuation, especially given the close proximity of the wounded to the enemy. Overall, every effort should be made to have smoke assets available, supplied, and incorporated into all urban operations.

Two other vital support areas are casualty evacuation and vehicle recovery. These operations will most likely be under enemy direct fire. Consequently, extracting casualties or equipment out of the danger area will require smoke and suppressive fires. Wounded soldiers need to be evacuated as quickly as possible, but the congestion of urban terrain will make rapid evacuation an even greater challenge. Units must establish medical facilities within the city as well as the normal casualty collection points. Similarly, damaged vehicles should be moved to a maintenance collection point in a previously cleared park, vacant lot, side street, or suitable building. At this point, a maintenance team could repair the vehicle or move the vehicle further to the rear only if absolutely necessary. Additionally, a security team must be present to protect the maintenance team and to protect medical assets from stay-behind or infiltrating forces.

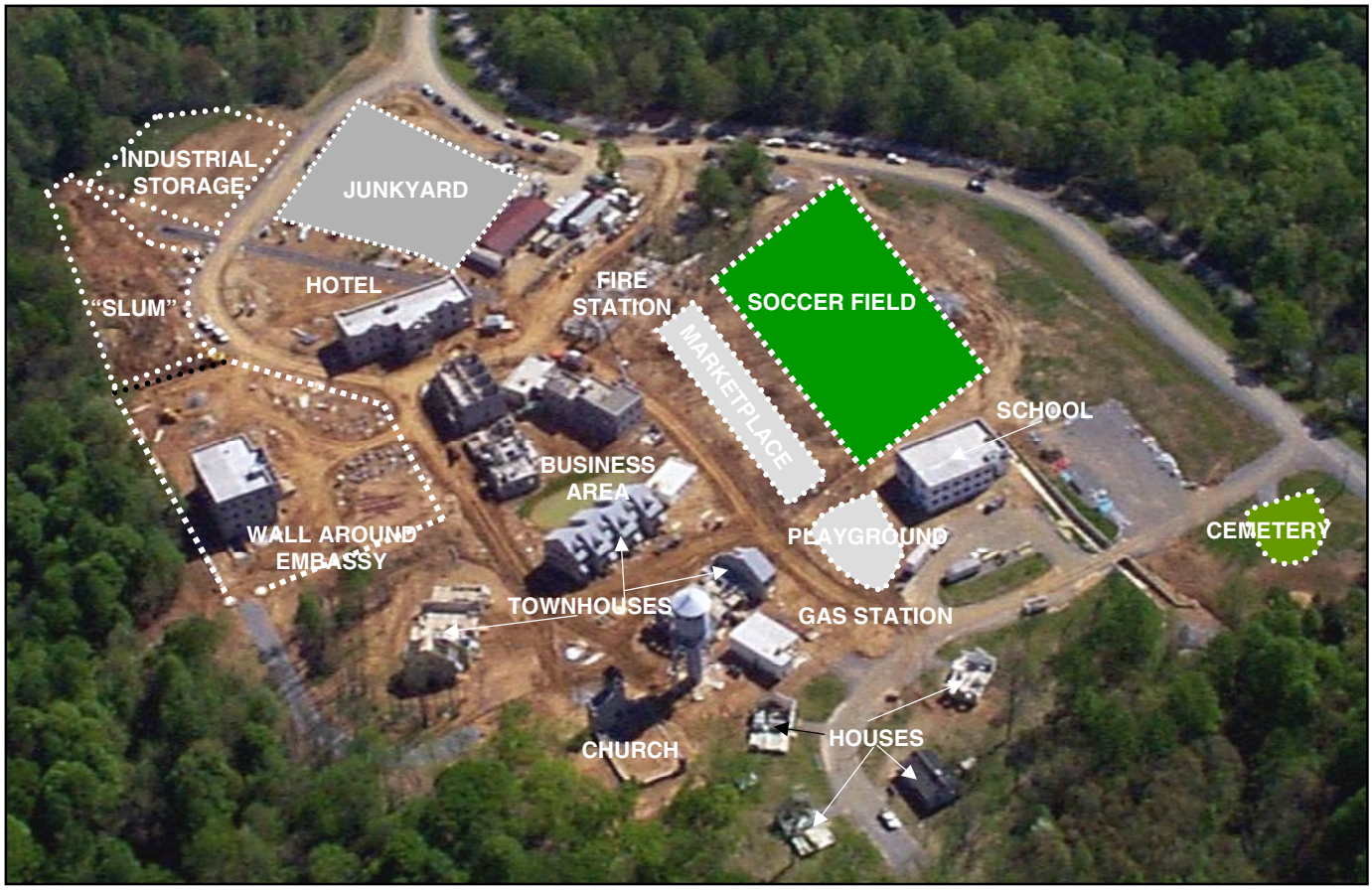
MOUT combat presents a great logistical challenge. First, each urban area is unique in some way, and this makes logistical operations in each urban area different.[34] Anticipation and improvisation are the most important two CSS characteristics in supporting MOUT and are inherently challenging to perform successfully.[35] Urban combat necessitates massive expenditures of ammunition and this makes accurate anticipation of class V needs essential.[36] Similarly, MOUT demands large volumes of food and water due to the great physical demands of house-to-house fighting. Logistical support of military forces in urban terrain also necessitates constant improvisation. First, the danger involved in refueling and rearming operations in urban areas demand creative means of transporting and off-loading supplies. Similarly, logistical areas will take careful planning, reconnaissance, and security forces. Prepackaging loads of supplies while outside the urban area is another example of possible improvisation. Similarly, using available containers to keep soldiers supplied with water, using caches, frontline soldiers taking supplies from evacuated soldiers, foraging within the ROE, and using helicopters to move supplies to secure areas within the city are all examples of MOUT logistical improvisation.[37]

Fort Knox MOUT Site

The Mounted Urban Combat Training Site, or MUCTS, at Fort Knox is an excellent example of the growing emphasis on MOUT combat training. It is a 26-acre training facility centered on a mock-up small town. Ample pyrotechnic devices within the town replicate collateral damage and battlefield effects. An observer/controller support package and a dedicated OPFOR add to the training experience of the MUCTS. Three perceived problems with the MUCTS are the expense of training, the difficulties of vehicle transportation, and the limitation that two platoons can train on the site. First, money should be allocated for this type of training, as the next conflict may be fought in this difficult environment. A partial solution to the expense problem may be for Fort Knox to maintain vehicles for training and sign them out to the training unit. This would eliminate the difficulties of transporting vehicles. Similarly, any problems with the number of platoons that can train can be rectified with some creativity. For example, an armor battalion could train with an infantry battalion from the 101st Airborne Air Assault Division from Fort Campbell in various Fort Knox training areas and rotate platoons through the MUCTS. Another possibility is combining SIMNET, CCTT, and other Fort Knox training facilities with MUCTS training.

Summary

The U.S. military recognizes that future military operations on urbanized terrain are almost certain to occur given current world political and demographic trends. In order to be successful on the urban battlefield of tomorrow, the Department of Defense is reevaluating and rewriting MOUT doctrine. The Marine Corps has led the way in this process. The Army has learned much from the Marine Corps and is working with the Corps to complete its own doctrinal reevaluation. Similarly, the Armor branch is working to clarify its own niche in MOUT doctrine. This is where the importance of Armor leaders comes to the fore. The more we know about MOUT, the direction of MOUT doctrine, and evolving MOUT TTPs, the more we can prepare ourselves and our soldiers to fight and win on the urban battlefield. Furthermore, we must recog-



nize that this type of fighting may be necessary to succeed in future conflicts. Therefore, we need to be ready for MOUT conditions with effective doctrine and trained units.

Notes

[1]MOUT is an acronym for Military Operations on Urbanized Terrain.

[2]Kevin J. Hammond and Frank Sherman, "Sheridans In Panama," *ARMOR,* March-April 1990.

[3]Charles P. Ferry, "Mogadishu, October 1993: A Company XO's Notes on Lessons Learned," *Infantry,* November-December 1994.

[4]Raymond C. Finch, III, "Why the Russian Military Failed in Chechnya," *Special Study Number 98-16,* Fort Leavenworth, Kansas: Foreign Military Studies Office, 1998.

[5]William G. Rosenau, *The Lessons of Modern Urban Warfare,* (Philadelphia: Foreign Policy Research Institute, 1997), pp. 373-374.

[6]Ibid., p. 375.

[7]Frank J. Abbott Deputy Chief of Staff for Doctrine, "Joint Urban Operations," MOUT Conference Briefing, 1999, p. 4.

[8]Ibid. p. 5.

[9]Ibid. p. 6.

[10]Russell Glenn, *Marching Under Darkening Skies: The American Military and the Impending Urban Operations Threat,* (Santa Monica: RAND, 1998), p. 11.

[11]Ibid., p. 9.

[12]Ibid., p. 13.

[13]Ibid., p. 9.

[14]Ibid., p. 7.

[15]Gen. Charles C. Krulak, "The Strategic Corporal: Leadership in the Three Block War." *Marines Magazine,* January 1999, p. 4.

[16]Robert F. Hahn II and Bonnie Jezior, "Urban Warfare and the Urban Warfighter of 2025," *Parameters,* Summer 1999, p. 74.

[17]Krulak, p. 5.

[18]Ibid., pp. 6-7.

[19]Glenn, pp. 13-14.

[20]Bill Donahue, "The Thin Red Subway Line," *The Metropolis Observed,* June 1999.

[21]"Corps Completes Urban Bombing Range," *Marine Corps Gazette,* September 1999.

[22]Abbott, p. 22.

[23]Ibid., pp. 16-17.

[24]Author's interviews with Armor Center MOUT Doctrine personnel.

[25]Abbott, p. 7.

[26]Ibid., pp. 8-15.

[27]The information in this paragraph is based on two sources. The first is a briefing by Major General B.B. Bell, Commanding General, U.S. Army Armor Center, to the Fort Knox Armor community, which I attended. The second source was a briefing by Major General James M. Dubik, who is the TRADOC official responsible for the Army's current transformation toward medium weight brigades. The three scenarios mentioned are the result of my personal analysis, and are not based on any official or unofficial sources.

[28]Hahn and Jezior, pp. 76-77.

Kentucky's Newest Village – The Fort Knox MOUT training area was scheduled to be formally opened at this year's Armor Conference.

[29]Ibid. p. 77.

[30]Donahue, p. 2.

[31]Jeb Stewart, "Thinking Through Force XXI," *Engineer,* August 1995, p. 2.

[32]Captain John C. DeJarnette, "Urban Combat Operations," *Call Newsletter No. 99-16,* p. 5.

[33]Stewart, p. 3.

[34]MAJ William Carter, "Logistical Operations on Urban Terrain," *CALL Newsletter No. 99-16,* p. 1.

[35]Ibid., p. 1.

[36]Ibid., p. 11.

[37]Ibid., pp. 7-11

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The Chinese Type 98 Main Battle Tank:

A New Beast from the East

by James M. Warford

On October 1, 1999, during a parade in Beijing marking the 50th anniversary of the People's Republic of China, the world got a look at the current Chinese armored force, including a first glimpse of the new Type 98 main battle tank (MBT). This huge parade, the first since 1984, reportedly involved 500,000 PLA personnel, and provided an unprecedented view of the Chinese army's latest weaponry and equipment.

The PLA paraded three different tank types, with one of the most significant surprises being the new Type 98, which resembles a Russian T-72 MBT with a new and well-protected "box-like" turret. The Type 98 (and other improved and evolving armored vehicles like it) represent a potentially significant and continuing heavy threat confronting U.S. Army forces in the future.

The New Chinese Type 98 – Configuration of the turret roof, from left, includes the covered commander's machine gun, the Laser Warning Receiver, wind sensor, and the Laser Self-Defense weapon.

While two of the tanks paraded by the PLA were shown for the first time in their latest forms — the Type 80-III/Type 88B and the Type 85-III/Type 88C — the Type 98 had never before been seen in public. This tank, also known as the WZ-123, represents a significant improvement in Chinese MBT development.

The Type 98 actually began during the continuing development of another Chinese tank known as the Type 90-II/Type 90-IIM. In late 1991, the China North Industries Corporation (NORINCO) released initial information describing the development of the Type 90-II. Reportedly, a deal had been signed in May 1990 between China and Pakistan allowing for the production of this new tank in Pakistan. As of early 1999, however, the Type 90-II had still not been put into production in either China or Pakistan.

Although the Chinese consider the Type 90-II a tank development for the export market, there apparently is a future for the tank in Pakistan. In January 1998, a photograph was published showing the prime minister of Pakistan in the driver's position of an "**Al-Khalid**" or **P-90** MBT. The photo confirms that the Al-Khalid is either based on the Type 90-II or is, in fact, the same tank. Pakistani press reports in August 1999 finally confirmed that the Al-Khalid is now in production at the Heavy Industries facility in Taxila, Pakistan. Reportedly, this new tank has evolved into a three-way development effort between China, Pakistan, and Ukraine, with Ukrainian support focused on the addition of the 6TD 1200-hp diesel engine. Finally, the Chinese exhibited a model of the Al-Khalid labeled the "**Type 2000**" tank in 1999. According to the available information, the Type 2000 tank is the international version of the Al-Khalid currently being marketed by the Chinese.

Since the Type 90-II/Type 90-IIM failed to meet expectations during trials in China, a major effort was initiated to improve its performance. Unconfirmed reports claim that in 1997 the Russians conducted a series of secret demonstrations of Russian MBTs in China at a PLA tank test-center in the city of Zhang Jia Kou. Reportedly, these demonstrations pushed the PLA to demand even better performance from its next MBT. That new, previously unseen tank was shown for the first time in model form during an exhibition in Beijing in 1999. The model clearly showed a new tank development which combined a T-72-like hull with a new "box-like" turret. Additionally, the tank model was fitted with what appear to be hunter-killer style optics for the commander and gunner, a wind sensor, and two new devices on the turret roof (see photo at left). Undoubtedly timed to coincide with the October 1st parade, photos of this new tank on maneuvers with the PLA suddenly appeared in the Chinese press. While the exact role and designation for this tank are unconfirmed, it is probably a prototype of the Type 98, known as the **Type 96** MBT. It is safe to say, however, that the Type 96 is not exactly the same tank that was in the anniversary parade through Beijing.

When the **Type 98** was first seen during the rehearsal for the parade, it was initially incorrectly identified as the Type 90-II/Type 90-IIM. Photos taken during the actual parade, however, confirmed that it was only a relative of the Type 90-II and was still different from the Type 96. The Type 98 incorporated a variety of subtle differences from the Type 96, including different style hull skirts, tracks with rubber pads, and a slightly different box-like device behind the gunner on the turret roof. The Type 98 is armed with a 125mm smoothbore main gun fed by a carousel autoloader. The source of this gun and autoloader, which allow the crew of the tank to be reduced to three men, is believed to be the former Soviet Union/Russia. While not much is known about the tank's fire control system, it is fitted with a new stabilized independent sight for the commander.

Perhaps the most interesting characteristic of the Type 98 is the addition of what appears to be a previously unknown active self-defense system. Unlike contemporary Russian active tank self-defense systems like Drozd, Drozd-2, and Arena, which launch projectiles to disable or "shoot-down" incoming anti-tank missiles and projectiles, the Chinese system apparently uses a high-powered laser to directly attack the enemy weapon's optics and gunner. The system includes what

Chinese Type 98 MBTs on parade in Beijing in October. Note new hull skirts, rubber padded tracks, and the raised turret roof.

appears to be a laser warning receiver (LWR - the dome-shaped device on the turret roof behind the commander's position), that warns the crew that their tank is being illuminated by an enemy range-finding or weapon-guidance laser. The turret of the tank can then be traversed to face the direction of the enemy threat, and the laser self-defense weapon (LSDW - the box-shaped device on the turret roof behind the gunner's position), can be employed against the source of the enemy laser.

While the engagement procedure of the Type 98's self-defense laser is unknown, published reports concerning similar weapons describe a procedure where the laser weapon would first use a low-powered beam to locate the optics of the enemy weapon. Once the enemy weapon was located, the power level of the laser would be immediately and dramatically increased. Such an attack would disable the guidance optics of the enemy weapon and/or damage the eyesight of the enemy gunner.

The turret-mounted system carried by the Type 98 is very similar to a tripod-mounted laser weapon that was seen for the first time at an arms exhibition in Manila in 1995. Identified at the exhibition as the "Laser Interference Device," it matched the description of a known Chinese laser weapon called the ZM-87. According to its promotional information, one of the ZM-87's major uses is to "injure or dizzy targeted individuals." The ZM-87 can reportedly injure the human eye at 2-3 kms, this rising to over 5 kms using a 7-power magnification device. Additionally, short-term "flaring blindness" can be inflicted on the human eye at up to 10 kms. The ZM-87 and the laser weapon carried by the Type 98 should not be confused with electro-optical "dazzlers" like those turret-mounted devices used by the Iraqis during Operation Desert Storm. Those Iraqi devices (some of which are believed to have been supplied by the Chinese), are designed to confuse the tracking systems of Western/NATO anti-tank guided missiles (ATGMs), without directly attacking the controlling optics or the eyesight of the weapon's gunner. The available photos of the Type 96 have also confirmed that the laser weapon can be elevated to a higher angle than the tank's main gun, indicating that the engagement of attack helicopters is possible.

The Type 98 reportedly weighs 50 tons and is powered by a new 1200-hp diesel engine. As far as armor protection is concerned, some initial observations can be made. Generally speaking, the Type 98's turret is larger than the turrets of other PLA tanks. More importantly, the turret has been lengthened or extended forward, creating a noticeable gap between the lower edge of the turret-front and the hull decking. This new gap is most visible just to the right and left of the driver's position (see photo on top of next page). It is very likely that the Chinese decided to increase/improve the turret frontal armor protecting the Type 98 to the point where extending the turret forward became a requirement.

For comparison, the Type 90-II/Type 90-IIM prototypes, which carry a smaller turret and are two tons lighter, do not have this tell-tale gap between the turret frontal armor and the tank's hull decking. While details concerning the type and design of the Type 98's armor are lacking, there is the possibility that its armor is based on, or influenced by, the Russian T-80U MBT. When the PLA's relatively recent purchase of Russian T-80Us is combined with what was learned during the parade, a Russian armor connection is certainly possible. Like the T-80U, the Type 98 incorporates turret frontal armor cavities (one on either side of the main gun — clearly visible when viewed from above), covered by plates which are fitted flush and bolted to the turret roof. The purpose of these cavities may be to allow the composite contents of each cavity to be easily upgraded and changed during the life of the tank.

In addition to these frontal armor cavities, the construction of the turret itself may provide some insights into the Type 98's armor. Close examination of the turret roof reveals that the portion of the roof above the crew compartment is raised and slightly rounded when compared to the lower and flat area of the roof above the frontal armor arrays. Additionally, there has been speculation that the Type 98's turret is actually manufactured in two parts, consisting of a cast crew compartment protected by box-like frontal armor arrays or "packs" that are welded in-place. A close look at the turret roof also reveals prominent welding seams or "beads" that run from the turret front (on either side of the main gun), back to the raised portion of the roof.

Finally, the Type 98's turret is fitted with six lifting "eyes;" four on the turret front (two on either side of the main gun) and two on the turret roof (one on either side of the main gun), just inside the welding seams on the flat part of the turret. While it's clear that these lifting eyes are not intended for lifting the entire turret, their purpose is still the subject of speculation. If they were used solely for the initial installation or attachment of the frontal armor arrays to the rest of the turret, it would be unnecessary to keep them fitted to the tanks after they left the factory. In fact, all 18 Type 98s that participated in the parade were fitted with the lifting eyes.

All of this information concerning this new tank's turret seems to point to a very interesting possibility: that the lifting eyes may be intended to facilitate the removal, upgrade and/or modernization, and subsequent replacement of both turret frontal armor arrays. The triangular arrangement of the lifting eyes does generally support the use of a "T-shaped" lifting "sling" that would certainly be available in a variety of maintenance organizations. If true, this would mean that the Type 98's turret frontal armor could be completely changed on an as-needed basis. Like the Cold War "shell game" established by the evolution of Soviet/Russian tank turret armor, perhaps the Type 98 and the potential of its turret armor has ushered in a shell game all its own.

The production status of the Type 98 is still unclear. The group of Type 98s that participated in the Beijing parade may be prototypes. But unlike the infamous PLA tanks photographed crushing a historic rebellion in Beijing, the tanks that returned to Tianenmen Square for the 1999 parade provide a clear glimpse of both the present and the future of Chinese MBT development.

Like the majority of potential threat military forces around the world, the PLA is modernizing at a significant pace. So fast, in fact, that many of the new weapons systems that remain on the drawing boards throughout the West are at risk of being surpassed by our potential opponents.

As the U.S. Army turns its focus inward and reconsiders the design of its own armored force, it could be a costly mistake to underestimate the heavy threat represented by tanks like the Chinese Type 98 — the Beast from the East.

James M. Warford was commissioned in Armor in 1979 as a Distinguished Military Graduate from the University of Santa Clara, Santa Clara, California. A frequent contributor to *ARMOR,* Mr. Warford has held a variety of Armor and Cavalry assignments, ranging from tank platoon leader to brigade S3, and has served as a tactics instructor both at Fort Knox, Ky. for AOAC, and at CGSC, Fort Leavenworth, Kan. Upon retirement in September, 1996, he was awarded the Silver Medallion of the Order of St. George. He is currently an employee development analyst in the Kansas City area.

Elevated view of the Type 98 reveals details of the box-like turret roof, new optics for the commander and gunner, and the triangular lifting eyes along the turret upper edge. The Laser Self-Defense Weapon can be seen on the gunner's left.

This photo of the earlier Type 96 prototype shows the raised Laser Self-Defense Weapon and a dome-shaped Laser Warning Receiver on the rear of the turret roof. This model also had steel tracks.

The earlier Type 90II/Type 90 IIM, seen here in a manufacturer's brochure with simulated add-on armor, did not meet China's expectations, but may be built for export.

The Merkava Mk.3 Defies Its Critics

Israel's Tank Far Exceeds Controversial Rating By International Group, Expert Says

by Lieutenant Colonel David Eshel, IDF, Retired

The article entitled "What's the Best Tank in the World," (*ARMOR*, July/August 1999) prompts me to take up the cudgels on behalf of the Israeli Merkava Mk.3 MBT which, to my surprise, received the lowest marks out of the list of ten. Allow me, therefore, as a loyal reader of *ARMOR* for several decades and one who has spent his entire adult life in armor matters, to offer a few comments to redress the issue, without prejudice to the other tanks mentioned in the article.

The original report by the renowned firm Weapons Group Forecast International based its report on the following parameters:

- Level of mobility
- Lethality
- Ergonomics.

My article will, therefore, follow the lines of these principal criteria while adding a few of my own where these are deemed necessary to highlight any of my arguments regarding the unique technological characteristics of the Merkava Mk.3 MBT.

As your article rightly states, the original Merkava concept "reflects the unique requirements and doctrine' of the Israeli armed forces. Israel has had to fight, sadly, some of the most vicious tank battles since World War II and has, therefore, established its professional credentials through battlefield experience paid in blood. No less than 1,800 out of the 2,700 men killed in action throughout the three weeks of high-intensity fighting in October 1973 were tank crews. This proportion called for urgent measures to provide a platform which would afford survivability under highly lethal battlefield conditions. The result was the Merkava Mk.1, which first saw action in the 1982 Lebanon War, passing that test with flying colors.

The father of the design concept was Major General Israel Tal who, together with his group of top experts, has since upgraded the original design with countless modifications and improvements to reflect performance in battle, which is a routine daily occurrence in Israel. The Merkava Mk.3, which includes several technological breakthroughs in its design, has all the systems and components of ultra-modern technologies which have very few equals in other tanks worldwide.

A Merkava Mk.3 rears up as it crosses an obstacle in recent field test.

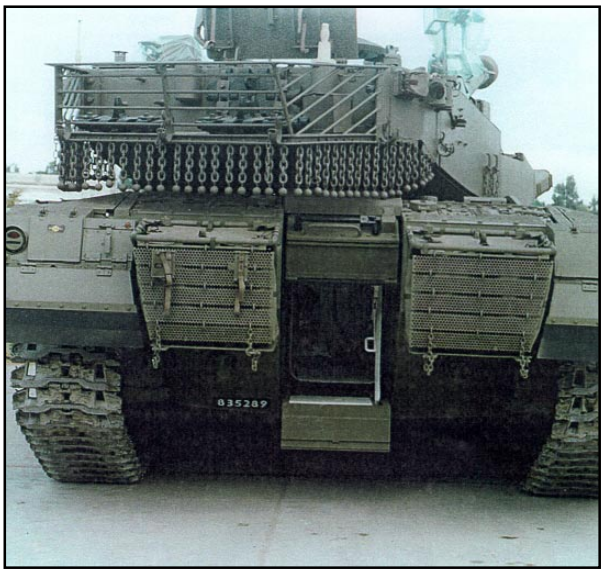
Level of Mobility

This article will limit itself to the definition of "Battlefield Mobility," which is the most important criterion for a fighting tank. As [British engineer and tank authority] Richard M. Orgorkiewicz has determined, "the ability of tanks to move at speed over rough ground is governed by their suspensions and in particular by the vertical travel which these provide for the road wheels."[1] The Merkava was designed to meet the topographical requirements of the Golan Heights which, with its basalt rocks, boulders, and deep gorges, present perhaps some of the most demanding ground conditions for battlefield mobility.

The designers have, therefore, provided a special suspension system which is typified by a powerful spring and rotary coil-spring design, differing from the double-spring system used in the previous Merkava Mk.1 and Mk.2 versions. The Merkava Mk.3 suspension is optimized for a fast ride over extremely difficult terrain, and a vertical road wheel travel of up to 600 mm gives the crew a softer ride. The suspension meets the stringent requirements of 60 km/h in rough country, such as the Golan Heights. The forces acting on the crew, thanks to the excellent absorption capacity of the suspension system, never surpass g-1.

In other tanks undergoing similar tests, when the speed approached g-9, crew members suffered injuries and systems failed to function properly. In the Merkava Mk.3 at double the test speed on the same testbed conditions, the g-force never exceeded g-1 with a totally smooth ride. The reliability of the suspension is absolute; it requires no field maintenance at all, and its life span covers years, and thousands of kilometers.

Another criterion given high priority in the Merkava is the power to weight ratio. Battlefield mobility, though, depends not on the theoretical hp/ton ratio, but rather on the actual power which reaches the sprocket, giving the tank its driving power. According to Ogorkiewicz, "the net engine power is generally taken to be not more than 70% of the gross engine power"[2] at the sprocket. The Merkava Mk.3, which is currently powered by a 1200-hp engine, reaches no less than a net 850 hp on the sprocket, which falls well within the required parameters of



This Merkava Mk.3 has been upgraded with modular armor suite and thermal sleeve integrated into the main gun barrel. At right, a view of the rear hull door, useful for MEDEVACing casualties and as an escape hatch for the crew.

71%. In fact, tanks powered by 1500-hp engines do not perform better when measured at the sprocket, as reliable comparisons show. The Merkava designers are already working on a 1500-hp engine, which will further improve battlefield performance.

Another factor which affects battlefield mobility is the acceleration rate, which has a direct bearing on the tank's survivability in combat. Experience has shown that a figure of around 15 seconds is usually the longest time in which a tank can safely dash from cover to cover under combat conditions. This also depends, of course, on the nature of the battlefield; under Continental conditions it can be less, while in the desert the open ground offers less cover, so that acceleration becomes more crucial.

The Merkava Mk.3 offers a 0-32 km/h acceleration in 10 seconds, comparable to the most advanced tanks in the world. Its combination of excellent cross-country speed — thanks to the advanced technological suspension — and the road wheel configuration makes it one of the best battlefield-mobile tanks. It is, therefore, very surprising that the WGFI report mentioned the Merkava Mk.3 as "by Western standards, somewhat deficient in terms of battlefield mobility due to rather anemic power-to-weight ratio, which is lower than what is considered acceptable in most other leading tank developing nations." In view of the facts I have given above, it seems superfluous to comment further on this issue.

Lethality Protection and Firepower

The WGFI report and subsequent *ARMOR* article rightly gives due credit to the Merkava Mk.3's firepower, but some further comments are in order here. The tank mounts a 60mm mortar firing a wide range of ammunition, such as smoke, illumination and high explosive, up to a range of 3,000 meters. The weapon is highly accurate and has a high rate of fire. It is operated from the fighting compartment, geared to the firing mechanism of the main gun. Apart from three flat trajectory machine guns, the mortar is an important addition in close combat, for the protection of the tank crew against hostile tank killer teams and AT guided missiles.

The Merkava Mk.3 incorporates an extremely reliable threat warning system, which has already proved itself in combat on the battlefield against most enemy threats, such as electro-magnetic, laser, and other means. The tank carries 50 rounds of ammunition for its main armament, rounds which rate among the most effective of their kind, and all battle-proven.

Although full details of the ammunition have not been released for reasons of security, two of the more unique rounds were seen recently. The Anti-Personnel (APAM) cartridge was developed in Israel to meet the requirement for tanks to engage soft ground targets, such as enemy infantry tank killer teams, against which Israeli tanks had no effective countermeasures in the 1973 War.

The other round which has entered service is the Laser Homing Anti-Tank (LAHAT) gun-launched weapon system, which extends the range of normal gun-fired rounds substantially. Both weapons are fully integrated into the tank's fire control system, which in itself is extremely advanced technically. It includes elements developed with the latest state-of-the-art technology, as a result of long combat experience in modern tank fighting. The FCS enables a high rate of first-round hit at long ranges by day and night and under adverse weather conditions, from stationary or moving platforms against stationary or moving targets.

Using the unique Baz ("Hawk") auto-tracking system, which locks onto targets at several km ranges, the Merkava's gunner can track and destroy enemy helicopters in flight with his main gun firing APDSFS or HEAT (or the latest LAHAT if available). The gunner's sight is locked onto its target throughout the firing sequence irrespective of any evasive maneuvers the target attempts when aware that it is under threat. The auto tracker system is based on the video output from either a TV camera (daylight channel) or a thermal imaging camera (night channel). The commander's sight is also of the latest design, the result of long years of research and combat experience. One of the main reasons for Israeli tank commander losses in combat was their exposure to enemy fire when operating with their hatches open. Now a new commander's sight enables the Merkava TC to operate with hatches shut down completely, while maintaining full all-round observation without having to traverse the turret. The sight enables the commander to overlap the gunner's sight at the throw of his switch, or override the gunner's sight when priority targets appear in his own sector.

Moreover, the commander's sight is independent of the gunner's, so that he can search for a new target while the gunner is engaging a previous one. The fact that the commander's sight protrudes slightly over the turret top affords the few inches necessary to observe hostile targets from turret-down position.

The Merkava Mks. 1, 2, and 3 have been fighting almost incessantly since 1982 and have destroyed a wide range of targets of all kinds, from tanks to ATGW, bunkers and helicopters. They have also

been hit repeatedly by all kinds of enemy weapons, from hypersonic anti-tank rounds to the latest generations of anti-tank guided weapons. In all of these cases, the Merkava, especially the latest design, has averted major damage to the crew, and is thus regarded as the safest tank in battle. In an incident in Lebanon in 1997, a Merkava Mk.3 took no less than 20 hits by ATGWs, but only a single warhead penetrated from a sharp angle, killing one crew member who had his head outside the tank turret hatch.

Fightability and Ergonomics

Israeli tank designers have placed the human element at the top of their list of priorities, and the Merkava is a shining example of what this attitude can do to make life more bearable for the tank crew under even the toughest battle conditions. The human element is at the center of the Merkava designers' considerations and this was the main reason for placing the engine in front of the hull, as this is still where the main threat comes from in a tank-versus-tank battle.

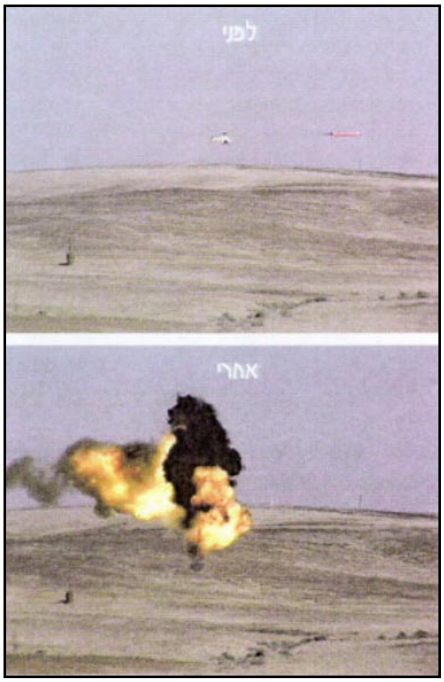
The Merkava Mk.3 is protected by a modular armor system, which is a unique approach to modern tank protection suites. It enables the basic tank to be upgraded with special armor suites to fit state-of-the-art technologies as they become available. Today, for example, the Merkava Mk.3 has already upgraded with its fourth generation of special armor. But the Merkava crew is not only protected from incoming rounds; the hybrid air-cooling system CBR is ultra-modern and adapted to meet the most stringent threat conditions presented by both present and future chemical warfare. This enables the crew to fight without cumbersome protective clothing and harness gear. It operates on the principle of a pressure chamber inside the fighting compartment. Optionally, filtered air can be directed to flow into the face masks and protective personal gear when worn by the crew operating with open hatches. The system also includes a modern air conditioning mechanism designed especially to meet the hot climatic conditions prevailing in Israel and its surroundings. It inserts fresh filtered air into the tank hull and crew clothing, dispensing with the heavy special vests worn by most tankers over their coveralls.

Due to special configurations included in the Merkava design, a definite breakthrough has been achieved as regards the survivability of the tank crews. Moreover, the dreaded fire hazard, which has haunted every tanker since WWI, has been virtually eliminated in the Merkava design concept. The percentage of wounded tank crews suffering from burns when Merkava MBTs were hit has been reduced to *ZERO***.** There were no burns whatsoever as a result of Merkava tanks being hit by enemy action, or otherwise, during the 1982 Lebanon War or in the anti-guerrilla campaign since then. In Lebanon, where the Merkava Mk.1 first saw combat, although dozens of crew members were wounded in action, none suffered burns of any kind; in other tanks, like the M60 or the Centurion, the rate was 26% on average, as it was during the 1973 war. There is no tank that can match up to this dramatic lifesaving criterion.

The Merkava Mk.3's fighting compartment is totally "dry." All accessories, ancillaries and supporting systems are electrically operated, devoid of any hydraulic fluids or other inflammable elements. The fire hazard from exploding ammunition is also eliminated by stowage in special heat resistant ammunition containers in the rear compartment.

With the power train located forward, there is ample space in the rear, which can be used for ammunition stowage as well as to carry infantry over dangerous ground, and to evacuate wounded, even on stretchers, where immediate MEDEVAC lifesaving activities can be effected en route.

A quite unique facility is the possibility of installing, in the field, in every tank configuration, additional communications equipment in order to convert the tank into a command vehicle. There already exist, as standard equipment, all the necessary connection boxes for radio or staff aids, so that within minutes the tank can be converted without any further work. Experience has clearly shown that special command vehicles that can be recognized by the enemy become prime targets.



Using the auto-tracking sight, the Merkava gunner can engage helicopters. In this test, a helicopter UAV is seen here just before and just after being hit.

The Mk.4 version of the Merkava, which is in its final stages of development, will retain the IMI 120mm smoothbore gun and not, as speculated, a larger caliber main armament, such as a 140mm barrel. However, refitted for the use of advanced technology ammunition with enhanced penetration capability, the gun's recoil system has been redesigned and based on compressed gas rather than the traditional heavy coil spring system previously used. For additional enhancement of first-round hit probability, a new thermal sleeve is fitted to the gun barrel, increasing its effect by 80%, according to field tests. The Merkava Mk.4, due to become operational soon, will be powered by a new 1500-hp engine, which has already passed the 10,000 km running field test in a prototype version. Further improvements are on the way, but so far kept under a tight lid of security; however, according to experts, they should represent a new stepping stone in unique tank design, fitting General Tal's concept of advanced technology concepts for the 21st century.

Notes

[1]See R.M. Ogorkiewicz, *Technology of Tanks,* Janes IG, London.

[2]Ibid.

LTC David Eshel was born in Dresden, Germany in 1928, and emigrated to Palestine in 1938. After serving briefly with British Forces after WWII, he became one of the founding members of the Israeli Armoured Corps in 1948 and served as a career officer with the IDF for 26 years. Educated at the French Cavalry School at Saumur, he later held various command and staff assignments and fought in all of the Arab-Israeli wars up to and including the 1973 conflict, when he served as the Armoured Corps' chief of signals. He later lectured on tactics at the IDF Command and Staff College. Formerly publisher of a military magazine, he is now a freelance journalist and serves as a defense analyst for several military journals.

Vigilant Warrior:

General Donn A. Starry's AirLand Battle And How It Changed the Army

by First Lieutenant Martin J. D'Amato

In light of the recent debate over the future of U.S. Army doctrine, it is essential to revisit how the Army developed its doctrine in the past. Probably the best case to analyze and draw lessons from is the development of AirLand Battle doctrine. Although the threat and political and economic environments from which AirLand Battle doctrine emerged are totally different from today's situation, the process and the forces that created AirLand Battle doctrine are even more relevant today. As the Army, and in particular the Armor force, searches for its place in the military of the future, it must draw from the lessons of the past to develop a coherent and relevant doctrine for the 21st century.

How does doctrine evolve? What are the forces and processes that lead the United States Army to recast the way it intends to fight? In his 1979 Leavenworth Paper on the evolution of U.S. Army tactical doctrine since World War II, Robert A. Doughty argues that while many factors influence the development of doctrine, national security policy is the fundamental basis for its development.[1] Doughty's insight is a deceptively simple one, for the interaction between internal and external factors and their relevance to national security policy is frustratingly complex. Each factor influences the evolution of doctrine in its own distinct way. This point is illustrated clearly in the evolution of U.S. Army doctrine from Active Defense to AirLand Battle during the years 1979 to 1982. Dissatisfied with Active Defense, the Army set out to develop a new doctrine in 1977, an initiative that coincided with a shift in national security policy. Four major external events — the overthrow of the Shah of Iran, the Soviet invasion of Afghanistan in 1979, the failed Iranian rescue mission in 1980, and the appearance of a Communist-sponsored government in Nicaragua — shifted the focus of President Jimmy Carter's foreign policy from a Third World, "world order politics" orientation to one recognizing the primacy of the Soviet Union as the principal adversary.[2] Carter's resulting defense spending stimulus and its extensive reinforcement by President Ronald Reagan's defense build-up in the 1980s led to an unprecedented expansion of defense programs, especially the "Big Five."[3] This increased spending, along with Reagan's belief that the United States should counter Soviet threats everywhere and that the nation had the resources to accomplish that mission, influenced the Army's doctrinal reform efforts.[4]

As the United States Army's Training and Doctrine Command's (TRADOC) commander during this period, General Donn A. Starry proved to be the Army's primary agent for the doctrinal revision that came to be called AirLand Battle. Recognizing the need for reform, Starry's energy and conceptions about the nature of future warfare combined with alliance considerations, particularly German concerns, to shape an offensively-oriented doctrine emphasizing firepower, soldiers, and technology. Starry was instrumental in making sense of these influences and melding them into a coherent and effective doctrine.

General Starry, as a colonel in Vietnam in 1970.

He took these influences, as well as those of the national strategy and new technologies, and focused the Army's efforts in its quest to perfect the Army's doctrine. His experiences as V Corps commander in Europe and his integral role in the development of the doctrine of Active Defense gave him a unique advantage when General E.C. Meyer, the Army Chief of Staff, tasked him to write a new doctrine. Not only did it allow him to discover firsthand the shortcomings of Active Defense, but it also illustrated the intense resistance to Active Defense within the Army in the field.[5] This was a key factor in Starry's approach to the doctrinal reform process.

"One of the greatest contributions to the development of AirLand Battle was the Yom Kippur War. After visiting the Golan Heights after the war, Starry realized that the old American style of warfare, based on the industrial mobilization model of massed forces and brute force of annihilation, was essentially bankrupt."

Understanding the development of AirLand Battle doctrine requires an understanding of the context from which it emerged. By the end of the Vietnam War, the United States faced a Soviet threat to NATO Europe that had grown in numbers, in quality of fielded equipment, and in operational doctrine, while the Vietnam War preoccupied the United States. The Army needed to find a way to fight outnumbered and win at the operational level of war without serious risk of having to resort to nuclear weapons.[6]

In July 1973, General William DePuy became the first commander of the U.S. Army Training and Doctrine Command (TRADOC). Using his experiences in World War II and Vietnam, and his analysis of the Arab-Israeli War of October 1973, DePuy developed FM 100-5, *Active Defense Doctrine*, in 1976. Designed to allow American forces to fight outnumbered and win, Active Defense emphasized the principle of economy of force and the need to strike the enemy with surprise and carefully husbanded combat power at the critical place and time. Since Soviet doctrine called for attacking in successive echelons of armor, Active Defense sought to destroy enough Soviet tanks in each echelon to give the U.S. Army and its allies time to reconsolidate and face the next echelon before it came within range.[7]

As soon as TRADOC published the 1976 edition of FM 100-5, Active Defense came under strong criticism. One of the main objections centered on the fact that DePuy had written the field manual with the help of the doctrine department at Fort Monroe instead of using the Command and General Staff College at Fort Leavenworth, where the Army traditionally writes doctrine.[8] Other criticisms focused on the doctrine's preoccupation with weapons effects, exchange ratios, and the return to the American fixation on "firepower-attrition" warfare, rather than a maneuver-centered focus.[9]

In contrast, the 1982 edition of FM 100-5, *AirLand Battle Doctrine*, identified leadership as an element of combat power equal to firepower and maneuver, and emphasized the validity of training, motivation, and boldness. Success depended on the basic tenets of initiative, depth, agility, and synchronization. AirLand Battle sought to defeat the Soviet second and third echelon forces deep within their own territory before they could attack while simultaneously defeating the first echelon. To accomplish these missions, the doctrine proposed using distant fires and electronic warfare to slow, damage, and confuse the enemy in a deep attack, thus creating gaps for a lightning-fast counterattack by mechanized forces, supported by tactical air power and attack helicopters.[10]

The study of the development of AirLand Battle needs a more thorough investigation into what focused the Army's doctrinal reform effort and who advocated and gained its acceptance within the Army. Historical or intellectual change requires vision, advocacy, and direction. Once the decision to change is reached, leadership in the process of the institutionalization of the change is paramount. In the case of the Army's development of AirLand Battle General Donn A. Starry performed all these tasks, providing focus for the development of the new doctrine and then working tirelessly to ensure adoption within the Army. General Starry's ideas developed over a long tenure in the Army. Through his experiences, he perfected his views on the difficulties of using tactical nuclear weapons, the need for meaningful use of the military to obtain strategic and political goals, and the nature of the war with the Soviets or Soviet satellite states.

From 1960 to 1964, Starry served in the 3d Armored Division, first as the Third Brigade's S3, and then as battalion commander of 1-32 Armor. This experience taught him that tactical and operational commanders would probably never be able to order a nuclear release. Although he saw great utility, both operationally and tactically, for nuclear weapons, the time needed to gain authorization for their release reduced their effectiveness. By the time operational commanders gained authorization to use tactical nuclear weapons, the Soviets would have already won using conventional forces and possibly even nuclear weapons. Even so, many Supreme Allied Commanders in Europe felt that they could not defeat the Soviets without release of nuclear weapons to the theater commander.[11]

One of the greatest contributions to the development of AirLand Battle was the Yom Kippur War.[12] After visiting the Golan Heights following the war, Starry realized that the old American style of warfare, based on the industrial mobilization model of massed forces and brute force of annihilation, was essentially bankrupt. The increased lethality of modern weaponry and the necessity to fight outnumbered and win the first battle of any future war demanded a new style of warfare.[13] He also realized, while numbers count, battles usually go to the side that sometime in a fight seizes the initiative and holds it till the end of the battle, regardless of numbers.[14] He now knew the U.S. had to find the way — technically, tactically, and operationally — to fight with conventional means below the nuclear threshold. The lack of reliable intelligence before the Yom Kippur War convinced Starry that the corps commander had to have control of surveillance and target acquisition means to find succeeding echelons and to deliver weapons against them. These echelons could threaten the success of the corps battle plan.

The daunting task of applying these lessons to the Army would not be easy.[15]

One of the most important experiences that crystallized Starry's views on doctrine and operational maneuver was his experience commanding V Corps in Germany from February 1976 to June 1977.[16] His time in command allowed him to lay out Active Defense on the ground and walk the terrain. This firsthand experience exposed glaring shortcomings. It was inadequate at stopping a Soviet breakthrough attack unless the Army found a better means to meet the arrival of new enemy units at the friendly line of contact.[17] He also learned from these terrain walks that too many commanding officers had never visited their General Defense Plan Battle Positions and the vast extent to which the Leavenworth malaise about Active Defense Doctrine affected the Army in the field.[18] His commanders did not feel that they could defeat the Soviets using Active Defense. This resistance showed Starry the need to incorporate the entire Army into the doctrinal reform movement and the need to reform the military school system to teach the

Army how to fight with the new doctrine. In order for the reform to take hold, Starry believed he needed to provide commanders and their staffs the tools and the vehicle to convince themselves that they could win.[19]

German doctrinal theory also had a great influence on Starry and AirLand Battle at the tactical level.[20] One of the German ideas Starry pushed in the doctrinal development was *Auftragstaktik*, or mission type orders.[21] This is the idea that subordinate leaders can change the mission within the commander's intent without having to ask for permission in order to obtain the objective.[22] Another German idea influenced AirLand Battle at the operational level. The concept of the *Schwerpunkt* combined synergy, fragmentation, successive operations and momentum, deception and surprise, within systemic maneuver. It emphasized both the logical linkage between concentration of effort and accomplishment of the operational aim, and the principle of directing one's own main strike into the enemy's principal operational weakness.[23]

These experiences forced Starry to do some serious thinking about the problems of the Army and how to fix them. After analyzing the German Army's successful resurgence between World War I and World War II, he developed a framework to change the way the Army fought. First, he understood the need for an institution or mechanism to identify the requirement for change and draw guidelines for change. This institution or mechanism has to describe clearly what has to be done and how that differs from what was done in the past. The principal staff and commanders responsible for change must be rigorous, relevant, and demanding in order to bring commonality to the solution of the problem. They must work closely with the spokesman for change — usually a maverick or an institution like a staff college — and build consensus, seeking an audience of converts and believers to help in the process.

In order for the reform movement to be successful, someone at the top of the institution must be willing to hear out arguments for change, agree to the need, embrace the new operational concepts, and become at least a supporter, if not a champion, of the cause. Once the proposed change is final, it must be subjected to trials that convincingly demonstrate its relevance to a wide audience by experimentation and personal experience. The process of change does not end there; necessary modifications must be made as a result of such trials.[24] This is the blueprint for how Starry helped change the Army.

The formulation of General Starry's ideas did not take place in a vacuum. The quest to change Army doctrine was an Army-wide effort. Political and international concerns, especially NATO alliance obligations, were aired and taken into account by Starry and doctrinal writers. Although these concerns found their way into the development of the doctrine, the driving force behind AirLand Battle was the Soviet threat. Starry did use these and other outside influences to help him focus the doctrinal reform effort.

The then-Army Chief of Staff, General E.C. Meyer, did not directly involve himself in the formulation of AirLand Battle. His main contribution came from his help in lobbying Congress and the Defense Department to support AirLand Battle. He then used the support he gained from AirLand Battle to help gain support for weapons acquisitions and coherent research and development programs.[25] However, immediately before he became Army Chief of Staff, he outlined his doctrinal concerns to Starry on 13 June 1979. Meyer's first concern was that doctrine should be applicable in a varying number of environments. War in Europe was the most important war to the United States, but wars in other places were probably more likely to happen. Doctrine needed to be expanded to address wars in other areas of the world such as the Middle East and Korea. Next, the Army Chief wanted to reduce the emphasis given to the classic Soviet breakthrough scenario on a single axis and give added consideration to other Soviet tactics, including attacks on multiple breakthrough axes with supporting divisional efforts to tie down our forces. Finally, he argued that the current Active Defense doctrine was too heavily defensive in orientation. He emphasized that even though the Army may be on the strategic defense in Europe, it needed to promote an offensive state of mind, conducting offensive operations at the tactical level. He still expected American soldiers to take the fight to the enemy.[26] Meyer further emphasized the need for change in his 1980 *White Paper* which stated:

> The most demanding challenge confronting the U.S. military in the 1980s is to develop and demonstrate the capability to successfully meet threats to vital U.S. interests outside of Europe, without compromising the decisive theater in Central Europe.[27]

German and British viewpoints were also fully aired during the development of AirLand Battle.[28] Early in 1978, talks began with the two nations to produce agreed tactical concepts for corps level and below, identify short-term interoperability goals, and discuss long-term operational requirements.[29] The biggest concern of the Germans was the vulnerability of the inner-German border and the need to defend forward. This was obvious to Starry even before these staff talks began. NATO simply could not afford to give up any ground in its initial defense because so much of Germany lay exposed to a Soviet thrust west.[30]

During the mid-1970s, the American domestic political environment began to change. The Vietnam War forced the Army to operate with severely constrained weapons budgets, although they gradually increased through the decade. Political currents of the 1970s advocated détente with the Soviets; however, the Soviet invasion of Afghanistan and the Iranian hostage crisis invalidated that outlook, and Congress wished to focus inward on domestic problems facing the United States. The Carter Administration's perceptions regarding the state of military readiness also changed vis-à-vis the Soviets and an unstable Third World. This shift on the national level gave impetus to policy changes concerning the tactical nuclear issue and rapid deployment world wide.[31] President Carter moved back to a national strategy that recognized the Soviet Union as the most dangerous threat.

At the time, a Carter foreign policy shift was not heralded as such by Starry and TRADOC and, as result, did not have a large impact on the development of AirLand Battle. The stark truth was that the United States, the leader of the NATO alliance, was confronted with more serious problems then ever before. Regardless of any policy shift, the Army needed to rewrite its doctrine to deal with the Soviet threat. As a result, this threat was the primary driving force in the development of AirLand Battle.[32]

The Soviets used the Vietnam years to perfect their operational doctrine and conduct a massive conventional force build-up in Europe.[33] By 1973, Warsaw Pact tanks outnumbered NATO tanks by two to one and the Soviets alone had 31 divisions along the East-West border and an additional 60 divisions west of the Ural Mountains.[34] Their overwhelming numbers and new operational doctrine caused serious problems for the United States and its NATO allies. The Soviets embraced a doctrine of mass, momentum, and continuous combat. Mass was their sheer numbers; momentum was setting those numbers into mo-

tion; and then keeping them in motion in continuous combat, echelon after echelon, to achieve overwhelming combat power at places where they hoped to achieve victory. There were four echelons deployed between European Russia and the inner-German border capable of launching four simultaneous breakthrough attacks against eight NATO corps.[35]

General Starry now set out to lead the Army in its quest to develop a new doctrine. One of the most important factors in the Army's rejection of Active Defense centered on the idea that General DePuy wrote it himself with the help of the Armor Center and the doctrine writers at Fort Monroe instead of at the Command and Staff College, where doctrine was traditionally written.[36] In order to avoid a repeat of rejection, Starry decided to return doctrine writing to TRADOC schools, like the Command and General Staff College (CGSC). The team that actually wrote *AirLand Battle* was from the Department of Tactics (DTAC) at CGSC.[37] Starry believed that if the schools did not write the doctrine, the school faculties could not explain the doctrine properly and students left the schools misinformed about the doctrine. This belief also helped prompt him to reorganize the schools because he felt they were a valuable mechanism to the Army's way of thinking.[38]

However, he did not leave TRADOC totally out of the process. Starry moved TRADOC's Deputy Commander, Lieutenant General William R. Richardson, to Fort Leavenworth where he took on additional duty as head of the Combined Arms Center.[39] This allowed Starry to maintain control of the doctrinal writing process without seeming to be too involved. He also directed Brigadier Donald R. Morelli, Deputy Chief of Staff for Doctrine, to keep records describing concisely the operational concepts of any given item developed at TRADOC and forward those ideas to Fort Leavenworth where they were developed into doctrinal field manuals.[40] This allowed TRADOC to stay involved in the writing of doctrine while allowing traditional writers of Army doctrine to be the primary writers of *AirLand Battle*.

Starry's unique leadership style allowed the free flow approach to the writing of doctrine that helped quell the resistance created in the development of Active Defense. He chose to operate where the problems were and conduct business "on site," sometimes outside his staff. Starry stressed a freer, faster flow of staff actions, unimpeded by undue heed to the chain of command.[41] This explains his close relationship with the principal authors of *AirLand Battle*, Lieutenant Colonel Huba Wass de Czega, Lieutenant Colonel L.D. Holder, and Lieutenant Colonel Richmond Henriques.

According to Wass de Czega, Starry's initial guidance was simple and straightforward. First, work in the ability to fight on the nuclear/chemical/biological battlefield (the integrated battlefield) and second, imitate General George C. Marshall's, the Army Chief of Staff during World War II, 1941 manual and the German 100-100.[42]

Starry's input did not end there. The authors sent him the drafts, piece by piece, and he made corrections to the chapters and sent them back using express mail. He also called the writers to discuss his recommendations, but gave them latitude not to accept everything he had penciled in.[43]

In order to gain acceptance within the Army for a new doctrine, General Starry knew that the entire Army and not just TRADOC needed to be involved in the process. Doctrinal development was led by ideas that could be added to and taken from in order to develop better concepts.[44] He gave many different speeches during his tenure as TRADOC commander, but never wrote any of his ideas in an official Army document because he knew the ideas would get into the Pentagon and the Army would not be able to revise them as needed. Starry wanted the whole process to be a growing, living, and moving thing. After each briefing, Starry and his aides changed the briefing based on the questions that the audience asked. Early in 1981 when the questions became less substantive, one of Starry's aides, Lieutenant Colonel Dennis Crumley, convinced Starry to write down his ideas. They took a speech Starry gave at the Armed Forces Staff College and printed it in the March 1981 issue of *Military Review* as "Extending the Battlefield."[45]

The Extended Battlefield concept dealt with areas of the world such as Central Europe, the Middle East, and Korea which have relatively large numbers of modern and well equipped mechanized forces that use Soviet-style operational concepts and tactics. The Extended Battlefield became the basis for AirLand Battle. The battlefield was extended in depth, time, and interservice cooperation. First, it was extended in depth, with engagement of enemy units not yet in contact in order to disrupt the enemy's time table, complicate his command and control, and frustrate his plans. This wrestled the initiative away from the enemy. The battlefield was also extended forward in time to allow leaders to plan attacks on follow-on echelons; logistical preparation and plans were integrated to maximize the likelihood of winning the close-in battle. Finally, the range of assets available placed a greater emphasis on higher level Army and sister services acquisition means and attack resources.[46]

An integral part of the Extended Battlefield concept was the concept of deep attack. Its main goal was to create opportunities for friendly action — attack, counterattack, or reconstitution of the defense — on favorable ground forward of the battle area.[47] Deep attack was not a luxury, it was absolutely necessary to defeat a numerically superior enemy. In an environment of scarce acquisition and strike assets, deep attack needed to be tightly coordinated over time with the decisive close-in battle.

It was also important to consider the number of systems the force had during that time that allowed for a more responsive command and control. The force also had the sensors to find, identify and target the enemy for the more lethal and greater range weapon systems. New systems allowed the commander to see deep inside enemy territory and new weapons allowed him to kill them. Deep Attack was the unifying idea that pulled together all these emerging capabilities so that the Army and Air Force could realize their full combined potential for winning.[48]

Realizing the need to attack deep, Starry saw the need to integrate the Air Force into the extended battlefield, primarily in the roles of interdiction and enemy air defense suppression. This enabled Army helicopters to fly behind enemy lines and conduct interdiction missions.[49] The services bitterly debated issues over the jurisdiction of capabilities and weapons systems. To rectify the situation, General Starry worked closely with Air Force General William L. Creech, Tactical Air Command (TAC) commander, to iron out the many institutional problems created by deep battle.[50] Starry and Creech had to overcome more than thirty years of rivalries between the Army and the Air Force. The main question was jurisdiction over the suppression of enemy air defenses close to the forward line of troops.[51]

Unlike their respective services, Creech and Starry never disagreed over jurisdiction of capabilities and weapons.[52] The big problem was convincing the Army and the Air Force to cooperate with each other.[53] The rivalry began to subside on 3 April 1981, when the two commanders signed a joint operational concept produced by the Joint Suppression of the Enemy Air

Defense (J-SEAD) project. Under this agreement, the Army assumed primary responsibility for the joint suppression from the forward line of troops (FLOT) to the limits of observed fire, but it authorized Air Force crews to attack independently surface air defense points as targets of opportunity inside the fire support coordination line in accordance with certain carefully designed rules of engagement when such attacks did not interfere with the mission objectives.[54] This was the first time the Army and the Air Force agreed on jurisdiction for close air support and interdiction. It also shows the willingness of Starry to let go of service biases in order to create the most effective force.

On 23 May 1981, the Air Force and Army staffs agreed to the TAC-TRADOC agreement on the apportionment and allocation of offensive air support. This agreement adequately established the Army corps commander's role in prioritizing targets for Battlefield Air Interdiction (BAI). The Air Force component commander apportioned his tactical aircraft to various roles and missions based on the combined or joint force commander's decisions and guidance. The key feature in this agreement was the Army recognition of Air Force management of its deep attack capabilities, and Air Force recognition of the corps function of locating and prioritizing targets for battlefield air interdiction.[55]

In "Extending the Battlefield," Starry stated that defense must begin well forward and proceed aggressively from the forward defense to destroy enemy assault echelons and at the same time slow, disrupt, break up, or destroy follow-on echelons in order to quickly seize the initiative and go on the offensive.[56] Seizing the initiative allowed the defender to win the battle against an numerically superior opponent. According to Starry, this notion came from Bob Helmbold's report to a NATO operations conference in the late 1950s, which set forth analysis of opposing numbers in battle. Helmbold analyzed a thousand battles and concluded that with reasonable force ratios, one-to-six or six-to-one, battles more often than not went to the side that somehow seized and maintained the initiative to the end of the battle, regardless of who attacked whom, notwithstanding which side enjoyed the greater numbers.[57] The outcome of the Arab-Israeli war of 1973 further confirmed this notion.[58] The need to gain the initiative became the intellectual underpinning for AirLand Battle.[59]

Even before DTAC finished writing *AirLand Battle*, Starry and his staff set out to gain its acceptance within the Army and in Congress. Starry's ideas on doctrinal development synthesized into a four-phased program to gain acceptance within the Army. Phase one included conferences at each major command designed to lay down the basic ideas. In phase two, TRADOC and the major Army commands jointly refined implementation proposals to fit specific priorities and assets. In the third phase, TRADOC gave the joint product to the corps and divisions in the field. In the final phase, Army service schools and centers conducted training in the concept and implementing procedures to ensure that the officers and noncommissioned officers left the training base ready for their respective roles.[60]

This process showed the need to reorganize the Army's education system in order to educate officers in the operational level of war. The entire system needed to be adjusted in order to educate officers and change views embedded deep within tradition.[61] Starry started with ROTC. He wanted graduates of ROTC to attain a skill level 3 in order to "commission officers who went through AIT."[62] Instead of using the Basic Course to teach basic soldier skills, he wanted to spend the time teaching newly commissioned officers how to be platoon leaders.[63] Since the ROTC system at the time could not accommodate the new requirement, TRADOC increased the basic course to 19 weeks. In order to compensate for the shift of instructors to the Basic Course, Starry shortened the advanced course to less then 19 weeks, but made up some of the material at the Combined Arms and Services Staff School (CAS^3). CAS^3 was a nine-week course designed to teach officers how to think logically through tough problems.[64] Now the advanced course was tailored for those officers about to take command of companies or batteries.[65] These changes helped soldiers obtain consistency in their thinking and made it easier for them to accept the new doctrine because it familiarized officers with the way the Army wanted them to think early in their careers.

Starry also made several changes to CGSC. He originally wanted to make it a two-year course because of past experience. During the 1930s, CGSC was a two-year course and produced many great leaders in World War II and after. Starry wanted the first year of learning command and staff procedures to be followed by a second year in which the officer studied command and staff at higher levels — corps, army, army group, theater, to include extensive wargames, staff rides, and command post inspections. General Meyer rejected this idea because it took so many of the Army's best majors out of circulation for two years. The two generals reached a compromise in 1981 that allowed for a second year at Leavenworth for a few officers selected from the one-year CGSC course. They called the new course the School for Advanced Military Studies (SAMS).[66] The following year, Colonel Wass de Czega developed a curriculum for the course that focused on large unit operations. SAMS, designed to give students a better understanding of the operational level of war, accepted its first students in June of 1983. Students studied classical theory, principally Clausewitz's *On War*, and examined large unit operations in history and in simulations in order to understand what the school called operational art.[67] Although Starry did not invent the idea of operational art in *AirLand Battle Doctrine*, his idea for SAMS and restructuring of the school system, gave the Army a vehicle to teach its officers about the operational level of war. This helped prepare officers for Brigadier General Morelli's insistence on including the operational level of war in AirLand Battle. Starry now had to convince many people that AirLand Battle was a worthwhile venture. Describing the process as "marketing," he developed a concept for a product needed by a customer, and pulled together the necessary resources such as technology, programs, organizations, and money in order to convince the customer of the worth of the whole. He had to convince people within and outside the Army. To do this, Starry set up a two-pronged approach in which Brigadier General Morelli was "Mr. Outside" and worked closely with the Congressional Reform Caucus to gain support within Congress. General Starry, "Mr. Inside," worked within the Army to gain support for AirLand Battle.[68] Starry gave numerous speeches and wrote numerous articles emphasizing the Army's need to reform and outlining his ideas for change.

Starry also linked doctrine and equipment requirements closely together. This helped justify new technology to Congress while at the same time promoting AirLand Battle. In January 1981, Starry implemented a concept-based acquisition system designed as a mechanism to translate broad operational

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The Battle of Suoi Tre:

Viet Cong Infantry Attack on a Fire Base Ends in Slaughter When Armor Arrives

by First Sergeant Christopher P. Worick

"It Was Like the 10 o'clock Late Show"

Prelude

In 1967, the troop buildup in Vietnam was in full swing with no end in sight. American commanders, by then equipped with more personnel and supplies, decided to revise the overall strategy of local containment for a more aggressive approach. Combined arms operations would now venture farther into enemy-held territory in an attempt to draw the communist forces into battle.

Operation Junction City, the largest combined arms operation to that date, began on February 22nd. The operation was designed to disrupt the Viet Cong Central Office for South Vietnam (COSVN), destroy the Viet Cong and North Vietnamese forces, and clear War Zone C, III Corps Tactical Zone base areas in the northern Tay Ninh Province.[1] Junction City would reinforce the necessity for armor and cavalry for the remainder of the war.

The initial phase of Junction City kicked off with airmobile troops lifted into the northwest corner of the operational area near the Cambodian border.[2] The mission was to establish fire support bases for the follow-on infantry and establish a horseshoe blocking position.[3] With this in place, mechanized forces began their attack north into the open end of the horseshoe toward the U end of the position. Initial enemy contact was sporadic; but mechanized units found VC base camps, hospitals, bunker systems, and small groups of Viet Cong. Dense jungle and enemy mines made progress slow for the armored forces.

Upon reaching the northern limit of advance, the mechanized units wheeled west to "squeeze" the enemy.[4] Feeling the pressure, V.C. resistance began to stiffen until they were finally drawn out in an attempt to boost their sagging fortunes.

The last significant engagement involving the use of armor during OPERATION JUNCTION CITY occurred at a remote fire base on March 21st. It would become known as the battle of Suoi Tre or Fire Support Base Gold.[5] The shock effect of armor would turn an enemy victory into a disastrous defeat.

If You Build It, They Will Come.

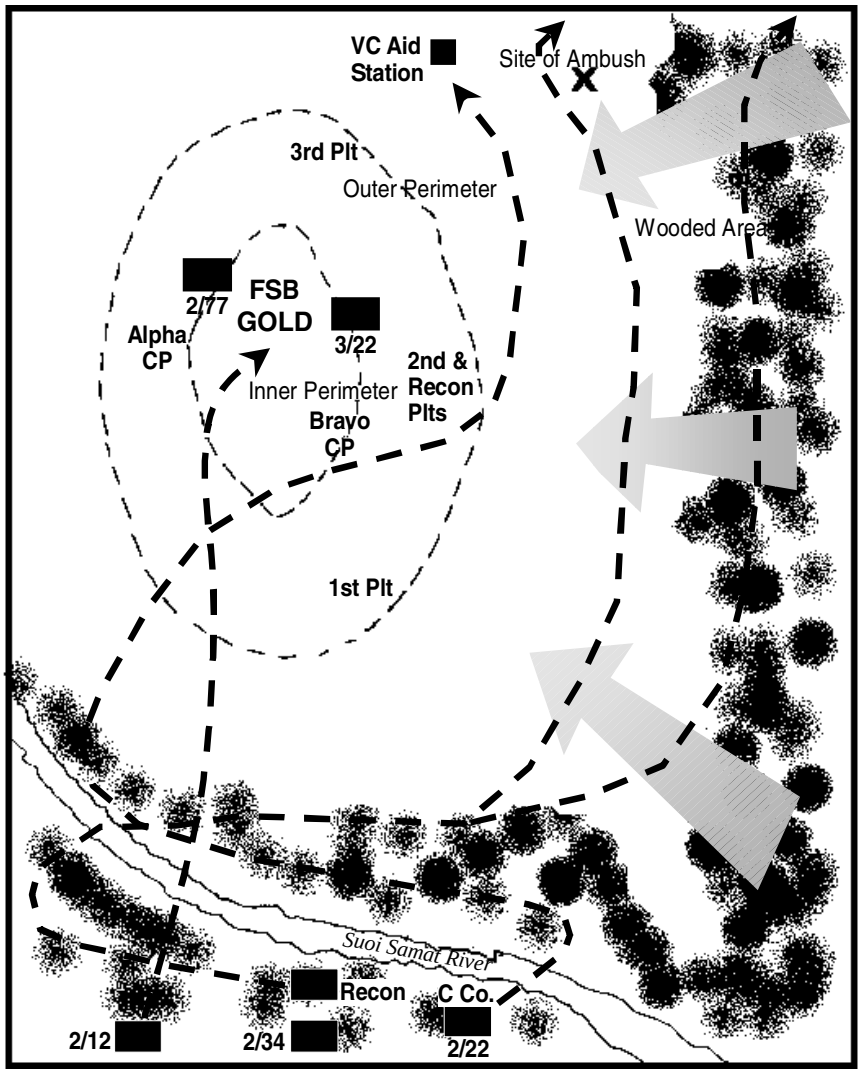
On March 19th, almost a month into the operation, the 3rd Battalion, 22nd Infantry (-) and the 2nd Battalion, 77th Artillery (-) began airlifting three batteries of 105mm howitzers and about 450 troops into an egg-shaped clearing near the former village of Suoi Tre. Their mission was to establish Fire Support Base Gold and provide indirect fire support for the 4th Infantry Division's 3rd Brigade Task Force.[6] This particular area had been quiet thus far and heavy action was not expected. When the first helicopters set down in the LZ, it became obvious that something was different. Viet Cong scouts, waiting in the surrounding woods, had placed command detonated mines facing inward in the clearing. The detonation of these explosives destroyed three Hueys. Undeterred, the Americans continued to secure the perimeter and establish the fire base, despite the fact that an unusually large number of VC were spotted moving in the area.[7]

What American troops didn't know was that they had landed virtually on top of approximately 2,000 Viet Cong troops spearheaded by the 272nd Main Force Regiment of the 9th Viet Cong Division.[8] Disturbed by this sudden threat, the enemy observed the Americans for the next two days while formulating their plan of attack. Feeling that the odds were in their favor on account of their numerical superiority, the VC would use speed and surprise to overwhelm the Americans. By using human wave assaults to quickly move in close to the defenders, they would deny U.S. forces the ability to use their technological advantage.

At FSB Gold, the infantry and artillerymen continued to reinforce and improve their perimeter defenses. They built defensive bunkers, rehearsed contingency plans, conducted ambush patrols, and constructed 18 firing positions for the artillery batteries.[9] To the southwest of Gold were elements of the 2nd Battalion, 12th Infantry, the tank-mech infantry task force of 2nd Battalion, 22nd Infantry (Mechanized) and the 2nd Battalion, 34th Armor(-).[10]

Under the command of LTC Raymond Stailey, 2-34 Armor had moved north on 20 March as part of the 3rd Bde, 4th ID Task Force, commanded by COL Marshall Garth. The TF had been placed under operational control of the 25th Infantry Division for "Junction City." 2-34 Armor had been conducting search and destroy operations, which consisted of clearing 10 x 10 kilometer quadrants, looking for any sign of the VC.[11] On March 20th, COL Garth ordered 2-34 AR to link up with 2/22 IN (Mech), commanded by LTC Ralph Julian, and continue their push north as a combined arms team toward the Suoi Samat River. Earlier that afternoon, the scout platoon of 2/22 Infantry had cleared a trail 1500 meters to the north but had been unable to find a ford.[12] The recon platoon from 2-34 would have better luck in the search.

Arriving ahead of the main body at the river, the 2-34 scouts found that the dry season had reduced the river to a muddy stream. A possible fording site had been located at a bend in the river; however, bridging assets would still be required in order to get vehicles across without getting stuck. LTC Stailey met with his scouts at the river and coordinated for an M113 to be sunk in the river and two AVLBs set across if the situation required it. This contingency plan was then passed along to all maneuver elements. Separated from the firebase by only two kilo-



Viet Cong preparing to assault the new fire base were discovered by an American patrol, triggering the beginning of the enemy assault from the woods at right. As the eastern perimeter of the base began to collapse, armored units crossed the river south of the base and attacked south to north, breaking the enemy assault.

meters, LTC Stailey felt confident that if any trouble should occur, his units were in a good position to provide support. Exchanging information with the firebase commander on the task force net, LTC Stailey received the troop disposition at Gold and the extent of the outer perimeter's location.[13] With darkness approaching, 2/22 IN and 2-34 AR had conducted their linkup and began setting up for the night. Normally a clearing would have been preferred, but none had been located or indicated on the maps. With the rear elements closing in on their respective unit night positions, LTC Stailey briefed his commanders on the current situation; he decided to wait until first light and resume the move toward the river.[14]

1LT Denny Hollister, executive officer of A Company, 2-34 AR, recalls the movement:

> The day before the battle, our unit, A Company, 2-34 and 2/22 IN (Mech), made little progress due to the heavy jungle and various breakdowns, mainly thrown tracks. By this time our tanks, which were old when we got them, had sustained months of mine and RPG damage. Also, the daily routine of bulldozing the jungle was beginning to take its toll. Throwing a track (especially off a vehicle that was already short tracked due to mine damage) often meant that everything was wedged in a tree or other jungle growth. The process of repairing it was very labor-intensive, as only a tanker can understand. As a result of all this, we did not make our assigned objective for that day. Since our objective was mainly just driving around in the woods until we ran into someone, it really didn't matter in the overall scope of the war — but it sure did upset the brigade commander (COL Marshall Garth). As a punishment, we did not receive any fresh water that evening.[15]

First Blood

Around 0600 the next morning, radio reports indicated possible enemy movement on the perimeter of the Fire Support Base.[16] First contact with the enemy was at 0631.[17] An ambush patrol from B Company, 3/22 IN, located 500 meters from the perimeter of Gold, broke down their ambush site when they spotted two VC. Taking the soldiers under fire, they discovered the enemy was in the tall grass all around them. With only part of the patrol making it back to the FSB, five soldiers were left pinned down. A squad was quickly assembled to provide help, but several short bursts of AK-47 fire indicated that any survivors had been killed. The sound of mortar rounds leaving tubes sent men diving for cover as 61mm and 82mm rounds began exploding throughout the fire support base.[18] Within minutes, the mortar fire shifted to the western side of the perimeter.

As the enemy continued to pound the western perimeter and the artillery batteries in the center of the FSB, the tempo of the battle increased. Scores of Viet Cong troops emerged from the jungle in a three-pronged assault along the eastern side of the perimeter. Small arms, RPGs, and recoilless rifle fire peppered the defenders along the outer perimeter. As counter-mortar fire went out, the amount of incoming fire in the FSB diminished. It was only 0638, seven minutes since the ambush patrol had set off the VC attack.[19] Immediately, it was obvious that this unprecedented daylight attack was not a small enemy force. The enemy's boldness and sheer numbers indicated that they were determined to overrun the fire support base.

While tactical air support was called in, all platoons along the eastern perimeter reported enemy in the wire.[20] The enemy surrounded some positions, with one platoon reporting hand-to-hand combat. The Artillery Reaction Force, which had rehearsed this move the day prior, was put on standby. With his company decisively engaged, the B-3/22 IN commander called for 105mm howitzer fire as close to the perimeter as necessary. He wanted to plaster the wood line and get as many troops emerging into the open as possible.[21] A forward air controller notified the fire base that four sorties of fighters were

inbound and would be on station shortly.[22]

Monitoring the situation from his helicopter, COL Garth ordered the armored units to move across the river in an effort to assist the embattled fire base. LTC Julian, commander of 2/22 IN (Mech), immediately ordered C-2/22 and an attached tank platoon from 2-34 to move across the river and head northwest using the trees for cover. Camping near the river the night before, a fording site was found that would not require bridging assets.[23]

With the C-2/22 IN team on the move ahead of the TF main body, the remaining units were cranked up, waiting to move. At 0700, incoming mortar fire landed among 2-34 Armor's tank positions.[24] Although ineffective, the mortar fire caused the tanks to disperse in order to get out of the impact area.[25] Straddling each other's tracks to clear a path wide enough for the tanks, the M113s pushed forward as fast as the jungle growth allowed.[26] The smell of diesel smoke filled the air as the two battalions crashed through the underbrush. The mortar fire gradually tapered off, with no casualties or vehicle damage reported. Although initial progress along the trail went well, maintaining dispersion and getting all the vehicles to converge on the fording site proved time-consuming. COL Garth, anxious to get a relief column to the fire base, radioed, "If a vehicle throws a track, leave it. Let's get in there and relieve the force!"[27]

As the mechanized forces moved toward the sound of the guns, the situation at Gold deteriorated. The outer perimeter along the eastern side was collapsing. The B Company, 2/22 IN commander called for the artillery reaction force in an attempt to reinforce the line.[28] Additionally, he told his fire support officer to move the artillery fire to within 100 meters of the perimeter. With all three platoons fighting hand-to-hand, it appeared that the reaction force would not make it in time. Ammunition was being consumed at an alarming rate. The 3rd platoon leader reported that he had VC in the foxholes at the center of his position. Suddenly the 1st platoon leader reported that the reaction force had arrived and was counterattacking on line across his positions. For a brief moment the situation had stabilized.[29]

At 0715, a silver Phantom jet swooped overhead, passing along the edge of the woods to the east, and pulled up to the north, followed by the thunder of ordnance exploding. The Air Force had arrived! A second F-4 repeated the lead plane's maneuver. The FAC plane could be seen circling to the southeast, directing the fighter-bombers. Then two more Phantoms appeared and dropped their loads along the eastern edge of the fire base. Trying to catch enemy troops in the open, the FAC moved some of the air strikes more closely along the southeast corner of the perimeter and to hit the VC with napalm.[30]

By the time the planes launched their sorties, enemy mortar fire had tapered off because of continuing artillery countermortar fire. The VC were still shooting at the artillery positions with RPG, 75mm, and 57mm recoilless rifle fire from the woodline.[31] The enemy raked the firebase with automatic fire as the attack on the eastern perimeter intensified.

At 0745, the FAC plane was shot down by heavy machine-gun fire and crashed into the trees beyond the fire base, killing both the pilot and observer.[32] As the ramifications of the loss sank in, there was a lull in the air strikes until a new FAC could come on station.[33] The battle would now take a radical turn of events.

Desperate Measures

The B Company commander directed 105mm artillery rounds, known as "beehives," to be loaded immediately; the rounds had not been used previously because of their classified nature.[34] Packed with thousands of small steel flechettes in a single projectile, a beehive could cut a wide swath in the enemy ranks. The B Company commander decided to use the beehives in the 1st platoon sector first.[35] After telling the platoon leader to get his men under cover, the commander instructed the guns to fire toward the east and southeast. The telltale effect was immediate. Although wide gaps had been blown in the attackers' ranks, more were requested along the whole eastern side. Due to a shortage of beehive rounds, a reaction force from A-3/22 was requested at 0800, to reinforce the B Company infantrymen. The A-3/22 CO, said that his 20-man force was on the move enroute to Bravo's positions.[36]

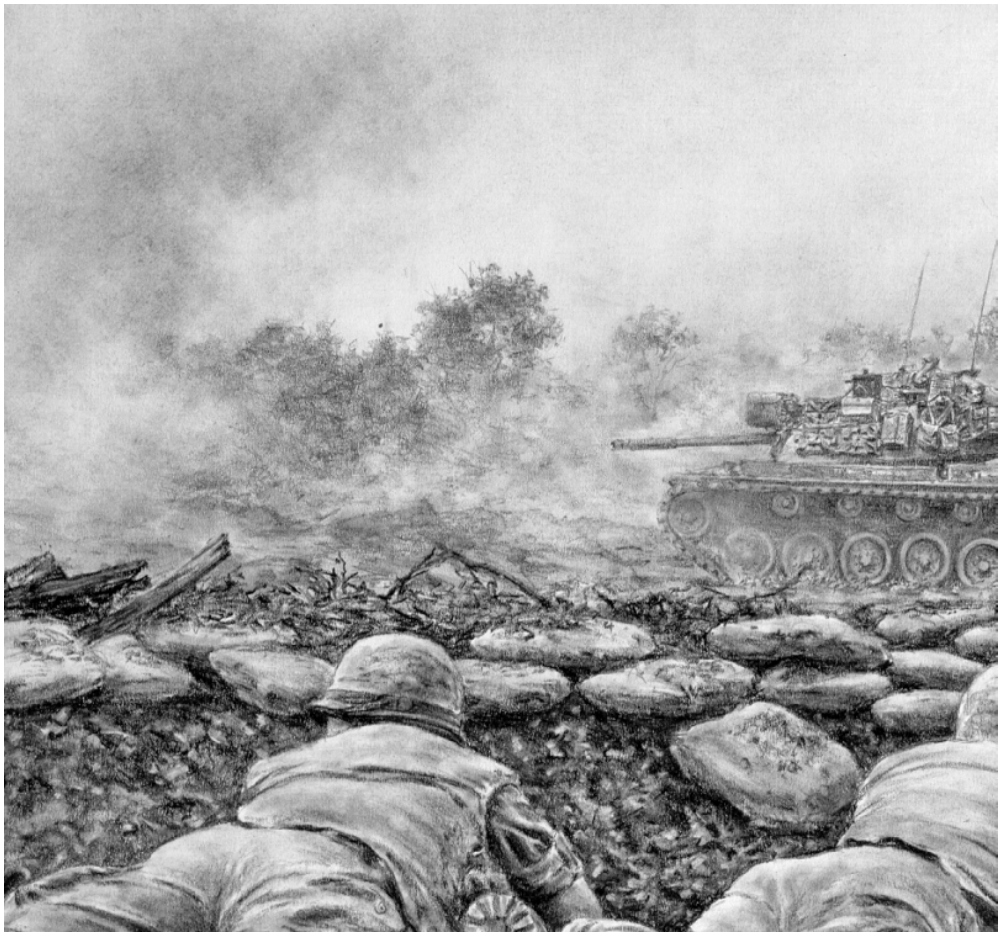
Within minutes, the reaction force linked up with B Company. Despite the best efforts of the artillery firing over the defenders heads, the VC were in scattered foxholes. More importantly, ammunition was now in short supply. With troops still emerging from the wood line, the order was given at 0820 for the eastern perimeter troops to fall back to secondary positions.[37] Platoons began bounding back to their alternate positions in a move rehearsed the day prior. By 0840, B Company had completed its move.[38] This allowed the artillerymen to drop the tubes and fire at point-blank range making the beehives even more effective. A Company now experienced problems of its own. The VC overran a quad .50 caliber machine gun, positioned on the northern perimeter. Attempting to turn it on the defenders, it was destroyed by a direct hit from a 105mm howitzer.[39]

Alarmed by the radio reports at Gold, the tank/infantry task force moved with all possible speed through the heavy vegetation in its attempt to relieve the base. Although sporadic sniper fire hampered their movement, they made progress. A new forward air controller arrived back on station at 0845 and coordinated more airstrikes.[40] Helicopter gunships had also been called in to assist the defenders. CH-47 Chinook helicopters dropped fresh supplies of ammunition directly into the firebase.[41] From his vantage point above the battlefield, LTC Stailey helped to direct his battalion's lead elements to the river from his helicopter. Calling foward the AVLBs and an M113 from the headquarters section, the contingency plan went into effect. The APC was driven to the middle of the river to act as an abutment. Once the crew was clear of their M113, the scissor bridges were set in, finally spanning the river.[42]

As the TF main body closed on the fording site, air strikes were within 100 meters of Gold.[43] Napalm was burning up the foliage around the base that enemy troops were using for concealment. Indirect fire to hit the troops still emerging from the jungle was on hold because of the aircraft in the area. Like a swarm of ants, the VC continued to advance on the defending troops.[44] With beehive rounds expended, the artillerymen resorted to firing HE at point-blank range. Enemy troops were within hand grenade range of the command bunker and five meters of the 3/22 IN Battalion Aid Station.[45] Having borne the brunt of the enemy's repeated attacks, B Company was on the verge of being overrun. A Company, under moderate pressure, still held its original positions, but in some places the VC were within 15 meters of their line.[46]

Into the Maelstrom

With C Company, 2-34 leading the TF main body across the Suoi Samat, the 2nd Battalion, 12th Infantry, had already moved up on foot and were just to the south of Gold in the woodline.[47] C Company, 2/22 IN, with its attached tank platoon, had also made it to the edge of the



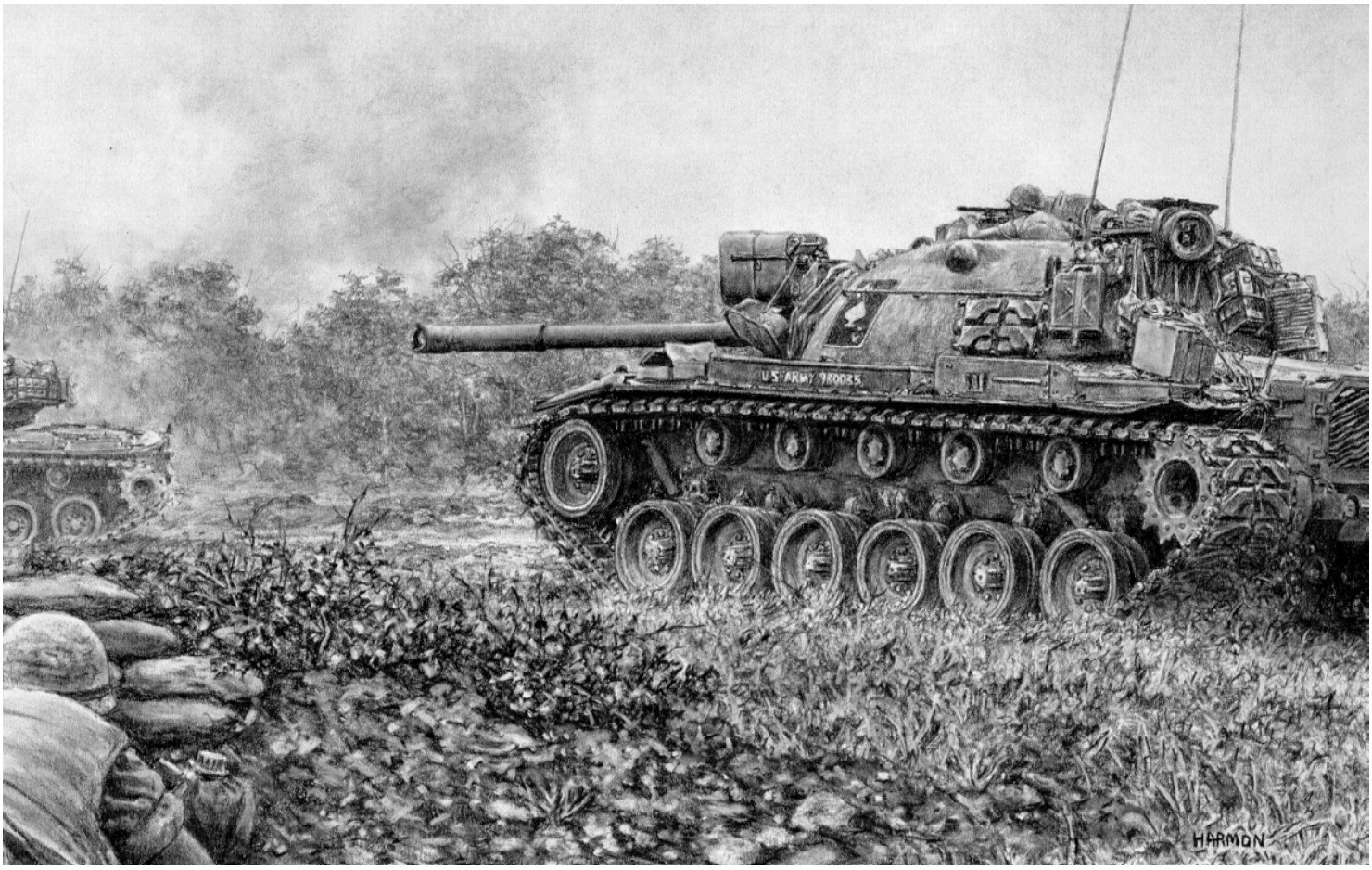
trees in good time. The situation at the fire base had rapidly gotten worse. VC soldiers continued to pour from the woods from the north and east.[48] Unknown to the VC troops, 2-34 Armor and 2/22 Infantry were consolidating in the wood line preparing to assault. The plan called for C-2/22 IN to attack northwest through the FSB and swing north.[49] The task force main body would skirt the wood line moving east and emerge swinging north, immediately spreading out to have room for fire and movement. They would continue along the wood line destroying all enemy forces in order to secure the eastern perimeter and prepare for a counterattack.

As the end of the column moved up to within 50 meters of the wood line, preparing to counterattack, the defenders at Gold were in dire straits. Some of the troops had begun to destroy their weapons to prevent capture. Along the B-3/22 sector, many troops were down to one grenade and two magazines apiece.[50] Small pockets of men, out of ammunition, had resorted to using weapons or entrenching tools as clubs in desperate battles for survival. 2/12 Infantry began its attack by firing directly into the VC flank as they emerged at the southern end of the clearing. Artillery fire was immediately adjusted to prevent hitting the friendly troops.[51] As the VC continued to advance through the smoke, a new sound was added to the chaos, growing louder from the south.

Fire and Maneuver

At 0912, with canister rounds exploding among the troops in the open and machine guns blazing, the tanks and APCs broke cover of the trees and began to fan out on line, suddenly throwing the enemy off balance.[52] Skirting the tree line toward the north, one tank crewman observed; "It was like shooting fish in a barrel."[53] Responding to this new threat, groups of VC began to rush the vehicles but were quickly crushed by the rolling juggernaut. Others foolishly attempted to climb onto the tanks and had to be taken off with pistols, hand grenades, and even pioneer tools. Anatol Kononenko, a 4.2 mortar forward observer with 2/22 IN, observed two tanks actually fire at each other using canister rounds to remove VC troops from their tanks.[54] PFC Gary Lapp, of C Company, 2-34 AR, was assigned as loader on C-25. Moving into the battle area, Lapp recalls the battle:

> As the tanks were racing up and down the trails to get to Gold, I was down inside. The center of gravity on a tank is so high, that once it starts bucking back and forth, it is very difficult to stay up top in the loader's hatch without getting thrown around. Down inside I was having a hard time holding on to anything that would give me support. Sitting on the loader's seat with feet spread apart for directional support, my right hand was on the steel grid that protects the radios from the spent 90mm shell casings and my left hand was placed on the gun carriage. That was the best place to be. Once we broke through onto the LZ, SSG Badoyen told me to get ready. One of the prides I had in being a lowly loader, was that I knew how to keep the coax machine gun going, and I could load the main gun so fast it sounded like a semi-automatic. I remember racing across the opening for some distance before we opened fire. I also remember soldiers of the 77th Artillery, waving and cheering as we raced around them moving northeast. We had still not opened fire and were now in the clearing. I jumped up in the loader's hatch and I could see the black grill doors of three other tanks in front of us. Once I had jumped down inside to begin loading the main gun and keep the coax from jamming, I kept thinking: 'This is it, this is real combat. I wonder if an RPG will come through the front slope and kill us all? I hope SSG Badoyan has his pistol ready to keep anybody from jumping up on the tank and throwing a grenade inside. I just kept loading that main gun and keeping the slack belts feeding into the coax. I recall the empty shell casings falling on the floor and using my boot to keep them away from the turret ring. When several shell casings stack up, they can roll into the drive gear and jam it up."[55]



Fatal Blows

Stunned by the unexpected armored onslaught, VC troops hesitated, unsure of what to do next. Now fighting a threat from two directions, the only logical course of action was to withdraw before being enveloped and cut off. The VC were truly between the hammer and anvil. The majority of enemy troops were caught in the open and were cut down by direct fire before they could reach the cover of the trees. A mechanic, aboard the A Company, 2-34 Armor tank recovery vehicle, sat calmly on top, filming the action with his home movie camera while the rest of the crew threw grenades and fired their .50 cal. machine gun at the fleeing enemy.[56] With the VC on the run, artillery was immediately shifted farther east into the woodline in an attempt to kill as many enemy as possible with indirect fire.[57] C Company, 2-22 IN, moving through the FSB, found a VC aid station just to the north of Gold.[58] Tying in with 2/12 IN, the armored vehicles quickly established a firing line outside the original perimeter and consolidated their combat power preparing for a counterattack.[59]

LTC John Bender, the fire base commander commented, "It was just like the 10 o'clock late show on TV. The U.S. Cavalry came riding to the rescue."

Once it was established that the VC had broken contact, treatment of the wounded and policing of the battlefield began. C Company, 2/22 Infantry located the missing ambush patrol. Four of the men were dead, but one soldier had miraculously survived.[60] Captured enemy soldiers and documents provided a wealth of information.

With 2,500 VC soldiers participating in the attack, 647 now lay dead with another 200 believed killed and dragged away.[61] Friendly casualties included 31 KIAs and 187 wounded.[62] Due to the large numbers of enemy dead, a mass grave was scooped out by one of 2-34 Armor's M-88 recovery vehicles.[63] Surveying the devastation, the survivors at Gold estimated that if the armor would had arrived 15 minutes later, the VC would have overrun the base.[64]

LTC John Bender, the fire base commander commented, "It was just like the 10 o'clock late show on TV. The U.S. Cavalry came riding to the rescue."[65] MSG Andrew Hunter recalled, "They haven't made a word to describe what we thought when we saw those tanks and armored personnel carriers. It was *devine*!"[66] For their participation in the battle, the 2nd Battalion, 34th Armor was awarded the Presidential Unit Citation.

Conclusion

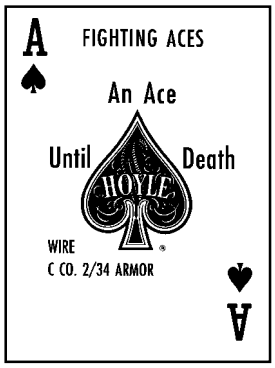
The battle of FSB Gold was over but not forgotten. The VC had lost more soldiers at Suoi Tre than any other single engagement of the war. The 9th VC division, although decimated on March 21, 1967, would fight in other battles throughout the rest of the war.[67] Once the smoke had cleared, after-action reports of the battle immediately concluded that the use of armor had turned the tide of battle in the Americans' favor. Initially hesitant about using armor in the jungle, senior officers were beginning to rethink their tactics in favor of the use of combined arms teams whenever possible. The geography of Vietnam would pose special problems for armored forces. When properly employed, however, tanks and mechanized infantry proved be a power-

Suoi Tre...The Aftermath

Above, an M88 digs a mass grave for the more than 600 Viet Cong casualties. A Vietnamese advisor, above right, with some of the hundreds of weapons captured.

RPGs were rarely seen until this battle. Some captured rounds are seen at left.

At right, the calling card of C Co., 2/34 Armor.



ful combat multiplier," as was the case at Suoi Tre.

Notes

[1]General Donn A. Starry, *Armored Combat In Vietnam*, (Indianapolis/New York: The Bobbs-Merrill Company, Inc.,1980), p. 100.

[2]Harry G. Summers, *Historical Atlas of the Vietnam War*, September 1995, p. 118.

[3]Starry, p. 95.

[4]Ibid., p. 95.

[5]Ibid., p. 100.

[6]Dave Gehr account, C/3-22 Infantry, (1966-1967), http://www.22ndinfantry.org/vietnam.htm, downloaded 9/20/99, p. 2.

[7]*Time Magazine*, March 31, 1967, p. 26.

[8]Ibid.

[9]Gehr, p. 2.

[10]Starry, p. 100.

[11]Col. (Ret.) Raymond Stailey, telephone conversation, October 5, 1999.

[12]Starry, p. 100.

[13]Stailey conversation.

[14]Ibid.

[15]Dennis Hollister, XO, A/2-34 AR, 1967, correspondence to LTC Fink, Commander, 2-34 Armor, dated Aug. 5, 1997.

[16]Anatol Konenenko, eyewitness account, (foward observer), HHC, 2-22 Infantry, dated June 1, 1998.

[17]LTC (Ret.) Robert L. Hemphill, *Vietnam Magazine*, December, 1998. Feature article, "VC Onslaught at Fire Support Base Gold," p. 22.

[18]Ibid.

[19]Ibid.

[20]Ibid.

[21]Ibid.

[22]Ibid.

[23]Starry, p. 101.

[24]Stailey.

[25]Ibid.

[26]Starry, p. 101.

[27]Ibid.

[28]*Vietnam Magazine*, p. 25.

[29]Ibid.

[30]Ibid.

[31]Ibid.

[32]Gehr, p. 2.

[33]*Vietnam Magazine*, p. 26.

[34]Ibid.

[35]Ibid.

[36]Ibid.

[37]Ibid.

[38]Ibid.

[39]Starry, p. 101.

[40]*Vietnam Magazine*, p. 26.

[41]*Time Magazine*, p. 26

[42]Stailey conversation.

[43]*Vietnam Magazine*, p. 27.

[44]Ibid.

[45]Ibid.

[46]Ibid.

[47]Stailey conversation.

[48]*Vietnam Magazine*, p. 27.

[49]Ibid.

[50]Hollister account.

[51]*Vietnam Magazine*, p. 28.

[52]Gehr account, p. 3.

[53]Konenenko account.

[54]Ibid.

[55]Gary Lapp, (loader C-25), C/2-34 AR, 1966-67 eyewitness account, correspondence dated June 21, 1999.

[56]Ibid.

[57]Starry, p. 101.

[58]*Vietnam Magazine*, p. 28.

[59]Ibid.

[60]Ibid.

[61]Ibid.

[62]Ibid.

[63]Hollister account.

[64]Eric M. Bergerud, *Red Thunder Tropic Lightning*, Viking-Penguin, March 1994, p.159.

[65]*Tropic Lightning News*, Vol. 2, No. 13, April 3, 1967, front page article, "Reactionary Drill Saves Artillerymen."

[66]Starry, p. 101.

[67]*Vietnam Magazine*, pp. 26-27.

1SG Christopher P. Worick enlisted in the Army in 1981 as an armor crewman. His assignments include 3-8 Cavalry, 8th Infantry Division; 5-12 Cavalry, U.S. Army Armor Center; 1-68 Armor, 8th ID; 3-69 Armor, 24th ID; and Great Lakes Recruiting Battalion, Recruiting Command. He is currently assigned as the first sergeant of C Company, 2-34 Armor at Fort Riley, Kansas.

Dismounted Training for the Company Team

by Captain Celestino Perez, Jr.

Many tanks are lost through a failure of the crews or the platoon leader to make a foot reconnaissance. People get vehicle bound and never dismount. Before exposing a valuable tank and the lives of its crews to danger of destruction by crossing an unreconnoitered skyline or emerging from cover, a foot reconnaissance should be made. Here again we have the question of haste and speed. It may seem a waste of time to look, but it is certain death to get on the front slope within effective range of undiscovered antitank [weapons] or lurking enemy tanks.

– General George S. Patton, May 1944

Dismounted training is an inexpensive technique that can help company teams begin to reverse trends that have led to poor performance at the National Training Center. When compared to mounted training, these techniques require few resources, and relatively little planning and preparation, but with frequent repetition can enable company teams to improve in precisely those areas many fall short. The following training materials best illuminate the company team's weaknesses while in the offense:

- A videotaped OPD entitled "Red Zone Brief," given by then-COL James Grazioplene, former chief of the Operations Group at the National Training Center. The tape was produced at Fort Hood in 1996.
- A Center for Army Lessons Learned (CALL) article entitled "Black 6, this is Red 6...contact...." (Combat Training Center Quarterly Bulletin No. 96-10)
- A CALL Special Study published in March 1998 entitled "Closing with the Enemy — Company Team Maneuver."
- For defensive training, the CALL article entitled "Building an Engagement Area: A Blueprint for Success," (Combat Training Center Quarterly Bulletin No. 96-7) is a valuable tool. The article explains 17 nuts-and-bolts tasks the company team commander must accomplish to enable a successful defense.

Much of the analysis in the videotape and the CALL publications grew out of shortcomings in the early editions of *FM 71-1* and *ARTEP 71-1-MTP,* which failed to provide the proper focus on maneuver. Consequently, platoon- and company-level leadership did not clearly focus their orders and after-action reviews on maneuver (which is the reason company teams exist). I believe the revised *FM 71-1* (1998) and the final draft of *ARTEP 71-1-MTP* (1998) provide the proper focus on maneuver addressed in the Grazioplene videotape and CALL publications. Company commanders and platoon leaders who read the revised doctrine in light of the videotape and CALL publications will increase their understanding of the company/team's tactical potential.

These exercises collectively address weaknesses in terrain appreciation at the levels of individual, crew, platoon, and company; target acquisition and 360-degree security; maneuver; and company defense. Using dismounted training, it is possible to train these tasks to a high degree of proficiency at low cost. Besides the obvious cost advantage, dismounted training offers other benefits:

- It enables all soldiers in the company to visualize how the company commander wishes them to fight, particularly since crew, section, and platoon movements will occur on a scale large enough to see relations between vehicles, leaders, and terrain. This technique offers significant merits over a sand-table exercise, which reduces the training audience and imperfectly approximates mounted execution.
- Since a soldier will train in relative proximity to his leader, his every action is subject to immediate feedback and on-the-spot correction. For instance, if a TC moves out of his fighting position by moving directly forward, his platoon sergeant or platoon leader can correct his decision and order proper execution. If a section or platoon masks the overwatching element's observation, a leader can readily observe and correct the error.
- When units later get around to mounted training, they will be better able to focus on those tasks neglected during dismounted training, like casualty evacuation and resupply. The unit will also be capable of dealing with advanced tactical problems sooner. For instance, a commander will not find it necessary to explain set-move drills, leaving more time to develop his sense of when to shift the main effort. Also, the dismounted training will produce intellectually prepared leaders with numerous tactical experiences upon which to draw.

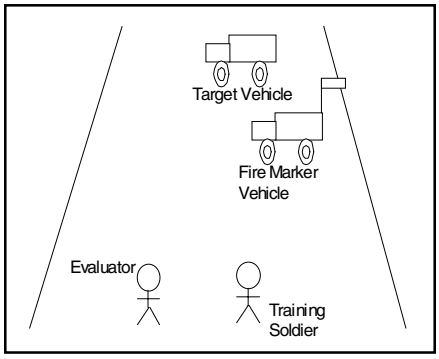
Leaders should understand that unless a unit can conduct a task dismounted, it has little hope of successful mounted execution. Exercises should be like athletic practice sessions, with many repetitions, numerous halts, restarts, and informal AARs. You'll probably find that soldiers are better at organized team athletics than they are at their soldierly craft, no doubt because the typical soldier has participated in athletics more frequently than he has participated in training engagements. Indeed, if a certain tank platoon has been lucky enough to play pick-up games or intramural sports regularly, one will probably find that the tank platoon is a better basketball team than a tank platoon.

The frequent repetition of dismounted maneuver will allow leaders and crews to know each other's strengths, weakness, and tactical habits, knowledge that can be gained easily during dismounted training. One will also notice improvements in dispersion, command and control, reporting, cross-talk at all levels, and actions upon contact.

Besides the opportunity for companies and platoons to develop standard operating procedures, many of the exercises offer opportunities for professional development. As one company goes through an exercise, the remainder of the battalion's officers might observe. To be sure, there is also much opportunity for professional development prior to doing these exercises. Suggested topics include a review of doctrinal terms, mission statements, maneuver, and engagement-area development.

It must be noted that the exercises described are untried. Some may require modifications to be feasible, and improvements making others more effective will surely arise. Furthermore, the article assumes a familiarity with the recom-

mendations offered by the CALL products listed above. My intent is merely to provide situations that exploit intellectual preparation and provide a forum to practice and refine tactics, techniques, and procedures short of mounting our vehicles. Here are some examples:



Call for Fire

1. A HMMWV or dismounted soldier serves as the target to be engaged by indirect fire. The target, which should be visible between 1000m to 3000m away, is stationary.

2. The soldier, given a map, his current location, binoculars, and a radio (hand-held or SINCGARS man-pack), calls for fire to the evaluator and the fire marker on radio frequency A.

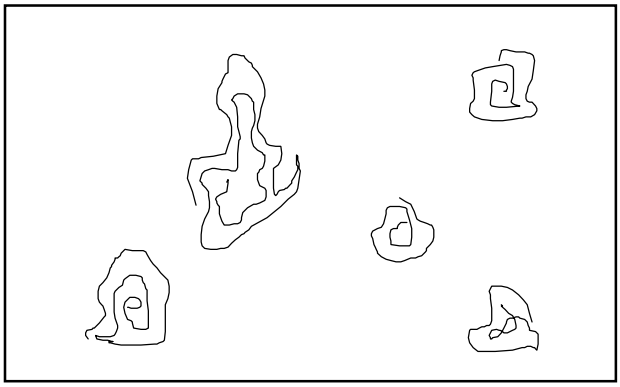
3. A HMMWV serves as a fire marker. The fire marker, which is conspicuously marked, drives to the location of the call for fire using a plugger. He can easily get there by quickly storing the call-for-fire grid as a waypoint. The fire marker monitors frequency A.

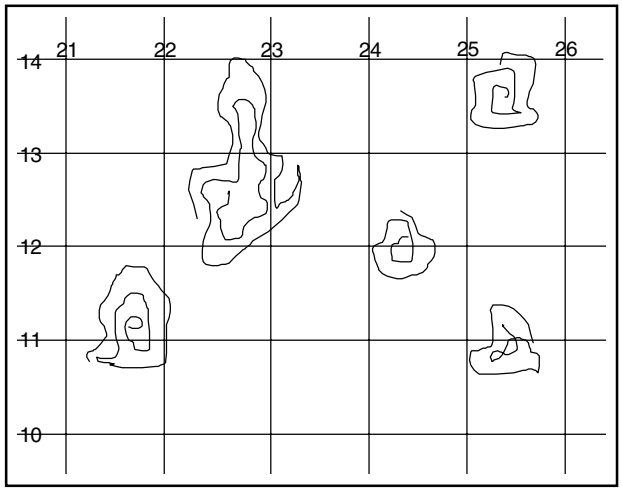
4. Steps 1 through 3 are repeated as the adjustments lead the fire marker to the target vehicle. As the evaluated soldier achieves proficiency, the target vehicle will replicate a slowly moving target.

Note: The exercise can incorporate mortar training. The soldier issues his fire commands to the mortar FDC, which then directs the guns through a series of dry-fire missions.

5. This system has the benefit of requiring soldiers and leaders to study and appreciate terrain, a skill that is too often neglected. This study facilitates not only more accurate calls for fire, but improves accurate reporting by enhancing a soldier's sense of range and terrain appreciation. Leaders should take this exercise a step further by training to translate a two-dimensional map into a three-dimensional image.

Target Acquisition





1. One platoon conducts the exercise, while a second platoon provides support. The company commander is the platoon evaluator. The platoon leader will have his tank crews walking together in various formations and movement techniques across a piece of terrain. Each tank crew will have a hand-held radio and will communicate on a platoon net. The company commander will monitor this net. As the platoon maneuvers across the terrain, the supporting platoon leader will position one- or two-man teams throughout the axis of advance. As the training platoon advances towards a supporting team, the team will make some movement that should be noticed by the training platoon. Once this movement begins, the team, which possesses a hand-held radio on a different frequency, notifies the company commander, who has a second hand-held radio for this purpose. The company commander then starts a stopwatch. The object is for the appropriate crew (which was assigned a specific sector on the move) to acquire the target and submit a contact report to the platoon leader within eight seconds.

2. After the platoon's run, the total time for target acquisition will be computed. The first goal is to achieve the standard of a platoon acquiring each target within eight seconds. The next goal is to achieve the lowest total acquisition time. The final goal will be to obtain the most accurate grids and target description (one- or two-man team?) for the target location. This drill facilitates platoon competition.

Actions on Contact and Maneuver

1. The company team commander visits a piece of terrain with multifarious terrain features. The terrain should be at least as wide and long as a golf-course fairway, but it should offer more interesting terrain.

2. The company team commander produces a rough map of the area (see examples at upper left), keeping in mind that the scale must facilitate walk-through missions. The grid lines should correspond with the dominant terrain features. The map is reproduced and issued to platoon leaders and platoon sergeants, the company XO, the 1SG, and the commander.

3. The S3 or battalion commander issues the company commander a simple order based on the map and limited graphics. The order might explain a movement to contact mission for a lead company team.

4. The company commander has about one hour to prepare and issue a simple order, to include additional graphic control measures, and issue it to his orders group.

5. The order should include a probable line of deployment that depicts the point at which movement (i.e., formations) ends and bounding begins. It should also include drills that explain how maneuver, i.e., bounding under direct-fire contact, should occur.

6. The commander's control measures should allow for maximum flexibility.

7. The commander and his platoon leaders, platoon sergeants, executive officer,

and first sergeant execute the mission by walking through the terrain. The S2 produces elements depicting various forms of contact. The commander, controlling his company via hand-held radio on a company net, reacts to the forms of contact. The platoon leaders and platoon sergeants each have a radio on the company frequency. A variation includes having the company commander apart from the battle unable to see the company's movement, thereby having to rely solely on reports and his battle tracking. Eventually, the wingmen tanks may participate if the terrain is sufficiently spacious.

8. The executive officer and company commander have two hand-held radios, one monitoring the battalion net (someone should be appointed to role-play the battalion commander) and one on the company net. Reporting to higher occurs according to SOP.

9. It is also possible to accomplish this exercise without battalion support. The commander can assign his headquarters platoon to depict the enemy while he acts as the sole evaluator, ensuring that he is training down to section level. The exercise can be used at platoon level using the same concept. The platoon leader reports to his commander while he maneuvers his tank commanders over the terrain.

Building an Engagement Area

1. The following exercise is a variation on the Tactical Exercise Without Troops. The battalion commander issues the company commander a FRAGO. The battalion is to conduct a defensive operation. The company commander is to establish a battle position. The battalion commander gives the company the general area in which the defense will take place. A general enemy situation is included.

2. Immediately, the company commander and his lieutenants begin engagement-area development with initial but incomplete information.

3. About one hour later, the battalion commander visits the area and gives the company commander more specific guidance. The guidance includes: 1) the TF TRP marking the location where the TF commander wants to kill the enemy; 2) as much of paragraphs 1, 2, and 3 of the TF OPORD as possible; 3) the time and location of the formal OPORD (notional); 4) a good visualization of how the enemy will attack, to include the enemy's use of combat multipliers; 4) the TF commander's intent for fires; 5) location of the company team sector or the tentative battle position area; 6) a clearly defined task and purpose; 7) task organization changes; 8) company team specified tasks; 9) designation of key and decisive terrain for both friendly and enemy forces; 10) location and responsibilities for employing additional TF TRPs; 11) the purpose for obstacle groups; and 12) coordination requirements.

4. The company commander should have one or two HMMWVs, company and platoon TRP marking kits, and sufficient pickets to delineate the general outline of the company's allotted obstacles. Tank commanders should accompany their platoon leader.

5. After about three hours of preparation, the commanders should explain his defense to the battalion's officers in an OPD format. The commander will have marked his company and platoon TRPs, marked the location of his obstacles, marked his battle positions, and identified his indirect-fire targets. Each tank commander is in his fighting position.

6. The commander can limit the training and support requirements to company level.

Defensive Fire Control and Distribution

1. A company team commander issues his platoons a simple order explaining the defense of a piece of terrain.

2. Platoon leaders and tank commanders develop the company engagement area. The objective here is not obstacle emplacement (which receives attention in the previous exercise) as much as direct-fire planning and TRP emplacement.

3. Once the preparation is complete, the tank commanders occupy their fighting positions. The tank commanders and the platoon leader each have a radio, whose frequency the evaluator is monitoring. Once the NLT-defend-time passes, one of the company's platoons (possibly the headquarters platoon) acts as the OPFOR. Their sole purpose is to send increasing numbers of soldiers into the engagement area from the enemy's direction. Each soldier will carry a sign — visible with binoculars from approximately 1500 meters away — that denotes whether the soldier is replicating a personnel carrier, a tank, or a set of troops. The platoons and company commander must then exercise fire control and distribution with the goals of no double-tapped targets, effective and concise cross talk, and accurate reporting. The key point is the method by which crews determine when to fire at a specific target depending on its location within the engagement area and the type of weapon system it is. As the units gain proficiency, some of the OPFOR soldiers may replicate friendly vehicles, the speed with which the OPFOR enters the engagement area may be increased, and the call-for-fire exercise may be added.

Platoon and Company Maneuver

1. Some form of direct-fire feedback is required for this exercise, such as MILES equipment for the dismounted soldier and an M-16 rifle. However, a disadvantage to MILES is that it requires several weeks of planning, particularly with regard to the blank ammunition. Another option is for the brigade or battalion to purchase a set number of paint-ball guns and accessories. In order to train one company for an offensive mission, the equipment's distribution (whether MILES or paint-ball) would be as follows:

Each tank crew, consisting of four soldiers, would get only one weapon and move as a crew at all times. The gunner carries the weapon, which should have the maximum range possible within reasonable cost constraints. The driver carries a plugger. The loader carries a set of binoculars. The tank commander carries the map and communication device, whether it is a SINCGARS manpack or, more likely, a hand-held radio. Platoon leaders, platoon sergeants, and the company commander should each have two radios if possible. This set-up would allow for the proper replication of platoon, company, and battalion nets.

2. The S3 or battalion commander issues a simple order explaining the mission the company is to accomplish. The commander has approximately two hours until LD time. The evaluator looks to see that the company commander depicts the point at which movement transitions to bounding, and where bounding transitions to maneuver.

3. The S2 controls the OPFOR, which can be as robust as cost will allow; i.e., if the battalion can obtain approximately seven enemy weapons, the S2 could establish a two-weapon CSOP, a one-weapon ambush position, and a four-weapon main defense. The S2 could replicate other forms of contact by simply telling a crewmember — in person — about the contact; e.g., Red 2, you are observing indirect fire at PJ565129.

4. The virtue of this exercise is that it allows the company commander to fully

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Virtual Simulations Training

How much? At what cost? Why use it at all?

by Major David S. Davidson

On November 5, 1999, Fort Knox dedicated the new Close Combat Tactical Trainer (CCTT) Building. This facility is the latest addition to the Army's virtual simulations capability and complements the older generation SIMNET facility. In the late 1970s and early 1980s, the Army embarked on a quest to acquire and use virtual simulations technology for training. SIMNET was the result of that quest. Many things have changed in the Army since the original SIMNET project, however, there are many similarities between 1979 and 1999.

The project that eventually resulted in SIMNET was developed based on the fielding of a new family of vehicles (M1 Abrams and M2/M3 Bradley). These new vehicles required more fuel and cost more to operate and maintain than the budgets of the early 1980s could support. Maneuver and operations budgets reduced unit Operations Tempo (OPTEMPO) miles to the bare minimum. Due to lack of funds, units needed a cost effective, efficient means of training maneuver tasks. It was a situation very similar to what we face today.

Unlike our current situation, in the early 1980s many of the budgetary constraints were lifted and money became available for units to go to the field and train on the equipment rather than in virtual simulation. SIMNET was fielded and operational in many locations, but instead of being the answer to low-cost maneuver training, it became an expensive toy used to fill training schedules or simply not used at all. Throughout the mid-1980s, the Army trained live in major exercises, REFORGER, Team Spirit, and two-month NTC train-ups, and used SIMNET primarily at basic and advanced courses for new officers and noncommissioned officers when *real* vehicles were not available. Virtual training never found its way into our collective training plans or became an integral part of our training philosophy. But, the *'good times'* were destined to end.

By the late 1980s, OPTEMPO restrictions and limited maneuver time were again becoming commonplace. The 1990s, with the exception of the Gulf War, were marked by shrinking budgets, limited maneuver time, and cuts in the force structure. No longer could units afford to go to the field to learn critical maneuver tasks in the dirt on the vehicles. Just as the budget forced us to find alternatives to live training in 1979, budget restrictions have forced us to find alternatives in the 1990s. These constraints forced us to evaluate our maneuver training strategies and consider how and where simulations technology fits into the overall training plan.

Experienced people such as COL (P) Guy Swan (*ARMOR,* July-August 1998) and COL (Retired) J.W. Thurman (*ARMOR,* March-April 1999) have expressed their opinions about simulations training and its impact on combat readiness. Their views and the views of others highlight the need for further discussion and consideration of the role of simulations in our future training plans. There are two categories of simulations, *virtual* (SIMNET, CCTT) and *constructive* (Janus, BBS, etc.). This article addresses *virtual* simulations.

The central premise of this article is that the Army has not answered the fundamental questions posed in the headline above: how much, at what cost, and why do we use virtual training, the very same questions posed during the original SIMNET project. In the 20 years since then, we are still fighting the same fights and will ultimately come to the same conclusion. The technology is available to effectively train maneuver tasks in a virtual simulations environment at a fraction of the cost of live training. The simulations are better than ever, the graphics are more realistic, the vehicles more closely replicate the actual vehicles, all the *'gee whiz'* stuff is there. Regardless of the simulation (CCTT or SIMNET), the missing piece today is the same piece that was missing in the 1980s. That piece is a clear plan to take advantage of the capabilities of the simulation to enhance the maneuver training plan.

In a September 1999 report by the United States Government Accounting Office to the House Subcommittee on Military Readiness, the GAO stated: "The opposing forces commander from the National Training Center, during congressional hearings in February 1999, said that the proficiency level of units arriving at the National Training Center is much lower now than in the past." Units cannot effectively execute at the platoon and company level resulting in an inability to conduct battalion- or brigade-level operations. The Virtual Training Program at Fort Knox provides a cost-effective ramp-up to improve the proficiency level of units, allowing them to enter live training events at a much higher level. In addition, it provides a feedback mechanism to determine the effectiveness of the training conducted.

This program wholeheartedly supports the continued requirement for live, "in the dirt" training, and does *not* advocate the replacement of live training with simulations. We do advocate the integration of simulations into the overall training plan. No simulation can train all the tasks required to achieve trained and combat ready units, nor can it replace the smell of cordite in the turret or the whine of a turbine on a cold morning. However, a tank crew that cannot pass the required gates in the Unit Conduct of Fire Trainer (UCOFT) to standard will likely not qualify during live fire. Similarly, a platoon that cannot execute an action drill in simulation will likely not execute it effectively on the ground.

The technology is available to train multiple tasks effectively using virtual simulations. Efficient use of the VTP as part of an overall training strategy will result in substantial savings in Operational Tempo (OPTEMPO) and Personnel Tempo (PERSTEMPO) associated with live training. For example, training a battalion that recently executed four days of VTP training covering platoon-, company-, and battalion-level missions cost approximately $16,800, while a similar exercise conducted in a field environment would have cost approximately $430,000. The unit trained for four days in simulations and retained over $400,000 in training funds to spend on a more effective three-day EXEVAL, providing a significantly

greater training payoff. The training conducted in the VTP will enhance training conducted in the dirt. These cost figures will vary from unit to unit, based on travel distance, number of soldiers, and other associated costs, but the savings and opportunities are no less dramatic.

The Warthog Observer/Controller (O/C) Team and the Virtual Training Program (VTP) was established in 1994 as part of 'Bold Shift.' The intent of the VTP is to provide professional, full-time O/Cs utilizing a cost-effective, structured training program to leverage the capabilities of SIMNET to train units from platoon through battalion on maneuver tasks. The O/C team provides training scenarios, orders, and training support packages to participating units before they arrive for training. The focus is on repetitive execution of critical maneuver tasks. The missions units can execute in the VTP are movement to contact, defense in sector (area defense), and deliberate attack for armor and mechanized units, and screen operations, route, area and zone reconnaissance for cavalry units. All VTP training is task-based, with each tactical table covering a portion of the tactical mission, and each focuses on the execution of specific tasks. The sequence of tables provides a logical progression of performance difficulty, from fundamental tables designed to train basic skills to structured missions requiring execution of complex tasks. The O/C team tailored the task list to maximize the capabilities of the SIMNET facility. The O/C can use an extensive array of battlefield effects, ranging from OPFOR vehicle types to artillery impacts and minefields to set the required conditions. This flexibility allows the unit to train to the MTP standard for each task. The O/C replicates the required MTP conditions until the unit executes the task to standard.

All structured VTP missions use the National Training Center (NTC) database. Alternate databases are available in the facility; however, the structured tables are only available on the NTC database. The training unit operates under a single tactical order and executes as the lead element, counterrecon element, or the main effort, depending on the chosen mission. The unit leadership and the O/C facilitating the training have the flexibility to stop the mission at any time and conduct a comprehensive, multi-media After Action Review (AAR). The O/C conducts the AAR using dedicated workstations capable of full audio and video playback of the entire mission. The O/C and the unit leadership can add additional tasks based on the demonstrated level of proficiency and the unit's training objectives.

SIMNET provides an effective method to train platoon-, company-, and battalion-level maneuver tasks in virtual reality. However, there is little quantifiable data to demonstrate the effectiveness of this training. No method exists to capture and compare how well a unit executes maneuver tasks before and after training using the simulation.

UNIT/Component/State:_____/____/_____ Date Pre: _____#VTP Tables Run_____O/C____EC____

Date Post: _____#VTP Tables Repeated_____

Type Unit: Circle One **Tank Mech Mix /**

VTP TRAINING ANALYSIS MATRIX (CO)

Task	Pre-Mission	Post-Mission	Difference	Comments
Total time to run table from end of table preview to COM? (make allowances for sim trouble)	ETP: RC1: MVT COM:	ETP: RC1: MVT: COM	ETP-RC1 = RC1-MVT = Total time =	
FRAGO complete and disseminated? Y/N	Y/N	Y/N		
Time elapsed between enemy contact and a contact report. Contact report given/complete? Y/N	FP: MB:	FP: MB:	FP: MB:	
Artillery request made? Y/N Grid accuracy in meters)	Y/N Dist. from enemy_____	Y/N Dist. from enemy_____		
Fratricide? Y/N If so, give bumper #s	Y/N	Y/N		
Enemy slant at COM (Tank/PC) Startex: 3/16	/	/	/	
Friendly slant at COM Startex: 14				

ETP: End of Table Preview
RC1: Redcon 1
MVT: When unit begins movement
COM: Change of Mission

FP: Forward Patrol
MB: Main Body

Turn in to 03 NLT 1 working date after completion

7 Apr 99

In the fall of 1998, the Armor Center tasked the Warthog O/C Team to design an impact analysis for the VTP to establish a simple, measurable standard to judge how well a unit performs critical combat tasks before and after executing the task-based Virtual Training Program. The O/C collects data during the execution of a pre- and post-mission executed under identical conditions.

The unit O/C initiates the pre-mission by an FM FRAGO, while the unit is stationary in the attack position. The FRAGO directs the unit to initiate movement and establish a hasty defense against a reported forward detachment. The forward detachment is moving to secure key terrain along the task force axis of advance. The O/C collects and records data on the unit's preparation and execution. The pre-mission is designed to establish the unit's baseline proficiency on the tasks of Tactical Movement, Actions on Contact, Use of Indirect Fire in the Offense, Reporting, and Fratricide Prevention.

Following the pre-mission AAR, the unit executes the standard VTP structured tables in accordance with their training plan. Rotation length varies from two days to two weeks and training units average between five and nine tactical tables during a rotation. The last mission of the training rotation is the post-mission. The O/C orders the unit to reoccupy the initial attack position due to diplomatic breakthroughs and a temporary cease-fire agreement. The cease-fire agreement is violated and the unit is again ordered to make contact with a reported forward detachment. The O/C team uses changes in the unit's proficiency from pre-mission to the post-mission to determine the effectiveness of the training conducted during the rotation. The O/C records unit names, training dates, and component on the data matrix in order to keep track of the data collected. This data is not included in the roll-up of performance results or trends. The O/C records the data on the matrix on Page 33.

The following tables show data from 9 company and 25 separate platoon rotations. (There is no distinction between AC and RC units).

It is important to note that the percentage of change from the pre- to post-mission is determined from the raw data and is strictly a statistical analysis. The raw data often does not tell the full story and requires additional analysis to provide useful information. In the case of platoon-level contact reporting, the raw data shows an increase in the time taken to accomplish the task. The increase in time appears to indicate the task was not trained effectively. Further analysis indicates that the platoons are actually concentrating on executing the required initial actions on contact (action and contact drills) as well as sending the report during the post-mission. This resulted in an increase in friendly survivability, an increase in lethality, and the reports are more accurate despite the increased time between contact and the contact report.

Company VTP Analysis results: 07 December 1998 through 14 April 1999.

Number of company rotations: 09

Number of total VTP tactical tables executed: 52

	Pre-mission	**Post-mission**	**Improvement (+) Decrease (-)**
Friendly Slant At COM (Start 14 Vehicles)	5	8	3 vehicles or 22% improvement
Enemy Slant At COM (Start 19 Vehicles)	4	1	3 Vehicles or 15% improvement
Fratricide (# of vehicles)	0	1	**1 Vehicle killed**
Time between initial contact and the Contact report	1.05	0.55	10-second improvement
Time-End of table Preview and REDCON 1	32.43	9.13	23.3 minute improvement
REDCON 1 to Movement	10.21	3.15	7.06 minute improvement
Use of Artillery	4 attempted	7 attempted	33% improvement **(Note: only 77% attempted)**
Accuracy of fires In meters	2075m	1067m	Improvement of 1008m **(Note: 1000m improvement in accuracy, still over 1000m off and only 2 units attempted to adjust rounds)**
Total execution time	56.26	30.23	26.03-min improvement

Although the current data sample is small, and not all measured tasks show improvement, the data collected thus far indicates that the task-based, structured use of virtual simulations has a positive impact on the training readiness of the units trained. Execution of critical combat tasks in the areas of survivability, lethality, and movement times showed improvement. Fratricide prevention, use of artillery and accuracy of indirect fires indicate the need for additional training and more emphasis by the O/Cs during the training. This data provides the training unit with valuable information to help formulate effective future training plans. It also gives the O/C team data to make modifications to the VTP focus in order to more effectively train the tasks that failed to show improvement. The arguments that better understanding of the machine and the mission during the post-mission accounts for the increase in performance has some validity. This hypothesis highlights two significant threats to the internal validity of the research, technical manipulation, and knowledge of the post-mission prior to execution. The O/C team reduces the technical manipulation threat as much as possible by combining the results of all units, regardless of simulation experience, and taking an average. Prior understanding of the mission is a difficult factor to eliminate, requiring modification of the specific conditions and location of the mission for each training rotation. This solution is impractical, and the change in conditions would cast doubt on the validity of the pre-post comparison. The O/C team reduces the impact of this threat by executing the pre-post mission at only one echelon of the scheduled training. If the unit conducts platoon and company training, the pre-post is executed at one or the other but not both. The only way to independently validate the results obtained is to design and implement a system to track and compare the results of task execution in the virtual world with the results

of execution during live training under similar conditions.

The impact analysis is a work in progress and is continually updated to better capture data and reflect the current state of the training conducted. It represents a first step in the process of quantifiably validating virtual training as an effective training tool.

MAJ David S. Davidson was commissioned through ROTC at Middle Tennessee State University in Murfreesboro, Tenn. in 1988 with a B.S. degree in International Relations. His assignments include scout platoon leader, 2-1 Cav, 2AD and scout platoon leader and troop XO, 1-7 Cav, 1CD at Ft. Hood, Texas; brigade S3 plans officer, 2d Bde, 1AD and commander, HHC and Delta Company, 2-68 Armor, and Team Delta Task Force 3-12 (Infantry), 1AD, Baumholder, Germany; and observer/controller/trainer, Armor Training Battalion, 2d Regional Training Brigade, Ft. Stewart, Ga. A graduate of AOB, AOAC, SPLC, Tank Commanders Certification Course, and Airborne School, he is an observer controller on the USA Force XXI O/C Team (WARTHOGs) executing the Virtual Training Program at Fort Knox.

Platoon VTP Analysis results: 07 December 1998 through 14 April 1999.

Number of platoon rotations: 25

Number of total VTP tactical tables executed: 125

	Pre-mission	**Post-mission**	**Improvement (+) Decrease (-)**
Friendly Slant At COM (Start 4 Vehicles)	1	2	1 vehicle or 32% improvement
Enemy Slant At COM (Start 19 Vehicles)	9	4	5 Vehicles or 28% improvement
Fratricide (# Vehicles)	1	1	**No change**
Time between Initial contact & contact report	1.33	1.54	**21-second increase**
Time-End of Table Preview and REDCON 1	19.22	10.14	9.08 minute improvement
REDCON 1 to Movement	6.55	4	2.55 improvement
Use of Artillery	7 attempted	16 attempted	17% improvement **(Note: only 56% attempted)**
Accuracy of fires In meters	1425m	1296m	Improvement of 129m **(Note: less than 150m improvement in accuracy only 4 units attempted to adjust rounds)**
Total execution time	50.41	35.14	15.27-min improvement

Dismounted Training, continued from Page 31

test whether his crews understand the transition between movement and maneuver, the use of terrain, battle drills, actions on contact, and target acquisition, all of which relate to negative trends for company teams during NTC rotations. If the FIST team participates, with a little more assets (the addition of a fire marker) the company could incorporate the call-for-fire exercise explained above. Furthermore, the brigade and battalion could train its companies and platoons on any piece of terrain more often and at a fraction of the cost of actual armored training.

5. Concerns relating to the paint-ball training include: 1) the soldiers' need to wear civilian clothes or specially purchased mechanic's coveralls (paintballs will stain); 2) the periodic cost of paintballs (which should be limited to 40 balls per exercise); 3) the periodic cost of CO^2 cartridges; and 4) the one-time purchase of eye protection.

6. The same training can be accomplished using the MILES system for dismounted soldiers and 5.56 blank ammunition; however, the ability to replicate suppressive fires diminishes.

7. This exercise will enhance crew-level teamwork and contribute to cross-training leader positions. If a TC is hit, the crew's gunner takes the map and the radios. If the commander is hit, the succession of command is affected. Furthermore, if a gunner is hit, the crew can move and report, but it suffers a firepower kill. And if the driver is hit, the crew suffers a mobility kill. If the loader is hit, the crew suffers a communication kill.

8. The training can also enhance training without communication. If communication is denied to platoons, then the crews will be forced to create and use a hand-signal or flag-signal SOP, which can then, with minor modification, be implemented during mounted training.

CPT Celestino Perez Jr. graduated from the U.S. Military Academy in 1992 with a B.S. degree in Political Science. His previous assignments include: tank platoon leader, mortar platoon leader, and company executive officer, 3-66 Armor, Ft. Hood, Texas; G3 asst. operations officer; 1st Brigade, 1st ID asst. operations officer; and company commander, D/2-34 Armor, Ft. Riley, Kansas. He is an AOAC graduate. Currently, he commands HHC/2-34 Armor at Ft. Riley.

The Day I Became a Brave Rifle

by Brigadier General Albin F. Irzyk, USA (Ret.)

Gen. Winfield Scott, at the Battle of Chapultepec, was reputed to have exclaimed about the 3d U.S. Cavalry Regiment, "Brave Rifles, Veterans, you have been baptized in fire and blood and have come out steel." Thenceforth, the troopers of the 3d Cav would be known as the "Brave Rifles."

My baptism of fire came not on the fields of strife, but at peaceful, picturesque Fort Myer, Virginia, where the 3d U.S. Cavalry Regiment was stationed. It occurred during my first tour as Officer of the Day. My "blooding" was not in combat, but for a brand-new, pre-war second lieutenant, it proved to be a pressure-packed, challenging, inspiring, exhilirating, exhausting, tempestuous 24 hours.

It all began at a gallop at Guard Mount, and never let up. As I descended the steps of the Guard House resplendent in polished boots, spurs, breeches, Sam Browne belt, saber, and campaign hat, I was weak-kneed with a pounding heart. My quivering legs somehow got me to my post. As I stood before the perfectly aligned, crisply and immaculately uniformed troopers, my mouth was dry, and my mind suddenly went blank like a quarterback about to call his first play and not remembering one thing out of his play book. My last vestige of confidence vanished when I saw my Sergeant of the Guard. He was a tiny, wizened, but very tough old soldier with over 20 years of service who allegedly ate second lieutenants with his scrambled eggs for breakfast. I knew his reputation, and had heard him on the parade ground during close order drill shout, "When aye say aysa rite, aye wanna heer dose aysa cleeeek."

But somehow the tough old sergeant and the new lieutenant were carrying it off. Now the ranks were open, and I was passing slowly, carefully, from man to man, checking each weapon, shoes, crispness of the summer-starched khakis, hair-cuts, shaves, position of the caps, knowledge of General and Special Orders, confirming that each was, indeed, qualified to stand guard.

At the same time, I was searching for the most perfectly turned-out trooper, who would be designated the Colonel's Orderly. The chosen soldier would not have to pull guard duty, and his selection was a greatly sought after honor for him and his troop. It was so competitive among troops that troopers were known to have been carried from their Orderly Rooms to Guard Mount by their fellows, so that they would not crack or wrinkle the heavily starched trousers at the knee.

I was now down to three. After checking handkerchiefs, undershirts, polish of their brass, and asking ever increasingly difficult military questions, I finally had my man, and Guard Mount was soon over.

I was now the Officer of the Day, and for the next hours, I would be in charge of the Post, as the colonel's designated representative. I did not have time to reflect upon my newly exalted status or my great responsibilities, for my corporals were now running the prisoners out of the Guard House, and lining them up for a rapid roll call. I watched with more than a vested interest, for like a supply sergeant, I was about to sign for them.

As soon as the count was correct and my signature on the dotted line, they were hustled out at a rapid clip for the Mess Hall, some distance away. They marched in a tight body, and members of my guard circled them like outriders during a cattle round-up, or fighters escorting heavily-laden bombers, and every bit as alert.

The moment I saw their plates being filled, I sallied forth directly toward the flagpole, for it was now almost time for Retreat. As I arrived, to my great relief I found the detail to be complete and in place — two men to fire the Retreat Gun, two to lower the colors, and the bugler. I glanced at my watch. I had been warned to start EXACTLY on time — after all, the colonel's quarters were only a stone's throw away, and HE might be watching. My watch said, "Now!"

I nodded to the bugler. With his first notes, I became swept up and deeply moved by the small, simple, yet poignant ritual which unfolded before me. I was standing on a high bluff looking down upon the whole city of Washington, D.C., which seemed to sprawl tightly around my feet. Behind me the setting sun, like a giant spotlight, bathed the city in the brightest of light. Every detail was so clear and so close that I was tempted to reach out and touch the Lincoln Memorial, Washington Monument, the Capitol. The bugler's notes were so strong, so clear, so penetrating that I was sure that the entire city before me was hearing him.

The spectacular setting and simple ceremony were so stirring and absorbing that I had difficulty holding back the shivers. Then came the BOOM of the gun, and the bugler, again, with his beautiful, plaintive, haunting notes — as I saluted and watched the colors being slowly and carefully lowered. That simple, dignified, and beautiful ceremony signified the end — the high point — of the soldier's day, and left me with a vivid and absolutely unforgettable picture. From that day on, Retreat would always have a special meaning for me.

As soon as the flag was folded and the detail began marching away, I shook myself back to reality, and hastily returned to the Guard House. The prisoners were back from their meal. I gave them time to get settled in for the night, then went in to check them.

As I wandered among these basically good-looking troopers, despite their prison garb, caged and lying on hard, uncomfortable bunks because of some transgression, I could not help but be struck by how this depressing sight contrasted so vividly with the truly beautiful one which I had so recently witnessed.

Darkness quickly settled in, and now it was time to carry out yet another one of my gamut of responsibilities. One by one, I visited each of the 14 widely scattered guard posts, and was challenged 14 times by 14 different sentries. I was encouraged and reassured that my guards were alert and familiar with their General and Special Orders, and that the post was secure.

This had been a long, demanding procedure, and midnight was approaching. Yet, before the task was completed, there was one more post to be inspected — the 15th. This one was the most distant, most unusual, and most special. It was the

sentry at the Tomb of the Unknown Soldier, deep in Arlington National Cemetery.

As it had been with the other 14 posts, this one would be on foot — *a la pied*. The day of the jeep had not yet arrived. From the Guard House my steps took me past the old, venerable, brick chapel, and through the nearby gate into the cemetery. I took a deep breath, for staring straight ahead of me was total blackness. The bright lights of the Post which I was leaving accentuated the darkness which I was facing.

I moved out briskly, for I had a long, long walk ahead of me. The lights of the Post had gradually dimmed, and soon disappeared behind me. It was now pitch, inky black, and absolutely still. The only sounds to be heard were the sharp crack of my leather heels as they hit the pavement. Since there were no competing sounds, the noise of my boots was greatly magnified. Each time the heel came down, it was like a spaced, single, pistol shot echoing in the heavy stillness of the night — crack, crack, crack.

As I walked deeper into the cemetery, I began to be flooded with emotions. It was eerie, unreal, spooky, scary. Here I was in a vast cemetery — all alone. What had I gotten myself into? Misgivings began to emerge. Who would know it if I turned back right now and forgot the whole thing? I, the only living person among acres and acres of dead. My chest got tighter, my breath shorter — crack, crack, crack. I gritted my teeth, and just knew that I had to ride it out. I resolutely continued on, and began to think positively.

My eyes were now more accustomed to the deep gloom. I could make out, dimly, row upon row of identical white headstones. Visible, too, from time to time were more elaborate markers and monuments. I began to reflect upon who it was that was buried around me and why they were there. Suddenly, abruptly, I realized how very privileged I was. Here, enveloping me were military heroes from every war in which the United States had ever been engaged, even including some from the Revolutionary War. There were military leaders and military men whose exploits fill endless pages of history books, recipients of the Medal of Honor, individuals known only to family and friends, and, as I would soon note, some known but to God. I was suddenly sobered and awed to realize that I was moving about the greatest collection of heroes in all the world.

I knew that, earlier this day, hundreds of people, busloads of them, had been scattered throughout the cemetery to pay homage to these heroes. Now I had them, all of them, the whole cemetery to myself. I was privileged, indeed.

My heart had stopped pounding, I was swallowing easier, my footsteps quickened — were more purposeful. I was now eating up the yards. Suddenly, it was no longer totally black, for up ahead I noted a faint spot of light.

As I walked, it gradually became larger and brighter, and I knew that I was about to reach my destination. I moved closer and then abruptly stopped. There before me in an island of

"I walked out of his office and into the corridor. My heart sank, for I counted six sheets of paper. Each one represented a funeral in Arlington National Cemetery that day."

bright light was pure, powerful drama. A lone sentinel — stiff, almost rigid — in crisp, sharp, splendid uniform, was executing an intense, moving ritual. He paced back and forth before the Tomb — 21 precise steps, an "about face," a shift from "right shoulder to left shoulder arms," a 21-second halt, and 21 more precise steps back. It was truly an awe-inspiring, breath-taking spectacle.

As I emerged out of the darkness into the bright light, I heard a loud, firm, "Halt, who goes there?" Standing at rigid "Attention" with his rifle at "Port Arms" was the guard who had abruptly stopped his pacing and now waited for me to identify myself. After a brief exchange of words, I instructed him to "carry on," and he resumed his brisk, clipped pacing.

My next duty was to inspect the Guard Room in the base of the Amphitheater. Before entering the room, I turned and drank in once again the poignant, symbolic, floodlit scene. Once again how privileged I was not only to "see" this tribute to that fallen hero and all those he represented, but to be, this night, the sole witness, the only spectator.

Soon I was back in the darkness retracing my steps. Those steps now were buoyant, for I felt exhilarated. What a rich, never-to-be-forgotten experience.

Before I knew it, I was out of the cemetery, and back in the Guard House. After a brief "breather," it was back to work — hitting, again, before dawn, the 14 guard posts.

The long, eventful night had, finally, ended. The Post was once more busy, bustling. I watched as my NCOs married up combinations of a guard and two prisoners, and sent each detail to their work locations.

For the Officer of the Day, the job was only partially finished. More challenges lay ahead.

Promptly at eight o'clock, I stood at Post Headquarters in front of the desk of Mr. Whitehouse, the senior warrant officer. I stared at the tall, lean, completely white-headed individual who looked old enough to have served with Teddy Roosevelt. My fate was now in his hands, and I wondered tremulously what that would be. He acknowledged my presence by reaching immediately into a side drawer of his desk. He removed some thin, typewritten, "onion-skin" sheets of paper, and wordlessly handed them to me. I walked out of his office and into the corridor. My heart sank, for I counted six sheets of paper. Each one represented a funeral in Arlington National Cemetery that day. I had "maxed the course," for in those days six was the most that could be handled. It had been impressed upon us that the Officer of the Day was solely responsible for the funerals on his tour, and that he would ensure that each funeral was completed exactly as prescribed — that there was no second chance, no second time around.

From my fellow lieutenants, I had heard all the "horror stories," undoubtedly highly exaggerated, about the OD who had a funeral without a bugler, another without a firing squad, still another without a chaplain who, himself, was forced to say, "ashes to ashes." The most colorful, of course, was about the OD who was bustling around, and in his great haste had stepped back and into the freshly dug grave.

Now it was my time. I was responsible for six.

When I came out of Post Headquarters, I spotted a pick-up truck, and knew that for this detail I would have "wheels." I hastened to the Office of the Superintendent, and was immediately handed a map of the cemetery with circled locations of each grave, numbered in sequence. I jumped back into the truck, and hastily reconnoitered each widely scattered site to determine where it was, and how to get there. I rushed back to the Post, and found the first funeral detail already forming. After checking and inspecting it, it was time to go, and the first funeral in Arlington National Cemetery that day was underway.

As soon as the graveside services had been completed, I quickly returned, and there, already forming, was the detail for the next funeral. And so it went all day — back and forth.

It turned out that my six spanned the spectrum from the very simple — chaplain, pallbearers, bugler with few mourners, to the elaborate with full military honors — including caisson, rider-less horse, sizeable honor guard, firing squad, and many mourners. Each was so sad, sober, moving that I became not a spectator but a mourner.

Now, finally, it was time for Guard Mount once again. There stood not an apprehensive, trembling young lieutenant, but an exhausted, shell-shocked one. I was still in a daze, and wondered if anyone could pack more varied activity into a 24-hour period than I just did.

From somewhere came the words, "Old Officer of the Day." I shook myself and realized that they were directed at me. I was finished, my tour was over, I had survived.

Once again the boots went click, click, click. This time they headed in the direction of my bachelor's quarters and bed. It had been a tumultuous day, an emotional roller-coaster. I felt a great sense of achievement, of fulfillment. I now knew that I had won my spurs and earned the appellation – "Brave Rifle."

BG Albin F. Irzyk served in the Army for 31 years, fighting five campaigns in Europe as a 27/28–year-old tank battalion commander in the 4th Armored Division, which spearheaded Gen. Patton's Third Army across much of Europe. He was wounded twice and received the nation's second highest decoration, The Distinguished Service Cross, for extraordinary heroism. Additional decorations include the Silver Star with OLC, the Bronze Star with three OLCs, and the Purple Heart with OLC. Additionally, he served two years in Vietnam, with 600 combat hours in a helicopter with the 4th Infantry Division for which he received 11 Air medals and the third highest decoration, The Distinguished Service Medal. He commanded the famed 14th Armored Cavalry Regiment along the Iron Curtain during the Berlin Crisis of 1961. For two years, he headed the U.S. Army Armor School at Fort Knox. At the University of Massachusetts, he received his Bachelor's Degree and a commission in the Horse Cavalry from ROTC. He holds a Master's Degree in International Relations from American University in Washington, and is a graduate of the National War College. He retired in 1971 at Fort Devens, Mass., where he was the Commanding General. He is the author of a recently published book entitled, *He Rode Up Front For Patton.*

"Digging In"

The Obsolete or Neglected Art?

by Captain Paul Maxwell

This article highlights an issue that does not get enough attention in the ground combat community — the construction of fighting positions.

After spending three years in a mechanized infantry battalion and two and a half years in the 2nd ACR, I noticed that the task of entrenchment receives little, if any, attention. When past battlefields have shown that artillery causes the majority of battle-related injuries, it is amazing that those hard-learned lessons have so readily slipped through our fingers. When discussing tactics in staff meetings and war games, the attitude often encountered is, "I don't need to dig in. Speed is my security." I cannot recall the number of times I have heard that from my counterparts.

Certainly there are times and situations where this idea is valid. However, it is my contention that we must teach our soldiers the importance of digging in, how to perform the task, and then instill the discipline to accomplish the task in tactical environments. A major lesson learned in World War II was, "Battalions that didn't dig in for the night didn't last long. That should have been learned in training, but it wasn't, so it had to be learned from experience."[1] We cannot wait until the casualties of the next major war begin flowing into the aid station to relearn the life-saving ability of the simple fighting position and the value of the spade.

When the subject of digging in arises, people in the Armor community most often think of tank and BFV fighting positions. This is natural, since most of a heavy battalion's combat power is invested in these vehicles. However, we cannot limit our knowledge of fighting positions to these vehicles. Combat soldiers must know how to build two-man fighting positions, crew-served weapon positions, and simple survival positions. There is no question that they increase survivability from direct and indirect fires. A properly constructed position with overhead cover provides safety from virtually everything except a direct hit. Of course, crews within tanks and Bradleys are protected from the effects of all but a direct hit from artillery and thus do not necessarily need fighting positions. The protection of our armor gives us security and our training in reacting to artillery reinforces the idea that we can simply drive out of the impact area and survive. When mounted and under armor, I agree with those who believe they do not always need fighting positions against artillery. Remember, though, that not all of the soldiers in our armor, infantry, and cavalry units are under armor all or even some of the time.

As an example, let's examine a mechanized infantry battalion. In this case, a large portion of the combat platoons' strength is dismounted infantry. Certainly these soldiers need to know how to construct fighting positions in the defense, or when in assembly areas within enemy artillery range. General Patton reinforced this idea in his writings, "…It is proper for a soldier to dig in when he has reached his final objective in an attack, or when he is bivouacking under circumstances where he thinks he may be strafed from the air or is within artillery range of the enemy."[2] Despite the clear need for this knowledge, training on individual fighting positions was conducted only once in my three years in the infantry. Part of the reason for this is training area limitations that do not allow for digging. However, most of the blame results from the belief that this task is innate and does not need to be practiced.

In order to more directly link the topic to the armor community, let's look at the structure of the 2nd ACR. The unit is open to all of the officers in our branch and all of the 19Ds, and thus we need to consider how to fight in that unit. Note the Dragoons' total lack of armored vehicles. Thus there is no protection from artillery readily available. The idea that one can drive out of an impact area in a light-skinned HMMWV is not very feasible. At a minimum, your chances of escaping intact have decreased significantly. Additionally, it is not always desirable to move from an observation post when it is in the optimal position to provide key intelligence. Despite the lack of armor in the unit, the speed attitude seems to prevail over entrenchment. Maybe MILES simulations have reduced our appreciation of the effects of artillery on the battlefield. The blast radius and the psychological effects of artillery are simply not effectively reproduced in these scenarios. Whatever the reason, in my two and a half years in the unit, training in construction of fighting positions occurred only once in one out of 12 ground combat companies. This does not place sufficient command emphasis on the task.

For those who still do not think the subject relates to them, let us consider an ordinary tank-pure battalion. One may ask, why do the soldiers of this battalion need to know how to dig-in? Rommel provides an answer: "The violence of the enemy artillery fire the day before had impressed us all with the value of spade work. Even the battalion staff, consisting of the battalion commander, adjutant, and four messengers, dug itself a twenty-foot trench…."[3] Another reason is evident in a defensive scenario. It is accepted procedure for units to post OPs in the defense. How many leaders ensure that the OP constructs a fighting position? In the defense, we expect artillery on our position. Knowing that, we should provide protection to our soldiers and that includes a survivability position for the OP. Our training manuals dictate that stays of more than four hours require positions to be dug. So why don't we enforce this tactic? Do we expect these soldiers to dash back to their vehicles while fragmentation is flying? How many think that we don't need to practice that task?

You may argue that we will do it when the time comes, but we cannot afford to take that position. After all, we know that how we train is how we fight. If the good habit of building a fighting position is not developed in training, then it will not be

practiced on the battlefield until it is too late. Vehicle crews sleeping in an assembly area or at an FMCP within artillery range need a place to go once the artillery begins to impact. Sleeping on the back of a tank or the seat of a 5-ton does not afford much protection. There may not be time to get inside the tank's protection. A simple survivability position can be the key to survival.

Key lessons were learned both times that construction of fighting positions was trained during my career. The first lesson was that our soldiers did not know how to perform the task. The second was that it was hard, time-consuming work. All involved were astonished at the amount of labor it took to build a position and the materials needed. In both of the training events, the task was made even easier because the soldiers were not working in a tactical environment. Their sole task was to dig the position to standard. The benefits of the exercise were innumerable. But the main goals accomplished were to show soldiers what "right" looks like and to give them practice on the task.

Certainly, terrain and weather dictate whether entrenchment will be easy or hard. Additionally, these factors also determine whether the hole will be relatively nice or a soggy mud pit. The main deficiency of the training I experienced was that it did not provide the soldiers with techniques to make their work easier. A study of past battlefields readily provides these techniques and offers ideas on what kinds of training our soldiers will need. For example, soldiers in World War II often used explosives to break up the frozen ground near the surface, thus allowing them to reach unfrozen soil in which they could dig. Others would use small arms to loosen up the soil before breaking out the spade. In training, few places allow us to detonate explosives to dig our holes. However, the more training we provide soldiers in garrison, the more prepared they will be on the battlefield.

Certainly, there are many who will disagree with my ideas. If we learn one thing from history and combat veterans, it should be that fighting positions save lives. Maybe further discussion on this subject will conclude that entrenchment is obsolete and unnecessary, although I don't believe that is the case. Maybe a conversation with some of the members of the Chechen militia will convince us of the need for digging in.

Digging a TOW fighting position at Fort Polk

The finished product after ten hours of work.

Notes

[1]Ambrose, Stephen E., *Citizen Soldiers: The U.S. Army from the Normandy Beaches to the Bulge to the Surrender of Germany June 7, 1944-May 7, 1945,* Simon & Schuster: New York, p. 254.

[2]Patton, George S., Jr., *War As I Knew It,* Houghton Mifflin Company: Boston, 1975, p. 261.

[3]Rommel, Erwin, *Infantry Attacks,* Presidio Press: California, 1990, p. 31.

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Editor's Note: This essay won the top prize in the Draper Essay Contest, sponsored by the Draper Armor Leadership Award Fund to mark the 75th anniversary of the program. Contestants were asked to write on the subject: "Leadership in the XXI Century — Digital Age." The second- and third-place entries will be published in future editions of ARMOR.

Between Decision and Action: Leadership at the Critical Moment

by Major Christopher D. Kolenda

Ten soldiers wisely led
Will beat a hundred without a head.

— Euripides

A great deal has been written about how leadership will change fundamentally in the twenty-first century as a result of digital technology. I disagree. To lead means to inspire others to follow willingly. Leaders do this by articulating a meaningful vision and a sound plan to get there, by being trustworthy in terms of character and competence, by instilling discipline and a winning attitude, and by making sound decisions. Such fundamentals have been discussed extensively, not just by modern theorists but by ancient soldiers and philosophers such as Xenophon, Plato, Caesar, Cicero, and myriad others.[1] Technology is merely a temporal condition. While specific leader competencies will change with technology, human nature does not. Leaders in the Digital Age will still have to inspire their soldiers with the same fundamentals as they did in the Bronze, Iron, Steel, and Industrial Ages.

A subject embedded in this discussion that bears serious consideration, however, is how digital-age technology will affect the role of the leader in combat. Will warfare in the twenty-first century be dominated by a "virtual" leader, a person who will become detached from the battle so he or she can process information and make decisions rapidly to keep pace with the tempo of information warfare? If the notion that combat is a contest of time-competitive decision-action cycles in which the side with the faster cycle will paralyze the slower side is accurate,[2] then the idea of a virtual leader — an information warrior — seems logical. Military history, in fact, is replete with examples of smaller, more agile forces shattering larger formations because of faster decision-action cycles.[3] According to the virtual leader argument, the side that can process information and make decisions the fastest will win.

The argument typically runs as follows. The advent of digital communications will speed the flow of information exponentially, enabling organizations to become flatter as the leader's span of control increases. Not only will leaders and staffs be able to receive, process, analyze, and produce data at a much more rapid pace, their ability to see the battlefield for themselves will see a similar dramatic increase. With digital technology, leaders will be able to "peer cybernetically" through the turret of a tank, the cockpit of an aircraft, or the sights of an infantryman. The result, according to one noted expert, will usher in the advent of the "electronic warfare wizard" as the leader of military organizations.[4] Armed with digital-age information technology, the twenty-first century leader will be able to make decisions on the battlefield detached from the chaos of combat. He or she will be a "virtual" leader, processing information and making decisions almost unfettered by friction. As the rapidity of decisions undergoes an order of magnitude increase, so will the speed of decision-action cycles in combat. Since the side with the faster decision-action cycle wins, warfare in the twenty-first century will be dominated by the virtual leader. The days of leaders having to be forward to see the battlefield for themselves will become a relic of previous millennia. In fact, the argument goes, leaders trapped in the old paradigm will not be able to keep pace with the tempo of the digital battlefield.

Furthermore, the enhanced capacity of digital command posts to assimilate subordinate units from many different organizations also enables the Army to break down existing organizational structures, create ad hoc, "plug and play," formations tailor-made for specific contingencies, and take them to war. Such capabilities mean that the old days of units having to spend a lot of time living and training together to achieve an acceptable level of performance and cohesion may be gone for good. Recent arguments in the *Army Times* about the "Strike Force" being the model of such an organization suggest that many senior leaders in the Army and Department of Defense take such notions seriously.[5]

These arguments assume that the movement from decision to action is continuous. When we dissect the nature of

battlefield paralysis in the decision-action framework, it becomes apparent that two periods of potential paralysis exist. The first instance occurs between information and decision. The second is the critical moment between decision and action; a connection that has fallen unexamined between military and leadership theory. This is the moment dominated by the human factor of fear in combat. A brief analysis of the importance of the critical moment illustrates the problem with the virtual leader argument. In fact, the increased lethality and tempo of the twenty-first century battlefield makes the physical presence of leaders and the necessity of developing cohesion, both in peace and in war, more rather than less crucial.

Combat Leadership: Dealing with Human Factors of War In the Critical Moment

The critical moment possesses the potential for battlefield paralysis, because the completion of the decision-action cycle requires soldiers to overcome fear and implement decisions. This is what Clausewitz meant when he said that "action in war is like movement in a resistant element."[6] Fear is one of the constants of war; fear of getting killed or maimed, fear of killing, fear of letting one's comrades down, fear of fear.[7] In battle, fear paralyzes soldiers. They tend to hide, take cover, bunch up, or simply remain in one spot. Paralysis remains until some minority of motivated, aggressive soldiers or leaders physically influences the action by taking the fight to the enemy. Such understanding of human behavior led commanders such as Alexander the Great, Caesar, Patton, and many others to wear distinctive dress in combat, and many armies to follow the example of the Romans and carry standards into battle. These easily recognizable leaders and symbols, by their physical presence, proved to be a source of strength to their formations. Oftentimes, however, even physical presence was not enough. Alexander's soldiers could not bring themselves to scale the walls of a Mallian fortress until Alexander led by example.[8] Caesar's legions would not debark from a ship on the shores of Britain in the face of the enemy until a standard bearer leapt into the surf.[9] Even in modern live-fire training exercises, soldiers will hesitate to fire the first round. Once a trusted fellow soldier or leader leads by example, however, most of the soldiers are able to overcome their fear.[10] The bottom line is that leaders overcome paralysis in the critical moment through personal example. Cybernetic presence simply will not have the needed effect. Thus, regardless of how many decisions a detached commander makes, he is powerless once the battle is joined. The outcome of the battle at that point will depend upon the actions of subordinate leaders and soldiers. The twenty-first century battlefield, with its increased lethality and dispersion, will see the effects of fear compounded, not diminished.

The effects of fear remain crucial even once the battle is over in the form of psychiatric casualties. Although some contemporary arguments suggest that unit cohesion will be less important in the digital age, examples from twentieth century conflicts should generate some needed caution. During the Second World War, the 85th and 91st Infantry Divisions, outfits that were thrown together quickly and had little time to develop any meaningful cohesion, had 22.7% and 34.0%, respectively, of their casualties due to combat stress after 44 days of action in Italy. The 82nd Airborne Division, by contrast, had only 5.7% of its casualties due to combat stress after 38 days at Normandy, while the 101st Airborne had 2.0% after 42 days in the Battle of the Bulge.[11] Such data suggests that a cybernetic approach to cohesion could have devastating effects on combat formations.

Perhaps the most persuasive argument that new information technology should not lead us to cast away time-honored and proven principles and concepts of leadership in favor of some form of virtual leadership is the 1940 campaign in France. Particularly instructive is the breakout at Sedan on the Meuse River that pitted Guderian's XIX Panzer Corps against the French 55th Infantry Division, commanded by General LaFontaine.[12] By 1940, the ability to communicate by wire and wireless radio down to company and platoon level was a breakthrough in communication technology similar to the one we are experiencing today. The Germans and the French took opposite approaches to leadership in this "age." Guderian's Corps used the new communications technology to speed the flow of information and decisions, but never lost sight of the importance of leaders being physically present at the decisive point.[13] It was not uncommon for a battalion commander to be with a lead platoon, as Hermann Balck was at the critical Meuse crossing, or for the corps commander to be near the lead regiment in a position where he could see the battle with his own eyes. The fact that Guderian took the opportunity during the "Phoney War" (September, 1939 to May, 1940) to build cohesion within his Corps added to the Germans' effectiveness.

The French, by contrast, believed that information technology fundamentally altered the role of the commander in combat. While to some extent a holdover from WWI, the French command and control system relied on the ability of the commander to "see" the battlefield from his command post via radio and telephone traffic, make decisions, and communicate them to his subordinates. The French commanders saw themselves as holding "the handle of a fan," with all communications emanating from the command post.[14] So confident were the French that this system would work that General LaFontaine placed his concrete command post nearly 10 miles behind the Meuse facing south (the Germans were coming from the north). Furthermore, the French commanders in the Meuse sector took the "plug and play" approach to manning in the 55th Division. Rather than maintaining unit integrity, the French commanders mixed companies among battalions and regiments. It was not uncommon for a battalion commander to have two of his four companies from a different battalion or regiment. Such shuffling even occurred at the individual levels.[15] The result was a force, although trained, that was led from the rear and completely lacking in cohesion and mutual confidence, pitted against a well-trained, cohesive, and confident force led from the front.

Individual French soldiers fought well and had a chance of stopping the XIX Panzer Corps at the Meuse (Guderian, in fact, regarded the victory as "almost a miracle"[16]), but the ability of the German commanders to not only make decisions but to implement them carried the day. General LaFontaine made plenty of decisions. Very few of them were carried out with any sense of purpose in the atomized French effort. The illusion of control evaporated into a reality of panic, hesitation, and fear that paralyzed the 55th Division.

Conclusion

The point that Guderian grasped so artfully was that technology is an ever-changing battlefield condition. The battlefield itself, he realized, and the soldiers

who fight in it, are permanent. Combat is a human endeavor. Personal, trusted leadership of confident and cohesive units creates the fabric of battlefield effectiveness. Effective combat leadership in the Digital Age will differ from effective leadership in the Bronze, Iron, Steel, and Industrial ages only in the form of specific competencies. Armies and leaders ignore this simple truth at great peril.

What will change, however, are the consequences of poor or "virtual" leadership. As lethality and the speed of information continue to increase, the margin for error in combat will continue to narrow and will carry with it harsher and more bloody penalties. As so many historical examples illustrate, it is not only the pace of decision-making that counts in battle — it is the pace of implementation. Information technology has the potential to speed decisions, and leaders must master this capability, but only trustworthy leaders in front of cohesive units can implement them in battle. It is the ability to execute in the critical moment between decision and action that will spell the difference between victory and defeat in the twenty-first century.

Notes

[1]For some classical references see Xenophon, *Oeconomicus* (Estate-Manager), in *Conversations of Socrates*, translated by Hugh Tredennick and Robin Waterfield (London: Penguin Books, 1990); Xenophon, *Cyropaedia* (Education of Cyrus), translated by Walter Miller (Cambridge: Harvard University Press, Loeb Classical Library, 1914); Alan Bloom, *The Republic of Plato* (New York: Harper Collins, 1991); Plato, *Statesman*, translated by Harold N. Fowler (Cambridge: Harvard University Press, Loeb Classical Library, 1925); Julius Caesar, *The Gallic War*, translated by H.J. Edwards (Cambridge: Harvard University Press, Loeb Classical Library, 1997); Marcus Tullius Cicero, *De Re Publica* (The Republic), translated by Clinton Walker Keyes (Cambridge: Harvard University Press, Loeb Classical Library, 1988); Marcus Tullius Cicero, *De Officiis* (On Duties or On Moral Obligations), translated by Walter Miller (Cambridge: Harvard University Press, Loeb Classical Library, 1990). For modern discussions of leadership see Lord Moran, *The Anatomy of Courage* (Garden City Park, New York: Avery Publishers, 1987); James MacGregor Burns, *Leadership* (New York: Harper and Row, 1978); Stephen R. Covey, *Principle-Centered Leadership* (New York: Simon & Schuster, 1991).

[2]For the best discussion of the "time-competitive decision-action cycle," also known as the "Boyd Cycle," see William S. Lind, *Maneuver Warfare Handbook* (Boulder, Colo.: Westview Press, 1985), 4-7.

[3]A few examples are the battles of Leuctra (371 B.C.), Cannae (216 B.C.), Gaugamela (331 B.C.), Austerlitz (1805), Sedan (1940), and Desert Storm (1991).

[4]Eliot A. Cohen, "A Revolution in Warfare," *Foreign Affairs* (Spring 1996), 48-50.

[5]See, for instance, Major General Daniel R. Zanini, "Commentary," *Army Times* (February 15, 1999).

[6]Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984), 120.

[7]Anthony Kellett, *Combat Motivation* (Ottawa, Canada: Department of National Defence, 1980), 309, cited in Charles F. Brower and Gregory Dardis, "Teaching Combat Leadership: Closing the Gap between Expectation and Experience," in Christopher D. Kolenda, *The Art of Leadership in War and Peace* (currently under review by Stackpole Press), 40.

[8]Flavius Arrian, *Anabasis Alexandri* (Campaigns of Alexander), translated by P.A. Brunt (Cambridge: Harvard University Press, Loeb Classical Library, 1976), VI. viii. 3 (Citations of classical texts are by book, section, and paragraph number. Some works, such as Caesar's, do not contain section numbers.).

[9]Caesar, IV. 25.

[10]Kellett, 314.

[11]DA PAM 350-2, *Developing and Maintaining Unit Cohesion* (Washington D.C.: U.S. Government Printing Office), cited in Robert W. Madden, "Living on the Edge: Building Cohesion and the Will to Win," in Kolenda, 60.

[12]For the best discussion of the breakout at Sedan and the differences in the command and control techniques employed by the French and Germans see Robert A. Doughty, *The Breaking Point: Sedan and the Fall of France, 1940* (Hamden, Conn.: Archon Books, 1990).

[13]Ibid., 326-332.

[14]Ibid., 27-30, 326-332.

[15]Ibid., 114-120.

[16]Heinz Guderian, *Panzer Leader* (New York: Ballantine Books, 1957), 84.

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Taps for an Armored Division

The Final Veterans Reunion of the 6th Armored Division

by George F. Hofmann, Ph.D.

Veterans of the 6th Armored Division gather for their final reunion in Louisville September 12-16. On the 14th, the Association will make its final pilgrimage to Fort Knox, where the division was activated in 1942. Twenty-nine months and twelve days later, the division was committed to combat in Normandy, and except for a period of less than two weeks, the 6th AD was continuously in combat for nine and half months in the European Theater until the surrender of Germany. By that time, the "Super Sixth" had fought in five major campaigns in Western Europe, and had sustained 1,274 killed in action and 10,842 casualty losses.

For the majority of the war, the 6th AD served under Lieutenant General George S. Patton, who considered the 6th AD and its commander, Major General Robert W. Grow, one of his most dependable leaders and divisions. Grow had been one of the pioneers in the mechanization of the U.S. Cavalry, having served in the 1930s as the S3 under Colonels Daniel Van Voorhis and Adna R. Chaffee, Jr., the Father of the Armor Force. Later, during the early days of the Armored Force, Grow served under Patton. The division inherited his philosophy and consequently established an impressive record of mobile warfighting. Unlike most other armored divisions, the 6th routinely reconfigured its combined arms organization of Combat Commands, depending upon the mission.

Grow's vision of the division as a brotherhood carried over into the post-war period. In 1947, the division association was founded at Fort Knox by Colonel (later Chief of Armor and Lieutenant General) George W. Read, Jr., and a year later the first reunion was held in Louisville. That same year, Gammon Field House at Fort Knox was dedicated to SSG Archer T. Gammon of the 6th AD, a recipient of the Medal of Honor for his courageous action near Bastogne on January 11, 1945.

Continued on Page 49

Solution — Tactical Vignette 00-01 *Ragin' Cajun Time*

(Author's Solution to the January-February 2000 Vignette)

TASK 1 – Issue 2nd Platoon FRAGO –

"All White elements, this is White one, FRAGO follows."

SITUATION: Scout report three BMPs followed by one T-72 vic MR235047.

MISSION: No Change.

EXECUTION:

-Occupy BP 1A and orient on **EA Houston** between TRPs 1 and 3.

-Alpha section orient from TRP 1 north to TRP 3; work far to near. Bravo section orient on TRP 3 south to TRP 1; work inside out.

-On order, displace and reposition to BP 1D, orient into **EA Seattle**. Alpha section orient from TRP 7 north to TRP 8; work far to near. Bravo section orient on TRP 8 south to TRP 7; work inside out.

-Engagement trigger is three tanks or four BMPs (what we believe is the FSE) in either **EA Houston** or **EA Seattle**.

-Trigger to reorient fires into **EA Seattle** is negative contact in **EA Houston** or confirmed enemy company (+) size element in **EA Seattle.**

-White displacement criterion is three tanks vicinity **EA Seattle.**

-Engagement priority is tanks, EN vehicles, BMPs, then all others.

SERVICE AND SUPPORT:

No change.

COMMAND AND SIGNAL:

CO will be with Red (1st) platoon; XO will be with blue (3rd) platoon.

"Acknowledge, over."

TASK 2 – White's response to SPOT reports over company net –

EVENT 1 – Report of one tank and one BMP vic TRP 1 in EA Houston.

Your response should be to continue to observe and monitor the situation. Both you and the Blue platoon see these enemy vehicles.

The size and activity of this enemy element does not meet any of the criteria set by your company commander for engagement, reorientation into your alternate engagement area (EA Seattle), or displacement to your alternate BP (BP 1D).

EVENT 2 – Report of three tanks and two BMPs vic EA Seattle.

Your response, because you cannot get contact with your commander or XO, should be to displace and occupy BP 1D.

This SPOT report meets the criteria set by your commander for your platoon to displace to BP 1D and begin engaging the enemy.

While this SPOT report also meets one of the criteria for you to reorient your platoon fires into your alternate engagement area (EA Seattle), it would do no good.

You are set in BP 1A. Your fires from there would be ineffective into EA Seattle because you are too far away (3km to the southern portion of EA Seattle). You must displace to BP 1D, reorient your platoon's fires to the appropriate TRPs, and begin engaging the enemy.

Commander's Hatch from Page 5

location capability of the LRAS3 will facilitate employment of organic and joint fires through digital interface with FBCB^2. The RV will carry a six-man scout squad, ensuring four scouts are always available for dismounted patrolling, HUMINT operations, and NAI observation activities. Finally, the RV will have the same scaleable armor packages as the MGS and ICV, capable of surviving 14.5mm and RPG-7 fires.

Command Vehicle (CV). The CV provides an operational platform for selected elements of command within the IBCT. Commanders must have the capability to see and direct the battle continuously, maintaining the Common Relevant Operating Picture (CROP) for all friendly forces within their respective areas of operation. This enhanced situational awareness and understanding will enable commanders to synchronize and employ widely dispersed and highly mobile forces at the decisive point(s) of the operation. The CV is also a configuration of the ICV, and will possess the same deployability, mobility, lethality, survivability, and sustainability requirements. One key differing characteristic is that the CV will have the capability to access aircraft power and antenna systems for enroute mission planning at all levels of command within the BCT. The specific communications equipment mounted on the CV will be in accordance with the Command, Control, Computers, Communications, Intelligence, Surveillance, and Reconnaissance (C4ISR) Annex and Operational Architecture (OA) for the brigade; however, each platform will possess the same "hooks" required to field any of the Army's existing or planned communications packages. Additionally, the CV will be provided with the same scaleable armor packages as the RV and MGS, ensuring survivability from RPG-7 and 14.5mm fires. Initial fielding of the CV will be three platforms to the brigade headquarters, two platforms to the infantry maneuver battalion HQ, and two per infantry maneuver company within each battalion.

The ORD has been approved by the Army and staffed worldwide. The Army Materiel Command (AMC) and the Tank and Automotive Command (TACOM) were to complete the IAV Request for Proposal (RFP) in March for industry to review and provide offers to the government. It is truly a "team of teams" effort. As work continues on the Army Transformation Strategy, the Armor Center continues to be a focal point for TRADOC and the U.S. Army. In a future article, I will address the components of the Mounted Force Modernization Plan that we are developing in concert with the rest of TRADOC, with a focus on the future of our decisive counterattack force and its centerpiece, the M1 Abrams. The Army is on the move to meet the current and future security needs of the nation. The Armor Force remains now and will be in the future the spearhead of our combat formations and the decisive combat element to win our nation's wars.

"FORGE THE THUNDERBOLT
…AND STRIKE FIRST!"

concepts into necessary equipment requirements. These concepts determined technology through less costly research, development, test and evaluation. The program set up several goals to guide program development and aid management. Starry wanted integrated operational concepts to be the foundation for an efficient training base that would be expandable in the event of mobilization. He also wanted to develop an organizational and force structure cognizant of weapon and equipment requirements and to provide adequate installation support and maintenance for the new force structure and equipment.[69] He also felt that equipment requirements drawn from the new doctrine had to be reconciled with requirements flowing from Active Defense. Weapons like the "Big 5" had to be integrated into the doctrine. This was a serious concern for Starry.[70]

Connecting the new doctrine with the development of these new weapons also helped gain Congressional support. Starry understood that new weapons meant jobs in many Congressional districts and linking the two closely together helped win support of the Congressmen whose districts gained from the new weapons contracts. Congressmen jumped at the chance to support a doctrine that needed weapons built in their districts. The new jobs created by the weapons contracts meant votes in upcoming Congressional elections.[71] Intertwining weapons and doctrine also brought the arms industry on board and in turn helped win support in Congress.[72] By gaining support from industry, Starry was able to use their powerful Congressional lobbyists as another indirect approach to win Congressional support.

The development of AirLand Battle was a long and arduous process, and many contributed. By the end of the Vietnam War, the United States faced a strong Soviet threat that used the distraction of Vietnam to leap ahead of the United States and NATO, in numbers, technology, and doctrine. The Army needed a way to defeat the new Soviet threat on the modern battlefield without reverting to nuclear weapons. At the center of the Army's attempts to meet this challenge was its quest to develop a doctrine to win the next war. General Donn A. Starry played an integral role in the Army's doctrinal reform push. He provided focus for the Army's doctrinal reform movement. His experiences in Vietnam, as V Corps commander, and analyst of the 1973 Arab Israeli War, showed him what the Army needed to do in order to win the next war.

Starry followed his blueprint for change to the letter. He and his staff officers at TRADOC recognized the need for change and provided commonality to the doctrinal reform movement. Starry and Morelli worked tirelessly to build a consensus that gave AirLand Battle an audience of believers and converts. Starry's unique and direct leadership approach provided consistency among the architects of AirLand Battle that brought consistency of effort to the process, but allowed traditional Army mechanisms to do what they always did.

Starry also played an important role in the Army and Congress's acceptance of AirLand Battle. He understood that the entire Army needed to be involved in the doctrinal reform process. Recognizing the need to educate the Army about the new doctrine, Starry gave several speeches and wrote several journal articles that illustrated his view of doctrinal reform. The Army's failure to accept Active Defense doctrine showed him the need to acknowledge the traditions of the Army and return writing of doctrine to Fort Leavenworth. However, he did maintain close control over the development process by having direct contact with the writers. He also knew he had to change the school system in order to train a wide range of officers in the new doctrine. These ideas helped AirLand Battle gain acceptance throughout the Army. General Starry was the person who brought together all these influences and focused them into a coherent doctrine able to defeat the Soviets. His restructuring of the Army school system allowed TRADOC to teach the principles of the new doctrine to officers early in their careers. Linking weapons procurement directly with the new AirLand Battle made it easier for Congressmen to back the new doctrine and utilized the lobbying resources of defense contractors as another weapon to gain Congressional support.

In order to resurrect the Army after the Vietnam War, the Army needed a corps of bright officers willing to work vigilantly to fix the tough problems that faced the Army. One of the most important of these officers was General Donn A. Starry. He understood the problems the Army faced and knew what had to be done to fix them. His unique leadership style allowed for a free flow of ideas to contribute to the development of the doctrine best suited for the United States Army. At a time of great turmoil within the ranks, Starry was the "Vigilant Warrior" who overcame great obstacles and persevered to help the Army evolve into a well trained effective fighting force. The Army and the nation owe a great deal to General Starry for his leadership during a time of great need.

No matter what future FM 100-5 holds in store for the Army, two things are clear. It needs to be flexible, but well defined in order to give a framework for the units on the ground engaged in nation-building, peacekeeping, warfighting, as well as numerous other missions. Although I do not claim to have the answer of what the Army's new doctrine should look like, I do know that it must take into account the ever-changing threat and political and economic environments in this post-Cold War world. Who knows what the Army's future doctrine will look like, but one thing is for sure: there will be much debate about it in the months and years to come.

Notes

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[2]James E. Dougherty and Robert L. Pfaltzgraff, Jr., *American Foreign Policy: FDR to Reagan* (New York: Harper & Row, Publishers, Inc., 1986), p. 331.

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[4]Lou Cannon, *President Reagan: The Role of a Lifetime* (New York: Touchstone Books, 1991), pp. 162-163.

[5]Letter, Donn A. Starry to Richard Swain, 7 June 1995, 22, *AirLand Battle* folder, TRADOC Archives, Fort Monroe, Va.

[6]Letter, Donn A. Starry to Martin J. D'Amato, 10 April 1998, in author's possession.

[7]Robert H. Scales, *Certain Victory: The U.S. Army in the Gulf War* (Fort Leavenworth: U.S. Army Command and General Staff College Press, 1994), pp. 13-14.

[8]Letter, Starry to Swain, 7 June 1995, p. 22.

[9]Ibid., p. 14.

[10]Ibid., p. 26.

[11]Letter, Starry to Swain, 7 June 1995, p. 3.

[12]Letter, Starry to D'Amato, 10 April 1998.

[13]James Kitfield, *Prodigal Soldiers* (Washington: Brassey, 1994), p. 316.

[14]Letter, Starry to Swain, 7 June 1995, p. 10.

[15]Ibid., p. 17.

[16]Simon Naveh, In Pursuit of Military Excellence: The Evolution of Operational Theory (Portland, Ore.: Frank Cass Publishers, 1997), p. 287.

[17]Richard Swain, "Filling the Void: The Operational Art and the U.S. Army," eds. B.J.C. McKercher and Michael A. Hennessy, *The Operational Art: Development in Theories of War* (Westport, Conn.: Praeger, 1996), p. 153.

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[20]John L. Romjue, Chief of Historical Studies Publication, TRADOC (Retired). Interview by author 31 March 1998, Fort Monroe, Va.

[21]Huba Wass de Czega , Interview by John L. Romjue, 6 Jan 1984, interview summary, *AirLand Battle* folder, TRADOC Archives, Fort Monroe, Va.

[22]Huba Wass de Czega, Interview by John L. Romjue, 16-17 April 1984, interview summary, *Airland Battle* folder, TRADOC Archives, Fort Monroe, Va., p. 3.

[23]Naveh, In Pursuit of Military Excellence, pp. 260-261.

[24]Donn A. Starry, "To Change an Army," *Military Review* 3 (March 1981), p. 23.

[25]J.A. Noble, Interview by John L. Romjue, 8 May 1984, interview summary, *AirLand Battle* folder, TRADOC Archives, Fort Monroe, Va., p. 2.

[26]Letter, Edward C. Meyer to Donn A. Starry, 13 June 1979, *AirLand Battle* folder, TRADOC Archives, Fort Monroe, Va., pp. 1-2.

[27]Edward C. Meyer, White Paper 1980: A Framework for Molding the Army of the 1980s into a Disciplined, Well Trained Fighting Force (Washington: Department of the Army, 1980), p. 1.

[28]Letter, Starry to D'Amato, 10 April 1998.

[29]Brooks E. Kleber, Richard P. Weinert, and John L. Romjue, *TRADOC ANNUAL HISTORICAL REVIEW: 1 Oct 1977 to 30 Sept 1978*, (material used is unclassified) (Fort Monroe: U.S. Army Training and Doctrine Command, 1979), p. 165.

[30]Letter, Starry to D'Amato, 10 April 1998.

[31]John L. Romjue, "AirLand Battle: The Historical Background," *Military Review* 3 (March 1986), pp. 52-53.

[32]Letter, Starry to Martin J. D'Amato, 10 April 1998.

[33]Romjue interview by author, 31 March 1998.

[34]Kitfield, *Prodigal Soldiers*, pp. 153-154.

[35]Letter, Starry to D'Amato, 10 April 1998.

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[38]Richard M. Swain, "Filling the Void," p. 158.

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[40]Donn A. Starry, Interview by John L. Romjue, 29 July 1981, interview summary, *AirLand Battle* folder, TRADOC Archives, Fort Monroe, Va., p. 1.

[41]Brooks E. Kleber, Richard P. Weinert, and John L. Romjue, *TRADOC ANNUAL HISTORICAL REVIEW: 1 Oct 1976 to 30 Sept 1977*, material used is unclassified (Fort Monroe: U.S. Army Training and Doctrine Command, 1978), p. 9.

[42]Wass de Czega interview by John L. Romjue, 16-17 April 1984, p. 1. General Marshall's 1941 manual was the basis for how the U.S. Army conducted operations during World War II. The German 100-100 is the German Army's equivalent of the U.S. Army's FM 100-5.

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[44]Colonel Michael Starry, United States Army, interview by author, 30 March 1998, Fort Monroe, Va.

[45]Donn A. Starry, Interview by Dr. Harold R. Winton, 13 November 1995, transcript, U.S. Air Force Oral History Interview, Gettysburg, Pa., pp. 3-5.

[46]Donn A. Starry, "Extending the Battlefield," *Military Review* 3 (March 1981), p. 32.

[47]Ibid., p. 38.

[48]Ibid., pp. 32-33.

[49]Starry interview by Winton, 13 November 1995, p. 12.

[50]Ibid., p. 9.

[51]Ibid., p. 12.

[52]Ibid., p. 9.

[53]Starry interview by Romjue, 29 July 1981, p. 2.

[54]John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982*, TRADOC Historical Monograph Series. (Fort Monroe: U.S. Army Training and Doctrine Command , 1984), p. 64.

[55]Ibid., p. 63.

[56]Starry, "Extending the Battlefield," p. 34.

[57]Letter, Starry to Swain, 7 June 1995, p. 3.

[58]Ibid., p. 10.

[59]Ibid., p. 4.

[60]Starry, "Extending the Battlefield," pp. 49-50.

[61]Letter, Starry to Swain, 7 June 1995, p. 29.

[62]AIT stands for Advanced Individual Training. AIT is the course that enlisted soldiers attend after basic training to learn specialized skills.

[63]Donn A. Starry, Interview by Brooks E. Kleber, 27 April 1978, summary interview, Fort Monroe, Virginia, p. 1.

[64]Letter, Starry to Swain, 7 June 1995, p. 19.

[65]Starry interview by Kleber, 27 April 1978, p. 2.

[66]Letter, Starry to Swain, 7 June 1995, p. 30.

[67]Swain, "Filling the Void," p. 161.

[68]Letter, Starry to Swain, 7 June 1995, pp. 22-23.

[69]John L. Romjue, Susan Canedy, and Anne W. Chapman, *Prepare the Army for War*, p. 12.

[70]Letter, Starry to Swain, 7 June 1995, p. 19.

[71]James F. Dunnigan and Raymond M. Macedonia, *Getting It Right: American Military Reforms After Vietnam to the Gulf War* (New York: William Morrow and Company, Inc., 1993), p. 202.

[72]Noble interview by Romjue, 8 May 1984, p. 2.

1LT Martin D'Amato is a 1998 graduate of the U.S. Military Academy. A graduate of the Armor Officer Basic Course and Airborne School, he is currently the 3rd Platoon Leader for B Company, 3-8 Cav, Fort Hood, Texas.

This 10-vehicle platoon must be able to operate in almost any terrain and over dispersed distances. Its speed on the battlefield and the embedded requisite digital command and control systems will allow it to mass quickly. The speed issue is critical. We need to be able to disperse and then mass quickly and overcome an opponent. Conceptually, in the defense, this places infantrymen on key terrain and in the early warning and channeling mode — building the kill sacks while denying key terrain — and only firing if attacked. The gun systems and missiles are then in depth and available to kill enemy vehicles while being supported by their own mortar and the digitally supported indirect fire.

In the offense, the process is deliberate and then dynamic — deliberate searching, finding, and fixing by dismounted infantry, infiltration, and then coordinated massed fires against critical nodes that cause the enemy's defense to come unhinged.

The above characteristics also make the force capable of widely dispersed peacekeeping operations or operations in urban terrain.

The ability to digitally issue orders and navigate are key to the execution of such tactics.

Finally, the Brigade Combat Teams will probably evolve into the test bed for the vehicles that are under consideration to constitute the future combat system (FCS). The above considerations and organization are perfectly compatible with that vision and may even provide some insights into the final 2020 force.

BRUCE B.G. CLARKE
COL, U.S. Army (Ret.)
Topeka, Kan.

Thoughts on the Formation Of the New Brigade Combat Teams

Dear Sir:

First of all, I would like to thank MAJ Daigle for allowing me the opportunity to talk through my hat and contribute, very humbly, to this debate.

Once again, the Army has determined to restructure our forces in order to meet what they perceive to be a change in the nature of modern warfare. The last time a major effort like this was undertaken was during the Eisenhower Administration when divisions were reorganized along the lines of the "battle group" concept. The theory behind this concept was that the next major conflict would involve the use of nuclear weapons and that on this type of battlefield, smaller, more "flexible" units would be most effective. It didn't take the Army long to realize, however, that the idea was seriously flawed and played havoc with the stability, morale, and command and control benefits that were the inherent strength of the triangular regimental system instituted just before the Second World War.

Now the Army has embarked upon a reorganization that will supposedly meet the requirements of warfare in the 21st century. Yet, while this restructuring may allow for the quick deployment of a highly mobile force overseas, in my opinion, it will leave these 'hybrid' units extremely vulnerable should they face a determined enemy. Either they will be too light in infantry or too light in armor — depending on the circumstances — to successfully engage a well-equipped and well-trained opponent in sustained ground combat. Using such units as a stopgap until heavier forces are deployed may be a prudent idea, but as an all-encompassing approach to future warfare, I believe it is severely flawed. The old adage 'jack of all trades, but master at none' comes most readily to mind.

In fact, could it be that the most "flexible" response to the perceived changes in the Army's mission is not the creation of new types of units, but the continued maintenance of both heavy mechanized and non-mechanized formations? Would it also be true to assert that the requirements inherent in rapid deployment and "peacekeeping" missions, as well as low-intensity conflicts, can best be met by the use of "straight-leg" infantry components adequately equipped with modern "man-portable" weaponry? And if greater mobility is required, could this not be met by the subsequent deployment of heavier mechanized forces?

The real decision the Army is facing is how best to utilize its assets in the apparent mission 'vacuum' of the post-Cold War era. These assets include both heavy mechanized and non-mechanized formations that, in my humble opinion, will each continue to play an essential role in our nation's defense for many, many years to come.

SPC THOMAS A. REBUCK
B Co., 3/103d AR
Sunbury, Pa.

Clarifying Some Points About a Much-praised New Book

Dear Sir:

In the introduction of *Camp Colt to Desert Storm* by George F. Hofmann and General Donn A. Starry, it was stated that, "this book is an anthology that seeks to identify milestones in the history of the mechanization of the U.S. Army... Each chapter is written by a storyteller describing important events." Chapter 13, "The Abrams Tank System," by MG Robert J. Sunell, has serious omissions of historical significance. And, in a few instances, conclusions are drawn and credit given to individuals, who as short-term participants, were undeserving of the successful conclusions reached by the author.

However, even with the omissions, the author's story outlines in credible fashion a roadmap of events that covers the Abrams tank program from development through its production and fielding. It is too bad that the M1A2 variant part of the story centered on minor tactical events, rather than the difficult strategic issues that were fortunately overcome, such as the selling of the M1A2 program to Congress in 1988. In an unprecedented step, General Dynamics joined with the United Auto Workers (UAW) union in championing the M1A2 on Capitol Hill. While key Army players testified, the GD/UAW lobbying effort carried the day. And of course, saving the industrial base was not an issue at this time. The 62 M1A2 tanks were not approved for production, but as a limited quantity for training, given the new digital technology of the M1A2.

And let me make a short comment on the author's story that DOD and the Army pursued an aggressive plan to sell M1A2 tanks to overseas customers. This is a complete "terminological inexactitude," to quote Mr. Churchill. The M1A2 Abrams was sold to the Kingdom of Saudi Arabia (KSA) in spite of DOD's recommendation, in writing, for KSA to buy the M1A1. Donald Atwood, Deputy Secretary of Defense, signed a letter to KSA as Acting Secretary of Defense recommending that the M1A1 was the Army's production tank and as such, it was recommended for purchase. A small quantity of M1A2s were being procured for training purposes, etc. Mr. Atwood will be remembered as the former General Motors executive who was a strong advocate of not supporting the tank industrial base. He was quoted as saying, "Any 10,000 GWV (gross weight vehicle) truck contractor can build tanks."

As for the Army's role in making the Saudi sale a reality, it was passive. The energetic and aggressive PM, MG Pete McVey, was having health problems and was quietly taking a supportive role to the General Dynamics Land Systems initiative to sell the M1A2 and not the M1A1. Credit must be given to LTG (R) Richard Graves, the GDLS in-country representative, advising the armor corps of KSA. His vision and foresight in advising the Saudis on the merits of digital technology, and alerting GDLS management to make a responsive offer, carried the day. The KSA purchased 315 M1A2 tanks, the DOD's recommendation notwithstanding.

I have selected three omissions that stand out as critical events that could have altered the entire direction of the M1 Abrams Tank Program, or, the termination of the program, hence jeopardizing the very existence of a U.S. Army Tank Program for a new tank. The three critical events follow below with a few comments on each.

The start of the M1 Tank Program marked the beginning of a new era in armored vehicle development and engineering. The M1 was the first tank designed and engineered by a contractor; heretofore, the U.S. Army arsenal system developed armored vehicles. The best arsenal engineers were promoted and moved on to PM jobs. There was no turning back.

The Chrysler Corporation and General Motors defense business units thus became essential components in meeting the needs of the U.S. Army for a new tank. Chrysler's Tank

Division was the incumbent tank producer for many years, operating a government-owned, company-operated facility, the Detroit Tank Plant. Chrysler, for the most part, was looked upon as a stodgy, unimaginative organization and as a no-investment contractor.

General Motors' massive resources and reputation for innovation was appealing to a number of DOD/Army decision-makers wanting change. All this translated into a win for GM on the MBT-70 co-development program with Germany, which was terminated in 1971.

The M1 Tank Program competition, starting in 1973, again brought together the two prior adversaries. Both contractors received validation phase contracts enabling each to offer a prototype, one diesel-powered and one turbine-powered tank. The next phase was the Full Scale Engineering Development phase, a winner-take-all competition. The author indicated that, prior to an award decision, the consensus was that General Motors was "first choice." I would have stated it differently. Both prototypes met the requirement, as was stated. Hence, I would say that Chrysler was not the "front runner," meaning that if the products were equal, one contractor must have a lower cost offer, aside from the turbine-vs-diesel bias mentioned. Chrysler won the FSED contract following a four-month extension and a re-pricing requirement making Chrysler the low bidder. Had General Motors won, would the Army have been better off? Let me go on.

Chrysler's FSED 36-month effort went through arguably the normal developmental growing pains. The transition to Low Rate Initial Production (LRIP) beginning in 1979 at the Lima Tank Plant, started a series of production problems that ultimately forced Chrysler to exit the tank business. The Chrysler tank business unit, reconstituted as Chrysler Defense Inc., was put up for sale in December 1980. How did this conclusive event happen?

As mentioned by the author, MG Duard D. Ball took over the M1 Abrams Program in June 1980. However, while assigned, he did not immediately take the helm. COL Herman Vetort, the Deputy PM at the time, became acting PM for over two months. Quietly, with minimal exchange and/or contact with Chrysler's Defense management team, he assessed the M1 tank production problems and the contractor's ability to recover. In October 1980, prompted by MG Ball's report, GEN John Guthrie wrote to Mr. Lee Iacocca, CEO and chairman of Chrysler Corporation, to this effect: "Come see me. I am considering shutting you down."

What was Mr. Iacocca's reaction to this letter? I happened to be one of the briefers meeting with Mr. Iacocca to review issues and concerns on Chrysler's tank contract. About 20-30 minutes into the briefing, Mr. Iacocca stopped the briefing. "I am having difficulty understanding the various defense terminology and contract language of this briefing and I do not have the luxury of time to learn it. I am trying to save this corporation (from bankruptcy) and its employees. I know you worked hard to pull together this briefing, colored slides, briefing books, etc. Thanks. I will go see GEN Guthrie and talk to him. I do not require any further efforts by you to brief me."

The meeting was held in October, 1980, at AMC headquarters, Guthrie and Iacocca alone in GEN Guthrie's office. Following the meeting, there were no directives from Chrysler's corporate offices to the Defense management team, other than to keep working the problems.

In March 1982, General Dynamics Corp. (GD) completed the purchase of Chrysler Defense Inc. Mr. O.C. Boileau, president of General Dynamics, assumed the general management responsibility of the business unit, named General Dynamics Land Systems Division (GDLS), and was named its acting president for about one year. He arrived on site with a transition team on 16 March 1982. GD provided not only the leadership but also a capital infusion of engineering, management, and quality control talent drawn from Convair, Fort Worth and other divisions of GD. Mr. Boileau's team, both GD and ex-Chrysler members, went to work hands-on with a degree of urgency not shown formerly. The production bottleneck was eliminated, a new cooperation with union employees was developed, and by the efforts of Mr. Edward Ewing and the quality control leader, Mr. Eric Smith, both transferred from the Fort Worth F16 Division, a zero defects program was initiated. In time, this program crossed over to suppliers and paid off handsomely in improved quality and fewer hours in assembly, The Army's authorized acquisition objective (AAO) was doubled to 7,000 units, enabling a multi-year contract and stable production base. Mr. Boileau turned over the general management responsibility of GDLS to Robert Truxell, a seasoned executive retired from General Motors with strong operational experience and a proven record in plant and engineering operations. The former Chrysler Engineering organization, often referred to as a fiefdom in management style and lacking computer system technology, was transformed into a high-tech operation with avionic technology and extensive computer system capabilities. Gordon England, formerly of GD's Fort Worth engineering staff, should be credited with the transformation that gave birth to the M1A2 variant with its digital technology.

The third omission of historical importance is the joint venture initiative by the FMC Corporation to combine the M2 Bradley production with the M1 Abrams tank production at the Lima plant. This was a serious effort in 1993 that was envisioned by FMC as a joint venture under their control. In the early stages of meeting after meeting to evolve a joint venture, General Dynamics Corp. was seriously interested. Later, the chairman and CEO, William Anders, reconsidered. I was present when he said to his vice chairman, Harvey Kapnick, "Call them up. I'm not selling, I'm buying. Let me know." This is a very brief capsule of the event, but one can easily envision the impact had it come about.

There's much more to the Abrams tank story, but I chose the Letters to the Editor route to present a snapshot of missing events and details that I consider serious omissions, the General Dynamics contributions in particular. Lastly, the author mentions by name a handful of Chrysler Defense employees who contributed to the M1 tank program only in the early stages. Be assured that, without the likes of Boileau, Truxell, Ewing, Smith, England, Claysmith, and one or two others, there would not be an Abrams program as we know it.

One more comment...The Egyptian program started with the design and construction of Factory 200 under contract (mid-1980) with General Dynamics Services Company, GDSC, which I headed. The co-production of 555 M1A1s that resulted later was planned to coincide with the activation of Factory 200, which was both a depot and tank plant (for new production). As a matter of fact, it is larger than the Detroit Tank Plant.

GEORGE P. PSIHAS
Former President, GDLS

Korean War Experience Supports Stealthy Scout Emphasis

Dear Sir:

After reading the comments submitted by LTC Burton S. Boudinot in "Letters," *ARMOR,* November-December 1999, entitled "Stealth in Scouting Requires Small, Quiet Vehicles, Not Guns," I am obligated to respond. Colonel Boudinot is right on target with his comments and Armor Branch should wisely take note. I, too, consider the XR311 the best scout vehicle for the U.S. Army.

I consider myself qualified to offer comment on this subject ... From March until August 1951, I was a member of the Intelligence and Reconnaissance Platoon, 5th Cavalry Regiment and Intelligence and Reconnaissance Section, 1st Battalion, 5th Cavalry. During combat operations in Korea, I was assigned as an infantry reconnaissance scout and served as a scout driver, section leader, and squad leader.

Previous to my assignment, the regiment had lost two I & R platoons. One had been captured and it was unknown what became of the other. The incident of the captured platoon is worthy of note. The platoon was led by First Lieutenant Joseph Toomey and was conducting route reconnaissance. The terrain was restricted, with steep banks on either side of the road. All three recon squads were in column on a narrow dirt trail. Lieutenant Toomey was leading the platoon, and as the platoon rounded a curve, a Russian .51 caliber machine gun opened fire, inflicting casualties. At that instant, Chinese soldiers swarmed down

the slopes on both sides of the trail and completely overwhelmed the platoon. It was over in a flash.

This action was witnessed and reported by the platoon sergeant, who was the only member to escape. His jeep had developed engine problems and had dropped out of formation. He managed to continue, and upon rounding the curve witnessed the action. As he rounded the curve, the .51 caliber machine gun opened fire on his jeep, damaging a tie rod and causing the vehicle to careen into a ditch short of the ambush site. The platoon sergeant, driver, and RTO all ran, but only the platoon sergeant returned to report the incident.

During my period of service with the platoon and the 1st Battalion I & R Section, not one soldier or vehicle was lost even though patrol activity increased.... The platoon used procedures outlined in the field manual on scouting and patrolling with particular attention to the chapter on mounted patrolling with the ¼-ton truck 4x4. This manual was written by officers with combat experience during WWII. We followed these procedures and only changed or modified them based on the factors of METT.

The platoon performed route, area, and zone reconnaissance, which included bridge and route classification. The platoon also conducted day and night dismounted patrolling, and observation and listening post assignments. The platoon performed all missions with squads. The entire platoon was not used, as it was too large for precise control and resulted in excessive noise and movement.

There are three jeeps in the scout squad. Each jeep was assigned a specific procedure. These procedures were practiced, practiced, practiced. The scout vehicles were gun jeeps equipped with pedestal machine gun mounts. Each jeep procedure was specified. The lead vehicle was the scout vehicle; the scouts on this vehicle performed all the scouting requirements. The machine gun on this vehicle was never used. The second vehicle was the overwatch vehicle. The scouts on this vehicle provided cover for the scout vehicle. The third vehicle was the base of fire vehicle. The scouts on this vehicle provided cover for the two forward vehicles. The squad moved by successive bounds. It was determined that this method resulted in effective and secure results. Artillery fires were planned for the patrol route. These fires were accurate and timely and enabled the patrol to break contact when required. Each jeep was equipped with a pedestal machine gun mount and a .30 caliber light machine gun. The windshields were removed to eliminate reflections. The vehicles were sandbagged to protect against antipersonnel mines and provided better stability at speed on unimproved roads and cross country.

The supporting ordnance battalion provided additional weapons and modifications as requested. A dash pedestal machine gun mount was installed on the overwatch vehicle. One squad was equipped with two cradle mounts welded together with two water-cooled .30 caliber machine guns mounted on the pedestal mount. A .50 caliber machine gun was mounted on the base of fire vehicle. This required that a steel plate be welded to the bottom of the vehicle to prevent the pedestal mount from breaking loose. One squad mounted a 57mm recoilless rifle on the base of fire vehicle. I cannot state that this equipment was necessary, but it was effective.

The following is an illustration of a patrol using stealth and quiet, not guns. During the early summer of 1951, the Chinese Army seems to have completely disappeared in our sector. The rifle companies were engaged in extensive day and night patrolling without contact. The First Cavalry Division initiated mounted patrolling by the 16th Reconnaissance Company, the division reconnaissance element...My unit at the time was the I & R section of the 1st Battalion, 5th Cavalry. My orders were to find the enemy. Initially, the section came upon the regimental I & R platoon, which was halted. The platoon sergeant said it was too risky to proceed. We next came upon the 1st platoon of Company A, 70th Tank Battalion. The platoon leader said he could not proceed as the road was mined. I remember thinking at the time that those big V8s on the M4A3E8s, were anything but stealthy. We continued very slowly and quietly until we were approximately six miles beyond the MLR. At that point, I considered it too risky to continue with the vehicles. The section dismounted while the drivers remained with the jeeps. Radio contact was maintained. After proceeding about a half mile, we encountered a large Chinese force descending the high ground to a large open area. We reported and withdrew without incident. The Chinese did not observe us.

In December 1973, then-Major General Donn A. Starry, while enroute to Fort Knox to assume command of the Armor Center, was the guest speaker at the Armor Cavalry Ball at Fort Leavenworth. I asked him at the time what he thought about the XR311. He said he had driven it and he liked it. I thought then, as I do now, that this is the best scout vehicle for the U.S. Army.

Colonel Boudinot is right. Let's take another look at the XR311.

GEORGE G. CHAPMAN
LTC, Armor (Ret.)

Vietnam Battle Account Was Worth the Space

Dear Sir:

What a great read in the January-February issue! "The Anonymous Battle" is exactly the material that I've longed to see in *ARMOR*. I commend you for publishing such a timely and interesting manuscript. I've distributed the extremely poignant description of tactics, initiative, and combined arms contact to my small group of 12 Armor Captains Career Course students, and have encouraged the other instructors here to do the same. We'll use the article to further our study of company/team operations, as well as demonstrate its use as a battle analysis from a first person perspective.

Mr. Poindexter's riveting account of his personal challenges as a company-level commander certainly cost you space for the publication of other worthy articles, but in my estimation, we need to revisit small unit actions and initiative from a historical as well as contemporary CTC perspective more often in this publication. Keep up the good work.

JOSEPH C. HOLLAND
CPT, AR
ACCC Instructor 5N

6th Armored Division
from Page 43

In addition, the Association had been a major contributor and supporter of the Patton Museum of Cavalry and Armor. Ed Reed, president of the Association, has served on the Museum's Cavalry-Armor Foundation since 1980.

The Association was also a major supporter of armor history. Its World War II military history, *The Super Sixth: A History of the 6th Armored Division in World War II and Its Postwar Association*, was published in 1975 by the association, and in 1987, *ARMOR* Magazine published General Grow's "*Ten Lean Years: From the Mechanized Force (1930) to the Armored Force (1940),*" an excellent account of the 6th AD commander's personal experience of the Cavalry's decline and the creation of the Armored Force. Four years ago, the Association also provided a major start-up grant for *Camp Colt to Desert Storm: A History of U.S. Armored Forces*, edited by George F. Hofmann and General Donn A. Starry and published late in 1999 by the University Press of Kentucky.

New Book Reviewers

If you're interested in reviewing books or software for *ARMOR*, contact Mary Hager at (502) 624-2249/2610 or DSN 464-2249/2610, or email: *hagerm@ftknox2-emh3.army.mil*

REVIEWS

Digital War: A View From the Front Lines edited by Robert Bateman III, Presidio Press, Novato, Calif., 1999; $29.95.

What exactly is digital war, and why is it important to the future of the military? Robert Bateman gathers a distinguished group of military authors and thinkers and tackles one of the most salient issues facing United States military forces in the 21st century in his finely edited and authored book, *Digital War: A View From the Front*.

Digital War is an anthology that is structured simply but carefully. The book is divided into three broad subsections, addressing the impact of the digital revolution at the tactical, operational, and strategic levels of warfare. The political aspects of warfare are not specifically addressed, but the purpose of the book is to "stimulate discussion about the course and direction of the military in light of the effects of digitization." Bateman accomplishes this purpose magnificently, with his own opening essay providing a solid introduction to the nuances and possible implications of the ever expanding torrent of digital information available to military leaders.

Many of the nine contributors to *Digital War* are familiar to the military reader: Daniel Bolger, John Antal, and Douglas MacGregor, to name but three. Each addresses a particular aspect of digitization. Antal will raise some eyebrows with his essay "The End of Maneuver," but his essay "Battleshock XXI" is the most entertaining and paints a grim tactical picture of a future Army force that is overreliant on technology and short on firepower. MacGregor clearly and cogently addresses command and control issues for the future while Bolger examines the prospects for the light fighter on the digital battlefield. Bateman ties the essays together with his conclusion, which includes a brief discussion of the aspects of a military revolution.

Digital War does exactly what its editor advertises. It is a great introduction to the thorny issues of digitization facing the Army and the rest of the military, and it will serve as a springboard for future discussion. As the commander of an M1A2 tank battalion, digitization makes an impact every time I climb into the turret. My tank is logged on; I have your icon on my IVIS screen. Are you logged on?

LTC BUCK CONNOR
Commander
1st Battalion, 12th U.S. Cavalry
1st Cavalry Division, Fort Hood, Texas

A Frozen Hell: The Russo-Finnish War of 1939-1940 by William R. Trotter, Algonquin Books, Chapel Hill, N.C., 2000; 304 pages; $15.95, paper; ISBN 1-56512-249-6.

If it is true that "climate is what you expect, but weather is what you get," then the Russo-Finnish War of 1939-1940 is quite literally the most chilling example of winter warfare in the 20th century. Here was a modern war in the arctic and subarctic winter where the importance of geography and weather cannot ever be understated.

A Frozen Hell is the apt title of this re-release of William Trotter's award-winning history of the one-sided 100-day war between the mighty totalitarian Soviet Union and the tiny, parliamentary democracy of Finland. Originally published as a hardcover in 1991, this astonishing story is now reprinted in a classy, well-presented paperback. Trotter is a historian and feature writer who has produced 12 books and numerous articles, but this book is by far his most important contribution to our understanding of military history and men at war in the most harsh conditions imaginable. It is no surprise that for several years this book has been required reading in the 2nd Marine Division, the USMC's specialist unit for arctic warfare.

Few books have been written about the Winter War, and the only other English language book of any substance on this subject is *The White Death* by Allen F. Chew (Michigan State University Press, 1971). Trotter's study is a dramatic and gripping blend of blunt Russian "realpolitik" and the gritty reality of warfare in the dark, trackless forests of frozen Finland, with men killing each other in temperatures 30 degrees below zero.

Finland is a Scandinavian country "whose terrain consists of practically nothing but natural obstacles to military operations," not to mention a rather inhospitable climate in which to wage war. As Trotter relates, in 1939 Stalin was fearful of his tiny, weak neighbor, suspicious of a possible Finnish-German alliance during that period of the Phony War in Europe. Stalin's paranoia concluded that Finland could not be allowed to remain neutral. After absurd posturing, threats, and ridiculous demands, the Russians attacked Finland on November 30, 1939. A quick and easy victory, the political commissars promised Stalin.

The Finns, however, were not intimidated. Although desperately outnumbered, outgunned, and poorly equipped, with no tanks, few planes, and obsolete artillery dating back to 1871, the Finns had no shortage of courage, resourcefulness, and resolute leadership. And for 100 days they fought the Soviet war machine to a bloody standstill, inflicting more than half a million casualties on the Red Army. Of course, Finland eventually lost the war, overwhelmed by men and material, but amazingly, of all the Baltic states that negotiated with Stalin in 1939, only Finland resisted Soviet aggression and only Finland survived as a free and independent nation.

With vivid and haunting descriptions, Trotter tells how the Finns made maximum use of their geography and weather in combination with tactical adjustments and small-unit leadership to repeatedly foil and defeat huge Soviet armor and infantry formations. Speed, camouflage, deception, economy of force, quick concentration and rapid dispersal, audacity, and surprise were the cornerstones of Finnish military planning.

Trotter tells of large and small scale raids, ambushes, long-range patrols, junior officer and NCO leadership, and the savagery of close-quarters combat in deep snow, at night, in subzero temperatures. The importance of bold commanders armed with guts, imagination, and determination is stressed continuously. In just one example, a Finnish infantry company killed 1,000 Russian soldiers and destroyed 16 enemy tanks in one engagement, without any antitank guns, and no friendly artillery or air support.

Finland finally surrendered in March 1940, but not until it had dealt the Russians "a major military debacle whose diplomatic and material damage would prove costly to repair." Stalin was shaken, and Finland retained its sovereignty. Trotter's superb research and riveting narrative tell a tale of epic resistance to naked aggression, with all the military and diplomatic lessons clear to see and as timely today as they were 60 years ago. This book should be essential reading for every military professional.

COL WILLIAM D. BUSHNELL
USMC, Retired
Sebascodegan Island, Maine

Eighth Army's Greatest Victories: Alam Halfa to Tunis 1942-1943 by Adrian Stewart, Leo Cooper, Barnsley: United Kingdom, 1999; 224 pp., hardback.

Source: Penn & Sword Book Ltd., Freepost SF5, 47 Church St., Barnsley, South Yorkshire S70 2BR or *www.yorkshire-web.co.uk/ps/*

Adrian Stewart's little book is quite surprising. At first glance it has hard to see how there can be anything new to tell in the story of Eighth Army. Although Stewart attempts no new scholarship, he does add two useful pieces to the body of history of the North African campaigns. First, he takes the history of Eighth Army as a whole, and not as two discrete parts, one coming before El Alamein and one after. Secondly, he examines critically Montgomery's role in reorganizing the Eighth Army, planning and executing its successful effort to rid Egypt and Libya of Rommel. The result is a very readable and complete narrative of the Eighth Army's ups and downs and the special imprint that Montgomery had on this heterogeneous colonial and allied force.

Beyond knowing that first, the Italians raced east, and then were chased west, and then Rommel came, most Americans know little and probably care less what went on in North Africa prior to Torch. The campaigns in North Africa deserve more but were overshadowed by larger if not more important operations elsewhere. The Russian victory at Stalingrad and the Russian offensives of the spring and summer of 1942 have tended to overshadow the war in the desert. In the spring of 1942, the Americans still held a toehold in Asia, not surrendering Corregidor until May, and, in June, the United States Navy stopped Yamamoto cold at Midway, sinking four of his carriers. In the summer of 1942, Eighth Army, led by Montgomery, first stopped Rommel at Alam Halfa and then thoroughly defeated him at El Alamein in October-November 1942.

From that point on, Montgomery and Eighth Army had the upper hand.

The forces that both sides commanded in the desert were never very large. Rommel began his last major offensive in January 1942 with 160 tanks. In June, he crossed into Egypt, having taken Tobruk, with 55 German tanks, 30 Italian tanks, and 4,500 German and Italian infantry. The Allies always outnumbered their opponents, but their numbers were not large either. In August of 1942, just before Alam Halfa, the British fielded 772 tanks, of which 693 were serviceable. Rommel, having received some reinforcement, could field 232 German tanks and another 281 Italian tanks. Rommel enjoyed a slight edge in the comparison of the two desert air forces, with 720 aircraft vice 565 aircraft of all types in support of Eighth Army. Rommel's total troop strength was under 100,000 while Eighth Army's approached 150,000.

What mattered most was the quality of weapons and the quality of leadership. Rommel and the German tanks were generally superior to their British counterparts. With the arrival of Montgomery and the Sherman tanks, the balance shifted toward the British. Until Montgomery's arrival, Eighth Army had not beaten Rommel and had broken their tank strength time and again on Rommel's 88s. The British had one eye on Rommel and one eye on the way back toward Alexandria. Montgomery changed all of that. Montgomery understood how to handle both British and Colonial troops. More importantly, he had a clear vision of what had to be done. First, he reorganized the Army from a brigade model to a divisional model. Though the brigade model was tempting because it fostered maneuver, it effectively assured that armor and artillery would not mass. Montogmery looked to his divisions to integrate combined arms and mass the fires of his tanks and artillery. Montgomery also eschewed preparations to retreat toward the Nile, electing instead to erect a defense between the Qatara Depression and the Mediterranean against which he expected Rommel to break.

Montgomery's scheme included interlocking defenses and thoroughly rehearsed local attacks. No longer would Rommel be offered a war of maneuver against fragmented armor and infantry brigades. Montgomery also worked hard to assure that all of his Army understood his intent and were trained and ready for the moment. Rommel duly attacked at Alam Halfa in August to find that Montgomery's new system worked. Determined to hold on, Rommel assumed the defensive. In October and November, Eighth Army attacked, employing massed fires and coordinated efforts by large formations of tanks against Rommel's thinned-out but still formidable defenses, reinforced by a half million mines. With the operation planned in detail, the thoroughly rehearsed Eighth Army broke through.

Eighth Army's pursuit failed to catch Rommel in the open, and though he lost thousands of his infantry, the heart of his army — his tanks and mobile forces — escaped to prolong the campaign until 1943. Stewart notes that though personal supervision had characterized the early months of Montgomery's leadership of Eighth Army, he did not closely control the pursuit. Stewart believes he did not because he believed a decentralized effort was the best way to pursue. Stewart argues here that Montgomery failed in this, and his assessment is compelling.

Stewart reveals the long trials and tribulations of Eighth Army and the power of Montgomery to turn a sullen and poorly led Army into one of high morale capable of defeating the legendary Erwin Rommel and his Afrika Korps. Montgomery was brilliant in the desert and Stewart's little book explains why. Montgomery's example is useful for contemporary soldiers reminding us of the need to know ourselves, our weapons, and our soldiers. With that knowledge, we can prepare ourselves properly and succeed against the very best opponents.

GREGORY FONTENOT
COL, USA, Retired
Lansing, Kan.

Ortona, Canada's Epic World War II Battle by Mark Zeuhlke, Stoddart Publishing Co., 1999; 320 pages plus 16 pages of photographs, 4 maps, 2 indices, a glossary and 5 appendices); $22.95.

By December 1943, the Allies were stopped at the German Bernhard/Gustav Line in Italy with the U.S. 5th Army in the west and the British 8th Army in the east. The Allied plan called for the 8th Army to attack to force the Germans to shift forces away from the 5th Army, allowing it to break through the Gustav Line at Cassino, link up with the planned amphibious invasion at Anzio, and then capture Rome. The British plan was to attack with three divisions up. While they were initially successful, momentum was soon lost in the face of strong counterattacks by the German forces. At Moro River, three miles south of Ortona, the Germans entrenched. The 8th Army ordered the 1st Canadian Division to conduct a relief in place with the 78th Division and then capture Ortona. This was to be the first major battle fought entirely by an all-Canadian force: the 1st Canadian Division supported by the 1st Canadian Armour Brigade.

The battle of Ortona took a month and was really three distinct fights: the crossing of the Moro River, a fight for The Gully and then the street fighting to take Ortona. The author tells his story starting with the relief in place and then covers each of the fights in detail. The narrative is written in a style that keeps your interest while still detailing the action from brigade to platoon. While most of it deals with how the Canadians fought, Mr. Zeuhlke also mixes in stories about the German forces and the Italian civilians which helps to make it readable.

The author describes an interesting difference in the operational concept of the two German divisions facing the Canadians. The 90th Panzer Grenadier Division defended in the first stages of the battle and their concept involved a strong defensive coupled with repeated counterattacks whenever they lost a position. While successful, it cost them a large number of casualties. The 1st Parachute Division, which fought the later fights, used strong defensives coupled with a lot of demolitions. Rather than counterattacking, they infiltrated small groups behind the Canadians to harass after they lost a position.

The battle was essentially an infantry fight because of the very wet weather and the close country (river valleys and ridges and vineyards full of farming obstacles). The fight for Ortona was unusual in itself. Usually the Germans would withdraw from towns and villages after the Allies had bypassed them. In this case, politics seems to have made the Germans stay and defend. They defended well and it became a classic MOUT battle. The Sherman tanks of 1st Canadian Armour Brigade were used throughout. It is especially interesting to read of the tactics the tanks used, both in the close country and in Ortona itself, which may well give us modern tankers some lessons that can be used in today's MOUT situations.

The author specializes in Canadian military history and this is his ninth book. The last chapter of the book describes the ground today, based on his walking the battlefield accompanied by an acquaintance of mine who is a serving Canadian armour officer and whose interest and knowledge of military history I personally respect. His involvement helped persuade me that the facts relating to ground and tactics were accurately covered.

Bottom line: a very readable and interesting book which is relevant today as we look at using armor in MOUT situations and in places like Bosnia and Kosovo where the country is constricted.

MAJOR G.R. HALL
Canadian Forces Liaison Officer, Armour
Fort Knox, Ky.

Duty, Honor, Country: A History of West Point by Stephen E. Ambrose, The Johns Hopkins University Press, Baltimore, 1999; 377 pages; $16.95.

This is the best general history of the United States Military Academy ever written. Originally published in 1966, Ambrose's work has been updated to the present day by LTG (Ret.) Andrew Goodpaster, who has written an extended afterword. The volume recounts the founding and evolution of the Academy, from the Revolutionary era debates over its establishment to the end of the last century.

Beginning with a short summary of the American military experience in the 18th century, Ambrose discusses the birth of the Academy at West Point and the acrimonious debate which surrounded it, a debate which has persisted, in one form or another, throughout its history. He then takes the reader through the rough early years, the crystallization of the West Point ideal under Sylvanus Thayer, and the making of West Point's reputation during the Mexican and Civil Wars. Following the

doldrums of the late 19th century, Ambrose describes how Douglas MacArthur brought the Academy, kicking and screaming, into the 20th century after the First World War. He then traces the further evolution of West Point into something more akin to a modern university, a story extended from the mid-'60s by Goodpaster, a former Superintendent who served during the turbulent integration of women into the Corps of Cadets.

The narrative focuses on the internal changes at the Academy, particularly the growth of the curriculum, while fixing them firmly within the ever-evolving role West Point played in American military culture. From a narrow focus on producing engineers for a young nation desperate for them, USMA's mission expanded to training the future leaders of an Army. For many years, West Point provided the only institutional schooling in tactics, military history, or strategy that an officer might receive during his entire career. The rise of staff and branch schools freed West Point to devote more time to the education of future officers in politics, economics, and other arts needed in an Army with a worldwide reach and concomitant responsibilities.

Not to say that these transitions were smooth. Ambrose points out that agreement on the place of West Point in the Army or society has never been reached (a conclusion supported by the constant fiddling with the USMA mission statement over the last decade or so). Moreover, even when the need for change was patently obvious to everyone else, West Point as an institution has proven to be extremely resistant to new ideas. To Ambrose, the West Point story has been one of success breeding complacency, punctured by sharp shocks. These shocks had to be administered by men with the vision to comprehend the need for change, and the arrogance to carry it through the opposition of hidebound professors and disgruntled old grads. In the 19th century, Sylvanus Thayer fulfilled this role, and is quite properly recognized as the father of the Academy. Less well known is the revolution wrought by Douglas MacArthur in the 1920s, which launched West Point along a path of modernization from which it has not yet deviated.

Ambrose also relates the inner life of the Academy, and thereby captures the essential paradox of West Point: it is an institution that has reformed itself violently over the centuries, while maintaining a sense of timelessness about its daily rhythms and customs. Certainly the complaints of 19th century cadets that there was little to do, that they learned many things they saw no value in, and that life as a cadet did not prepare them for life after graduation, would be echoed by their modern counterparts.

In summary, this is an essential read for anyone wishing to understand West Point — it should be mandatory reading for all cadets. I only wish that Ambrose could find the time to update the volume himself; the integration of women is an issue I would love to see him sink his analytical teeth into. Goodpaster's afterword is workmanlike but uninspired, and he is certainly far from a disinterested observer. If Ambrose did bring this book up to date, perhaps he could help us to identify who will be the 21st century's MacArthur.

LTC STEVE EDEN
16th Cavalry
Fort Knox, KY

"Tank Battles" Series Books; Tanks In Chechnya: Soviet Armored Technology in the Hot Spots of the USSR and the CIS 1989-1998 by M. Baryatinskiy; "Zheleznodorozhnoye Delo" (Railway Affairs) Publishing, 1999; 72 pp. (ISBN 5-93574-001-X); price $14 plus $3.50 shipping and handling from Eastern Front Hobbies, P.O. Box 758, Madison, AL 35758.

Advantages: Clear, clean photos of modern Soviet combat systems in action, taken from many combat areas not familiar outside of the former Soviet Union, dual Russian-English text throughout.

Disadvantages: New publisher, small circulation on first press run (1,000 copies).

Rating: Highly recommended to anyone interested in "local wars and regional conflicts" and Soviet armored equipment.

This is a very handy book to many of us who follow Soviet and post-Soviet armored vehicles. It provides material from the personal collections of Mr. Baryatinskiy, Russian press agencies, and Aleksandr Kovshchatsev, which covers the post-Soviet era of combat within the borders of the former Soviet Union.

Photos cover action in Georgia (1989 onward), Armenia and Azerbaijan (1990 onward), Nagorno-Karabakh (1990 onward), South Ossetia (1991 onward), Vilius 1991, the Moscow Revolt of 1991, Tadzhikistan (1992 onward), North Ossetia (1992 onward), the birth of the Transdnestr Republic (1992), Abkazhia (1992 onward), the Storming of the White House (1993), Chechnya (1994 onward), and some memorial vehicles in Maykop, North Caucasus Military District, 1999. There are over 120 good clear shots of this equipment, including vehicles such as the T-72BM and BMP-3 in action.

The book was sponsored by the Moscow City Chapter of the All-Russia Society for Preservation of Memorials and Culture, which is described as a military history club. Units in action, as well as knocked-out and totally destroyed equipment, is presented. To the slight dismay of modelers, no color information is provided, nor are any color photos included.

This book is highly recommended to all modern armor fans who need to understand the real problems faced by the former republics of the Soviet Union, or who need to get a solid feeling for what the systems really look like in action. Mr. Baryatinskiy's photo collection and text explain things very concisely.

COOKIE SEWELL
AMPS

Special Forces: the Men, the Weapons, and the Operations by David Miller, Salamander Books Limited, London, UK, 1999, 176 pp. Foreword, photos, diagrams, and index, (hardbound); $29.95; ISBN: 1-840-65021-4.

According to the jacket overleaf, Mr. David Miller was a former British Army officer who served in the Far East, Central Europe, and the Falkland Islands in his career. After leaving the service, he went to work for Jane's Information Group, where he was on staff for *Jane's International Defence Review* and produced the first edition of *Jane's Major Surface Warships.* He then returned to the life of a freelance writer and contributed articles to many military journals, as well as writing some 35 books. Despite these impressive credentials, however, a number of errors in reporting have crept into his most recent work.

The book itself is a big, coffee-table-sized edition with lots of color pictures. The typeface is small, but readable. The book's content is divided into three main sections: an overview of 31 nations' special forces units, an examination of several operations, and a chapter on the specifications of weapons and equipment used by such units. There is also a foreword, introduction, and an index.

In the opening foreword by General (Ret.) Robert C. Kingston, the tone of the book appears to be more concerned with presenting an aura of elitism in the proverbial "war story" format, than a serious study of the training, methods of operation and employment, and, ultimately, the effectiveness of special operations units. For example, the following quotation from the foreword is offered as illustration: "Some organizations, when not selecting certain individuals within their ranks (for whatever reason) return them to their parent unit, or to another organization, usually a *support type...*" (Emphasis added). This seems to perpetuate the same ideas expressed in the condescending phrase "soft-skilled MOS," used to generally mean anyone not from an infantry or Ranger unit in the U.S. Army.

I had problems with the introduction because Mr. Miller failed to adequately define his terminology. He used elite force, special force, and counter-terrorist force almost interchangeably, and without regard to any subtleties in definition. Once again, the perception of elitism crept into the wording of his explanations. In point of fact, any military, police, or counter-terrorist organization can be viewed as elite if the organization is good at what it does and it recruits and trains quality people to fill its ranks. A far more useful approach would have been to look at these paramilitary/unconventional organizations in terms of their missions, rather than using some form of nebulous subjective assessment of 'elitism.' For example, conventional maneuver forces at platoon, company, battalion, and brigade levels perform tactical tasks on the battlefield such as destroy, disrupt, deny, seize, secure, defeat, etc., that reference the enemy, terrain, or friendly forces for their accomplishment. Unconventional forces, however, usually operate in elements significantly smaller than a

conventional battalion or even a large company, and are not equipped or supported with the same levels of firepower and vehicles. They do not, therefore, fit into the conventional force employment paradigm, except, perhaps as reconnaissance assets, or target designators for deep-strike platforms. Their missions, therefore, are unconventional by that definition. And, in fact, the U.S. defines four broad missions for the employment of non-conventional forces: unconventional warfare, special reconnaissance, foreign internal defense, and direct action.

There were a number of errors in his description of the U.S. Special Forces, of which I will highlight a few. On page 59, he writes, "With the increasing emphasis of recent years that has been placed on special forces, this decline (in training standards following the Vietnam War) is in the process of being reversed and training attrition rates — now in the 60 percent plus range — are about what would be anticipated for a special force." This is a curiously immature outlook on the purpose of selection and training. Any military school can achieve a high attrition rate by simply placing enormous physical burdens on its attendees. The challenge is to ensure that the process that selects and trains the members of the organization is achieving the desired outcome — regardless of the pass-fail rate.

Again, on the same page, he writes that one of the six missions for which Special Forces are trained is coalition warfare. This is ludicrous. Coalition warfare is carried out under national command authority directive and involves joint and combined operations on a theater scale.

There is also a strangely captioned photograph on page 64 that states, "...This huge ladder (obstacle) is at the Ranger's base at Fort Bragg." There are no Ranger battalions at Fort Bragg, and the ladder obstacle is part of a small obstacle course frequently used by Air Assault School MTTs, although units do use it for physical training.

Finally, he often refers to the M-16A2 as the "famous Armalite" and the M4 as the "Colt Commando." Neither name is used in the U.S. Army. However, the pictures and diagrams of the weapons and equipment are well done and make for an easy reference for some of the characteristics of the weapons.

Unfortunately, the descriptions of a selection of various Special Forces' operations around the world suffer from a lack of incisive conclusions or new revelations. The account of the "Achille Lauro Incident" ends with, "What really counted was that terrorists who took the law into their own hands for whatever motive were ultimately brought to justice."

While this book provides an introduction of sorts and a broad swath of information on Special Forces and unconventional units around the world, it is not the definitive resource on the subject.

STEVE POLICASTRO
University Place, Wash.

SOFTWARE

Imperialism II by Mindscape, $34.96 from the Strategic Simulations Inc. website, *www.ssionline.com,* or local software retailer.

Requires Windows 95/98, Pentium 133 or higher, 4x CD ROM, 16 MB RAM minimum, Microsoft-compatible mouse, 16-bit high color SVGA graphics and any Windows-compatible sound card.

Reviewed on IBM PC 133 Pentium with Windows 98 and 56 MB RAM.

Strategic Simulations Incorporated has released the second game in its age of exploration games. *Imperialism II* simulates nation building from the 1500s to the 1900s in Europe. Not only does a player explore the New World to gain power, but he must also dominate the political landscape in Europe. The game has tutorials and campaigns that range from historical maps and forces to hypothetical maps and forces.

The game casts the player as a leader in Europe during the 1500s. *Imperialism II's* main goal is to become the most powerful country in Europe. You can do this through conquest, diplomacy, or a combination of both. Using your nation's resources, such as production and labor, you struggle to dominate Europe through the end of the 1900s. The game has single and multiple player, modem and linked scenarios, and campaigns. Each scenario or campaign allows the player to choose from a historical setting that includes map, leaders, and resources or a random setting in each of the categories. With three hundred years to choose from, playability will not become an issue. The game also includes a rulebook and gloss map and resource information card for quick reference. The card contains a hot key reference as well. The rulebook follows a typical setup explaining units, resources, and a description of play.

The game uses a turn-based sequence. With each turn, the player receives notification of new information in numerous areas, ranging from industrial production to political intrigue. The player can perform many functions during each turn, from increasing his labor pool, raising new units for his army or navy, and creating new civilian units, such as explorers or spies. The player can also perform diplomatic functions, ranging from opening a new embassy, to trade negotiations, to declarations of war. To move a unit, the game uses a point and click interface that allows for quick turn resolution. Explorers discover new lands and resources. Carpenters and laborers develop land and products. Advisors calculate resources. Politicians provide advice on how to deal with neighboring countries and allies. With this turn system, a player can easily complete a number of years in 30 minutes. The player can determine how much of the administrative burden he will control by using a tool menu. This menu allows the player to delegate administrative functions, such as research and development, to government ministers. These settings can be changed anytime the player likes with no penalty, allowing for a leader to change any part of his nation's growth based on game events. The game has over forty types of units with laborers, explorers, frigates, knights, and spies, to list a few. It also has over one hundred technologies that can be developed, twenty terrain types, and a Windows-based interface that most potential players will recognize. The game provides a lot of action, as a single turn can see declarations of war, new technologies and races discovered, and random events, such as plagues. The game is aesthetically pleasing with battlefield sights and sounds, official proclamations, and baroque type screens and stylish background music.

The game's primary strengths stem from the well-designed rule book, ease of play format, and overall appearance. The tutorial allows players to immediately install the game and play within minutes. It requires a player to successfully execute each function, from researching new technologies to building new units to exploring and developing new territories. Each tutorial also carries over into the next, so a player can practice each function repetitively. The tutorial covers fifty years if a player performs all of the functions successfully. The Windows-based game system allows players to learn the game format itself quickly. It also allows players to customize game features, even during play. Finally, the graphics and sound effects just make an enjoyable gaming experience.

On the negative side, I just cannot find the right mix of diplomacy, industrial management and exploration to win. I have managed a country through a century, but never really gotten out of the middle of the pack. At some point in each of the games I have played, my nation ends up declining rapidly in all areas and becoming conquered by a stronger power. The game has numerous websites, which provide tips on play. Of course, this is not a negative aspect, but play balance seems to present a considerable challenge. Even with the AI turned down, I still cannot break into Great Power status. The nuances of this game cannot be stressed enough. The game seamlessly integrates all the aspects of nation-building. The replay value of the game is limitless. I really enjoyed the game and found that losing can still provide some enjoyment. The game plays cleanly and quickly, so there are really no complaints from this reviewer.

This game does an excellent job in providing the user with a detailed simulation of nation building in Europe from 1500 to 1900. The game challenges a player to build his nation and allies, destroy his enemies and develop his country in all facets of civilization to win. With great graphics, an easy Windows interface and endless replay value, I recommend Mindscape's *Imperialism II* as a repeated play game to enjoy again and again. The interaction of diplomacy, politics, industrial development and exploration require a player to be more than an armchair general.

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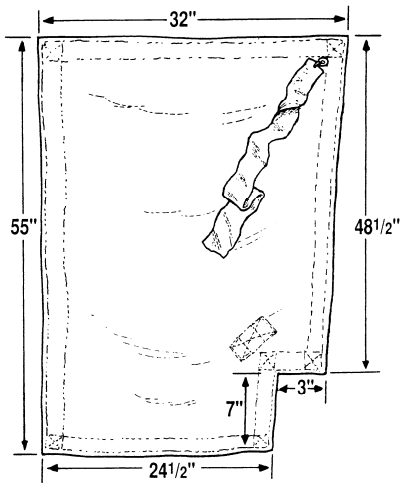
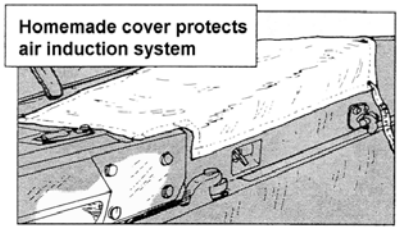
This Canvas Cover Can Keep Your Air Induction System Dry

by Captain Frederick R. Snyder





When the subject of air induction problems comes up, many people automatically think dirt and debris, but many units are also finding that water is causing more air induction problems than dirt. Usually dirt causes air induction problems only when a tank unit is maneuvering in the field or at gunnery. On the other hand, water problems exist in the motor pool, in the field, and at the wash rack. Water that is ingested during start-up procedures not only damages Vee Packs but also the engine. As the water travels through the Vee Packs, it picks up fire retardant. The water with the fire retardant is then sprayed on the compressor blades in the engine, which causes the blades to become unbalanced, resulting in severe and possibly catastrophic damage to the engine. Units cannot afford to buy engines every time there is a heavy rain or the unit goes to the wash rack and a crewman mistakenly sprays water into the intake. This is not to say that it only takes one rainfall or one trip to the wash rack to cause catastrophic damage, but it may. Furthermore, many units cannot afford to buy two tarps per tank to ensure the air intake is completely covered.

The soldiers and mechanics of the 2nd Battalion, 70th Armor, Ft. Riley, Kansas, have developed an economical way to prevent unwanted water from entering the air intake. The unit has developed a single cover for the air intake, thus alleviating the need for a second tarp.

The sketches at right show you the dimensions of the cover. Keep in mind that you will need to add two inches all the way around the cover to fold under and stitch. At the same time, make sure your canvas shop sews two-inch wide hook side of Velcro (NSN 8315-01-172-1329) all the way around the cover. Once the cover is made, place it on the tank making sure it covers the entire intake. Next, using a marker, outline the cover on the tank. Then, cut the loop side of the Velcro to fit the outline on the tank. Use spray adhesive (NSN 8040-01-040-0947) to secure the Velcro to the tank. I suggest that you allow the adhesive several hours to set before putting the cover on.

The sketch also shows a streamer (NSN 8345-00-995-7806). The streamer is there as a reminder for the tank crew performing Check 1 of PMCS (visually inspect the tank) to remove the cover before starting the engine. Remember, the tank requires air to run, and the cover will not allow the tank to get the air it needs. The sketch also shows how the cover is placed on the tank.

The cover costs about $40 and can be used in the motor pool, the field, and especially at the wash rack on the M1A1 and M1A2 tank. For further information, read the article in the May 98 edition of *PS Magazine,* pages 10-11.

CPT Frederick R. Snyder graduated from Frostburg State University in Maryland in 1995. After AOBC, he was assigned to 4-37 AR, Ft. Riley, which redesignated to 2-70 AR, where he served as company XO and BMO. He has attended BMOC, ACCC, CAS3, and M1A2 TCCC. He is currently assigned to 1st Bde, 1st Cav, Ft. Hood, Texas.

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